FACTORS AFFECTING FINANCIAL PERFORMANCES

OF ENERGY AND ELECTRICITY FIRMS IN JAPAN

by

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I wish destiny can meet us again in a different situation. Warm regards,

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Certificate of Originality

I hereby declare that this thesis is written by me. Any contribution made to this research has been acknowledged appropriately. The data, information, pictures, and literatures used are explicitly indicated in the thesis with proper citation and quotation.

I also certify that the thesis has not previously been submitted in any forms for the degree nor as part of the requirements for a degree except as fully acknowledged within the text.

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Muhammad Sito Cahyono

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Abstract

The energy sector plays an important role in the economic development of countries, both developed and developing including Japan. Although the country imports 87.6 percent of energy supply (Statistic Bureau, 2013), Japanese government relies on energy & electricity companies to manage the business. Most firms are private and public corporations, and to a certain extent government owned. Given its unique structure and significant roles in the economy, an explanatory analysis of energy firms is warranted with Japan as a subject of the study. The research aims to identify and describe factors affecting financial performance of energy and electricity firms, i.e., petroleum, gas utilities and electricity utilities in Japan.

The research collects the data from S&P Capital IQ, which counts 46 firms with 10 years spanning (2001 – 2010). This industry quantitative case study utilizes STATA 12 for panel data regression on the impact of internal factors (i.e., size, age, location, ownership) on profitability measures (i.e., accounting-based measures return on sales, return on equity and return on sales) as well as market-based measures (i.e., share price, earning per share, and price/earnings ratio).

The research reveals following results. Regarding the relation between each independent variable with dependent factors, the results of the panel data analysis can be categorized into three types, the positive factor, the negative factor, and the neutral factor. Positive factor is a factor which positively influences two or more accounting-based measures. The positive factors are liquidity and size. The

economic situation makes the company with high liquidity enjoy high profitability for the short run (Shinada, 2012). Furthermore, size gives advantage the firms through (1) economies of scale in operations costing (Majumdar, 1997), (2) larger control over external stakeholders (Orlitzky, 2001), and (3) support corporation to build various capabilities (Majumdar, 1997 & Orlitzky, 2001).

Negative factor is factor negatively affects two or more accounting-based firm performance. The negative factors are leverage, depreciation and age. The detriments of the debt in the form of interest payment and financial distress (Coricelli, Driffield, Pal, & Roland, 2011) excess the advantages of the debt. Consequently, increasing debt will harm the performance. Although older companies enjoy higher revenue, the firms in energy and electricity industry in Japan also falls on inertia effects (Coad, Segarra, & Teruel, 2010), and corporate aging (Loderer & Waelchli, 2010).

Lastly, the neutral factor is a factor affects one or less following variables: return on assets, return on equity, and return on sales. The neutral factors are investment, location, and government ownership. The investment successfully improves the revenue but failed to increase the firm performance. The trade-off between location and price (Rothenberg, 2011) support the neutrality of location. Meanwhile, neutral effect of state ownership shows that the government does not look for the financial benefit through the state-owned enterprises.

Keywords: Japan, Financial Performance, Analysis, Energy, Electricity

Chapter 1.

Introduction

This chapter elaborates the background why this research chooses Japan as the subject of the study, specifically the energy and electricity industry, then followed by an overview of the problem statement and research objectives. Further, the explanation about the significance of research and thesis structure closes the introduction section.

1.1 Background

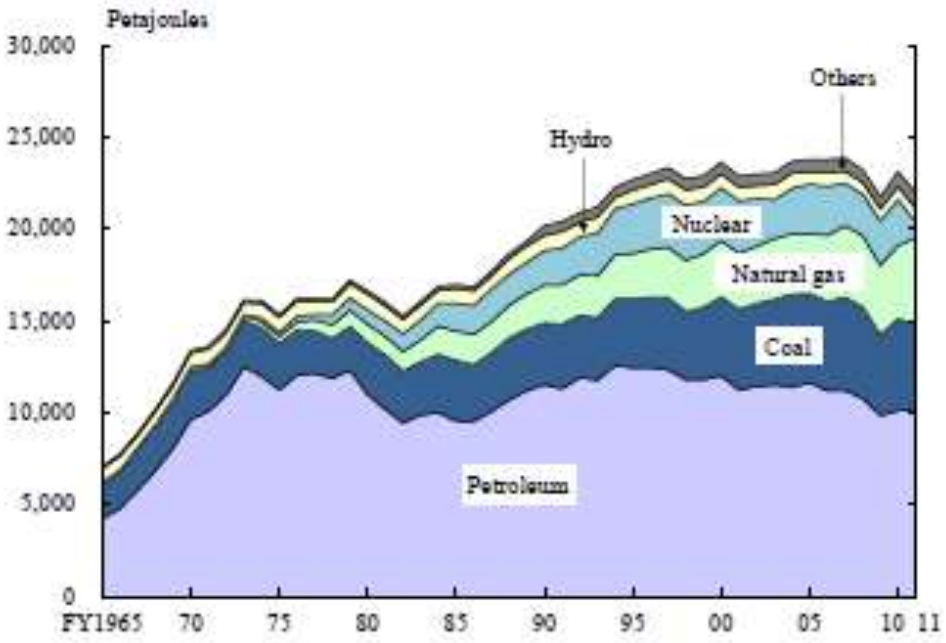
Japan is one of the leading economies as well as ranked for the fourth largest economies in the world after the United Stated, China, and India (International Comparison Program, 2014). Compared to other three countries, Japan is short on natural resources (Takase & Suzuki, 2011) and low in population. Thus, the achievement must be supported by high productivity and energy-efficiency (Statistic Bureau, 2013). reveal how the energy takes role in the economic growth of the countries. They found that there is one way relation from energy consumption to income and Gross Domestic Product. It means energy triggers the increasing of production and value added in Japan (Soytas & Sari, 2003).

Understanding how important of energy important role in the economy, the government struggles to fulfil the energy needs, and as results Japan imports 87.6 percent of energy supply, and about half of the supply is converted into electric power (Statistic Bureau, 2013). In order to reduce the risk of the price volatility,

Japan has taken many actions to secure the energy, from both supply side (i.e. diversify energy sources, protection on the supply of petroleum) and demand side (i.e. energy conservation).

As a result, Japan becomes one of the lowest rates of energy use per unit of GDP produced among the industrialized nations (Statistic Bureau, 2013). As shown in the figure 1.1, the consumption of petroleum declined from 77.4 percent in fiscal 1973 to 46.1 percent in fiscal 2011 (Statistic Bureau, 2013).Even though it still dominates the energy supply, other sources are significantly increased with the latest figure is 21.3 percent (coal), 21.4 percent (natural gas), 4.0 percent (nuclear) and 3.3 percent (hydro power) (Statistic Bureau, 2013).

Although energy is an important sector, Japanese government involves private and public firms to manage the business, with government ownership in certain companies. The government has major ownership in two petroleum companies (i.e. INPEX and JAPEX) which responsible to explore and exploit oil and gas in domestic and overseas. While local government possesses minority shares of the electricity and gas companies, which responsible for electric and gas distribution respectively. In order to protect their concern in the utilities industry, the government has conducted tight regulation. Had a unique business structure with vital roles, an explanatory investigation of energy and electricity firms in Japan is required.



(Source: Statistic Bureau, 2013 p. 90)

Figure 1.1: The trend of Japanese energy supply

1.2 Problems Statement

The previous researches of energy in Japan, mostly focus on energy policy, productivity and efficiency in order to build the recommendation for the energy policy maker, hence the analysis emphasizes on evaluating the current system and also regulation. This study is about company level investigation of factors affecting financial performance. This energy and electricity company level investigation is mainly expected to answer following questions:

a. What are the factors affecting financial performances of energy and electricity firms in Japan?
b. How do those factors influence the financial performances of energy firms in Japan?

1.3 Research Objectives

Conform to the problem statements, this research is aimed to identify, describe and explain the factors affecting financial performances of energy and electricity firms in Japan. The factors are limited to internal factors. Accordingly, the executive in the company has the authority to control and manage the items. The causal relationship of the factors to firm performance is tested using statistical analysis.

1.4 Significance of Research

The research will be beneficial for the scholars, managers, and government. In terms of researcher, this study will provide references for the study of energy and electricity sector in company-level especially for spanning time 2001-2010. The executive within a company can utilize this research for the consideration of the corporate strategy-building, compared with the industrial average and the effect to firm performance.

Likewise, Japanese government as the energy policy-maker can use the research as consideration in building the energy policy with sustainable result, especially from the corporation's perspective, where the profit-seeking is one of the reasons to involve in the industry. While governments in developing countries, especially Indonesia, the research is important since the energy system in Japan involves the private companies with high efficiency, which is a good model for Indonesia.

1.5 Thesis Structure

The structure the thesis is as follows: chapter 2 provides a literature review; chapter 3 explains the theoretical analysis and hypotheses. In chapter 4, there is discussion about research methodology, and chapter 5 is about data processing and the result. Chapter 6 provides discussion and finding, and the last chapter explains about the conclusion.

Chapter 2.

Literature Review

The literature review chapter covers a depth review on energy study in Japan, firm performance in Japan, and also global firm performance analysis. Many scholars have published the researches about energy and electricity from policy and productivity perspectives while studies in company level are rare. Mostly, the studies are about how the government manages the limitation upon the natural resources as the supply for the energy. Such as electricity deregulation (Asano, 2004); gas utilities (Matsumoto & Kasahara, 1998 ; and Lam, 2000); energy policy (Duffield & Woodall, 2011 ; Matsumura, 2003 ; Nagayama, 2011 ; Koike, Mogi, & Albedaiwi, 2008 , and Takase & Suzuki, 2011); renewable energy (Moe, 2012 ; and Huenteler, Schmidt, & Kanie, 2012); efficiency and productivity (Nemoto, Nakanishi, & Madono, 1993 ; Goto & Sueyoshi, 2009 and Nakano & Managi, 2008).

In firm-level, there are many researches related to financial performance in Japan. Mostly, it relates with manufacturing and electronic industry, with the study area focuses on the relation of firm performance with the labour union (Brunello, 1992), information sharing (Morishima, 1991), environmental issue (Cortez & Cudia, 2011 and Nakamura, 2011), ownership and investment behaviour (Gedajlovic, Yoshikawa, & Hashimoto, 2005), technological capabilities (Isobe, Makino, & Montgomery, 2008) and CEO remuneration (Kato

& Kubo, 2006). Investigation about firm performance in energy and electricity sector seems unfavourable.

Since the research about the factors affecting firm performance for Japanese firms is limited, the study expands the literature review into global journals. They are from Greece (Liargovas & Skandalis, 2010); Jordanian (Almajali, Alamro, & Al-Soub, 2012); Indonesia (Prasentyatoko & Rachmadi, 2008); Slovenia (Hrovatin & Ursic, 2002), Scotland (Glancey, 1998); India (Majumdar, 1997); and Croatian (Pervan & Visic, 2012).

2.1 Energy Studies in Japan

Since the beginning, Japan realizes that the country does not have sufficient energy sources and tries to reduce dependency through managing the supply and reducing the demand (Statistic Bureau, 2013). In terms of energy supply per GDP, Japan is one of the most-efficient countries in the world (Statistic Bureau, 2013) while, from the price perspective, Japan had the most expensive electricity the 1990s developed countries in 1990s (Asano, 2004).

Securing the overseas oil and gas supply by private investment is the example of the measures taken by the states. Koike, Mogi, & Albedaiwi, (2008) mentions four advantages of those actions, i.e. the long-run stability of the petroleum supply through the direct participation; precision in market estimation as the results of the better understanding of the energy policies of oil producing countries. In addition, the understanding of international issues of the oil industry strengthens the partnerships, and lastly, to diversify and improve the interdependent relationship

between Japan and petroleum-exporters countries (Koike, Mogi, & Albedaiwi, 2008).

However, since the Japan lack of petroleum resources, the private corporation does not have enough experience and technologies in the area of exploration and exploitation, and this situation increases the risk and investment as well. On the effort to overcome the problems, the government invited the private company to invest in petroleum exploration through the financial support from Japan National Oil Corporation. Later, the institution changed to Japan Oil, Gas and Metals National Corporation (Koike, Mogi, & Albedaiwi, 2008). In addition, the government also involved in the business through two biggest Japan upstream companies and owned by the state, JAPEX and INPEX, which spent 3 million dollars and 0.4 million dollars in 2006 for R&D respectively. As a comparison, ExxonMobil spent 200 million dollars in the same year (Koike, Mogi, & Albedaiwi, 2008).

The Japan efforts to achieve the independent supply from its own companies find other obstacles. After the World War II Japanese petroleum and the oil industry were horizontally truncated and fragmented with the upstream sector (exploration and exploitation) on one side, and the downstream sector (oil refinery, wholesales and retails) in the other side. Majority corporations in downstream depend on the foreign partners who major player in the petroleum (Matsumura, 2003 and Koike, Mogi, & Albedaiwi, 2008). Government's mean to combine the sector through integration industry was failed and result in two incomplete state-owned companies (Matsumura, 2003).

In order to ensure to stable oil supply and equalized the petroleum products in the local market, the government opened the importation of petroleum products in 1996 and allowed the petroleum importers to share the stockpiling obligation in 1996 as a reserve in emergency situations (Ministry of Economy, Trade, and Industry).

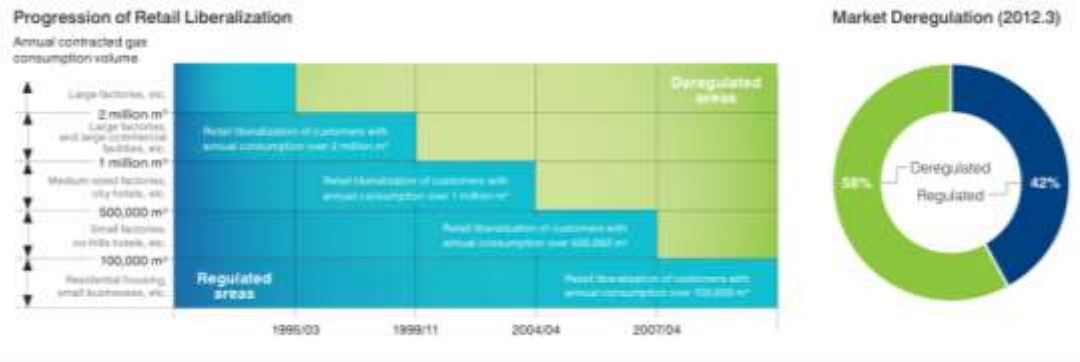
In the other hand, the electricity sector dominates the energy sector in Japan as more than half energy supply is converted into electricity (Statistic Bureau, 2013). Within the sector, the industry is free from fragmentation. Integration from power generation, transmission and power retail give advantages to the private companies and result regional monopoly of nine electricity companies (Matsumura, 2003). However, the system harms the society and the company itself. As the study by Nemoto, Nakanishi & Madono (1993) reveals that the utilities companies, except TEPCO, experience dis-economies in the long term and most of the companies are significantly over-capitalize (Nemoto, Nakanishi, & Madono, 1993).

In order to overcome the situation, the Japanese government started electricity deregulation in 1995. The revision of the Electric Utility Industry Law opened the electricity wholesale market, which removes the requirement of approval from the MITI for entrance (Matsumoto & Kasahara, 1998). The government opens the supply side through a policy of allowing the non-integrated electricity to be an independent power producer (Asano, 2004).

Further, the action is followed by liberalization for retail competition for the large customers with contract over 2 MW, which has 30% of the market in 1999 (Asano, 2004 & Nakano & Managi, 2008). As a result, deregulation leads to an enhancement in productivity growth, technical change and economies of scale and scope (Goto & Sueyoshi, 2009). Moreover, the spike is also found in productivity of the steam power generation (Nakano & Managi, 2008).

Likewise, government reduce the dependent on petroleum by introduces Liquid Natural Gas (LNG). The policies encourage the use of gas for air-conditioning and transportation to lower the highest demand of electricity in the summer. The action leads the reducing of the capital investment for building power plants. As the electricity industry, the gas industry has been managed by private firms while the government manages the policies to ensure energy and economic efficiencies (Lam, 2000).

The gas utilities also enjoyed a monopoly as the existing regulation protected the industry, though only local and much smaller than of electricity. The gas industry consumes only 25% of the LNG, while energy spends the rest. In addition, there are 244 gas companies involved within the industry, both small and large companies (Matsumura, 2003). The largest companies, Tokyo Gas and Osaka Gas, enjoy the national domination and cover about 70% market shares (Matsumoto & Kasahara, 1998). Along with electricity, government also conducts liberalization in gas utilities.



(Source: Osaka Gas, 2012 p. 09)

Figure 2.1: The deregulation of Japanese gas utilities

The deregulation was started by amendment of Gas Utility Industry Law in 1995 by allowing the gas supplier to enter the region outside its service area under certain circumstances (Ministry of Economy, Trade, and Industry) as shown in figure 2.1.

2.2 Firm Performance Studies in Japan

Within company level researches, there are many journals related Japanese firm performance in manufacturing industry, especially electronic sectors. The studies focus on the relation of firm performance with many factors. Those are the labour union (Brunello, 1992), information sharing (Morishima, 1991), environment (Cortez & Cudia, 2011 and Nakamura, 2011), ownership and investment behaviour (Gedajlovic, Yoshikawa, & Hashimoto, 2005), technological capabilities (Isobe, Makino, & Montgomery, 2008) and CEO remuneration (Kato & Kubo, 2006). Investigation about firm performance in energy and electricity sector seems unfavourable.

Using data of *the Yearbook of Japanese Unlisted Companies 1987*, Brunello (1992) investigates the relationship between labor union and manufacturing firm

performance. The result proposes that Japanese unions significantly lessened productivity and profitability, also monthly payroll and bonuses. Strong unions decrease the productivity by intervening the management's decision on the employees, including relocations and promotion. The research also finds that unionized employees have shorter working hours, which lead to smaller productivity.

In addition, the establishment of the union has led to the lower profitability operation. Accordingly, companies pay lower wages for the unionized firms. Either the recruiting costs or the rent-sharing explains the relationship between lower profitability and lower wages. However, the slight influences are found for the smaller firms, suggesting that small-medium size companies were subcontractors that have weak bargaining position for the competition and forced to cut cost and increase productivity (Brunello, 1992).

Same study conducted by Morishima (1991), about the relationship between manufacturing firm performance and labour, although from the perspective of sharing business information with employees. The study uses survey about wage negotiation and data about financial performances. The finding suggests a positive relation between information sharing with profitability and productivity, and a negative relation between information sharing and labour cost. Increases of joint consultation committee info improve employee productivity (Morishima, 1991).

Another manufacturing firm investigation is performed by Gedajlovic et.al (2005). Using three years data (1996-1998), the scholars study how ownership

structure affects investment behaviour and financial performance. The types of shareholders give various influences on dividend policy, return on assets and capital expenditures. Investment trusts and pension fund ownership positively affect firm performance. While ownership of pension funds and investment trusts have a negative relation with dividend pay-out levels and market risk. Lastly, shareholding by financial institutions has positive relationships with dividend and accounting profits. While for the relation of ownership with ROA, investment trusts, pension funds and financial institutions indicate positive, but affiliated firms have a negative association. (Gedajlovic, Yoshikawa, & Hashimoto, 2005).

The above finding is in line with a study by Mizuno (2010) and Saito (2008). First researcher finds that corporate governance has been enhanced by institutional investors, even though there is no significant relation between institutional investors' shareholdings and firm performance (Mizuno, 2010). From family firm perspectives, the performance of family firms possessed and managed by the founder's descendants is poorer than of non-family firms. In contrast, the performance of family firms possessed or managed by the founder's descendants is better than of non-family firms (Saito, 2008).

In terms of technological capability, study by Isobe et.al (2008) reveals the effects of refinement capability (the improvement of the existing asset) and reconfiguration capability (integration of new assets) on the small manufacturing industry firm performance. Using the mail survey, the scholars find that on operational efficiency, the effects of refinement capability is bigger than of reconfiguration capability, but on strategic performance the impact of

reconfiguration is bigger rather than of refinement (Isobe, Makino, & Montgomery, 2008).

Along with the awareness on global warming, the research on the effect of environmental factors on firm performance is also increasing, for example the research entitled *Sustainability and firm performance: A case study of Japanese electronics companies* (Cortez & Cudia, 2011) and *Does environmental investment really contribute to firm performance? An empirical analysis using Japanese firms* (Nakamura, 2011).

Nakamura (2011) finds the contribution of environmental investment to firm performance. Utilized Japanese listed company data, the findings reveal that the environmental investment does not affect firm performance significantly in the short term; however, the opposite effect found in the long term, even though the effect disappear in the next period. The results propose that there be a time lag between investment and firm valuation according to consumers and shareholders (Nakamura, 2011). While Cortez & Cudia (2011) focuses the impact of the environmental cost into firm performance. Environmental costs positively affect the total income generation and vice versa, though the net income and firm size are not positively impacted.

Kato & Kubo (2006) and Kubo & Saito (2008) reports the alternative finding of firm performance study. Their investigations are about the relation of CEO remuneration and firm performance. Kato & Kubo (2006) disclose that Japanese CEO's payroll is sensitive to accounting based performance. The bonus system is

significantly encouraged CEO to achieve better firm performance and increase their take home pay. However, previous finding by Kubo & Saito (2008) explains that the performance-based bonus decreased significantly after 1990 (Kubo & Saito, 2008).

2.3 Factors Affecting Firm Performance

The firm performance studies in Japan mostly relate specific factors. Those are the labour union (Brunello, 1992), information sharing (Morishima, 1991), environment (Cortez & Cudia, 2011 and Nakamura, 2011), ownership and investment behaviour (Gedajlovic, Yoshikawa, & Hashimoto, 2005), technological capabilities (Isobe, Makino, & Montgomery, 2008) and CEO remuneration (Kato & Kubo, 2006). Since the research of mine focus on the internal factors, the literature review are expanded to international libraries, i.e. Greece (Liargovas & Skandalis, 2010); Jordanian (Almajali, Alamro, & Al-Soub, 2012); Indonesia (Prasentyatoko & Rachmadi, 2008); Slovenia (Hrovatin & Ursic, 2002), Scotland (Glancey, 1998); India (Majumdar, 1997); and Croatian (Pervan & Visic, 2012). The results are summarised and provided in Table 2.1.

Liorgovas & Skandalis (2010) analyze financial performance within the Greek industrial firm during 1997-2004. Using the return on sales, return on assets, and return on equity in the panel least squared regression with a random effect, the author finds that leverage, export activity, location, size and effective management substantially affect firm performance in Greece. Moreover, they also found that large, young, exporting firms are the characteristic of profitable firms (Liargovas & Skandalis, 2010).

Same investigation is conducted Almajali, Alamro, & Al-Soub (2012) in the Jordanian insurance industry during 2002-2007, covered 25 companies. Utilizing T-test and multiple-regression, the researchers find that leverage, liquidity, size, and management competence index have positively affected the financial performance of Jordanian Insurance Companies (Almajali, Alamro, & Al-Soub, 2012).

While from Indonesia, Prasentyatoko & Rachmadi (2008) employs panel data of 238 listed companies during 1994 – 2004 to investigate firm performance during the 2007 economic crisis. They find that macro factors play more significant than firm-specific factor to drive the financial performance, even though the firm size has a positive relation to firm profitability but not market capitalization. In addition, firms of foreign stockholder have better performance than of domestic stockholder in term of return on asset (ROA) and market capitalization growth (Prasentyatoko & Rachmadi, 2008).

In the Scotland, Glancey (1998) conducted the research about profitability in 38 small manufacturing firms during 1988-1990 to determine the key factors of small firm performance. The author finds that smaller firms are more profitable but do not grow as fast as larger firms. The profit of the operation reflects a security to support the owner's lifestyle rather than a source of fuel to develop the firm. There is an evidence that location support the growth which shown by stronger companies lie in urban areas than those lie in remote locations. In addition, the result shows that younger firms grow rapider than the older (Glancey, 1998).

The relation between ownership and firm performance are also investigated in different countries. Using 488 Slovenian companies, Hrovatin & Ursic (2002) examine the effect of insider ownership to the companies' performance after ownership transformation. Their study reveals that insider ownership improved firm performance, and performance is negatively influenced export, while government ownership insignificantly affects firm performance. (Hrovatin & Ursic, 2002).

Table 2.1: Summary of factors affecting firm performance

Author(s) and year	Factors (relation)									
	Export	**Location**	**Size**	**Management**	**Age**	**Leverage**	**Liquidity**	**Ownership**	**Inflation**	**Interest rate**
Liargovas & Skandalis, 2010	O	O	O(+)	O	O(-)	O	O			
Almajali, Alamro, & Al-Soub, 2012			O	O		O	O			
Prasentyatoko & Rachmadi, 2008			O(+)			O(-)	O(-)	O(f)	O(-)	O(+)
Glancey, 1998		O(u)	O(-)							
Hrovatin & Ursic, 2002								O(i)		
Majumdar, 1997			O(+)		O(-)					
Pervan & Visic, 2012			O(+)			O	X			

O: significantly affect
(+): positively affects
(-): negatively affects
(u): urban area
(i): institutional ownership
(f): foreign ownership

On the other hand, in India older firms generate more products though less profitable than the younger. This result is one of the findings of Majumdar (1997) on the research on the impact of size and age on firm-level performance in India. Another finding is that the bigger companies are more profitable but less productive than smaller. In the research, Majumdar (1997) employs cross-section regression on data of 1020 companies collected for one of the years between 1988 and 1994.

From Croatia, Pervan & Visic (2012) investigate the effects of financial factors on the firm performance using data of medium and large enterprises within 2002-2010. The findings show that the firm size positively affects firm profitability. Additionally, results showed that asset turnover and debt ratio also statistically significantly affects firms' performance (Pervan & Visic, 2012).

Chapter 3.

Theoretical Analysis and Hypotheses Building

This chapter gives detailed explanations about the theory and literature related the hypotheses-building of the research. There are 8 investigated factors in relation to firm performance, i.e. leverage, liquidity, depreciation, investment, size, age, location, and ownership. Age of the company is started when it is found in certain locations, usually close to the customer or resources (Lucky, 2012). Establishing a company, the founders required capital in the form of equity from the investors, this situation will be represented by ownership, even though over time it could be changed by corporate action.

Another source of capital comes from creditors in the form of debt. Leverage is a ratio shows the combination between debt and equity. A manager in the firm will utilize the funds, both from creditors and investors, to acquire long-term assets and short-term assets and build the size of the company through the aggregate of both assets. The assets will represent the size of the company (Majumdar, 1997). In this research, current assets will be represented by liquidity ratio, while the fixed assets will be measured from investment and depreciation.

3.1 Leverage and Firm Performance

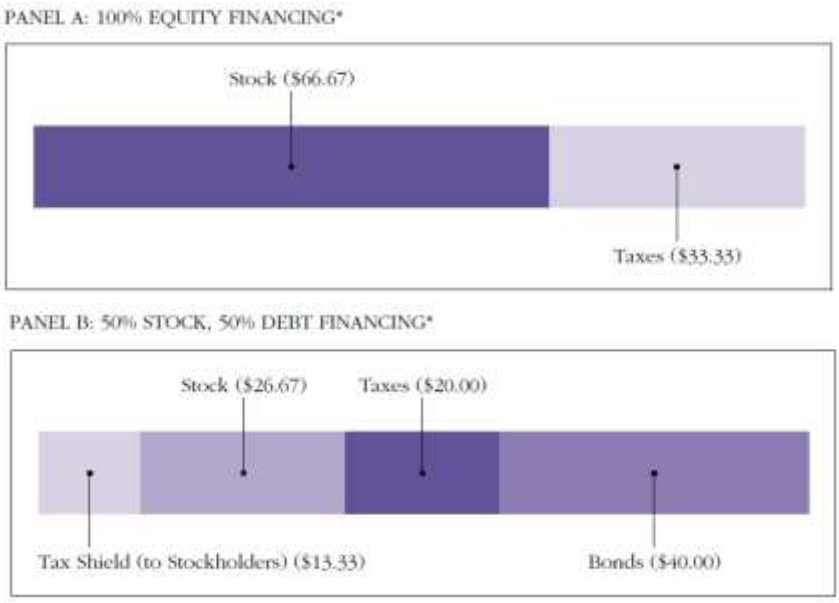
The theory of capital structure is initiated by Modigliani and Miller with irrelevance theorem in 1958 (Pagano, 2005 ; Popescu & Visinescu, 2009 ; Graham, 2001 ; Frydenberg, 2011). Building the irrelevance theorem,

Modigliani and Miller made a strict assumption about perfect market. They assumed that: no corporate or personal taxes (Pagano, 2005 ; Frydenberg, 2011 ; Graham, 2001), no transaction costs and no bankruptcy costs (Frydenberg, 2011), financial perfect market with lenders and borrowers have the same borrowing rate and no asymmetric information (Pagano, 2005 ; Frydenberg, 2011 ; Graham, 2001).

As a result, "the value of a company is not affected, by the way, the company finances its operations; the value of a company equals the present value of its operating cash flows, regardless of whether the firm finances its projects by issuing stocks, bonds or some other security" (Graham, 2001 , p. 42). "The theorem establishes that a company's value – the market value of its shares and debt – equals the present discounted value of the company's cash flow, gross of interest, where the discount rate is the required return for firms of the same risk class" (Pagano, 2005 , p. 8).

The paper headed subsequently to both clarity and controversy and because the assumption far from reality (Popescu & Visinescu, 2009). When the assumption is relaxed, many theories emerged (Pagano, 2005). The relaxation of the tax assumption revealed an optimal capital structure, which requires a larger leverage than that observed in reality. Offsetting the tax advantage of debt with the costs of bankruptcy will result in optimal leverage; the value increases from tax would follow the probability of bankruptcy. The relaxation of asymmetric information in financial markets brought the theory of adverse selection and/or moral hazard between external financiers and company managers (Pagano, 2005).

In terms of leverage, the focus will be a trade-off between the costs against the benefits of the use of debt and equity. The advantage of debt is tax-shield, where the disadvantage is the financial distress of the debt (Popescu & Visinescu, 2009).



(Source: Graham, 2001 p. 43)

Figure 3.1: Illustration of the tax-shield benefit of debt

The tax - shield benefit of tax comes from the nature of debt which is tax-deductible. The debt will decrease the tax payment and increase net operating income to investors (Brigham et.al, 2010). As illustration is shown in figure 3.1, with explanation following:

- Panel A: corporate tax 33.3%, with perpetual cash flow $10 annually, and discount rate 10%, equity 100%.
- Panel B: corporate tax 33.3%, with perpetual cash flow $10 annually, and discount rate 10%, equity 60%, bonds 40% with interest rate 10%.

When only equity forms the capital, the value of the firm is $100 where $33.33 is taxed, and $66.67 is common stock. $100 comes from net present value of perpetual cash flow ($10) divided by the discount rate (10%). From the value, 33.3% is taken by government in the form of taxes (Graham, 2001).

When utilized 40% bonds; the value of the firm is still in total $100, where $20 is the taxes, $20 is the equity and $20 is the bonds. From the perpetual cash flow, company pays $4 annually for the interest payment and the taxable income remains $6, and the tax is only $2 annually. When the numbers are converted into net present value using discount factor 10%, the taxes become $20, interest payment is $40, and equity $40. Panel B has $13.33 better than Panel B, and the shareholders also collect $40 up-front from bondholders (Graham, 2001).

If the debt provides advantages, why company does not maximize it by financed entirely using debt? Graham (2001) reports that there are costs to using debt, and these costs need to be balanced (or "traded off") against the tax benefits of debt.

The disadvantages of debt are related to bankruptcy. When a company utilizes debt to finance the projects, the interest payment burdens the company in fixed rate. The situation is worsening when the profit from the project could not cover the interest payment, and the company is exposed to bankruptcy. As leverage improved, the costs of the loan become higher and erode the benefits of leverage. "Highly-levered firms not only suffer from a debt overhang problem, which reduces their incentives to invest in productive investment, their attention is

also diverted from productivity improvements by the need to generate cash flow in order to service their debts" (Coricelli, Driffield, Pal, & Roland, 2011 , p. 2).

To sum up, there is an optimal leverage ratio, Graham (2001) states "the optimal amount of debt varies by firm and each firm should issue debt as long as the benefits outweigh the costs, but no more than that." Leverage of electricity and energy sector industry in Japan is unknown. However, there are two possibilities, when the leverage is below the optimal ratio, leverage will positively affect firm performance (H1a) until it touches the optimal point or leverage of the industry above the optimal point so leverage will negatively affect the firm performance (H1b).

Hypothesis 1a: Leverage positively affects firm performance

Hypothesis 1b: Leverage negatively affects firm performance

3.2 Liquidity and Firm Performance

Liquidity means the ability to convert an asset to cash. An asset called liquid when it could change into cash quickly without price deteriorated (Brigham, Houston, Chiang, Lee, & Arifin, 2010). On the balance sheet, assets are listed in order of declining liquidity, meaning that the top is the most liquid asset, and the bottom is the most illiquid asset (Ross, Westerfield, & Jordan, 2003).

In terms of liquidity, assets are divided into 2 types; current assets which listed in the top part and fixed assets listed in the bottom part. Current assets consist of relatively liquid asset that will be converted to cash within 12 months

such as cash and near cash, account receivables, and inventory. Those three items of current assets are also called working capital because those assets are utilized and substituted all during one year for the operating cycle (Brigham et.al, 2010).

The amount of the current assets of the companies varies. The nominal of current assets can be high or low depend on the size of the company and also current assets financing policy. The relaxed policy results high amount of cash, inventories and account receivables. While restricted policy will be reflected from the constraint on the current assets, and moderate policy lies between both policies. The current ratio is one of tools to measure liquidity. Having formula current assets divided by current liabilities, current ratio shows the ability of the company to pay the coming liabilities within one year using their short term assets (Brigham et.al, 2010).

One of the reasons behind high liquidity is when the company holds much cash. John Maynard Keynes asserts three motives for holding the cash, i.e. the speculative motive, the precautionary motive, and the transaction motive (Ross, Westerfield, & Jordan, 2003).

The speculative motive is the reason where the company wants to take advantages of having cash for a better interest rate, supported exchange rate, or even for bargain purchases with cash. The precautionary motive is the need of holding cash for fund reserve as safety supply and a buffer. Lastly, the transaction motive is where holding cash on hand to fulfil the coming payment such as monthly bills, rental cost, regular wages, taxes, and interest payment.

Even though the e - banking has brought payment transaction in high-speed era, there will still be a demand for liquidity and the need to manage it efficiently (Ross, Westerfield, & Jordan, 2003). While in Japan, Shinada (2012) asserts that started in 1990's Japanese corporation accumulate their cash holding because of the trend of greater cash flow volatility since the 1990s and the availability of cheap financial sources.

What is the effect of having high liquidity? There is a trade-off between liquidity and profitability (Ross, Westerfield, & Jordan, 2003) (Saleem & Rehman, 2011) (Wang, 2002). Saleem & Rehman (2011) explain that increasing more of one means giving up some of the other. The statement is in line with the findings of many studies.

Large studies about the relationship of liquidity and profitability, using cash conversion cycle, find that there is a negative connection between those two factors (Saleem & Rehman, 2011 , Raheman & Nasr, 2007 , Mousavi & Jari, 2012 , Vural, Sokmen, & Setenak, 2012 , Dash & Hanuman, 2009 , and Wang, 2002). Higher liquidity means holding higher liquid assets. Liquid assets are less profitable to hold, for example, cash holdings are the most liquid of all investments, but it does not generate any return at all (Ross, Westerfield, & Jordan, 2003).

To recap, liquidity and profitability have trade-off principle. Accordingly, the hypothesis is liquidity negatively affects firm's performance.

Hypothesis 2: Liquidity negatively affects firm performance

3.3 Depreciation and Firm Performance

Proper recording of the purchasing price of long-term assets has implications for both the profit and loss statement and the statement of financial position. If the acquisition cost is recorded as an expense in the profit and loss statement, the balance sheet will be understated because these assets still exist within a year, and the profit-loss statement will be overstated because the spending are too high. The method to recognize of the spending is called depreciation.

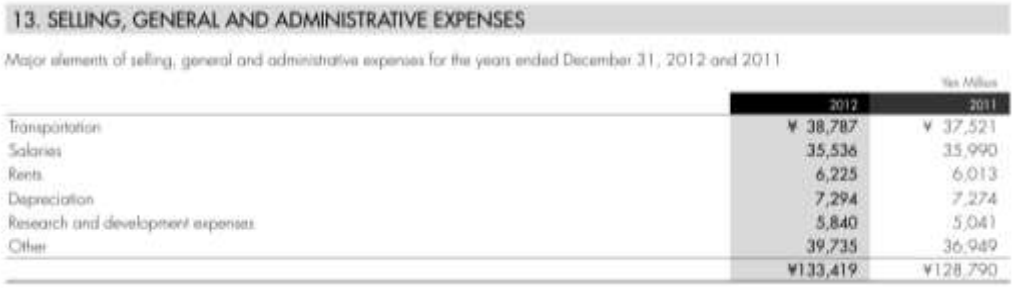
The value of long-term asset is declining little by little; an adjustment is taking place to reduce the book value of fixed assets conformed with the asset's lifetime. Depreciation is an annual charge against income that reflects the estimated dollar cost of the capital equipment and other tangible assets that were used up in the production process (Brigham, Houston, Chiang, Lee, & Arifin, 2010).

While Stice & Stice (2006) define depreciation as the process of allocating the cost of assets such as plant and equipment for a period in which the company receives the benefits from these assets. The accumulated amount of depreciation of an asset is subtracted from the original cost of the asset to reflect the remaining cost to be allocated to the expense in the future period.

Depreciation is taken to the account because the fixed assets are deteriorated and obsolete (Stice & Stice, 2006). Physical deterioration because of the assets is utilized during the production period and exposed to the air and materials while

the obsolescence is the process of becoming outdated when new technology appeared or market changed.

Reichelstein (2007) explains that depreciation charge is one of accrual accounting measures which reflect project-specific information (Reichelstein, 1997). Chambers, Jennings, & Thompson II (1999) adds that depreciation potentially contributes to this forward-looking role for earnings by providing information about future consumption per-period of fixed asset services (Chambers, Jennings, & Thompson II, 1999).



13. SELLING, GENERAL AND ADMINISTRATIVE EXPENSES

Major elements of selling, general and administrative expenses for the years ended December 31, 2012 and 2011

	Yen Millions	
	2012	2011
Transportation	¥ 38,787	¥ 37,521
Salaries	35,536	35,990
Rents	6,225	6,013
Depreciation	7,294	7,274
Research and development expenses	5,840	5,041
Other	39,735	36,949
	¥133,419	¥128,790

(Source: Showa Shell Seiyu, 2013 p. 90)

Figure 3.2: Depreciation as expense in the income statement

Other advantages of depreciation are tax deductible and increasing the cash flows. Depreciation expense is conducted in the income statement before the tax calculation as shown in figure 3.2. Depreciation reduces the net income before tax and lessens the corporate tax in total. The tax is one of the companies' burdens since it should be paid in cash and compulsory.

Even though depreciation is recorded as an expense in the income statement, in the reality company does not spend any money to pay these spending. The figure is non-cash transaction which means it does not require any cash payment

and become free cash flow in the statement of cash flow as shown in figure 3.3. In the reality, the cash outlay took place when the payment of the assets is acquired by related party (Stice & Stice, 2006).

CONSOLIDATED STATEMENTS OF CASH FLOWS

Showa Shell Sekiyu K.K. and Consolidated Subsidiaries
Years ended December 31, 2012 and 2011

Yen Million

	2012	2011
Net cash provided by (used in) operating activities		
Income before income taxes and minority interests	¥ 12,379	¥ 56,710
Depreciation and amortization	43,620	43,329
Impairment loss	978	11,423
Loss (gain) on disposal of property, plant and equipment	1,943	3,210
Loss (gain) on sales of property, plant and equipment	(1,733)	(8,951)
Loss (gain) on valuation of investment securities	20	53
Increase (decrease) in allowance for doubtful accounts	(342)	476
Increase (decrease) in provision for employees' retirement benefits	(842)	2,943
Increase (decrease) in provision for special repairs	(417)	4,621
Interest and dividends income	(1,748)	(472)
Interest expense and sales discounts	4,301	4,124
(Increase) decrease in notes and accounts receivable–trade	(51,930)	(34,817)
(Increase) decrease in inventories	(3,542)	(37,663)
Increase (decrease) in notes and accounts payable	35,216	22,406
Other, net	12,564	(9,697)
Sub-total	50,466	57,698

(Source: Showa Shell Seiyu, 2013 p. 80)

Figure 3.3: Depreciation is added back in the statement of cash flow

How about the effect of depreciation towards firm performance? A ratio used to measure firm performance utilized net income as numerator, i.e. return on equity, return on assets, and return on sales. The figure of net income is found in the profit-loss statement as the result of the revenue decreased by expenses, depreciation, and taxes. In this situation, higher depreciation will result in much lower net income. Regardless the roles in reducing taxes and providing cash for operations, depreciation will lower the net income, so the research postulates that depreciation has a negative relation to financial firm performance.

Hypothesis 3: Depreciation negatively affects firm performance

3.4 Investment and Firm Performance

In the past, many researchers investigated the relationship of investment with firm performances. A group of researcher investigates France, and Italian manufacturing industry finds that the investment has shown a further performance gain, even though increasing of sales through open new plant is also followed by higher levels of employment and decreasing the profitability (Grazzi, Jacoby, & Treibich, 2013). While from Swedish found that there are two-ways causality relationship between investment and firm performance (Heshmati & Loof, 2008). When investment is focused on the information technology, the result is also similar; it shows that IT investment has a positive impact on firm performance in China (Kim, Xiang, & Lee, 2008).

Investment can be identified from the capital expenditure which shows cash outflows for long-lived assets (Ross, Westerfield, & Jordan, 2003). In the stock market, announcement of increases (decreases) in capital expenditures are associated with significant positive (negative) share price (McConnel & Muscarella, 1985 and Chung, Wright, & Charoenwong, 1998).

Investment refers to an activity of spending the funds for fixed assets either to increase the availability of the means of production or simply replaces depreciated capital goods (Liargovas & Skandalis, 2010). In the statement of cash flows, investing activities of the company shows the cash flows from purchasing and selling fixed assets such as plants, property and equipment; selling and acquiring investment securities, and disbursement and repayment of the loans.

Along with intangible assets, plants, property and equipment are called as long-term operating assets since it plays important roles for operating activities and generating revenues. These assets are not purchased for resale to customers, but are seized and utilized as infrastructure to produce and distribute the products and services of the company sufficiently, in the end, to generate revenue (Stice & Stice, 2006).

To sum up, the investment gives information about the company's effort to maintain their operation by the facts of how much company spends the money on property, plants and equipment. It is crucial because the long-term asset is diminished over time. This figure is aimed to expand the production and the cash flow generating capacity of the firm in the future (Liargovas & Skandalis, 2010).

Hypothesis 4: Investment positively affects the firm performance

3.5 Size and Firm Performance

A meta-analysis study by Gooding & Wagner III (1985) reveals the size and performance relationship. The study differentiates between size-performance relationships with organizational size-performance relationships using 31 literatures. Size and performance are non-significantly or negatively related because of the free-rider and process-loss models of group behavior. Even so, when the performance is measured using an absolute number of size and productivity, the result is positively related to each other. Likewise, when the performance is measured as relative (output-input) terms, the findings are no positive relationship to each other (Gooding & Wagner III, 1985).

Likewise, the study of Dogan (2013) investigates the effect of firm size on profitability. Utilizing data by 200 of Istanbul Stock Exchange 2008-2011, the author uses "Return on Assets" (ROA) as firm profitability indicators and total assets, total sales and number of employees as size indicators. The analysis finds a positive effect of size towards firm performance, though only liquidity has positive relations to return on assets (Dogan, 2013). From similar countries, using different span of time data from 2005-2011, researchers also find that firm size, from the perspective of total assets and total sales, positively affects the profitability of manufacturing companies (Akbas & Karaduman, 2012).

Many scholars investigate the roles of the size towards firm performances. The results are (1) economies of scale in operations costing (Majumdar, 1997), (2) larger control over external stakeholders (Orlitzky, 2001), (3) support corporation to build various capabilities (Majumdar, 1997 and Orlitzky, 2001) and (4) better access of finance in the term of internal resources, issuance of equity, or debt (Audretscha & Elston, 2002).

The economies of scale exist when the per-unit cost of production decrease as the level of production increases (Ross, Westerfield, & Jordan, 2003). It relates to the average cost per unit of producing goods and services. There are two components in the production cost, fixed cost and variable cost. The variable costs change as the quantity of products, while the fixed costs do not change (Ross, Westerfield, & Jordan, 2003). Therefore, the production cost per unit declines as the quantity of goods increased.

The internal funds of the corporation in some extent build various companies' capabilities, including the promotional in term of attracting better workers (Orlitzky, 2001). Kadapakkam, Kumar & Riddick (1998) investigates the relation of cash flow availability with firm investment in developed countries. They find that availability of internal fund affects the amount of investment of corporate investment in all OECD countries. However, the size of the company positively affects the cash flow-investment sensitivity, meaning that high-cash-flow sensitivity finds in a large firm size group and vice versa (Kadapakkam, Kumar, & Riddick, 1998).

Audretscha & Elston (2002) reveal that in Germany since 1974, the firms have been obliged to manage pension funds of the employees. However, since the small company unable to obtain capital market at an interest rate, these funds become a source of capital for firms, particularly the large companies and loosen their liquidity. The large companies are able to dominate the utilization of the available funds while the company with strict funds is very limited in term of utilizing the internal earnings and the acquiring fresh fund through issuing equity. The accesses for financing of the smaller firms are more limited than of the larger firms (Audretscha & Elston, 2002) as smaller firms have less access to external capital markets (Kadapakkam, Kumar, & Riddick, 1998).

In summary, size of the company has many various roles to support the firm operation and performance, including for the economic opportunities, internal investment and access for funds. The research postulates that size will positively affect the firm performance because those advantages.

Hypothesis 5: Size positively affects firm performance

3.6 Age and Firm Performance

Another character of the company which affects firm performance is age. The connection between age and firm performance vary, could be positive, negative or even no relation. Loderer & Waelchli (2010) investigates the relation of age and firm performance using public companies data between 1974-2004. They find that the firm performance declines along the time. The profitability of the company drop as age increases, expenses spikes with growth declines, while innovation falls behind the industry average. Similar finding is revealed Dogan (2013). The study uses data of 200 of Istanbul Stock Exchange 2008-2011 and finds that there is a negative relation between age and firm performance.

In the other hand, using Spanish manufacturing firm 1998-2006, Coad, Segarra, & Teruel, (2010) asserts "milk hypothesis and wine hypothesis." The milk hypothesis mean firm deteriorated with time while wine hypothesis mean firm improved with age (Coad, Segarra, & Teruel, 2010, p. 24).

The wine hypothesis is supported by the findings that older firms improve over time with increasing levels of productivity, profitability, bigger assets, lower leverage, and ability to convert sales growth into the subsequent growth of profits and productivity. In the other hand, milk hypothesis is supported with the evidence that firm performance declines along with increasing of age. Older firms have worse figure than younger firm in term of sales, profitability and productivity growth. In addition, older company lost their capability and failed to

translate from employment growth to sales and productivity growth (Coad, Segarra, & Teruel, 2010).

There are two primary findings related the effects of age to firm performances. In order to explain the phenomena, there are many theories, namely inertia effects (Coad, Segarra, & Teruel, 2010), corporate aging (Loderer & Waelchli, 2010) selection effects, and learning-by-doing effects (Coad, Segarra, & Teruel, 2010).

The milk hypothesis has two supported theories, the inertia effect and corporate aging. Inertia effect is a condition where firm becomes less productive as age increases because of increasingly inert and inflexible. Old firms are exposed to obsolescence when they do not suit in the new business situation, and exposed to senescence because of the accumulation of regulations, habits, and organizational governance (Coad, Segarra, & Teruel, 2010).

Furthermore, Loderer & Waelchli (2010) recommends corporate aging to explain the negative relation between age and firm performance with two supported factors, i.e. organizational rigidities and rent seeking. Organizational rigidities result from the past success which followed by firms to transform their story into the organization, regulations, culture, process and habits. This situation creates rigid organization where the older company generates low profitability, has a lack of innovation and experiencing degeneration with an unbalanced CEO compensation with the provided solution (Loderer & Waelchli, 2010).

Selection effect and learning by doing is the supporter of wine hypothesis. Coad et.al (2010) reports “selection effects arise when selection pressures

progressively eliminate the weakest firms, and result in an increase in the average productivity level of surviving firms, even if the productivity levels of individual firms do not change with age" (Coad, Segarra, & Teruel, 2010 , p.3). It means that over time, the companies with low productivity will be extinct because lost in the competition and failed to respond the change and results high-productivity firms remain in business.

Learning by doing is a situation where a corporation accumulates skills and knowledge from regular production line to create better technique and technology in order to improve productivity. In addition to better business experiences, over the time, the firms also could be benefited from the establishment of customers and supplier network (Coad et.al, 2010).

To conclude, there are two main relations between age and firm performance, negative and positive. Both are supported by strong theories. Therefore, the study hypotheses that (a) age have a positive relation with the firm performance, and (b) age has a positive relation with the firm performance.

Hypothesis 6a: Age positively affects firm performance

Hypothesis 6b: Age negatively affects firm performance

3.7 Location and Firm Performance

Location plays important roles in firm operation. Sridhar & Wan (2010) compares the firm's location choices in China, India, and Brazil. In three countries, capital cities are not a popular place as a firm location because of the

high cost of doing business in the city, especially labour cost. The labour intensive industry chooses mid to large cities to decrease the training cost, and proximity to inputs, especially raw materials and suppliers, attracts firm in China and India, but in Brazil is the opposite (Sridhar & Wan, 2010).

In different research, Minai & Lucky (2011) investigate the location's role Lagos-Nigeria. They find that location is the moderating factor between external factors and firm characteristics, and firm performance. It means location converts the external factors into the firm performance (Minai & Lucky, 2011). In Britain, firms prefer to locate their green-field close to the identical manufacturing plants, even though government provides subsidies in the other regions (Devereux , Griffith, & Simpson, 2007).

In certain circumstances, location gives advantages to firms. Urban area supports the new entrants of companies because of the "markets are characterized by knowledge spill-overs across firms and workers, a large customer base, easy access to information on new technologies, easy availability of differentiated skills in the labor markets, close proximity to suppliers, and superior transportation, telecommunication, and energy infrastructure" (Yu, Orazem, & Jolly, 2011 , p.673).

To condense, location support firm with proximity to customer and materials (Lucky, 2012). Situation in Japanese energy and electricity sector is different. The country is low of natural resources and results Japan imports 87.6 percent of energy supply, and about half of the supply is converted into electric

power (Statistic Bureau, 2013). The role of location is limited to proximity of customers. Nemoto et.al (1993) argues that the in term of an electric company, Tokyo, Kansai and Chubu companies can make the most of their efficient transmission and distribution network systems due to dense customers. Tokyo, Kansai and Chubu companies cover the three largest metropolitan areas of Tokyo, Osaka and Nagoya. These three companies can make the most of their efficient transmission and distribution network systems due to dense customers (Nemoto, Nakanishi, & Madono, 1993).

This study postulates that better location supports the financial performance by provides dense of customers.

Hypothesis 7: Location positively affects firm performance

3.8 Ownership and Firm Performance

Government ownership has both positive and negative effects on firm performance. In China, the effect of ownership to the firm performance had been analysed by Yu (2013). Applying panel data with 10,639 public companies in 2003–2010, the author finds that government ownership has a U-shaped relationship with firm performance. It means the government ownership negatively affects the firm performance and in a certain point the effects turned to positive direction (Yu M. , 2013).

However, from a similar region based study of Le & Chizema (2011) reveals different finding. The study collected financial data of 1,154 companies in 2004 and 1,255 companies 2005 and reports that the state ownership has a negative

impact to firm performance at low level, and the relation becomes positive at high level (Le & Chizema, 2011).

From banking sector, the relation between government ownership with firm performance is investigated Kiruri (2013). The investigation reveals that in Kenya, concentration of state ownership has negative and substantial impacts on profitability. In addition, the larger concentration of state ownership leads to lower profitability (Kiruri, 2013).

Many arguments about the relation of state ownership with firm performance, both positively and negatively. Yu (2013) argues that the state ownership supports the companies through benefits of government support and political connections. Furthermore, increasing the level of government shares enhances firm performance and provides financing and resources. For example, in China, government support the state-owned, government with privileged market entrance regulations, favourable taxation, financial access, and loan decisions to support (Le & Chizema, 2011).

Yu (2013) also asserts a negative relation between firm performance and state ownership. "The existence of state and legal person shares has created a few problems. Because they are mostly government-owned, the standard principal-agent problem is compounded by a multiple-principal problem, as government owners may pursue different objectives that do not necessarily relate to profit maximization" (Yu M. , 2013), p. 77). For instance, in Kenya, the government is involved in ownership of banking firms to accelerate the financial and economic

development or in order to provide employment and benefits for political constituents (Kiruri, 2013).

Giving arguments and examples above, this study hypothesis that government ownership has positive influences to firm performance (H8a) and government ownership has negative influences to firm performance (H8b).

Hypothesis 8a: Ownership positively affects firm performance

Hypothesis 8b: Ownership negatively affects firm performance

Chapter 4.

Research Methodology

This chapter covers brief explanation of the methodology of the research, including research design, panel data analysis, fixed effects, and random effects. In the last section, it also provides an introduction on the statistical method to choose between fixed effects and random effects.

This research is aimed to find the causality relation from the internal factors of the firms to the firm performance specifically financial performance. When the relation is significant, the notation of the relation will be observed and analysed. Positive relation means the increasing of the factor will improve the performance while negative relation means the additional of the factor will reduce the performance. This section covers the explanation of the tools for defining the relation. As explained in the previous chapter, the hypotheses are:

1. *H1a Leverage positively affects firm performance*

   H1b Leverage negatively affects firm performance
2. *H2 Liquidity negatively affects firm performance*
3. *H3 Depreciation negatively affects firm performance*
4. *H4 Investment positively affects firm performance*
5. *H5 Firm size positively affects firm performance*
6. *H6 Firm age negatively affects firm performance*

7. *H7 Firm location positively affects firm performance*
8. *H8a Ownership positively affects firm performance*

   H8b Ownership negatively affects firm performance

4.1 Research Design

The research uses regression in order to investigate one-way relation. Quantitative approach will be conducted with statistical analysis of panel data regression method. In this situation, the performance is treated as the dependent which affected by the observed independent factor. Independent variables are the factors, in the other hand dependent variables are firm performance.

In the research, independent variables are limited to internal factor of the company. Those factors are leverage, liquidity, depreciation, investment, size, age, location and ownership.

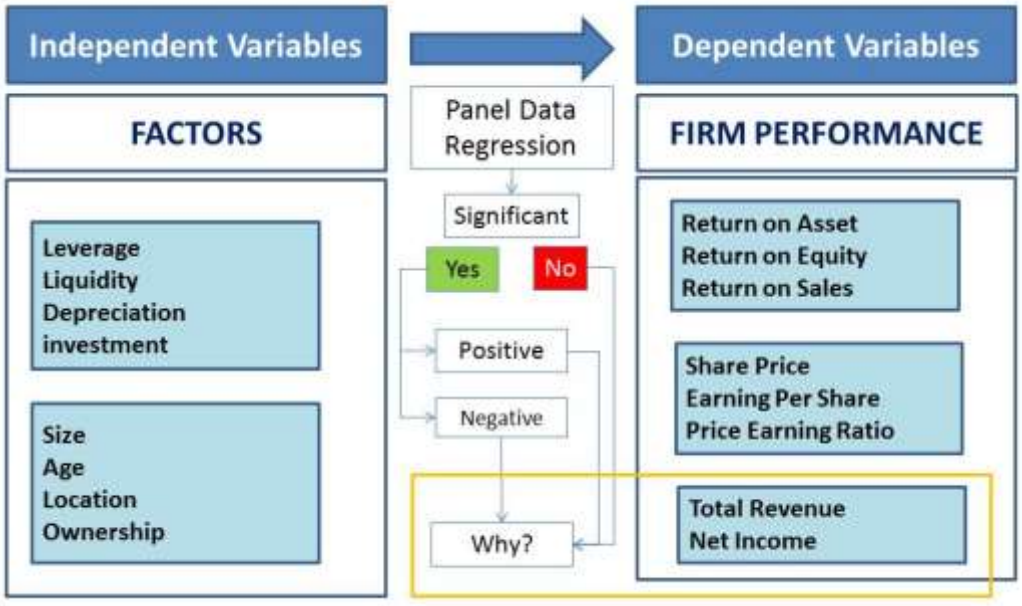


Figure 4.1: Illustrated scheme of research design

In term of firm performance as dependent variables, there are 8 factors, i.e. return on asset, return on equity, and return on sales, share price, earnings per share, price earnings ratio, total revenue and net income. A factor will be regarded as significantly affects the firm performances when minimum 2 out of 3 accounting-based measures, namely return on asset, return on equity and return on sales, are influenced with similar notation (positive or negative). After the relation is revealed, the first approach to explain is by observing the regression results on the total revenue and net income.

Interpretation of the research will be done carefully with several limitations. The analysis on detail explanation of the relation between controlled factors and dependent variables use the association of factor with revenue, net income, and return on sales. When the factor positively affects the revenue, but not net income, it is interpreted that the efficiency of the business operation is getting worse because larger input only results in the same amount or less. Otherwise, when the factor negatively affects revenue, but positively affects net income, it means the productivity and efficiency of the operation are improved.

In addition, the result of the above comparison will be checked with the effect on return on sales to provide a comparative analysis on the efficiency and the productivity of the business operation. Further, return on assets uses earnings before interest and taxes and return on equity utilises earnings after taxes. Accordingly, taxes are excluded from the calculation. Return on equity uses earning from the operation where only the related taxes are used. The above definition assists the interpretation as well as profit margin and revenue.

Further, the market-based measures, namely share price, earnings per share, price earnings ratio are used for identifying the market responses on the specific factor.

4.2 Data Collection

In the investigation, the research finds the list data of energy and electricity from the COMPUSTAT. The advantage of COMPUSTAT is the list of similar sectors can be found within second by choosing similar categories. Based on Global Industry Classification Standard of Standard and Poor (Standard & Poor, 2010), Energy Sector has code 1010 and consists of Energy Equipment & Services and Oil, Gas & Consumable Fuels. In the other hand, electricity is classified under utilities sector with code 5510 and one group with gas, water, multi-utilities, and independent power producers and energy traders. The two industries are interconnected, so the analysis is conducted for two sectors as energy and electricity industry.

From the COMPUSTAT, in total there are 57 firms; with 11 firms are incomplete data. Accordingly, only 46 firms will be used for the research. Here is the detailed number of companies in each Subsector.

Table 4.1: The list of 4 categories energy and electricity firm in Japan

No	**Subsector**	**Number of Companies**
1	Electricity Utilities	12
2	Gas Utilities	12
3	Oil, Gas & Coals Companies	10
4	Trading	10
5	Chemical & Machinery	2
	Total	**46**

After the firms are being listed, the next step is searching the data about the independent variables and dependent variables in the Standard and Poor Capital IQ (S&P Capital IQ) database as the main source of the data. Additional data is gathered from various sources such as COMPUSTAT, Tokyo Stock Exchange website (http://www.tse.or.jp/english) and Statistical Handbook of Japan (Statistic Bureau, 2013). Additional data are collected to complete the unavailable data and also to confirm the information.

4.3 Panel Data Analysis

Baltagi (2013) defines panel data as "the pooling of observations on a cross section of household, countries, firms, and others over several periods" (Baltagi, 2013 , p. 1). While Kohler & Kreuter (2012) explain panel data as dataset which consist of similar measures of the same individuals over time, and resulted in same variables for the same respondents at different points in time (Kohler & Kreuter, 2012).

Brüderl (2005) reports there are 4 advantages of panel data. First, panel data give more informative about variability, provide the less collinearity, and shows more degrees of freedom. In addition, the estimates of panel data are more efficient. Second, panel data permit investigating individual dynamics (i.e. separating age). Third, panel data provide information on the time-sequences of events. Lastly, the panel allows to control for individual unobserved heterogeneity (Brüderl, 2005 , p. 2)

In the research, collected data consists of 46 firms, 16 variables (8 independents and 8 dependents), with a time horizon from 2001 to 2010 which will result in maximum dataset contains 460 observations. The dataset has fulfilled the requirement of panel data since it is a cross section with 16 variables of 46 firms, and annually repeated within 10 years.

Panel data analysis is conducted with one-way regression using STATA 12. One-way analysis is conducted to find the causality relation from independent variables to the dependent variables. In one-way regression, there are many options to investigate the data panel, i.e. random effect and fixed effect.

4.4 Fixed Effects

Fixed effects are designed for analysing the effect of variables change over time because it explores the association between independent variables and dependent variables within the country, person, and the company (Torres-Reyna).

One of the assumptions for fixed effects is the factors inside the individual can affect or bias the independent variables, and it should be controlled, hence fixed effect removes time-invariant (e.g. culture, religion, gender, and race) characteristic of independent variable to provide a better assessment (Torres-Reyna). Furthermore, the time-invariants are unique for individual and should not be correlated with other individual characteristic.

The above explanation conforms to Kohler & Kreuter (2012). The fixed effects neglect time-invariants characteristics in order to reduce the bias of resulted coefficient by controls all time-invariant differences between individuals.

That is why fixed effects are designed to investigate the causes of change within an individual (Kohler & Kreuter, 2012).

To simplify, Bilal, Khan, Tufail, & Najm-ul-Sehar (2013) concludes "Fixed effects model is simply a model in which slope coefficients are constant while the intercept varies across the cross-sectional unit in the panel" (Bilal, Khan, Tufail, & Najm-ul-Sehar, 2013) p.14). The model is below:

$$PERF_{it} = \beta_{0i} + \beta_1 LEV_{it} + \beta_2 LIQ_{it} + \beta_3 DEP_{it} + \beta_4 INV_{it} + \beta_5 SIZE_{it} + \beta_6 AGE_{it} + \beta_7 LOC_{it} + \beta_8 OWN_{it} + u_{it}$$

$PERF_{it}$: Performance of company i at year t

LEV_{it} : Leverage of company i at year t

LIQ_{it} : Liquidity of company i at year t

DEP_{it} : Depreciation of company i at year t

INV_{it} : Investment of company i at year t

$SIZE_{it}$: Size of company i at year t

AGE_{it} : Age of company i at year t

LOC_{it} : Location of company i at year t

OWN_{it} : Ownership of company i at year t

u_{it} : Error term

4.5 Random Effects

In contrast with fixed effects model, in the random effects assumes "the entity's error is not correlated with the independent variables which permit the time-invariant variables to play as explanatory variables" (Torres-Reyna). To

shorten, Bilal, Khan, Tufail, & Najm-ul-Sehar (2013) concludes "Random effects model is a model which treats cross-sectional unit as well as variation within cross-sectional unit in the model" (Bilal, Khan, Tufail, & Najm-ul-Sehar, 2013) p.14). The model is below:

$$PERF_{it} = \beta_0 + \beta_1 LEV_{it} + \beta_2 LIQ_{it} + \beta_3 DEP_{it} + \beta_4 INV_{it} + \beta_5 SIZE_{it} + \beta_6 AGE_{it} + \beta_7 LOC_{it} + \beta_8 OWN_{it} + u_{it} + e_{it}$$

$PERF_{it}$: Performance of company i at year t

LEV_{it} : Leverage of company i at year t

LIQ_{it} : Liquidity of company i at year t

DEP_{it} : Depreciation of company i at year t

INV_{it} : Investment of company i at year t

$SIZE_{it}$: Size of company i at year t

AGE_{it} : Age of company i at year t

LOC_{it} : Location of company i at year t

OWN_{it} : Ownership of company i at year t

u_{it} : Between-entity error term

e_{it} : Within-entity company error

4.6 Random or Fixed

The weakness of fixed effect is that the model is less efficient than a random effect specifically higher variance, and also the model does not build the coefficients of time-invariant variables (McGovern, 2012).

Similarly, Hsiao (2007) concludes that the advantage of fixed effects is the disadvantage of the random effect, namely fixed effect allows individual and time specific effect to correlate with independent variables. While the disadvantages of fixed effects are it does not cover a finite number of observations in term of time or individually, and fixed effects do not cover the time-invariant variable (Hsiao, 2007).

In order to decide whether fixed effects or random effect to analysis the regression, Hsiao (2007), McGovern (2012) & Torres-Reyna suggest Hausman test. The test is based on the null hypothesis that the coefficient of the random effects result is similar with of fixed effects. Accordingly, the Hausman test can be applied by comparing the two models (McGovern, 2012).

Chapter 5.

Data Analysis and Results

Chapter 5 covers the detailed explanation of the data, analysis and the results. The data are collected from COMPUSTAT, S&P Capital IQ, Tokyo Stock Exchange website (http://www.tse.or.jp/english/), and Statistical Handbook of Japan (Statistic Bureau, 2013). The data are about independent variables and dependent variables. The collected data are processed using STATA, specifically using fixed effects, random effects, and Hausman test. The last section is about the final result of the data processing.

5.1 Independent Variables

Independent variables consist of eight variables, i.e. leverage, liquidity, depreciation, investment, size, age, and location. S&P Capital IQ provides data of leverage, liquidity, depreciation, and ownership. It also provides data of capital expenditure which used as a proxy for the investment. Further, size is measured from the total assets, collected from the balance sheet of S&P Capital IQ. Age is the number years since the establishment of the company. Location uses dummy variable, and the data comes from the Japanese statistical bureau. Table 5.2 shows the summary of the explanation and the next subsection is the detailed explanation on each statistical property of independent variables in sub-section.

Table 5.1: Independent variables in the STATA analysis			
No	**Variable**	**Explanation**	**Sources**
1	Leverage	Total debt/equity	S&P Capital IQ
2	Liquidity	Current assets/current liabilities	S&P Capital IQ
3	Ln_Depreciation	Natural logarithm of depreciation	S&P Capital IQ
4	Investment	Natural logarithm of capital expenditure with 1 year delay	S&P Capital IQ
5	Size	Natural logarithm of total assets	S&P Capital IQ
6	Age	Current year – year of established	Tokyo Stock Exchange
7	Location	Dummy variable, 1 for Prefecture with density more than 1000 per square km and 0 for Prefecture with density less than 1000/square km	Statistical Bureau
8	Ownership	Government ownership in percent	S&P Capital IQ

5.1.1. Leverage

Leverage is the ratio of debt over equity. The variable is showing the capital structure of the companies, especially the debt ratio. The data about leverage comes from S&P Capital IQ in the ratios chapter of the financial report. From the data extracted from the source, there are 453 observations for the period 10 years from 2001-2010. In total, there are seven missed observations. The data of leverage have averaged 1.713, with standard deviation 1.631. Uehara Sei Shoji in 2009 (with value 0.002) has the lowest debt while Electric Power Development in 2001 (with value 15.277) owns the highest debt. The value 1.713 means that the debt is 0.713 higher than the equity.

5.1.2. Liquidity

Liquidity is how easy to convert assets to cash (Reimers, 2011). In this research, current ratio is used to measure liquidity. Current ratio is current assets

divided by current liabilities. The data about liquidity derives from S&P Capital IQ in the ratios chapter of the financial report. There are 453 observations for the period 10 years from 2001-2010 from the database; only seven observations are not available. Liquidity has mean 0.929, with standard deviation 0.667. The most illiquid company is Kanto Natural Gas Development in 2010 (with value 0.036), in contrast the most liquid company is Japan Petroleum in 2010 (with value 4.801). The value 0.929 means that current assets are 0.071 lower than the current liabilities, the company current assets cannot cover 0.071 of the current liabilities.

5.1.3. Depreciation

Depreciation is the amount of the estimated dollar cost of long-term assets that were used in the production process in annual basis. The data about depreciation draws from the cash flow statement within the financial report of S&P Capital IQ. There are 450 observations; with 10 others are not available. Depreciation has mean 74735.58, with standard deviation 157322. Daiya Tsusho in 2010 has the lowest depreciation with value 26.424, and Tokyo Electric Power Company in 2001 possesses the highest depreciation with value 964625.

However, the standard deviation of depreciation value, 157322, is very high, so small changes will not significant. In order to increase the sensitivity of the analysis, the depreciation value will be replaced with the natural logarithm of depreciation (Ln_Depreciation). The fact that the value of depreciation has been always positive supports the replacement. The Ln_Depreciation has mean 9.263, with standard deviation 2.249, minimum value 3.274 and maximum value 13.779.

5.1.4. Investment

Investment is aimed either to increase the efficiency of the operation or to expand the market. This research utilizes capital expenditure as a proxy of investment because capital expenditure is spending that is documented as an asset, not an expense, at the transaction is incurred (Reimers, 2011). Thus, the benefit of the expenditure will be given for long term. The data on capital expenditure takes from the cash flow statement within the financial report of S&P Capital IQ. There are 450 observations, and only 10 others are missing. The capital expenditure has mean 68282.26, with standard deviation 149266.9. Daiya Tsusho in 2010 generated the lowest investment with value 7.7, on the other hand, Tokyo Electric Power Company in 2001 made the highest investment with value 1095311.

Similar with depreciation, the standard deviation of the capital expenditure is high (149266.9) with no negative value, hence to increase the sensitivity, the analysis uses the natural logarithm of depreciation. In addition, since investment requires a certain time to influence on the performance, the regression uses the previous year of the natural logarithm depreciation (Ln_Capex_1), with assumption investment will affect the performance in the following year. Ln_Capex_1 has 414 observations, with mean 9.171023, standard deviation 2.381154, minimum value 0, and maximum value 13.85641.

5.1.5. Size

Size is measured by the total assets because energy and electricity sector is a capital intensive industry. Therefore, the number of assets shows the capacity and the size of the firms. Total assets can be found in the balance sheet within the

financial report of S&P Capital IQ. There are 453 observations. Only 7 observations are missing. The total asset has mean 1235838, with standard deviation 2456196. The smallest company is Japan Wind Development in 2001, (with total asset value 850), while the largest firm is Tokyo Electric Power Company in 2002 (with total asset 14578579).

Similar with depreciation, the standard deviation of the total asset is high (2456196) with no negative value, thus to increase the sensitivity, the analysis uses the natural logarithm of total asset (Ln_Asset). Ln_Asset has 453 observations, with mean 12.4346, standard deviation 1.940178, minimum value 6.745236, and maximum value 16.49506.

5.1.6. Age

This study identifies the relation between age and firm performance. Age of the companies is calculated from the year of the establishment. The date of establishment of the companies can be found on the website of Tokyo Stock Exchanges. Average age of the companies is 64.196 years from 460 observations, with standard deviation 21.389, the youngest firm is Japan Wind Development (age 2 year in 2001), while the oldest firm is Tokyo Gas (age 125 year in 2010).

5.1.7. Location

This research investigates the effects of location on the firm performance. The focus of the location is about the relation with the customers because most of the resources in Japan are imported. The research uses the location of the company and calculates the density of every prefecture. However, this condition

is only applied for the regulated industry, which creates oligopoly, i.e. gas utilities and electricity utilities, while other sectors are not geographically limited.

Data of Population by Prefecture in Japan Statistical Yearbook (Statistic Bureau, 2014) provides data of the number of residents in 1920-201toth year basis, but the density only provided for 2010. Therefore, the information of population density is calculated using available figures. During 2000-2010, prefectures of Saitama, Chiba, Tokyo, Kanagawa, Aichi, Osaka, and Fukuoka have density more than 1.000 per square kilometres (score 1), and the rest have less (score 0).

Table 5.2: The dummy variables of location

Prefecture	Area (km2)	Population density (per km^2)				Score for dummy		
		2000	2005	2010	2012	2000	2005	2010
Japan	371	341.81	344.08	344.86	343.40	0	0	0
Hokkaido	78	73.07	72.36	70.79	70.20	0	0	0
Aomori	9	155.69	151.58	144.83	142.40	0	0	0
Iwate	15	94.65	92.58	88.90	87.10	0	0	0
Miyagi	7	327.84	327.15	325.49	322.30	0	0	0
Akita	11	104.36	100.58	95.32	93.30	0	0	0
Yamagata	9	135.41	132.37	127.25	125.40	0	0	0
Fukushima	13	159.58	156.88	152.23	147.20	0	0	0
Ibaraki	6	494.32	492.50	491.67	487.20	0	0	0
Tochigi	6	315.34	317.23	315.82	313.30	0	0	0
Gumma	6	320.83	320.67	318.13	315.60	0	0	0
Saitama	4	1,822.24	1,852.70	1,889.74	1,894.20	**1**	**1**	**1**
Chiba	5	1,153.15	1,178.45	1,209.59	1,205.50	**1**	**1**	**1**
Tokyo	2	5,485.52	5,718.78	5,983.42	6,015.70	**1**	**1**	**1**
Kanagawa	2	3,507.05	3,631.80	3,737.55	3,745.40	**1**	**1**	**1**
Niigata	12	199.07	195.45	190.87	188.70	0	0	0
Toyama	4	266.68	264.54	260.02	257.40	0	0	0
Ishikawa	4	283.83	282.14	281.18	279.50	0	0	0
Fukui	4	199.62	197.94	194.09	192.40	0	0	0
Yamanashi	4	201.47	200.79	195.80	193.30	0	0	0
Nagano	13	164.88	163.46	160.19	158.70	0	0	0

Gifu	11	200.37	200.27	197.80	195.90	0	0	0
Shizuoka	8	488.05	491.28	487.79	483.90	0	0	0
Aichi	5	1,360.62	1,401.57	1,431.71	1,434.80	**1**	**1**	**1**
Mie	6	323.97	325.71	323.62	321.00	0	0	0
Shiga	4	333.33	342.51	350.21	351.20	0	0	0
Kyoto	5	575.54	576.41	573.79	571.40	0	0	0
Osaka	2	4,642.81	4,649.14	4,674.45	4,669.70	**1**	**1**	**1**
Hyogo	8	663.21	667.99	667.63	665.60	0	0	0
Nara	4	393.97	387.96	382.50	379.50	0	0	0
Wakayama	5	229.60	222.30	215.00	212.00	0	0	0
Tottori	3	176.74	175.01	169.82	167.80	0	0	0
Shimane	7	115.32	112.30	108.51	107.00	0	0	0
Okayama	7	275.62	276.47	274.77	273.50	0	0	0
Hiroshima	8	341.07	340.84	338.94	337.40	0	0	0
Yamaguchi	6	253.49	247.69	240.72	237.40	0	0	0
Tokushima	4	201.12	197.70	191.60	189.40	0	0	0
Kagawa	2	548.94	543.04	534.46	530.70	0	0	0
Ehime	6	266.00	261.54	254.95	252.10	0	0	0
Kochi	7	116.47	113.90	109.32	107.60	0	0	0
Fukuoka	5	1,005.17	1,011.99	1,016.39	1,019.00	**1**	**1**	**1**
Saga	2	362.35	357.80	351.19	348.30	0	0	0
Nagasaki	4	374.40	365.02	352.19	347.50	0	0	0
Kumamoto	7	252.46	250.15	246.76	245.40	0	0	0
Oita	6	194.43	192.68	190.61	188.70	0	0	0
Miyazaki	8	152.43	150.22	147.87	146.70	0	0	0
Kagoshima	9	196.25	192.62	187.46	185.70	0	0	0
Okinawa	2	572.38	591	605	612	0	0	0

5.1.8. Ownership

In terms of ownership, the research utilizes the percentages of the government's shares in the companies, both central government and local government. S&P Capital IQ provides the data about government ownership, specifically in the public ownership section. However, in order to confirm the data, certain companies' related-data can be found in a Tokyo Stock Exchanges website within the corporate governance section.

There are 442 observations, with 28 observations are not available. The data of government ownership has average .0143625, with standard deviation .0836251, and 0% as the minimum value, and 83.944% as the maximum value. Most of the companies have 0% value, while the government's biggest shares was found in Japan Petroleum Exploration in 2009. That ownership of government has two types of shareholders, Government of Japan (34.001%) and Ministry of International Trade and Industry (49.943%).

Table 5.3 The statistical properties of independent variables

Variable	Obs.	Mean	Std. Dev.	Min	Max
Leverage	453	1.712819	1.631011	0.002189	15.27748
Liquidity	453	0.929987	0.6667669	0.036534	4.801646
Ln_Depreciation	450	9.262685	2.249659	3.274273	13.77949
Ln_Capex_1	414	9.171023	2.381154	0	13.85641
Ln_Assets	453	12.4346	1.940178	6.745236	16.49506
Age	460	64.19565	21.38823	2	125
Location	460	0.6956522	0.4606316	0	1
Ownership	442	0. 0143625	0. 0836251	0	0.8394379

5.2 Dependent Variables

The dependent variables represent the firms' performance, especially from a financial perspective. There are eight items, i.e. return on equity, return on asset, return on sales, share price, earning per share, price earnings ratio, revenue and net income. Table 5.5 shows a summary of explanation and data source of dependent variables. The following sub-section explains the detailed explanation about simple statistical property of each independent variable.

Table 5.4: The dependent variables in the STATA analysis			
No	**Variable**	**Explanation**	**Sources**
1	Ln_Revenue	Natural logarithm of total revenue	S&P Capital IQ
2	ROS	Normalized net income divide by total revenue	S&P Capital IQ
3	Net Income	Net income	S&P Capital IQ
4	ROA	Standardized earnings before tax and interest (EBIT) divided by average total assets	S&P Capital IQ
5	ROE	Earnings from continuing operation divided by average shareholder equity	S&P Capital IQ
6	Share price	Share price at the end of fiscal year	COMPUSTAT
7	EPS	Normalized net income divided by weighted average shares outstanding	S&P Capital IQ
8	P/E ratio	Share price divide by normalized earnings per share	S&P Capital IQ

5.2.1. Return on Assets

Return on Assets (ROA) is the ratio of the earnings before tax and interest (EBIT) to total assets which show how much return of each yen of the assets before interest and tax. The data of ROA comes from the ratio section of the financial report of S&P Capital IQ. The ROA data from the database are calculated using normalized net income. It means the data already calculate business cycle. There are 444 observations, with 16 observations are missing. The ROA has mean 0.0251, with standard deviation 0.0304. AOC Holding in 2009 possessed the most unproductive assets with the value -0.054, and INPEX in 2006 had the most productive assets with value 0.3. The value 0.3 means that one yen of assets generates 0.3 yen net income for the company.

5.2.2. Return on Equity

Return on Equity (ROE) is the ratio of the earnings from operation of total common equity, which shows how much earnings generated from each yen of investment from the investors (Brigham et.al, 2010). The data of ROE can be extracted from the ratio section of the financial report of S&P Capital IQ. In contrast with the calculation of the ROA, the ROE in the database is calculated using earnings from operation. There are 444 observations, with 16 observations are not available. The ROE has mean 0.0453, with standard deviation 0.104. The lowest return per equity is generated by AOC Holding in 2006 (with value -0.777), and the highest return per equity is created by Fuji Kosan in 2004 (with value 0.346). The value 0.346 means that one yen of common equity generates 0.346 yen earnings from operation for the company.

5.2.3. Return on Sales

Return on Sales (ROS) is also called profit margin, which defined as the ratio of the net income to total revenue, which shows how much net income generated from each yen of revenue (Brigham et.al, 2010). The data of ROS can be extracted from the ratio section of the financial report of S&P Capital IQ. Similar with ROA, the ROS in the database are calculated using normalized net income, which deduct the portion of corporate tax 37.5% from the net income. There are 453 observations, with 7 observations are missing. The ROS has mean 0.0319, with standard deviation 0.0491. The lowest return per sales is generated by Japan Wind Development in 2006 (with value -0.268), and the highest return

per sales is created by INPEX in 2009 (with value 0.376). The value 0.376 means that one yen of sales generates 0.376 yen net income for the company.

5.2.4. Share Price

Share Price is showing the price of stock in the stock exchange, mostly in Tokyo Stock Exchange. The data on the share price can be extracted from the historical capitalization section of the financial report of S&P Capital IQ. However, the data is synchronized with the date of the financial report published, in certain companies the data of share price are downloaded from COMPUSTAT to find the closest date to the end of the fiscal year of the firm. There are 449 observations, with 11 observations are not available. The data of the share price has mean 17207.54, with standard deviation 105968.5. The cheapest price was owned Daiya Tsusho in 2009 (with value 34), and INPEX in 2008 had the most expensive with value 1110000.

Similar with depreciation, the standard deviation of the share price is high (105968.5) with no negative value, hence to increase the sensitivity, the analysis uses the natural logarithm of the share price (Ln_Share_Price). Ln_Share_Price has 449 observations, with mean 6.727382, standard deviation 1.478864, minimum value 3.526361, and maximum value 13.91987.

5.2.5. Earnings per Shares

Earnings per Share (EPS) are the ratio of the standardized net income to the number of the outstanding shares which show how much net income generated from one share. The data of EPS can be extracted from the income statement section of the financial report of S&P Capital IQ. Similarly with the calculation of the ROA, the EPS in the database is calculated using normalized net income. There are 453 observations, with 7 observations are missing. The EPS has mean 71.786, with standard deviation 89.253. The lowest return per shares is generated by AOC Holding in 2009 (with value -299.27), and the highest return per shares is created by Okinawa Electric Power Company in 2006 (with value 578.934). The value 578.934 means that one share generates 578.934 yen net income for the company.

5.2.6. Price Earnings Ratio

Price Earnings Ratio (P/E Ratio) is the ratio of the share price to earnings per shares which shows how much yen investor willing to pay per yen of reported earnings (Brigham et.al, 2010). The data on P/E Ratio is calculated from the share price divided with EPS, which both data available in S&P Capital IQ and COMPUSTAT. There are 448 observations, with 12 observations are missing. The data on P/E Ratio have mean 129.373, with standard deviation 845.913. The lowest price willing to pay is from Japan Wind Development in 2010 (with value -2746.313), and the highest price willing to pay is from Japan Wind Development in 2003 (with value 9031.524). The value 9031.524 means the investor willing to pay 9031.524 yen for 1 yen net income of the company.

5.2.7. Total Revenue

Total Revenue or Total Sales are the total money that generated from the firm's operation by providing goods or services, both cash and non-cash. This variable will give information about the total money collected from the customer. The data about total revenue can be found in the income statement within the financial report of S&P Capital IQ. There are 453 observations; only 7 observations are not available. The data of total revenue have mean 699128.7, with standard deviation 1040667. The lowest revenue is generated by Japan Wind Development in 2001 (with value 364); on the other hand the highest revenue is earned by Tokyo Electric Power Company in 2009 (with value 5887575).

Similar with depreciation, the standard deviation of the total revenue is high (1040667) with no negative value, hence to increase the sensitivity, the analysis uses the natural logarithm of total revenue (Ln_Revenue). Ln_Revenue data has 453 observations, with mean 12.255, standard deviation 1.751, minimum value 5.897, and maximum value 15.588.

5.2.8. Net Income

Net Income is total revenues minus all expenses for one fiscal period. The data of net income can be extracted from the income statement section of the financial report of S&P Capital IQ. This research utilizes normalized net income. There are 453 observations, with 7 observations are not available. The ROE has mean 21335.53, with standard deviation 46754.27. The lowest net income is generated by Tokyo Electric Power Company in 2008 (with value -150107.6), and

the highest net income is created by Tokyo Electric Power Company in 2006 (with value 310384.2).

The eight independent variables of downloaded data have simple statistical properties as follows.

Table 5.5: The statistical properties of dependent variables

Variable	Obs.	Mean	Std. Dev.	Min	Max
ROA	444	0.0250921	0.0303605	-0.054421	0.299923
ROE	444	0.0453297	0.104146	-0.777274	0.346477
ROS	453	0.0319593	0.0491208	-0.268146	0.375641
Ln_share_price	449	6.727382	1.478864	3.526361	13.91987
EPS_Norm	453	71.7866	89.25287	-299.27	578.9336
PE_Ratio_Norm	448	129.3627	845.9131	-2746.313	9031.524
Ln_Revenue	453	12.25488	1.750847	5.897154	15.58835
Net_Income	453	21335.53	46754.27	-150107.6	310384.2

5.3 Statistical Analysis Using Stata 12

The panel data regressions are performed using STATA 12. In order to decide whether use fixed effects or random effects to analyze the one way relation from independent variables to dependent variables, the statistical analysis began with fixed effects estimators and random effects estimators, and finished with Hausman test. Hausman test is designed to choose more appropriate estimators between fixed effects and random effects.

5.3.1. Fixed Effects Models

Since there are 8 dependent variables, fixed effect estimators will also generate 8 models. The result shows the relation between dependent variable and 8 independent variables. All STATA results of the fixed effect model are shown

in the Appendix. In order to check whether the model is OK or not, F-TEST result, the number of **Prob>F,** is analysed. When the number is smaller than 0.05, then the model is OK (Torres-Reyna). The 8 models of Fixed Effects estimators show that the result of F-TEST is more than 0.05. It means the entire model is acceptable.

Table 5.6: The result of F-TEST of Fixed Effects estimators

Dependent Variables	No. of Observation	No. of Group	Prob > F	Explanation
Return on Assets	383	46	0.0000	The model is OK*
Return on Equity	383	46	0.0000	The model is OK*
Return on Sales	389	46	0.0000	The model is OK*
Share price	386	46	0.0000	The model is OK*
Earnings per Shares	389	49	0.0002	The model is OK*
Price Earnings Ratio	389	46	0.0000	The model is OK*
Revenue	389	46	0.0000	The model is OK*
Net Income	389	46	0.0129	The model is OK*

* (Prob > F) < 0.05, the model is OK (Torres-Reyna)

After finding the models are fit, the next step is the observation on the significance values and the coefficient of the relationship between each dependent variable and independent variables. The significance value is identified from the two tails p-values test or the number of **P>l t l.** When the number is greater than 0.05, the current independent variable is significantly related to the dependent variable at alpha 5%. In certain situation, the number is greater than 0.10 is accepted using alpha 10%.

Table 5.8 shows the result of fixed effects model with return on assets as the dependent variable. The two tails p-values test indicates the values are from 0.000-0.996 with one variable, location, is omitted. Location is time-invariant

variable which has not changed over time. In the fixed effects estimators, time-invariant variable is not resulted, the fixed effects model does not build the coefficients of time-invariant variables (McGovern, 2012).

Table 5.7: The result of fixed effects estimators for Return on Asset			
Independent Variables	**P>l t l**	**Explanation**	**Coefficient**
Leverage	0.002	Significant	-.0030807
Liquidity	0.004	Significant	.0133737
Depreciation	0.004	Significant	-.0127823
Investment	0.996	Insignificant	-5.73e-06
Size	0.000	Significant	.0273033
Age	0.000	Significant	-.0018288
Location	Omitted	Omitted	Omitted
Ownership	0.181	Insignificant	-.0398511

The result demonstrates that investment and ownership insignificantly affect return on assets while other independent variables, except location, significantly affect the return on assets. From the notation of the coefficient, it shows that leverage, depreciation, and age have a negative relationship while liquidity and size have positive relationships with return on assets.

Table 5.8: The result of fixed effects estimators for Return on Equity			
Independent Variables	**P>l t l**	**Explanation**	**Coefficient**
Leverage	0.000	Significant	-.0324532
Liquidity	0.018	Significant	.0859188
Depreciation	0.000	Significant	-.1239529
Investment	0.049	Significant*	.0202707
Size	0.000	Significant	.2167198
Age	0.000	Significant	-.0097125
Location	Omitted	Omitted	Omitted
Ownership	0.619	Insignificant	-.117386

The result of the STATA model for the fixed effects model with return on equity as the dependent variable is shown in Table 5.9. The two tails p-values test indicates the values are between 0.000-0.619 with a variable, location, is omitted.

The result indicates that the return on equity is insignificantly affected by ownership while other independent variables, except location, significantly affect the dependent variable. From the notation of the coefficient, it shows that leverage, depreciation, and age have negative relationship, while liquidity, investment, and size positively affect return on equity.

Table 5.9: The result of fixed effects estimators for Return on Sales

Independent Variables	P>l t l	Explanation	Coefficient
Leverage	0.000	Significant	-.0045313
Liquidity	0.688	Insignificant	.0020836
Depreciation	0.147	Insignificant	-.0072411
Investment	0.724	Insignificant	-.0005118
Size	0.000	Significant	.0346742
Age	0.000	Significant	-.0019832
Location	Omitted	Omitted	Omitted
Ownership	0.019	Significant	-.0811464

Table 5.10 demonstrates the result of fixed effects model with return on sales as the dependent variable. The two tails p-values test indicates the values are from 0.000-0.724 with one variable, location, is omitted.

The result shows that liquidity, depreciation, and investment insignificantly influence the return on sales while other independent variables, except location, significantly associate with return on sales. From the notation of the coefficient, it shows that leverage, age, and ownership have negative relationship, while only the size has positive association with return on sales.

Table 5.10: The result of fixed effects estimators for Share Price			
Independent Variables	**P>l t l**	**Explanation**	**Coefficient**
Leverage	0.000	Significant	-.1766711
Liquidity	0.003	Significant	.3039906
Depreciation	0.000	Significant	-.4438364
Investment	0.143	Insignificant	.0411234
Size	0.000	Significant	1.167679
Age	0.975	Insignificant	.0002212
Location	Omitted	Omitted	Omitted
Ownership	0.407	Insignificant	-.5480775

The result of fixed effects model with the share price as the dependent variable is shown in Table 5.11. The two tails p-values test indicates the values are from 0.000-0.975 with one variable, location, is omitted.

The result demonstrates that investment, age, and ownership insignificantly affect share price, and other independent variables, except location, significantly relate share price. From the notation of the coefficient, it shows that leverage and depreciation have the negative relationship. on the other hand, liquidity and size have a positive impact to share price.

Table 5.11: The result of fixed effects estimators for Earning per Share			
Independent Variables	**P>l t l**	**Explanation**	**Coefficient**
Leverage	0.361	Insignificant	-2.66939
Liquidity	0.031	Significant	33.8435
Depreciation	0.000	Significant	-58.78597
Investment	0.301	Insignificant	-4.517761
Size	0.000	Significant	102.4669
Age	0.001	Significant	-3.711004
Location	Omitted	Omitted	Omitted
Ownership	0.807	Insignificant	-25.42348

Table 5.12 shows the result of fixed effects model with earnings per share as the dependent variable. The two tails p-values test indicates the value is from 0.000-0.807 with one variable, location, is omitted.

The result demonstrates that leverage, investment and ownership insignificantly relate to the dependent variable. Further, other independent variables, except location, significantly affect the variable. From the notation of the coefficient, it shows that depreciation and age have negative relationship, and liquidity and size have positive effects with the dependent variable.

Table 5.12: The result of fixed effects estimators for Price Earnings Ratio

Independent Variables	P>l t l	Explanation	Coefficient
Leverage	0.292	Insignificant	28.76311
Liquidity	0.132	Insignificant	-219.825
Depreciation	0.001	Significant	-448.8769
Investment	0.642	Insignificant	-18.96003
Size	0.000	Significant	922.9859
Age	0.754	Insignificant	3.173
Location	Omitted	Omitted	Omitted
Ownership	0.826	Insignificant	214.29

Table 5.13 shows the result of fixed effects model with the price earnings ratio as the dependent variable. The two tails p-values test indicates the value is from 0.000-0.826 with one variable, location, is omitted.

The result demonstrates that almost independent variables insignificantly affect the dependent variable, i.e. leverage, liquidity, investment, age and ownership. Other independent variables, except location, significantly affect price earnings ratio, i.e. depreciation with negative direction and size with a positive relation.

Table 5.13: The result of fixed effects estimators for Total Revenue			
Independent Variables	**P>l t l**	**Explanation**	**Coefficient**
Leverage	0.742	Insignificant	-.0027496
Liquidity	0.031	Significant	.0962971
Depreciation	0.366	Insignificant	-.0388279
Investment	0.002	Significant	.0384582
Size	0.000	Significant	.6498018
Age	0.000	Significant	.0334611
Location	Omitted	Omitted	Omitted
Ownership	0.488	Insignificant	-.2064823

Table 5.14 shows the result of fixed effects model with total revenue as the dependent variable. The two tails p-values test indicates the value is from 0.000-0.742 with one variable, location, is omitted.

The result shows that almost all independent variables are significantly related to revenue, i.e. liquidity, investment, size, and age. While other independent variables, except location, insignificantly affect revenue. From the notation of the coefficient, it shows that no negative relation between revenue and independent variable where liquidity, investment, size, and age have a positive association with revenue.

Table 5.14: The result of fixed effects estimators for Net Income			
Independent Variables	**P>l t l**	**Explanation**	**Coefficient**
Leverage	0.065	Significant *	-3481.814
Liquidity	0.748	Insignificant	-3229.51
Depreciation	0.533	Insignificant	-5032.284
Investment	0.765	Insignificant	-841.9223
Size	0.267	Insignificant	15300.95
Age	0.004	Significant	-1995.449
Location	Omitted	Omitted	Omitted
Ownership	0.051	Significant*	-131138.3

Table 5.15 shows the result of fixed effects model with net income as the dependent variable. The two tails p-values test indicates the value is from 0.000-0.765 with one variable, location, is omitted.

The result indicates that liquidity, depreciation, investment and size insignificantly affect net income, and other independent variables, except location, significantly affect net income. From the notation of the coefficient, it shows that leverage, age, and ownership have the negative relationship. Moreover, no independent variables have positive influences to net income.

Table 5.15: The summary of the result of fixed effects estimators

Independent Variables	ROA	ROE	ROS	Share Price	EPS	P/E Ratio	Revenue	Net Income
Leverage	(-)	(-)	(-)	(-)	X	X	X	(-)*
Liquidity	(+)	(+)	X	(+)	(+)	X	(+)	X
Depreciation	(-)	(-)	X	(-)	(-)	(-)	X	X
Investment	X	(+)	X	X	X	X	(+)	X
Size	(+)	(+)	(+)	(+)	(+)	(+)	(+)	X
Age	(-)	(-)	(-)	X	(-)	X	(+)	(-)
Location*	omitted							
Ownership	X	X	(-)	X	X	X	X	(-)*

In order to ease the interpretation, the result is summarized with the following criteria: significant or insignificant. Insignificant relation is marked with X mark, while for the significant relation, goes to observe on the coefficient: positive (+) or negative (-). The red cell indicates a negative relation (-), while blue cell indicates a positive association (+). The detail is shown in Table 5.16.

5.3.2. Random Effects Models

Similarly, the random effects estimator generates 8 models from 8 different dependent variables. All STATA results of the fixed effect model are shown in the Appendix. Regarding whether the model is OK or not, F-TEST result is analysed. If the fixed effects estimator using the number of Prob>F, in the random effects, the F-TEST can be seen from the number of **Prob>chi2**. When the number is smaller than 0.05, then the model is OK (Torres-Reyna). The 8 models of Random Effects estimators show that the result of F-TEST is more than 0.05. It means the entire model is acceptable.

Table 5.16: The result of F-TEST of Random Effects estimators

Dependent Variables	No. of Observation	No. of Group	Prob > chi2	Explanation
Return on Assets	396	46	0.0005	The model is OK*
Return on Equity	396	46	0.0000	The model is OK*
Return on Sales	404	46	0.0000	The model is OK*
Share price	397	46	0.0000	The model is OK*
Earnings per Shares	404	46	0.0000	The model is OK*
Price Earnings Ratio	399	46	0.0000	The model is OK*
Revenue	404	46	0.0000	The model is OK*
Net Income	404	46	0.0000	The model is OK*

* (Prob > chi2) < 0.05, the model is OK (Torres-Reyna)

Next step after finding the models are fit, is the observation on the significance values and the coefficient of the relationship between each dependent variable and independent variables. Similar in the fixed effect model, the significance value is identified from the two tails p-values test, but from the number of **P>l z l.** When the number is greater than 0.05, the current independent

variable significantly influences to the dependent variable at alpha 5%. In certain situation, the number is greater than 0.10 is accepted using alpha 10%.

Table 5.17: The result of fixed effects estimators for Return on Asset			
Independent Variables	**P>l z l**	**Explanation**	**Coefficient**
Leverage	0.052	Significant*	-.0020798
Liquidity	0.011	Significant	-.0100963
Depreciation	0.727	Insignificant	-.0014881
Investment	0.058	Significant*	.0026542
Size	0.445	Insignificant	.00392
Age	0.008	Significant	-.000494
Location	0.162	Insignificant	.0147489
Ownership	0.742	Insignificant	.0091624

Table 5.18 shows the result of random effects models with return on assets as the dependent variable. The two tails p-values test indicates the values are from 0.000-0.742. The result shows that depreciation, size, location, and ownership insignificantly affect return on assets while other independent variables significantly alter return on assets. From the notation of the coefficient, it shows that leverage, liquidity, and age have a negative relationship, and only investment positively influences return on assets.

Table 5.18: The result of fixed effects estimators for Return on Equity			
Independent Variables	**P>l z l**	**Explanation**	**Coefficient**
Leverage	0.005	Significant	-.0112992
Liquidity	0.540	Insignificant	.0081364
Depreciation	0.397	Insignificant	-.0103451
Investment	0.000	Significant	.0333491
Size	0.502	Insignificant	-.0080906
Age	0.808	Insignificant	-.0000722
Location	0.895	Insignificant	.0016944
Ownership	0.450	Insignificant	-.0552862

Table 5.19 shows the result of random effects models with return on equity as the dependent variable. The two tails p-values test indicates the values are from 0.000-0.895. The result shows only two variables have a significant relation with return on equity, i.e. leverage with negative values and investment with positive value. Other than those are insignificant.

Table 5.19: The result of fixed effects estimators for Return on Sales

Independent Variables	P>l z l	Explanation	Coefficient
Leverage	0.001	Significant	-.0032823
Liquidity	0.001	Significant	-.0135081
Depreciation	0.863	Insignificant	.0008077
Investment	0.492	Insignificant	.0010241
Size	0.063	Significant*	.0108055
Age	0.000	Significant	-.0009088
Location	0.307	Insignificant	.0141532
Ownership	0.808	Insignificant	.0075855

Table 5.20 shows the result of random effects models with return on sales as the dependent variable. The two tails p-values test indicates the values are from 0.000-0.863. The result shows there are 4 variables have insignificant relation with return on sales, i.e. depreciation, investment, location, and ownership, where the other 4 are significant in positive relation is size, the negative relation is leverage, liquidity, and age.

Table 5.20: The result of fixed effects estimators for Share Price			
Independent Variables	**P>l z l**	**Explanation**	**Coefficient**
Leverage	0.000	Significant	-.178167
Liquidity	0.002	Significant	.3046179
Depreciation	0.000	Significant	-.4750485
Investment	0.013	Significant	.0722598
Size	0.000	Significant	.9015016
Age	0.000	Significant	-.0179038
Location	0.005	Significant	-.8766329
Ownership	0.399	Insignificant	.5288042

Table 5.21 shows the result of random effects models with a share price as the dependent variable. The two tails p-values test indicates the values are from 0.000-0.399. The result shows that only one variable has insignificant relation with dependent variable, i.e. ownership where the remaining variables significantly affect the dependent variable. Out of significant variable, liquidity, investment, and size have positive effects, while leverage, depreciation, age, and location negatively affects share price.

Table 5.21: The result of fixed effects estimators for Earnings per Shares			
Independent Variables	**P>l z l**	**Explanation**	**Coefficient**
Leverage	0.651	Insignificant	-1.27048
Liquidity	0.036	Significant	-22.23168
Depreciation	0.609	Insignificant	-5.974643
Investment	0.418	Insignificant	3.521407
Size	0.167	Insignificant	18.22304
Age	0.000	Significant	-1.496627
Location	0.380	Insignificant	-16.66631
Ownership	0.000	Significant	259.54449

Table 5.22 shows the result of random effects models with earnings per share as the dependent variable. The two tails p-values test indicates the values are from 0.000-0.651. The result shows that only 3 variables have a significant

relation with this dependent variable, i.e. liquidity, age, and ownership with only ownership has positive effects while the others have negative. The remaining variables insignificantly affect the dependent variable, i.e. leverage, depreciation, investment, size, and location.

Table 5.22: The result of fixed effects estimators for Price Earnings Ratio

Independent Variables	P>l z l	Explanation	Coefficient
Leverage	0.203	Insignificant	32.91025
Liquidity	0.003	Significant	-331.5075
Depreciation	0.000	Significant	-510.1494
Investment	0.011	Significant	102.9604
Size	0.002	Significant	369.7498
Age	0.019	Significant	-8.002224
Location	0.011	Significant	-425.4752
Ownership	0.039	Significant	1391.296

Table 5.23 shows the result of random effects models with a price earnings ratio as the dependent variable. The two tails p-values test indicates the values are from 0.000-0.203. The result shows that leverage has insignificant relation to the dependent variable with the remaining have a significant impact for the dependent variable. The positive effects are coming from investment, size, and ownership while the others have negative effect, i.e. liquidity, depreciation, age, and location.

Table 5.23: The result of fixed effects estimators for Total Revenue

Independent Variables	P>l z l	Explanation	Coefficient
Leverage	0.003	Significant	-.0276211
Liquidity	0.117	Insignificant	.0588651
Depreciation	0.080	Significant*	-.0783617
Investment	0.000	Significant	.051017
Size	0.000	Significant	.8451392
Age	0.000	Significant	.0190719
Location	0.000	Significant	.6415108
Ownership	0.919	Insignificant	.0306691

Table 5.24 shows the result of random effects models with total revenue as the dependent variable. The two tails p-values test indicates the values are from 0.000-0.919. The result shows that only liquidity and ownership have an insignificant effect to dependent variable with the remaining have a significant impact for the dependent variable. The positive effects are affected by investment, age, size, and location while the others the negative relation is shown from leverage and depreciation to total revenue.

Table 5.24: The result of fixed effects estimators for Net Income

Independent Variables	P>l z l	Explanation	Coefficient
Leverage	0.062	Significant*	-3032.298
Liquidity	0.014	Significant	-14993.21
Depreciation	0.518	Insignificant	4224.863
Investment	0.310	Insignificant	2576.2
Size	0.346	Insignificant	6828.472
Age	0.088	Significant*	-348.4162
Location	0.008	Significant	26077.47
Ownership	0.132	Insignificant	61565.98

Table 5.25 shows the result of random effects models with net income as the dependent variable. The two tails p-values test indicates the values are from 0.000-0.518. The result shows 4 variables have an insignificant relation with this dependent variable, i.e. depreciation, investment, size, and ownership. The remaining variables significantly relate with net incomes. The positive association is shown by location only, while other three controlled variables have a negative association, i.e. leverage, liquidity, and age.

Table 5.25: The summary of random effects estimator results								
Independent Variables	ROA	ROE	ROS	Share Price	EPS	P/E Ratio	Revenue	Net Income
Leverage	(-)	(-)	(-)	(-)	X	X	(-)	(-)*
Liquidity	(-)	X	(-)	(+)	(-)	(-)	X	(-)
Depreciation	X	X	X	(-)	X	(-)	(-)	X
Investment	(+)	(+)	X	(+)	X	(+)	(+)	X
Size	X	X	(+)	(+)	X	(+)	(+)	X
Age	(-)	X	(-)	(-)	(-)	(-)	(+)	(-)*
Location	X	X	X	(-)	X	(-)	(+)	(+)
Ownership	X	X	X	X	(+)	(+)	X	X

In order to ease the interpretation, the result is summarized with the following criteria: significant or insignificant. Insignificant relation is marked with X sign, while for the significant relation, goes to the observation on the coefficient: positive (+) or negative (-). The red cell indicates a negative relation (-), while blue cell indicates a positive association (+). The detail is shown in Table 5.26.

5.3.3. Hausman Test

Hausman test is a way of choosing whether to use random effects or fixed effects in the panel data in any given situation, and this test can be executed by comparing the estimates from the two models by assuming that no correlation between the individual error and explanatory variables (McGovern, 2012). This test is under the hypothesis that the random effect should give a similar coefficient with fixed effects (McGovern, 2012) or simply said that the random effects model is valid (Hoechle, 2007).

Hausman test delivers 8 models as the number of dependent variables. In the STATA, the results of the Hausman test are shown by the "Prob>chi2". When the value of Prob>chi2 is less than 0.01 (using confidence level 1%), then the null hypothesis is rejected.

Table 5.26: The summary of the Hausman test result

No	Dependent Variables	Prob>chi2	Null hypothesis	Conclusion
1	Return on Asset	0.0000	Rejected	Use fixed effects
2	Return on Equity	0.0001	Rejected	Use fixed effects
3	Return on Sales	0.0000	Rejected	Use fixed effects
4	Share Price*	0.0000	Rejected	Use fixed effects
5	Earnings per Shares	0.0003	Rejected	Use fixed effects
6	Price Earnings Ratio	-	-	-
7	Revenue	-	-	-
8	Net Income	0.0020	Rejected	Use fixed effects

*using original value, not the natural logarithm value

The summary of the Hausman test results is shown in the table 5.27. The detail of the Hausman test result using STATA can be found in the appendix. The Prob>chi2 values of 6 (out of 8 models) are between 0.0000-0.0020. It means that the null hypothesis is rejected at confident level 1% (0.01). The result shows that the difference in coefficient of fixed effects and random effects is systematic, and the test strongly recommends using fixed effects, not random effects.

5.4 Panel Data Processing Results

The Hausman test analysis recommends using the result of fixed effects estimators over of random effects estimators. The problem of fixed effects is that a location is omitted in the model. In order to analyze the result, the research uses

the result of fixed effect processing with one variable, location, comes from random effects. The focus of the study is the affecting factors. Accordingly, the results are regrouped into an explanation of independent variables.

Table 5.27: The summary of the result of panel data analysis

Independent Variables	ROA	ROE	ROS	Share Price	EPS	P/E Ratio	Revenue	Net Income
Leverage	(-)	(-)	(-)	(-)	X	X	X	(-)*
Liquidity	(+)	(+)	X	(+)	(+)	X	(+)	X
Depreciation	(-)	(-)	X	(-)	(-)	(-)	X	X
Investment	X	(+)	X	X	X	X	(+)	X
Size	(+)	(+)	(+)	(+)	(+)	(+)	(+)	X
Age	(-)	(-)	(-)	X	(-)	X	(+)	(-)
Location*	X	X	X	X	X	(-)	(+)	(+)
Ownership	X	X	(-)	X	X	X	X	(-)*

*using random effects

The results in Table 5.28 show the various effects of each factor on firm performance. In order to simplify the conclusion, the hypothesis is accepted if 2 out of 3 accounting-based measures are fulfilled with the results, i.e. return on assets, return on equity, and return on sales.

Hypothesis 1a: Leverage positively affects firm performance: Rejected, Hypothesis 1b: Leverage negatively affects firm performance: Accepted. Leverage negatively affects return on assets, return on equity, and return on sales, share price and net income. While earnings per shares, price earnings ratio and revenue are not affected by leverage.

Table 5.28: The summary of hypothesis-testing result				
Number	Factor	Relation from factor to firm performance		Conclusion of Hypothesis
		Hypothesis	Results	
1a	Leverage	Positive	Negative	Rejected
1b	Leverage	Negative	Negative	Accepted
2	Liquidity	Positive	Positive	Accepted
3	Depreciation	Negative	Negative	Accepted
4	Investment	Positive	Neutral	Rejected
5	Size	Positive	Positive	Accepted
6a	Age	Positive	Negative	Rejected
6b	Age	Negative	Negative	Accepted
7	Location	Positive	Neutral	Rejected
8a	Ownership	Positive	Neutral	Rejected
8b	Ownership	Negative	Neutral	Rejected

Hypothesis 2: Liquidity negatively affects firm performance: Rejected. Liquidity has a positive effect to return on assets, return on equity, share price, price earnings ratio, and revenue. In the other hand, the return on sales, price earnings ratio and net income are insignificantly affected by liquidity.

Hypothesis 3: Depreciation negatively affects firm performance: Accepted. Depreciation negatively influences return on assets, return on equity, share price, earnings per shares, and price earnings ratio. While the remaining variables are not affected, i.e. return on sales, revenue and net income.

Hypothesis 4: Investment positively affects the firm performance: Rejected. Investment positively affects return on equity and revenue, while the remainders are insignificantly affected.

Hypothesis 5: Size positively affects firm performance: Accepted. Size is the most influential independent variables which positively affect seven variables, i.e. return on assets, return on equity, return on sales, share prices, earnings per shares, price earnings ratio, and revenue with no effect on net income.

Hypothesis 6a: Age positively affects firm performance: Rejected, Hypothesis 6b: Age negatively affects firm performance: Accepted. Age positively affects to revenue only and negatively affects return on assets, return on equity, return on sales, earning per share, and net income. While two other variables, share price and price earnings ratio, are not affected.

Hypothesis 7: Location positively affects firm performance: Rejected. Five variables are insignificantly affected by location while the price earnings ratio is negatively affected by location. The two remaining variables, revenue and net income, receives positive influence.

Hypothesis 8a: Ownership positively affects firm performance: Rejected, Hypothesis 8b: Ownership negatively affects firm performance: Rejected. Last variable is ownership. Six variables are not influenced, while other two are negatively affected by government possession, i.e. return on sales and net income.

Chapter 6.

Discussion and Findings

The results of the panel data analysis can be categorized into three types, the positive factor, the negative factor, and neutral factor. The positive factor is a situation where more than one accounting-based measure is positively influenced by the factor, while the negative factor is a factor that negatively affects two or three accounting-based firm performance. Lastly, the neutral factor is a factor that substantially affects less than one following variables: return on assets, return on equity, and return on sales.

Likewise, chapter 6 also provides about firms' management on each factor from 2001-2010 in average base, and discussion of the management within the industry, including firms and government. The last section is about the responses to panel committee in the interim review, especially the questions.

6.1 Positive Factors and Why: Liquidity and Size

The result about liquidity is surprising and far from the expectation. The hypothesis 2 asserts that liquidity negatively affects firm performance, the decreasing of liquidity leads the improving firm performance. However, the result shows that liquidity has positive relationships to firm performance, specifically return on assets and return on equity, higher liquidity companies lead to better performance.

The trade-off between liquidity and profitability (Ross, Westerfield, & Jordan, 2003 ; Saleem & Rehman, 2011 ; & Wang, 2002) is not applicable in energy and electricity industry in Japan. The finding shows that companies with more liquid assets achieve better performance. The question is how does the higher liquidity improve the performance?

The result of liquidity also shows a positive effect on the revenue, more liquid asset leads to the higher revenue. The revenue generated from the liquid asset is higher than the long-term assets. The effect on the revenue can be recognized for the impact of liquidity to return on sales and net income. Both variables (return on sales and net income) are not affected by liquidity. It means the higher liquidity does not have an effect to the business operation but the revenue. Shinada (2012) asserts that companies with conservative cash management generate better profitability during 2008 when the economy is deteriorated, however for the long term; the strategy erodes the companies' profitability.

In the research, liquidity is represented by current ratio, which formula is short-term assets divided by short-term liabilities. Short-term assets consist of cash and cash equivalent, marketable securities, account receivable, and inventory. Although, in the liquidity, fixed assets are not involved, inventory is the products of fixed assets, while the account receivable is the sold goods on credit.

Liquidity also positively affects the two market-based measures, share price and earnings per shares, higher liquidity has a higher share price and earnings per shares. It seems that the increasing of return on assets and return on equity have

generated an appreciation from the investor. The study of Shinada (2012) reports that investor appreciated the firm with a company which accumulated cash after 2008 because the company created fiscal and monetary policy support. In addition, the research also suggests that companies in Japan accumulated the cash during 1980-2010 because of the easiness of finding the cheap money in 2000s and cash-flow volatility in 1990s.

The second positive factor is the size. The research shows that the size positively affects all variables except net income. The finding conforms to the hypothesis 5: Size positively affects firm performance. Larger companies have better firm performance with the affected all accounting-based variables, return on assets, return on equity and return on sales.

As explained in the theoretical analysis, the size of the company supports the firm performance through 4 functions. They are (1) economies of scale in operations costing (Majumdar, 1997), (2) larger control over external stakeholders (Orlitzky, 2001), (3) support corporation to build various capabilities (Majumdar, 1997 & Orlitzky, 2001) and (4) better access to finance in term of internal resources, issuance of equity, or debt (Audretscha & Elston, 2002).

The effect of size to the firm performance through economies of scale can be recognized from the total revenue and profit margin. The economies of scale are achieved at one point where the revenue covers the total cost, and the next revenue generates the profit with increasing margin. The result shows that the revenue of companies conforms to the size, and the effect of the size has

influenced the profit margin as well. It means larger companies generate bigger revenue and bigger profit margin. Therefore, the increasing profit margin as increasing size indicates that the revenue has exceed the point where the total cost is covered, and the average cost-per-unit declines as revenue increases. Hence, this situation shows economies of scale are achieved.

Larger control over external stakeholders can be interpreted from the return on sales. When the bargaining position of the supplier and other stakeholder are good, companies can suppress the operating costs which result in higher profit margin. Since size positively affects return on sales as well, there is possibility that size positively affects firm performance with control over external stakeholder as a moderating factor.

Additionally, building the capacities as the advantages of companies' size can be observed from the investment, where the investment will affect financial performance. However, the outcome shows the investment positively affects return on equity and total revenue. Accordingly, for energy and electricity industry in Japan, the advantage of size is not led into firm performance through better financial access and building the capacities. In terms of the size backing firm performance through better financial accesses, the research does not give related results.

The market positively responds size of the companies. The investor valuation of firm performance in the market reflects the expectation on future performance while accounting based-measure is a reflection of historical performance (Gentry

& Shen, 2010). The result of the study shows that the investor believe the relationship between bigger companies with better performance in the future because the large companies will generate good profitability. In addition, the association between larger companies with better share price, higher earnings per shares and price earnings ratios are in line with the relationship of the size with the accounting-based measures.

6.2 Negative Factors and Why: Leverage, Depreciation and Age

The first negative factor is leverage. This result suits with the Hypothesis 1b: Leverage negatively affects firm performance, and against Hypothesis 1a: Leverage positively affects firm performance. Lower leverage leads to better firm performance, it means increasing the debt ratio worsen the firm performance. The affected variables are 3 accounting-based measures, i.e. return on equity, return on assets, and return on sales.

In terms of the optimal capital structures, the negative relation between leverage and firm performance shows the optimal point is exceeded. The current capital structure of energy and electricity in Japan are above the optimal structure. The benefit of debt is below the disadvantages of debt. Debt gives mores burden in the form of interest payment and financial distress (Coricelli, Driffield, Pal, & Roland, 2011) while the tax-deductible advantages of debt less support the company performance. This finding is contrary to the suggestion of Graham (2001) that regulated utility is one of the largest beneficiaries of tax advantage (Graham, 2001).

Leverage harms the profitability variables. The profit margin decreases as debt increases and resulting in lower net income. Going deeper, the leverage also harms earning from operation as reflected in return on asset. The tax advantages of debt losses against the interest burdens of debt and results lower return on equity. Further, earnings before interest and tax per assets also decreases as shown from the declining of return on assets, showing that the company loses focus on the improving the productivity.

The company loses focus on the productivity improvement, and concentrate more on how to generate cash flow to fulfil the debt responsibility (Coricelli, Driffield, Pal, & Roland, 2011). Hence, the profit margin has been eroded by leverage, and the generated net income becomes low, which is shown from the effect of leverage to the net income, which is also negatively affected. Graham (2001) suggests "many debt-conservative firms will reach the conclusion that they should use more debt" (Graham, 2001 , p. 54).

Furthermore, the investor in the market reacts through the share price. The share price declines as the increasing leverage. The increasing debt reflects the lack of internal funds to finance investment opportunities (Popescu & Visinescu, 2009). It means the firms do not have enough fund and investor react negatively. In this situation, investor expectation on the future of the company drops as the financial figures decreases. The effect on the share price conforms to the effect on return on equity, return on assets and return on sales.

A second negative factor is depreciation. Similar with leverage, this finding suits with the Hypothesis 3: Depreciation negatively affects firm performance. The independent variable significantly affects return on equity and return on assets, while return on sales is not affected. Although 3 market-based measures are influenced, net income and revenue are not affected.

Depreciation is the annual expenses which recorded in the profit and loss statement. The recording method of depreciation conforms to the accounting policy which consistently written since the beginning of fiscal year. This constant method on depreciation makes the variable insignificantly affects the profit margin and net income because the depreciation expenses are regularly taken.

However, negative reaction of the investor on depreciation does not conform to Chambers, Jennings, & Thompson II (1999) who assert that depreciation potentially contributes to the forward-looking role for earnings by providing information about future consumption per-period of fixed asset services (Chambers, Jennings, & Thompson II, 1999). The investor recognizes depreciation as regular expenses which erode the performance.

The last negative factor is age. This finding is in line with the hypothesis 6b but contrary to hypothesis 6a. The milk hypothesis (Coad, Segarra, & Teruel, 2010) is supported with the effect of age on the return on assets, return on equity, and return on sales. The firms in energy and electricity industry in Japan falls on inertia effects (Coad, Segarra, & Teruel, 2010), and corporate aging (Loderer & Waelchli, 2010).

Inertia effect is a condition where firm becomes less productive as age increases because of increasingly inert and inflexible. Old firms are exposed to obsolescence when they do not suit in the new business situation, and exposed to senescence because of the accumulation of regulations, habits, and organizational governance (Coad, Segarra, & Teruel, 2010).

Furthermore, corporate aging is supported 2 factors, i.e. organizational rigidities and rent seeking. Organizational rigidities result from the past success which followed by firms to transform their story into the organization, regulations, culture, process and habits. This situation creates the older company as rigid organization, where they has low profitability, lack of innovation, and experiencing degeneration with an unbalanced CEO compensation with the provided solution (Loderer & Waelchli, 2010).

Corporate aging and inertia effect can be observed from the influence of age to return on sales and net income. Negative relation means that older firms have a worse return on sales and net income. Moreover, the older firms failed to convert the increasing of revenue as shown from the positive effect of age to higher net income. The firms have lost the efficiency and profitability. Older firms have higher revenue and lower net income. Earnings per share are the only market-based measures that affected by age. This negative influence comes from the negative effect of age to net income.

However, the relation of age to revenue shows support for opposite hypothesis. The wine hypothesis (Coad, Segarra, & Teruel, 2010) is applicable to

the research. The result shows that there is a positive association between age and revenue; it means older companies have bigger sales. Although, over time the profit margin eroded by lower efficiency and profitability, the company is benefited from the establishment of accumulation of customer network (Coad et.al, 2010) which leads to higher revenue of older firms than of young firms.

The findings show that the age influence internal factor of the company (i.e. efficiency and productivity), not external factors (i.e. customers and stakeholders).

6.3 Neutral Factors and Why: Investment, Location, and Ownership

The first neutral factor is investment. It means investment insignificantly affects firm performance. Hence hypothesis 4: Investment positively affects the firm performance, are rejected. Investment positively affects return on equity and revenue, while the remainders are insignificantly affected.

This result is surprising because investment should increase the firm performance. The efforts of the firm to improve the firm performance through its capital expenditures find failure. The investment successfully increases the revenue as expected in the theoretical analysis that investments are seized and utilized as infrastructure to produce and distribute the goods and services of the company, in the end, to generate revenue (Stice & Stice, 2006). However, net income is insignificantly influenced and overall performances are insignificantly affected, with only return on equity is positively affected.

A study of Isobe et.al (2008) suggests improvement of existing assets over integration of new assets because the ability of improving technology in line with

ability to integrating new technology. Their study reveals that refinement capability improves operational efficiency while reconfiguration has better strategic performance than of refinement. In energy and electricity industry, the firms had successfully acquired the customers with higher sales but failed to increase the profitability, thus the refinement of technology is more required than the reconfiguration of new assets.

Next neutral factor is location. Location insignificantly affects 3 accounting-based measures. Therefore, hypothesis 7: Location positively affects firm performance, are rejected. Five variables are insignificantly affected by location while negatively affects the location and positively affects revenue and net income.

Firms which have advantages over location is failed to convert the positive effect on revenue and net income into better firm performance. However, this advantage difficult to maintain, especially to increase the profit margin because there is a trade-off between location and price, location close to the market have more expensive price factor (Rothenberg, 2011).

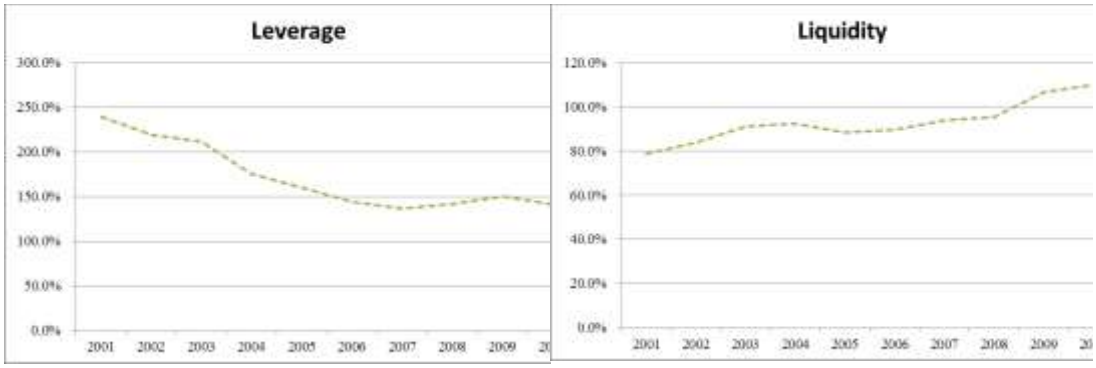
Lastly, ownership insignificantly affects firm performance. Hence, hypothesis 8a: Ownership positively affects firm performance, and hypothesis 8b: Ownership negatively affects firm performance, are rejected. State ownership negatively affects return on sales and net income.

The negative effect on return on sales and net income indicates that the financial benefit of the firm is not the main objective of the state. The government

pursues a different objective rather than firm performance and sacrifice the financial measure as asserted by Yu (2013) & Kiruri (2013). Therefore, the larger government shares have a lower return on sales and net income.

6.4 Firms' Management on the Factors

Leverage is one of the negative factors. It means higher leverage leads lower firm performance. Within energy and electricity industry, average of leverage shows sharply declining from 2001-2010. The firms take appropriate actions during the timeline, and the result shows the portion of the debt is decreasing as shown in the figure 6.1.



(Data taken from S&P Capital IQ)

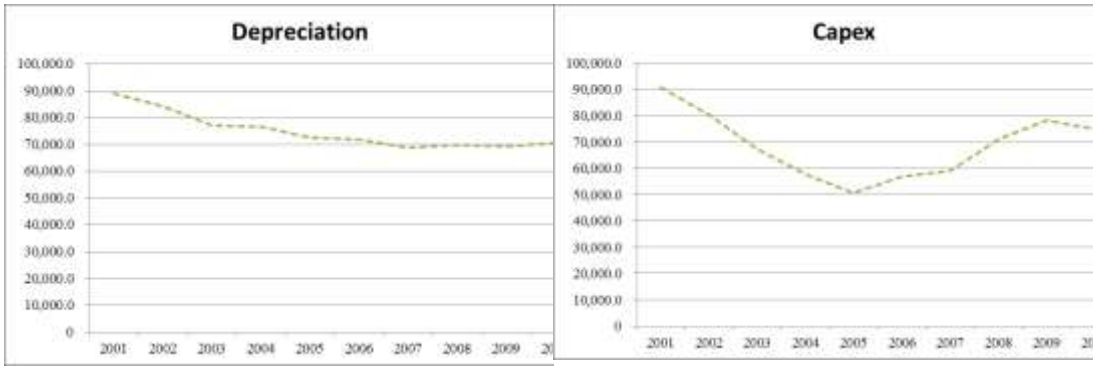
Figure 6.1: Industrial average of leverage and liquidity in 2001-2010

Similar action is also taken for liquidity. Since the variable has a positive relation to financial performance, the companies within the industry improve their liquidity from 2001 to 2010, as shown in figure 7, to gain the advantages of having more liquid assets and enjoy better performance.

In terms of depreciation, although the average data is declining, and it has a negative relation to firm performance, the treatment of depreciation has followed

the accounting policy. The depreciation charge relates to the fixed assets and capital expenditure.

The average of capital expenditure as a proxy of investment shows decline from 2005, and begin to increase constantly in the following year. Although investment is a neutral factor, positive influences receive by revenue. The firms exploit the variable to improve the revenue after 2005. However, the firm needs to shift the focus of investment to improve the profit margin through increasing efficiency and productivity.

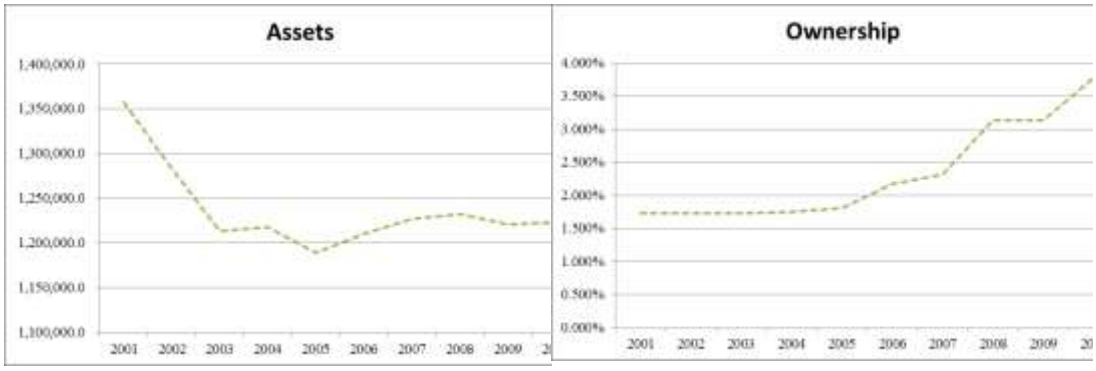


(Data taken from S&P Capital IQ)

Figure 6.2: Industrial average of depreciation and capital expenditure in 2001-2010

A size which is represented by assets, positively affects firm performance. It means higher assets generate better financial performance. However, the historical data of assets in 2001-2010 shows sharply declines in first 3 years and followed by shaky patterns until the end of the period. The firms' policy to reduce the debts seems to restrict the companies to find alternative financial sources and limit the asset acquisition.

Likewise, the average of state ownership from 2001 to 2010 is significantly increasing, although government ownership negatively affects return on sales and net income. It seems Japanese government has an agenda to increase their ownership in energy and electricity industry.



(Data taken from S&P Capital IQ)

Figure 6.3: Industrial average of assets and state ownership in 2001-2010

Location is a neutral factor which does not affect the firm performance. However, better location contributes to higher revenue and higher net income. It is common there is a trade-off between location and price. The better place for business has a more expensive price to pay (Rothenberg, 2011). It means, even though in the good places firms gain higher revenue, they also bear higher cost of the operation. Therefore, better location contributes for higher sales and earnings, but insignificantly affects firm performances.

6.5 Discussions for the Manager

In terms of leverage, executive in the firms have taken proper measures by constantly reduce the debt from the capital structure since the disadvantages of loan is higher than the benefit. Firms should keep the policy to decrease the debt

portion over equity until the benefit of debt is higher than the disadvantages of debt, though the strategy also restricts the capability of firms to acquire the assets. Firms should look for an alternative source of funds because the assets positively affect the firm performance. Retained earnings are one of the solutions. The firm can utilize the more retained earnings and avoid high dividends for shareholder in order to improve the ability to purchase more assets, and create a virtuous cycle between high assets and firm performance.

Further, the firms should manage the retained earning carefully since the investment has an insignificant relationship to financial performance, even though the size has a positive association; while liquidity has positive associations. If the investment is taken as usual, the result only boosts return on equity and revenue. Firms should review the investment plan and alter the focus of investment to not only to improve the revenue, but also to repair the operational efficiency and productivity. Thus, the effort of creating a virtuous cycle will find the success.

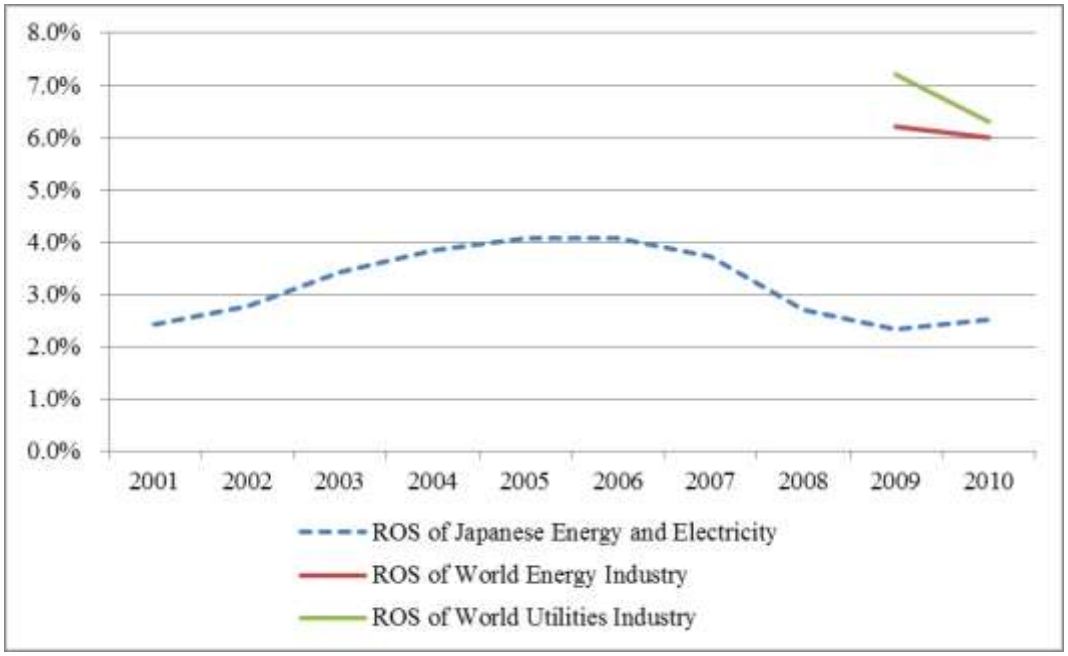
Furthermore, if the rearrangement of investment plan finds disappointment, firms should maintain the liquidity in high condition. The economic situation has led the higher liquidity enhances the profitability for the short term. The manager appropriately manages the cash management and enjoys higher performance as the increasing of liquidity (Shinada, 2012). The manager should keep monitoring the economic situation, and prepare a long-term performance through selective investment.

Another key factor is age. Age has the negative effect of the dependent variables, but positive influence on revenue. The firms failed to convert their advantages over the experiences and skills to improve the efficiency and productivity. The manager should rejuvenate the firms and transform the companies into more flexible and adaptive by carefully observe the environmental change and the competitors, review the internal regulation, evaluate the organizational structure, assess the decision-making process and monitor the current technology.

6.6 Policy Implication

Japanese government as the energy policy-maker can use the research as consideration in building the energy policy with sustainable result, especially from the corporation's perspective, where the profit-seeking is one of the reasons to involve in the industry. While governments in developing countries, especially Indonesia, the research is important since the energy system in Japan involves the private companies with high efficiency, which is a good model for Indonesia.

The role of the government is creating the rule of the game in the industry by making the policy and regulation. The industry plays important roles in the Japanese economic growth with public and private parties manage the business. The reason of private parties joins the business is to gain profit as reflected in the financial performance. The financial performances of energy and electricity firms in Japan are far from the global average as compared using the graphs below.

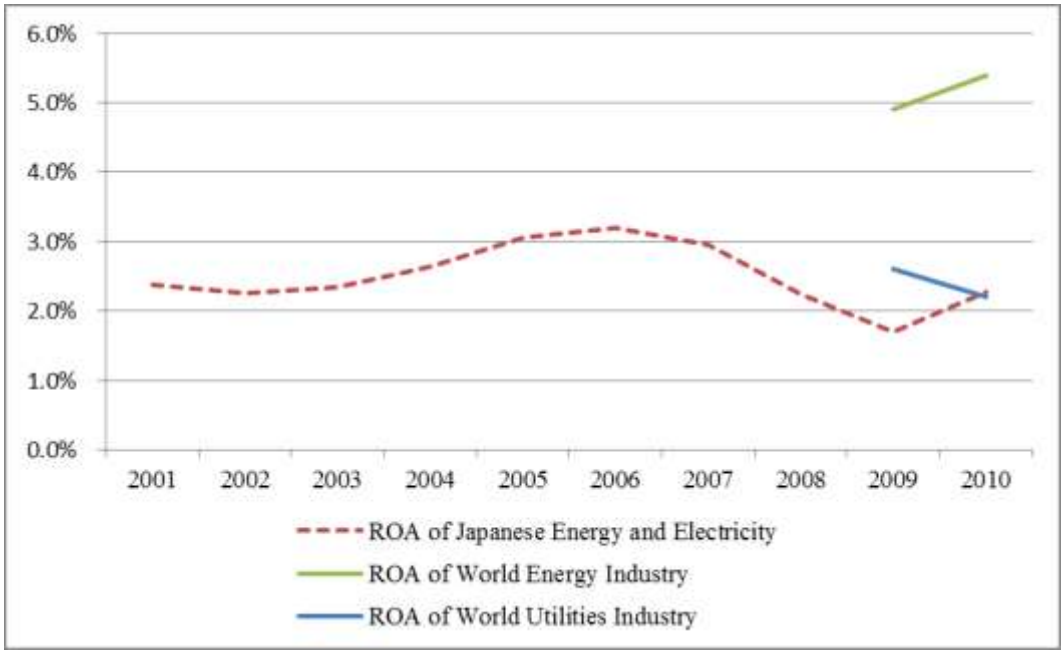


(Data taken from S&P Capital IQ)

Figure 6.4: Industrial average of return on sales of 2001-2010

First graph, as shown in the figure 6.4, displays the average of return on sales the energy and electricity in 2001-2010. The average return on sales shows that during the first 6 years, the graphic is slightly increasing, and the return on sales is increased from 2.4% to 4.01%. It means the firms have managed the business properly and improve the productivity. However, the situation is altered in 2007-2010. The return on sales was dropped from 4.1% to 2.5%, even worse; the figure was 2.3% in 2009. It seems that the industry was influenced by economic recession in 2008.

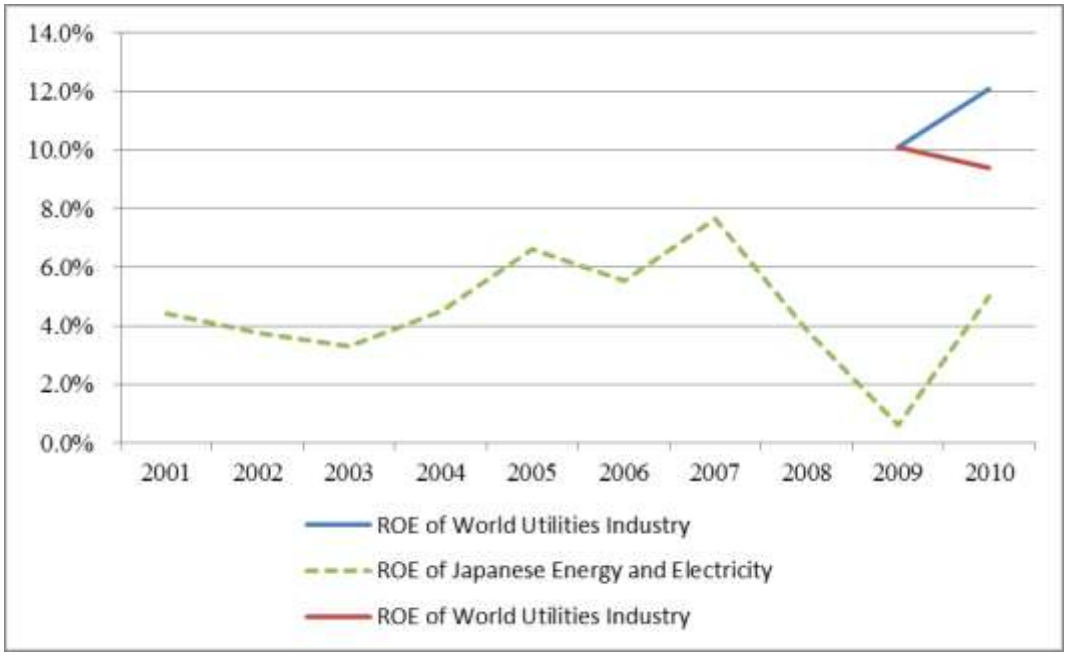
In comparison, in 2009-2010 the global industrial averages of return on sales were 6.2%-6.0% (energy industry) and 7.2%-6.0% (utilities industry). The global industry averages are far above Japanese industrial average. Japan energy and electricity industry gave lower profitability in term of return on sales.



(Data taken from S&P Capital IQ)

Figure 6.5: Industrial average of return on assets of 2001-2010

The graph in figure 6.5 is about return on assets compared with global average. The pattern of return on assets in 2001-2010 is similar to the return on sales, increasing in 2001-2006, and declining in 2007-2010. The 2008 economic crisis stopped the improvement of the financial performance in term of return on assets during the six years from 2001-2006. However, the market average of return on assets for utilities sector is slightly higher than of Japanese, and the market average of return on assets for the energy sector is considerably higher than of Japanese. Return on equity, as shown in figure 6.6, has a more chaotic pattern than two previous graphs. However, in general, the situation is similar, where economic recession altered the enhancement, and market average is far higher than of Japanese.



(Data taken from S&P Capital IQ)

Figure 6.6: Industrial average of return on equity in 2001-2010

The government has started the deregulation in the energy and electricity sector and introduce competition. Market mechanisms will enhance the productivity and create competitive price of energy. Limitation of the primary energy supply has pressed down the profitability of the firms. Therefore, the promotion of renewable energy utilization is a good move to reduce the energy dependent.

Financial performance is not the reason government involved directly in the firm's ownership. In fact, the percentage of state ownership has a negative relation with profit margin and net income. Bigger government shares have generated lower net income and lower profit margin. Government uses the firms to provide affordable energy. This situation is not favourable for the investor who looking

for profit for the involvement in the industry. At least, government ownership is not an indicator of investor to join in the industry.

The trade-off mechanism for location (Rothenberg, 2011) has assisted the government to provide the energy availability in both the rural area and urban area and create a neutral relation on between location and firm performance. Hereafter government does not require any location-based incentive to attract the investor for putting the investment.

Since size has a positive impact on the performance, regarding the policy, the government should have a certain minimum capital requirement for the new entry of industry, in order to make sure the company is able to invest at certain technology, sustain the business, and generate profit in the future.

The result reveals that liquidity positively affects firm performance. This condition contrasts with the theory that mention there is a trade-off between liquidity and profitability (Ross, Westerfield, & Jordan, 2003 ; Saleem & Rehman, 2011 ; Wang, 2002), increasing more of one means giving up some of the other. Shinada (2012) asserts that economic situation makes the company with higher liquidity generates better profitability. The government should maintain the economic condition in order to improve the firms confident on liquidity management.

Government can attract more investment using fiscal incentive. Regulated utility is one of the largest beneficiaries of the tax advantage (Graham, 2001). Accordingly, taxes are not an issue for the industry. It is also reflected from the

relation of higher leverage generates lower performance. Higher leverage also means lower taxes. Likewise, the two variable, i.e. return on assets (before taxes) and return on equity (after taxes), are simultaneously affected except investment. On the other hand, depreciation negatively affects firm performance. Government can create the incentive through change the policy in depreciation, for example, using an accelerated depreciation method.

The government should make a policy stimulate the firms to utilize the advantages of age. Regulated industry makes the firms confidently believe that new entrants are restricted, and less competition makes the established firms are comfortable with the situation. Change the policy by open the market will force the firms to improve the performance. In addition, shifting the energy policy also push the firm to learn new technology.

To recap, the industrial averages of financial performance are far above the Japanese. It is possible to achieve the numbers through collaboration between government policy and firms effort.

Chapter 7.

Conclusion

Chapter 7 is the last chapter in the research. This chapter provides the thesis summary in order to give a brief explanation about the research. The research outcomes and research implications, specifically for the future research, follows the thesis summary.

7.1 Thesis Summary

The introduction explains about the background why the research chooses energy and electricity industry in Japan, regarding the economic growth, energy consumption and publicly and privately firm's involvement in the industry. In fact, the government setup the regulation so the private corporation able to dominate the industry where the supplies majority come from overseas. Giving those circumstances, the study about the firm-level performance is interesting.

The significant of the study are (1) to provide research on energy and electricity sector in firm-level, (2) to provide the recommendation for the government as regulator, and (3) to provide a reference in future research. While this industry case is mainly expected to answer the following questions, i.e. (1) what are the factors affecting financial performances of energy and electricity firms in Japan? Also, (2) how do those factors influence the financial performances of energy firms in Japan?

Align with the problem statements, the research is intended to identify and describe-explanatory the factors affecting financial performances of energy and electricity firms in Japan. Theoretical analysis produces eight hypotheses which will be tested using quantitative analysis. The research takes data from S&P Capital IQ, COMPUSTAT, Tokyo Stock Exchange and the Japanese Statistical Bureau. The panel data regression (i.e. fixed effects and random effects) of STATA reveals following findings:

1. Hypothesis 1a: Leverage positively affects firm performance: Rejected, Hypothesis 1b: Leverage negatively affects firm performance: Accepted.
2. Hypothesis 2: Liquidity negatively affects firm performance: Rejected.
3. Hypothesis 3: Depreciation negatively affects firm performance: Accepted.
4. Hypothesis 4: Investment positively affects the firm performance: Rejected.
5. Hypothesis 5: Size positively affects firm performance: Accepted.
6. Hypothesis 6a: Age positively affects firm performance: Rejected, Hypothesis 6b: Age negatively affects firm performance: Accepted.
7. Hypothesis 7: Locations positively affects firm performance: Rejected.
8. Hypothesis 8a: Ownership positively affects firm performance: Rejected, Hypothesis 8b: Ownership negatively affects firm performance: Rejected.

7.2 Research Outcomes

Regarding the relation between each independent variable with dependent factors, the results of the panel data analysis can be categorized into three types, the positive factor, the negative factor, and the neutral factor. Theoretically based

on the association, to improve the firm performance, the firms should increase the positive factors and decrease the negative factors.

Positive factor is a factor which positively influences two or more accounting-based measures. The positive factors are liquidity represents current ratio and size represents assets. The economic situation makes the company with high liquidity enjoy high profitability for the short run (Shinada, 2012). Furthermore, size gives advantage the firms through (1) economies of scale in operations costing (Majumdar, 1997), (2) larger control over external stakeholders (Orlitzky, 2001), and (3) support corporation to build various capabilities (Majumdar, 1997 & Orlitzky, 2001).

Negative factor is factor negatively affects two or more accounting-based firm performance. The negative factors are leverage represent debt to equity ratio, depreciation and age. The detriments of the debt in the form of interest payment and financial distress (Coricelli, Driffield, Pal, & Roland, 2011) excess the advantages of the debt. Consequently, increasing debt will harm the performance. Although older companies enjoy higher revenue, the firms in energy and electricity industry in Japan also falls on inertia effects (Coad, Segarra, & Teruel, 2010), and corporate aging (Loderer & Waelchli, 2010).

Lastly, the neutral factor is a factor affects one or less following variables: return on assets, return on equity, and return on sales. The neutral factors are investment represent capital expenditures, location, and government ownership. The investment successfully improves the revenue but failed to increase the firm

performance. The trade-off between location and price (Rothenberg, 2011) support the neutrality of location. Meanwhile, neutral effect of state ownership shows that the government does not look for the financial benefit through the state-owned enterprises.

7.3 Research Limitation

Regarding the characteristic of the energy and electricity industry in Japan, this research has the following limitation.

The research does not reflect the renewable energy industry. Japan relies on petroleum as the main energy sources. Even though several measures had been taken, other sources of energy are non-renewable energy such as coal, gas, and nuclear (Statistic Bureau, 2013). In the posture of energy in 2011, Japan used hydro power as resources by 3.3 percent and other renewable sources, such as geothermal, solar energy, wind power, biomass energy, were also utilized with a very small amount.

In addition, energy and electricity industry in Japan was highly regulated. The step liberalization was started in 1995 (Ministry of Economy, Trade, and Industry). However, until 2001, the deregulation has not fully completed, specifically for the gas utilities and electricity utilities. The electricity market for customers with demand less than 50kWe is still regulated (Takase & Suzuki, 2011), Furthermore, in gas utilities, 42 percent of the market is highly regulated (Osaka Gas , 2012). Accordingly, the energy and electricity industry in Japan is semi-regulated.

7.4 Implication for Future Research Needs

The replication of this research is recommended, especially with different time spanning. The earthquake-triggered-tsunami in 2011 had reshaped the energy policy in Japan, precisely related policy of nuclear annihilation and renewable utilization. The situation has reset the target every company and significantly changes the direction of the future of the industry, and probably the internal factors. This time forward is a good object to investigate. Therefore, the result will provide the different timeline. The comparison of two findings will reveal the shifting of the firms' characters post energy policy changing, which is a valuable input for government and companies.

This 10-year case study analysis is applicable for a generalization of factors affecting firm performance, specifically energy and electricity industry. The generalization does not conform to other industries because energy and electricity industry is semi-regulated, while different industries are not. The finding of leverage is the example. This research finds that leverage has a negative relation with financial performance. In the previous research, many scholars across countries reveal the significant association of leverage with firm performance, i.e. Greece industrial (Liargovas & Skandalis, 2010) Jordanian insurance industry (Almajali, Alamro, & Al-Soub, 2012) and Indonesian public companies (Prasentyatoko & Rachmadi, 2008).

However, only Prasentyatoko & Rachmadi (2008) report the direction of the relationship, which is similar to the finding of this research, negative. Although

the findings are similar, it cannot be generalized that every financial performance analysis will have similar results because the characteristic of every industry is different. The table 6.1 shows the leverage of industries in the United States in 2000. The numbers of debt to equity ratio are varying from 2.83% to 126.46%. It demonstrates that there is no consensus, because the figures are determined by the characteristic of the industry, i.e. volatility of earnings before interest and taxes; asset types (Ross, Westerfield, & Jordan, 2003).

Table 7.1: Leverage for U.S. Industries in 2000

Industry	Debt to Equity Ratio (%)	Number of Companies
Dairy products	15.47	8
Fabric apparel	29.93	38
Paper	58.99	30
Drugs	2.83	161
Petroleum refining	43.55	12
Rubber footwear	41.22	6
Steel	126.46	28
Computers	7.42	90
Motor vehicles	71.21	39
Aircraft	20.44	5
Airlines	90.49	17
Cable television	68.66	8
Electric utilities	99.43	54
Department store	110.43	8
Eating places	39.49	62

(Source: Ross et.al, 2003, p.593)

In term of similar industry, the result of this research is still applicable to the current situation because the market has same characteristics. The shifted energy policy has influenced the direction of the industry, especially in the investment. However, the result shows that the investment has neutral relation to firm

performance; it means different energy policy provides an opportunity to alter the investment plans.

Further, the interpretation of the research has been done carefully with several limitations. In order to build the argumentation of detail explanation for the relation between controlled factors and dependent variables, the research uses three connections, i.e. factor - revenue, factor - net income, and factor - return on sales. Hence, this research suggests details study about the each component of independent factors, specifically positive factor and negative factors with each of firm performance measures.

For example, the research reveals that liquidity has a positive association with financial performance. Detail investigation about the relation of the component of liquidity with the financial measures is encouraged. Components of liquidity are the cash, account receivables, inventory, short-term debt, and account payable. Inventory turnover, account receivable turnover and account payable turnover show how long firm generates the money for the raw materials. New study uses these variables as independent variables can define details explanation on the positive relation of liquidity and the firm performance.

Chapter 8.

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Chapter 9.

Appendices

A. List of Companies for the the Research

Table 9.1: Name and Category of the Companies in the Research		
No	**Firm**	**Categories**
1	CHUBU ELECTRIC POWER CO INC	Electricity
2	CHUGOKU ELECTRIC POWER CO	Electricity
3	ELEC POWER DEVELOPMENT CO	Electricity
4	HOKKAIDO ELECTRIC POWER CO	Electricity
5	HOKURIKU ELECTRIC POWER CO	Electricity
6	JAPAN WIND DEV CO LTD	Electricity
7	KANSAI ELECTRIC POWER CO	Electricity
8	KYUSHU ELECTRIC POWER CO INC	Electricity
9	OKINAWA ELECTRIC POWER CO	Electricity
10	SHIKOKU ELECTRIC POWER CO	Electricity
11	TOHOKU ELECTRIC POWER CO INC	Electricity
12	TOKYO ELECTRIC POWER CO INC	Electricity
13	CHUBU GAS CO LTD	Gas utilities
14	HIROSHIMA GAS CO LTD	Gas utilities
15	HOKKAIDO GAS CO LTD	Gas utilities
16	HOKURIKU GAS CO LTD	Gas utilities
17	KEIYO GAS CO LTD	Gas utilities
18	OSAKA GAS CO LTD	Gas utilities
19	OTAKI GAS CO LTD	Gas utilities
20	SAIBU GAS CO LTD	Gas utilities
21	SHINNIHON GAS CORP	Gas utilities
22	SHIZUOKAGAS CO LTD	Gas utilities
23	TOHO GAS CO LTD	Gas utilities
24	TOKYO GAS CO LTD	Gas utilities
25	AOC HOLDING	Oil and Gas, Oil & Coal Products
26	COSMO OIL CO LTD	Oil and Gas, Oil & Coal Products

27	DAIYA TSUSHO CO LTD	Oil and Gas, Retail Trade
28	INPEX CORP	Oil and Gas, Mining
29	JAPAN PETROLEUM EX	Oil and Gas, Mining
30	KANTO NATURAL GAS DEVELOPMENT	Oil and Gas, Mining (K&O)
31	NIPPON SEIRO CO LTD	Oil and Gas, Oil & Coal Products
32	SHOWA SHELL SEKIYU KK	Oil and Gas, Oil & Coal Products
33	TONEN GENERAL SEKIYU CORP	Oil and Gas, Oil & Coal Products
34	FUJI KOSAN CO LTD	Oil and Gas, Wholesale Trade
35	ITOCHU ENEX CO LTD	Diversified, Wholesale Trade
36	IWATANI CORP	Diversified, Wholesale Trade
37	KAMEI CORP	Diversified, Wholesale Trade
38	MISUMI CO LTD	Diversified, Wholesale Trade
39	MITSUUROKO GROUP HOLDINGS CO LTD	Diversified, Wholesale Trade
40	NEW JAPAN CHEMICAL CO LTD	Diversified, Chemicals
41	NISSIN SHOJI CO LTD	Diversified, Wholesale Trade
42	SAN-AI OIL CO LTD	Diversified, Wholesale Trade
43	SANRIN CO LTD	Diversified, Wholesale Trade
44	TOKAI HOLDING CORP	Diversified, Wholesale Trade
45	TOYO KANETSU CORP	Diversified, Machinery
46	UEHARA SEI SHOJI CO LTD	Diversified, Wholesale Trade

B. STATA result of Fixed Effects Estimators

1. Return on Assets as Dependent Variable

```
. xtreg ROA Leverage Liquidity Ln_Depreciation Investment Size Age Location Ownership, fe
note: Location omitted because of collinearity

Fixed-effects (within) regression               Number of obs      =       383
Group variable: Company_code                    Number of groups   =        46

R-sq:  within  = 0.1199                         Obs per group: min =         1
       between = 0.0516                                        avg =       8.3
       overall = 0.0027                                        max =         9

                                                F(7,330)           =      6.42
corr(u_i, Xb)  = -0.9543                        Prob > F           =    0.0000
```

ROA	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
Leverage	-.0030807	.0010084	-3.06	0.002	-.0050643	-.0010971
Liquidity	.0133737	.0045749	2.92	0.004	.004374	.0223733
Ln_Depreciation	-.0127823	.0044059	-2.90	0.004	-.0214495	-.004115
Investment	-5.73e-06	.0012924	-0.00	0.996	-.0025481	.0025367
Size	.0273033	.0061764	4.42	0.000	.0151532	.0394534
Age	-.0018288	.0003205	-5.71	0.000	-.0024593	-.0011984
Location	0	(omitted)				
Ownership	-.0398511	.0297508	-1.34	0.181	-.0983763	.0186741
_cons	-.0866632	.0470843	-1.84	0.067	-.1792864	.0059601
sigma_u	.05246635					
sigma_e	.01246505					
rho	.94657072	(fraction of variance due to u_i)				

```
F test that all u_i=0:     F(45, 330) =     9.14             Prob > F = 0.0000
```

2. Return on Equity as Dependent Variable

```
. xtreg ROE Leverage Liquidity Ln_Depreciation Investment Size Age Location Ownership, fe
note: Location omitted because of collinearity

Fixed-effects (within) regression               Number of obs      =       383
Group variable: Company_code                    Number of groups   =        46

R-sq:  within  = 0.1260                         Obs per group: min =         1
       between = 0.0718                                        avg =       8.3
       overall = 0.0139                                        max =         9

                                                F(7,330)           =      6.80
corr(u_i, Xb)  = -0.9836                        Prob > F           =    0.0000
```

ROE	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
Leverage	-.0324532	.0079996	-4.06	0.000	-.0481899	-.0167166
Liquidity	.0859188	.0362941	2.37	0.018	.0145219	.1573157
Ln_Depreciation	-.1239529	.0349536	-3.55	0.000	-.1927128	-.055193
Investment	.0202707	.0102531	1.98	0.049	.000101	.0404405
Size	.2167198	.0489995	4.42	0.000	.120329	.3131105
Age	-.0097125	.0025426	-3.82	0.000	-.0147143	-.0047108
Location	0	(omitted)				
Ownership	-.117386	.2360225	-0.50	0.619	-.5816844	.3469125
_cons	-1.083352	.3735344	-2.90	0.004	-1.818161	-.3485431
sigma_u	.30674477					
sigma_e	.09888906					
rho	.90585429	(fraction of variance due to u_i)				

```
F test that all u_i=0:     F(45, 330) =     1.19             Prob > F = 0.1939
```

3. Return on Sales as Dependent Variable

```
. xtreg ROS Leverage Liquidity Ln_Depreciation Investment Size Age Location Ownership, fe
note: Location omitted because of collinearity

Fixed-effects (within) regression               Number of obs      =       389
Group variable: Company_code                    Number of groups   =        46

R-sq:  within  = 0.1826                         Obs per group: min =         1
       between = 0.0697                                        avg =       8.5
       overall = 0.0431                                        max =         9

                                                F(7,336)           =     10.73
corr(u_i, Xb)  = -0.9135                        Prob > F           =    0.0000
```

ROS	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
Leverage	-.0045313	.0009696	-4.67	0.000	-.0064385	-.0026241
Liquidity	.0020836	.0051775	0.40	0.688	-.0081007	.0122679
Ln_Depreciation	-.0072411	.0049832	-1.45	0.147	-.0170433	.0025612
Investment	-.0005118	.0014496	-0.35	0.724	-.0033631	.0023396
Size	.0346742	.007103	4.88	0.000	.0207023	.0486461
Age	-.0019832	.000359	-5.52	0.000	-.0026894	-.0012769
Location	0	(omitted)				
Ownership	-.0811464	.0345575	-2.35	0.019	-.1491226	-.0131701
_cons	-.1969402	.0543864	-3.62	0.000	-.303921	-.0899595
sigma_u	.07311355					
sigma_e	.01449312					
rho	.96219149	(fraction of variance due to u_i)				

```
F test that all u_i=0:     F(45, 336) =    17.29             Prob > F = 0.0000
```

4. Share Price as Dependent Variable

```
. xtreg Ln_share_price Leverage Liquidity Ln_Depreciation Investment Size Age Location Ownership, fe
note: Location omitted because of collinearity

Fixed-effects (within) regression               Number of obs      =       386
Group variable: Company_code                    Number of groups   =        46

R-sq:  within  = 0.3137                         Obs per group: min =         1
       between = 0.1539                                        avg =       8.4
       overall = 0.1216                                        max =         9

                                                F(7,333)           =     21.74
corr(u_i, Xb)  = -0.5835                        Prob > F           =    0.0000
```

Ln_share_price	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
Leverage	-.1766711	.0273596	-6.46	0.000	-.2304907	-.1228516
Liquidity	.3039906	.0999295	3.04	0.003	.1074179	.5005633
Ln_Depreciation	-.4438364	.0968489	-4.58	0.000	-.6343491	-.2533237
Investment	.0411234	.0280254	1.47	0.143	-.0140058	.0962526
Size	1.167679	.1550696	7.53	0.000	.8626392	1.472718
Age	.0002212	.0070076	0.03	0.975	-.0135635	.0140058
Location	0	(omitted)				
Ownership	-.5480775	.6596975	-0.83	0.407	-1.845777	.7496224
_cons	-4.112307	1.285352	-3.20	0.002	-6.64074	-1.583873
sigma_u	1.6441825					
sigma_e	.27647582					
rho	.97250177	(fraction of variance due to u_i)				

```
F test that all u_i=0:     F(45, 333) =    64.72             Prob > F = 0.0000
```

5. Earnings per Shares as Dependent Variable

```
. xtreg EPS Leverage Liquidity Ln_Depreciation Investment Size Age Location Ownership, fe
note: Location omitted because of collinearity

Fixed-effects (within) regression               Number of obs      =       389
Group variable: Company_code                    Number of groups   =        46

R-sq:  within  = 0.0790                         Obs per group: min =         1
       between = 0.3010                                        avg =       8.5
       overall = 0.1927                                        max =         9

                                                F(7,336)           =      4.12
corr(u_i, Xb)  = -0.7866                        Prob > F           =    0.0002
```

EPS	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
Leverage	-2.66939	2.9182	-0.91	0.361	-8.409633	3.070853
Liquidity	33.8435	15.58306	2.17	0.031	3.190845	64.49616
Ln_Depreciation	-58.78597	14.99852	-3.92	0.000	-88.2888	-29.28314
Investment	-4.517761	4.362892	-1.04	0.301	-13.09979	4.064263
Size	102.4669	21.37848	4.79	0.000	60.41441	144.5195
Age	-3.711004	1.08065	-3.43	0.001	-5.836695	-1.585312
Location	0	(omitted)				
Ownership	-25.42348	104.0107	-0.24	0.807	-230.0177	179.1708
_cons	-404.982	163.6917	-2.47	0.014	-726.9716	-82.99234
sigma_u	105.18703					
sigma_e	43.621244					
rho	.85325867	(fraction of variance due to u_i)				

```
F test that all u_i=0:     F(45, 336) =    11.91             Prob > F = 0.0000
```

6. Price Earnings Ratio as Dependent Variable

```
. xtreg PE_Ratio Leverage Liquidity Ln_Depreciation Investment Size Age Location Ownership, fe
note: Location omitted because of collinearity

Fixed-effects (within) regression               Number of obs      =       389
Group variable: Company_code                    Number of groups   =        46

R-sq:  within  = 0.0993                         Obs per group: min =         1
       between = 0.0115                                        avg =       8.5
       overall = 0.0102                                        max =         9

                                                F(7,336)           =      5.29
corr(u_i, Xb)  = -0.7807                        Prob > F           =    0.0000
```

PE_Ratio	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
Leverage	28.76311	27.2742	1.05	0.292	-24.8866	82.41281
Liquidity	-219.825	145.6431	-1.51	0.132	-506.3121	66.66218
Ln_Depreciation	-448.8769	140.1798	-3.20	0.001	-724.6175	-173.1363
Investment	-18.96003	40.77665	-0.46	0.642	-99.16971	61.24965
Size	922.9859	199.8085	4.62	0.000	529.9527	1316.019
Age	3.173	10.10002	0.31	0.754	-16.69423	23.04023
Location	0	(omitted)				
Ownership	214.29	972.1095	0.22	0.826	-1697.897	2126.477
_cons	-7089.624	1529.902	-4.63	0.000	-10099.02	-4080.231
sigma_u	1237.5121					
sigma_e	407.69472					
rho	.9020912	(fraction of variance due to u_i)				

```
F test that all u_i=0:     F(45, 336) =    15.53             Prob > F = 0.0000
```

7. Total Revenue as Dependent Variable

```
. xtreg Ln_Revenue Leverage Liquidity Ln_Depreciation Investment Size Age Location Ownership, fe
note: Location omitted because of collinearity

Fixed-effects (within) regression               Number of obs      =       389
Group variable: Company_code                    Number of groups   =        46

R-sq:  within  = 0.6657                         Obs per group: min =         1
       between = 0.6622                                        avg =       8.5
       overall = 0.6621                                        max =         9

                                                F(7,336)           =     95.60
corr(u_i, Xb)  = 0.0120                         Prob > F           =    0.0000
```

Ln_Revenue	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
Leverage	-.0027496	.0083387	-0.33	0.742	-.0191522	.0136531
Liquidity	.0962971	.0445283	2.16	0.031	.0087077	.1838866
Ln_Depreciation	-.0388279	.042858	-0.91	0.366	-.1231316	.0454759
Investment	.0384582	.0124669	3.08	0.002	.0139352	.0629812
Size	.6498018	.0610886	10.64	0.000	.5296375	.7699661
Age	.0334611	.0030879	10.84	0.000	.027387	.0395353
Location	0	(omitted)				
Ownership	.2064823	.2972087	0.69	0.488	-.3781419	.7911066
_cons	1.963337	.467746	4.20	0.000	1.043257	2.883416
sigma_u	1.0074872					
sigma_e	.1246469					
rho	.98492398	(fraction of variance due to u_i)				

```
F test that all u_i=0:     F(45, 336) =   118.99             Prob > F = 0.0000
```

8. Net Income as Dependent Variable

```
. xtreg Net_Income Leverage Liquidity Ln_Depreciation Investment Size Age Location Ownership, fe
note: Location omitted because of collinearity

Fixed-effects (within) regression               Number of obs      =       389
Group variable: Company_code                    Number of groups   =        46

R-sq:  within  = 0.0512                         Obs per group: min =         1
       between = 0.0342                                        avg =       8.5
       overall = 0.0250                                        max =         9

                                                F(7,336)           =      2.59
corr(u_i, Xb)  = -0.7430                        Prob > F           =    0.0129
```

Net_Income	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
Leverage	-3481.814	1878.831	-1.85	0.065	-7177.567	213.9393
Liquidity	-3229.51	10032.88	-0.32	0.748	-22964.67	16505.65
Ln_Depreciation	-6032.284	9656.528	-0.62	0.533	-25027.15	12962.58
Investment	-841.9223	2808.97	-0.30	0.765	-6367.305	4683.46
Size	15300.95	13764.15	1.11	0.267	-11773.82	42375.72
Age	-1995.449	695.7572	-2.87	0.004	-3364.038	-626.8604
Location	0	(omitted)				
Ownership	-131138.3	66965.45	-1.96	0.051	-262862.7	585.9934
_cons	32020.41	105390	0.30	0.761	-175286.9	239327.7
sigma_u	57281.157					
sigma_e	28084.758					
rho	.80619754	(fraction of variance due to u_i)				

```
F test that all u_i=0:     F(45, 336) =     5.86             Prob > F = 0.0000
```

C. STATA result of Random Effects Estimators

1. Return on Assets as Dependent Variable

```
. xtreg ROA Leverage Liquidity Ln_Depreciation Investment Size Age Location Ownership, re

Random-effects GLS regression                   Number of obs      =       396
Group variable: Company_code                    Number of groups   =        46

R-sq:  within  = 0.0823                         Obs per group: min =         6
       between = 0.0509                                        avg =       8.6
       overall = 0.0386                                        max =         9

                                                Wald chi2(8)       =     27.98
corr(u_i, X)   = 0 (assumed)                    Prob > chi2        =    0.0005
```

ROA	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
Leverage	-.0020698	.001064	-1.95	0.052	-.0041552	.0000155
Liquidity	-.0100963	.0039721	-2.54	0.011	-.0178815	-.0023111
Ln_Depreciation	-.0014881	.0042703	-0.35	0.727	-.0098578	.0068816
Investment	.0026542	.0013986	1.90	0.058	-.0000871	.0053954
Size	.00392	.0051309	0.76	0.445	-.0061363	.0139763
Age	-.000494	.0001861	-2.66	0.008	-.0008587	-.0001293
Location	.0147489	.010546	1.40	0.162	-.005921	.0354188
Ownership	.0091624	.0278347	0.33	0.742	-.0453927	.0637174
_cons	.0009199	.035456	0.03	0.979	-.0685726	.0704123
sigma_u	.02998314					
sigma_e	.01429334					
rho	.81482655	(fraction of variance due to u_i)				

2. Return on Equity as Dependent Variable

```
. xtreg ROE Leverage Liquidity Ln_Depreciation Investment Size Age Location Ownership, re

Random-effects GLS regression                   Number of obs      =       396
Group variable: Company_code                    Number of groups   =        46

R-sq:  within  = 0.0482                         Obs per group: min =         6
       between = 0.6533                                        avg =       8.6
       overall = 0.1424                                        max =         9

                                                Wald chi2(8)       =     64.27
corr(u_i, X)   = 0 (assumed)                    Prob > chi2        =    0.0000
```

ROE	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
Leverage	-.0112992	.0040274	-2.81	0.005	-.0191928	-.0034056
Liquidity	.0081364	.0132815	0.61	0.540	-.017895	.0341678
Ln_Depreciation	-.0103451	.0122083	-0.85	0.397	-.0342729	.0135826
Investment	.0333491	.0063495	5.25	0.000	.0209042	.045794
Size	-.0080906	.0120648	-0.67	0.502	-.0317372	.0155559
Age	-.0000722	.0002971	-0.24	0.808	-.0006545	.0005102
Location	.0016944	.0127992	0.13	0.895	-.0233916	.0267803
Ownership	-.0552862	.0731273	-0.76	0.450	-.1986131	.0880407
_cons	-.0505688	.0635362	-0.80	0.426	-.1750976	.0739599
sigma_u	0					
sigma_e	.09774163					
rho	0	(fraction of variance due to u_i)				

3. Return on Sales as Dependent Variable

```
. xtreg ROS Leverage Liquidity Ln_Depreciation Investment Size Age Location Ownership, re

Random-effects GLS regression                   Number of obs      =       404
Group variable: Company_code                    Number of groups   =        46

R-sq:  within  = 0.2017                         Obs per group: min =         7
       between = 0.0545                                        avg =       8.8
       overall = 0.0542                                        max =         9

                                                Wald chi2(8)       =     68.05
corr(u_i, X)   = 0 (assumed)                    Prob > chi2        =    0.0000
```

ROS	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
Leverage	-.0032823	.0009892	-3.32	0.001	-.0052212	-.0013435
Liquidity	-.0135081	.003939	-3.43	0.001	-.0212284	-.0057878
Ln_Depreciation	.0008077	.0046866	0.17	0.863	-.0083778	.0099933
Investment	.0010241	.0014897	0.69	0.492	-.0018957	.0039439
Size	.0108055	.0058054	1.86	0.063	-.000573	.0221839
Age	-.0009088	.0002254	-4.03	0.000	-.0013506	-.000467
Location	.0141532	.0138442	1.02	0.307	-.0129809	.0412873
Ownership	.0075855	.031217	0.24	0.808	-.0535987	.0687697
_cons	-.0507214	.0425559	-1.19	0.233	-.1341294	.0326867
sigma_u	.03856987					
sigma_e	.01496389					
rho	.86917268	(fraction of variance due to u_i)				

4. Share Price as Dependent Variable

```
. xtreg Ln_share_price Leverage Liquidity Ln_Depreciation Investment Size Age Location Ownership, re

Random-effects GLS regression                   Number of obs      =       397
Group variable: Company_code                    Number of groups   =        46

R-sq:  within  = 0.2688                         Obs per group: min =         5
       between = 0.4095                                        avg =       8.6
       overall = 0.3896                                        max =         9

                                                Wald chi2(8)       =    168.66
corr(u_i, X)   = 0 (assumed)                    Prob > chi2        =    0.0000
```

Ln_share_price	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
Leverage	-.178167	.0276698	-6.44	0.000	-.2323989	-.1239352
Liquidity	.3046179	.0959663	3.17	0.002	.1165273	.4927085
Ln_Depreciation	-.4750485	.0941663	-5.04	0.000	-.6596111	-.2904859
Investment	.0722598	.0291763	2.48	0.013	.0150753	.1294443
Size	.9015016	.1242852	7.25	0.000	.657907	1.145096
Age	-.0179038	.0048411	-3.70	0.000	-.0273922	-.0084154
Location	-.8766329	.310968	-2.82	0.005	-1.486119	-.2671467
Ownership	.5288042	.6275544	0.84	0.399	-.7011797	1.758788
_cons	1.104221	.9630661	1.15	0.252	-.7833535	2.991796
sigma_u	.84492626					
sigma_e	.27519304					
rho	.90409298	(fraction of variance due to u_i)				

5. Earnings per Shares as Dependent Variable

```
. xtreg EPS Leverage Liquidity Ln_Depreciation Investment Size Age Location Ownership, re

Random-effects GLS regression                   Number of obs      =       404
Group variable: Company_code                    Number of groups   =        46

R-sq:  within  = 0.0462                         Obs per group: min =         7
       between = 0.5259                                        avg =       8.8
       overall = 0.3826                                        max =         9

                                                Wald chi2(8)       =     67.06
corr(u_i, X)   = 0 (assumed)                    Prob > chi2        =    0.0000
```

EPS	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
Leverage	-1.27048	2.808821	-0.45	0.651	-6.775667	4.234708
Liquidity	-22.23168	10.62773	-2.09	0.036	-43.06164	-1.401709
Ln_Depreciation	-5.974643	11.68697	-0.51	0.609	-28.88069	16.93141
Investment	3.521407	4.346661	0.81	0.418	-4.997893	12.04071
Size	18.22304	13.18829	1.38	0.167	-7.625529	44.07161
Age	-1.496627	.3856163	-3.88	0.000	-2.252421	-.7408331
Location	-16.66631	18.97682	-0.88	0.380	-53.86019	20.52757
Ownership	259.5449	73.7859	3.52	0.000	114.9272	404.1626
_cons	-6.446509	79.13547	-0.08	0.935	-161.5492	148.6562
sigma_u	49.348449					
sigma_e	48.603307					
rho	.5076068	(fraction of variance due to u_i)				

6. Price Earnings Ratio as Dependent Variable

```
. xtreg PE_Ratio Leverage Liquidity Ln_Depreciation Investment Size Age Location Ownership, re

Random-effects GLS regression                   Number of obs      =       399
Group variable: Company_code                    Number of groups   =        46

R-sq:  within  = 0.0236                         Obs per group: min =         4
       between = 0.4058                                        avg =       8.7
       overall = 0.3009                                        max =         9

                                                Wald chi2(8)       =     59.97
corr(u_i, X)   = 0 (assumed)                    Prob > chi2        =    0.0000
```

PE_Ratio	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
Leverage	32.91025	25.85127	1.27	0.203	-17.75731	83.57781
Liquidity	-331.5075	112.6056	-2.94	0.003	-552.2103	-110.8046
Ln_Depreciation	-510.1494	106.7751	-4.78	0.000	-719.4248	-300.8741
Investment	102.9604	40.47383	2.54	0.011	23.63315	182.2876
Size	369.7498	120.6402	3.06	0.002	133.2993	606.2002
Age	-8.002224	3.420713	-2.34	0.019	-14.7067	-1.297751
Location	-425.4752	167.2234	-2.54	0.011	-753.2271	-97.72334
Ownership	1391.296	673.1628	2.07	0.039	71.92161	2710.671
_cons	355.6949	712.574	0.50	0.618	-1040.925	1752.314
sigma_u	383.53706					
sigma_e	406.83344					
rho	.47055033	(fraction of variance due to u_i)				

7. Total Revenue as Dependent Variable

```
. xtreg Ln_Revenue Leverage Liquidity Ln_Depreciation Investment Size Age Location Ownership, re

Random-effects GLS regression                   Number of obs      =       404
Group variable: Company_code                    Number of groups   =        46

R-sq:  within  = 0.6652                         Obs per group: min =         7
       between = 0.8472                                        avg =       8.8
       overall = 0.8416                                        max =         9

                                                Wald chi2(8)       =   1076.53
corr(u_i, X)   = 0 (assumed)                    Prob > chi2        =    0.0000
```

Ln_Revenue	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
Leverage	-.0276211	.0093208	-2.96	0.003	-.0458894	-.0093527
Liquidity	.0588651	.0375057	1.57	0.117	-.0146446	.1323749
Ln_Depreciation	-.0783617	.0447444	-1.75	0.080	-.1660592	.0093357
Investment	.051017	.0139107	3.67	0.000	.0237525	.0782815
Size	.8451392	.0570865	14.80	0.000	.7332516	.9570267
Age	.0190719	.0023993	7.95	0.000	.0143693	.0237744
Location	.6415108	.1644986	3.90	0.000	.3190995	.9639221
Ownership	.0306691	.3010591	0.10	0.919	-.559396	.6207341
_cons	.3281418	.4427558	0.74	0.459	-.5396436	1.195927
sigma_u	.43530216					
sigma_e	.12962152					
rho	.91855271	(fraction of variance due to u_i)				

8. Net Income as Dependent Variable

```
. xtreg Net_Income Leverage Liquidity Ln_Depreciation Investment Size Age Location Ownership, re

Random-effects GLS regression                   Number of obs      =       404
Group variable: Company_code                    Number of groups   =        46

R-sq:  within  = 0.0678                         Obs per group: min =         7
       between = 0.5159                                        avg =       8.8
       overall = 0.3554                                        max =         9

                                                Wald chi2(8)       =     70.30
corr(u_i, X)   = 0 (assumed)                    Prob > chi2        =    0.0000
```

Net_Income	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
Leverage	-3032.298	1627.079	-1.86	0.062	-6221.315	156.7195
Liquidity	-14993.21	6086.328	-2.46	0.014	-26922.19	-3064.222
Ln_Depreciation	4224.863	6531.7	0.65	0.518	-8577.033	17026.76
Investment	2576.2	2537.384	1.02	0.310	-2396.982	7549.382
Size	6828.472	7243.922	0.94	0.346	-7369.354	21026.3
Age	-348.4162	204.1085	-1.71	0.088	-748.4614	51.62901
Location	26077.47	9799.378	2.66	0.008	6871.04	45283.89
Ownership	61565.98	40846.39	1.51	0.132	-18491.48	141623.4
_cons	-104210.5	42282.27	-2.46	0.014	-187082.2	-21338.78
sigma_u	24742.69					
sigma_e	29170.06					
rho	.41842907	(fraction of variance due to u_i)				

D. STATA Result of Hausman test

1. Return on Assets as Dependent Variable

```
. hausman fixed random
```

	Coefficients (b) fixed	(B) random	(b-B) Difference	sqrt(diag(V_b-V_B)) S.E.
Leverage	-.0030807	-.001622	-.0014586	.0003347
Liquidity	.0133737	.0061072	.0072665	.0022148
Ln_Depreci~n	-.0127823	-.0044113	-.008371	.0018675
Investment	-5.73e-06	.0007944	-.0008001	.0001763
Size	.0273033	.0099571	.0173463	.0038517
Age	-.0018288	-.0005563	-.0012725	.0002693
Ownership	-.0398511	-.0246185	-.0152326	.0140658

```
                b = consistent under Ho and Ha; obtained from xtreg
B = inconsistent under Ha, efficient under Ho; obtained from xtreg

    Test:  Ho:  difference in coefficients not systematic

                  chi2(7) = (b-B)'[(V_b-V_B)^(-1)](b-B)
                          =       35.61
                Prob>chi2 =      0.0000
                (V_b-V_B is not positive definite)
```

2. Return on Equity as Dependent Variable

```
. hausman fixed random
```

	Coefficients (b) fixed	(B) random	(b-B) Difference	sqrt(diag(V_b-V_B)) S.E.
Leverage	-.0324532	-.0111687	-.0212845	.0068701
Liquidity	.0859188	.0133465	.0725723	.0332778
Ln_Depreci~n	-.1239529	-.0030916	-.1208613	.0324762
Investment	.0202707	.0317621	-.0114913	.007908
Size	.2167198	-.0140698	.2307895	.0473648
Age	-.0097125	-.000156	-.0095565	.0025238
Ownership	-.117386	-.1129224	-.0044635	.2216909

```
                b = consistent under Ho and Ha; obtained from xtreg
B = inconsistent under Ha, efficient under Ho; obtained from xtreg

    Test:  Ho:  difference in coefficients not systematic

                  chi2(7) = (b-B)'[(V_b-V_B)^(-1)](b-B)
                          =       30.94
                Prob>chi2 =      0.0001
```

3. Return on Sales as Dependent Variable

```
. hausman fixed random
```

	Coefficients (b) fixed	(B) random	(b-B) Difference	sqrt(diag(V_b-V_B)) S.E.
Leverage	-.0045313	-.0034254	-.0011059	.0001403
Liquidity	.0020836	-.0025955	.0046791	.0018111
Ln_Depreci~n	-.0072411	-.0020131	-.0052279	.0013289
Investment	-.0005118	-.0001263	-.0003855	.
Size	.0346742	.0169054	.0177688	.0037181
Age	-.0019832	-.0010773	-.0009059	.0002671
Ownership	-.0811464	-.0321737	-.0489727	.0110032

```
                b = consistent under Ho and Ha; obtained from xtreg
B = inconsistent under Ha, efficient under Ho; obtained from xtreg

    Test:  Ho:  difference in coefficients not systematic

                  chi2(7) = (b-B)'[(V_b-V_B)^(-1)](b-B)
                          =       67.65
                Prob>chi2 =      0.0000
                (V_b-V_B is not positive definite)
```

4. Share Price as Dependent Variable

```
. hausman fixed random
```

	Coefficients (b) fixed	(B) random	(b-B) Difference	sqrt(diag(V_b-V_B)) S.E.
Leverage	489.0861	334.4426	154.6435	.
Liquidity	-8698.673	-7475.634	-1223.039	.
Ln_Depreci~n	-3514.741	-4341.818	827.0774	.
Investment	-2224.98	-2203.269	-21.71105	.
Size	33426.54	31441.77	1984.768	874.9302
Age	408.8215	225.787	183.0345	58.40338
Ownership	1429.438	12028.63	-10599.2	.

```
                b = consistent under Ho and Ha; obtained from xtreg
B = inconsistent under Ha, efficient under Ho; obtained from xtreg

    Test:  Ho:  difference in coefficients not systematic

                  chi2(7) = (b-B)'[(V_b-V_B)^(-1)](b-B)
                          =       68.52
                Prob>chi2 =      0.0000
                (V_b-V_B is not positive definite)
```

5. Earnings per Shares as Dependent Variable

```
. hausman fixed random
```

	Coefficients (b) fixed	(B) random	(b-B) Difference	sqrt(diag(V_b-V_B)) S.E.
Leverage	-2.66939	.218442	-2.887832	1.244159
Liquidity	33.8435	17.12147	16.72203	9.430318
Ln_Depreci~n	-58.78597	-20.77556	-38.01041	9.022867
Investment	-4.517761	-1.300083	-3.217678	1.432853
Size	102.4669	42.02461	60.44233	16.18417
Age	-3.711004	-1.565668	-2.145335	.9906648
Ownership	-25.42348	144.5072	-169.9307	68.9976

```
                b = consistent under Ho and Ha; obtained from xtreg
 B = inconsistent under Ha, efficient under Ho; obtained from xtreg

    Test:  Ho:  difference in coefficients not systematic

                  chi2(7) = (b-B)'[(V_b-V_B)^(-1)](b-B)
                          =       26.98
                Prob>chi2 =      0.0003
```

6. Price Earnings Ratio as Dependent Variable

```
. hausman fixed random
```

	Coefficients (b) fixed	(B) random	(b-B) Difference	sqrt(diag(V_b-V_B)) S.E.
Leverage	28.76311	35.75674	-6.993636	8.862688
Liquidity	-219.825	-321.5685	101.7436	89.66999
Ln_Depreci~n	-448.8769	-476.11	27.23313	89.41008
Investment	-18.96003	96.02938	-114.9894	4.922945
Size	922.9859	330.5735	592.4124	159.2323
Age	3.173	-7.349893	10.52289	9.516014
Ownership	214.29	986.3758	-772.0857	693.6812

```
                b = consistent under Ho and Ha; obtained from xtreg
 B = inconsistent under Ha, efficient under Ho; obtained from xtreg

    Test:  Ho:  difference in coefficients not systematic

                  chi2(7) = (b-B)'[(V_b-V_B)^(-1)](b-B)
                          =   -37.47    chi2<0 ==> model fitted on these
                                        data fails to meet the asymptotic
                                        assumptions of the Hausman test;
                                        see suest for a generalized test
```

7. Total Revenue as Dependent Variable

```
. hausman fixed random
```

	Coefficients (b) fixed	(B) random	(b-B) Difference	sqrt(diag(V_b-V_B)) S.E.
Leverage	-.0027496	-.0229782	.0202286	.
Liquidity	.0962971	.2110709	-.1147737	.
Ln_Depreci~n	-.0388279	-.1412187	.1023909	.
Investment	.0384582	.0318399	.0066183	.
Size	.6498018	.9261279	-.2763261	.0227869
Age	.0334611	.0168761	.016585	.0020275
Ownership	.2064823	.0155596	.1909227	.

```
            b = consistent under Ho and Ha; obtained from xtreg
B = inconsistent under Ha, efficient under Ho; obtained from xtreg

    Test:  Ho:  difference in coefficients not systematic

                chi2(7) = (b-B)'[(V_b-V_B)^(-1)](b-B)
                        =   -45.86    chi2<0 ==> model fitted on these
                                      data fails to meet the asymptotic
                                      assumptions of the Hausman test;
                                      see suest for a generalized test
```

8. Net Income as Dependent Variable

```
. hausman fixed random
```

	Coefficients (b) fixed	(B) random	(b-B) Difference	sqrt(diag(V_b-V_B)) S.E.
Leverage	-3481.814	-2479.284	-1002.529	923.6727
Liquidity	-3229.51	-3619.441	389.9308	6719.629
Ln_Depreci~n	-6032.284	5403.576	-11435.86	6559.976
Investment	-841.9223	706.6357	-1548.558	1157.987
Size	15300.95	7316.217	7984.734	11156.04
Age	-1995.449	-479.7813	-1515.668	655.1758
Ownership	-131138.3	2062.429	-133200.8	49409.14

```
            b = consistent under Ho and Ha; obtained from xtreg
B = inconsistent under Ha, efficient under Ho; obtained from xtreg

    Test:  Ho:  difference in coefficients not systematic

                chi2(7) = (b-B)'[(V_b-V_B)^(-1)](b-B)
                        =       22.66
              Prob>chi2 =      0.0020
```