A Review Study on Spatial Planning of Sumatera Island, Sulawesi Island, and Java Island

Work Package

The Effect of Wages and Infrastructure on Foreign Direct Investment (FDI) By Industry in Sumatera Island, Sulawesi Island, and Java Island

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Abstract

As preliminary, there were some stylist facts related to : fluctuation of FDI, the spreadment of region as the investment recipient, and the dominancy of sectors as the investment targets. The inflow of foreign direct investment (later is abbreviated as FDI) to Indonesia fluctuates. The sectors composition of FDI inflows recipient from 2009 to 2018 are dominated by the industrial sector i.e. 66.93%. During 2009 to 2018, most of the FDI inflows were invested in Java by 48.71%. According to the table above, industry emerges as a dominant sector in 3 (three) islands, namely Java, Sulawesi, and Sumatra respectively 97.38%, 79.42%, and 68.73%. Essentially, this study attempts to portrait the FDI (industry) flows of Sumatra Island., Sulawesi, and Java.

Based on several previous styudies showed that Minimum wages are one of the factors influencing the FDI choice of industrial locations (Owuka, 2011). And Infrastructure was another factor that significantly influenced FDI industry (Iskandar, 2014), Huyen (2015), William (2015), and Singh (2008).

As a start of this study description, this section relates to the literature study as stated in CHAPTER 2, that the choices of variables and methods refers to the results of the respective examination. In this study, researcher uses panel data of foreign direct investment (FDI) by industry from 10 (ten) provinces of Sumatra Island, 6 (six) provinces of Java Island, and 6 (six) provinces of Sulawesi Island from 2009 to 2018. The number of observations is 10 x 22 = 220. Analysis of the data in this study uses regression of 22 provinces cross section panel data approach and time series of the last 10 years (2009-2018). In this case, panel data regression will be applied to the secondary data since it is bound by the realization of the total foreign direct investment (FDI) by industry.

There are several variables one of which is minimum wages, which is a control variable, that is affected by the foreign direct investment (FDI) inflows. On the other hand, the electricity variable, CPI, and dummy of Island/Islands spatial plan are variables affect significantly to the flow of FDI by industry in Sumatra, Java, and Sulawesi. At the same time, other variables, namely roads and labor do not significantly affect the flow of FDI by industry in the three islands.

Keywords:- Investment, Industry, Infrastructure, Wage.

CHAPTER 1

INTRODUCTION

The inflow of foreign direct investment (later is abbreviated as FDI) to Indonesia fluctuates. Based on the Investment Coordinating Board data in 2018, from 2009 to 2018, the realization of FDI inflows showed an increasing trend. The highest point was recorded in 2013 attracted 21.5 trillion US dollars, while the lowest was in 2009 to the point of 3.9 trillion US dollars. In light of the above, the number of FDI inflows from 2009 to 2018 increased by 231.39% despite some declines in certain years. As can be seen from these data, there were some FDI decreased in 2014, 2015, 2017, and 2018 respectively amounted to 11.01%, 5.19%, 10.62%, and 22.69%. In addition, there was also an increasing trend of decline in other years as showed in this following breakdown: 63.38% in 2009-2010 period, 77.46% in 2010-2011, 38.86% in 2012 and 36, 93% in 2013, and 3.11% in 2016.

The sectors composition of FDI inflows recipient from 2009 to 2018 are dominated by the industrial sector i.e. 66.93%. The mining sector is 22.77% equals to the second rank. The third place is agriculture at 10.29%, while other sectors with small FDI values are not the part of this study.
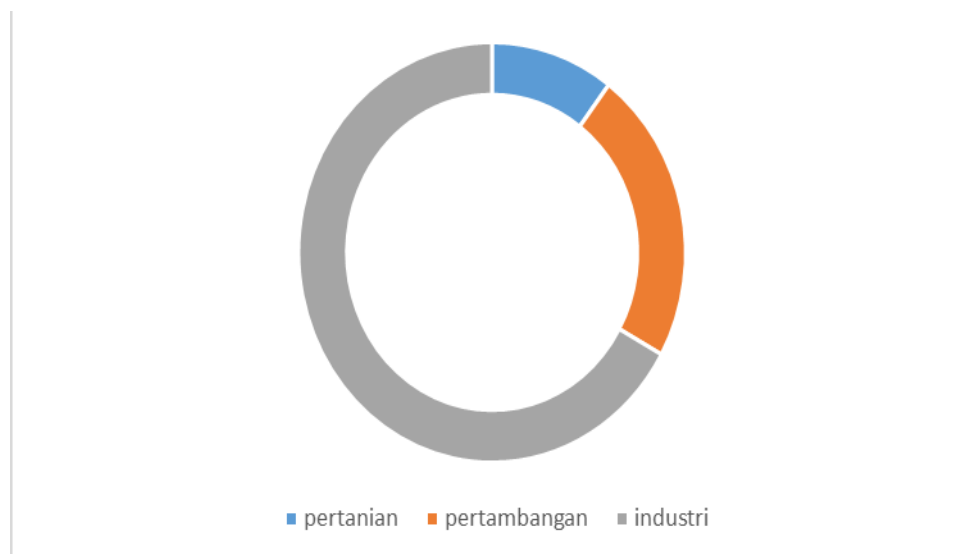

Figure 1.1 Sector Composition of FDI inflows Recipient in 2009-2018

Source: bkpm.go.id

During 2009 to 2018, most of the FDI inflows were invested in Java by 48.71%. In the second place was Kalimantan Island at 17.30%, followed by Sulawesi Island at 11.49%. The last four are Papua at 9.50%, Sumatra at 8.87%, Bali and Nusa Tenggara at 2.41%, and Maluku at 1.71%.
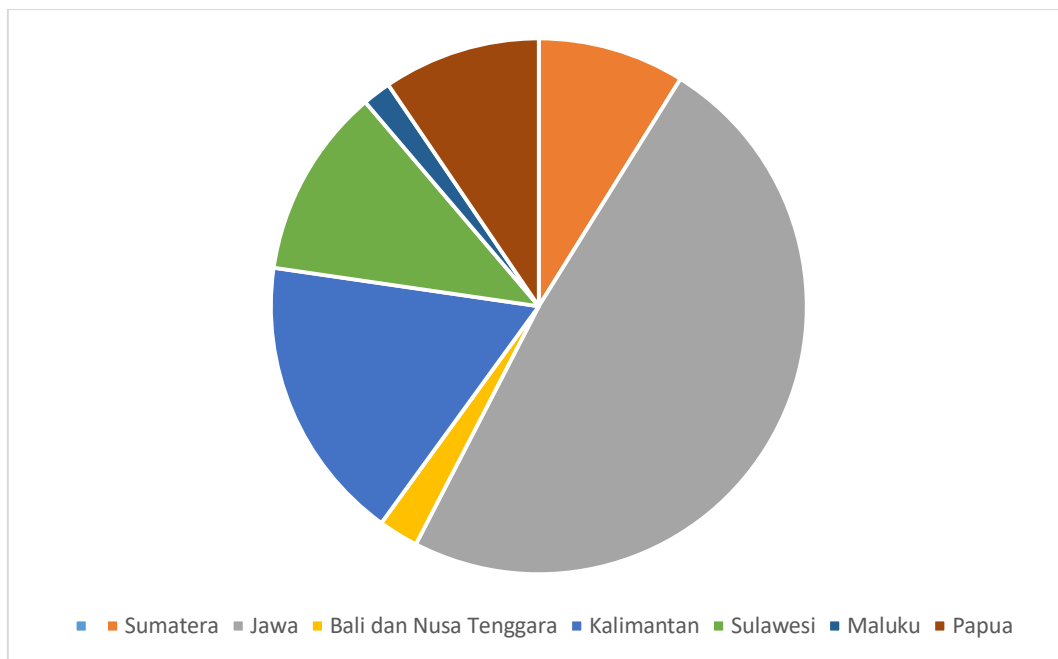
Figure 1.2 Investment Realization by Region

Source: bkpm.go.id

On the other hand, the dominant sectors receiving FDI in the period from 2009 to 2018 are as follows:

island/(-s)	distribution		
	farming	mining	industry
Sumatera	14,77%	16,50%	68,73%
Java	1,02%	1,60%	97,38%
Bali and Nusa Tenggara	1,91%	91,41%	6,69%
Kalimantan	37,83%	41,36%	20,81%
Sulawesi	1,52%	19,06%	79,42%
Maluku	4,66%	54,42%	40,92%
Papua	6,64%	85,35%	8,00%
National	10,29%	22,77%	66,93%

Table 1

Source: bkpm.go.id

According to the table above, industry emerges as a dominant sector in 3 (three) islands, namely Java, Sulawesi, and Sumatra respectively 97.38%, 79.42%, and 68.73%. Bali Island, Nusa Tenggara, Papua, and Kalimantan are dominated by the mining sector with an investment percentage in the range of 41.36%-85.35%. On the other hand, agriculture is not a dominant sector in the island/islands.

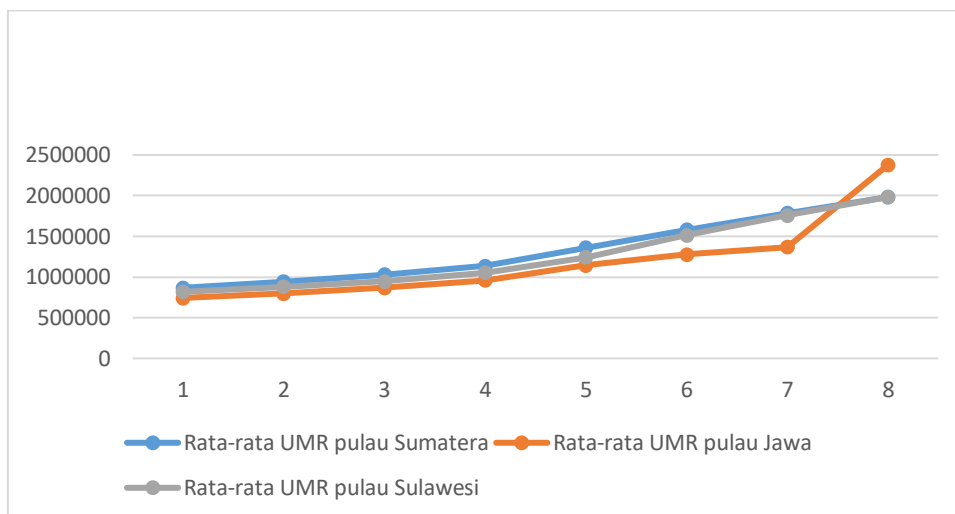Minimum wages are one of the factors influencing the FDI choice of industrial locations (Owuka, 2011).

Figure 1.3 The Average of Minimum Wages in Sumatra, Java, And Sulawesi from 2009 to 2016

Source: bps.go.id, 2019

Based on the graphic above, it can be inferred that during 2009-2015, the average regional minimum wage in Sumatra Island was always higher than Java and Sulawesi Island. However, Java set a higher regional minimum wage than the other two islands in 2016.

Infrastructure was another factor that significantly influenced FDI industry (Iskandar, 2014), Huyen (2015), William (2015), and Singh (2008).
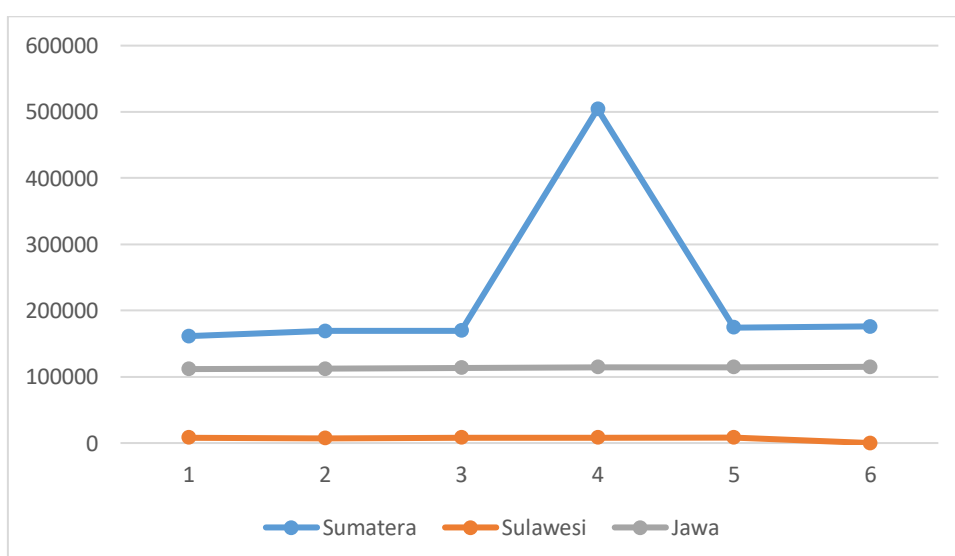

Figure 1.4 The Length of Road in Sumatra, Java, and Sulawesi in 2009-2014

Source: bps.go.id, 2019

Based on the graph, the regular length of road in Sumatra from 2009 to 2014 period remains and tends to be higher than Java and Sulawesi. However, the FDI of mining is influenced by market openness (Walsh, 2010).
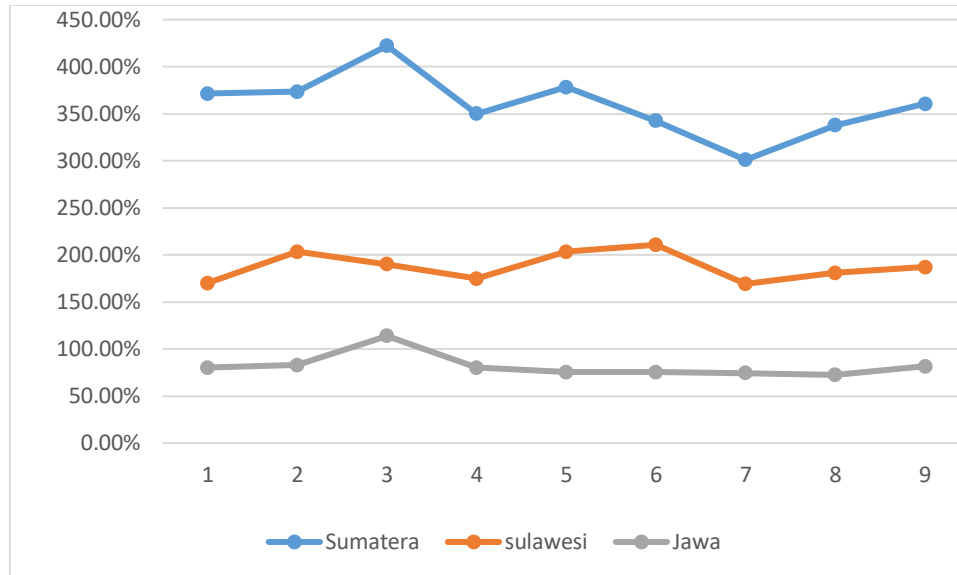

Figure 1.5:- Market Openness in Sumatra, Java, and Sulawesi in 2009-2017

Source: bps.go.id, 2019

Figure 1.6 shows the market openness in the period of 2009-2017 is dominated by Sumatra, which is higher than Sulawesi and Java.

Essentially, this study attempts to portrait the FDI (industry) flows of Sumatra Island., Sulawesi, and Java. The trend of the foreign investment flows is directly take account of the role of regional minimum wages and infrastructure that influence the FDI inflows to the industrial sector in Sumatra, Sulawesi, and Java.

1.2 Problem Definition

The problem definitions of this study are as follows:

- The inflows of FDI from 2009 to 2018 are stagnant at times. From 2014 to 2015 and 2017 to 2018 FDI inflows declined. Therefore, knowing the grounds to this condition would be necessary.
- Most FDI flows are in the industrial sector around 66.93% of FDI flows. According to Bank Indonesia in 2007, the contribution of the manufacturing sector to the economy was higher than the natural resources sector. This is as a result of the high value added. To find the background, it is needed to determine the phenomenon by studying similar studies from other countries.

- The FDI inflows in the industrial sector are still concentrated in Java. Java as the center of the economy in Indonesia has numerous facilities, policies, and factors that attract FDI inflows. These factors must be identified with the intention that they can be applied in other regions.

- The impact of wages (regional minimum wages) and infrastructure on FDI flows (industry) varies among provinces in Sumatra, Sulawesi, and Java.

- Therefore, it is suspected that there are factors that influence FDI flows. As a consequence, investigations of other factors that influence the flow of FDI are required.

- The domination decrease of Java Island and the finalization of island spatial planning policy which has implemented from 2011 to 2014 promote additional industrial activity concentration in Sumatra Island and Sulawesi.

1.3 The Research Significance

The significance of this research is as follows:

The increase in the regional minimum wage is an indication of an economic slowdown affecting the Indonesian trade sector and the flow of foreign direct investment (FDI). The rocketing regional minimum wage value in the country has generated a weak foreign investment (FDI) in the country. This can lead to held back the economic growth in the country. Foreign investors will rethink to set their investment. The increase of the minimum wage may possibly prompt foreign investors to move their businesses to other countries with lower regional wages. The decline in investment, especially in the real sector, will also have an impact on the employment reduction and can instigate massive layoffs in each region (Handayani, 2013).

1.4   Objectives

The objectives of this study comprise:

1. To examine the impact of wages and infrastructure from FDI inflows by industry in Sumatra Island, Sulawesi, and Java.

2. To find out other factors that influence FDI inflows by industry in Sumatra Island, Sulawesi, and Java.

1.5   Research Gaps

There are several research gaps, including:

1. Testing other factors that influence the flow of FDI in the industrial sector which are previously investigated by (Emi, 2015) who examines all sectors.

2. FDI flows-grouping based on the classification of FDI flows by the industrial sectors (all industries, labor-intensive industries, capital-intensive industries, and the number of multinational companies).

3. Investigate the impact of the regional minimum wages, which in fact is a wider discussion compared to the previous study by Emi (2015) whose investigations are limited to regional minimum wages.

4. Testing the influence of infrastructure development, which is a broader research scope than the previous research by Priyanti (2012) who focuses on the road alone.

1.6 Research Contributions

The research contributions are as follows:

1. Providing information related to the factors that influence the flow of FDI to the industrial sector.

2. Providing information on factors that significantly affect the flow of FDI to the industrial sector.

3. Contribute to giving recommendations on types of industries that are trusted to be developed in each province in Java. This can be seen from the weight of the scoring elements of the variables significance order in each province.

4. Provide recommendations on the proportion of budget allocation for the development of industrial groups based on the coefficients of each variable that significantly affects the FDI flows of Sumatra Island, Sulawesi, and Java. This can be seen from the variable significance order.

1.7 Limitations of Study

Here are some of the study limitations:

1. The coverage of the area in this study includes Sumatra Island, Sulawesi Island, and Java Island as the main regions of the location of foreign direct investment (FDI) in the industrial sector.

2. This study focuses on the industrial sector as the largest sector that contributes to FDI flows.

3. This research period covers 2009 to 2018 by considering the availability of the latest data from all variables.

CHAPTER 2
LITERATURE REVIEW

2.1   Theoretical Framework

As stated by Sichei, et al. (2012) labor costs and foreign direct investment (FDI) correlates in terms of higher labor costs manufacturing higher production costs. This is subsequently limiting FDI inflows. Labor costs can be settled based on the proxy by wages.
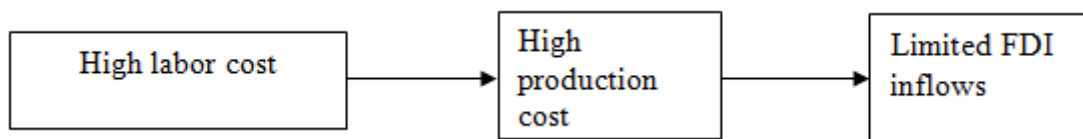

Chart 2.1 Labor costs and FDI correlation according to Sichei (2012)

Source: *Global Journal of Management and Business Research*, 2012

Lower labor cost is believed to be one of the determinants boosts up foreign direct investment. This correlates since lower labor costs cut the production costs. Low production costs, consequently, increasing company profits. Thus, product prices will be relatively low which promotes increasing demand accordingly (Yogatama, 2011).
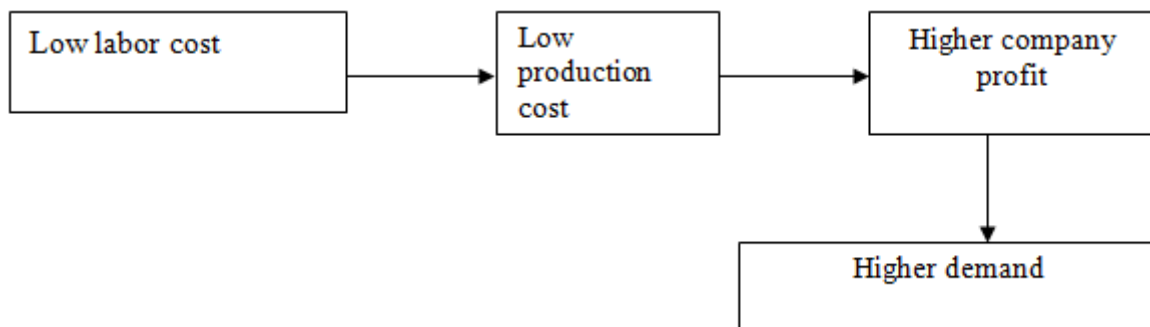
Chart 2.2 The relation between labor costs and FDI according to Yogatama (2011)

Source: *Asian Economic and Financial Review*

The increase of regional minimum wages in Indonesia related to the production costs of a company. In case of the increase in wages is not followed by an increase in labor productivity, the company product will undergoing decline. As a result, the level of investment will decrease as well (Frederica and Juwita, 2013).
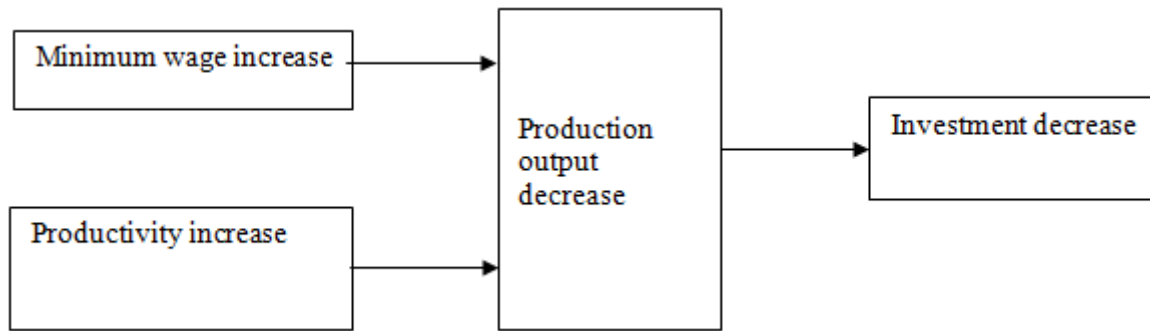
Chart 2.3 Labor costs and FDI correlation according to Frederica and Juwita (2013)

Source: *Jurnal Manajemen Teknologi,* 2013

Labor costs affecting the production costs of a company. The production costs will increase due to the increase in labor costs. Low labors costs are one of to boost foreign direct investment (FDI) inflows since lower labor costs keep lower production costs. Low production costs followed by increased corporate profit. High labor costs lead to high output prices and poor competition. In other conditions, low labor costs promoting low output prices and high competitiveness, and increasing the demand. Therefore, investors are liable to invest in lower labor costs countries (Marcelia, et al.).

Chart 2.4 Labor costs and FDI correlation according to Marcelia

Sumber : Researcher's analysis

Chart 2.5 The relation between labor costs and FDI according to Mankiw-1 (2003)

Source: author analysis of Pydick and Rubenfield in *Microeconomics* (2003)

The wage efficiency theory (Mankiw, 2003 in Syarif, 2015) argues that there is a correlation between wages and labor productivity. Thus, the decrease in wage will promote drop off in corporate profit. This condition will reduce productivity and corporate profit.
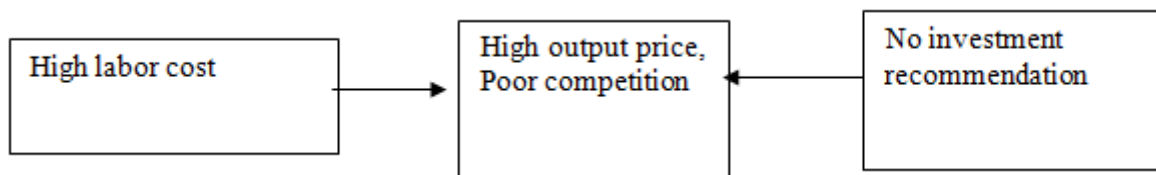
- *The first wage efficiency theory* argues that high wage can lead to the increase of labor productivity. Wage additionally influences health. The impact of wages on efficiency will possibly lead to company failure as wages reduction will impact on the labor productivity decrease and of course corporate profit.

Chart 2.6 The relation between labor costs and FDI according to Mankiw-2 (2003)

Source: author analysis of Pyndick and Rubenfield in *Microeconomics* (2003)

- *The second wage efficiency* theory argues that high wages will reduce the labor turnover. By paying high wages, the company will need adjustment in the number of labor. The number of labor force will certainly decrease. However, at the same time, firms do not need further effort in recruiting and training new workers.
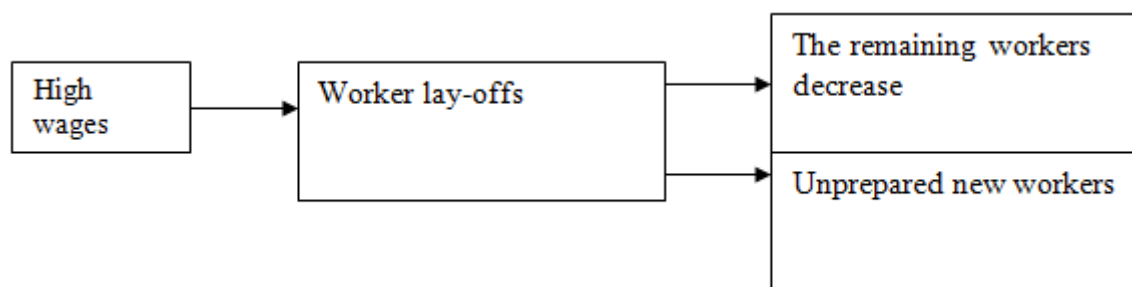
Chart 2.7 The relation between labor costs and FDI according to Mankiw-3 (2003)

Source: author analysis of Pyndick and Rubenfield in *Microeconomics* (2003)

- *The third wage efficiency theory* argues that the average quality of labor determined by the interaction with the wages paid. Wages reduction, as a consequence, tends to lead turnovers by the best workers out of the company and move elsewhere. Meanwhile, unskilled labor will remain due to fewer alternatives.
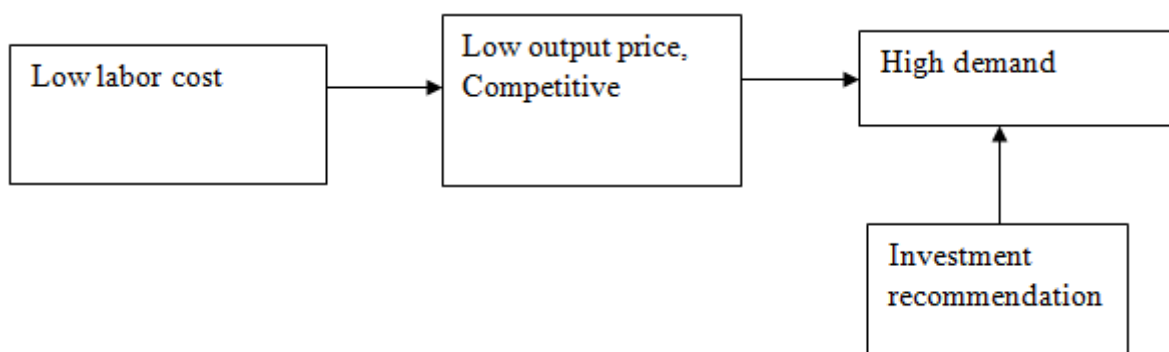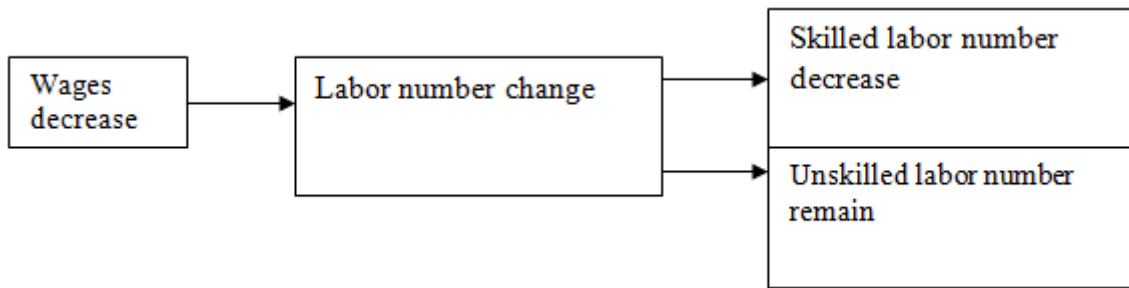
Chart 2.8 The relation between labor costs and FDI according to Mankiw-4 (2003)

Source: author analysis of Pyndick and Rubenfield in *Microeconomics* (2003)

- *The fourth wage efficiency theory* suggests that high wages can improve labor productivity efforts. The focus of this theory argues that if a company fail to properly monitor the labor effort, the workers will decide for themselves their amount of work. By paying high wages, companies motivate workers to work harder and increase the productivity.
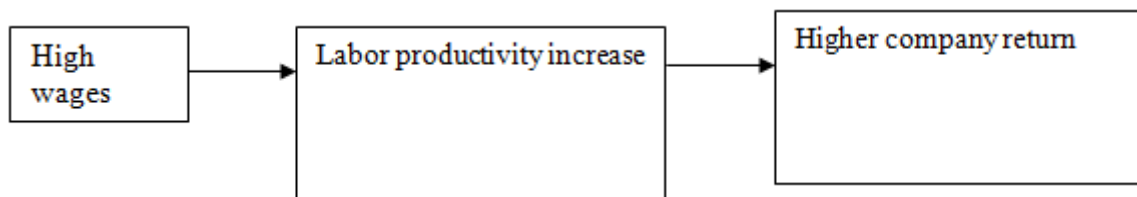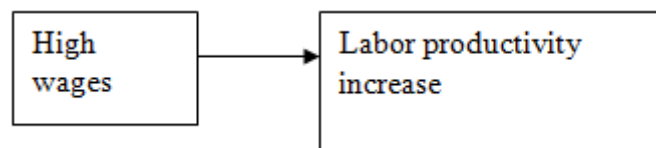

Chart 2.9. The relation between labor costs and FDI according to Mankiw-5 (2003)

Source: author analysis of Pyndick and Rubenfield in *Microeconomics* (2003)

These theories conclude that firms will be more efficient when high wages are paid. Therefore, maintaining high wages will be better to maintain the supply and demand balance that promotes profits to the firms. However, this situation should take into account the company finances.

According to Aschauer, infrastructure such as roads, airports and high-speed trains play important roles in improving the emergence of productivity (Legowo, 2010). ((Jayne, et al., 2009) in (Priyanti, 2012: 20)) added that increased costs in infrastructure can reduce the company's production costs, consequently stimulate investment, productivity, and economic growth.
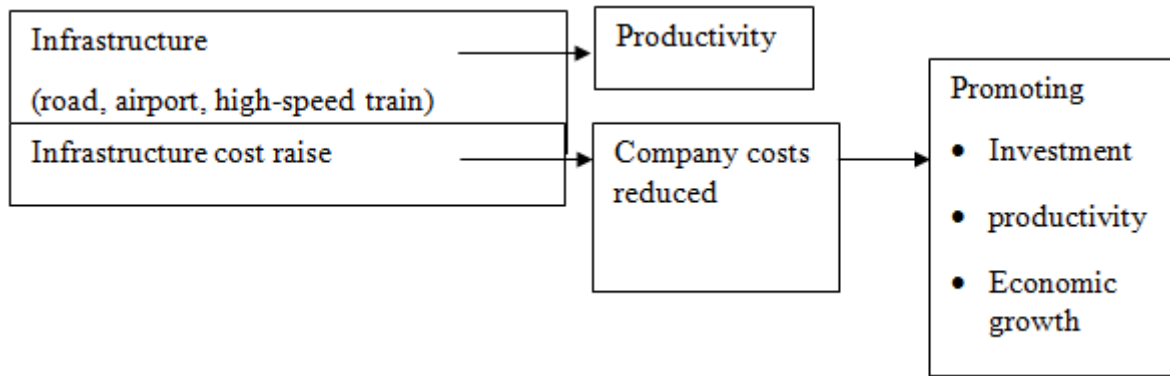
Chart 2.10 The relation between labor costs and FDI according to Jayne (2009)

Source: IPB Journal

The theory justifies the existing variables with insignificant regression results by parsing statistical data in each province.

2.2 Empirical Framework

The Empirical Framework is needed to intensify argumentations, selection of variables, and methods. Besides, empirical framework is reference for the research hypothesis grounding.

2.2.1 Dependent Variables

Most journals use total foreign direct investment as the dependent variable. Meanwhile, three other journals have conducted more specific studies using investments in textile industry and textile products (Asmara, 2013); foreign direct investment in the agricultural sector (Rashid, 2016), and foreign direct investment in the main sources of oil and gas (Iskandar, 2014).

2.2.2 Independent Variables

Wages are the main factor affecting foreign direct investment. In addition, other explanatory variables have been added to the research model to obtain a better understanding of the relationship of foreign direct investment. The use of wages can be found in Owuka (2011), Alia (2013), Cushman (1987), Amaro (2006), and Mihai.

Other determinants will be grouped by the researcher. Calhoun, et al. (2002) has investigated the relation between labor quality and export orientation to foreign direct investmen in developing countries. Onwuka in his research on wage rates, regional trade blocs, and the chosen location of foreign direct investment (2011) estimates wage rates, export intensity, import intensity, trade openness, exchange rates, and average rates influence foreign direct investment in five ASEAN countries.

2.2.3 Method

Most of the research related to foreign direct investment uses panel data. The advantage of using this method is to provide informative data, more variation, add degrees of independence, more efficiency, reduce colinearity between variables, estimate larger degree of heterogeneity that characterize individuals over times, allowing analysis of crucial economic problems that unresolved by time series analysis and cross-section, and relatively more flexible when modeling different behaviors of each individual compared to cross-sectional data, and can explain the dynamic adjustment in a better way (Asmara, 2013).

More specifically, the data model used is a balanced panel, while each cross- section unit has the same number of time series observations (Ruth, 2014). Other research that applies data panels using the fixed effect method (FEM) to test its determinants. Other is Rashid (2016) about foreign direct investment in the oil and gas source industry in Indonesia. The analysis encompasses wage rates, regional trade blocs, and foreign investment location between five ASEAN countries during 1976-2000 by using panel data.

Vector autoregression (VAR) models is applied due to the fact that such model generally is used to forecast interrelated time series systems and to analyze the dynamic impact of random disturbances on variable systems. For additional information, in the vector autoregression (VAR) model some variables are treated as endogenous and some are treated as exogenous or lagged endogenous (Mutasen).

Another method used by Cushmand (1987) to study the effect of real wages and labor productivity on foreign direct investment is the analysis of time series. The possibility of simultaneous interaction between direct investment and several independent variables are allowed by using the three-stage least squares method.

2.2.4 Result

FDI responds both negatively and significantly to wages (Owuka, 2011). This finding has similar results as research conducted by Alia (2013) on factors influence the investment of the textile industry and textile products which shows negative but insignificant results. The same FDI response is also indicated by the results estimated by Cushman (1987) and Amaro (2006). The same result is stated by Mihai that the increase in wages affected the decline in foreign direct investment.

Infrastructure has positively affected foreign direct investment by main sources of the oil and gas industry. Research on this subject was carried out by Iskandar in (2014), Huyen (2015), William (2015), and

Singh (2008). These findings are in accordance with the results by Amaro (2006) that infrastructure generates an insignificant effect on foreign direct investment.

Meanwhile, inflation has a negative but insignificant effect on foreign direct investment as stated by Amaro (2006). The same condition is stated by Iskandar (2016) and William (2015) that inflation has a negative influence on foreign direct investment. Similarly, Ruth (2003) and Huyen (2015) have proven that negative inflation has insignificant effect towards foreign direct investment.

While the gross regional domestic product variable significantly influence the flow of FDI in the agriculture and mining sectors (Santangelo, 2018).

CHAPTER 3
METHODOLOGY

3.1 Research Description

As a start of this study description, this section relates to the literature study as stated in CHAPTER 2, that the choices of variables and methods refers to the results of the respective examination. In this study, researcher uses panel data of foreign direct investment (FDI) by industry from 10 (ten) provinces of Sumatra Island, 6 (six) provinces of Java Island, and 6 (six) provinces of Sulawesi Island from 2009 to 2018. The number of observations is 10 x 22 = 220. Analysis of the data in this study uses regression of 22 provinces cross section panel data approach and time series of the last 10 years (2009-2018). In this case, panel data regression will be applied to the secondary data since it is bound by the realization of the total foreign direct investment (FDI) by industry. Those 22 provinces specifically are Aceh, North Sumatra, West Sumatra, Riau Islands, Riau, Jambi, Bengkulu, South Sumatra, Lampung, Banten, DKI Jakarta, West Java, Central Java, DI Yogyakarta, East Java, North Sulawesi, Gorontalo, Central Sulawesi, West Sulawesi, South Sulawesi, and Southeast Sulawesi. The method employed is *panel* regarding to the minimum regulation of 220 observations. Relies on the data availability, time series cannot be applied with respect to the data availability from 2009 to 2018. The observation period is 10 years.

3.2 Dependent Variables

The dependent variable encompasses the foreign direct investment by industry. This is consistent with the strategic issues relevant to the research to prove the dependent variable correlates to the background of observation.

3.3 Independent Variables

Independent variable functioning as control variable is wages (minimum and relative), while other independent variables are infrastructure (road length and electricity distribution capacity), inflation, GDP, trade openness (loading and unloading ratio), and the National Spatial Planning (RTRWN) dummy. There is an empirical and theoretical framework that supports bridging the dependent and independent variables. Some views claim connections between the independent and dependent variables.

3.4 Operational Variable Synchronization

Operational variable synchronization includes (Operational variables, sources, details, and data adjustments):

1. **Foreign direct investment by all industries:** The Investment Coordinating Board (BKPM); foreign

direct investment by all sectors in Sumatra, Java, and Sulawesi Island; and foreign direct investment by industry in Java;

2. **Regional minimum wages,** Central Statistics Agency (BPS), and regional minimum wages in each province of Sumatra Island, Java Island, and Sulawesi Island;

3. **Relative minimum wages:** Central Statistics Agency (BPS), and relative regional wages in each province of Sumatra Island, Java Island, and Sulawesi Island;

4. **Consumer price index:** Central Statistics Agency (BPS), consumer price index of selected city data in Indonesia, and consumer price index data from capital city in each province of Sumatra Island, Java Island, and Sulawesi Island;

5. **Length of road:** Ministry of Public Works and Public Housing (PUPR), Ministry of Public Works and Public Housing Regulation relates to the length of national roads in Indonesia, and the total length of national roads in each province;

6. **Electricity capacity:** Central Statistics Agency (BPS), electricity transmission capacity during the period of 2005-2009, 2006-2010, 2007-2013, 2010-2014, and electricity distribution to the industrial sector;

7. **Work force:** The Central Statistics Agency (BPS), the number of workers in all sectors, the number of workers in industrial sector;

8. **Market size (gross regional domestic product):** Central Statistics Agency (BPS), The number of gross regional domestic product, and industrial gross regional product;

9. **Trade openness:** Central Statistics Agency (BPS), total of exports and imports from and to ports in Indonesia, and the ratio between loading and unloading in each port;

10. **Dummy of National Spatial Planning (RTRWN).**

3.5 Observation Area

The observation areas in this study are all provinces in Sumatra Island, Java Island, and Sulawesi Island. There is no omitting selection bias. All data related to independent and dependent variables are presented.

Pyndick and Rubinfield (2008) point out three estimation approaches in data panel model, i.e. *least square, fixed effect,* and *random effect*. The least square approach is done by simply combining all time series data and cross-section data, and the estimated model use ordinary least squares model. Here the constant (intercept) will be assumed for time-series or cross-section. Fixed effects imply time-series or cross-section differences. While the random effect approach improves the process of least square efficiency with time-series error estimation, cross-sections, and intercept differences.

According to Nachrowi (2005) the fixed effect model of the random effect model is suitable model in several respects, that is: If T (time-series data number) > N (number of cross-section data), it is recommended to use the fixed effect model (FEM). If N (number of cross-section data) > T (time-series data number), it is recommended to use random effect model (REM), If the cross-section effect correlates with one or more X variables, then FEM is predicted to be unbiased and fit. Hypothesis testing is not used for more convincing decisions in terms of choosing the best model, i.e. using the Hausman test. This is to find out the functional relationship between the realization of total foreign direct investment by the regional minimum wage, consumer price index, road length, port capacity, airport capacity, market size, and export-import ratio. Not in searching for the best, both the pooled least square model and the fixed effect model can be tested through the Chow test. If the *Chi square* probability value is less than alpha 5%, the fixed effect model can be resolved as the best model.

3.6 Econometric Equations

The equations of the dependent variables in this study are divided into 4 (four), as follows:

FDI allit = β 0 + β 1 minwageit + β 2 relwageit + β 3 roadit + β 4 CPI it + β 5 electricityit + β 6 laborit + β 7 market sizeit + β 8 market opennessit + dummy policyit + εit

FDI Allit   : total foreign direct investment (FDI) by industry in Sumatra, Java, and Sulawesi Island i in year t

minwageit   : average regional minimum wages of provinces in Sumatra Island, Java Island, and Sulawesi Island i in year t

relwageit   : average regional relative wages of provinces in Sumatra Island, Java Island, and Sulawesi Island i in year t

CPIit   **:** consumer price index in the capital city of the provinces i of Sumatra Island, Java Island, and Sulawesi Island in year t

roadit   : the length of national roads in the provinces i of Sumatra Island, Java Island, and Sulawesi Island i in year t

electricity   : distribution of State Electricity Company (PLN) electricity to industries in the provinces i of Sumatra Island, Java Island, and Sulawesi Island i in year t

laborit   : the number of industrial sector workers in the provinces i of Sumatra Island, Java Island, and Sulawesi Island i in year t

market sizeit : gross regional domestic product in the provinces i of Sumatra Island, Java Island, and Sulawesi Island i in year t

market opennessit   : the ratio between exports and imports in the provinces i of Sumatra Island, Java Island, and Sulawesi Island i in year

dummy policy   : to invest the impact of national policy in each province of the islands of Sumatra, Java, and Sulawesi.

β 0: constants

β 1, β 2, β 3, β 4, β 5, β6, β7, β8: regression coefficient

εit: error term

3.6.1 Model Considerations

The equation model is to split the impact of regional minimum wages and relative wages trend as the main variables and other variables as the control variables on the total fluctuations of foreign direct investment (FDI) of provinces i in Sumatra Island, Java Island, and Sulawesi Island; The choice of non-infrastructure variables regarding the direction of this thesis is regional economy including proven variables to show significant impacts, based on several research journals, either at domestic and foreign level; The choice of infrastructure variable regarding to the quotation of one book published by Bank Indonesia also shows the relation between investment and these variables; Dummy policy choices, regarding national policies are guidelines for the planning permission, hence, comprehending the impact of this policy on investment, before and after this policy is set is necessary.

After estimating the research model, we will get the value and mark of each model parameter. Whether positive or negative, it will then be employed to test the research hypothesis (Raharjo, et al., 2005).

3.6.2 Research Hypothesis

Hypothesis of each regression coefficient or factors influenced the investments realizations above are:

1) β 1 <0; Regional minimum wage. Increasing regional minimum wages will reduce investment because an increase in wages is an in increase labor costs (production costs) that must be paid by company as a consequence of uncertainty in future budget plans, ceteris paribus. (Emmi, 2015).

2) β 2 <0; Relative minimum wage. Increasing minimum wages will relatively reduce investment because an increase in wages is an increase in labor costs (production costs) that must be paid by the company as a consequence of uncertainty in future budget plans, ceteris paribus.

3) β 3> 0; Consumer price index. A high inflation rate affects the total value of investment realization. The higher the inflation means the higher the price of goods as production inputs. This condition will force an increase in overall production costs, thereby reducing the level of profits that might be obtained by

investors. This condition reduces the investment drives and ultimately reduces the total value of investment, ceteris paribus.

4) $\beta 4 > 0$; National road length. Road infrastructure has a positive relation to the total value of investment; higher road construction especially total road asphalt will accelerate the mobility of product distribution, in this manner, reducing overall production costs. This condition stimulates the creation of a secure investment climate and increased realization of realistic investment, ceteris paribus (Emmi, 2015).

5) $\beta 5 > 0$; Electricity distribution to industry. If electricity capacity increases, investment will also increase through the company's additional operating hours because it increases company profits, and vice versa, ceteris paribus.

6) B6 > 0; Number of workers. The number of large and qualified workers will increase investor's interest because of the absence of difficulty in finding them, and conversely a small amount will reduce investment, ceteris paribus.

7) B7 > 0; Gross regional domestic product. If gross regional domestic products increase, investment also increases through the increase of real value added from the increases of corporate profits, and vice versa, ceteris paribus.

8) $\beta 8 > 0$; The ratio between loading and unloading. If the ratio of loading and unloading increases, investment will increase through corporate profits increase, and vice versa, ceteris paribus.

9) Dummy policy. If the number industry and location have been arranged in a national spatial planning, investment will increase through corporate profits increase, and vice versa, ceteris paribus.

3.7 Regression Analysis

Panel data regression analysis: Determining the model for foreign direct investment research; Estimating with pooled least square (PLS) model; Estimating with the fixed effect model (FEM); Do Chow test to determine the choice of PLS or FEM models. If the Chi square probability is less than alpha 5% then FEM will be selected; Estimating with the random effect model (REM); Conduct a Hausman test to determine the use of FEM or REM model. If the Chi square probability is less than alpha 5% then FEM will be selected.

3.7.1 Test of Regression Assumptions

Promoting the regression assumption test to produce a robust model requires multicollinear testing, autocorrelation test, and heterocedasticity test. The multicollinear test will be conducted with the Breusch Pagan LM test of independence. If the p-value of Chi square estimation test is less than alpha 5%, then the autocorrelation phenomenon occurs. If the p-value heteroscedasticity of the Chi square estimation test is less than alpha 5%, then the heteroscedasticity phenomenon occurs.

CHAPTER 4
RESULTS AND ANALYSIS

4.1 Ordinary Regression Econometric Model Testing

4.1.1 Brief Description of the Econometric Model

The econometric model testing of factors influencing foreign investment--in all industries classifications, foreign investment in labor-intensive industries, capital-intensive foreign investment industries, and the number of foreign companies in the industrial sector--is carried out by a panel data regression approach involving cross section data covering 10 (ten) provinces of Sumatra Island, 6 (six) provinces of Java Island, and 6 (six) provinces of Sulawesi Island; and time series with a period of 10 years from 2009 to 2018. This research prioritizes the main minimum wage variables with control variable factors, namely, consumer price index, road length, electricity distributed to industry, number of workers working in industrial sector, gross regional domestic product, market openness, and also the island/islands spatial planning.

4.1.2 Initial Examination

The initial examination of the best model assortment is prepared by comparing *the pooled least square (*PLS) model to the *fixed effect model* (FEM) by means of the Chow test. If the Chow tests p-value resulting less than alpha 5% then FEM is the best model. Furthermore, a test between the *pooled least square* (PLS) model and the *random effect model* (REM) is conducted by using the Pagan Breusch Lagrange multiplier (LM) test. If the test result evidences p-value of Pagan Breusch test Lagrange multiplier is less than alpha 5%, then REM is the best model. Furthermore, the test between *fixed effect model* (FEM) and *random effect model* (REM) was also carried out by using the Hausman test. However, if the test result obtained by the p-value of Hausman test is less than alpha 5% then REM is the best model. All in all, the data processing has shown that the regression on the model can only be done by means of *pooled least square* (PLS), while the regression with the other two models cannot be done.

Furthermore, an examination of regression assumption was conducted by means of multicollinearity test, autocorrelation test, and heteroscedasticity test. The multicollinear test was carried out by correlation analysis while the autocorrelation test was carried out with Breusch Pagan LM test and heterocedasticity test using modified Wqald test employing Stata 13 software.

Variabel	Model 1
Min. wage	49.82
CPI	7.56
Road	7.55
Electricity	12.35
Labor	43.54
Island/islands spatial planning	3.51

Table 4.1 Multicollinear Test Results

In the dummy model of Island/Islands spatial planning, CPI and roads have a VIF value of less than 10. This means that multicollinearity is not found in all three variables. Meanwhile, in other variables, VIF values are more than 10. Hence, multicollinearity is found in these variables.

Variabel	Model 1
C	3019009 (0.23)
minimum wage	-0.5811298 (-0.18)*
Road	1.608759 (0.30)
Electricity	9.064084 (0.11)*
Labor	-218344.4 (-0.35)
dummy of island/-s spatial planning	-552580.25 (-0.05)**

Table 4.2 Model Estimation Results

4.1.3 Econometric Test Results

Based on the results above, the minimum wage variable has a significant negative impact at alpha 10% on foreign direct investment (FDI) inflows in all industries. Meanwhile, the electricity variable has a significant positive impact at alpha 10% on foreign direct investment (FDI) by industries inflows particularly in Sumatra Island, Java, and Sulawesi. In addition, with positively and significantly at 5% alpha, FDI by industry in all of the 3 islands is influenced by CPI and spatial planning of the particular islands/islands. On the other hand, in all industries, other variables turn out leave the FDI inflows unaffected.

4.1.4 Discussion on the Econometric Regression Results

The discussion on econometric regression results encompasses each variable coefficient and also the results of the previous studies whether they are or are not in accordance with this study.

Minimum Wage Variable

Previous research conducted by Odi (1997) shows a similar thing that wages do not effect investment in labor-intensive industries. Meanwhile, according to Emi's research (2015), the minimum wage also does not affect the investment of both FDI and domestic direct investment. In the short-term process, it appears that investment in Indonesia is increasing. However, the increase of rigid minimum wages, in the long run, will disrupt the development of investment which in turn can adversely affect the structure of the economy. High wages are a burden on employers or investors because the company's operational costs from labor costs increase. In addition, if the products produced are not competitive, in the long run, the company will certainly suffer from loses. This is in accordance with the research by Rifianto (2002) and Silalahi (2006). They argue that the increasing minimum wages unease the investors to make assumptions on their possible benefits. This reflects the increased risk of setting business in Indonesia. Furthermore, labor commonly wants an increase in their wages through demonstrations and workers strike. However, if the increase in wages is followed by the increase in productivity, Indonesia will remain competitive compared to other countries and also remain attractive for investments.

Consumer Price Index Variable

Previous research conducted by Giordano Dell-Amore Foundatio shows that inflation as a factor in macroeconomic promoting stability is an important determinant of investment flows because it shows significant results. On the contrary, Emi (2015) argues that increasing inflation will reduce investment interest in the manufacture sector. Its impact on investment in the direction of negative causality can be explained first by the increase in inflation which promotes price increase which in turn will encourage people to reduce consumption so that the money supply will decrease. Second, a decrease in money supply will increase the interest rates of loan which upholds decline in investment.

Road variable

The construction of road networks affects the development of industrial investment which effecting the use of vehicles as a means of transportation (Samir, 2016).

Electricity variable

Regarding to the road and electricity variables, in a previous study, Odi (1997) stated that infrastructure is in a bad condition. This can be seen as an obstacle or at the same time as an opportunity for foreign investment. The majority of countries low-income are considered to be one of the factors that promote the difficulty. However, foreign investors show this potential in attracting foreign investment if the government in the country concerned gives more permits to foreign participation in the infrastructure sector. Jordan's research (2004) suggests that good quality and well developed infrastructure increases the potential productivity of investment in a country. Therefore, it stimulates the flow of foreign investment into the country. According to Emi (2015), the increase in infrastructure conditions will increase investment interest in the manufacturing sector. A good condition of infrastructure factors effective for the lower costs of production and trade. The total transportation costs from the availability and conditions of good infrastructure will drive low economic costs. This condition will certainly support the convenience of investors or entrepreneurs in running the business.

Labor Variable

This is in accordance with previous studies which suggested that the workforce is one of the determinants of FDI in determining the location of FDI–showing the importance of human capital although the results were insignificant (Danciu, et al., 2015).

Dummy of Island/Islands Spatial Planning

According to previous research, the existence of spatial policies led to the existence of corporate agglomeration so that there was a spatial distribution flow in the form of company spread (Garretsen, et al., 2007).

CHAPTER 5

CONCLUSION AND POLICY RECOMMENDATIONS

5.1   Conclusion

5.1.1   Results of Regression and Empirical Framework

There are several variables one of which is minimum wages, which is a control variable, that is affected by the foreign direct investment (FDI) inflows. On the other hand, the electricity variable, CPI, and dummy of Island/Islands spatial plan are variables affect significantly to the flow of FDI by industry in Sumatra, Java, and Sulawesi. At the same time, other variables, namely roads and labor do not significantly affect the flow of FDI by industry in the three islands.

5.2 Policy Recommendations

In formulating permission and budget policies, the central government and local governments need to scale up priorities according to the significance of the variables affecting FDI flows; should prioritize increasing the amount of electricity distribution to industry and CPI to encourage FDI by industry inflows in Sumatra, Java, and Sulawesi; and also Increasing minimum wages and limiting the area of industrial estates to control the flow of FDI by industry in the islands.

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ATTACHMENT 1: Regression Result

```
  ___  ____  ____  ____  ____ (R)
 /__   /  ____/  /  ____/
___/  /  /___/  /  /___/  13.0   Copyright 1985-2013 StataCorp LP
  Statistics/Data Analysis          StataCorp
                         4905 Lakeway Drive
   MP - Parallel Edition       College Station, Texas 77845 USA
                         800-STATA-PC      http://www.stata.com
                         979-696-4600      stata@stata.com
                         979-696-4601 (fax)


3-user 8-core Stata network perpetual license:
     Serial number:  501306208483
       Licensed to:  IDRE-UCLA
                 IDRE-UCLA


Notes:
     1.  (/v# option or -set maxvar-) 5000 maximum variables


. edit


. *(9 variables, 10 observations pasted into data editor)


. xtset province year
      panel variable:  province (strongly balanced)
       time variable:  year, 2009 to 2018
            delta:  1 unit
reg fdiall upahminimum jalan listrik ihk tenagakerja rtrpulaukepulauan


     Source |    SS      df      MS          Number of obs =     10
-------------+----------------------------         F( 6,    3) =    0.76
     Model | 2.0594e+12   6  3.4323e+11        Prob > F     = 0.6459
   Residual | 1.3520e+12   3  4.5067e+11        R-squared    = 0.6037
-------------+----------------------------         Adj R-squared = -0.1890
```

```
   Total |  3.4114e+12    9  3.7904e+11          Root MSE     =  6.7e+0
> 5
```

```
--------------------------------------------------------------------------------
fdiall |    Coef.   Std. Err.    t    P>|t|    [95% Conf. Interval]
-------------+------------------------------------------------------------------
```

Lampiran 1 (lanjutan)

```
upahminimum |  -.5811298   3.175287   -0.18   0.866   -10.68631   9.524051
jalan |   1.608759    5.42707    0.30   0.786    -15.6626   18.88012
listrik |   9.064084   78.96156    0.11   0.916   -242.2268    260.355
ihk |   10958.54   275205.4    0.04   0.971   -864867.9    886785
tenagakerja |  -218344.4   624440.7   -0.35   0.750   -2205594   1768905
rtrpulauke~n |  -52580.25   994995.6   -0.05   0.961   -3219100   3113940
_cons |   3019009   1.34e+07    0.23   0.836   -3.96e+07   4.56e+07
--------------------------------------------------------------------------------
```

reg fdiall upahminimum jalan listrik ihk tenagakerja rtrpulaukepulauan

```
   Source |    SS      df      MS          Number of obs =     10
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   Total |  3.4114e+12    9  3.7904e+11          Root MSE     =  6.7e+0
> 5
```

```
--------------------------------------------------------------------------------
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```

```
rtrpulauke~n |  -52580.25   994995.6   -0.05   0.961    -3219100    3113940
      _cons |   3019009   1.34e+07    0.23   0.836    -3.96e+07   4.56e+07
------------------------------------------------------------------------------
```

. vif

```
    Variable |     VIF      1/VIF
-------------+----------------------
 upahminimum |    49.82   0.020073
 tenagakerja |    43.54   0.022966
     listrik |    12.35   0.080963
         ihk |     7.56   0.132314
        jalan |    7.55   0.132427
```
Lampiran 1 (lanjutan)
```
rtrpulauke~n |     3.51   0.284510
-------------+----------------------
    Mean VIF |    20.72
```
reg fdiall upahminimum jalan listrik ihk tenagakerja rtrpulaukepulauan

```
    Source |     SS        df      MS              Number of obs =     10
-------------+------------------------------         F( 6,    3) =   0.76
     Model |  2.0594e+12    6   3.4323e+11          Prob > F     = 0.6459
   Residual |  1.3520e+12    3   4.5067e+11          R-squared    = 0.6037
-------------+------------------------------         Adj R-squared = -0.1890
      Total |  3.4114e+12    9   3.7904e+11          Root MSE     = 6.7e+0
> 5
```

```
------------------------------------------------------------------------------
      fdiall |    Coef.   Std. Err.     t    P>|t|    [95% Conf. Interval]
-------------+----------------------------------------------------------------
 upahminimum |  -.5811298  3.175287   -0.18   0.866   -10.68631   9.524051
        jalan |  1.608759   5.42707    0.30   0.786   -15.6626    18.88012
      listrik |  9.064084  78.96156    0.11   0.916   -242.2268   260.355
          ihk |  10958.54  275205.4    0.04   0.971   -864867.9   886785
```

```
 tenagakerja |  -218344.4   624440.7   -0.35  0.750    -2205594    1768905
rtrpulauke~n |  -52580.25   994995.6   -0.05  0.961    -3219100    3113940
       _cons |   3019009    1.34e+07    0.23  0.836    -3.96e+07   4.56e+07
```

. hettest

Breusch-Pagan / Cook-Weisberg test for heteroskedasticity

        Ho: Constant variance

        Variables: fitted values of fdiall

        chi2(1)   =   1.03

        Prob > chi2 =   0.3094

reg fdiall upahminimum jalan listrik ihk tenagakerja rtrpulaukepulauan


```
   Source |     SS      df      MS             Number of obs =      10
------------+------------------------------         F( 6,    3) =    0.76
    Model | 2.0594e+12    6  3.4323e+11         Prob > F     = 0.6459
  Residual | 1.3520e+12    3  4.5067e+11         R-squared    = 0.6037
------------+------------------------------       Adj R-squared = -0.1890
```

        Lampiran 1 (lanjutan)

```
Total | 3.4114e+12    9  3.7904e+11        Root MSE     = 6.7e+0
> 5
```

```
   fdiall |    Coef.   Std. Err.    t    P>|t|   [95% Conf. Interval]
------------+----------------------------------------------------------------
 upahminimum |  -.5811298  3.175287   -0.18  0.866   -10.68631   9.524051
       jalan |   1.608759  5.42707    0.30   0.786    -15.6626    18.88012
      listrik |   9.064084  78.96156   0.11   0.916   -242.2268   260.355
         ihk |   10958.54  275205.4   0.04   0.971   -864867.9   886785
 tenagakerja |  -218344.4  624440.7  -0.35   0.750    -2205594   1768905
rtrpulauke~n |  -52580.25  994995.6  -0.05   0.961    -3219100   3113940
       _cons |   3019009   1.34e+07   0.23   0.836    -3.96e+07  4.56e+07
```

. bgodfrey

Breusch-Godfrey LM test for autocorrelation

----

  lags(p) | chi2   df   Prob > chi2

-------------+---

   1 | 5.861   1   0.0155

              H0: no serial correlation

.

..