



**Minimum Wage and Poverty:
Empirical Study on District Panel Data in Java,
Indonesia**

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This document represents part of the author's study programme while at the Institute of Social Studies. The views stated therein are those of the author and not necessarily those of the Institute.

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List of Acronyms

BPS	Badan Pusat Statistik (Statistical Central Bureau of Indonesia)
BPKP	Badan Pengawas Keuangan dan Pembangunan (Monitoring Agency in Financial and Development)
GDP	Gross Domestic Product
GRDP	Gross Regional Domestic Product
ILO	International Labor Organization
ISS	Institute of Social Studies
KHM	Kebutuhan Hidup Minimum (Minimum Necessities of Life)
MW	Minimum Wage

Abstract

Poverty is a problem for a society by considering the socio-political and economic considerations. Socio-political aspect of poverty underlines social exclusion in society. While, economically, poverty can decelerate development process. To alleviate poverty, economists believe that economic growth is important. This, in turn, result in a unique set of policies among government. Minimum wage is one of most popular policy to alleviate poverty. Not only because minimum wage can improve average income of society, but also because it is a low-cost policy (Card and Krueger 1995).

The objective of this research paper is to investigate the relationship of minimum wage and poverty empirically. In order to do that this research paper construct a data set of time-series data for fourteen years from 2001 until 2014 and cross section data of 119 districts in the Java. The analysis is run by using three methods of panel data analysis; pooled OLS, fixed effect and random effect method. This research paper also tries to analyze the relationship of minimum wage and poverty in the province level using sub-sample data. Result of this research papers shows that minimum wage policy in Java can reduce both poverty gap index and poverty rate. However, in the province level, the regression show more varied results. In most of the analyzed provinces, minimum wage has negative effect towards poverty gap and poverty rate.

Relevance to Development Studies

This Research Paper will contribute to development study by giving empirical input about poverty in developing countries. In doing so, this Research Paper will try to empirically assets effect of minimum wage on poverty. Specifically, this research paper will discuss relationship between minimum wage policy and districts poverty in 119 districts in Java, Indonesia.

Keywords

Minimum Wage, Poverty Gap, Poverty Rate, District, Java, Indonesia

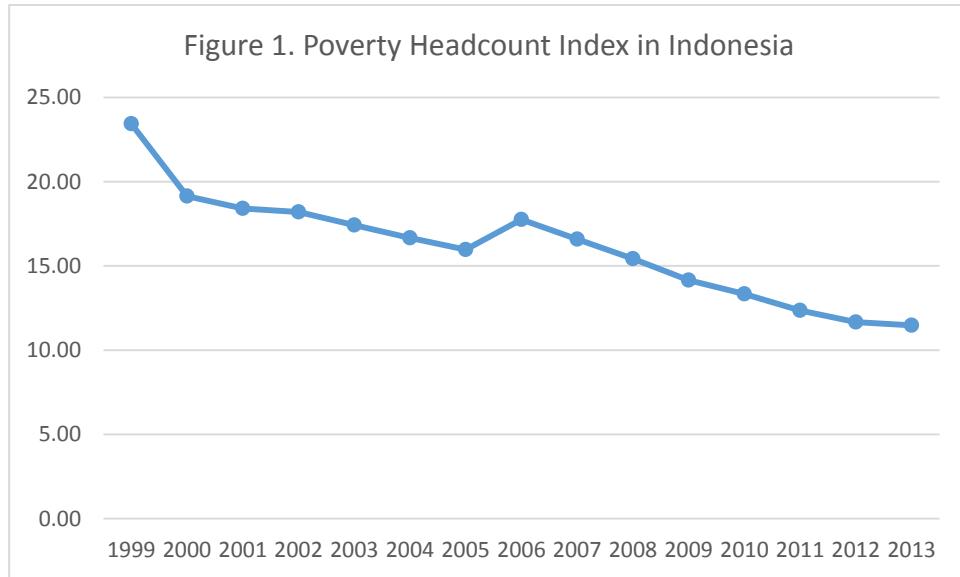
Chapter 1 Introduction

1.1 Background

Poverty is a problem for a society by considering the socio-political and economic considerations. Socio-political aspect of poverty underlines social exclusion in society. It is because poverty could allow marginalization of a sub-group in a society. While, economically, poverty can decelerate development process. It creates negative effects such as centralized capital accumulation which creates macro-economic instability. Poverty can also slowing down development process by restricting people to access education and health services. This, in turn will decrease the needed human capital accumulation in economic growth.

Indonesia experiences satisfying trend in poverty reduction.¹ Using national monetary poverty line of Statistical Central Bureau of Indonesia (2015a), Figure 1. shows how the share of absolute poverty in Indonesia's population is decreasing. There is roughly 11.96 percent decrease between 1999 and 2013. In 1999, the poverty headcount index was 23.43 percent. While, in the 2013 the level of the index dropped in to the 11.47 percent. The biggest drop happened in the period of 1999 and 2000. In this period, the index decrease by 4.29 percent. It is also important to remember that in the same period, the economy of Indonesia experienced a 4.12 percent growth. The index level continues to decline until it slightly rise in 2006 from 15.97 percent to 17.75 percent. After 2006, the headcount index continuously decreases.

¹ Except from author's essay 'Interdependence between Economic Growth, Poverty Alleviation and Inequality Reduction: The Case of Indonesia'. Submitted in March 2015, Institute of Social Studies. The Hague.

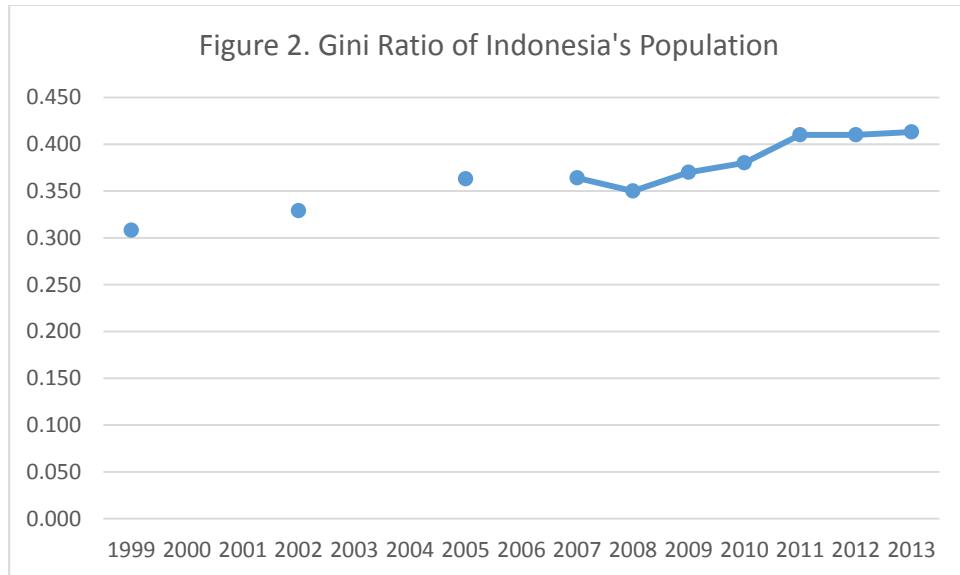


Source: Statistical Central Bureau of Indonesia (2015a)

There are two variables that influence poverty; inequality and economic growth (Ravallion 2005). These two variables represents different views about policies that should be taken to reduce poverty. On one hand, study conducted by David Dollar and Aart Kraay in 2002 shows that economic growth is important to reduce poverty. Dollar and Kraay (2002) argue that growth has positive impact to poverty reduction. By using data of 92 countries from 1960s to 1990s, they found that an increasing number of average income of all population will increase the income of the poorest quintile of population (Dollar and Kraay 2002).

On the other hand, Simon Kuznet argues that the economic growth will also create greater inequality. Kuznet argues that 'in the early stages of economic growth, the distribution of income will tend to worsen; only at later stages it will improve' (Kuznet 1955 in Todaro and Smith 2009). In fact, inequality is rising in Indonesia. The data of Indonesia's Gini ratio shows that there is an increasing trend of inequality. Figure 2. shows that the Gini ratio is 0.308 in 1999. This initial level of Gini ratio can be considered as an equitable value. Todaro and Smith (2009) state that the Gini ratio value of an equal society lays between 0.2 and 0.35. Thus, it is safe to assume that in 1999, Indonesia has an equal population. In 2005, the Gini ratio went up to the level of 0.363. This means that Indonesia's population starts to become more unequal. In 2008, the level slightly decrease to 0.35. Sadly, since 2009 the level of inequality gradually grow. The latest level of Indonesia's Gini ratio is 0.413 in 2013. This

ratio is the largest Gini ratio that is experienced by Indonesia from 1999 until 2013.



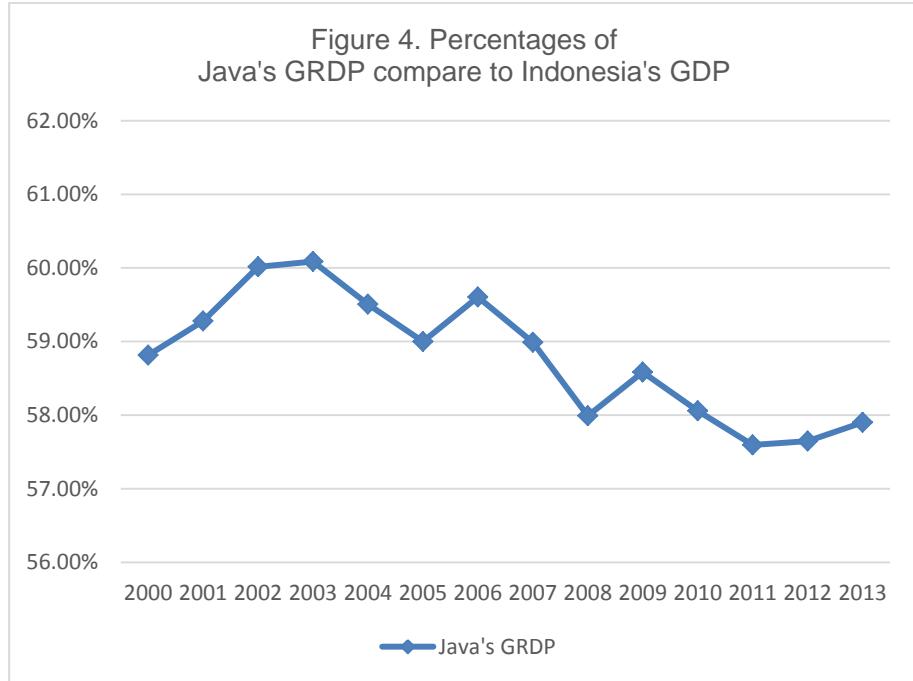
Source: Statistical Central Bureau of Indonesia (2015b)

Even so, economically, Indonesia is one of the largest economy in the Southeast Asia region. It experienced a stable GDP growth rate above 5.5% from 2010 until 2013 (Worldbank, 2015a). Indonesia's economic growth between 1999 and 2013 is shown in the Figure 3. It can be clearly see from the graph that the rate of economic growth is increasing. In 1999, the economic growth was 0.79 percent. The rate level shot up in 2000 by 4.12 percent. In 2001 there was a slight decline of economic growth by 1.27 percent. From 2002 until 2008, Indonesia experienced gradually increasing economic growth. This growing process was slightly interrupted in 2009 because of the global crisis. The economy of Indonesia rise in 2010, but it gently decreased between the 2011 until 2013.



Source: World Bank (2015a)

Approximately half of Indonesia's Gross Domestic Product is situated in the Island of Java. This is because, historically, the island is dominant in Indonesia, both politically and economically. Politically, Java is the Island where Jakarta, the capital city is located. Economically, from 2000 until 2013, 50 percent – 60 percent of Indonesia's aggregate output is produced by the Java (Figure 4.). In 2002 and 2003, the island produce 60percent of Indonesia's output. This is the highest ratio in the period of the last decade. In the last two years, the ratio is decreasing, yet the percentage is still above 55 percent (Statistical Central Bureau of Indonesia 2015c). The population of the Island consist of 121.352.608 people in the 2000. This is 59 percent of Indonesian population. In 2010, the ratio is slightly decreased to 57 percent (Statistical Central Bureau of Indonesia 2015d). Though, the Island still play important role in Indonesia's economy.



Source: Statistical Central Bureau of Indonesia (2015c)

In tune with the economic growth, the minimum wage of the Indonesia labor is also increasing time after time. Del Carpio *et al.* (2012) report that from 2001 to 2006, the monthly minimum wage relative to GDP in Indonesia was bigger than Thailand or China. Rama (2001) finds that the nominal minimum wage in Indonesia were tripled from 1990 to 1995.

Discussion of minimum wages is a ‘question of distribution’ (Card and Krueger 1995). It is a unique subject in economics because it deals with how an economy could reduce inequality in a society. There are two main viewpoints in this discussion. On one hand, some economists believe that minimum wages policy create adverse effects on society. On the other hand, other believe that minimum wages policy is beneficial to society.

In many developing countries, the implementation of the minimum wage policy is different than it does in a rather developed countries. This is because in the developing countries, the monitoring of the policy implementation is low. Furthermore, the significant proportion of informal sector in economy makes the minimum wage harder to be implemented (Islam and Nazara 2000). Different experience of minimum wage policy adoption in developing countries raise because the labor market has more complex characteristic. The labor market is distinguished by a less skilled labor, un-equal ratio in gender, and the firms are generally small and informal (Islam and Nazara 2000).

Even so, Saget (2004) mentions that the goal of the minimum wage policy is to protect labor and their families. In fact, World Banks (2015b) writes that labor earning is heavily important to poor households' income. Likewise, by studying the effect of minimum wage on employment exclusively seems to underestimate the purpose of the policy. In consequence, a study regarding the relationship of the minimum wage policy and poverty in developing countries such as Indonesia, becomes important.

Indonesia's government has determined minimum wages differently. Since 1969 until 2014 there are six different legal bases that regulated minimum wage; Presidential Decree number 85 in 1969 (Keputusan Presiden No. 85 Tahun 1969 tentang Pembentukan Dewan Penelitian Pengupahan Nasional); Minister Policy No. 5 in 1989 (Permenaker: Per-05/Men/1989); Minister Policy No. 1 in 1990 (Per-01/Men/1990 tentang Perubahan Permenaker : Per-05/Men/1989); Minister Policy No. 4 in 1997 (Permenaker No.3 Tahun 1997 tentang Upah Minimum Regional); Minister Policy No. 1 in 1999 (Permenakertrans No. 01 Tahun 1999 tentang Upah Minimum); Minister Policy No. 226 in 2000 (Keputusan Menteri Tenaga Kerja dan Transmigrasi: KEP-226/Men/2000 tentang perubahan pasal-pasal Permenakertrans No. 01 Tahun 1999 tentang Upah Minimum); and The 13rd law in 2003 (Undang-Undang no. 13 Tahun 2003 tentang Ketenagakerjaan).

From 1970 until 2001 the minimum wage was centrally determined by Indonesia's central government. In 2001 the minimum wage is determined by provincial government. This is because in the year 2000, Indonesia underwent decentralization of government's authority. However, since 2003 the district government is authorized to set the minimum wage.

The last three legal bases are the one that are used by Indonesia government from 2001 until 2014. The regulation from the Manpower Minister no 1 in 1999 base regulates that the minimum wages comprise of basic wages and the fixed benefits.

There are also two kinds of minimum wage in Indonesia. The first one is the Regional minimum wage, while the second one is the regional minimum wage based on sector. The regional minimum wage is the minimum level of wage that a worker receives that is acted in a specific region. The regional minimum wage can be distinguished in to two level, based on the level of govern-

ment authority; the provincial minimum wage (UMR Tk. I) and the district minimum wage (UMR Tk. II). In addition, the Regional Sectoral minimum wage is a more detailed level of minimum wage in a region based on the economic performance of the sector. The Regional Sectoral minimum wage can also be differentiated into two level; the provincial sectoral minimum wage and the district sectoral minimum wage.

In setting the level of minimum wage, both the provincial and district level government refer to the regulation from the Manpower Minister no 1 in 1999. There are seven variables that need to be considered; minimum necessities of life (KHM), consumer price index, employer's ability, level of wage in surrounding area, labor market, economic growth and per capita income. A more detailed explanation of minimum wage setting can be found in Minister Regulation No. 17 2005 (Permennaker Per-17/Men/VIII/2005). This regulation state that the minimum wage should be based on the decent living needs, growth of Gross Regional Domestic Product (GRDP), regional's productivity and marginal sector in the specific region.

1.2 Objectives

This study has the central objective to investigate the relationship of the minimum wage and the poverty empirically while focusing on the economy of Indonesia's district that are geographically located in the Island of Java. Second, out of this study may be able to resolve an issue regarding finding out the best level of minimum wage for the district in the Island. Finally, the study has special purpose to provide an efficient and active policy for future.

1.3 Research Question

Considering that the objective of this research is to analyse the minimum wage and poverty relationship empirically, the proposed main research question of this research paper is:

- 1) What is the relationship between minimum wage and poverty in Java?

In order to answer this question, this research paper will try to answer two related question:

- 2) How does the minimum wage affect poverty in the Island of Java, Indonesia from 2001 to 2014?
- 3) Does the minimum wage increase affect the poverty differently in each province of Java, Indonesia from 2001 to 2014?

1.4 Structure of Research Paper

In analyzing the relationship between minimum wage and poverty, this research paper will be divided in to five chapters.

Chapter 1. Introduction

This chapter discusses the background of the problem in this research paper. A summarize of how minimum wage policy implemented in Indonesia will be given by this chapter. It also presents the objectives and research questions of this research paper.

Chapter 2. Theoretical and Empirical Review on Minimum Wage Policy and Poverty

This chapter will discuss the conceptual framework of minimum wage policy and poverty. It will also present the empirical finding from previous research regarding the problem. Based on the theoretical and empirical review, this research paper will present its hypothesis.

Chapter 3. Research Methods

This chapter will display methods of this research. Here, this research paper will present its research variables. This chapter will also explain their data and analytical methods.

Chapter 4. Analysis of Empirical Results

This chapter will reveal the result of regression of the data. This chapter will try to analyze the result based on the theoretical background and empirical result.

Chapter 5. Conclusion

In this chapter, the paper will deliver its conclusion and suggestion based on the research.

Chapter 2 Conceptual Framework and Empirical Review

This chapter will discuss the conceptual framework of minimum wage policy and poverty. It will also present the empirical finding from previous research regarding the problem. Based on the theoretical and empirical review, this research paper will present its hypothesis.

2.1 Conceptual Framework on Poverty

Poverty becomes one of development focus because it involve ethical considerations. Social aspect of poverty underlines social exclusion in society. It is because poverty could allow marginalization of a sub-group in a society. Poverty can also decelerate development process. It creates negative effects such as centralized capital accumulation which creates macro-economic instability.

Poverty also become a ‘critical global issue’ because there is no justification of poverty to exist (Ellison and Thompson 1994). Poverty is a question of distribution of income. It is because income is related to welfare. Income will determine various aspect of people lifestyle, such as; their level of education, health service, mode of transportation, consumption of goods, and their saving pattern.

In this research paper, the concept of poverty is understood using its economic definitions. The World Bank defines poverty as a condition where people fail to achieve a certain standard of living based on their household income and expenditures per capita (World Bank 1990). The use of income and expenditures shows different approach in measuring poverty. An income approach is considered less reliable, not only because it is difficult to have data about income from informal sector, but also it cannot show how household would adapt to price fluctuation. While, the expenditure approach is considered to be better than the first one, because it reflect households’ adaptation (World Bank 1990).

To understand poverty, Novak (2003) explains that the poverty concept can be clustered in to two main groups. The first group try to understand pov-

erty by focusing on the ‘causes’ of poverty. It observed the quantity of sources available, thus it deals with individual causes of poverty. While, the second group emphasis on the outcomes of poverty. It analyze the inhumane living condition of poor people. Thus, it discussed about the concept of ‘basic needs’ (Novak 2003).

Ellison and Thompson (1994) use the view of G. M. Meier to explain the concept of poverty. There are two concepts of poverty; relative poverty and absolute poverty. The first concept of poverty refers to the concept of inequality. Relative poverty is defined as an ‘international gap in standard of living between rich and poor countries’ (Meier 1984 in Ellison and Thompson 1994). While, the Absolute poverty is described as ‘a degraded condition of life which prevent people to have access to ‘basic human necessities’ (Meier 1984 in Ellison and Thompson 1994).

There are three elements that relates to absolute poverty (Holman 1978). The first one is that poverty line is fixed in to minimum amount of necessities needed by people to be ‘physically efficient’. In fact, Holman (1978) states that the presence of such minimum level means that ‘enjoyment of life’ is not possible. The second element is that absolute poverty need to be strict in calculation and implementation. The last one is that absolute poverty is not related to income of society in general. He explain that the comparison in absolute poverty happen between working people and minimum level of necessities (Holman 1978).

Todaro and Smith (2009) defines an absolute poverty as a concept that measure number of people who are unable to fulfil their basic needs. To measure poverty in a society, the poverty line plays an important role (Todaro and Smith, 2009). The poverty line is an imaginary line which differentiates people between the poor and the have. Todaro and Smith (2009) define the poverty line as a specific minimum level of real income of less than one or two ‘purchasing power parity’ dollars per day. Ray (1998) considers the poverty line as an ‘expenditure threshold’ which considered as the most minimum level of

proper economic life. Todaro and Smith (2009) also classify the number of people who live below the poverty line as the absolute poverty.²

To measure the number of people living below the poverty line, economists use the headcount. While, to take the number of poor as the fraction of the population, economists come with the headcount index (Todaro and Smith 2009 and Ray 1998). The headcount index is interchangeable with poverty rate. However, in order to alleviate poverty, it is important not only to know the number or the ratio of the poor, but also the required income that allow them out of poverty. Economist use the Poverty Gap to measure the later. Todaro and Smith (2009) define the total poverty gap as the total amount of income which is needed by the poor to move from below the poverty line up to the line.

2.2 Conceptual Framework on Minimum Wage

There is various definitions that can be used to describe minimum wage. The Committee of Experts in the ILO (International Labor Organization) defines minimum wage as 'the wage in each country has the force of law and which is enforceable under threat of penal or other appropriate sanctions' (ILO 1967 in Belser and Rani 2015). While, Mankiw (2009) defines minimum wage policy as a law that sets the minimum amount of wages that need to be paid to the workers by the employee.

Belser and Rani (2015) mentions that the minimum wage can be used to redistribute wealth in society and also improve purchasing power of low-paid workers. This is in tune with Chard and Krueger's understanding of minimum wage's objective. They argue that minimum wage help to reduce poverty in a society (Card and Krueger 1995).

David Card and Alan B Krueger (1995) study the effect of minimum wages and employment in USA between 1989 and 1991. More importantly, they also study the effect of minimum wages increase to poverty reduction. They find that 'poverty rates, particularly for working adults, fell more quickly be-

² Except from author's essay 'Interdependence between Economic Growth, Poverty Alleviation and Inequality Reduction: The Case of Indonesia'. Submitted in March 2015, Institute of Social Studies. The Hague.

tween 1989 and 1991 in states in which the increase in the minimum wage had the largest impact on wages' (Card and Krueger 1995).

Card and Krueger study's shows that the distributional effect of minimum wages is limited. They argue that in their study the minimum wages increase generate 10 to 15 percent increase in less than 10 percent 'lowest paid worker' (Card and Krueger 1995). They also find that the effect of minimum wage is limited because two-thirds of poor adults is unemployed (Card and Krueger 1995).

Richard B Freeman (1996) argues that minimum wage is a policy that intended to redistribute income to 'low-paid workers'. He states that under three conditions, the intended goal can be achieved. The first one is the labor market condition. The second condition is the level of minimum wage. The last condition is the enforcement of the policy Freeman (1996). In his study, Freeman (1996) finds that a minimum wage policy can be a redistributive tool in the United Kingdom and the United States as long as it a correctly decided and connected with other form of redistributive policies.

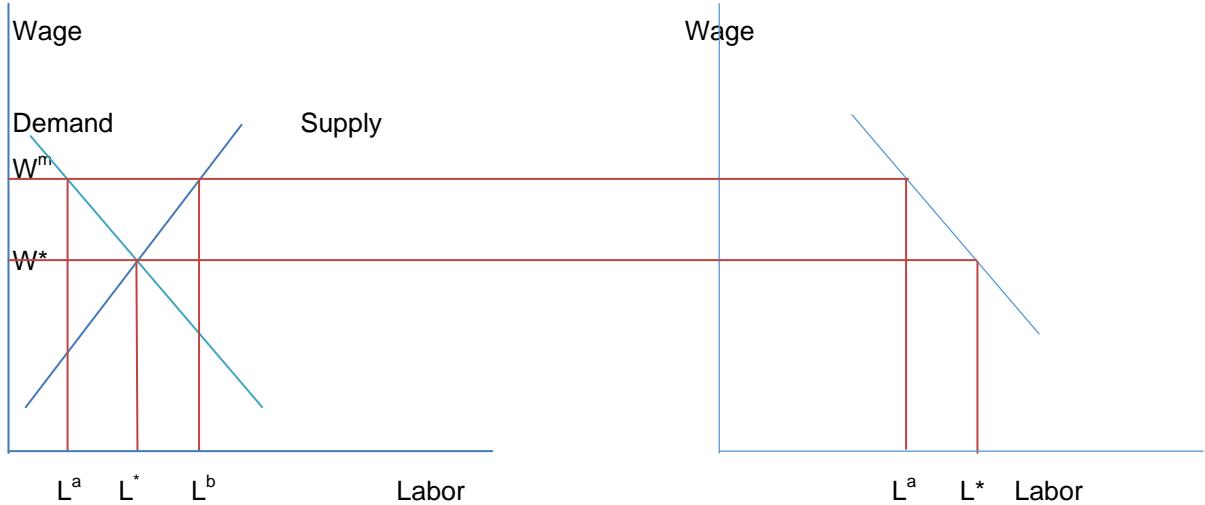
In South Africa, Karl Pauw and Murray Leibbrandt study minimum wages effect on households' poverty. In order to do that, they create a 'general equilibrium microsimulation model' (Pauw and Leibbrandt 2012). They find that the minimum wage policy only slightly decrease the level of poverty and inequality in general. It is because the minimum wages policy will create unemployment and inflation in South Africa economy (Pauw and Leibbrandt 2012).

However, the effectiveness of these objectives are debatable. Catherine Saget (2001) argues that an increase in minimum wages could alleviate poverty rely upon the 'employment effect' and 'impact on average earnings'. Theoretically, there are two different way of understanding the effect of minimum wage, based on the condition of the labor market. The first one is the context of competitive labor market. The second is the monopsonistic labor market (Islam and Nazara 2000).

Figure 5. shows that in a competitive labor market, the decision to implement a minimum wage will create a job rationing condition and hence unemployment (Islam and Nazara 2000). This viewpoint argues that implementation of minimum wage (W^m) above the equilibrium point (W^*) will create increase in supply and decrease in demand of labor. Thus, in the right side of the figure,

the number of labor employed will decrease from the equilibrium level (L^*) to the level where unemployment occur (L^a) (Islam and Nazara 2000).

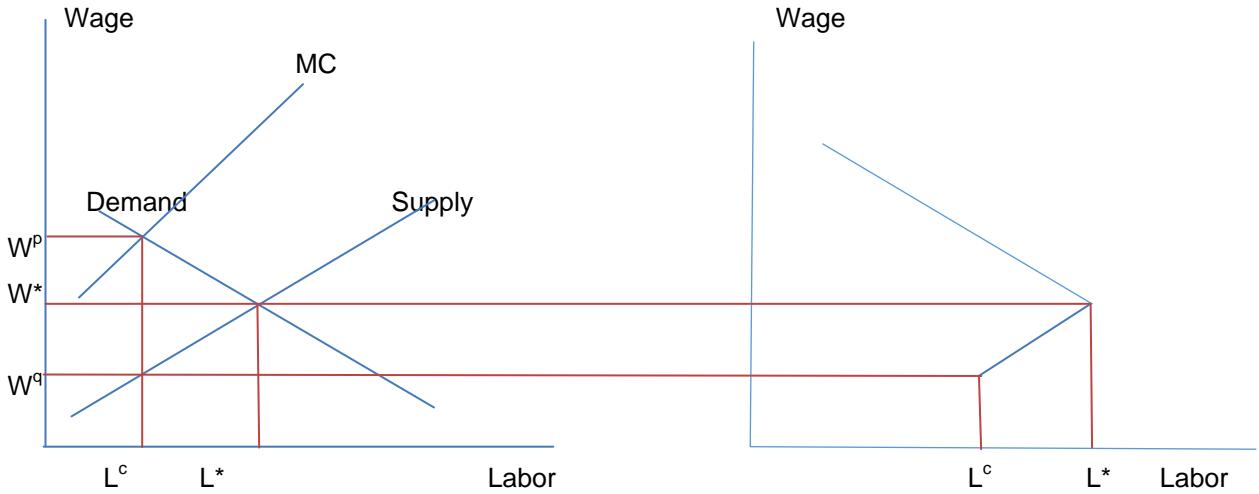
Figure 5. Competitive Labor Market



Source: Islam and Nazara (2000)

In a monopsonistic labor market, an ‘employer power’ exist in the labor market. Figure 6. Shows the illustration a monopsonistic labor market. This viewpoint argue that the existence of ‘employer power’ shift the equilibrium that presence in a competitive labor market. A profit maximizing orientation of employer will create a much lower wage than the market-determined wage. The profit maximization orientation is shown by the wage level (W^q). In this level of wage, employer can achieve profit maximization. However, this level of wage cannot create equilibrium (L^*) in labor demand and supply. In order to reduce employment, the minimum wages should be implemented. The minimum wages (W^*) will create equilibrium, thus, increasing the employment of labor.

Figure 6. Monopsonistic Labor Market



Source: Islam and Nazara (2000)

Thus, in a world of imperfect market where employer has its advantage toward employee, there are positive employment effect of minimum wage (Islam and Nazara 2000 and Chard and Krueger 1995). Furthermore, even though there are also possibilities of unemployment or bankruptcy of an employer, it is important to apprehend minimum wage effect in its whole macroeconomic effect rather than its micro effect (Belser and Rani 2015).

2.3 Empirical Review on Minimum Wage and Poverty

It is important to understand the effect of minimum wage to poverty. The minimum wage can be understood as a redistributive policy which alleviates poverty. Saget (2004) discuss the role of minimum wage policy as a tool to reduce poverty. She argues that the level of minimum wages is not enough to protect worker from poverty. It is because, the number of the wages is very close to 'the level of extreme poverty' (Saget 2004).

It is also important to note Sage other argument that the policy has direct and indirect effect on the poverty reduction. The example of the direct effect of the policy on poverty alleviation is the remittance of textile worker in Cambodia to the countryside. The textile sector in Cambodia is required to implement the minimum wage policy. Saget argues that the remittance of the worker reduce poverty (Saget 2004). While, the indirect effect of the policy can be seen in the way the policy act as 'reference wage' of the informal sector (Saget 2004).

The need for an increase in the level of income to reduce poverty also found by Felix Naschold. Naschold (2002) finds that distribution of income plays significant role in reducing poverty in the Least Developed Countries (LDC). In his study, He suggests that in order to achieve millennium development goal in poverty, the LDC have to improve their income distribution (Naschold 2002). Even though Naschold does not specifically mention the policy. This research paper holds to Chard and Krueger's understanding that minimum wage's is a redistributive policy (Card and Krueger 1995). Thus, it can be understood that minimum wage is important to reduce poverty.

Belser and Rani (2015) mentions that the minimum wage can be used to redistribute wealth in society and improve purchasing power of low-paid workers. Their argument is based on perception of monopsonistic labor market. They argue that because of monopsony nature in labor market, minimum wage policy able to redistribute income in society. They explains that minimum wage can redistribute income share in society by helping the 'low-paid workers' and minimize the level of poor people. However, they also stress the importance of supervision. It is because the effectiveness of minimum wage require enforcement of the policy itself Belser and Rani (2015).

In 2013, Rani *et al.* study the role of minimum wages in the economy of developing countries. They find that because the level of minimum wage is larger than the level of average earning, the minimum wage policy has a large effect on population. They also argue that minimum wage is needed to 'boost domestic source of growth' despite limitation in fiscal policy faced by policy maker. They also find that employment effects of minimum wage in developing countries are small or significance (Rani *et al.* 2013). Thus, the minimum wage policy is important to alleviate poverty.

The previous finding of the relationship between minimum wage and poverty can also be found in the work of Sara Lemos (2009) and T.H. Gindling and Katherine Terrell (2010). Using households survey panel from 1984 until 2004 in Brazil, Lemos (2009) finds that the minimum wage policy results in reduction in gap of wage distribution. According to Lemos (2009) there is no employment effect of minimum wages. This assumes that minimum wage is important to income redistribution in society.

The work of Gindling and Terrell (2010) also support the notion of minimum wage importance in alleviating poverty. They observed minimum wage implementation in Honduras between 2001 and 2004. Their study asserts that a ten percent increase in minimum wage is capable to reduce extreme poverty by 1.8 percent (Gindling and Terrell 2010). Taking account the fact that 71 percent of minimum wage earners are poor in Honduras, the minimum wage increase could considerably reduce poverty (Gindling and Terrell 2010).

Bird and Manning (2008) simulates the effect of minimum wage to poverty in Indonesia's poor households. Their finding are supported by earlier finding that minimum wage has negative impact toward poverty. Their simulation result suggests that an increase in minimum wage appears to reduce the number of the poor by 2.7 million out of 90.4 million poor people Bird and Manning (2008).

The 'Social Sharing Model' is another way to understand how minimum wage can affect poverty. This model is proposed by Gary S. Fields and Ravi Kanbur. They argue that even in a 'competitive labor market' the presence of 'social sharing' in minimum wage policy can potentially reduce poverty (Fields and Kanbur 2007). There are three types of social sharing model; perfect income sharing, partial income sharing, and zero income sharing (Fields and Kanbur 2007).

Fields and Kanbur (2007) argue that in the model, both employed and unemployed worker will benefit from the minimum wage. The sharing model is conceptualized as;

$$y^* = a + (1 - b)y$$

where y is the wage of employees. b is the 'marginal tax' that paid by employed worker to finance 'social benefits'. a is benefits or 'fixed income grant' that received by both the unemployed and employed. The last variable, y^* is the amount of incomes that received by employed worker (Fields and Kanbur 2007). By having the social sharing, the income of the employed will be the 'fixed income grant' and 'after tax wages'. While, for the unemployed, their will receive 'fixed income grant' instead of nothing (Fields and Kanbur 2007).

2.4 Empirical Review on Indonesia's Labor Market

A lot of previous study focus on the relationship between the minimum wage policy and the employment. In 2001, Martin Rama tries to analyze the effect of minimum wage increase on wage earning and employment In Indonesia. In the study, he finds that the raise of minimum wage has moderate effect on the average wage of labor. Rama also finds that the increase of minimum wage has a huge impact in the employment of small firm. In contrast, the effect of the increase has positive impact on the employment of large firms (Rama 2001).

Del Carpio *et al.* (2012) also investigate the impact of minimum wage policy on wages and employment in Indonesia. They emphasize that the marginal product of labor (MPL) could be also considered in order to understand the policy. It is because changes in minimum wage will have different effect on an economy, depends on the MPL. If the present wage is set below the MPL, a rise in minimum wages can benefit the worker without harming employer (Del Carpio *et al.* 2012). Del Carpio *et al.* (2012) try to investigate the relationship using data from 1993 until 2006. This analysis has different time range compare to study conducted by Rama which focus on 1993. However, they share same finding regarding the effect of minimum wage on employment both in small and large firms. They also find different effect of minimum wage based on the gender. Most of the job losses are experienced by female workers (Del Carpio *et al.* 2012).

More recent study of Indonesia's labor market was conducted by Shasta Pratomo (2014). The study also try to examine the impact of minimum wage policy on the working hours of labor based on gender and domicile. He finds that the raise of minimum wage level will positively affect the working hours of labor. He also finds that the minimum wage coefficient in urban area is lower than rural area (Shasta Pratomo 2014).

2.5 Hypothesis

Based on the conceptual framework and previous research, the hypothesis of this Research Paper are:

- 1) There is a negative effect of minimum wage increase on the poverty in the island of Java, Indonesia from 2001 to 2014.
- 2) There is an unvarying negative effect of minimum wage increase on the poverty in the island of Java, Indonesia from 2001 to 2014.

Chapter 3 Research Methods

In order to investigate the relationship of the minimum wage and the poverty in the Island of Java, this research will try to analyze the relationship by using a set of data and a specific econometric methodology. The data set is obtained from official institutions that have credibility in the issue of minimum wage and poverty. While, the methodology refers to theoretical and empirical studies discussed above.

3.1 Data

In order to achieve study objectives, this study will be conducted into several broad steps. Firstly, study on official or other related published documents from government institution and other institution associated to macroeconomic policies and indicators as well as those from international institutions. Secondly, review on empirical evidences of minimum wage and poverty in Java to obtain some related data and information. Thirdly, this research paper will examine the relationship of the minimum wage and the poverty data.

This study is based on secondary source of data on the annually observations of the economy of district that is located in Java for the period of 2001-2014 which is provided by national and international institutions. Data will be obtained from the; Provincial level of Statistical Bureau of Indonesia (BPS Prov), Ministry of Manpower and Transmigration (Kemenakertrans), International Labor Organization (ILO), World Bank and other reliable sources.

This study uses district's poverty gap and district's poverty rate as dependent variables. These variables are collected from the Indonesia's Central Statistical Bureau. While, independent variables are divided into main variable and control variables. The main variable is the minimum wage value of districts in Java. Data of this particular variable is collected from the Central Statistical Bureau and Ministry of Manpower and Transmigration. The control variables consist of Gross Regional Domestic Product (GRDP) per capita, population, inflation rate and household's electricity. These variables are considered important to explain the poverty based on previous empirical research. These variables are district level data which are obtained from the Central Statistical Bu-

reau. Complementary data, such as a set of rules in minimum wage policy, are obtained from reliable sources.

This research paper uses time-series data for fourteen years from 2001 until 2014 and cross section data of 119 districts in the Java. Pooling of these data results in 976 observations. The acquired number of observations is also indicating that the used data set is an unbalanced panel data set.

3.2 Methodology

This study will use panel data analysis to achieve study objectives. The panel data is a set of data which has the same sample at several subsequent points in time. Wooldridge states that 'Panel data set are very useful for policy analysis and, in particular, program evaluation' (Wooldridge, 2014). Panel data set combine the time-series data and cross-section data. Thus, it combine the variation of individual and the variation of time phases.

Baltagi (1995) explains that the panel data analysis has five advantages compare to time-series data and cross-section data. First, panel data estimation is able to show individual heterogeneity. By showing the heterogeneity, a panel data estimation can prevent bias result which cannot be controlled in a cross section or a time series data. The second advantage is that the panel data can be more informative, more variability, less collinearity among variables, more degrees of freedom and more efficient. Third, a panel data set is better to study the dynamics of adjustments, rather than having multiple cross-section estimation. Fourth, panel data is also better to identify and measure effects that are not detectable in pure cross-sections or pure time-series data. Finally, a panel data set is also able to construct and test more complicated behavioural models than time-series data or cross-section estimation.

This research paper will try to find and analyze the relationship between the variables, and also the magnitude of their interaction. This will be done by using unique regression methods of panel data set; Pooled Ordinary Least Square (OLS), Fixed Effect Model (FEM), and Random Effect Model (REM). This is in tune with Wooldridge's explanation that to analyze panel data model, there are three approaches that can be used; the Ordinary Least Square, the Fixed Effect Model, and the Random Effect Model (Wooldridge 2014). Furthermore, this research paper will also try to analyze the variation of the rela-

tionship in each province in Java. To observe the relationship, this research paper will compute the regression by sub-sample. Here, the three regression method of panel data will be used.

3.2.1 Econometric Model of Minimum Wage and Poverty

This study use minimum wage as the main variable that affects poverty gap and poverty rate. While, as control variables this research paper use GRDP per capita to represent economic growth, population and inflation rate as factors that foster poverty. The last control variable; the household's electricity represents infrastructure availability in society.

There are two models use by this research paper. The first model try to analyze the relationship between poverty gap and minimum wage on districts in Java. The first analysis model that is used by this research paper is:

$$p_gap_{it} = \beta_0 + \beta_1 mw_{it} + \beta_2 gcpt_{it} + \beta_3 totpop_{it} + \beta_4 infl_{it} + \beta_5 elect_{it} + \varepsilon_{it}$$

Since the value of each observation in independent variables are very diverse, this research paper then try to convert the initial value in to natural logarithms value. For instance, the value of poverty gap variable is measured in index, while the GRDP per capita variable is measured in million. The first model then become:

$$p_gap_{it} = \beta_0 + \beta_1 \ln mw_{it} + \beta_2 \ln gcpt_{it} + \beta_3 \ln totpop_{it} + \beta_4 \ln infl_{it} + \beta_5 \ln elect_{it} + \varepsilon_{it} \dots (1)$$

The second model try to analyze the relationship between minimum wage and poverty using the percentage of the poor in each district as dependent variable. The second model that is used by this research paper is:

$$p_rate_{it} = \beta_0 + \beta_1 mw_{it} + \beta_2 gcpt_{it} + \beta_3 totpop_{it} + \beta_4 infl_{it} + \beta_5 elect_{it} + \varepsilon_{it}$$

Similar to the first model, the value of observation is highly diverse. This will result in multicollinearity or outlier. Thus transformation into natural logarithm is also underwent in the second model. The second model then become:

$$p_rate_{it} = \beta_0 + \beta_1 \ln mw_{it} + \beta_2 \ln gcpt_{it} + \beta_3 \ln totpop_{it} + \beta_4 \ln infl_{it} + \beta_5 \ln elect_{it} + \varepsilon_{it} \dots (2)$$

Where i denotes specific district in the Java; $i = 1, \dots, 119$. t denotes specific year; $t = 2001, \dots, 2014$. $p_{gap_{it}}$ is the first dependent variable and $p_{rate_{it}}$ is the second dependent variable. $lnmw_{it}$ is the value of minimum wage (which has unique value in each district and time). $lncpt_{it}$ is the value of GRDP per capita. $lntotpop_{it}$ is the number of people live in each district. $Infl_{it}$ is the value of inflation rate which is calculated by GRDP deflator. Finally, $elect_{it}$ is the percentage of household which receive electricity in each district. ϵ is the error component at time of t for unit cross section of i . β_0 is the intercept. $\beta_1 - \beta_5$ are coefficients of independent variables. Discussion regarding the variables will be presented by this research paper in the later part of this chapter.

As this research paper mention earlier, three methods will be used to compute the relationship between minimum wage and poverty. The first method is the Pooled Ordinary Least Squares (OLS). The Pooled OLS method will try to find the value of parameter by minimizing ‘the sum of square vertical distance’ (Wooldridge 2014). Wooldridge (2014) calls this method as the Pooled Cross Section. This is the simplest method in analyzing panel data set. It is because, it creates ‘minor statistical complications (Wooldridge 2014). This method regards that each individual observation don’t have any differences in its effect regardless the nature of cross section and time series. It means that this method cannot represent differences of each individual observation. In fact, Wooldridge (2014) states that one of many reason to use Pooled OLS in a panel data set is to create a larger size of sample.

The second method is the Fixed Effect Model method. This model produce the fixed effect estimator. Wooldridge explains that the fixed effect estimator is essentially a pooled OLS estimator which is established on ‘time-demeaned’ variables (Wooldridge 2014). It means that in this model, the independent variables are considered as a ‘non-random’. This model can generate an unbiased estimator, under a strict exogeneity assumptions; each error term should not be correlated with independent variables in all time periods; error term have to be homoskedastic and serially uncorrelated (Wooldridge 2014).

These models are performed under several assumption. These strict assumptions will ensure the estimator is unbiased. There are also homoskedastic assumption and serially uncorrelated across different period assumption of the

error that have to be satisfied to ensure the fixed effect estimator is the best linear unbiased estimator (Wooldridge, 2014)

Finally, the third method is the Random Effect Model (REM). The REM assume that the error term represent difference in individual and time series (Gujarati 2003). This model also assume that the analyzed data set, has a hierarchy inside its population (Gujarati 2003). In fact, REM's assumptions consist of Fixed Effect Model's assumptions and one unique REM's assumption. This assumption states that the unobserved effect should uncorrelated with each independent variables (Wooldridge 2014). Thus, if the model is assumed to have an unobserved effect which is correlated to independent variables, the model should be compute using the Fixed Effect Model (Wooldridge 2014).

Even though it is possible to regress the model using all of three methods. It is also important to find the best statistical method. In order to find the best method this research paper will execute the Hausman Test. The Hausman Test is a formal test to choose the appropriate model between FEM and REM. Gujarati (2003) explains that the null hypothesis of Hausman test is that FEM and REM is not significantly different. If the null hypothesis is rejected, the FEM should be used to regress the model. It is because the test result show that REM is inappropriate to be used (Gujarati 2003).

This research paper will also employ a test to see whether a multicollinearity exist in the regression. Gujarati (2003) defines multicollinearity as a condition where the independent variables are 'intercorrelated'. The correlation between independent variables can be perfectly correlated or not. There are five sources of multicollinearity (Montgomery and Peck 1982 in Gujarati 2003). The first one is because of the data collection method. The second source is the constraint that exist on the model or the sample. The third one is because of the 'model specification'. The fourth source is because of over determination of a model. This can be happen if the independent variable outnumbered the observations. The last source is the existence of common trend among independent variables.

3.2.2 Econometric Model of Minimum Wage and Poverty in Province level

To analyze ‘individuality’ of each province, this research paper will use the sub-sample data. The analysis will be done in six provinces located in Java. Thus, districts which are located in same province, will have same parameter’s value. This will show variety of parameter’s value among provinces. This research paper avoids to create dummy variables, because of the problem of ‘degree of freedom’. Gujarati (2003) mentions that by adding the dummy variables in the fixed effect model, the degree of freedom will also decrease. This trade off will diminish efficiency of estimated parameter. If this research paper decide to have 118 dummy variable to show units variety, degree of freedom of the model will be heavily affected.

Thus, in order to analyze the relationship of minimum wage and poverty gap in province level, the model is model (1) with a specific data of analysed province. While, to analyze the relationship between minimum wage and poverty rate in province level, the used model is model (2) with a specific data of analysed province.

3.3 Research Variables and Operational Definition

3.3.1 Minimum Wage

Based on the proposed model that are used by this research paper, poverty is operationalized into poverty gap and poverty rate.³ Those variables become dependent variables in its each model. Since this study try to analyze the relationship between minimum wage and poverty, minimum wage is the main variable. Hypothesis of this research paper states that there is a negative effect of minimum wage increase on the poverty in the Java. It is because this research paper believe that an increase in minimum wage will increase earning of society. This increase of earning in society will reduce the poverty level. Therefore, minimum wage should have negative relationship with poverty gap and poverty rate.

³ Discussion regarding poverty gap and poverty rate is discussed in sub-chapter ‘2.1 Conceptual Framework on Poverty’

3.3.2 GRDP per Capita

This negative expectation also addressed to the GRDP per capita and households' electricity variables. The first control variable, the GRDP per capita, is a variable chosen to represent Dollar and Kraay finding in their study in 2002. Dollar and Kraay (2002) finds that an increasing number of average income of all population will increase the income of the poorest quintile of population. The GRDP per capita data will be used to represent the average income of population. Thus, the increase of the GRDP per capita wage should have negative relationship with poverty gap and poverty rate.

3.3.3 Households' electricity

The second variable, the households' electricity, try to represent the effect of infrastructure to poverty. Study of Balisacan *et al.* (2002) shows that in Indonesia, electricity contributes directly to increase in employment and reduction in poverty. They use electricity as the proxy of infrastructure (Balisacan *et al.* 2002). This research paper argues that, based on the previous research, households' electricity variable should have negative relationship with the dependent variable; poverty gap and poverty rate.

3.3.4 Population

The population variable and the inflation variable are control variables which are expected to have a positive relationship with the dependent variables. This assumption is also based on the previous research. The logic behind the relationship between population variable and the dependent variables lies on the concept of inequality. The work of Becker *et al.* (1999) shows that a high level of population can decrease per capita income. This is important to note, because a reduction in per capita income in a society will increase the level of poverty.

3.3.5 Inflation rate

The last control variable is the inflation rate variable. This variable is used based on the finding by Eliana Cardoso in 1992. Cardoso (1992) finds that inflation play significant role in affecting poverty level in Latin America. It is be-

cause, inflation has a significant impact on real wages. The prices of goods will increase because of inflation. Thus, it can adverse positive effect created by a wage increase (Cardoso 1992). Therefore, this research paper argues that population variable and inflation variable are expected to have positive sign with the dependent variables.

This research uses panel data set. Variables of the panel data set are poverty gap (p_gap), poverty rate (p_rate), minimum wage (l_mw), Gross Domestic Regional Product per capita (l_gcpt), population (l_totpop), inflation (infl) and household's electricity (elect). In order to clarify the variables used in this research paper, it is important to define their operational definition. The paper will try to find the relationship between the variables in district level.

Table 1. Research Variables

Variable	Variable Name	Code	Expected Sign	Definition	Unit
Dependent	Poverty Gap	p_gap		The total amount of income which is needed by the poor to move from below the poverty line up to the line in each of 119 district in Java from 2001 until 2014	Index
	Poverty Rate	p_rate		Percentage of population who lives below the poverty line in each of 119 district in Java from 2001 until 2014	
Independent	Minimum Wage	l_mw	Negative	The monthly minimum amount of wages that enforced in each of 119 district in Java from 2001 until 2014	Percentage
	GRDP per capita	l_gcpt	Negative	The value of the aggregate of production in a district which is divided by the population of the district in each of 119 district in Java from 2001 until 2014	Percentage
	Population	l_totpop	Positive	The number of people live in each of 119 district in Java from 2001 until 2014	Percentage
	Inflation	infl	Positive	The percentage of increase of price in each of 119 district in Java from 2001 until 2014	Percentage
	Household's Electricity	elect	Negative	The percentage of household which have access to electricity in each of 119 district in Java from 2001 until 2014	Percentage

Chapter 4 Analysis of Empirical Results

In order to analyze the relationship between minimum wage and poverty, data regarding Java's poverty from 2001 until 2014 will be observed. This chapter will quantitatively analyze the relationship between this research paper's variables.

4.1 Data Description

Data that used in this research paper is a panel data which is taken from district level in java from 2001 until 2014. As the objective of this research paper is to analyze relationship between minimum wage and poverty, the dependent variables of this research paper are poverty gap and poverty rate. These dependent variables are operationalization of poverty. The minimum wage is the main variable. The control variables are GRDP per capita, population, inflation and household's electricity. As also discussed above, natural logarithm alteration is exercised to GRDP per capita and population variable, to avoid multicollinearity and outlier in the computation process.

In the Table 2. we have included the main statistic parameters which characterize the variables:

Table 2. Descriptive Statistics

Variable		Mean	Std. Dev.	Min	Max	Observations
p_gap	Overall	2.597847	1.541852	0.09	9.424	N = 1392
	btween		1.310877	0.2	6.931167	n = 118
	Within		0.8332693	0.0066806	6.233097	T = 11.7966
p_rate	Overall	15.36144	7.470124	1.33	41.77742	N = 1392
	btween		6.937001	1.5625	35.42603	n = 118
	Within		2.966441	5.580247	25.69522	T = 11.7966
Mw	Overall	780508	411662.4	220500	2447450	N = 1246
	btween		303886.6	526807.1	1828250	n = 119
	Within		315472.6	85078.31	2099828	T-bar = 10.5
g_cpt	Overall	17223.25	31567.67	1771	370931	N = 1509
	btween		27948.85	3778.462	190380.5	n = 119
	Within		14691.82	-95484.21	197773.8	T = 12.6807
tot_pop	Overall	1138524	725330.8	18221	5202097	N = 1505
	Btween		717985.3	20059.55	4213016	n = 118
	Within		105071	555907.9	2286873	T = 12.7542
I_mw	Overall	13.46346	0.4891854	12.30365	14.71056	N = 1186

	Btween		0.3354867	13.06884	14.38019	n = 119
	within		0.3828076	12.51693	14.46514	T-bar = 9.97
l_gcpt	Overall	9.201211	0.8958744	7.4793	12.82377	N = 1509
	Btween		0.7747427	8.149497	12.03737	n = 119
	within		0.4454842	8.051148	10.2261	T = 12.6807
l_totpop	Overall	13.70061	0.803603	9.81033	15.46457	N = 1505
	Btween		0.8142215	9.903458	15.24581	n = 118
	within		0.0541176	13.45854	14.02548	T = 12.7542
Infl	Overall	0.078471	0.0494031	0.0003873	0.5937631	N = 1390
	Btween		0.0151184	0.0474728	0.1567309	n = 119
	within		0.0471723	-0.0561532	0.5155026	T = 11.6807
Elect	Overall	98.07178	3.541379	55.82	100	N = 1380
	Btween		2.525909	84.19237	99.82187	n = 118
	within		2.469317	69.69941	112.3394	T = 11.6949

Source: Author's computation

4.2 Quantitative analysis of Minimum Wage and Poverty in Java

Analysis of minimum wage and poverty in Java are conducted in two separated models based on the operationalization of poverty. The first model tries to analyze the relationship between minimum wage and poverty gap. While, the second model analyze the relationship between minimum wage and poverty rate.

However, before conducting the analysis, as already been discussed in the previous chapter, Hausman Test is employed by this research paper. This is because this research paper try to find the proper regression method in analyzing the panel data set. Gujarati (2003) mentions that the Hausman test is a formal test to choose the best regression method for a model. The null hypothesis of this test is that the random effect model should be implemented. Thus, If the null hypothesis is rejected, the FEM should be used to regress the model. On the contrary, if the null hypothesis is accepted, the REM should be used (Gujarati 2003). The result of the tests are shown in Table 3.

Table 3. Result of Hausman Test

	Model (1)	Model (2)
Chi ²	96.10	8.02
Prob>Chi ²	0.0000	0.1552

Source: Author's computation

The value of Prob>chi² of the first model is smaller than α , which is 5%. Thus, the result suggest that to analyze the relationship between minimum wage and poverty gap, it is better to use the FEM. Whereas, the value of Prob>chi² of the second model is larger than α . This means that the test's result suggest that the REM is more suitable in analyzing the relationship between minimum wage and poverty rate.

However, Gujarati (2003) also mention that a study should be cautious in choosing the best regression method for a model. It is because there is always be 'scylla of fixed effect and charybdis of measurement error and dynamic selection' (Johnston and Dinardo 1984 in Gujarati 2003). Therefore, this research paper will use three regression methods. This way, this research paper could observe and compare the value of the regression's coefficients.

4.2.1 Analysis of effect of Minimum Wage on Poverty Gap

Table 4. Result of Poverty Gap Regression

Variable	OLS	FEM	REM
I_mw	-1.007 *** (0.123)	-0.963 *** (0.249)	-0.771 *** (0.145)
I_gcpt	-0.522 *** (0.054)	-0.408 * (0.208)	-0.4999 *** (0.108)
I_totpop	0.066 (0.045)	2.321 *** (0.669)	0.074 (0.101)
Infl	1.038 (0.818)	1.726 *** (0.527)	1.587 *** (0.531)
Elect	-0.174 *** (0.015)	-0.088 *** (0.013)	-0.097 *** (0.013)
_cons	37.135 (1.748)	-3.9096 (8.784)	25.922 (1.816)
Prob> F / Prob> Chi	0.0000	0.0000	0.0000
R ²	0.498	0.101	0.489
Obs	976	976	976

Source: Author's computation. Robust Standard errors used.

Note: *** significant at 1%, ** significant at 5%, * significant at 10%

Table 4. shows the result of regressions of the first model. The first step of analyzing regressions' result is analyzing the 'goodness of fit' of the model. After that, the other step is to analyze the variables. Gujarati (2003) explains that the 'goodness of fit' shows how complaint is the 'regression line' to the data. On one hand, if the 'regression line' accommodate all of the data, the regression will be considered to have a perfect goodness of fit. On the other hand, if the regression does not in tune with majority of the data, the goodness of fit is poor. The goodness of the model can be identified by using the value of 'R square' and 'prob> F / prob> Chi²' (Gujarati 2003).

Gujarati (2003) states that the 'R square' value is a concise information that tells researcher how well is the 'goodness of fit'. The 'R square' value measures the proportion of dependent variables' variation that could be explained by the regression model. The value of 'R square' spans between zero and one. If the value of 'R square' is one, it means that the regression line is perfect. While, if the value is zero, there are no relation between dependent and independent variables (Gujarati 2003).

In other word, the 'R square' value shows the magnitude of independent variables' effect on dependent variables. For instance, the Table 4. shows that the value of 'R square' of the OLS regression is 0.498 points (49.8 percent). It means that there are 50.2 percent chance that variance of poverty gap can be explained by other explanatory variable. The OLS regression has the highest 'R square' value compare to the other regressions'. The 'R square' value of REM method is similar to the OLS's result. It has the value of 0.489 points. The FEM method has the smallest value of 'R square'. It has value of 0.101 points. This 'R square' value is bad. Not only because it means that there are 89.9 percent of chances that the poverty gap could be explain by other variables, but also because it means that only 10.1 percent chances of explanatory variables in the model can be used to explain poverty gap.

Even though the 'R square' value can statistically show how poverty gap varied, Wooldridge (2014) explains that the 'R square' value should not become the key instrument of an econometric analysis. It is because, a low value of 'R square' does not mean that the used method is fail to explain the relationship (Wooldridge 2014). He continues by arguing that there are still possible

for a regression to have a low valued ‘R square’ and estimate relationship between dependent and independent variables nicely (Wooldridge 2014).

Another indicator of ‘goodness of fit’ of a model is the ‘P value’. Gujarati (2003) defines ‘P value’ as the lowest significance level where a null hypothesis can be rejected. In term of the regression, it means that the value of the ‘P value’ can be used to see whether, in general, the independent variables affect poverty gap. In order to see this effect, the ‘P value’ will be compared to the value of α . If the value of α is greater than the ‘P value’, the independent variables can be justified to affect the independent variable; poverty gap.

The ‘P value’ of the three methods can be seen in the row of ‘Prob> F / Prob> Chi’ in Table 4. By using the value of α is one percent, the ‘P value’ of all three methods are smaller than α . This means that, in general the independent variables; minimum wage, GRDP per capita, population, inflation and household’s electricity affect poverty gap in Java.

In term of the variables, the t-test shows that using all regression methods, minimum wage, as the control variable, statistically significant in affecting poverty gap in Java’s districts. The t-test is a testing procedure that shows significance effect of each independent variables to independent variable in a model (Gujarati 2003).

The significance also applies to the four control variables. The result shows that the Gross Regional Domestic Product (GRDP) per capita variable and household’s electricity variable are significance in all of the regression method. Even though, the GRDP per capita variable is less significant to the poverty gap in FEM method, because statistically it need a ten percent threshold to be considered significant.

As can be seen in Table 4., there are two variables which have different significance to poverty gap; the inflation variable and the population variable. The inflation variable is only significant to poverty gap in the districts using the FEM and REM methods, the OLS’s result reveals that inflation is not a significant factor in affecting poverty gap. This is also the case in the population variable. It has no significant effect to the poverty gap in Java’s district if it regressed using OLS and REM method, while if it is regressed by FEM method, population variable is considered significant.

It is also noticeable that minimum wage, GRDP per capita, household's electricity, population and inflation have contrasting effect upon poverty gap. The first three variables have a negative effect to poverty gap, while the population and inflation variables appears to have a positive effect on the poverty gap. Table 4. shows that not only the minimum wage significantly affect poverty gap, but it also has negative effect to poverty gap. This negative effect is consistent with the hypothesis of this research paper.

The GRDP per capita variable and household's electricity variable also have a negative relationship with poverty gap. This means that the regression result meets the expectation. As been discussed in the previous chapter, that an increasing number of average income of all population will increase the income of the poorest quintile of population (Dollar and Kraay 2002). While, electricity will contributes directly to reduction in poverty (Balisacan *et al.* 2002). The inflation and population variable are expected to have a positive effect to poverty gap. This is exactly the result. Table 4. shows that these variable have a positive effect to poverty gap. This is also consistent with the result of previous researches which have been discussed in the third chapter.

The regression result shows that among the significant independent variables, minimum wage has the biggest influence in poverty gap reduction. The REM regression result shows that, a one percent increase in minimum wage appears to lead to decreasing of poverty gap index by about 0.0077 points if the other control variables are constant. The REM method gives the smallest number of effect. The FEM method shows a larger magnitude. This regression suggests that, a one percent increase in minimum wage appears to lead to decreasing of poverty gap index by about 0.0096 points if the other control variables are constant. While, the result of OLS method shows that a one percent increase in minimum wage appears to lead to decreasing of poverty gap index by about 0.0101 points if the other control variables are constant.

The second influential variable in poverty gap reduction is the GRDP per capita. The REM regression shows that a one percent increase in GRDP per capita will decrease poverty gap index in the district by about 0.0050 points if the other control variables are constant. The FEM regression result give a smaller result. The regression shows that as long as the other control variable is

constant, a one percent increase in GRDP per capita will decrease poverty gap index in the district by about 0.0041 points. The biggest result of GRDP per capita variable is produced by the OLS regression. The regression suggest that a one percent increase in GRDP per capita will decrease poverty gap index in the district by about 0,0052 points as long as the other control variable is constant.

The households' electricity has the smallest impact on poverty gap reduction. Regression using FEM method shows that a one percent rise in this variables create a 0.00088 points of reduction in poverty gap index as long as the other variables remain the same. While, the REM method suggest that a one percent rise in this variables create a 0.00097 points of reduction in poverty gap index as long as the other variables remain the same. The result of OLS method shows that a one percent increase in households' electricity appears to lead to decreasing of poverty gap index by about 0,0017 points as long as the other control variable is constant.

The regression result also demonstrates that an increase in inflation will lead to an increase in poverty gap. In fact, the inflation rate has the biggest effect on poverty gap index compare to others. Regression using FEM method suggests that a one percent increase in inflation rate appears to lead to escalation of poverty gap index by about 0.0173 points if the other control variables are constant. A smaller effect is obtained by REM method. It suggest that a one percent rise in this variables create a 0,0159 points of reduction in poverty gap index, holding the minimum wage, GRDP per capita, population and percentage of household which receive electricity constant. While, the result of OLS method shows that a one increase in inflation rate appears to lead to decreasing of poverty gap index by about 0.0104 points if the other control variables are constant.

The same positive effect also applies to the population variable. The REM method shows that holding the minimum wage, GRDP per capita, inflation and percentage of household which receive electricity constant, a one percent increase in population increase poverty gap index by about 0.00074 points. The OLS regression give a smaller result. The regression shows that as long as the other control variable is constant, a one percent increase in population will in-

crease poverty gap index in the district by about 0.00066 points. While, the result of FEM method shows that a one percent increase in population appears to lead to increasing of poverty gap index by about 0.0232 points if the other control variables are constant.

After observing the result of all regression methods, this research paper finds that there are similarities in the results. On one hand, there is negative effect of three variables; minimum wage, GRDP per capita and households' electricity in affecting poverty gap. On the other hand, there is a positive effect of inflation rate and population variable toward poverty gap.

This research paper then tries to refer to Table 3. The Hausman test suggests that the FEM method is better to analyze the relationship between minimum wage and poverty gap. Thus, FEM's result can be used to explain the first research question; minimum wage reduce poverty gap in districts of Java. At the same time, the other independent variables correspond to the expectation of this research.

4.2.2 Analysis of effect of Minimum Wage on Poverty Rate

Table 5. Result of Poverty Rate Regression

Variable	OLS	FEM	REM
I_mw	-4.727 *** (0.578)	-2.863 *** (0.711)	-2.568 *** (0.559)
I_gcpt	-3.181 *** (0.252)	-3.531 *** (0.594)	-3.418 *** (0.452)
I_totpop	0.131 (0.213)	8.842 *** (1.911)	0.388 (0.521)
Infl	0.969 (3.843)	5.308 *** (1.504)	4.98 *** (1.54)
Elect	-0.731 *** (0.0696)	-0.221 *** (0.037)	-0.242 *** (0.037)
_cons	178.996 (8.212)	-12.536 (25.075)	99.724 *** (7.712)
Prob> F / Prob> Chi	0.0000	0.0000	0.0000
R ²	0.532	0.146	0.503
Obs	976	976	976

Source: Author's computation Robust Standard errors used.

Note: *** significant at 1%, ** significant at 5%, * significant at 10%

Table 5. shows regression result of minimum wage and poverty rate relationship. The 'goodness of fit' of the model looks promising. It has a satisfactory value of 'R square' and 'prob> F / prob> Chi²'. The 'P value' of the min-

imum wage and poverty rate model is smaller than α even if α is set to one percent. The 'P value' of all of the regression methods is zero. This means that, in general the independent variables; minimum wage, GRDP per capita, population, inflation and household's electricity affect poverty rate in Java.

Table 5. also shows that the value of 'R square' of the regressions. The OLS and REM regressions have a high level of 'P value', while the FEM regression method have a smaller one. The OLS regression has 'P value' of 0.532 points. It means that there are 46.8% chances that variance of poverty gap can be explained by other explanatory variable outside the model. The OLS regression has the highest 'R square' value compare to the other regressions. The 'R square' value of REM method is similar to the OLS's result. It has the value of 0.503 points. . It means that there are 49.7% chances that variance of poverty gap can be explained by other explanatory variable outside the model. The FEM method has the smallest value of 'R square'. It has 'P value' of 0.146 points. This 'R square' value is not good enough. Not only because it means that there are 85.4% of chances that the poverty gap could be explain by other variables, but also because it means that, in general, only 14.6% chances of explanatory variables in the model can be used to explain poverty gap.

In term of the variables, the 't test' shows that the control variable, minimum wage, statistically significant in affecting poverty rate in the districts. The significance of this variable is shown in all of three regressions. This is also applies to the other independent variables such as; GRDP per capita, population, inflation and household's electricity variable. The result shows that the GRDP per capita variable and household's electricity variable are significant in all of the regression methods. It means that, statistically, these three variables appears to affect poverty rate in Java.

Despite significance of minimum wage, GRDP per capita, and household's electricity, Table 5. suggests that population and inflation variable can be insignificant and significant in the same time. It is because, the 't test' result of each regression come different. For instance, the value of 't test' of population variable is 0% in FEM method, but it is 53.8% in OLS and 45.6% in REM. This means that the population is considered affecting poverty rate if we analyzed it using only FEM method. The 't test' value of inflation variable also ex-

periences the same pattern. Table 5. shows that this variable is affecting poverty rate if it was regressed using FEM and REM methods.

Table 5. shows that effect of the independent variables toward poverty rate is vary. The minimum wage, GRDP per capita and households' electricity variable have a negative effect to poverty rate. While the population and inflation variables appears to have a positive effect on the poverty rate. As discussed in earlier part of this chapter, these variables effects are consistent with this research paper expectation. Negative effect of the main variable, the minimum wage, is consistent with the hypothesis of this research paper. The effect of the control variable also meets the expectation. Negative effects of GRDP per capita variable and households' electricity variable which shown by Table 5. meet the finding of previous study. The inflation and population variable are expected to have a positive effect to poverty rate. This is exactly the result. Table 5. demonstrates that these variable have a positive effect to poverty gap. This is also consistent with the result of previous researches.

The regression result shows that among the independent variables, the GRDP per capita variable has the biggest influence in poverty rate reduction in Java. On average, the effect of one percent increase in GRDP per capita appears to reduce poverty rate by 3.377 percent. The OLS regression result shows that, a one percent increase in GRDP per capita appears to lead to decreasing of poverty rate by about 3.18 percent as long as the other control variable is constant. Greater effect is obtained by FEM method. It suggest that a one percent rise in this variables create a 3.53 percent of reduction in poverty rate, holding the minimum wage, population, inflation and percentage of household which receive electricity constant. While, regression using REM method suggests that a one percent increase in GRDP per capita appears to lead to reduction of poverty rate by about 3.42 percent if the other control variables are constant.

The minimum wage, as the main variable, has a smaller effect than the GRDP per capita in affecting poverty rate in Java. The FEM regression shows that a one percent increase in minimum will decrease poverty rate in the district by about 2.86 percent if the other control variables are constant. While, the REM method suggest that a one percent rise in this variables create a 2.57

percent of reduction in poverty rate as long as the other variables remain the same. The result of OLS method shows a greater magnitude of minimum wage. It shows that a one percent increase in minimum wage appears to lead to decreasing of poverty rate by about 4.73 percent as long as the other control variable is constant.

The other negatively related variable; the households' electricity has the smallest impact on poverty rate reduction. The REM regression shows that one percent rise in this variables create a 0.24 percent reduction in poverty rate as long as the other variables remain the same. The FEM regression result give a smaller result. The regression shows that as long as the other control variable is constant, a one percent increase in households' electricity will decrease poverty rate in the district by about 0.22 percent. The biggest result of households' electricity variable is produced by the OLS regression. The regression suggest that a one percent increase in households' electricity will decrease poverty rate in the districts by about 0.73 percent as long as the other control variable is constant.

The regression result also demonstrates that an increase in inflation will lead to an increase in poverty rate. Holding the minimum wage, GRDP per capita, population and percentage of household which receive electricity constant, a one percent increase in inflation rate increase poverty rate by about 5.30 percent. This result is an output of FEM regression methods. The REM method give a slightly smaller value. By using the REM, a one percent increase in this variable increase poverty rate by about 4.98 percent if the other variable stay the same. While, the OLS regression method shows that the effect of one percent increase in inflation, supposed to increase poverty rate by 0.97 percent if the other variable are constant,

The same positive effect also apply to the population variable. Furthermore, the population has the biggest effect on poverty rate compare to other independent variables. The FEM regression method shows that a one percent increase in population appears to lead to escalation of poverty rate by about 8.84 percent if the other control variables are constant. However, the OLS and REM regression results shows a much smaller value. Holding the minimum wage, GRDP per capita, inflation and households' electricity constant, a one

percent increase in population appears to lead to an increase in poverty rate by about 0.13 percent using OLS regression and 0.39 percent in REM method.

Similar to the finding in the previous discussion. In this part of study, this research paper finds that there are similarity in the regression results. On one hand, minimum wage, GRDP per capita and households' electricity negatively affect poverty rate. On the other hand, inflation rate and population positively affect poverty rate.

4.3 Quantitative analysis of Minimum Wage and Poverty in Province Level.

The effect of minimum wage to poverty can be also analyzed by province. This research will try to analyze the effect of the independent variables on the poverty by using REM method in sub-sample level. This is to take in to account the uniqueness of each provinces. It because, by sub-sample, each province will have different value of parameter, thus showing its uniqueness in terms of the relationship between poverty and minimum wage in Java.

There are two models used to analyze this relationship based on the operationalization of poverty. The first model will try to analyze the relationship between poverty gap and minimum wage in each provinces, while the second one will try to analyze the relationship between poverty rate and minimum wage in each provinces.

Unfortunately because of shortage of data in Yogyakarta province, this research paper could not analyze the relationship of minimum wage and poverty in this province. The STATA program informs writer that there is an 'insufficient observations' for the Yogyakarta province. This research paper finds that political situation of this province is the reason for this problem. The Yogyakarta province is a special province which ruled by monarch, and this monarchy privilege is shaken by parliament of national government. The result is a political uncertainty which hamper Yogyakarta's government policy (Monitoring Agency in Financial and Development, 2015). In 2012, dispute between the monarch and national government came to an end. This was marked by the 13rd law of 2012. After the 2012, Yogyakarta then have a district's minimum wage policy.

4.3.1 Analysis of effect of Minimum Wage on Poverty Gap in Province Level

Table 6. Result of Poverty Gap Regression using Sub-sample by Province.

Variable	East Java	Banten	Jakarta	West Java	Middle Java
	Coef	Coef	Coef	Coef	Coef
I_mw	-1,13 ***	-0,59 ***	-0,16	-0,44 **	-0,38
I_gcpt	-0,35 *	-0,05	-0,01	-0,39 *	-0,78 ***
I_totpop	0,43 **	0,16 **	-0,24 ***	-0,032	0,55 **
Infl	0,64 ***	0,43	-0,87 **	-0,37	11,09 ***
Elect	-0,10 ***	-0,04 **	0,054	0,013	-0,12 **
_cons	25,3 ***	10,86	1,043	10,71 **	18,24 ***
Prob> Chi ²	0.0000	0.0000	0.0000	0.0001	0.0000
R ²	0.493	0.643	0.606	0.122	0.457
Obs	416	49	64	129	313

Source: Author's computation Robust Standard errors used.

Note: *** significant at 1%, ** significant at 5%, * significant at 10%

Table 6. gives the idea that an increase in minimum wage's percentage lead to a lower index of poverty gap. Even so, the magnitude of minimum wage is different in each provinces. If the other control variables are constant, in East Java province a one percent increase in minimum wage decrease poverty gap index by about 0.0113. In Banten the magnitude is smaller, 0.0059 points of poverty gap index will decrease if the minimum wage is increased by one percent. While, a one percent increase in minimum wage seems to decrease the poverty gap index by 0.0044 in West Java province. The forth province is the Middle Java province. In this province, a one percent increase in minimum wage seems to decrease the poverty gap index by about 0.0038 points. The least magnitude of minimum wage increase from the data set can be found in Jakarta province. In this province, the one percent increase in minimum wage decrease the poverty gap index by 0.0016 points.

Although the regressions illustrate that minimum wage has an adverse effect on poverty gap index, the statistical significance of the variable is varies. The minimum wage is significant in the East Java, Banten, and West Java province. On the contrary, the minimum wage is not statistically significant in Jakarta and Middle Java province.

These significances differences are also shown in the control variables. The GRDP per capita is a statistically significant variable which affect poverty gap in three provinces; East, West and Middle Java. However, in Banten and

Jakarta, this variable is not statistically significant. The population and inflation are statistically significant in East Java, Jakarta and Middle Java province, yet they are not statistically significant in West Java province. In Banten the population variable is statistically significant in affecting poverty gap while the inflation is not. Table 6. also tells that the households' electricity is statistically significant in East Java, Banten, and Middle Java. Though, in Jakarta and West Java, this variable is considered insignificant.

Table 6. also presents a varied effect of control variables except in the case of GRDP per capita variable. The population variable can be used as example. In provinces such as; Jakarta and West Java, this variable has a negative effect to poverty gap index. However, in the other three provinces the same variable has positive effect to poverty gap index. This is also happening to the inflation and the households' electricity variables. Inflation has a negative effect in Jakarta and West Java province. However, Table 6. suggests that inflation has a positive effect on poverty gap index in East Java, Banten and Middle Java province. On the contrary, the households' electricity variable has a positive effect on poverty gap index in Jakarta and West Java, while it has negative effect to poverty gap in East Java, Banten and Middle Java province. The GRDP per capita variable has a consistent effect throughout the provinces. The regression result shown in Table 6. statistically shows that the GRDP variable has negative effect on poverty gap index.

The magnitude of these control variables are also different in each province. The biggest effect of GRDP per capita increase on poverty gap can be found in Middle Java. In this province a one percent increase in GRDP per capita decrease poverty gap index by about 0.0078 if the other control variables are constant. In West Java province the magnitude is smaller, 0.0039 points of poverty gap index will decrease if the GRDP per capita is increased by one percent. While, a one percent increase in GRDP per capita seems to decrease the poverty gap index by 0.0035 points in East Java province. The forth province is the Banten. In this province, a one percent increase in GRDP per capita seems to decrease the poverty gap index by 0.0005. The smallest magnitude of GRDP per capita increase from the data set can be found in Jakarta province. In this province, the one percent increase in GRDP per capita decrease the poverty gap index by 0.00013 points.

The households' electricity variable plays a small role in affecting poverty gap index. In East Java province, a one percent increase in household's electricity appears to decrease the poverty gap index by 0,001 as long as the other variables remain constant. Similarly, the decreasing effect also took place in Banten and Middle Java. In the later province, 0.0012 points of poverty gap index will decrease if the households' electricity is increased by one percent. While, a one percent increase in household's electricity indicate a reduction in the poverty gap index by 0.00035 in the Banten province. By contrast, in Jakarta and Middle Java Province, the household's electricity rise appears to have a positive effect to the poverty gap index. In the first province, a one percent increase in household's electricity appears to increase the poverty gap index by 0.00054. While, a one percent increase of household's electricity in Middle Java province will increase the poverty gap index by 0.00013 points. This is statistically true as long as the other independent variable is constant.

The magnitude of population variable toward poverty gap index is also interesting to discuss because of its variation. The smallest magnitude of population increase from the data set can be found in West Java province. In this province, the one percent increase in population appears to decrease the poverty gap index by 0.00032 points. In its neighbouring province, the Banten, a one percent increase in population increase the poverty gap index by 0.0016 as long as the other control variable is constant. While, in Jakarta province, 0.0024 points of poverty gap index will decrease if the population variable is increased by one percent. The second largest province in term of the population effect is the East Java province. A one percent increase in population indicate a reduction in poverty gap index by about 0.0043 in this province. The biggest effect of population increase on poverty gap can be found in Middle Java province. In Yogyakarta province a one percent increase in population increase poverty gap index by about 0.0055 points as long as the other independent variables are constant.

Finally, the last variable to be discussed is the inflation rate. The estimation results shows that in Middle Java, inflation rate can affect poverty gap index by 11.09. This means that as long as the other control variable unchanged, a one percent increase in inflation rate appears to lead to a 0.1109 increase in poverty gap index. In the other provinces, the estimated coefficient of inflation

rate is more moderate. In East Java the magnitude is 0.0064 points. It means that the regression suggest that 0.0064 points of poverty gap index will increase if the inflation is increased by one percent. While, a one percent increase in inflation seems to also increase the poverty gap index by 0.0043 in Banten province. By contrast, in Jakarta and West Java Province, the inflation rate rise is decreasing the poverty gap index. In the first province, a one percent increase in inflation appears to decrease the poverty gap index by 0.0087 points. While, a one percent increase of inflation rate in West Java province will decrease the poverty gap index by 0.0037 points. These analysis is statistically true as long as the other control variable unchanged.

In short, the regression result confirms this research paper hypothesis that there is unvarying negative effect of minimum wage on poverty gap index across provinces. Although it has different magnitude, the minimum wage effect is consistently negative. However, the other independent variables have varied effect on poverty gap index. The population and inflation variable in Jakarta province for instance, it has a negative effect towards poverty gap index. This is contradicting the finding of Becker *et al.* (1999) and Cardoso (1992). Where as in the other province, the effect of these variables are synonymous.

4.3.2 Analysis of effect of Minimum Wage on Poverty Rate in Province Level

Table 7. Result of Poverty Rate Regression using Sub-sample by Province.

Variable	East Java	Banten	Jakarta	West Java	Middle Java
	Coef	Coef	Coef	Coef	Coef
I_mw	-5.97 ***	-0.65	1.29 **	-0.67 *	-1.88
I_gcpt	-1.49	-0.49	-1.09 **	-3.39 ***	-4.69 ***
I_totpop	2.66 ***	0.61	-2.29 ***	0.04	3.29 **
Infl	2.88	-0.04	2.30	-0.49	21.69 ***
Elect	-0.14 ***	-0.33 ***	-0.09	-0.31 **	-0.36 *
_cons	88.29 ***	44.54 ***	40.11	83.00 ***	74.58 ***
Prob> Chi ²	0.00	0.0000	0.0000	0.0000	0.0000
R ²	0.46	0.72	0.90	0.13	0.50
Obs	416.00	49	64	129	313

Source: Author's computation Robust Standard errors used.

Note: *** significant at 1%, ** significant at 5%, * significant at 10%

Table 7. suggests that the magnitude of minimum wage and poverty rate are varied across the provinces. Minimum wage has a negative effect to poverty rate in most of analyzed provinces. East Java has the largest effect of minimum wage on poverty rate. Having the other independent variables constant, a one percent increase in minimum wage decrease poverty rate by 5.97 percent in this province. In the other provinces, the minimum wage has a smaller effect to poverty rate. It is a reduction of poverty rate by 0.65 percent in Banten, 0.67 percent in West Java and 1.88 percent in Middle Java. Even so, Table 7. Also displays that in Jakarta, minimum wage has a positive effect to poverty rate. The regression result suggest that a one percent increase of minimum wage appears to lead to an increase in poverty rate by 1.29 percent if all other independent variables are constant.

The result of other independent variables are also unexpected in Jakarta province. The total population variable for instance, the regression's result shows that the magnitude of a one percent increase in population will decrease poverty rate by 2.29 percent. This is also unexpected, because the previous study finds that an increase in the level of population increase the level of poverty (Becker *et al.* 1999).

Nonetheless, the other three independent variables; GRDP per capita, inflation and households' electricity are in tune with this research paper's expectation. On one hand, Table 7. shows that GRDP per capita and households' electricity have a negative effect toward poverty rate. On the other hand, it also shows that inflation has a positive effect on poverty rate. Households' electricity has the smallest effect on poverty rate in Jakarta. The result suggests that a one percent increase in households' electricity appears to reduce poverty rate by 0.09 percent. Additionally, the GRDP per capita has a bigger effect than households' electricity in reducing poverty rate. Table 7. indicates that a one percent increase in GRDP per capita seems to decrease the poverty rate by 1.09 percent. The last variable, inflation, has the biggest influence on the increase of poverty rate in Jakarta. The result shows that in Jakarta province inflation rate can affect poverty rate by 2.30 percent. This means that as long as the other control variable unchanged, a one percent increase in inflation rate appears to lead to a 2.30 percent increase in poverty rate.

In the case of East Java province, the variables' sign are as expected. On one hand, as discussed earlier, the main variable; minimum wage, has a negative effect to poverty rate. The GRDP per capita and households' electricity also have the expected negative effect to poverty rate. On the other hand, population and inflation has positive effect on poverty rate. In other words, an increase in these variables will improve the poverty rate.

The result shown in Table 7. suggests that the minimum wage plays important role in reducing poverty rate in East Java. The second most affecting variable is Inflation. The result shows that a one percent increase in inflation appears to increase the poverty rate by 2.88 percent. This is statistically true as long as the other control variable constant. The third variable which affect poverty rate is the population. In this province, 2.66 percent increase on poverty rate appears to happen if there is a one percent increase in population. The other control variables, GRDP per capita and households' electricity has considerably small effect to poverty rate. The effect of these variables are 1.49 percent and 0.14 percent respectively. With this in mind, holding the other independent variables constant, a one percent increase in GRDP per capita will decrease the poverty rate by 1.49 percent. Further, a one percent increase in households' electricity will also decrease poverty rate by 0.14 percent.

Table 7. also indicates that Banten and West Java has similar pattern of variable's sign. In both provinces, minimum wage, GRDP per capita, inflation and households' electricity have negative relationship toward poverty rate. While, the population variable become the only variable which has a positive relationship with poverty rate.

However, the magnitude of each variables varies. In general the effect of independent variables on poverty rate are smaller in Banten than in West Java. Differentiating factor of this condition is the magnitude of GRDP per capita in West Java. In West Java, the GRDP per capita has a 3.39 percent effect on poverty rate. While, the same variable has a smaller effect of 0.49 percent in Banten. Considering the negative relationship, it means that a one percent increase in this variable will decrease poverty rate by 3.39 percent in West Java and by 0.49 percent in Banten.

By contrast, the magnitude of the other variables are considerably similar. The population variable has a 0.61 percent effect in Banten and 0.04 percent in West Java. In other words, a one percent increase appears to add poverty rate by 0.61 percent in Banten. If a same percentage of increase is applied to West Java population, 0.04 percent increase of poverty rate would likely to happen.

Another similarly valued variable is the households' electricity. It has magnitude of 0.33 percent in Banten and 0.31 percent in West Java. This means that in Banten, 0.33 percent of poverty rate would likely to decrease if there is a one percent increase of households' electricity. A same interpretation can also be applied to West Java. One percent increase in households' electricity appears to reduce the poverty rate by 0.31 percent. Finally, the last independent variable is the inflation variable. Table 7. shows that inflation appears to decrease poverty rate. This is unexpected. As, previous finding shows that inflation increase poverty rather than decreasing it (Cardoso 1992). The magnitude of this variable is considerably small. A one percent increase in inflation appears to decrease poverty rate by 0.04 percent in Banten. While, the same increase of inflation create a 0.49 percent of reduction in poverty rate in West Java.

The last analyzed province is the Middle Java. In this province, one of control variables; the inflation rate plays significant factor in affecting poverty rate. Table 7. shows that inflation contributes to 21.69 percent of poverty rate increase if it is increased by one percent. The effect of inflation in districts in Middle Java is a lot bigger than the effect of the other variables. For instance; the main variable, minimum wage, only has a 1.88 percent reducing effect on poverty rate. Population and households' electricity is 3.29 percent and 0.36 percent, respectively. The GRDP per capita has the second biggest effect than the other variables. It has a 4.69 percent reducing effect on poverty rate. In other words, a one percent of increase in GRDP per capita should decrease poverty rate by 4.69 percent.

In brief, in the case of minimum wage and poverty rate, the hypothesis of this research paper cannot be confirmed. It is because, the effect of minimum wage on poverty rate is not the same. While, the hypothesis states that there is unvarying negative effect of minimum wage on poverty rate across provinces.

In Jakarta province the effect of minimum wage is positive. On the contrary, the regression result of the other provinces shows that minimum wage has negative effect on poverty rate. The varied result also found in the control variables. In Banten and West Java province, inflation has negative effect towards poverty rate. While, in the rest of the provinces, the effect is positive. The population variables is expected to have positive effect to poverty rate. However, in Jakarta the regression result presents that this variable has a negative effect to poverty rate.

Chapter 5 Conclusion

Poverty is a problem for a society by considering the socio-political and economic considerations. Socio-political aspect of poverty underlines social exclusion in society. While, economically, poverty can decelerate development process. To alleviate poverty, economist believe that economic growth is important. This, in turn, result in a unique set of policies among government. Minimum wage is one of most popular policy to alleviate poverty. Not only because minimum wage can improve average income of society, but also because it is a low-cost policy (Card and Krueger 1995).

However, the effectiveness of minimum wage is debatable. There are two different views of minimum wage, the first view argues that minimum wage will harm society rather than benefiting it. It is because the minimum wage policy will create unemployment. Conversely, the second one argues that minimum wage is beneficial to society. Rather than creating unemployment, the second view of minimum wage argue that minimum wage implementation will create more employment (Islam and Nazara 2000).

Thus, the objective of this research paper is to investigate the relationship of minimum wage and poverty empirically. In order to do that this research paper construct a data set of time-series data for fourteen years from 2001 until 2014 and cross section data of 119 districts in the Java. The analysis is run by using three methods of panel data analysis; pooled OLS, fixed effect and random effect method. After operationalizing poverty into poverty gap and poverty rate, and controlling some variables, such as; GRDP per capita, population, inflation and households' electricity, the regression result suggests that minimum wage reduce poverty in Java. This research paper also try to analyze the relationship of minimum wage and poverty in the province level using sub-sample data.

Result of this research papers shows that minimum wage policy in Java can reduce both poverty gap index and poverty rate. The result shows that a one percent increase in minimum wage can reduce poverty gap by 0.0096 points. While, the same increase will reduce poverty rate by 2.57 percent if the other independent variables constant. However, in the province level, the re-

gression show more varied results. In most of the analyzed provinces, minimum wage has negative effect towards poverty gap and poverty rate. Nevertheless, in Jakarta province, minimum wage is positively correlated with poverty rate.

The regression result also shows that four control variables; GRDP per capita, population, inflation and households' electricity affect poverty gap and poverty rate. Relationship between these control variables towards poverty is mostly in line with the expectations and theories that used by this research paper. Even though in the province level, variation of the relationship occurs.

To conclude, this research paper finds an assuring negative relationship between minimum wage and poverty in Java. Based on panel data analysis, this research paper finds that minimum wage is significantly has a negative effect toward poverty gap and poverty rate.

Refference

Alkire, S. (2002) *Valuing Freedoms: Sen's Capability Approach and Poverty Reduction / Sabina Alkire*. Oxford [etc.]: Oxford University Press.

Baltagi, B.H. (1995) *Econometric Analysis of Panel Data: Badi H. Baltagi*. Chichester [etc.]: Wiley.

Balisacan, A.M., E.M. Pernia and A. Asra (2003) 'Revisiting Growth and Poverty Reduction in Indonesia: What do Subnational Data show?', *Bulletin of Indonesian Economic Studies* 39(3): 329-351.

Becker, G.S., E.L. Glaeser and K.M. Murphy (1999) 'Population and Economic Growth', *American Economic Review* : 145-149.

Belser, P. and U. Rani (2015) '5. Minimum Wages and Inequality', *Labour Markets, Institutions and Inequality: Building Just Societies in the 21st Century* : 123.

Bird, K. and C. Manning (2008) 'Minimum Wages and Poverty in a Developing Country: Simulations from Indonesia's Household Survey', *World Development* 36(5): 916-933.

Brown, C. (1988) 'Minimum Wage Laws: Are they Overrated?', *The Journal of Economic Perspectives* : 133-145.

Card, D. and A.B. Krueger (1995) *Myth and Measurement: The New Economics of the Minimum Wage*. Princeton, NJ: Princeton University Press.

Cardoso, E. (1992). *Inflation and poverty* (No. w4006). National Bureau of Economic Research.

Cazes, S. and S. Verick (2013) *Perspectives on Labour Economics for Development: Edited by Sandrine Cazes and Sher Verick*. Geneva; New Delhi: International Labour Organization.

Comola, M. and L. De Mello (2011) 'How does Decentralized Minimum Wage Setting Affect Employment and Informality? the Case of Indonesia', *Review of Income and Wealth* 57(s1): S79-S99.

Dagdeviren, H., R.v.d. Hoeven and J. Weeks (2001) *Redistribution Matters: Growth for Poverty Reduction / Hulye Dagdeviren, Rolph Van Der Hoeven, John Weeks*. Geneva: ILO, Employment Sector.

De Gregori, T.R. and H.R. Rodgers Jr (1994) *Poverty Policy in Developing Countries: Vol. Ed.: Thomas R. DeGregori, Harrell R. Rodgers, Jr.* Vol. 1. Greenwich, Conn [etc.]: Jai Press.

Del Carpio, X.V., H. Nguyen and L.C. Wang (2012) 'Does the Minimum Wage Affect Employment? Evidence from the Manufacturing Sector in Indonesia', *Evidence from the Manufacturing Sector in Indonesia (July 1, 2012)*. *World Bank Policy Research Working Paper* (6147).

Dollar, D. and A. Kraay (2002) 'Growth is Good for the Poor', *Journal of Economic Growth* 7(3): 195-225.

Ellison, J.H., and R. Thompson (1994) 'The Meaning and Measurement of Poverty' in De Gregori, T.R. and H.R. Rodgers Jr *Poverty Policy in Developing Countries: Vol. Ed.: Thomas R. DeGregori, Harrell R. Rodgers, Jr.* Vol. 1. Pp. 119-147. Greenwich, Conn [etc.]: Jai Press.

Freeman, R.B. (1996) 'The Minimum Wage as a Redistributive Tool', *The Economic Journal* : 639-649.

Fields, G.S. and R. Kanbur (2007) 'Minimum Wages and Poverty with Income-Sharing', *The Journal of Economic Inequality* 5(2): 135-147.

Gindling, T.H. and K. Terrell (2010) 'Minimum Wages, Globalization, and Poverty in Honduras', *World Development* 38(6): 908-918.

Gujarati, D.N. (2003) *Basic Econometrics: Damodar N. Gujarati*. Boston [etc.]: McGraw Hill.

Fields, G.S. and R. Kanbur (2007) 'Minimum Wages and Poverty with Income-Sharing', *The Journal of Economic Inequality* 5(2): 135-147.

Hoeven, R.v.d. (2011) *Employment, Inequality and Globalization: A Continuous Concern / Ed. by Rolph Van Der Hoeven*.London: Routledge.

Holman, R. (1978) *Poverty: Explanations of Social Deprivation / Robert Holman*. New York: St. Martin's Press.

Islam, I. and S. Nazara (2000) 'Minimum wage and the welfare of Indonesian workers', Occasional Discussion Paper Series No. 3. Jakarta: International Labour Organization Jakarta Office.

La Botz, D. (2001) *Made in Indonesia: Indonesian Workers since Subarto / Dan La Botz*. Cambridge, MA: South End Press.

Lemos, S. (2009) 'Minimum Wage Effects in a Developing Country', *Labour Economics* 16(2): 224-237.

Lister, R. (2004) *Poverty: Ruth Lister*. Cambridge [etc.]: Polity.

Mankiw, N.G. (2009) *Macroeconomics: N. Gregory Mankiw*. (7th edn) New York, NY: Worth.

Mason, A.D. and J. Baptist (1996) , *How important are labor markets to the welfare of the poor in Indonesia?* .

Ministry of Labor, Government of Indonesia (1989) 'Minister Policy No. 5 in 1989 [Permenaker: Per-05/Men/1989]'

Ministry of Labor, Government of Indonesia (1990) 'Minister Policy No. 1 in 1990 [Per-01/Men/1990 tentangPerubahanPermenaker : Per-05/Men/1989]'

Ministry of Labor, Government of Indonesia (1997) 'Minister Policy No. 4 in 1997 [Permenaker No.3 Tahun 1997 tentangUpah Minimum Regional]'

Ministry of Labor, Government of Indonesia (1999) 'Minister Policy No. 1 in 1999 [Permenakertrans No. 01 Tahun 1999 tentangUpah Minimum]'

Ministry of Manpower and Transmigration, Government of Indonesia (2000) 'Minister Policy No. 226 in 2000 [KeputusanMenteri Tenaga Kerja dan Transmigrasi: KEP-226/Men/2000 tentangperubahanpasal-pasalPermenakertrans No. 01 Tahun 1999 tentangUpah Minimum]'

Monitoring Agency in Financial and Development⁴(2015) 'SejarahKeistimewaan Yogyakarta [History of Yogyakarta Privilege]' Acessed 18 Juli

⁴Monitoring Agency in Financial and Development is translated from its formal name; Badan Pengawasan Keuangan dan Pembangunan (BPKP)

2015<<http://www.bpkp.go.id/diy/konten/815/sejarah-keistimewaan-yogyakarta>>

Naschold, F. (2002) 'Growth, Distribution, and Poverty Reduction: LDCs are Falling Further Behind' in A.F. Shorrocks, and R.v.d. Hoeven (eds) *Growth, Inequality, and Poverty: Prospects for Pro-Poor Economic Development / Ed. by Anthony Shorrocks and Rolph Van Der Hoeven*. Pp. 107-124. Oxford [etc.]: Oxford University Press.

Novak, M. (2003) Concepts of Poverty' in E. Øyen, 1934 and S.M. Miller (1996) *Poverty: A Global Review : Handbook on International Poverty Research*. Pp. 47-64 Oslo [etc.]: Scandinavian University Press.

Øyen, E., 1934 and S.M. Miller (1996) *Poverty: A Global Review : Handbook on International Poverty Research*. Oslo [etc.]: Scandinavian University Press.

Pauw, K. and M. Leibbrandt (2012) 'Minimum Wages and Household Poverty: General Equilibrium Macro-Micro Simulations for South Africa', *World Development* 40 (4): 771-783.

People's Representative Council, Government of Indonesia (2003) '13rd law in 2003 [Undang-Undang no. 13 Tahun 2003 tentang Ketenagakerjaan]'

President of Indonesia, Government of Indonesia (1969) 'Presidential Decree number 85 in 1969 [Keputusan Presiden No. 85 Tahun 1969 tentang Pembentukan Dewan Penelitian Pengupahan Nasional]'

Rama, M. (2001) 'The consequence of doubling the minimum wage: the case of Indonesia', *Industrial & Labor Relations Review* 54 (4): 864-881.

Rani, U.; Belser, P.; Ranjbar, S. (2013) 'Role of minimum wages in rebalancing the economy', *World of Work Report 2013: Repairing the Economic and Social Fabric*, ILO, Geneva

Ravallion, M. (2005) *Inequality is Bad for the Poor*. Vol. 3677. Washington: The World Bank, Development Research Group, Poverty Team

Ray, D. (1998) *Development Economics: Debraj Ray*. Princeton, NJ: Princeton University Press.

Saget, C. (2000) 'Can the Level of Employment be Explained by GDP Growth in Transition Countries? (Theory Versus the Quality of Data)', *Labour* 14(4): 623-643.

Saget, C. (2001) 'Poverty Reduction and Decent Work in Developing Countries: Do Minimum Wages Help', *Int'l Lab. Rev.* 140: 237.

Saget, C. (2004) 'Can Minimum Wage Policy Reduce Poverty', *Labour Education* : 1-2.

Shasta Pratomo, D. (2014) 'Does Minimum Wage Affect Hours Worked of Paid Employment in Indonesia?', *International Journal of Social Economics* 41(5): 362-379.

Shorrocks, A.F. and R.v.d. Hoeven (2004) *Growth, Inequality, and Poverty: Prospects for Pro-Poor Economic Development / Ed. by Anthony Shorrocks and Rolph Van Der Hoeven*. Oxford [etc.]: Oxford University Press.

Sinja, A.K. and R.K. Sen (2000) *Economics of Amartya Sen: Edited by Ajit Kumar Sinja and Raj Kumar Sen*. New Delhi: Deep & Deep publ.

Spicker, P. and S. Alvarez Leguizamón (2006) *Poverty: An International Glossary*. (2nd edn) London [etc.]: Zed Books.

Statistical Central Bureau of Indonesia⁵ (2015a) 'Kemiskinan [Poverty]' Accessed 18 April 2015 <<http://www.bps.go.id/Subjek/view/id/23>>.

Statistical Central Bureau of Indonesia (2015b) 'JumlahPendudukMiskin, PersentasePendudukMiskindanGarisKemiskinan, 1970-2013 [Number of Poor People, Percentage of Poor People and Poverty Line, 1970-2013]' Accessed 23 February 2015 <<http://www.bps.go.id/linkTabelStatis/view/id/1494>>.

Statistical Central Bureau of Indonesia (2015c) 'Produk Domestik Regional Bruto Atas Dasar Harga Konstan 2000 Menurut Provinsi, 2000-2013 (Miliar Rupiah) [Gross Regional Domestic Product on Constant price 2000 by province, 2000-2013]' <<http://www.bps.go.id/linkTabelStatis/view/id/1623>>

Statistical Central Bureau of Indonesia (2015d) 'Distribusi Persentase Penduduk dan Kepadatan Penduduk Menurut Provinsi, 2000-2013 [Percentage Distribution of Population and Density by Province, 2000-2013]' Accessed 23 February 2015 <<http://www.bps.go.id/linkTabelStatis/view/id/1277>>

Smith, S.W. (2003) *Labour Economics: Stephen Smith*. London [etc.]: Routledge.

Schwabish, J.A. (2014) 'An Economist's Guide to Visualizing Data', *The journal of economic perspectives* 28(1): 209-233.

Todaro, M.P. and S.C. Smith (2009) *Economic Development: Michael P. Todaro, Stephen C. Smith*. Harlow [etc.]: Addison-Wesley.

Wooldridge, J.M. (2014) *Introduction to Econometrics: Jeffrey M. Wooldridge*. Hampshire: Cengage Learning.

World Bank(1990) *World Development Report 1990 : Poverty*. New York: Oxford University Press.

World Bank (2001) *World Development Report 2000/2001 : Attacking Poverty*. New York: Oxford University Press.

World Bank (2015a) 'GDP Growth (annual %)' Accessed 23 February 2015 <<http://data.worldbank.org/indicator/NY.GDP.MKTP.KD.ZG>>

World Bank (2015b) 'Ending Poverty and Sharing Prosperity' Accessed 29 June 2015 <<http://www.worldbank.org/en/publication/global-monitoring-report>>

⁵Statistical Central Bureau of Indonesia is translated from its formal name; Badan PusatStatistik (BPS)

Appendix 1

1. Specification Test for the 1st Model (Hausman Test)

	Coefficients			
	(b) fe	(B) re	(b-B) Difference	sqrt(diag(V_b-V_B)) S.E.
l_mw	-.9632361	-.7709946	-.1922415	.2022223
l_gcpt	-.408436	-.4999155	.0914795	.1779002
l_totpop	2.320601	.0744316	2.246169	.6616801
infl	1.725965	1.587012	.1389531	.
elect	-.0876714	-.0966609	.0089895	.0024501

b = consistent under H_0 and H_a ; obtained from xtreg
 B = inconsistent under H_a , efficient under H_0 ; obtained from xtreg

Test: H_0 : difference in coefficients not systematic

```

chi2(5) = (b-B)'[(V_b-V_B)^(-1)](b-B)
          =      96.10
Prob>chi2 =      0.0000
(V_b-V_B is not positive definite)
    
```

2. Specification Test for the 2nd Model (Hausman Test)

	Coefficients			
	(b) fe	(B) re	(b-B) Difference	sqrt(diag(V_b-V_B)) S.E.
l_mw	-2.863388	-2.567805	-.2955829	.4395683
l_gcpt	-3.530684	-3.417699	-.1129854	.3857243
l_totpop	8.841883	.3882261	8.453656	1.838498
infl	5.308043	4.979833	.3282097	.
elect	-.2212569	-.2417269	.0204699	.

b = consistent under H_0 and H_a ; obtained from xtreg
 B = inconsistent under H_a , efficient under H_0 ; obtained from xtreg

Test: H_0 : difference in coefficients not systematic

```

chi2(5) = (b-B)'[(V_b-V_B)^(-1)](b-B)
          =      8.02
Prob>chi2 =      0.1552
(V_b-V_B is not positive definite)
    
```

Appendix 2

1. Regression Result of the 1st Model

Source	SS	df	MS	Number of obs = 976							
Model	1153.45755	5	230.691509	F(5, 970) = 192.09							
Residual	1164.92834	970	1.20095705	Prob > F = 0.0000							
Total	2318.38588	975	2.37783167	R-squared = 0.4975							
				Adj R-squared = 0.4949							
				Root MSE = 1.0959							
p_gap	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]						
l_mw	-1.006585	.1231154	-8.18	0.000	-1.248188	-.764982					
l_gcpt	-.5215021	.0536216	-9.73	0.000	-.6267299	-.4162744					
l_totpop	.0664223	.0452757	1.47	0.143	-.0224273	.155272					
infl	1.038364	.8180137	1.27	0.205	-.5669166	2.643644					
elect	-.1740505	.0148247	-11.74	0.000	-.2031428	-.1449582					
_cons	37.13526	1.748257	21.24	0.000	33.70446	40.56606					
<hr/>											
. xtreg p_gap l_mw l_gcpt l_totpop infl elect, fe											
Fixed-effects (within) regression											
Number of obs = 976											
Group variable: district											
Number of groups = 118											
R-sq: within = 0.4495											
between = 0.0542											
overall = 0.1006											
Obs per group: min = 1											
avg = 8.3											
max = 11											
F(5,853) = 139.28											
Prob > F = 0.0000											
p_gap	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]						
l_mw	-.9632361	.2490565	-3.87	0.000	-1.452071	-.4744007					
l_gcpt	-.408436	.2082039	-1.96	0.050	-.8170881	.0002161					
l_totpop	2.320601	.66935	3.47	0.001	1.006835	3.634367					
infl	1.725965	.5266884	3.28	0.001	.6922082	2.759722					
elect	-.0876714	.0128204	-6.84	0.000	-.1128347	-.0625082					
_cons	-3.909556	8.783685	-0.45	0.656	-21.14973	13.33061					
sigma_u	2.0878368										
sigma_e	.64248217										
rho	.91349608	(fraction of variance due to u_i)									
<hr/>											
F test that all u_i=0: F(117, 853) = 16.83 Prob > F = 0.0000											
<hr/>											
. xtreg p_gap l_mw l_gcpt l_totpop infl elect, re											
Random-effects GLS regression											
Number of obs = 976											
Group variable: district											
Number of groups = 118											
R-sq: within = 0.4420											
between = 0.5134											
overall = 0.4893											
Obs per group: min = 1											
avg = 8.3											
max = 11											
Wald chi2(5) = 778.37											
Prob > chi2 = 0.0000											
p_gap	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]						
l_mw	-.7709946	.1453797	-5.30	0.000	-1.055934	-.4860555					
l_gcpt	-.4999155	.1081684	-4.62	0.000	-.7119216	-.2879094					
l_totpop	.0744316	.1010391	0.74	0.461	-.1236015	.2724647					
infl	1.587012	.531262	2.99	0.003	.5457578	2.628267					
elect	-.0966609	.0125841	-7.68	0.000	-.1213253	-.0719965					
_cons	25.92196	1.816422	14.27	0.000	22.36184	29.48208					
sigma_u	.82440706										
sigma_e	.64248217										
rho	.62214218	(fraction of variance due to u_i)									
<hr/>											

2. Regression Result of the 2nd Model

Source	SS	df	MS	Number of obs = 976							
Model	29242.5665	5	5848.5133	F(5, 970) = 220.69							
Residual	25705.4943	970	26.5005096	Prob > F = 0.0000							
Total	54948.0608	975	56.3569854	R-squared = 0.5322							
				Adj R-squared = 0.5298							
				Root MSE = 5.1479							
p_rate	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]						
l_mw	-4.726684	.57833	-8.17	0.000	-5.861606	-3.591761					
l_gcpt	-3.181493	.2518855	-12.63	0.000	-3.675797	-2.68719					
l_totpop	.1310903	.212681	0.62	0.538	-.2862775	.5484582					
infl	.9686133	3.842589	0.25	0.801	-6.572132	8.509359					
elect	-.7310153	.0696387	-10.50	0.000	-.8676751	-.5943554					
_cons	178.9961	8.212371	21.80	0.000	162.88	195.1121					
<hr/>											
. xtreg p_rate l_mw l_gcpt l_totpop infl elect, fe											
Fixed-effects (within) regression											
Number of obs = 976											
Group variable: district											
Number of groups = 118											
R-sq: within = 0.6564											
between = 0.0780											
overall = 0.1455											
Obs per group: min = 1											
avg = 8.3											
max = 11											
F(5, 853) = 325.94											
corr(u_i, Xb) = -0.6491											
Prob > F = 0.0000											
p_rate	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]						
l_mw	-2.863388	.7109832	-4.03	0.000	-4.25887	-1.467906					
l_gcpt	-3.530684	.5943611	-5.94	0.000	-4.697266	-2.364103					
l_totpop	.841883	1.910798	4.63	0.000	5.091466	12.5923					
infl	5.308043	1.503541	3.53	0.000	2.35697	8.259116					
elect	-.2212569	.0365985	-6.05	0.000	-.2930906	-.1494233					
_cons	-12.53619	25.07484	-0.50	0.617	-61.75181	36.67943					
sigma_u	9.0465307										
sigma_e	1.8340979										
rho	.96051911	(fraction of variance due to u_i)									
<hr/>											
F test that all u_i=0: F(117, 853) = 58.02											
Prob > F = 0.0000											
. xtreg p_rate l_mw l_gcpt l_totpop infl elect, re											
Random-effects GLS regression											
Number of obs = 976											
Group variable: district											
Number of groups = 118											
R-sq: within = 0.6484											
between = 0.4590											
overall = 0.5030											
Obs per group: min = 1											
avg = 8.3											
max = 11											
Wald chi2(5) = 1632.42											
Prob > chi2 = 0.0000											
p_rate	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]						
l_mw	-2.567805	.5588174	-4.60	0.000	-3.663067	-1.472543					
l_gcpt	-3.417699	.4521967	-7.56	0.000	-4.303988	-2.531409					
l_totpop	.3882261	.520647	0.75	0.456	-.6322233	1.408675					
infl	4.979833	1.539539	3.23	0.001	1.962391	7.997275					
elect	-.2417269	.0371567	-6.51	0.000	-.3145526	-.1689011					
_cons	99.72354	7.711954	12.93	0.000	84.60839	114.8387					
sigma_u	4.4966614										
sigma_e	1.8340979										
rho	.85736379	(fraction of variance due to u_i)									
<hr/>											

Appendix 3

1. Regression Result of the 1st Model using sub-sample

<pre>. xtreg p_gap l_mw l_gcpt l_totpop infl elect if province == 1, robust fe</pre>											
Fixed-effects (within) regression		Number of obs = 416									
Group variable: district		Number of groups = 38									
R-sq: within = 0.5556		Obs per group: min = 9									
between = 0.1083		avg = 10.9									
overall = 0.1662		max = 11									
		F(5, 37) = 56.04									
corr(u_i, Xb) = -0.6922		Prob > F = 0.0000									
(Std. Err. adjusted for 38 clusters in district)											
p_gap	Robust										
	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]						
l_mw	-2.332885	.560262	-4.16	0.000	-3.468084	-1.197686					
l_gcpt	.5289383	.3923507	1.35	0.186	-.2660398	1.323916					
l_totpop	2.364376	1.758044	1.34	0.187	-1.197759	5.926512					
infl	.3243845	1.313769	0.25	0.806	-2.337565	2.986334					
elect	-.081558	.0223673	-3.65	0.001	-.1268785	-.0362375					
_cons	5.04195	21.73009	0.23	0.818	-38.98739	49.07129					
sigma_u	1.8690109										
sigma_e	.69914818										
rho	.87724587	(fraction of variance due to u_i)									

<pre>. xtreg p_gap l_mw l_gcpt l_totpop infl elect if province == 2, robust fe</pre>											
Fixed-effects (within) regression		Number of obs = 49									
Group variable: district		Number of groups = 8									
R-sq: within = 0.5212		Obs per group: min = 3									
between = 0.2308		avg = 6.1									
overall = 0.3309		max = 7									
		F(5, 7) = 54.17									
corr(u_i, Xb) = -0.7979		Prob > F = 0.0000									
(Std. Err. adjusted for 8 clusters in district)											
p_gap	Robust										
	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]						
l_mw	-.2590433	.1529044	-1.69	0.134	-.6206047	.1025181					
l_gcpt	-.4756729	.1691591	-2.81	0.026	-.8756705	-.0756753					
l_totpop	.5498266	.5505075	1.00	0.351	-.7519168	1.85157					
infl	.3705846	.3141323	1.18	0.277	-.3722203	1.113389					
elect	-.0204517	.0102823	-1.99	0.087	-.0447654	.003862					
_cons	3.455408	7.982305	0.43	0.678	-15.41974	22.33056					
sigma_u	.60551136										
sigma_e	.2173467										
rho	.88586263	(fraction of variance due to u_i)									

```

. xtreg p_gap l_mw l_gcpt l_totpop infl elect if province == 3, robust fe

Fixed-effects (within) regression                         Number of obs      =       64
Group variable: district                               Number of groups   =        6

R-sq:  within  = 0.1646                               Obs per group: min =         9
          between = 0.9156                               avg =      10.7
          overall = 0.5900                               max =      11

                                                F(5,5)           =     27.34
corr(u_i, Xb)  = -0.9992                           Prob > F        =  0.0012

```

(Std. Err. adjusted for 6 clusters in district)

p_gap	Robust				
	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]
l_mw	-.2798779	.3421119	-0.82	0.451	-1.159305 .5995487
l_gcpt	.3784772	.3857795	0.98	0.372	-.6132006 1.370155
l_totpop	-2.640152	2.081719	-1.27	0.261	-7.99138 2.711076
infl	-1.135673	.4220255	-2.69	0.043	-2.220524 -.0508215
elect	.0803478	.0589398	1.36	0.231	-.0711619 .2318575
_cons	28.67806	26.001	1.10	0.320	-38.15964 95.51577
sigma_u	4.6172671				
sigma_e	.27696302				
rho	.9964148	(fraction of variance due to u_i)			

```

. xtreg p_gap l_mw l_gcpt l_totpop infl elect if province == 5, robust fe

```

```

Fixed-effects (within) regression                         Number of obs      =       129
Group variable: district                               Number of groups   =        26

R-sq:  within  = 0.2526                               Obs per group: min =         4
          between = 0.0068                               avg =      5.0
          overall = 0.0132                               max =      5

```

```

                                                F(5,25)           =     4.14
corr(u_i, Xb)  = -0.6878                           Prob > F        =  0.0071

```

(Std. Err. adjusted for 26 clusters in district)

p_gap	Robust				
	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]
l_mw	-.1014848	.2252689	-0.45	0.656	-.5654347 .3624651
l_gcpt	-1.039307	.433385	-2.40	0.024	-1.93188 -.1467337
l_totpop	.5713296	.7867269	0.73	0.474	-1.048965 2.191624
infl	.1945115	.7843461	0.25	0.806	-1.420879 1.809903
elect	.0074584	.0535825	0.14	0.890	-.1028968 .1178135
_cons	4.291664	9.23874	0.46	0.646	-14.73588 23.31921
sigma_u	.93676591				
sigma_e	.28742736				
rho	.91395623	(fraction of variance due to u_i)			

<pre>. xtreg p_gap l_mw l_gcpt l_totpop infl elect if province == 6, robust fe</pre>						
Fixed-effects (within) regression						Number of obs = 313
Group variable: district						Number of groups = 35
R-sq: within = 0.4420						Obs per group: min = 7
between = 0.2962						avg = 8.9
overall = 0.2722						max = 9
						F(5, 34) = 24.38
corr(u_i, Xb) = -0.8310						Prob > F = 0.0000
(Std. Err. adjusted for 35 clusters in district)						
p_gap	Robust					
	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
	l_mw	-0.2732492	0.9463782	-0.29	0.775	-2.196521 1.650023
	l_gcpt	-1.069981	0.8148925	-1.31	0.198	-2.726042 .5860796
	l_totpop	3.218547	2.473975	1.30	0.202	-1.809176 8.24627
	infl	11.46203	2.083995	5.50	0.000	7.226844 15.69722
	elect	-0.0714825	0.0607103	-1.18	0.247	-.1948608 .0518957
sigma_u	[fraction of variance due to u_i)					

2. Regression Result of the 2nd Model using sub-sample

<pre>. xtreg p_rate l_mw l_gcpt l_totpop infl elect if province == 1, robust re</pre>						
Random-effects GLS regression						Number of obs = 416
Group variable: district						Number of groups = 38
R-sq: within = 0.7476						Obs per group: min = 9
between = 0.3918						avg = 10.9
overall = 0.4554						max = 11
corr(u_i, X) = 0 (assumed)						Wald chi2(5) = 508.59
						Prob > chi2 = 0.0000
(Std. Err. adjusted for 38 clusters in district)						
p_rate	Robust					
	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]	
	l_mw	-5.967461	1.530851	-3.90	0.000	-8.967875 -2.967048
	l_gcpt	-1.49067	1.082366	-1.38	0.168	-3.612068 .630728
	l_totpop	2.663001	.9803982	2.72	0.007	.7414559 4.584546
	infl	2.87903	3.057205	0.94	0.346	-3.112982 8.871043
	elect	-.140908	.052139	-2.70	0.007	-.2430986 -.0387173
sigma_u	[fraction of variance due to u_i)					

```

. xtreg p_rate l_mw l_gcpt l_totpop infl elect if province == 2, robust re

Random-effects GLS regression
Number of obs = 49
Group variable: district
Number of groups = 8

R-sq: within = 0.8110
between = 0.6854
overall = 0.7176

Obs per group: min = 3
avg = 6.1
max = 7

Wald chi2(5) = 143.54
Prob > chi2 = 0.0000

```

(Std. Err. adjusted for 8 clusters in district)

p_rate	Robust				
	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]
l_mw	-.6484736	.5087595	-1.27	0.202	-1.645624 .3486766
l_gcpt	-.494465	.7006819	-0.71	0.480	-1.867776 .8788462
l_totpop	.6132674	.5476982	1.12	0.263	-.4602014 1.686736
infl	-.0393121	1.124687	-0.03	0.972	-2.243659 2.165035
elect	-.3344417	.053635	-6.24	0.000	-.4395644 -.2293191
_cons	44.53737	8.29907	5.37	0.000	28.27149 60.80325
sigma_u	.92100433				
sigma_e	.60251632				
rho	.70029436				(fraction of variance due to u_i)

```

. xtreg p_rate l_mw l_gcpt l_totpop infl elect if province == 3, robust re

Random-effects GLS regression
Number of obs = 64
Group variable: district
Number of groups = 6

R-sq: within = 0.0883
between = 0.9589
overall = 0.8983

Obs per group: min = 9
avg = 10.7
max = 11

Wald chi2(5) = 1842.56
Prob > chi2 = 0.0000

```

(Std. Err. adjusted for 6 clusters in district)

p_rate	Robust				
	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]
l_mw	1.2899	.5756289	2.24	0.025	.1616878 2.418112
l_gcpt	-1.09116	.5146264	-2.12	0.034	-2.099809 -.0825109
l_totpop	-2.2908	.1457635	-15.72	0.000	-2.576491 -2.005108
infl	2.300671	3.419398	0.67	0.501	-4.401225 9.002568
elect	-.0913549	.2950547	-0.31	0.757	-.6696516 .4869417
_cons	40.10902	29.41443	1.36	0.173	-17.54219 97.76024
sigma_u	0				
sigma_e	.87683382				
rho	0				(fraction of variance due to u_i)

```

. xtreg p_rate l_mw l_gcpt l_totpop infl elect if province == 5, robust re

Random-effects GLS regression                               Number of obs      =      129
Group variable: district                                Number of groups   =       26

R-sq:  within  = 0.6345                                Obs per group: min =        4
       between = 0.1125                                avg  =      5.0
       overall = 0.1332                                max  =        5

                                                Wald chi2(5)      =   193.97
corr(u_i, X)  = 0 (assumed)                           Prob > chi2     = 0.0000

(Std. Err. adjusted for 26 clusters in district)


```

p_rate	Robust				
	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]
l_mw	-.6673836	.4042611	-1.65	0.099	-1.459721 .1249536
l_gcpt	-3.389549	.991209	-3.42	0.001	-5.332283 -1.446815
l_totpop	.0360755	.8471577	0.04	0.966	-1.624323 1.696474
infl	-.4945785	.8491256	-0.58	0.560	-2.158834 1.169677
elect	-.3077808	.1263866	-2.44	0.015	-.555494 -.0600676
_cons	83.0015	11.17962	7.42	0.000	61.08984 104.9131
sigma_u	3.5054179				
sigma_e	.58468967				
rho	.97293215				(fraction of variance due to u_i)

```

. xtreg p_rate l_mw l_gcpt l_totpop infl elect if province == 6, robust re

Random-effects GLS regression                               Number of obs      =      313
Group variable: district                                Number of groups   =       35

R-sq:  within  = 0.6704                                Obs per group: min =        7
       between = 0.4608                                avg  =      8.9
       overall = 0.5014                                max  =        9

                                                Wald chi2(5)      =   176.63
corr(u_i, X)  = 0 (assumed)                           Prob > chi2     = 0.0000

(Std. Err. adjusted for 35 clusters in district)


```

p_rate	Robust				
	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]
l_mw	-1.880067	2.286006	-0.82	0.411	-6.360557 2.600423
l_gcpt	-4.692655	1.794566	-2.61	0.009	-8.20994 -1.17537
l_totpop	3.285204	1.301645	2.52	0.012	.7340272 5.83638
infl	21.68672	4.232116	5.12	0.000	13.39192 29.98151
elect	-.3636541	.2034929	-1.79	0.074	-.7624929 .0351846
_cons	74.57533	23.54679	3.17	0.002	28.42447 120.7262
sigma_u	3.6931638				
sigma_e	1.7460492				
rho	.81731417				(fraction of variance due to u_i)