The Effect of Government Expenditure on Income Inequality and Poverty
Panel Data Analysis from 33 Provinces in Indonesia

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List of Acronyms

CPI	Corruption Perceptions Index
FEM	Fixed Effect Model
FPL	Food Poverty Line
GDP	Gross Domestic Product
GMM	Generalised Method of Moments
GRP	Gross Regional Product
NGO	Non-Government Organisation
NPL	Non-food Poverty Line
NPRCE	National Programme for Rural Community Empowerment
OECD	Organisation for Economic Co-operation and Development
PL	Poverty Line
REM	Random Effect Model
SLS	Stage Least Square
SURE	Seemingly Unrelated Regression
SVAR	Structural Vector Auto Regression
VAR	Vector Auto Regression

Dedication Page

For my beloved mom Endryani Nasution and dad Budiono,

For my little sisters, Rinida and Tami Nabila,

You are my world…

Thank you…

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Abstract

The issues of income inequality and poverty have become key issues in development studies since the 1970s. Although there are various factors theoretically associated with the incidence of poverty and income inequality, choices regarding the types and structure of government expenditure are often quoted as one of the crucial determinants. However, the evidence is still inconclusive, and the research about these issues in the case of Indonesia is still minimum. This paper tries to contribute to the discussion by analysing a panel data set of 33 provinces from 2005 to 2017 to examine the effect of different types of government expenditure on income inequality and poverty in Indonesia. Using the fixed effect, random effect, and Seemingly Unrelated Regression (SURE) system, this paper finds that social aid, subsidy and grant expenditure have an insignificant effect on reducing income inequality and poverty in Indonesia. However, the empirical evidence suggests that infrastructure spending has a negative correlation with income inequality in urban areas (when using the random effect model), and rural areas (when using the fixed effect model), both are statistically significant at the 5% level. In addition, infrastructure expenditure is also negatively and significantly correlated with poverty in Indonesia, and the impact is more significant in rural than urban areas.

Relevance to Development Studies

The impact of government spending on income inequality and poverty has been argued for several decades. However, the consensus is yet to be reached. This paper tries to enrich the discussion by providing new empirical evidence on how government expenditure can affect income inequality and poverty in Indonesia. Furthermore, this study also differentiates the impact on urban and rural areas, which may contribute for further policy improvement.

Keywords

Income inequality, poverty, government expenditure, infrastructure, social aid, subsidy, grant, Indonesia

Chapter 1
Introduction

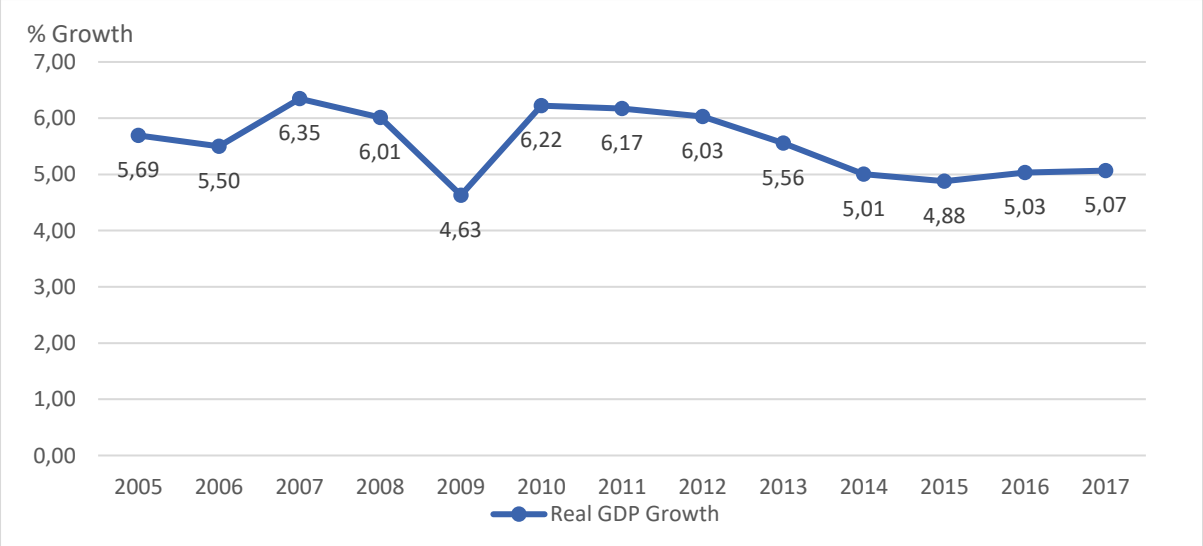
1.1 Background Analysis

The battle between the rich and the poor has existed as long as human history. However, nowadays, there is more focus on the poverty issue and distribution of wealth from the rich to the poor. A great number of authors in literature have discussed the inequality and poverty issues since the 1970s, making it one of the major fields in development studies (Ahluwalia 1976; Fields 1980; Kakwani 1980). Indonesia, as a developing economy, also faces the problem of inequality and poverty. Moreover, Indonesia is one of the most diverse countries in the world, which consists of more than 260 million people with 360 ethnicities, 700 local languages, and six primary religions (the Statistics Bureau of Indonesia 2019). Such diversity could be a double-edged sword for the development in Indonesia. On the one hand, Indonesia could use its diversity as resources to obtain benefit economically. On the other hand, diversity could also expose Indonesia towards the inequality problem in its society.

According to Oxfam Indonesia and the International NGO Forum on Indonesian Development (2017), there are two astonishing facts regarding income inequality problem in Indonesia. First, the four wealthiest men in Indonesia are worth as much as 100 million poorest citizens. Second, Indonesia's Gini index has fallen slower than any Southeast Asia countries in the last two decades. It indicates that there is a problem regarding income distribution in this country.

On the other hand, the economy of Indonesia has expanded fast in the 2000s and 2010s. Figure 1 illustrates the trends in real GDP growth rate of Indonesia from 2005 to 2017. It can be observed from the graph that Indonesia's economy has performed very well with the average annual real GDP growth of approximately 5.55% (The World Bank Data 2019), making Indonesia as one of the fastest-growing economies in Asia and the sixteenth biggest economy in the world by nominal GDP. However, the benefits of the growth have not been shared equally and left millions of people behind. There are 25 million Indonesian people who still live below the poverty line (the Statistics Bureau of Indonesia 2019). It suggests that an increase in GDP growth does not necessarily give a positive impact on poverty and income inequality.

Figure 1
Real GDP Growth in Indonesia



Source: The World Bank Data (2019)

Since income inequality and poverty have become major global issues, there has been considerable interest in what government can do to reduce it. There are several types of government policies that are assumed could influence income inequality, such as minimum wages policy, interest rate controls, anti-discrimination law, and government expenditure. Even though the evidence is still inconclusive, many scholars claim that one of the important tools to decrease income inequality and poverty rate is through government expenditure (Anderson 2017: 961). However, not all types of government expenditure affect income inequality and poverty. Some government expenditure might affect income inequality and poverty, and some others might not. Therefore, this research wants to examine the effect of different types of government expenditure on income inequality and poverty in Indonesia using panel data at the province level.

1.2 Justification and Relevance of The Research

There is still an outgoing debate about the effect of government expenditure on income inequality and poverty. Some economists believe that particular types of government expenditure could reduce income inequality and poverty (Anderson et al. 2017; Ogun 2010; Sylwester 2002). In contrast, Cozzy and Impullitti (2008: 20) concluded that the US government spending policy contributes to an increase in wage inequality in the late 1970s and 1980s. In those periods, the US government shifted its focus on public spending to stimulate research and development; thus, it increased the wage of skilled workers, while the wage of unskilled labour remained the same. Ultimately, it aggravated the wage inequality in the US. Meanwhile, other scholars argue that government expenditure has no significant impact on reducing poverty and income inequality (Habibov and Fan 2006; Ospina 2010; Permadi 2018).

Based on the description above, the impact of government expenditure on income inequality and poverty is still ambiguous. This is due to a few reasons. First, it depends on the data sample used in the research. A study using cross-countries panel data could have different results with research using national data. Similarly, studies using data from developed and developing countries could have a different outcome as well. Moreover, the characteristic of government spending could affect the results. Lastly, control variables also play a role in defining the results.

Despite the inconclusive evidence, research about this issue in the case of Indonesia is still minimum, especially at the province level. Moreover, as far as the author knows, research has yet to be done regarding the difference between the effect of government spending on income inequality and poverty in urban and rural areas. Therefore, this research paper, at the same time, will fill the gap in the literature regarding this issue.

1.3 Research Objectives and Questions

The objective of this paper is to examine the effect of different types of government expenditure on income inequality and poverty in Indonesia. Also, this paper tries to analyse whether there is a difference between the impact on urban and rural areas.

Therefore, this research will focus on the main research question: What is the effect of government expenditure on income inequality and poverty in Indonesia?
Furthermore, the objective of the research will be divided into four sub-questions, as follow:

1. What is the effect of infrastructure expenditure on income inequality and poverty in Indonesia?
2. What is the effect of social aid expenditure on income inequality and poverty in Indonesia?
3. What is the effect of subsidy and grant expenditure on income inequality and poverty in Indonesia?
4. What is the difference between the effect of government expenditure on income inequality and poverty in urban and rural areas?

However, before answering the research questions above, it is important to develop initial hypotheses regarding the relationship between variables in the research. Based on the theoretical framework and literature review that will be explained in Chapter 3, the initial hypotheses of this research can be described as follow:

1. The greater the infrastructure expenditure, the lower the level of income inequality and poverty
2. The higher the amount of social aid expenditure, the lower the level of income inequality and poverty
3. The greater the subsidy and grant expenditure, the lower the level of income inequality and poverty
4. Government spending has a more significant impact on income inequality and poverty in rural than in urban areas.

1.4 Contribution to the Literature

Although many studies have discussed the inequality and poverty issues around the world, the literature that examines the impact of government expenditure on income inequality and poverty in the case of Indonesia is still very minimum, especially at the province level. Also, as far as the author knows, there is no prior research that differentiates the impact of government expenditure on income inequality and poverty in urban and rural areas. Therefore, this research tries to fill the gap in the literature regarding these issues. Moreover, the novelty of this research also lies in the comparison of the results between three different regression models: the fixed effect, the random effect, and the Seemingly Unrelated Regression (SURE) models.

1.5 Research Outline

The structure of this paper is organised as follow:

Chapter 1	:	The first chapter of this research provides the background of the analysis, the relevance and contribution of this research, the research objectives and questions, and the tentative hypotheses as well as the outline of this paper.
Chapter 2	:	This chapter contains the context of Indonesia regarding income inequality, poverty, and government spending in the last decade (from 2007 to 2018).
Chapter 3	:	A summary of the relevant studies regarding the theoretical framework and empirical evidence associated with the topic will be explained in this chapter.
Chapter 4	:	This chapter presents the methodology, including the empirical model, data, and variables used in the analysis, along with their description.
Chapter 5	:	This chapter will draw and discuss the main findings of the research.
Chapter 6	:	The last chapter will present conclusions and recommendations.

Chapter 2
Context of Indonesia

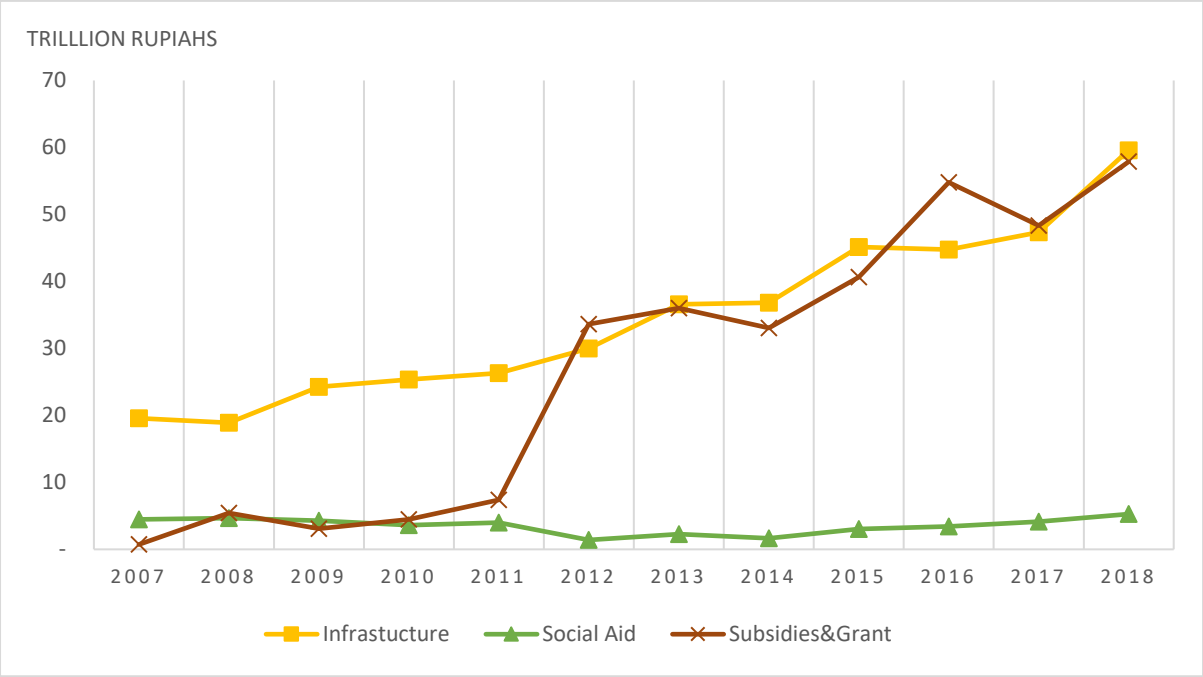
Being a diverse country, Indonesia has various regional cultures, enormous population, abundant natural resources, and strategic position lying between two continents (Asia and Australia), and two oceans (Indian and Pacific). These advantages have made economists predicting Indonesia as the fourth-largest economy in the world based on GDP in 2050, right below China, India, and the United States of America (PricewaterhouseCoopers 2017). Even though Indonesia is categorized as the top 20 biggest countries based on GDP in 2018 (International Monetary Fund 2018), its development is still only concentrated in major big cities and leave other regions behind, especially in the eastern part of Indonesia. This inequitable development could create a problem regarding the income distribution and poverty throughout the regions in Indonesia.

Many attempts have been made by the Indonesian government to minimize the income gap in a society and reduce the poverty rate. One of them is by increasing certain types of government expenditure that could overcome inequality and poverty issues. Figure 2 illustrates three types of government spending trends in Indonesia from 2007 to 2018. The first expenditure is infrastructure, which is expenses used for purchasing a tangible fixed asset that includes medical equipment, school practice tools, water installations, construction of roads and bridges. The other expenditure is social aid, which is used to provide assistance to civil society organizations, political parties, individuals or families to improve the welfare of the community. Lastly, subsidy and grant expenditure are the types of expenditure that is used to support the cost of production to specific company/organization so that the selling price of the goods/services produced can be affordable. These three types of expenditures are considered as the types of government expenditure that contribute the most to reduce income inequality and poverty.

It can be observed from Figure 2 that there are upward trends in nominal infrastructure expenditure, subsidy and grant spending. Infrastructure expenditure had tripled from around 20 trillion Rupiahs (approximately US$ 2 billion[1]) in 2007 to 60 trillion Rupiahs (approximately US$ 4.5 billion[2]) in 2018. Similarly, subsidy and grant expenditure have risen significantly in the last decade. From 2007 to 2010, the figure depicts that subsidy and grant expenditure were only below 10 trillion Rupiahs (approximately US$ 1 billion); however, it showed an increasing trend in the following years and reached its highest point at almost 58 trillion Rupiahs (approximately US$ 4.35 billion) in 2018. In contrast, social aid expenditure remains the same throughout the observation period.

[1] The average exchange rate in 2007: US$ 1 = 10,000 Rupiahs
[2] The average exchange rate in 2018: US$ 1 = 13,300 Rupiahs
(Source: The Central Bank of The Republic of Indonesia)

Figure 2
Government Expenditure Trends in Indonesia (in Nominal Values)

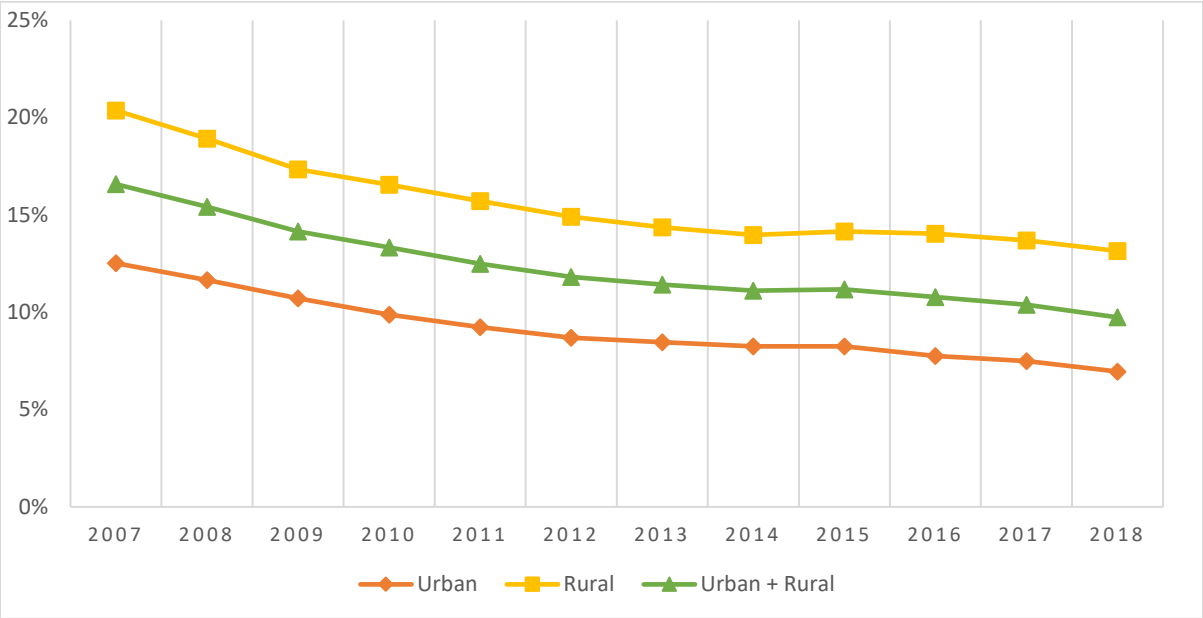


Source: Financial Statistics of Province Governance (2019)

Regarding the poverty in Indonesia, it is defined as economically disability to fulfil basic needs (food and non-food) measured based on expenditure. According to the Statistics Bureau of Indonesia (2019), the poverty line in Indonesia is 13,374 Rupiahs a day (a little less than US$1 a day). Despite the fact that the poverty line in Indonesia is lower than the world on average, Figure 3 shows that there are downward trends both in urban and rural areas. It can be observed from the figure that the poverty rate in urban areas had declined substantially from 12.52% in 2007 to 6.96% in 2018. Similarly, there was also a significant reduction in the poverty rate in rural areas, from 20.37% in 2007 to 13.15% in 2018. Even though there is a decreasing trend of poverty rate in both areas, it can be seen from the figure that the poverty rate in rural areas is approximately twice higher than urban areas. Therefore, it suggests that the government needs to have more focus on reducing poverty in rural areas because more people still live below the poverty line in rural areas compared to the ones in urban areas.

Besides, government poverty reduction policies or programmes such as building bridges or roads (infrastructure expenditure) and giving subsidies or aid are likely to have a more significant impact on low-income households in rural than urban areas, as in the case of the National Programme for Rural Community Empowerment (NPRCE) which was officially formed by the President of the Republic of Indonesia on April 30, 2007 in the City of Palu, Central Sulawesi. NPRCE has an objective to reduce the poverty level, specifically in the most deprived rural areas in Indonesia by including not only government's supports but also rural community participation. Various infrastructure developments by NPRCE have changed the face of many villages which were previously dominated by land roads, now have turned into concrete roads, making it cleaner, more comfortable, stronger and more expediting community traffic (Setiawan 2014). He mentioned one of the successful examples of the NPRCE is the development of the streets in Sragen District, which was previously only passable by pedestrians and bicycles, now can be passed by motorbikes and cars, so it really helps the village community to transport their agricultural products such as rice, corn, soybeans and tobacco to other areas or cities. Eventually, it stimulates the economic activities and increases the welfare of the people in that area.

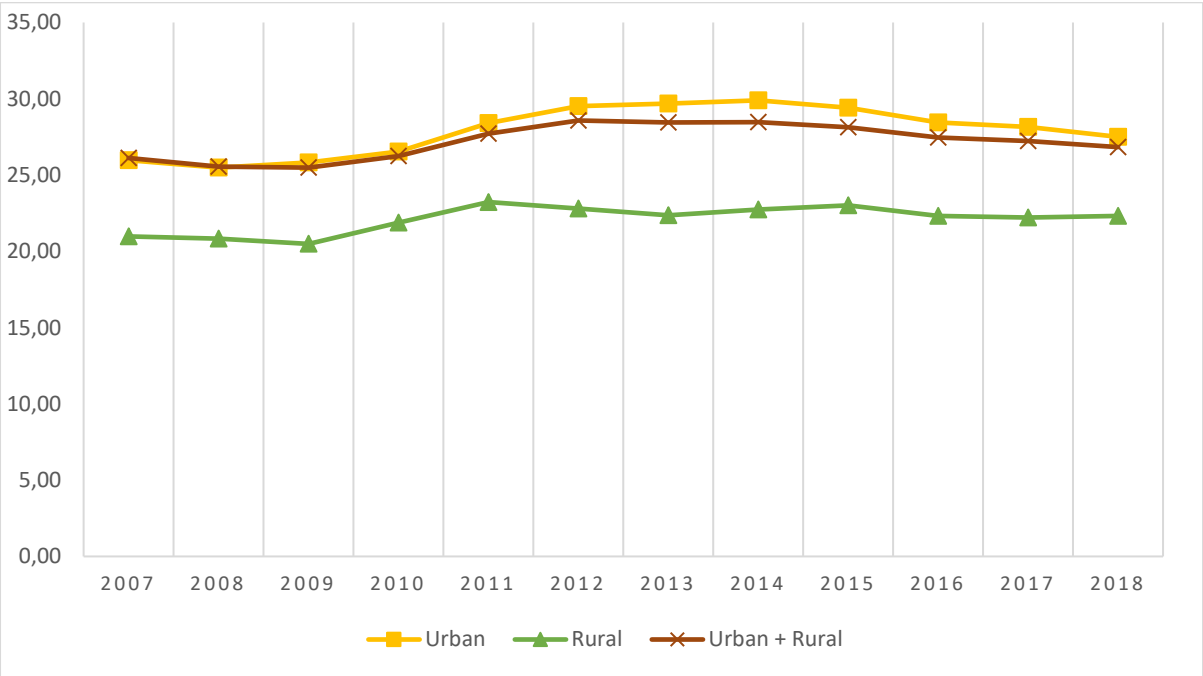
Figure 3
The Poverty Rate in Indonesia



Source: The Statistics Bureau of Indonesia (2019)

In contrast to the poverty rate, income inequality, represented by the Gini index, has increased slightly during the observation period. Figure 4 illustrates that there is a rise in the Gini index as much as 1.53 and 1.35 points in urban and rural areas, respectively. Besides, it can be observed from the figure that the gap between the high-income and low-income groups are more severe in urban than rural areas.

Figure 4
The Gini Index in Indonesia

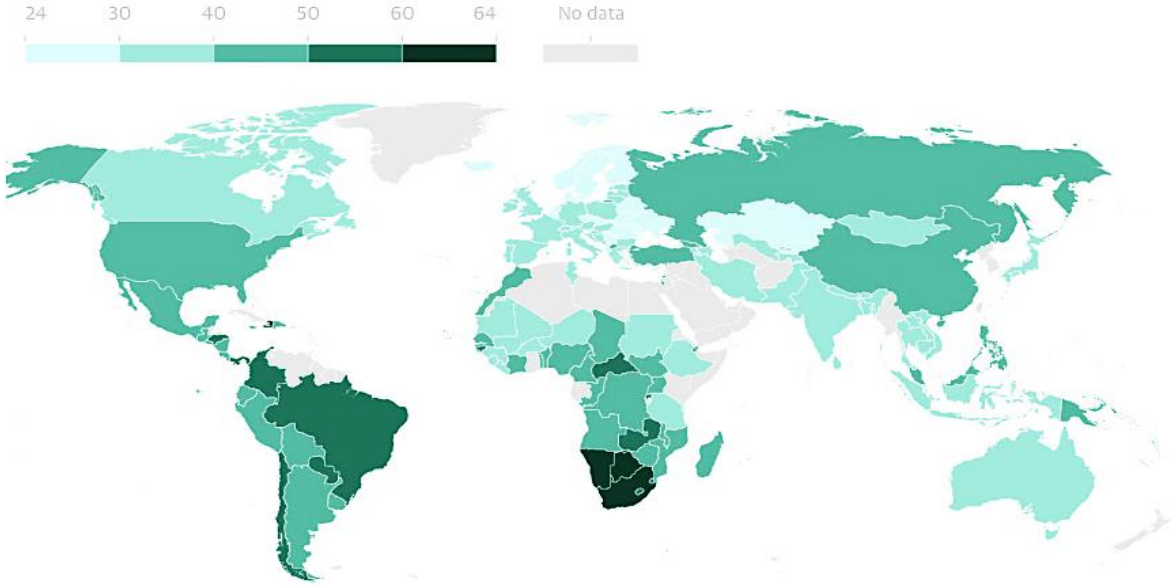


Source: The Statistics Bureau of Indonesia (2019)

Even though Indonesia has experienced a slight increase in income inequality in the 2010s, Indonesia still has a relatively low Gini index. It can be observed from Figure 5 that the Gini index in Indonesia is around 30 to 40. This number is considered small compared to the rest of the world.

Figure 5

The Gini Index Ranges from Zero (Absolute Equality) to 100 (Absolute Inequality) for 140 Countries



Source: World Bank, Graphed by The Guardian (2017)

Based on the figures above, it can be concluded that even though Indonesia has experienced a quite high economic growth for the past ten years (as shown in Figure 1), it seems that the growth is more beneficial for middle and top-income households than low-income households (anti-poor growth). Indeed, the growth has raised the living standard of low-income groups and reduced the poverty rate; however, it seems like the growth has no impact on reducing income inequality.

Furthermore, it is worth to note that Indonesia consists of 34 provinces, and each province has different economic growth; thus, it may create cross-regional differences in terms of government spending, income inequality, and the poverty rate (Djohan et al. 2016: 148-149). First of all, government spending funds are not divided equally between provinces. Most of the government expenditure funds are spent in the western part of Indonesia. Java and Sumatera Islands, which are the two biggest islands in the west part of Indonesia, are accounted for 68.4%, 75.9%, and 74.2% of the total amount in infrastructure, subsidy-grant, and social aid expenditure respectively, while other regions only enjoy less than 30% of the total expenditure (the Statistics Bureau of Indonesia 2019).

Regarding the poverty rate, there is a significant gap between the western and eastern part of Indonesia. The data from the Statistics Bureau of Indonesia (2019) shows that the provinces in Java and Sumatera Islands, who enjoy most of the government spending funds, seem to have a relatively low poverty rate of 12% on average. In contrast, Papua and West Papua (eastern part of Indonesia) suffer a high poverty rate of 31.90% on average. Meanwhile, there is no significant difference in income inequality among the provinces in Indonesia.

Finally, the objective of this research is to examine whether an increasing trend in government spending as shown in Figure 2 correlates with the downward trend of poverty rate (Figure 3) and a slight increase in income inequality (Figure 4). Therefore, the next chapter will explain the underlying theories and empirical evidence that relates the government spending, income inequality, and poverty.

Chapter 3
Theoretical Framework and Empirical Evidence

Chapter 3 explains the theoretical framework and empirical evidence of the determinants of inequality and poverty. The determinants of inequality and poverty in this chapter are divided into two categories: government expenditure as a main determinant variable and other determinants (economic growth, education, and unemployment rate) as control variables.

3.1 Government Expenditure as A Determinant of Income Inequality and Poverty

This section presents the Keynesian theory regarding the role of government as a main theoretical concept on addressing income inequality and poverty issues. The next section will disaggregate the government's role into three types of government interventions: infrastructure expenditure, social aid expenditure, and subsidy-grant expenditure.

3.1.1 Keynesian Theory

One of the theories that tie income inequality, poverty, and government expenditure is the Keynesian theory of employment, interest, and money. Keynes' theory is relevant because of its concern about the government's role in the economy. According to Stack (1978: 882), "Keynes' theory offers an explanation for the variation in employment and economic growth rates; these, in turn, can be applied to the problem of income inequality (the greater the employment and growth rate, the less the inequality)". However, one can argue that this is not always the case because there are some advanced economies with full employment but still have high inequality. For instance, the United States is one of the biggest economies in the world, but its Gini index is quite high, at 0.415 in 2016 (The World Bank data, n.d.).

In Keynesian theory, the government could enhance the probability of achieving the fundamental goal of equilibrium between saving, consumption, and investment. The employment level, which is an essential factor in measuring the degree of income inequality, depends on good and service demands. Stack (1978: 882) stated that "demand is a function of the relative propensity to consume and the propensity to save. If the amount of money saved by income recipients is greater than the amount required by those who are responsible for investment, then total demand will be insufficient to sustain full employment". Hence, too much saving is not good for the economy because it lowers job creation and creates unemployment problem that leads to higher income inequality level (Stack 1978: 882).

The government can design policies to balance savings, consumption, and investment. Such government policies include government expenditure, such as social security programmes, subsidies, and welfare expenditure that could affect low-income households. Moreover, the government's ability to create a job through such means as public work projects and government ownership industry also could decrease the unemployment rate and eventually will reduce the income inequality (Stack 1978: 882-883). In addition, Stack (1978: 883) suggested that government involvement through job creation programmes could have **a multiplier effect**. A job creation programme creates not only more productivity, but also more money that could be reinvested both in public or private sectors.

Therefore, the theory suggests that government involvement in the economy could reduce income inequality and poverty through three paths. First, particular types of government expenditure could ease the constraints and improve the living standard of low-income households.

Second, the more job creation through public work projects, the less unemployment and the lower inequality and poverty level. Third, the multiplier effects of job creation programmes could lead to an increase in economic activities and multiple reinvestments.

The impact of such government expenditure, job creation, and the multiplier effect contribute to the economic growth rate. "This, in turn, fosters a climate favouring income redistribution since the affluent can reduce their relative share of the income while at the same time increase the absolute amount of real income" (Stack 1978: 882-883).

Next, the theoretical framework and empirical evidence of the impact of government expenditure on inequality and poverty will be divided into three types of government interventions: infrastructure expenditure (3.1.2 and 3.1.3), social aid expenditure (3.14 and 3.15), and subsidy-grant expenditure (3.1.6 and 3.17).

3.1.2 Theoretical Framework on Infrastructure Expenditure

There are various factors theoretically associated with the incidence of poverty and inequality. One of them is public infrastructure spending, such as healthcare and public education infrastructure expenditure. People with poor health status cannot perform well in life, thus affects their welfare negatively. Meanwhile, a healthy person tends to have higher human capital and productivity than a poor health one. Since health status is strongly associated with the welfare of the households (Castro-Leal 1999: 29); therefore, an increase in the health of the workforce and infrastructure spending is negatively correlated with the poverty level.

Regarding public education expenditure, there is a general presumption that this type of government expenditure could reduce inequality and poverty problems. When the government devotes more fund to education, it increases the school enrolment rates of low-income people since education becomes more affordable (Lokshin and Yemtsov 2005: 329). Eventually, a better education leads to higher human capital, and increasing the human capital of low-income people is one of the solutions to reduce income inequality and poverty.

In addition to the healthcare and school infrastructures, investment in construction such as roads and bridges could also affect inequality and poverty. According to Lokshin and Yemstov (2005: 329), bridges and roads rehabilitation projects in rural areas would raise the level of economic activities, increase the number of small and medium enterprises, and improve the access for emergency medical assistance. Higher economic activities and easier access to other cities and medical assistance will cause a drop in the cost of goods and services, and eventually leads to poverty and inequality reduction.

Drawing from this theory, this paper tries to examine whether or not public infrastructure expenditure has an effect on income inequality and poverty. The following hypothesis is made regarding public infrastructure expenditure:

"The higher the amount of infrastructure expenditure, the lower the level of income inequality and poverty."

3.1.3 Empirical Evidence on Infrastructure Expenditure

A series of previous studies have indicated that one of the significant determinants of income inequality and poverty is public infrastructure expenditure. A case in point is a study by Ospina (2010: 16-17) using a panel data set from 1980 to 2000 to determine the effect of education and healthcare expenditure on income inequality in Latin America countries. After controlling the endogeneity problem of government expenditure in the inequality equation using 2SLS and GMM method, Ospina (2010: 16-17) finds that both education and healthcare expenditure have a significant effect on reducing income inequality. He also finds that the impact would be much higher if he does not take account of the endogeneity problem.

Another research conducted by Ogun (2010: 263-264) finds that infrastructural development has a significant impact on poverty alleviation in Nigeria. Using Structural Vector Auto Regression (SVAR) technique, the author suggests that both physical and social infrastructure expenditure could reduce poverty; however, social infrastructure (such as investment in schools and health centres) has more significant impact than physical infrastructure (such as transport, communication, and roads) because education and health contribute to human capital development, which is a crucial factor to improve the living standard of impoverished population (Ogun 2010: 264). Similarly, Sylwester (2002: 49) concludes that countries that have a higher share of public education as a percentage of GDP tend to have lower income inequality, and the correlation is to be found stronger in developed countries.

3.1.4 Theoretical Framework on Social Aid Expenditure

Social aid expenditure is potentially an essential tool for poverty eradication and income inequality reduction. Social aid expenditure is given by the government in the form of money transfers, goods, or services to poor people to protect them from the possibility of social risks and to improve their welfare. Even though social aid expenditure in the form of transfers can be given conditionally or unconditionally, the studies show that a conditional transfer tends to have a more significant impact than an unconditional transfer (Akresh et al. 2016; Baird et al. 2014; Robertson et al. 2013). According to Fernald et al. (2008), families enrolled in a conditional cash transfer programmes should fulfil certain conditions first such as the minimum requirement for health, nutrition, or education before they get the transfer. The conditional cash transfer is likely to have a result of better outcomes in child health, growth, and development; thus, it increases children's human capital and stops the lifelong poverty transmission to children. However, it seems worth to note that not only families should fulfil specific requirements first before accepting the transfer, but also it is crucial to monitor how and where the transfer is spent.

Furthermore, "cash transfer may have persistent effects on chronic poverty if they ease liquidity constraints that inhibit the poor from investing in productive activities which generate multipliers on the cash received" (Farrington and Slater 2006; Lloyd-Sherlock 2006; Sadoulet et al. 2001). Therefore, cash transfer is likely to improve the living standard of the poor people not only by fulfilling their basic needs that are useful for human capital development, but also giving a chance for low-income groups to invest in productive activities. This leads to the following hypothesis:

"The higher the amount of social aid expenditure, the lower the level of income inequality and poverty."

3.1.5 Empirical Evidence on Social Aid Expenditure

Concerning the effect of social aid expenditure on inequality and poverty, the evidence is still inconclusive. Several studies suggest that social aid spending will help to reduce the gap between the rich and the poor. Using meta-analysis of 84 studies with over 900 estimates, Anderson et al. (2017: 981-983) state that government expenditure is significantly and negatively associated with income inequality, and the result is strongest for social welfare and other social expenditure. In line with Anderson's study, by using an unbalanced panel data of 150 countries for 39 years period, Martinez-Vasquez et al. (2012: 122) find that the higher ratio of social welfare, housing, education, and medical care expenditure to GDP leads to a lower degree of income inequality, both individually and collectively.

In addition, using unbalanced panel data from 14 advanced capitalist economies[3] from 1970 to 1997, Moller et al. (2003: 44) show that the average poverty rate among these countries is 16% before the taxes and transfers are given to the households, ranging from 10% in Germany to an exceptionally high 22% in France. However, the average poverty rate is halved after the transfer is given to the families, and the range declines significantly from the lowest point of 3% in Finland and the highest point of 15% in the United States.

In contrast, other researchers refute this hypothesis. They argue that social aid expenditure has no impact on income inequality and poverty. Van den Berg and Chuong (2011: 709) suggest that the effect of public transfer expenditure on poverty reduction in Vietnam was insignificant due to two reasons. Firstly, there was a targeting problem. The main target of transfers expenditure is the poor households; however, there was a leak problem that causes a significant share of transfers went to non-poor households. Secondly, the amount of transfer fund was too small to have an impact on existing poverty in Vietnam.

Similarly, using micro file data from the national household budget survey, Habibov and Fan (2006: 222-223) find insignificant evidence of the effectiveness of social assistance programmes to reduce inequality and poverty in Azerbaijan. The cause of this failure is because the fund is too small to have an impact on reducing inequality in society. Moreover, there was a problem of inefficiency and identifying which community is more vulnerable.

Based on the literature above, it can be concluded that the evidence of government spending's impact on income inequality and poverty is still inconclusive. There are some factors that may cause these different results. Firstly, it depends on the data source used in the research, whether it uses data from developed or developing countries, cross-countries panel data or national data. Studies using cross-countries panel data analysis seem to have an adverse correlation between government spending and income inequality. Conversely, research using national data analysis is likely to conclude that government expenditure has no impact on income inequality. Secondly, the outcomes may vary depending on the amount of money used for transfers, whether or not it is significant enough to have an impact on reducing poverty. Lastly, it also depends on the structure and effectiveness of the programme target. The transfer should be more beneficial for poor households rather than non-poor people.

3.1.6 Theoretical Framework on Subsidy and Grant Expenditure

Another factor that has been theorized to be correlated with income inequality and poverty is subsidy and grant expenditure. The government could give subsidy and grant to specific companies/organizations as a support to reduce their cost of production. For example, the government provides subsidies for water and electricity companies, so that the selling price of those essential services can be more affordable for society. Other subsidies might be given to schools or hospitals to provide free (or lower cost) education and medical services for poor people.

Subsidies for basic needs such as water and electricity are crucial for low-income households. By increasing subsidies in those sectors, low-income households could get more access to clean water and electricity. Clean water is one of the requirements for good health, while electricity could improve productivity. As a result, it could improve the living standard of low-income households (Wokodala et al. 2010).

With regard to subsidies on education, most would argue that education benefits provided by the government are most appreciated by families with children. Education subsidies will help poor households to get a better education for their children, so they could have a better job opportunity in the future and stop the lifelong poverty transmission in their families. Meanwhile, health subsidies seem to have a more significant impact on households with the elderly since older citizens

[3] The 14 advanced capitalist economies are Sweden, Norway, Denmark, Finland, Belgium, France, Germany, Italy, Netherlands, Switzerland, Australia, Canada, the United Kingdom, and the United States.

are more likely to benefit from medical services (Smeeding et al. 1993: 253-254). Based on these theories, the following hypothesis is formulated:

"The higher the amount of subsidy and grant expenditure, the lower the level of income inequality and poverty."

3.1.7 Empirical Evidence on Subsidy and Grant Expenditure

One of the characteristics of poverty is a high rate of infant mortality and poor child health. Novignon et al. (2012: 7) uses panel data analysis of Sub-Saharan Africa countries found that "health care expenditure significantly influences health status through improving life expectancy at birth, reducing death and infant mortality rates". Also, it is worth to note that most developing countries, especially Sub-Saharan Africa, rely on subsidy and grant to finance their healthcare (Novignon et al. 2012: 2). Hence, an increase in subsidies on healthcare could improve the children's health status; thus, reducing the poverty rate in poor societies. Similarly, a study using OECD countries panel data conducted by Fournier and Johansson (2016: 35-36) find that raising the size of subsidies and secondary education expenditures may lower income inequality.

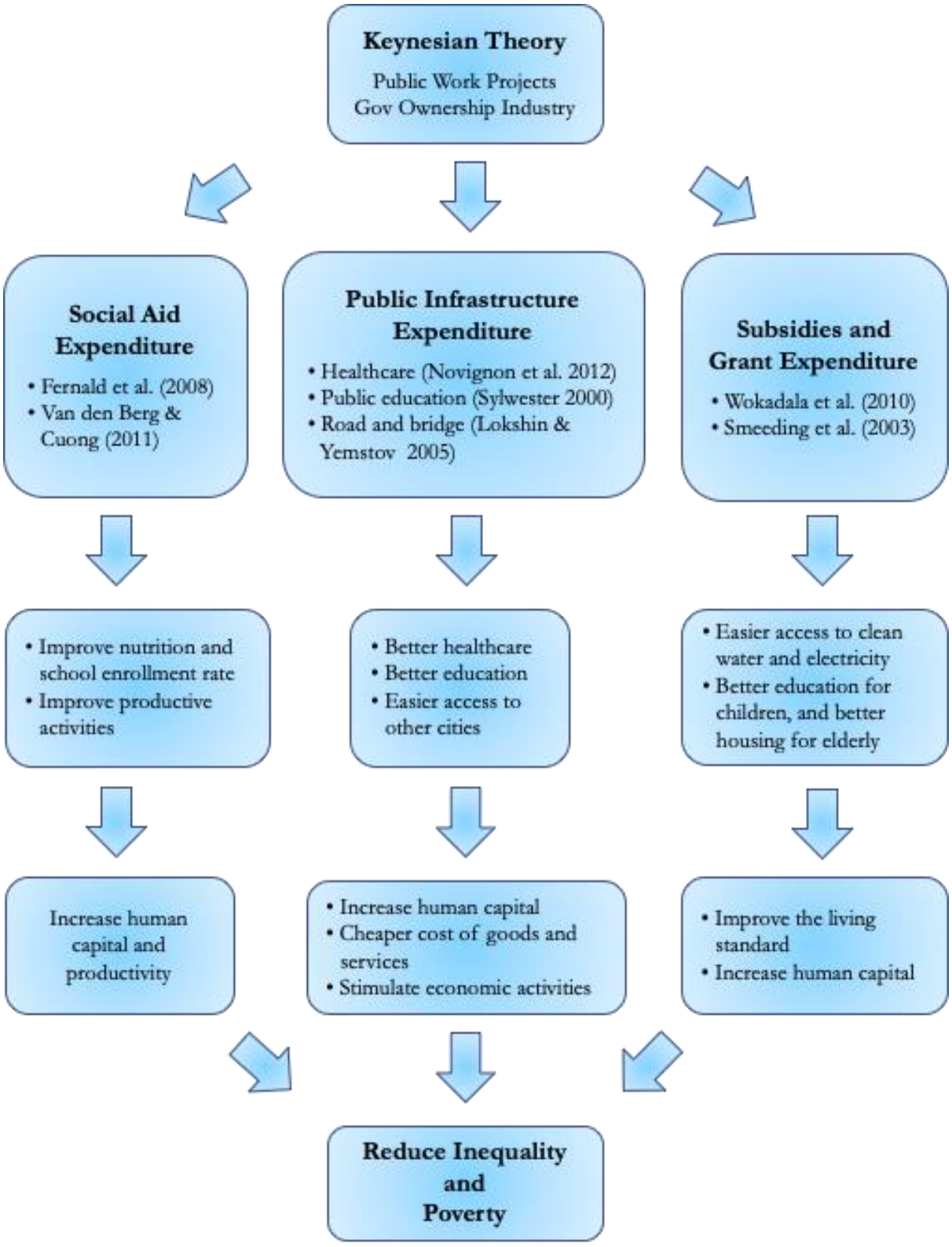
In contrast, a study conducted by Permadi (2018) shows different results. Permadi (2018: 231) finds that public expenditures such as subsidy and grant on education and health have not yet brought benefit for the low-income groups. However, these type of expenditures may increase human resource quality, which is an essential factor for future development.

Nevertheless, it requires reforming the fee structure for public service health to improve the effectiveness of poverty and inequality reduction programmes. Giving subsidies to public health facilities, indeed, could lower the medical fees; however, the extreme-poor people may still not afford it. Therefore, the programmes give more benefit to the middle or high-income groups than the low-income groups. By reforming these practices, the consumption of public health resources focusing on the extreme-poor people might be improved (Castro-Leal 1999: 30).

3.1.8 Summary of Theoretical Framework on Income Inequality and Poverty

Figure 6 summarizes the theoretical framework of the determinants of income inequality and poverty. It illustrates the Keynesian theory as a main theoretical concept and disaggregates the government's role into three types of government interventions: infrastructure, social aid, and subsidy-grant expenditure. Then, Figure 6 also summarizes the channels on how these government expenditures may affect the incidence of income inequality and poverty.

Figure 6
Summary of Theoretical Framework on Income Inequality and Poverty



3.2 Other Determinants of Inequality and Poverty

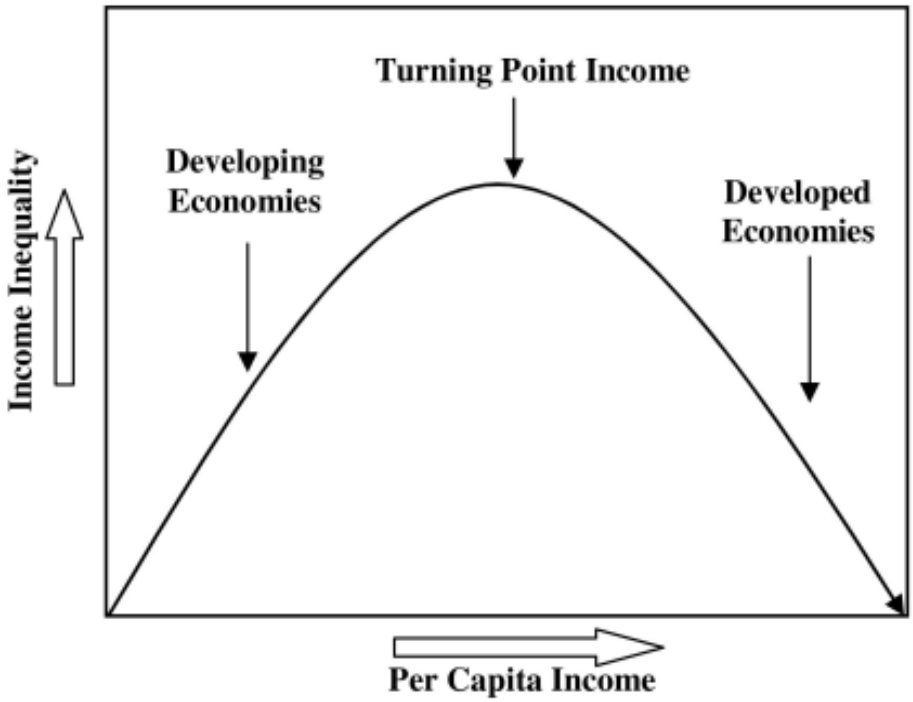
This section presents other factors that could influence the degree of income inequality and poverty in Indonesia. There are three control variables used as other determinants affecting inequality and poverty: economic growth, education, and the unemployment rate.

3.2.1 The Growth, Poverty, and Inequality Triangular Relationship

There have been many studies (Bourguignon 2004; Kakwani 1993; Kuznets 1955) that relate the economic growth with the incidence of income inequality and poverty. Economic growth is the percentage change in average income or expenditure level of the households. Meanwhile, even though poverty and inequality are closely related, they have a different concept. Poverty is an absolute concept because it is measured by using the ratio of the population who live below a particular poverty line, for example $1.90 per day. Conversely, inequality is a relative concept which refers to "disparities in relative income across the whole population, i.e., disparities in income after normalizing all observations by the population mean so as to make them independent of the scale of incomes" (Bourguignon 2004: 4).

One of the earliest studies regarding the relationship between economic growth and inequality was pioneered by Kuznets (1955), who described that there is an inverted U-shaped relationship between economic growth and income inequality (as shown in Figure 7).

Figure 7
The Kuznets Curve Figure



Source: Simon Kuznets (1955)

Figure 7 illustrates that inequality would rise in the beginning stages of growth and development then declines in advanced economies. The inverted U-shaped demonstrates the process of an economy that undergoes industrialization. In the early stage of development, economic activity centres start to shift from agricultural in rural areas to industrial in urban areas.

It causes labour migration from rural to the cities looking for a higher-paying job. As a result, firm owners' profit would increase as well as the workers' but at a slower rate, while the income of the farmers decrease. Eventually, it increases the inequality gap between rural and urban people. However, inequality is expected to decrease once economies reach the industrialization, allowing rapid growth and increase in income per capita as overall.

In addition to the stage of development as explained by the Kuznets curve, the effect of economic growth on inequality also depends on which class of societies that are benefited the most from the growth. If the growth benefits the top-level income groups exclusively, then inequality will rise. In contrast, if the growth relaxes the financial constraints of the poor households, then inequality will decrease.

Concerning the degree of poverty, it depends upon two factors. First is **the growth effect**. A positive economic growth reduces poverty when income inequality does not change, which means everyone gets an equal proportional from growth advantages (Kakwani 1993: 121-122). However, growth is always accompanied by the change in the distribution of income. According to Kakwani et al. (2003: 8), the growth is pro-poor (anti-poor) if the change in inequality that accompanies growth reduces (increases) the total poverty. This second factor is known as **the inequality effect**.

Based on the literature above, the effect of economic growth on income inequality and poverty could be positive or negative depending on whether the growth is pro-poor growth or not. However, regarding the case of Indonesia, even though economic growth is potential to reduce the poverty rate in Indonesia, the growth seems like more beneficial for households at the top expenditure distribution (De Silva and Sumarto 2014: 239). Moreover, considering Kuznets' theory and the state of Indonesia, which is still in the early stages of development, the following hypothesis is then formulated:

"The higher the economic growth, the higher the level of income inequality and the lower the poverty rate."

3.2.2 Empirical Evidence on Economic Growth (Control Variable)

With regard to the effect of economic growth on inequality, the evidence is still inconclusive. Using data from OECD countries, Hermansen et al. (2016: 34-35) state that the link between economic growth and income inequality could be positive or negative depending on the sources of growth. If the growth comes from employment growth, then it benefits mostly low-income households and has an equalising effect. In contrast, if the growth is derived from labour productivity, it is likely to have an impact on rising income inequality.

Another research using the US data from 1953 to 2008 concludes that economic growth is more beneficial for the upper-part income distribution because their wealth and labour income are more sensitive to growth than lower-part income distribution's (Rubin and Segal 2015: 272). Similarly, Scully (2003: 308-309) finds that every time economic growth increases one point, it will lead to a rise in the Gini coefficient by 0.075 percentage points.

Regarding poverty, Chen and Wang (2001: 14-15) suggest that high economic growth plays a significant part in reducing poverty in China. In line with Chen and Wang's findings, Glewwe et al. (2004: 39) conclude that an annual average of 8% economic growth in Vietnam during the 1990s has reduced the poverty rate dramatically from 58% in 1993 to 37% in 1998.

3.2.3 Theoretical Framework on Education (Control Variable)

There have been numerous studies to investigate the effect of education on income inequality and poverty. The majority of prior research suggests that education is negatively related with poverty incidence and income inequality (Awan et al. 2011; Fields 1980; Schultz 1963). Without adequate

education, the opportunity of getting a decent job is limited. As a result, people with low-level of education are likely associated with low income.

By increasing the level of education, especially for low-income households, it opens a new opportunity for the children of the poor to improve their human capital and find a more decent job; thus, raising their level of income in the future. Besides, it is worth to note that not only education could reduce poverty and inequality, but also certain types of government expenditure have a significant impact on supporting education (as already discussed in 3.1.2). Therefore, support from government is essential to increase the level of education in society, and it eventually leads to inequality and poverty reduction. Drawing from these theories, the following hypothesis is conveyed:

"The higher the level of education (years of schooling), the lower the level of income inequality and poverty."

3.2.4 Empirical Evidence on Education (Control Variable)

One of the earliest studies regarding education and inequality was presented by Schultz (1963: 65) who stated that "…these changes in the investment in human capital are a basic factor reducing the inequality in the personal distribution of income". However, a change in human capital does not decrease income inequality directly since unequal income is not only because of human capital but also conventional physical capital. Therefore, in order to reduce income inequality, human capital (education) needs to increase more rapidly than the physical capital (Schultz 1963: 65).

Furthermore, unlike most studies that focus on literacy and primary education to reduce poverty, Tilak (2006: 443) argues that secondary and higher education are found to be important as well in poverty alleviation.

3.2.5 Theoretical Framework on the Unemployment Rate (Control Variable)

Another factor that has been theorized to be correlated with the incidence of income inequality and poverty is the unemployment rate (Martinez et al. 2001: 418). They stated that "unemployment tends to affect the less skilled and low-paid more than other groups. These segments are the first to be forced out of the labour market in times of economic crisis". Since lower-income households are the ones who suffer the most from unemployment; therefore, an increase in the unemployment rate is likely to have an impact on raising the level of poverty and income inequality. This leads to the following hypothesis:

"The higher the unemployment rate, the higher the level of income inequality and poverty."

3.2.6 Empirical Evidence on the Unemployment Rate (Control Variable)

One of empirical evidence regarding the effect of the unemployment rate on poverty is presented by Akinbobola and Saibu (2004: 181). The quarterly data from 1986 to 2000 is examined by using a vector autoregression (VAR) system, and the results suggest that a decrease in the unemployment rate improves the living standard of Nigerians. Since there is an increase in the standard of living, people are able to fulfil their basic needs, including health and education. Therefore, it increases human development and eventually leads to poverty alleviation. Similarly, a study by Xue and Zhong (2003: 404) stated that unemployment is the cause of the increase in urban poverty and income inequality in China. Therefore, creating more jobs are probably one of the solutions to reduce poverty and inequality problems.

Chapter 4
Methodology

The present chapter corresponds to the methodology and the identification strategy to address the research questions. It includes a description of the data, summary statistics, econometric model, and a description of each variable used in the model.

4.1 Data Description

4.1.1 Data Sources

This paper uses a panel data set of 33 provinces in Indonesia from 2005 to 2017 (Indonesia has 34 provinces, but this paper excludes North Kalimantan because the province was newly formed in 2012). Panel data is used in this research due to three reasons; first, panel data gives more data variation and more degree of freedom; second, it allows the study of more complicated behaviour; and third, panel data simplifies statistical inference and computation because it provides more data from both cross-section and time-series (Hsiao 2005: 145-148).

The data used for this study are secondary data from several sources. Gross Regional Product and government expenditure are acquired from Gross Regional Domestic Product of Province in Indonesia by Expenditure (2019) and Financial Statistics of Province Governance (2019), respectively. Meanwhile, data for Gini index, poverty rate, unemployment rate, and years of education are obtained from the Statistics Bureau of Indonesia (2019). Regarding the total population in each province, the data are acquired from the World Bank Data (2019).

4.1.2 Descriptive Statistics

The summary statistics for each variable are presented in Table 1. There is a general presumption that even though income per capita in urban areas are higher than in rural areas, the gap between the rich and the poor are usually larger in urban than rural areas. The statistics in Table 1 has confirmed this presumption. Based on the table, it can be observed that inequality in urban society, on average, is higher than in rural areas. In contrast, the poverty rate in rural areas is, on average, two times higher than in urban areas. It is worth to note that the number of observations between urban and rural areas could be different because some of the provinces, such as Special Capital Region of Jakarta, do not have rural areas in its region.

Regarding government expenditure, this paper uses three proxies to measure each type of government expenditure. The first proxy uses government expenditure per capita. The data for this proxy are obtained by dividing the amount of government expenditure with the total population in the province. The second proxy takes government expenditure variable using its growth or the percentage change of government expenditure in the current year compared to the previous year. Finally, the last proxy uses government expenditure as a percentage of Gross Regional Product.

Table 1
Descriptive Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
Gini Index:					
Gini Index Total	394	24.84	28.45	16.39	35.14
Gini Index Urban	394	25.10	3.24	14.51	31.81
Gini Index Rural	382	21.31	2.89	12.08	37.92
Poverty Rate:					
Poverty Rate Total (%)	396	13.67	7.62	3.48	40.83
Poverty Rate Urban (%)	363	8.87	4.91	2.66	30.44
Poverty Rate Rural (%)	352	16.18	9.15	4.48	50.47
Infrastructure:					
Per capita (thousand Rupiahs)	395	222.08	254.03	6.82	1930.21
As % of change (growth)	394	17.51	42.86	-72.22	274.08
As % of GRP	396	0.690	0.59	0.043	3.73
Social Aid:					
Per capita (thousand Rupiahs)	359	25.99	47.83	0.0241	310.742
As % of change (growth)	352	131.36	1019.81	-99.43	15337.1
As % of GRP	358	0.086	0.13	0.00007	0.88
Subsidy & Grant:					
Per capita (thousand Rupiahs)	369	121.75	129.39	0.0541	1003.79
As % of change (growth)	348	568.73	3830.43	-94.86	64096
As % of GRP	369	0.41	0.47	0.00024	2.46
Total Expenditure:					
Per capita (thousand Rupiahs)	396	358.681	363.54	13.49	2650.35
As % of change (growth)	394	21.9	45.3	-60.5	314.7
As % of GRP	396	1.15	0.91	0.105	5.08
Years of Education	393	11.63	1.01	8.73	14.69
Unemployment Rate (%)	393	6.44	2.89	1.38	15.93
GRP per capita (mil Rupiahs)	396	34.69	30.92	2.96	168.92

Source: Author's Calculation

The dispersion of government spending between regions and years is quite large. For example, the smallest infrastructure expenditure was only 6,824 Rupiahs per capita for North Sulawesi in 2005, while West Papua had the largest infrastructure expenditure of 1,930,211 Rupiahs per capita in 2015. This large dispersion is likely to happen because there are specific government policies to promote certain underdeveloped regions in particular years. Consequently, it could affect the coefficients in the regression results. Therefore, this paper will use the time effects to eliminate those problems.

With regard to the level of education and GRP per capita, Table 1 shows that people, on average, have almost 12 years of education with earnings of approximately 35 million Rupiahs per year. In addition, Banten suffered the highest unemployment rate of 16% in 2008, while Bali had the lowest unemployment rate in 2017.

4.1.3 Correlation Table

In statistics, it is essential to ensure that there is no collinearity problem between variables in the regression, so that a stable and precise coefficient estimate can be obtained. Table 2 presents the correlation between each variable that will be used in the analysis. The coefficient of correlation can vary from -1 (a perfect negative correlation) to +1 (a perfect positive correlation), and a value of 0 (zero), which shows no correlation at all. Using Evans (1996) categorisation[4] as a guideline to determine the strength of correlation among variables, Table 2 indicates that there are strong correlations between few variables (the ones in red). These strong correlations are due to two factors. Firstly, the value of Gini total consists of the value of Gini urban and Gini rural; thus, these variables are highly correlated with each other, as well as poverty rural and poverty total. Secondly, infrastructure and subsidy-grant expenditure have a strong correlation with total expenditure because these variables hold a large share of total government expenditure. However, all variables that have a strong correlation will not be used in the same regression; therefore, it will not affect the results of the estimation. Finally, the rest of the covariates do not show any correlation that might influence the results.

Additionally, it can be observed from Table 2 that there is a negative correlation between social aid and subsidy-grant expenditure. It indicates that if the government increases the amount of social aid expenditure fund, it will cause a decrease in subsidy and grant expenditure.

[4] Very week: 0.00-0.19; weak: 0.20-0.39; moderate: 0.40-0.59; strong: 0.60-0.79; and very strong: 0.80-1.00

Table 2
Correlation Table

	Gini Total	Gini Urban	Gini Rural	Pov Total	Pov Urban	Pov Rural	Infrastructure	Social Aid	Subsidy & Grant	Total Exp	Educ	Unemployment	GRP per Capita
Gini Total	1.000												
Gini Urban	0.750	1.000											
Gini Rural	0.747	0.388	1.000										
Pov Total	0.095	-0.218	0.282	1.000									
Pov Urban	-0.154	0.062	-0.089	0.436	1.000								
Pov Rural	0.273	-0.158	0.395	0.968	0.212	1.000							
Infrastructure	0.038	-0.084	-0.175	-0.009	-0.349	0.165	1.000						
Social Aid	-0.136	-0.386	-0.052	0.267	0.031	0.310	0.268	1.000					
Subsidy&Grant	0.278	0.329	0.263	-0.187	-0.300	-0.089	0.525	-0.207	1.000				
Total Exp	0.155	0.063	0.241	-0.037	-0.368	0.128	0.931	0.157	0.735	1.000			
Education	0.194	0.359	0.087	-0.257	-0.038	-0.189	0.270	-0.197	0.551	0.405	1.000		
Unemployment	-0.181	-0.282	-0.365	-0.014	-0.040	0.042	-0.169	0.162	-0.358	-0.284	-0.172	1.000	
GRP per Capita	0.097	0.017	0.011	-0.274	-0.333	-0.132	0.605	0.155	0.394	0.626	0.156	0.090	1.000

Source: Author's elaboration

4.2 Variables

4.2.1 Dependent Variables

There are two dependent variables in this paper, income inequality and poverty rate. Both of the variables are obtained from the Statistics Bureau of Indonesia (2019) and divided into three categories based on the location: total, rural, and urban areas.

Table 3
Description of Dependent Variables

Variable	Code	Description
Income inequality	Ineq	The Gini coefficient is used as a proxy for income inequality in this research. It is measured based on the Lorenz curve, which describes the cumulative share of total income against the cumulative percentage of the total population. It has a value between 0 and 100. A Gini coefficient of zero represents perfect equality, which means everyone has the same income or wealth. In contrast, a Gini coefficient of 100 expresses maximum inequality, where one person has all the income. Therefore, the higher the Gini coefficient, the higher the degree of income inequality.
Poverty rate	Pov	The proxy used for this variable is the ratio of people who are living under the poverty line to the total population. To define the poverty line, the Statistics Bureau of Indonesia uses a basic needs approach utilizing data from the National Social Economy Survey. Based on this approach, poverty is defined as economically disability to fulfil basic needs (food and non-food) measured based on expenditure. Poverty Line (PL) is the sum of Food Poverty Line (FPL) and Non-food Poverty Line (NPL). FPL is the total expenditure of basic food commodities that are consumed by the reference population, which is equated with 2100 kilocalories per capita per day. Meanwhile, NPL is the sum of the minimum needs of selected non-food commodities, which include housing, clothing, education and health. People who have per capita income below PL are categorized as poor people. According to the Statistics Bureau of Indonesia (2019), the poverty line in Indonesia is 13,374 Rupiahs a day (a little less than US$1 a day).

4.2.2 Independent Variables

Infrastructure, social aid, subsidy and grant, and the total expenditure are the main independent variables in this research. The data for all those variables are obtained from Financial Statistics of Province Governance (2019), using the percentage of change (growth) or weighted by population (in logarithm form) or weighted by GRP (in logarithm form).

Table 4
Description of Independent Variables

Variable Name	Code	Description	Expected Sign
Infrastructure expenditure	Log_Infra	Infrastructure expenditure is expenses used for purchasing/procurement of a tangible fixed asset that includes medical equipment, school practice tools, water installations, construction of roads and bridges.	Negative
Social aid expenditure	Log_Social	Social aid expenditure is expenses that are budgeted to provide assistance to civil society organizations, political parties, individuals or families to improve the welfare of the community.	Negative
Subsidy and grant expenditures	Log_SubGra	Subsidy and grant expenditure is expenses that have been budgeted and used to support the cost of production to a specific company/organization so that the selling price of the goods/services produced can be affordable. The intended company/agency must be providing products or services for public/society needs.	Negative
Total expenditure	Log_TE	Total expenditure is the summation of infrastructure, social aid, subsidy and grant expenditure.	Negative

4.2.3 Control Variables

There are three control variables in this paper: education, unemployment rate, and Gross Regional Product per capita. The data sources of all control variables are obtained from the Statistics Bureau of Indonesia (2019).

Table 5
Description of Control Variables

Variable Name	Code	Description	Expected Sign
Education	Educ	Variable education is represented by the number of years of education completed in a formal programme provided by primary, secondary, and tertiary education.	Negative
Unemployment rate	Unemp	The unemployment rate is defined as the percentage of unemployed workers in the total labour force.	Positive
Gross Regional Product per capita (in logarithm form)	Log_GRP	Gross Regional Product per capita is a monetary measure of all final goods and services produced in a province of Indonesia divided by the total population in a year. This paper uses GRP with constant prices[5].	Positive (for inequality) and negative (for poverty)

[5] This paper uses GRP with constant prices because it is already adjusted with inflation effect, so it is a better measurement for the actual change in output compared to GRP with current prices.

Time effects	i.year	Time effects is a variable to control for time-specific fixed effects such as economic shocks or specific government policies that are not controlled by other independent variables.	-

4.3 Econometric Model

A set of equations using a panel data approach is used to examine the effect of government expenditure on income inequality and poverty in Indonesia. Panel data is used in this paper because it combines both time series and cross-section data; thus, it increases the number of observation and gives more degree of freedom (Hsiao 2005: 145-148).

The regression models in this paper are not only divided into four groups based on the types of government spending as the main independent variables, but also each regression models are divided into three categories (total, rural, and urban):

1. The effect of infrastructure expenditure on income inequality and poverty

$$Ineq_{it} = \alpha + \beta 1\, Log\_Infra_{it} + \beta 2\, Educ_{it} + \beta 3\, Unemp_{it} + \beta 4\, LogGRP_{it} + \beta 5\, i.year + \varepsilon_{it}$$
$$Pov_{it} = \alpha + \beta 1\, Log\_Infra_{it} + \beta 2\, Educ_{it} + \beta 3\, Unemp_{it} + \beta 4\, LogGRP_{it} + \beta 5\, Ineq_{it} + \beta 6\, i.year + \varepsilon_{it}$$

2. The effect of social aid expenditure on income inequality and poverty

$$Ineq_{it} = \alpha + \beta 1\, Log\_Social_{it} + \beta 2\, Educ_{it} + \beta 3\, Unemp_{it} + \beta 4\, LogGRP_{it} + \beta 5\, i.year + \varepsilon_{it}$$
$$Pov_{it} = \alpha + \beta 1\, Log\_Social_{it} + \beta 2\, Educ_{it} + \beta 3\, Unemp_{it} + \beta 4\, LogGRP_{it} + \beta 5\, Ineq_{it} + \beta 6\, i.year + \varepsilon_{it}$$

3. The effect of subsidy and grant expenditure on income inequality and poverty

$$Ineq_{it} = \alpha + \beta 1\, Log\_SubGra_{it} + \beta 2\, Educ_{it} + \beta 3\, Unemp_{it} + \beta 4\, LogGRP_{it} + \beta 5\, i.year + \varepsilon_{it}$$
$$Pov_{it} = \alpha + \beta 1\, Log\_SubGra_{it} + \beta 2\, Educ_{it} + \beta 3\, Unemp_{it} + \beta 4\, LogGRP_{it} + \beta 5\, Ineq_{it} + \beta 6\, i.year + \varepsilon_{it}$$

4. The effect of total expenditure on income inequality and poverty

$$Ineq_{it} = \alpha + \beta 1\, Log\_TE_{it} + \beta 2\, Educ_{it} + \beta 3\, Unemp_{it} + \beta 4\, LogGRP_{it} + \beta 5\, i.year + \varepsilon_{it}$$
$$Pov_{it} = \alpha + \beta 1\, Log\_TE_{it} + \beta 2\, Educ_{it} + \beta 3\, Unemp_{it} + \beta 4\, LogGRP_{it} + \beta 5\, Ineq_{it} + \beta 6\, i.year + \varepsilon_{it}$$

To investigate the relationship between inequality and poverty with the independent variables, this paper will analyse the data using the Fixed Effect Model (FEM) and Random Effect Model (REM). The Hausman test will be used to select the best model among those two models. Moreover, since there is a possibility of the error correlation in the equations; thus, this paper also uses the Seemingly Unrelated Regression (SURE) system.

Chapter 5
Results

Chapter 5 presents the results of the regression analysis, whether using the Fixed Effect Model (FEM), Random Effect Model (REM), or Seemingly Unrelated Regression (SURE) system. This paper uses three proxies for each type of government expenditure to measure its impact on income inequality and poverty in Indonesia. The first proxy uses government expenditure per capita, which is government expenditure weighted by the total population in the province. The next proxy takes the government expenditure variable using its growth or the percentage change of government expenditure in the current year compared to the previous year. Finally, the last proxy uses government expenditure as a percentage of Gross Regional Product. However, this chapter only presents the results using government spending per capita because it is the most used proxy for government expenditure in the literature (Ogun 2010; Ospina 2010; Wokadala et al. 2010). Meanwhile, the government expenditure as a percentage of change (growth) and government expenditure as a percentage of Gross Regional Product will be presented in Appendix I-VIII and Appendix IX-XVI, respectively.

The structure of this chapter is divided into seven sections. The first section will describe the panel data model selection between FEM and REM using the Hausman test. The second section will present the regression results of the effect of infrastructure expenditure on income inequality and poverty in Indonesia. Next, the third section will show the role of social aid spending on reducing the inequality and poverty rate. Moreover, the empirical evidence regarding the effect of subsidy and grant expenditure will be explained in the fourth section. The fifth section will present the regression results of the total expenditure's impact on the incidence of income inequality and poverty. Then, the alternative results of the regression analysis using other government indicators will be shown in the sixth section. The last section will explain the synthesis of all regression results. All results will be presented in terms of income inequality and poverty in total, urban, and rural areas using the fixed effect, random effect, and SURE system.

5.1 Panel Data Model Selection

The Hausman test is used to determine which model is better between FEM or REM. It tests whether the unique errors are correlated with regressors. The hypothesis is as follow:
H_0 : The preferred model is the Random Effect Model (REM)
H_1 : The preferred model is the Fixed Effect Model (FEM)
If the p-value is insignificant ($p>0.05$), then it is safe to use the random effect model. If we get a significant p-value ($p<0.05$), however, we should use the fixed effect model.

The results of the Hausman test for each regression are presented in the following tables:

Table 6
Hausman Test for the Effect of Government Expenditure on Income Inequality

	Gini Total		Gini Urban		Gini Rural	
	P-value	Preferred Model	P-value	Preferred Model	P-value	Preferred Model
Infrastructure Expenditure	0.976	REM	0.566	REM	0.245	REM
Social Aid Expenditure	0.998	REM	0.513	REM	0.870	REM
Subsidy and grant Expenditure	0.999	REM	0.0005	FEM	0.716	REM
Total Expenditure	0.966	REM	0.365	REM	0.364	REM

Table 7
Hausman Test for the Effect of Government Expenditure on Poverty

	Poverty Total		Poverty Urban		Poverty Rural	
	P-value	Preferred Model	P-value	Preferred Model	P-value	Preferred Model
Infrastructure Expenditure	0.996	REM	0.965	REM	$chi^2<0$	-
Social Aid Expenditure	$chi^2<0$	-	0.997	REM	$chi^2<0$	-
Subsidy and grant Expenditure	$chi^2<0$	-	0.678	REM	$chi^2<0$	-
Total Expenditure	0.937	REM	0.978	REM	$chi^2<0$	-

Table 6 and 7 show a significant p-value by the Hausman test. It indicates that the coefficients estimated by the random effects and fixed effects model are not the same. The p-value is insignificant (larger than 0.05 or 5%) suggests that Random Effect Model (REM) is the preferred model, except for the effect of subsidy and grant expenditure on income inequality in urban areas, which will use Fixed Effect Model (FEM).

Regarding the regression models which fail to meet the asymptotic assumptions of the Hausman test ($chi^2<0$), this paper will use the non-statistical consideration by comparing the time series unit and cross-section unit (the number of individuals). It is said that if the number of individuals is larger than time series unit, then REM is preferable. On the contrary, if the time series unit is larger than the number of individuals, then FEM is better (Baltagi 1995; Nachrowi and Usman 2006). Since this paper uses data of 33 provinces in twelve years period, it means the number of individuals is larger than the time series unit. Therefore, REM is the preferred model for this case.

It is worth to note that even though the Hausman test suggests that random effect is the preferred model, this paper still reports the results of the fixed effect model and the Seemingly Unrelated Regression system for comparative reasons and to enable result robustness.

5.2 Infrastructure Expenditure

This section presents the empirical evidence of the impact of infrastructure expenditure on income inequality and poverty, both in urban and rural areas.

5.2.1 The Effect of Infrastructure Expenditure on Income Inequality

This sub-section presents the results of the effect of infrastructure expenditure (as a main independent variable), and control variables (education, unemployment, and GRP per capita) on the incidence of income inequality. Table 8 reports three sets of results; first, the results of the effect of independent variables on income inequality in total; second, it reports the empirical evidence regarding the impact of the regressors toward income distribution in urban areas; and third, it presents the regression results for income inequality in rural areas. All three sets of results are obtained by using three regression models: the random effect model in column (1), (4), and (5); the fixed effect model in column (2), (5), (8); and the SURE system in column (3), (6), and (9).

Based on Table 8, all three regression models suggest that infrastructure expenditure has a negative correlation with income inequality for the Gini total, the Gini urban, and the Gini rural, which means the more the government devotes fund to build infrastructure, the less gap between the rich and the poor. However, the results are only statistically significant at 5% level for Gini urban when using random effect, and Gini rural when using fixed effect. According to the random effect model, it is suggested that every time the government increases infrastructure expenditure by one per cent, the Gini index for urban areas will decrease by 0.0049 points on average. Similarly, the fixed effect model suggests that a one per cent increase in infrastructure spending reduces the Gini index in rural areas by 0.0054 points on average. These results confirm the findings of previous studies in the literature that infrastructure spending could decrease the incidence of income inequality (Ospina 2010; Sylwester 2002).

Table 8

Estimation Results for the Effect of Infrastructure Expenditure on Income Inequality

VARIABLES	Gini Total			Gini Urban			Gini Rural		
	REM	FEM	SURE	REM	FEM	SURE	REM	FEM	SURE
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Log Infrastructure	-0.182	-0.124	-0.124	-0.496**	-0.077	-0.089	-0.298	-0.536**	-0.024
	(0.214)	(0.234)	(0.219)	(0.240)	(0.297)	(0.249)	(0.237)	(0.265)	(0.221)
Education	0.613*	0.860**	0.860**	0.524*	0.464	-0.428	0.934***	1.870***	0.809*
	(0.314)	(0.381)	(0.357)	(0.319)	(0.483)	(0.456)	(0.343)	(0.445)	(0.414)
Unemployment	-0.226***	-0.285***	-0.285***	-0.124	-0.161	-0.137	-0.337***	-0.324***	-0.157
	(0.082)	(0.093)	(0.087)	(0.088)	(0.118)	(0.114)	(0.093)	(0.109)	(0.106)
Log_GRP per capita	0.893**	0.929**	0.929**	0.639	0.781	0.924*	0.935**	1.424***	0.607
	(0.386)	(0.452)	(0.423)	(0.406)	(0.572)	(0.474)	(0.424)	(0.506)	(0.417)
Constant	15.864***	13.458***	10.451**	16.709***	15.600***	26.280***	10.349***	-0.354	7.895
	(3.450)	(4.136)	(4.313)	(3.498)	(5.242)	(5.425)	(3.801)	(4.882)	94.968)
Observations	392	392	392	392	392	363	380	380	352
R-squared	0.4815	0.483	0.757	0.550	0.556	0.748	0.4012	0.411	0.743
Number of prov	33	33	33	33	33	33	32	32	32
Standard errors in parentheses									
*** p<0.01, ** p<0.05, * p<0.1									

With regard to control variables, education is shown to have a positive correlation with income inequality, which means an increase in years of schooling aggravates the gap in income distribution. All results are statistically significant, except for the Gini urban when using the fixed effect and the SURE model. The results may indicate that the increase in years of schooling mostly comes from tertiary education who are usually occupied by middle and top-income households. As a result, an increase in education only contributes to rising the welfare of middle and top-income households, while the welfare of low-income households remains the same. Eventually, it exacerbates the income gap in society.

Meanwhile, unemployment is found to have a significant negative relationship with income inequality for both the Gini total and the Gini rural, which means an increase in the unemployment rate will reduce the level of inequality. At first, this result seems to be unexpected; however, a decrease in inequality does not necessarily mean a good thing. According to Tambunan (2010: 157), when there is a shock in the economy, such as global crisis, "it hits first middle and high-income groups such as current employees in the financial/banking sector and large-scale industries". As a result, the unemployment rate rises in middle and high-income households, and decreases their income at the same time, while the income of poor households remains the same. Therefore, there is a decrease in income inequality when the unemployment rate rises. In contrast, the results suggest that the unemployment rate does not have an impact on inequality in urban areas.

Concerning GRP per capita, it is shown to be positively correlated with income inequality. All results are statistically significant, except for the Gini urban when using the fixed effect and random effect model, and the Gini rural when using the SURE model. Most of the results are aligned with previous studies, which said that inequality would rise in the beginning stage of development (Kuznets 1955).

5.2.2 The Effect of Infrastructure Expenditure on Poverty

The regression results of the impact of infrastructure expenditure on poverty are presented in Table 9. The empirical evidence suggests that infrastructure expenditure is negatively associated with the level of poverty in total, urban, and rural areas, which is in line with the hypothesis. All results are statistically significant, except for poverty total when using the random effect model. Moreover, it can be observed from Table 9 that the impact of infrastructure spending is more significant on income inequality in rural than urban areas. The fixed effect and SURE model suggest that a one per cent increase in infrastructure expenditure will reduce the poverty rate, on average, as much as 0.0048 percentage points in urban areas, and the results are 0.0017 percentage points higher for poverty in rural areas. Meanwhile, the random effect model indicates that an increase in infrastructure spending by one per cent leads to a decline in poverty rate as much as 0.0049 percentage points (in urban areas) and 0.0052 percentage points (in rural areas). These results are aligned with the prior studies that conclude an increase in infrastructure spending leads to a decline in the poverty rate (Lokshin and Yemtsov 2005; Ogun 2010; Wokadala et al. 2010).

When the paper estimates the impact of education on the level of poverty, the results find that education is negatively correlated with the poverty rate. However, the results are only significant for the poverty rate as overall. All three models suggest that every one year increase in schooling leads to a decrease in the total poverty rate by 1.6% on average. This result is in line with the hypothesis and previous research that education is one of the effective tools for poverty reduction (Awan et al. 2011; Fields 1980; Schultz 1963). Regarding the unemployment rate, the result is only significant for poverty in urban areas, and poverty in total when using the random effect model.

Furthermore, the empirical evidence shows that GRP per capita has positive and significant effects on the poverty rate, except in urban areas when using the random effect model. It means

that if GRP per capita increases, the poverty rate will go up as well. These findings suggest that the growth mostly benefits the high-income households (the growth is anti-poor). Meanwhile, the effect of inequality on poverty is only significant in urban areas. The results show that an increase in the Gini index by one point will raise the level of poverty by approximately one per cent.

Table 9
Estimation Results for the Effect of Infrastructure Expenditure on Poverty

VARIABLES	Poverty Total			Poverty Urban			Poverty Rural		
	REM	FEM	SURE	REM	FEM	SURE	REM	FEM	SURE
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Log Infrastructure	-0.298	-0.389*	-0.389*	-0.488**	-0.481**	-0.481***	-0.523**	-0.646***	-0.646***
	(0.215)	(0.214)	(0.200)	(0.189)	(0.192)	(0.179)	(0.250)	(0.245)	(0.228)
Education	-1.603***	-1.644***	-1.644***	-0.133	-0.327	-0.327	-0.724	-0.692	-0.692
	(0.348)	(0.351)	(0.329)	(0.336)	(0.353)	(0.329)	(0.460)	(0.460)	(0.428)
Unemployment	-0.143*	-0.127	-0.127	-0.317***	-0.298***	-0.298***	0.015	0.021	0.021
	(0.086)	(0.087)	(0.081)	(0.086)	(0.088)	(0.082)	(0.119)	(0.117)	(0.109)
Log GRP per capita	0.744*	0.983**	0.983**	0.531	0.669*	0.669*	0.987**	1.215***	1.215***
	(0.414)	(0.416)	(0.389)	(0.358)	(0.368)	(0.343)	(0.470)	(0.463)	(0.431)
Gini Total	-0.022	-0.032	-0.032	-	-	-	-	-	-
	(0.050)	(0.049)	(0.046)	-	-	-	-	-	-
Gini Urban	-	-	-	0.111***	0.103**	0.103***	-	-	-
	-	-	-	(0.040)	(0.041)	(0.038)	-	-	-
Gini Rural	-	-	-	-	-	-	-0.045	-0.072	-0.072
	-	-	-	-	-	-	(0.061)	(0.059)	(0.055)
Constant	35.852***	35.956***	44.915***	14.126***	15.813***	22.255***	28.683***	28.688***	36.119***
	(3976)	(3.844)	-3.972	(3.848)	(3.936)	(4.026)	-5.161	(4.987)	-5.133
Observations	392	392	392	363	363	363	352	352	352
R-squared	0.759	0.759	0.971	0.6464	0.6470	0.951	0.7124	0.713	0.978
Number of province	33	33	33	33	33	33	32	32	32
Standard errors in parentheses									
*** p<0.01, ** p<0.05, * p<0.1									

5.3 Social Aid Expenditure

The analysis of the effect of social aid expenditure on the incidence of income inequality and poverty in Indonesia will be presented in this section.

5.3.1 The Effect of Social Aid Expenditure on Income Inequality

Table 10 presents the empirical evidence of the impact of social aid expenditure on income inequality in total, urban, rural areas using the fixed effect, random effect, and SURE system. It can be observed from Table 10 that social aid spending is not an important determinant for income inequality in total and urban areas. The results are consistent with Habibov and Fan (2006: 222-

223), who found that social aid programmes have an insignificant effect on income inequality. In contrast, the evidence suggests that social aid expenditure positively affects income inequality in rural areas at a significance level of 5%, which means the more the government devotes fund in social spending, the worse income inequality in rural areas. This might be due to the targeting problem and failure of identifying which community is more vulnerable. The subsidy, grant, and social aid expenditure should give more benefit to low-income than middle or high-income groups. However, this is not always the case in Indonesia. For instance, US$ 22 billion (3% of GDP) was allocated for fuel subsidies in 2015 (Climate Scorecard 2018). If government spending goal is to reduce poverty and inequality, then these fuel subsidies expenditure is not effective because these subsidies give more benefit to the people who own cars, which are usually middle-high income households. According to Dartanto (2013: 118), 72% of total fuel subsidies in Indonesia is enjoyed by the top 30% income households.

Table 10
Estimation Results for the Effect of Social Aid Expenditure on Income Inequality

VARIABLES	Gini Total			Gini Urban			Gini Rural		
	REM	FEM	SURE	REM	FEM	SURE	REM	FEM	SURE
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Log Social Aid	0.086	0.101	0.101	-0.082	-0.007	0.052	0.175**	0.184**	0.162**
	(0.067)	(0.069)	(0.064)	(0.083)	(0.086)	(0.073)	(0.082)	(0.085)	(0.070)
Education	0.314	0.503	0.503	0.206	-0.144	-0.321	0.617*	1.411***	0.700*
	(0.333)	(0.413)	(0.384)	(0.334)	(0.520)	(0.477)	(0.363)	(0.480)	(0.425)
Unemployment	-0.166*	-0.231**	-0.231**	-0.056	-0.092	-0.163	-0.282***	-0.284**	-0.168
	(0.089)	(0.105)	(0.097)	(0.093)	(0.132)	(0.121)	(0.100)	(0.124)	(0.111)
Log GRP per capita	0.643*	0.893**	0.893**	0.044	0.779	0.884*	0.417	0.730	0.402
	(0.347)	(0.429)	(0.399)	(0.353)	(0.539)	(0.457)	(0.383)	(0.480)	(0.396)
Constant	18.563***	16.378***	13.237***	19.979***	21.719***	24.635***	13.313***	3.798	8.931*
	(3.661)	(4.471)	(4.614)	(3.673)	(5.628)	(5.722)	(4.025)	(5.258)	(5.141)
Observations	356	356	356	356	356	332	344	344	321
R-squared	0.462	0.465	0.759	0.522	0.528	0.742	0.371	0.379	0.740
Number of province	33	33	33	33	33	33	32	32	32
Standard errors in parentheses									
*** p<0.01, ** p<0.05, * p<0.1									

Similar to social aid spending, the results also show that education does not have a significant impact on income inequality in total and urban areas. However, education is found to be positively and significantly correlated with income inequality in rural areas. The empirical evidence suggests that one year increase in education leads to an increase in the Gini index in rural areas as much as 1.41 points at 1% significance level (the fixed effect model), 0.62 points at 10% significance level (the random effect model), and 0.70 points at 5% significance level (the SURE system).

With regard to the unemployment rate, it is found to have a negative and significant correlation with income inequality in total and rural areas. However, the unemployment rate has no correlation with income inequality in urban areas. In addition, GRP per capita seems to have a positive impact on increasing the gap between the rich and the poor. This result suggests that growth is not pro-poor growth.

5.3.2 The Effect of Social Aid Expenditure on Poverty

This sub-section presents empirical evidence regarding the effect of social aid expenditure on the incidence of poverty. Table 11 shows that social aid expenditure does not seem to have a correlation with the poverty rate. The result is only significant at 10% level in poverty for urban areas. It is suggested that one per cent increase in social aid expenditure per capita will increase the poverty rate in urban areas by 0.00095% on average, which is not practically significant because the coefficients are relatively too small. Therefore, it can be said that there is insignificant evidence of the effectiveness of social aid spending to reduce poverty in Indonesia. These results align with the previous studies who expressed that social aid spending has no correlation with the incidence of poverty (Habibov and Fan 2006; Van den Berg and Chuong 2011). One of the reasons why social aid expenditure has no significant impact on reducing the existing poverty in Indonesia is because the fund is relatively too small. According to the Statistics Bureau of Indonesia (2019), the average shares of social aid expenditure with respect to GRP are only 0.086%.

With regard to education, it is found to be negatively and significantly correlated with poverty in total and rural areas. However, the result is insignificant for poverty in urban areas. This suggests that an increase in years of schooling has a more significant impact on reducing the poverty rate in rural than urban areas. The evidence shows that every one year increase in schooling, on average, will lead to a decline in the poverty rate as much as 1.6% for poverty as overall and 1% for poverty in rural areas.

Furthermore, the unemployment rate is presented to be negatively and significantly associated with poverty in total and urban areas, while poverty in rural areas does not seem to be correlated with the level of unemployment. Regarding GRP per capita, it is suggested to have a positive relationship with poverty in total and rural areas; however, GRP per capita has no correlation with poverty in urban areas. Finally, the evidence shows that an increase in inequality leads to a rise in poverty in urban areas.

Table 11
Estimation Results for the Effect of Social Aid Expenditure on Poverty

VARIABLES	Poverty Total			Poverty Urban			Poverty Rural		
	REM	FEM	SURE	REM	FEM	SURE	REM	FEM	SURE
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Log Social Aid	0.080	0.071	0.071	0.095*	0.096*	0.096*	-0.004	-0.023	-0.023
	(0.063)	(0.062)	(0.058)	(0.054)	(0.055)	(0.050)	(0.081)	(0.077)	(0.071)
Education	-1.592***	-1.660***	-1.660***	-0.213	-0.373	-0.373	-1.008**	-1.019**	-1.019**
	(0.369)	(0.373)	(0.347)	(0.340)	(0.356)	(0.329)	(0.475)	(0.469)	(0.433)
Unemployment	-0.188**	-0.165*	-0.165*	-0.292***	-0.275***	-0.275***	0.083	0.113	0.113
	(0.094)	(0.095)	(0.088)	(0.087)	(0.090)	(0.083)	(0.125)	(0.122)	(0.113)
Log GRP per capita	0.877**	1.084***	1.084***	-0.092	0.052	0.052	1.028**	1.233***	1.233***
	(0.384)	(0.389)	(0.362)	(0.329)	(0.342)	(0.316)	(0.447)	(0.436)	(0.403)
Gini Total	-0.003	-0.014	-0.014	-	-	-	-	-	-
	(0.052)	(0.051)	(0.048)	-	-	-	-	-	-
Gini Urban	-	-	-	0.094**	0.086**	0.086**	-	-	-
	-	-	-	(0.040)	(0.041)	(0.038)	-	-	-
Gini Rural	-	-	-	-	-	-	-0.014	-0.047	-0.047
	-	-	-	-	-	-	(0.064)	(0.061)	(0.057)

Constant	33.891***	34.099***	42.637***	14.670***	15.998***	21.647***	28.165***	28.324***	35.194***
	(4.242)	(4.121)	(4.204)	(3.921)	(3.989)	(4.050)	(5.381)	(5.155)	(5.239)
Observations	356	356	356	332	332	332	321	321	321
R-squared	0.761	0.762	0.974	0.673	0.674	0.954	0.721	0.721	0.980
Number of province	33	33	33	33	33	33	32	32	32
Standard errors in parentheses									
*** p<0.01, ** p<0.05, * p<0.1									

5.4 Subsidy and Grant Expenditure

This section reports the regression result of the impact of subsidy and grant expenditure on income inequality and poverty using the fixed effect, random effect, and SURE system, both in urban and rural areas.

5.4.1 The Effect of Subsidy and Grant Expenditure on Income Inequality

This sub-section presents empirical evidence regarding the effect of subsidy and grant expenditure on the incidence of income inequality. Based on Table 12, it can be observed that subsidy and grant expenditure seems to have no significant impact on income inequality, both in urban and rural areas. The results are consistent whether using the fixed effect, random effect, or SURE model.

Table 12

Estimation Results for the Effect of Subsidy and Grant Expenditure on Income Inequality

VARIABLES	Gini Total			Gini Urban			Gini Rural		
	REM	FEM	SURE	REM	FEM	SURE	REM	FEM	SURE
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Log Subsidy and Grant	0.133	0.137	0.137	0.101	0.151	0.098	0.089	0.064	-0.138
	(0.090)	(0.091)	(0.085)	(0.114)	(0.115)	(0.103)	(0.101)	(0.101)	(0.089)
Education	0.246	0.403	0.403	0.124	-0.363	-0.640	0.741**	1.719***	0.724
	(0.346)	(0.434)	(0.405)	(0.355)	(0.547)	(0.514)	(0.371)	(0.499)	(0.460)
Unemployment	-0.133	-0.187*	-0.187*	-0.062	-0.065	-0.102	-0.207**	-0.167	-0.053
	(0.092)	(0.108)	(0.101)	(0.100)	(0.136)	(0.123)	(0.103)	(0.126)	(0.113)
Log GRP per capita	0.491	0.576	0.576*	0.008	0.476	0.665*	0.544	0.748*	0.693**
	(0.323)	(0.372)	(0.347)	(0.355)	(0.470)	(0.397)	(0.357)	(0.411)	(0.345)
Constant	19.557***	18.084***	15.081***	20.638***	24.443***	28.734***	11.439***	-0.147	7.512
	(3.758)	(4.619)	(4.751)	(3.888)	(5.825)	(5.990)	(4.072)	(5.360)	(5.413)
Observations	366	366	366	366	366	344	355	355	334
R-squared	0.452	0.454	0.767	0.530	0.533	0.753	0.347	0.356	0.758
Number of province	33	33	33	33	33	33	32	32	32
Standard errors in parentheses									
*** p<0.01, ** p<0.05, * p<0.1									

With regard to education, it is found to be not correlated with the level of income inequality, except for rural areas when using the fixed effect and random effect models. The evidence shows that education is positively associated with the incidence of income inequality; however, the coefficient is relatively small. It suggested that one year increase in schooling leads to an increase in income inequality in rural areas as much as 1.72 points (fixed effect) and 0.74 points (random effect).

Meanwhile, the unemployment rate only affects income inequality significantly and negatively for the Gini total when using the fixed effect and SURE models, and the Gini rural when using the random effect model. Furthermore, the effect of GRP per capita on income inequality is still ambiguous, depending on the regression models. When using the SURE model, the effect is positive and significant for all types of Gini index (total, urban, and rural). In contrast, the effect is insignificant when using the random effect model; while when using the fixed effect model, the evidence is only significant for income inequality in rural areas.

5.4.2 The Effect of Subsidy and Grant Expenditure on Poverty

The regression results of the impact of subsidy and grant expenditure on the poverty rate are presented in Table 13. The empirical evidence suggests that subsidy and grant expenditure are negatively associated with the level of poverty for both in urban and rural areas. However, none of these results is significant, which concurs with Permadi (2018: 231), who expressed that education and health subsidies have not yet benefited the poor in Indonesia. This is because the subsidy and grant spending fund are relatively too small to have a significant impact on reducing the level of income inequality and poverty in Indonesia. According to the Statistics Bureau of Indonesia (2019), the average shares of subsidy-grant expenditure with respect to GRP are only 0.41%.

With regard to education, it is shown to have a negative and significant correlation with poverty in total and rural areas. It means that the higher the years of schooling, the less poverty level in total and rural areas. All three models suggest that, on average, one year increase in years of schooling will reduce the poverty rate by 1.8% in total and 1.3% in rural areas. These results are consistent with the majority of prior research, which suggests that education is negatively related with poverty incidence (Awan et al. 2011; Fields 1980; Schultz 1963). However, the evidence shows that there is no impact of education on poverty in urban areas.

Furthermore, the evidence for the unemployment rate shows that it has a negative correlation with poverty in total and urban areas, but insignificant for poverty in rural areas. Regarding GRP per capita, it is found to have no impact on poverty incidence. Finally, Table 13 shows that income inequality is positively and significantly associated with poverty in urban areas. The result suggests that every one point increase in the Gini urban index rises the poverty rate in urban areas by approximately 0.12% on average. However, income inequality has no impact on poverty in total and rural areas.

Table 13
Estimation Results for the Effect of Subsidy and Grant Expenditure on Poverty

VARIABLES	Poverty Total			Poverty Urban			Poverty Rural		
	REM	FEM	SURE	REM	FEM	SURE	REM	FEM	SURE
	(2)	(1)	(3)	(5)	(4)	(6)	(8)	(7)	(9)
Log Subsidy and Grant	0.007	-0.001	-0.001	-0.045	-0.051	-0.051	-0.032	-0.052	-0.052
	(0.082)	(0.081)	(0.075)	(0.077)	(0.077)	(0.072)	(0.100)	(0.097)	(0.090)
Education	-1.727***	-1.803***	-1.803***	-0.068	-0.311	-0.311	-1.311***	-1.344***	-1.344***
	(0.379)	(0.386)	(0.359)	(0.364)	(0.386)	(0.359)	(0.495)	(0.499)	(0.462)
Unemployment	-0.185*	-0.164*	-0.164*	-0.271***	-0.247***	-0.247***	0.129	0.151	0.151
	(0.096)	(0.096)	(0.090)	(0.090)	(0.093)	(0.086)	(0.124)	(0.122)	(0.113)
Log GRP per capita	0.354	0.487	0.487	-0.129	0.023	0.023	0.404	0.519	0.519
	(0.330)	(0.332)	(0.309)	(0.291)	(0.299)	(0.278)	(0.383)	(0.375)	(0.348)
Gini Total	0.016	0.007	0.007	-	-	-	-	-	-
	(0.050)	(0.050)	(0.046)	-	-	-	-	-	-
Gini Urban	-	-	-	0.128***	0.119***	0.119***	-	-	-
	-	-	-	(0.040)	(0.040)	(0.038)	-	-	-
Gini Rural	-	-	-	-	-	-	-0.038	-0.068	-0.068
	-	-	-	-	-	-	(0.061)	(0.059)	(0.055)
Constant	36.813***	37.259***	46.026***	13.315***	15.558***	21.166***	33.582***	33.993***	41.108***
	(4.287)	(4.196)	(4.266)	(4.105)	(4.255)	(4.309)	(5.467)	(5.335)	(5.439)
Observations	366	366	366	344	344	344	334	334	334
R-squared	0.753	0.753	0.973	0.639	0.640	0.954	0.688	0.688	0.979
Number of province	33	33	33	33	33	33	32	32	32
Standard errors in parentheses									
*** p<0.01, ** p<0.05, * p<0.1									

5.5 Total Expenditure

This section corresponds to the empirical evidence regarding the impact of total expenditure on income distribution and poverty. It includes a description of the results for income inequality and poverty in total, urban, and rural areas.

5.5.1 The Effect of Total Expenditure on Income Inequality

The empirical evidence of the effect of total expenditure on income inequality will be explained in this sub-section. The total expenditure used in this regression is the summation of the four types of expenditures (infrastructure, social aid, subsidy and grant expenditure) that are theorized to be correlated with the income inequality incidence. Similar to the previous sub-section, this paper uses three regression models (the fixed effect, the random effect, and SURE model) to investigate the impact of total expenditure on income inequality. Moreover, the paper also separates the results between urban and rural areas.

Table 14
Estimation Results for the Effect of Total Expenditure on Income Inequality

VARIABLES	Gini Total			Gini Urban			Gini Rural		
	REM	FEM	SURE	REM	FEM	SURE	REM	FEM	SURE
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Log Total Expenditure	0.096	0.164	0.164	-0.633**	-0.129	-0.046	-0.013	-0.289	-0.221
	(0.254)	(0.274)	(0.257)	(0.287)	(0.347)	(0.287)	(0.283)	(0.312)	(0.254)
Education	0.579*	0.806**	0.806**	0.587*	0.495	-0.424	0.909***	1.920***	0.870**
	(0.319)	(0.388)	(0.364)	(0.317)	(0.492)	(0.463)	(0.347)	(0.455)	(0.419)
Unemployment	-0.218***	-0.281***	-0.281***	-0.130	-0.162	-0.135	-0.326***	-0.321***	-0.170
	(0.082)	(0.093)	(0.087)	(0.088)	(0.118)	(0.114)	(0.093)	(0.110)	(0.106)
Log GRP per capita	0.597	0.605	0.605	0.702*	0.827	0.868*	0.628	1.099**	0.813*
	(0.398)	(0.461)	(0.432)	(0.417)	(0.584)	(0.481)	(0.439)	(0.519)	(0.422)
Constant	15.903***	13.769***	10.484**	16.642***	15.386***	26.151***	10.304***	-0.839	7.822
	(3.461)	(4.164)	(4.314)	(3.444)	(5.276)	(5.416)	(3.802)	(4.930)	(4.954)
Observations	392	392	392	392	392	363	380	380	352
R-squared	0.482	0.483	0.757	0.550	0.556	0.748	0.395	0.405	0.744
Number of province	33	33	33	33	33	33	32	32	32
Standard errors in parentheses									
*** p<0.01, ** p<0.05, * p<0.1									

Table 14 presents the estimation results of the effect of total expenditure on income inequality. It can be observed from Table 14 that none of the total expenditure has a significant correlation with the incidence of income inequality, except for income inequality in urban areas when using the random effect model. According to the random effect model, total expenditure is negatively correlated with income inequality in urban areas with significance level at 5%. The empirical evidence shows that every time the government increases total expenditure by one per cent, the Gini index for urban areas will decrease by 0.0063 points on average. It is worth to note that even though the result is significant for Gini urban when using random effect, the coefficient is relatively too small. Therefore, it can be concluded that there is no evidence showing that total expenditure significantly affects income inequality. These results do not concur with the previous studies (Fournier and Johansson 2016; Lustig et al. 2014; Martinez-Vasquez et al. 2012) which show that government spending is negatively correlated with income inequality.

With regard to control variables, all three regression models show that education has a positive and significant correlation with Gini total and Gini rural. However, it is only significant for Gini urban when using the random effect model. In contrast, the unemployment rate is shown to be negatively and significantly correlated with Gini total and Gini rural; while Gini urban seems to have no relationship with the unemployment rate. Furthermore, the evidence suggests that GRP per capita has a positive correlation with income inequality, but it is only significant for Gini urban (when using the random effect and SURE system), and Gini rural (when using the fixed effect and SURE model).

5.5.2 The Effect of Total Expenditure on Poverty

The regression results of the impact of total expenditure on poverty are presented in Table 15. The results find insignificant evidence of the effectiveness of total government expenditure to reduce poverty in total and rural areas, which contrasts with the hypothesis. However, the results show that total government spending is negatively associated with the poverty rate in urban areas at a significance level of 1%. Also, the results are consistent whether using the fixed effect, random effect, or SURE model. The results suggest that a one per cent increase in total expenditure leads to a poverty reduction in urban areas as much as 0.0073 percentage points on average. However, it is worth to note that even though the results are highly significant at 1%, the total expenditure has a little impact on reducing the poverty rate in urban areas because the coefficients are relatively too small.

With regard to control variables, it is found that education has a negative relationship with total poverty at a significance level of 1%. Also, education is negatively associated with the level of poverty in rural areas when using the random effect model with a significance level at only 10%. The evidence shows that one year increase in the level of schooling will reduce the total poverty as much as approximately 1.7%, and decrease the poverty rate in rural areas by 0.78% when using the random effect model. In contrast, education seems to have no significant impact on poverty in urban areas. In addition, unemployment seems to be only correlated with the poverty rate in urban areas, while for total poverty and rural poverty, it has an insignificant impact.

Both GRP per capita and the Gini index are only positively and significantly correlated with poverty in urban areas. Table 15 shows that one per cent increase in GRP per capita or one point increase in the Gini index will increase the poverty rate in urban areas by approximately 0.008% and 0.1%, respectively. These results suggest that the growth effect and inequality effect in Indonesia is not pro-poor growth.

Table 15
Estimation Results for the Effect of Total Expenditure on Poverty

VARIABLES	Poverty Total			Poverty Urban			Poverty Rural		
	REM	FEM	SURE	REM	FEM	SURE	REM	FEM	SURE
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Log Total Expenditure	0.207	0.095	0.095	-0.738***	-0.731***	-0.731***	-0.026	-0.198	-0.198
	(0.254)	(0.252)	(0.236)	(0.217)	(0.220)	(0.205)	(0.294)	(0.285)	(0.265)
Education	-1.674***	-1.698***	-1.698***	0.009	-0.170	-0.170	-0.780*	-0.708	-0.708
	(0.356)	(0.359)	(0.336)	(0.338)	(0.355)	(0.331)	(0.472)	(0.472)	(0.439)
Unemployment	-0.137	-0.122	-0.122	-0.335***	-0.317***	-0.317***	0.043	0.046	0.046
	(0.087)	(0.087)	(0.081)	(0.085)	(0.088)	(0.082)	(0.121)	(0.119)	(0.111)
Log GRP per capita	0.159	0.419	0.419	0.741**	0.876**	0.876**	0.388	0.663	0.663
	(0.424)	(0.425)	(0.398)	(0.360)	(0.370)	(0.345)	(0.487)	(0.475)	(0.442)
Gini Total	-0.020	-0.030	-0.030	-	-	-	-	-	-
	(0.050)	(0.050)	(0.046)	-	-	-	-	-	-
Gini Urban	-	-	-	0.111***	0.104**	0.104***	-	-	-
	-	-	-	(0.040)	(0.040)	(0.037)	-	-	-
Gini Rural	-	-	-	-	-	-	-0.039	-0.073	-0.073
	-	-	-	-	-	-	(0.062)	(0.060)	(0.056)
Constant	36.189***	36.165***	44.596***	13.425***	14.944***	21.447***	28.584***	28.428***	35.230***

	(4.005)	(3.890)	(3.992)	(3.826)	(3.914)	(3.988)	(5.217)	(5.048)	(5.178)
Observations	392	392	392	363	363	363	352	352	352
R-squared	0.757	0.757	0.971	0.652	0.652	0.952	0.706	0.707	0.977
Number of province	33	33	33	33	33	33	32	32	32
Standard errors in parentheses									
*** p<0.01, ** p<0.05, * p<0.1									

5.6 Alternative Government Expenditure Indicators

This sub-section presents the alternative results of the regression analysis using other government indicators. The results when using government expenditure as a percentage of GRP (the regression tables are presented in Appendix IX-XVI) are very similar to the results when using government expenditure per capita as an indicator. The results show that social aid, subsidy and grant expenditure have insignificant impacts on the incidence of income inequality and poverty. In contrast, infrastructure spending seems to be negatively correlated with poverty in urban areas (when using the random effect model only), and poverty in rural areas (when using the fixed effect model only). Moreover, infrastructure spending has a negative and significant impact on the poverty rate, and the impact is larger in rural than urban areas.

However, the results of the regression analysis are a bit different when using government expenditure as a percentage of change (growth). Based on the tables in Appendix I-VIII, it can be observed that infrastructure expenditure has no significant impact on income inequality and poverty, which contrasts the results when using government expenditure per capita or as a percentage of GRP. Similarly, subsidy and grant expenditure are also found to be not correlated with income inequality and poverty. In contrast, social aid spending seems to be negatively correlated with income inequality in urban areas and positively correlated with income inequality in rural areas. Both results are only statistically significant at the 10% level when using SURE model.

5.7 Synthesis

This sub-section explains the synthesis based on regression results and analysis in previous sub-sections. There are several key findings. First, the effect of infrastructure expenditure on income inequality is still ambiguous, depending on the methods. The random effect model suggests that infrastructure expenditure is negatively associated with income inequality in urban areas, while the fixed effect model shows that infrastructure spending significantly affects income inequality in rural areas. Both are statistically significant at the 5% level. However, the SURE system shows that none of the infrastructure expenditure has a significant impact on income inequality. Furthermore, the empirical evidence suggests that infrastructure expenditure is negatively associated with the level of poverty, and the impact is more significant on poverty in rural than urban areas.

Second, the results also find insignificant evidence of the effectiveness of social aid spending to reduce income inequality in total and urban areas. In contrast, the evidence shows that social aid expenditure is positively and significantly associated with income inequality incidence in rural areas at a significance level of 5%. It means that the greater the amount of social aid spending, the worse inequality in rural areas. This might be due to the targeting problem and failure of identifying which community is more vulnerable. Therefore, instead of reducing the constraint of the poorest community, it aggravates inequality.

In addition, the results from all three models suggest that social aid expenditure is also not an important determinant for poverty in total and rural areas. Nevertheless, the result is significant at the 10% level for poverty in urban areas. The evidence shows that one per cent increase in social aid expenditure per capita will increase the poverty rate in urban areas by only 0.00095%. Even though the result is statistically significant at the 10% level, it is not practically significant because the coefficients are relatively too small. Therefore, it can be concluded that social aid spending has no significant impact on the poverty rate.

Third, subsidy and grant expenditure are found to have no significant impact on income inequality and poverty incidence, both in urban and rural areas. The results are also consistent whether using the fixed effect, random effect, or SURE model. Lastly, the empirical evidence suggests that none of the total expenditure has a significant correlation with income inequality, except for income inequality in urban areas when using the random effect model. With regard to poverty, total expenditure is found to be negatively associated with the poverty rate in urban areas only.

Chapter 6
Conclusion and Recommendation

6.1 Conclusions

The research has focused on the effect of government expenditure on the incidence of income inequality and poverty in Indonesia. It has looked into the effect of infrastructure expenditure, social aid spending, subsidy and grant expenditure on income inequality and poverty in Indonesia. Also, it has examined the difference between the impact of government expenditure on income inequality and poverty in urban and rural areas.

Using the fixed effect, random effect, and Seemingly Unrelated Regression (SURE) system, this paper tries to answer four sub-questions and one main research question as follow:

First sub-question:

'What is the effect of infrastructure expenditure on income inequality and poverty in Indonesia?'

In answering this question, the empirical evidence in Table 8 finds that the effect of infrastructure expenditure on income inequality is still ambiguous, depending on the methods used to analyse the data. When using the SURE system, the evidence shows that none of the infrastructure expenditure has a significant impact on income inequality, whether in total, urban, or rural areas. However, the random effect model suggests that infrastructure expenditure is negatively associated with income inequality in urban areas, while the fixed effect model shows that infrastructure spending significantly affects income inequality in rural areas.

Furthermore, the empirical evidence in Table 9 suggests that infrastructure expenditure is negatively associated with the level of poverty, which is in line with the hypothesis and the prior studies that conclude an increase in infrastructure spending leads to a decline in the poverty rate (Lokshin and Yemtsov 2005; Ogun 2010; Wokadala et al. 2010). Moreover, the results show that the impact of infrastructure spending is more significant on poverty in rural than urban areas.

Second sub-question:

'What is the effect of social aid expenditure on income inequality and poverty in Indonesia?'

Based on Table 10 in section 5.3, the empirical evidence shows insignificant evidence of the effectiveness of social aid spending to reduce income inequality in total and urban areas. These results are consistent with Habibov and Fan (2006: 222-223) who found that social aid programmes do not give impact on income inequality. In contrast, the evidence shows that social aid expenditure is positively and significantly associated with income inequality incidence in rural areas at a significance level of 5%.

In addition, the results from all three models suggest that social aid expenditure is also not an important determinant for poverty, which is consistent with the previous studies (Habibov and Fan 2006; Van den Berg and Chuong 2011). However, the results do not concur with Moller et al. (2003: 44), who expressed that social aid spending contributed significantly to poverty alleviation.

Third sub-question:

'What is the effect of subsidy and grant expenditure on income inequality and poverty in Indonesia?'

In answering this question, the empirical evidence in section 5.4 finds that subsidy and grant expenditure seem to have no significant impacts on income inequality and poverty incidence, both in urban and rural areas. The results are also consistent whether using the fixed effect, random effect, or SURE model. Besides, these results support the prior study conducted by Permadi (2018: 231), who expressed that education and health subsidies have not yet benefited the poor in Indonesia. Conversely, the results do not concur with the Fournier and Johansson (2016: 35-36),

Novignon et al. (2012: 7), and Smeeding et al. (1993: 253-254) who found that subsidy and grant expenditure could reduce income inequality and poverty.

Fourth sub-question:

'What is the difference between the effect of government spending on income inequality and poverty in urban and rural areas?'

Based on the analysis in Chapter 5, it can be concluded that there is no significant difference between the impact of social aid, subsidies, and grant expenditure on income inequality and poverty in urban and rural areas. However, the impact of infrastructure expenditure on the incidence of poverty seems to be more significant in rural than urban areas.

In conclusion, this paper has been able to answer the **main research question**: '*What is the effect of government spending on income inequality and poverty in Indonesia?'*. Overall, by looking at the answers and findings of the sub-questions above, it can be concluded that social aid, subsidy and grant expenditure have an insignificant effect on reducing income inequality and poverty in Indonesia. However, the empirical evidence suggests that infrastructure spending has a negative correlation with income inequality in urban areas (when using the random effect model), and rural areas (when using the fixed effect model), both are statistically significant at the 5% level. In addition, infrastructure expenditure is also negatively and significantly correlated with poverty in Indonesia, and the impact is more significant in rural than urban areas.

There are two main reasons that could explain why some government expenditure did not succeed yet to reduce income inequality and poverty in Indonesia. First, according to the Statistics Bureau of Indonesia (2019), the average shares of infrastructure, social aid, and subsidy-grant expenditure with respect to GRP are only 0.69%, 0.086%, and 0.41%, respectively. These shares of government spending fund are relatively too small to have a significant impact on reducing the level of income inequality and poverty in Indonesia. Second, there is a targeting problem and identifying which community is more vulnerable. Subsidies, grant, and social aid expenditure should give more benefit to low-income than middle or high-income groups. However, this is not always the case in Indonesia. For instance, US$ 22 billion (3% of GDP) was allocated for fuel subsidies in 2015 (Climate Scorecard 2018). If government spending goal is to reduce poverty and inequality, then these fuel subsidies expenditure is not effective because these subsidies give more benefit to the people who own cars, which are usually middle-high income households. According to Dartanto (2013: 118), 72% of total fuel subsidies in Indonesia is enjoyed by the top 30% income households.

6.2 Policy Recommendation

As implied in the result and conclusion sections, the type of government expenditure that has significant impacts on reducing poverty and income inequality in Indonesia is infrastructure expenditure. It may suggest that policymakers need to focus on increasing the infrastructure expenditure to boost economic activities and improve the welfare of the people, especially the poor ones. Therefore, it would decrease the poverty rate and narrow the gap between low and high-income households. Moreover, the impact of infrastructure expenditure on the incidence of poverty seems to be more significant in rural than urban areas. This result could be important for policy recommendation because it could provide an insight for the government on where to spend the infrastructure expenditure funds.

6.3 Limitations and Future Research

Finally, in terms of the limitation of this paper, the main one is the lack of income inequality data. The only data available to measure income inequality in Indonesia at the regional level is the Gini

index. However, the earliest data of the Gini index is from 2005. Therefore, this research can only use data from 2005 to 2017 (twelve years). Another limitation of the analysis lies in the lack of corruption index as a control variable. According to Transparency International (2018), Indonesia's Corruption Perceptions Index (CPI) in 2018 is 38[6], which is quite low compared to the average world's score (43). It indicates that the level of corruption in Indonesia is still high, and it may distort government priorities and the effectiveness of government spending (IMFBlog 2019). However, this paper cannot include the corruption index into the analysis since data for the corruption index per province in Indonesia is still not available. This opens the opportunity for further research to include the corruption index into the analysis.

[6] The Corruption Perceptions Index has a value from 0 to 100, where 0 is highly corrupt, and 100 is very clean.

Appendices

Appendix I

Estimation Results for the Effect of Infrastructure Expenditure
(as Percentage of Change or Growth) on Income Inequality

VARIABLES	Gini Total			Gini Urban			Gini Rural		
	REM	FEM	SURE	REM	FEM	SURE	REM	FEM	SURE
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Infrastructure Exp Growth	0.003	-0.007	-0.007	0.004	-0.002	0.007	-0.171	-0.166	-0.054
	(0.187)	(0.186)	(0.174)	(0.236)	(0.235)	(0.190)	(0.213)	(0.210)	(0.169)
Education	0.574*	0.852**	0.852**	0.484	0.459	-0.437	0.895***	1.840***	0.809**
	(0.309)	(0.381)	(0.357)	(0.333)	(0.482)	(0.456)	(0.341)	(0.448)	(0.413)
Unemployment	-0.214***	-0.284***	-0.284***	-0.113	-0.160	-0.133	-0.328***	-0.319***	-0.159
	(0.081)	(0.093)	(0.087)	(0.091)	(0.118)	(0.114)	(0.092)	(0.110)	(0.105)
Log GRP per Capita	0.680**	0.780**	0.780**	0.189	0.689	0.819**	0.599*	0.776*	0.574*
	(0.303)	(0.357)	(0.334)	(0.337)	(0.452)	(0.371)	(0.340)	(0.400)	(0.326)
Constant	16.077***	13.484***	10.332**	16.387***	15.614***	26.158***	10.525***	-0.250	7.891
	(3.398)	(4.139)	(4.311)	(3.667)	(5.244)	(5.416)	(3.785)	(4.911)	(4.960)
Observations	392	392	392	392	392	363	380	380	352
R-squared	0.481	0.483	0.756	0.554	0.555	0.748	0.396	0.405	0.743
Number of province	33	33	33	33	33	33	32	32	32
Standard errors in parentheses									
*** p<0.01, ** p<0.05, * p<0.1									

Appendix II

Estimation Results for the Effect of Infrastructure Expenditure
(as Percentage of Change or Growth) on Poverty

VARIABLES	Poverty Total			Poverty Urban			Poverty Rural		
	REM	FEM	SURE	REM	FEM	SURE	REM	FEM	SURE
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Infrastructure Exp Growth	0.139	0.137	0.137	-0.146	-0.146	-0.146	0.129	0.125	0.125
	(0.172)	(0.170)	(0.159)	(0.149)	(0.148)	(0.138)	(0.195)	(0.189)	(0.176)
Education	-1.629***	-1.672***	-1.672***	-0.152	-0.363	-0.363	-0.792*	-0.774*	-0.774*
	(0.347)	(0.352)	(0.329)	(0.339)	(0.355)	(0.331)	(0.462)	(0.464)	(0.432)
Unemployment	-0.135	-0.120	-0.120	-0.301***	-0.283***	-0.283***	0.054	0.066	0.066
	(0.086)	(0.087)	(0.081)	(0.086)	(0.089)	(0.083)	(0.119)	(0.118)	(0.110)
Log GRP per Capita	0.414	0.532	0.532*	-0.066	0.084	0.084	0.384	0.463	0.463
	(0.327)	(0.330)	(0.309)	(0.283)	(0.291)	(0.271)	(0.371)	(0.366)	(0.340)
Gini Total	-0.021	-0.030	-0.030	-	-	-	-	-	-
	(0.050)	(0.050)	(0.046)	-	-	-	-	-	-
Gini Urban	-	-	-	0.115***	0.105**	0.105***	-	-	-
	-	-	-	(0.041)	(0.041)	(0.038)	-	-	-
Gini Rural	-	-	-	-	-	-	-0.043	-0.070	-0.070
	-	-	-	-	-	-	(0.061)	(0.060)	(0.055)
Constant	35.796***	35.907***	44.393***	13.804***	15.713***	21.589***	28.567***	28.576***	35.184***
	(3.987)	(3.860)	(3.983)	(3.873)	(3.969)	(4.051)	(5.193)	(5.041)	(5.179)
Observations	392	392	392	363	363	363	352	352	352
R-squared	0.757	0.757	0.971	0.640	0.641	0.951	0.707	0.707	0.977
Number of province	33	33	33	33	33	33	32	32	32
Standard errors in parentheses									
*** p<0.01, ** p<0.05, * p<0.1									

Appendix III

Estimation Results for the Effect of Social Aid Expenditure
(as Percentage of Change or Growth) on Income Inequality

VARIABLES	Gini Total			Gini Urban			Gini Rural		
	REM	FEM	SURE	REM	FEM	SURE	REM	FEM	SURE
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Social Aid Exp Growth	0.003	0.003	0.003	-0.004	-0.008	-0.026*	0.012	0.014	0.025*
	(0.008)	(0.008)	(0.008)	(0.010)	(0.010)	(0.014)	(0.010)	(0.010)	(0.015)
Education	0.316	0.496	0.496	0.108	-0.311	-0.466	0.741**	1.653***	0.797*
	(0.343)	(0.425)	(0.395)	(0.347)	(0.527)	(0.478)	(0.367)	(0.491)	(0.435)
Unemployment	-0.173*	-0.236**	-0.236**	-0.069	-0.102	-0.188	-0.264***	-0.252**	-0.119
	(0.091)	(0.108)	(0.100)	(0.097)	(0.133)	(0.122)	(0.102)	(0.126)	(0.114)
Log GRP per Capita	0.686*	0.930**	0.930**	-0.004	0.724	0.862*	0.511	0.832*	0.532
	(0.350)	(0.432)	(0.402)	(0.360)	(0.536)	(0.449)	(0.382)	(0.482)	(0.395)
Constant	18.639***	16.587***	13.731***	21.175***	23.839***	27.214***	11.803***	0,59375	7.582
	(3.757)	(4.587)	(4.710)	(3.822)	(5.689)	(5.694)	(4.070)	(5.365)	(5.237)
Observations	350	350	350	350	350	326	338	338	315
R-squared	0.457	0.459	0.755	0.528	0.528	0.749	0.370	0.379	0.740
Number of province	33	33	33	33	33	33	32	32	32
Standard errors in parentheses									
*** p<0.01, ** p<0.05, * p<0.1									

Appendix IV

Estimation Results for the Effect of Social Aid Expenditure
(as Percentage of Change or Growth) on Poverty

VARIABLES	Poverty Total			Poverty Urban			Poverty Rural		
	REM	FEM	SURE	REM	FEM	SURE	REM	FEM	SURE
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Social Aid Exp Growth	0.007	0.007	0.007	0.004	0.004	0.004	-0.004	-0.004	-0.004
	(0.008)	(0.008)	(0.007)	(0.011)	(0.011)	(0.010)	(0.017)	(0.016)	(0.015)
Education	-1.599***	-1.671***	-1.671***	-0.223	-0.392	-0.392	-1.000**	-1.010**	-1.010**
	(0.378)	(0.382)	(0.355)	(0.343)	(0.360)	(0.332)	(0.481)	(0.481)	(0.443)
Unemployment	-0.181*	-0.156	-0.156*	-0.264***	-0.244***	-0.244***	0.093	0.119	0.119
	(0.097)	(0.097)	(0.090)	(0.089)	(0.092)	(0.085)	(0.127)	(0.126)	(0.116)
Log GRP per Capita	0.908**	1.112***	1.112***	-0.018	0.126	0.126	1.063**	1.228***	1.228***
	(0.386)	(0.391)	(0.363)	(0.325)	(0.339)	(0.313)	(0.442)	(0.436)	(0.402)
Gini Total	0.000	-0.011	-0.011	-	-	-	-	-	-
	(0.052)	(0.052)	(0.048)	-	-	-	-	-	-
Gini Urban	-	-	-	0.113***	0.106**	0.106***	-	-	-
	-	-	-	(0.041)	(0.042)	(0.038)	-	-	-
Gini Rural	-	-	-	-	-	-	-0.025	-0.055	-0.055
	-	-	-	-	-	-	(0.064)	(0.062)	(0.057)
Constant	33.863***	34.166***	42.814***	14.086***	15.546***	21.386***	28.171***	28.446***	35.117***
	(4.322)	(4.205)	(4.272)	(3.975)	(4.049)	(4.087)	(5.432)	(5.247)	(5.329)
Observations	350	350	350	326	326	326	315	315	315
R-squared	0.755	0.756	0.974	0.661	0.662	0.955	0.710	0.711	0.980
Number of province	33	33	33	33	33	33	32	32	32
Standard errors in parentheses									
*** p<0.01, ** p<0.05, * p<0.1									

Appendix V

Estimation Results for the Effect of Subsidy and Grant Expenditure
(as Percentage of Change or Growth) on Income Inequality

VARIABLES	Gini Total			Gini Urban			Gini Rural		
	REM	FEM	SURE	REM	FEM	SURE	REM	FEM	SURE
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Subsidy and Grant Growth	0.000	0.000	0.000	-0.001	-0.001	-0.001	0.001	0.002	0.002
	(0.002)	(0.002)	(0.002)	(0.003)	(0.003)	(0.002)	(0.003)	(0.003)	(0.002)
Education	0.357	0.597	0.597	0.014	-0.519	-0.945	1.031***	2.244***	0.974*
	(0.362)	(0.461)	(0.428)	(0.392)	(0.582)	(0.577)	(0.399)	(0.537)	(0.516)
Unemployment	-0.099	-0.147	-0.147	-0.033	-0.006	-0.008	-0.187*	-0.158	-0.020
	(0.093)	(0.108)	(0.101)	(0.106)	(0.137)	(0.125)	(0.108)	(0.127)	(0.115)
Log GRP per Capita	0.492	0.544	0.544	0.058	0.482	0.606	0.595*	0.678*	0.385
	(0.312)	(0.359)	(0.333)	(0.358)	(0.453)	(0.379)	(0.352)	(0.400)	(0.329)
Constant	18.281***	15.945***	12.772***	21.799***	26.015***	31.196***	8.003*	-5.717	4.698
	(3.889)	(4.832)	(4.958)	(4.248)	(6.101)	(6.638)	(4.332)	(5.687)	(5.986)
Observations	346	346	346	346	346	325	336	336	316
R-squared	0.441	0.442	0.779	0.515	0.518	0.760	0.351	0.363	0.774
Number of province	33	33	33	33	33	33	32	32	32
Standard errors in parentheses									
*** p<0.01, ** p<0.05, * p<0.1									

Appendix VI

Estimation Results for the Effect of Subsidy and Grant Expenditure
(as Percentage of Change or Growth) on Poverty

VARIABLES	Poverty Total			Poverty Urban			Poverty Rural		
	REM	FEM	SURE	REM	FEM	SURE	REM	FEM	SURE
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Subsidy and Grant Growth	0.001	0.001	0.001	0.000	0.000	0.000	0.003	0.003	0.003
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Education	-1.954***	-2.034***	-2.034***	0.218	-0.031	-0.031	-1.882***	-1.960***	-1.960***
	(0.403)	(0.415)	(0.385)	(0.398)	(0.430)	(0.397)	(0.549)	(0.563)	(0.520)
Unemployment	-0.164*	-0.147	-0.147	-0.293***	-0.270***	-0.270***	0.183	0.203	0.203*
	(0.096)	(0.098)	(0.090)	(0.089)	(0.093)	(0.085)	(0.125)	(0.124)	(0.115)
Log GRP per Capita	0.386	0.481	0.481	-0.302	-0.176	-0.176	0.363	0.441	0.441
	(0.318)	(0.323)	(0.299)	(0.274)	(0.282)	(0.261)	(0.361)	(0.358)	(0.331)
Gini Total	0.026	0.018	0.018	-	-	-	-	-	-
	(0.052)	(0.052)	(0.048)	-	-	-	-	-	-
Gini Urban	-	-	-	0.127***	0.118***	0.118***	-	-	-
	-	-	-	(0.041)	(0.041)	(0.038)	-	-	-
Gini Rural	-	-	-	-	-	-	-0.028	-0.053	-0.053
	-	-	-	-	-	-	(0.062)	(0.061)	(0.056)
Constant	38.761***	39.384***	48.348***	11.045**	13.498***	18.632***	39.205***	40.097***	47.808***
	(4.486)	(4.415)	(4.485)	(4.407)	(4.661)	(4.700)	(5.952)	(5.914)	(6.002)
Observations	346	346	346	325	325	325	316	316	316
R-squared	0.746	0.746	0.973	0.641	0.642	0.958	0.671	0.671	0.979
Number of province	33	33	33	33	33	33	32	32	32
Standard errors in parentheses									
*** p<0.01, ** p<0.05, * p<0.1									

Appendix VII

Estimation Results for the Effect of Total Expenditure
(as Percentage of Change or Growth) on Income Inequality

VARIABLES	Gini Total			Gini Urban			Gini Rural		
	REM	FEM	SURE	REM	FEM	SURE	REM	FEM	SURE
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Total Exp Growth	-0.108	-0.123	-0.123	-0.148	-0.199	-0.194	-0.098	-0.091	-0.162
	(0.205)	(0.204)	(0.191)	(0.260)	(0.259)	(0.211)	(0.235)	(0.233)	(0.188)
Education	0.586*	0.849**	0.849**	0.485	0.454	-0.435	0.922***	1.840***	0.809**
	(0.312)	(0.381)	(0.356)	(0.328)	(0.482)	(0.455)	(0.344)	(0.448)	(0.413)
Unemployment	-0.218***	-0.285***	-0.285***	-0.111	-0.162	-0.138	-0.326***	-0.315***	-0.160
	(0.081)	(0.093)	(0.087)	(0.090)	(0.118)	(0.113)	(0.093)	(0.110)	(0.105)
Log GRP per Capita	0.685**	0.781**	0.781**	0.163	0.689	0.821**	0.618*	0.791**	0.580*
	(0.305)	(0.356)	(0.334)	(0.332)	(0.451)	(0.371)	(0.341)	(0.400)	(0.325)
Constant	15.995***	13.547***	10.407**	16.468***	15.722***	26.236***	10.162***	-0.340	7.929
	(3.425)	(4.137)	(4.309)	(3.612)	(5.239)	(5.410)	(3.818)	(4.913)	(4.955)
Observations	392	392	392	392	392	363	380	380	352
R-squared	0.482	0.483	0.757	0.554	0.556	0.749	0.396	0.404	0.744
Number of province	33	33	33	33	33	33	32	32	32
Standard errors in parentheses									
*** p<0.01, ** p<0.05, * p<0.1									

Appendix VIII

Estimation Results for the Effect of Total Expenditure
(as Percentage of Change or Growth) on Poverty

VARIABLES	Poverty Total			Poverty Urban			Poverty Rural		
	REM	FEM	SURE	REM	FEM	SURE	REM	FEM	SURE
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Total Exp Growth	0.129	0.123	0.123	0.071	0.062	0.062	0.088	0.081	0.081
	(0.189)	(0.188)	(0.176)	(0.165)	(0.165)	(0.153)	(0.215)	(0.210)	(0.196)
Education	-1.627***	-1.669***	-1.669***	-0.170	-0.373	-0.373	-0.785*	-0.768*	-0.768*
	(0.347)	(0.352)	(0.330)	(0.339)	(0.356)	(0.331)	(0.460)	(0.464)	(0.432)
Unemployment	-0.136	-0.122	-0.122	-0.293***	-0.275***	-0.275***	0.050	0.061	0.061
	(0.086)	(0.087)	(0.081)	(0.086)	(0.089)	(0.083)	(0.118)	(0.118)	(0.109)
Log GRP per Capita	0.405	0.519	0.519*	-0.049	0.096	0.096	0.380	0.451	0.451
	(0.326)	(0.330)	(0.308)	(0.283)	(0.291)	(0.271)	(0.369)	(0.365)	(0.340)
Gini Total	-0.020	-0.029	-0.029	-	-	-	-	-	-
	(0.050)	(0.050)	(0.046)	-	-	-	-	-	-
Gini Urban	-	-	-	0.115***	0.106**	0.106***	-	-	-
	-	-	-	(0.041)	(0.041)	(0.038)	-	-	-
Gini Rural	-	-	-	-	-	-	-0.045	-0.070	-0.070
	-	-	-	-	-	-	(0.061)	(0.060)	(0.056)
Constant	35.798***	35.907***	44.406***	13.832***	15.663***	21.511***	28.579***	28.587***	35.212***
	(3.990)	(3.862)	(3.985)	(3.881)	(3.975)	(4.058)	(5.189)	(5.044)	(5.181)
Observations	392	392	392	363	363	363	352	352	352
R-squared	0.757	0.757	0.971	0.640	0.640	0.950	0.706	0.706	0.977
Number of province	33	33	33	33	33	33	32	32	32
Standard errors in parentheses									
*** p<0.01, ** p<0.05, * p<0.1									

Appendix IX

Estimation Results for the Effect of Infrastructure Expenditure
(as Percentage of Gross Regional Product) on Income Inequality

VARIABLES	Gini Total			Gini Urban			Gini Rural		
	REM	FEM	SURE	REM	FEM	SURE	REM	FEM	SURE
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Log Infrastructure Expenditure	-0.182	-0.124	-0.124	-0.496**	-0.077	-0.089	-0.298	-0.536**	-0.024
	(0.214)	(0.234)	(0.219)	(0.240)	(0.297)	(0.249)	(0.237)	(0.265)	(0.221)
Education	0.613*	0.860**	0.860**	0.524*	0.464	-0.428	0.934***	1.870***	0.809*
	(0.314)	(0.381)	(0.357)	(0.319)	(0.483)	(0.456)	(0.343)	(0.445)	(0.414)
Unemployment	-0.226***	-0.285***	-0.285***	-0.124	-0.161	-0.137	-0.337***	-0.324***	-0.157
	(0.082)	(0.093)	(0.087)	(0.088)	(0.118)	(0.114)	(0.093)	(0.109)	(0.106)
Log GRP per Capita	0.711**	0.804**	0.804**	0.143	0.703	0.835**	0.637*	0.888**	0.583*
	(0.307)	(0.359)	(0.336)	(0.324)	(0.455)	(0.374)	(0.340)	(0.401)	(0.328)
Constant	14.608***	12.598***	9.592**	13.280***	15.066***	25.665***	8.294**	-4.057	7.731
	(3.743)	(4.456)	(4.498)	(3.831)	(5.646)	(5.589)	(4.103)	(5.207)	(5.111)
Observations	392	392	392	392	392	363	380	380	352
R-squared	0.482	0.483	0.757	0.550	0.556	0.748	0.401	0.441	0.743
Number of province	33	33	33	33	33	33	32	32	32
Standard errors in parentheses									
*** p<0.01, ** p<0.05, * p<0.1									

Appendix X

Estimation Results for the Effect of Infrastructure Expenditure
(as Percentage of Gross Regional Product) on Poverty

VARIABLES	Poverty Total			Poverty Urban			Poverty Rural		
	REM	FEM	SURE	REM	FEM	SURE	REM	FEM	SURE
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Log Infrastructure Expenditure	-0.298	-0.389*	-0.389*	-0.488**	-0.481**	-0.481***	-0.523**	-0.646***	-0.646***
	(0.215)	(0.214)	(0.200)	(0.189)	(0.192)	(0.179)	(0.250)	(0.245)	(0.228)
Education	-1.603***	-1.644***	-1.644***	-0.133	-0.327	-0.327	-0.724	-0.692	-0.692
	(0.348)	(0.351)	(0.329)	(0.336)	(0.353)	(0.329)	(0.460)	(0.460)	(0.428)
Unemployment	-0.143*	-0.127	-0.127	-0.317***	-0.298***	-0.298***	0.015	0.021	0.021
	(0.086)	(0.087)	(0.081)	(0.086)	(0.088)	(0.082)	(0.119)	(0.117)	(0.109)
Log GRP per Capita	0.445	0.595*	0.595*	0.044	0.188	0.188	0.464	0.568	0.568*
	(0.329)	(0.331)	(0.310)	(0.282)	(0.291)	(0.271)	(0.370)	(0.364)	(0.339)
Gini Total	-0.022	-0.032	-0.032	-	-	-	-	-	-
	(0.050)	(0.049)	(0.046)	-	-	-	-	-	-
Gini Urban	-	-	-	0.111***	0.103**	0.103***	-	-	-
	-	-	-	(0.040)	(0.041)	(0.038)	-	-	-
Gini Rural	-	-	-	-	-	-	-0.045	-0.072	-0.072
	-	-	-	-	-	-	(0.061)	(0.059)	(0.055)
Constant	33.790***	33.271***	42.231***	10.757***	12.487***	18.929***	25.070***	24.223***	31.654***
	(4.248)	(4.126)	(4.135)	(4.045)	(4.140)	(4.135)	(5.432)	(5.258)	(5.278)
Observations	392	392	392	363	363	363	352	352	352
R-squared	0.759	0.759	0.971	0.646	0.647	0.951	0.712	0.713	0.978
Number of province	33	33	33	33	33	33	32	32	32
Standard errors in parentheses									
*** p<0.01, ** p<0.05, * p<0.1									

Appendix XI

Estimation Results for the Effect of Social Aid Expenditure
(as Percentage of Gross Regional Product) on Income Inequality

VARIABLES	Gini Total			Gini Urban			Gini Rural		
	REM	FEM	SURE	REM	FEM	SURE	REM	FEM	SURE
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Log Social Aid Expenditure	0.090	0.102	0.102	-0.073	-0.000	0.059	0.175**	0.182**	0.162**
	(0.068)	(0.069)	(0.064)	(0.083)	(0.087)	(0.074)	(0.083)	(0.086)	(0.070)
Education	0.304	0.493	0.493	0.185	-0.184	-0.375	0.613*	1.424***	0.701
	(0.336)	(0.416)	(0.387)	(0.335)	(0.523)	(0.481)	(0.364)	(0.483)	(0.429)
Unemployment	-0.164*	-0.229**	-0.229**	-0.050	-0.081	-0.148	-0.281***	-0.288**	-0.168
	(0.089)	(0.105)	(0.098)	(0.094)	(0.133)	(0.122)	(0.101)	(0.125)	(0.112)
Log GRP per Capita	0.734**	0.994**	0.994**	-0.036	0.773	0.937**	0.591	0.913*	0.564
	(0.347)	(0.428)	(0.398)	(0.351)	(0.539)	(0.455)	(0.381)	(0.479)	(0.394)
Constant	19.252***	17.148***	14.018***	19.652***	22.027***	25.512***	14.561***	4.938	10.040*
	(3.705)	(4.491)	(4.613)	(3.737)	(5.648)	(5.719)	(4.117)	(5.361)	(5.200)
Observations	355	355	355	355	355	331	343	343	320
R-squared	0.462	0.464	0.757	0.521	0.526	0.741	0.371	0.379	0.739
Number of province	33	33	33	33	33	33	32	32	32
Standard errors in parentheses									
*** p<0.01, ** p<0.05, * p<0.1									

Appendix XII

Estimation Results for the Effect of Social Aid Expenditure
(as Percentage of Gross Regional Product) on Poverty

VARIABLES	Poverty Total			Poverty Urban			Poverty Rural		
	REM	FEM	SURE	REM	FEM	SURE	REM	FEM	SURE
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Log Social Aid Expenditure	0.086	0.078	0.078	0.105*	0.106*	0.106**	0.002	-0.016	-0.016
	(0.063)	(0.062)	(0.058)	(0.054)	(0.055)	(0.051)	(0.082)	(0.078)	(0.072)
Education	-1.633***	-1.703***	-1.703***	-0.279	-0.443	-0.443	-1.051**	-1.067**	-1.067**
	(0.370)	(0.375)	(0.348)	(0.341)	(0.357)	(0.330)	(0.478)	(0.473)	(0.437)
Unemployment	-0.176*	-0.153	-0.153*	-0.274***	-0.255***	-0.255***	0.095	0.126	0.126
	(0.095)	(0.096)	(0.089)	(0.087)	(0.091)	(0.084)	(0.126)	(0.123)	(0.114)
Log GRP per Capita	0.965**	1.157***	1.157***	0.010	0.153	0.153	1.024**	1.212***	1.212***
	(0.384)	(0.389)	(0.361)	(0.326)	(0.340)	(0.314)	(0.445)	(0.433)	(0.400)
Gini Total	-0.004	-0.014	-0.014	-	-	-	-	-	-
	(0.052)	(0.051)	(0.048)	-	-	-	-	-	-
Gini Urban	-	-	-	0.090**	0.083**	0.083**	-	-	-
	-	-	-	(0.040)	(0.041)	(0.038)	-	-	-
Gini Rural	-	-	-	-	-	-	-0.014	-0.047	-0.047
	-	-	-	-	-	-	(0.064)	(0.061)	(0.057)
Constant	34.823***	35.001***	43.536***	16.023***	17.418***	23.064***	28.547***	28.624***	35.494***
	(4.262)	(4.139)	(4.201)	(3.936)	(3.999)	(4.042)	(5.473)	(5.244)	(5.298)
Observations	355	355	355	331	331	331	320	320	320
R-squared	0.762	0.762	0.974	0.676	0.677	0.955	0.720	0.721	0.980
Number of province	33	33	33	33	33	33	32	32	32
Standard errors in parentheses									
*** p<0.01, ** p<0.05, * p<0.1									

Appendix XIII

Estimation Results for the Effect of Subsidy and Grant Expenditure
(as Percentage of Gross Regional Product) on Income Inequality

VARIABLES	Gini Total			Gini Urban			Gini Rural		
	REM	FEM	SURE	REM	FEM	SURE	REM	FEM	SURE
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Log Subsidy and Grant Expenditure	0.133	0.137	0.137	0.101	0.151	0.098	0.089	0.064	-0.138
	(0.090)	(0.091)	(0.085)	(0.114)	(0.115)	(0.103)	(0.101)	(0.101)	(0.089)
Education	0.246	0.403	0.403	0.124	-0.363	-0.640	0.741**	1.719***	0.724
	(0.346)	(0.434)	(0.405)	(0.355)	(0.547)	(0.514)	(0.371)	(0.499)	(0.460)
Unemployment	-0.133	-0.187*	-0.187*	-0.062	-0.065	-0.102	-0.207**	-0.167	-0.053
	(0.092)	(0.108)	(0.101)	(0.100)	(0.136)	(0.123)	(0.103)	(0.126)	(0.113)
Log GRP per Capita	0.624**	0.714**	0.714**	0.109	0.627	0.763**	0.633*	0.812**	0.556*
	(0.309)	(0.358)	(0.334)	(0.339)	(0.452)	(0.379)	(0.341)	(0.395)	(0.329)
Constant	20.476***	19.031***	16.029***	21.338***	25.484***	29.414***	12.055***	0.295	6.560
	(3.900)	(4.756)	(4.862)	(4.080)	(5.998)	(6.063)	(4.223)	(5.493)	(5.465)
Observations	366	366	366	366	366	344	355	355	334
R-squared	0.453	0.454	0.767	0.523	0.533	0.753	0.347	0.356	0.758
Number of province	33	33	33	33	33	33	32	32	32
Standard errors in parentheses									
*** p<0.01, ** p<0.05, * p<0.1									

Appendix XIV

Estimation Results for the Effect of Subsidy and Grant Expenditure
(as Percentage of Gross Regional Product) on Poverty

VARIABLES	Poverty Total			Poverty Urban			Poverty Rural		
	REM	FEM	SURE	REM	FEM	SURE	REM	FEM	SURE
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Log Subsidy and Grant Expenditure	0.007	-0.001	-0.001	-0.045	-0.051	-0.051	-0.032	-0.052	-0.052
	(0.082)	(0.081)	(0.075)	(0.077)	(0.077)	(0.072)	(0.100)	(0.097)	(0.090)
Education	-1.727***	-1.803***	-1.803***	-0.068	-0.311	-0.311	-1.311***	-1.344***	-1.344***
	(0.379)	(0.386)	(0.359)	(0.364)	(0.386)	(0.359)	(0.495)	(0.499)	(0.462)
Unemployment	-0.185*	-0.164*	-0.164*	-0.271***	-0.247***	-0.247***	0.129	0.151	0.151
	(0.096)	(0.096)	(0.090)	(0.090)	(0.093)	(0.086)	(0.124)	(0.122)	(0.113)
Log GRP per Capita	0.361	0.486	0.486	-0.174	-0.028	-0.028	0.373	0.467	0.467
	(0.318)	(0.320)	(0.298)	(0.278)	(0.286)	(0.265)	(0.364)	(0.357)	(0.331)
Gini Total	0.016	0.007	0.007	-	-	-	-	-	-
	(0.050)	(0.050)	(0.046)	-	-	-	-	-	-
Gini Urban	-	-	-	0.128***	0.119***	0.119***	-	-	-
	-	-	-	(0.040)	(0.040)	(0.038)	-	-	-
Gini Rural	-	-	-	-	-	-	-0.038	-0.068	-0.068
	-	-	-	-	-	-	(0.061)	(0.059)	(0.055)
Constant	36.864***	37.250***	46.017***	13.003***	15.202***	20.810***	33.364***	33.637***	40.752***
	(4.414)	(4.325)	(4.371)	(4.183)	(4.329)	(4.365)	(5.539)	(5.401)	(5.488)
Observations	366	366	366	344	344	344	334	334	334
R-squared	0.753	0.753	0.973	0.639	0.640	0.954	0.688	0.688	0.979
Number of province	33	33	33	33	33	33	32	32	32
Standard errors in parentheses									
*** p<0.01, ** p<0.05, * p<0.1									

Appendix XV

Estimation Results for the Effect of Total Expenditure
(as percentage of Gross Regional Product) on Income Inequality

VARIABLES	Gini Total			Gini Urban			Gini Rural		
	REM	FEM	SURE	REM	FEM	SURE	REM	FEM	SURE
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Log Total Expenditure	0.096	0.164	0.164	-0.633**	-0.129	-0.046	-0.013	-0.289	-0.221
	(0.254)	(0.274)	(0.257)	(0.287)	(0.347)	(0.287)	(0.283)	(0.312)	(0.254)
Education	0.579*	0.806**	0.806**	0.587*	0.495	-0.424	0.909***	1.920***	0.870**
	(0.319)	(0.388)	(0.364)	(0.317)	(0.492)	(0.463)	(0.347)	(0.455)	(0.419)
Unemployment	-0.218***	-0.281***	-0.281***	-0.130	-0.162	-0.135	-0.326***	-0.321***	-0.170
	(0.082)	(0.093)	(0.087)	(0.088)	(0.118)	(0.114)	(0.093)	(0.110)	(0.106)
Log GRP per Capita	0.694**	0.770**	0.770**	0.068	0.698	0.822**	0.615*	0.810**	0.592*
	(0.307)	(0.357)	(0.334)	(0.320)	(0.452)	(0.372)	(0.340)	(0.400)	(0.325)
Constant	16.569***	14.904***	11.619**	12.267***	14.495**	25.832***	10.217**	-2.834	6.293
	(3.965)	(4.769)	(4.757)	(3.957)	(6.044)	(5.787)	(4.315)	(5.569)	(5.273)
Observations	392	392	392	392	392	363	380	380	352
R-squared	0.482	0.483	0.757	0.550	0.556	0.748	0.395	0.405	0.744
Number of province	33	33	33	33	33	33	32	32	32
Standard errors in parentheses									
*** p<0.01, ** p<0.05, * p<0.1									

Appendix XVI

Estimation Results for the Effect of Total Expenditure
(as percentage of Gross Regional Product) on Poverty

VARIABLES	Poverty Total			Poverty Urban			Poverty Rural		
	REM	FEM	SURE	REM	FEM	SURE	REM	FEM	SURE
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Log Total Expenditure	0.207	0.095	0.095	-0.738***	-0.731***	-0.731***	-0.026	-0.198	-0.198
	(0.254)	(0.252)	(0.236)	(0.217)	(0.220)	(0.205)	(0.294)	(0.285)	(0.265)
Education	-1.674***	-1.698***	-1.698***	0.009	-0.170	-0.170	-0.780*	-0.708	-0.708
	(0.356)	(0.359)	(0.336)	(0.338)	(0.355)	(0.331)	(0.472)	(0.472)	(0.439)
Unemployment	-0.137	-0.122	-0.122	-0.335***	-0.317***	-0.317***	0.043	0.046	0.046
	(0.087)	(0.087)	(0.081)	(0.085)	(0.088)	(0.082)	(0.121)	(0.119)	(0.111)
Log GRP per Capita	0.366	0.514	0.514*	0.003	0.145	0.145	0.363	0.465	0.465
	(0.329)	(0.330)	(0.309)	(0.279)	(0.287)	(0.267)	(0.375)	(0.366)	(0.340)
Gini Total	-0.020	-0.030	-0.030	-	-	-	-	-	-
	(0.050)	(0.050)	(0.046)	-	-	-	-	-	-
Gini Urban	-	-	-	0.111***	0.104**	0.104***	-	-	-
	-	-	-	(0.040)	(0.040)	(0.037)	-	-	-
Gini Rural	-	-	-	-	-	-	-0.039	-0.073	-0.073
	-	-	-	-	-	-	(0.062)	(0.060)	(0.056)
Constant	37.622***	36.821***	45.252***	8.325**	9.894**	16.397***	28.406***	27.060***	33.862***
	(4.541)	(4.448)	(4.402)	(4.172)	(4.280)	(4.243)	(5.685)	(5.518)	(5.502)
Observations	392	392	392	363	363	363	352	352	352
R-squared	0.757	0.757	0.971	0.651	0.652	0.952	0.706	0.707	0.977
Number of province	33	33	33	33	33	33	32	32	32
Standard errors in parentheses									
*** p<0.01, ** p<0.05, * p<0.1									

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