THREE ESSAYS ON POVERTY AND POLARIZATION IN INDONESIA

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This dissertation examines the poverty line, the levels and trends of income polarization, and the relationship between income polarization and economic growth in Indonesia. The first essay takes a close look at the data, methodology, and implications of the way in which the national poverty line and indices were calculated rather than simply accepting these figures as givens. Several key findings are as follows. First, the disclosure of two data sets from the Central Bureau of Statistics (CBS) and the significant differences between them in 2008 and 2009 explain why attempts to replicate the official poverty figures often fail. Second, the number of food items in the food poverty basket is the most sensitive assumption affecting the poverty line. Finally, an alternative method used to estimate Indonesia's poverty line shows not only a higher level but also a different trend than the official poverty line data for 2008 to 2010.

The second essay studies the level of national and regional polarization in Indonesia and its evolution from 2000 to 2010, and compares polarization measures with traditional inequality measures. Our results show that polarization and inequality generally move in the same direction; however, there are certain periods in which the two move in opposite directions. Another key finding is that, since 2000, Indonesia has rapidly become more polarized in terms of consumption expenditures at the national and regional levels. One possible explanation for this rapid increase in polarization is that the expenditures of the rich have risen much more quickly than those of the poor. We find that polarization was substantially high when fuel subsidy cuts occurred in 2002, 2005, and 2008. The compensation programs that followed fuel subsidy cuts

assisted the poor (and the non-poor due to large leakages) and reduced polarization, but only temporarily. Fuel subsidy cuts saved the government's budget from deteriorating; however, they clearly exacerbated polarization indicating that maintaining the government's fiscal position was prioritized over improving socioeconomic conditions.

Lastly, the third essay analyzes the link between income polarization and economic growth. Despite Indonesia's rapid economic growth in the last decade, regional differences in growth remain substantial. It is shown that provinces with higher polarization tend to have lower subsequent growth, which exacerbates polarization further. Our findings also suggest that better institutions are associated with lower polarization; weak local institutions tend to favor large firms whose owners are politically and economically powerful. The collusions between local leaders and large firms often turn a blind eye to environmental degradation and other social issues. Institutional factors including legal certainty, regional finance, government services, and local regulations clearly play an important role in reducing polarization. To the extent that rising polarization could be harmful from the perspectives of socio-political and future growth prospect, the importance of countering this trend of rising polarization should be seriously considered in efforts to promote growth.

BIOGRAPHICAL SKETCH

Alvin Pratama was born and raised in Jakarta, Indonesia. He received his Bachelor of Science degree in mechanical engineering from Trisakti University, Indonesia in 2000 and obtained his Master of Business Administration degree in finance from University of San Francisco, California in 2004. He taught undergraduate financial management classes at Gunadarma University, Jakarta, Indonesia prior coming to Cornell University in 2007. He is married to Pratita Chusnun and has two children, Rasyid and Nayla.

His research interest, among others, is poverty and income polarization in Indonesia. In the summers of 2009 and 2010, he had an internship at Indonesia's Central Bureau of Statistics, and developed great interest in studying the official poverty line figures. Alvin completed his Ph.D. program in Regional Science at Cornell University in May 2013.

for Papa & Mama, who show me the power of dreams
for Tita, who always believes in me
for Rasyid and Nayla, who bring out the best in me

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CHAPTER 1

RE-EXAMINING INDONESIA'S POVERTY LINE

1.1 Introduction

In 2010, the Central Bureau of Statistics (CBS), the official statistical bureau of Indonesia, estimated that the poverty headcount had declined to 13.3% from 14.15% the previous year. In other words, more than 31 million out of 235 million people in Indonesia were poor according to the CBS. During the East Asian financial crisis in 1998, Indonesia's poverty headcount reached an all-time record high of 24%, but subsequently, the poverty headcount has been declining slowly (except in 2006 when the fuel subsidy was cut in the previous year, resulting in high inflation). Despite a significant increase in the government's poverty alleviation budget, the poverty headcount has decreased only slightly. In 2005, the poverty reduction budget was 23 trillion Rupiah. According to the Ministry of Finance, the budget increased significantly to more than 64 trillion Rupiah in 2010, reflecting the government's significant effort to eradicate poverty in Indonesia. Nonetheless, instead of continuing to increase the poverty reduction budget, the Indonesian government reduced the budget to 45 trillion Rupiah in 2011, a decrease of almost 40%. The government likely made this decision based on the declining official poverty headcount estimated by the CBS.

In general, policy makers have paid less attention to the methods of calculating the poverty line and have focused more on results such as the national and regional poverty headcount numbers. Based on the official poverty headcount number released by the CBS, the central government can determine the effectiveness of its national poverty reduction programs over time and can estimate a budget for poverty reduction programs. For example, regional

poverty indices such as the poverty headcount, poverty gap, and poverty severity provide valuable information that allows policy makers to prioritize regions with high poverty indices. Moreover, a reliable and accurate estimation of poverty indices results in better poverty targeting. Therefore, the method of calculating the poverty line is crucial for generating poverty indices that are useful for policy makers, and the method needs to be carefully constructed based on sound assumptions.

In this study, we attempt to answer the following questions: Can we replicate Indonesia's poverty line figures using the data acquired from the CBS? What assumptions does the CBS make when estimating the poverty line? How do these assumptions affect poverty line figures? Does the methodology need to be revised since it was last updated in 1998?

The objective of this paper is twofold: First, this study will attempt to estimate the official poverty line numbers with data available for public users (i.e., from the CBS's Dissemination Unit). In addition, the study will attempt to replicate the official poverty line figures with data from the CBS's Poverty Unit. Second, this study will systematically examine the CBS's poverty line calculation method and will propose an alternative method.

The CBS has used the same methodology since 1998 with no updates, despite critiques from scholars such as Pradhan et al. (2000, 2001). The CBS argues that it wants to maintain consistency so that the poverty lines and poverty indices are comparable over time. However, this study will show that the methodology requires major revision and some updates regarding its assumptions. The debate over updating the poverty line methodology has been active among stakeholders such as the Indonesian government and the CBS for quite some time. Updating the methodology will most likely lead to a higher poverty line, a higher number of poor people, and thus a higher budget allocation for poverty reduction programs. Therefore, strong political

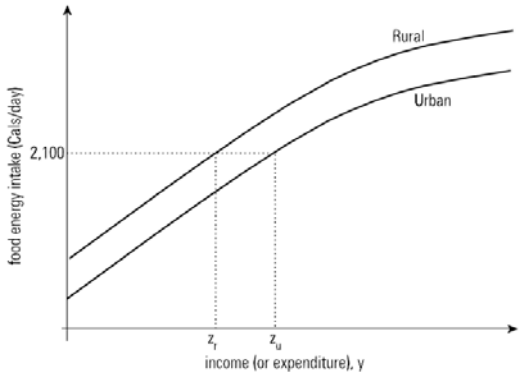
volition will be necessary to revise and update the outdated methodology. One possible reason for maintaining the current methodology is that a higher number of poor people in the country is likely to be viewed as a sign of failure in the current government.

1.2 Literature Review

Prior to 1998, the CBS used the food energy intake method (FEI) to calculate Indonesia's poverty lines. This method requires no price data, which might primarily explain why the CBS used this method at that time. The poverty line is measured by determining the expenditure necessary for a household to obtain a standard energy requirement. According to the Food and Agricultural Organization (FAO), the minimum energy requirement per person per day is 2100 kilocalories. The poverty line (z) is simply an inverse function of the minimum energy intake, 2100 kilocalories per day. Indonesia used 2100 kilocalories per day, whereas other countries employed different figures. Haughton and Khanker (2000) argue that "…the food energy intake method is seriously flawed, and should not be used for comparisons across time, or across regions, or between urban and rural areas, unless the alternatives are infeasible" (p.56).

Examining the Indonesian case, Ravallion and Bidani (1994) assert that the FEI method has serious flaws. Using the SUSENAS (Indonesia's National Economic Survey) data for 1990 and both the food energy intake and cost of basic needs (CBN) approaches, the researchers calculated Indonesia's headcount poverty measures and compared the results. Their results show that although there are small differences between their overall poverty headcounts using the CBN approach and the official headcounts using the FEI method, the urban and rural poverty headcounts are significantly different. The FEI method indicates that the poverty headcounts are higher in urban than in rural areas (16.8% vs 14.3%), whereas the CBN approach shows that

rural poverty is more than two times higher than the rate of urban poverty (23.6% vs 10.7%). Figure 1.1 illustrates the calorie income functions for urban and rural Indonesia estimated by Ravallion and Bidani:



Source: Haughton and Khanker (2002, p.58)

Figure 1.1. Calorie Income Function for Urban and Rural Indonesia

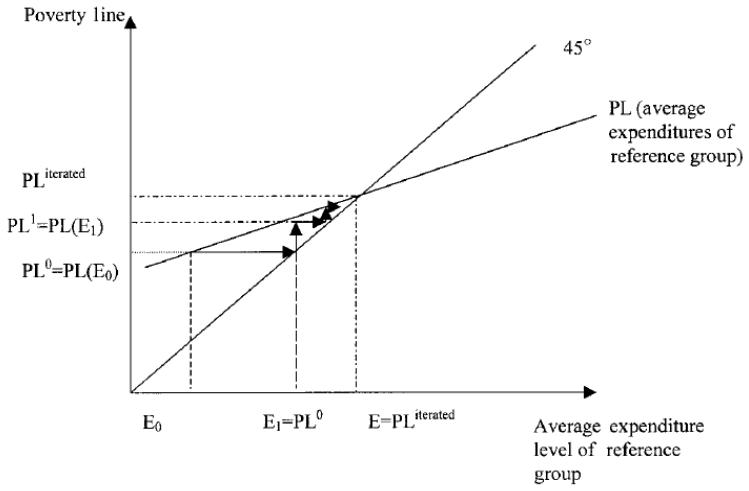
The problem with the FEI method is that food energy intake is assumed to depend only on expenditure. However, many factors influence food energy intake. First, different households have different tastes. For example, urban households tend to consume more expensive food that tastes good, given relative prices and real total expenditures. Second, the level of activity between urban and rural areas differs. Urban workers may require fewer calories than rural workers because activities in urban jobs require less physical exertion compared with those in rural jobs (for example, people working in an urban office versus those working on a farm). Finally, prices in urban and rural areas are different. Relative prices and food prices relative to non-food prices also differ, which will influence the demand for food and non-food items. For instance, some non-food items in urban areas are priced lower than food items and are easy to access through large and small retail outlets across urban areas. This fact may lead to lower food demand and thus lower food energy intake in urban than in rural areas. All these factors suggest that the calorie income function is higher in rural than in urban areas. As a result, for a given

level of food energy intake, the urban poverty line will be higher than the rural poverty line. Due to these problems, the FEI is not a reliable approach for measuring the poverty line.

Another approach for calculating the poverty line is the cost of basic needs (CBN). The CBN approach begins by specifying a consumption bundle that is considered to be adequate for essential consumption needs. Then, the poverty line is obtained by costing out this consumption bundle. Two elements of the poverty line are food and non-food components. The overall poverty line is the combination of these components. The food component of the food poverty line is calculated by estimating the cost of meeting the food energy requirement (e.g., 2100 calories per day). There are various ways to calculate the non-food poverty line, and there is disagreement about this. In the US, the overall poverty line is obtained by multiplying the food poverty line by three. According to this formula, the poor in the US spend one third of their expenditures on food items and the rest on non-food items. In contrast, Indonesia's poverty line is determined by adding the food poverty line and the non-food poverty line, which is the mean non-food expenditure of the reference population adjusted with some parameters. Ravallion and Bidani (1994) discuss some problems with the CBN method. First, defining basic needs involves an inevitable degree of arbitrariness. Second, regional price data are unavailable and unreliable, especially for non-food items.

Furthermore, Pradhan et al. (2000, 2001) discuss the importance of choosing the reference population. They consider the choice of the reference population to be an arbitrary yet important decision. They find that researchers who already believe that the poverty rate is high will tend to choose higher percentiles as their reference group. For example, one researcher believes that the poverty rate is 20% and thus chooses a 20^{th} percentile reference group, whereas another researcher believes that the poverty rate is 30% and thus chooses a 30^{th} percentile group.

It follows that these two researchers, using the same method and data but with different prior beliefs about the poverty rate, would generate different poverty rates. Pradhan et al. propose a solution to overcome the reference population issue by using an iterative method. This approach uses an initial reference group to estimate the poverty line. Initial steps taken will yield the poverty line that serves as the center of the reference group for the next step. The reference group in the next step is defined as households with per capita expenditures of 20% above and below the poverty line obtained in the previous step. This iteration continues until it converges to an intersection point between two curves, as shown in Figure 1.2:



Source: Pradhan et al. (2001)

Figure 1.2. Expenditure Level of Reference Group, Poverty Line, and the Iterated Poverty Line

Asra (2000) shows the significance of urban-rural price differences and inflation numbers in the poverty line calculation. Based on his food poverty line calculation, he reports that the food price difference between urban and rural regions was 13-16%, whereas the official urban-rural food price differential was 28-52% during the period 1987-1996, indicating that the CBS overestimated the urban-rural food price differential. In addition, Asra shows that trends of national poverty headcounts based on his poverty line estimation were similar to those of official

national poverty headcounts between 1987 and 1996. However, Asra's national poverty headcounts were significantly higher than the official ones, with the differences somewhere between 3 and 14 percentage points, demonstrating the sensitivity of poverty line measures to urban-rural price differences.

This literature discussion highlights certain issues concerning Indonesia's poverty line calculation method. The CBS adopted a cost of basic needs approach since 1998, whereas the poverty rates prior to 1998 were estimated using the food energy intake method. Despite the weaknesses of the CBN method, the CBS still currently uses this approach. This study examines closely all the assumptions made by the CBS to estimate the poverty line, conducts sensitivity analysis on several parameters, and proposes an alternative approach, which arguably represents a refinement of the existing approach.

1.3 Data and Methodology

1.3.1 SUSENAS

The main source of data for poverty and inequality measures in Indonesia is the SUSENAS (National Socioeconomic Survey), which is collected annually by Indonesia's Central Bureau of Statistics (CBS). Figure 1.3 illustrates the SUSENAS classification. Two types are the SUSENAS Core and the SUSENAS Module. The SUSENAS Core consists of demographic and socioeconomic characteristics of households and individuals, including age, gender, health, education level, employment, and fertility. This type of SUSENAS has been collected every year since 1992 in all provinces in Indonesia. Households and individuals are the observation units and are interviewed directly by surveyors of the CBS. Examples of the use of the SUSENAS Core are the Human Development Index (HDI), the poverty headcount, the Gini

ratio, and the Regional Gross Domestic Product (RGDP).

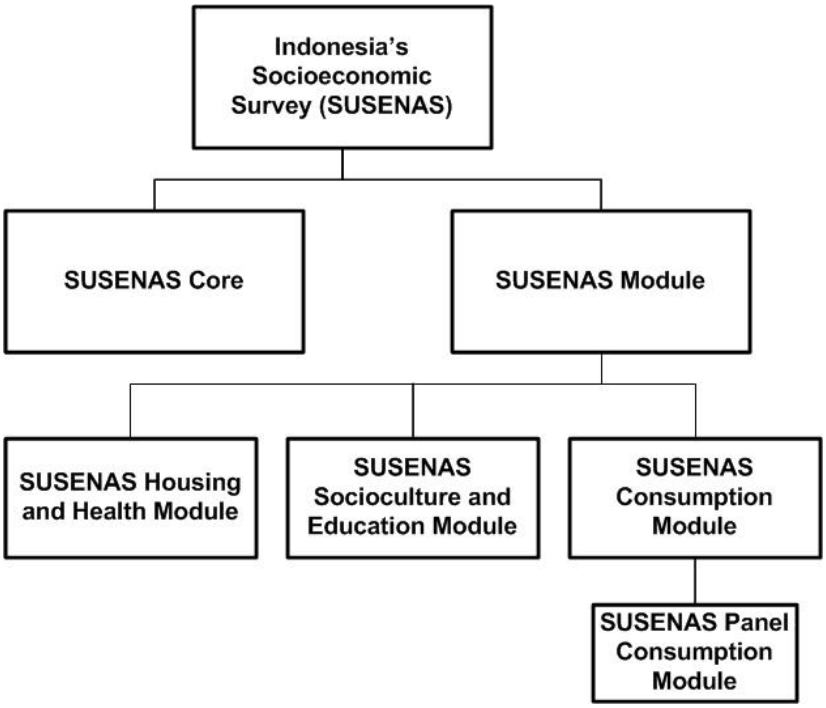


Figure 1.3. SUSENAS Classification

The SUSENAS Module is differentiated into three types, the first being the SUSENAS Consumption Module (SCM), which consists of detailed information about households' income and total consumption/expenditures on food and non-food items. First collected in 1993, the SCM has been collected every three years in all provinces in Indonesia. Observation units are households and individuals, and the survey method is direct interviews. Like the SUSENAS Core, the SCM is also used for calculating welfare indicators. In 2002, the CBS took a subset of the SUSENAS consumption module of approximately 10,000 households and called it the SUSENAS Panel Consumption Module (SPCM). These households are followed over time, and their detailed consumption/expenditures are recorded every year. However, the CBS changed the sample households every three years. Before the SPCM existed, the poverty line was calculated by adjusting the previous year's poverty line for inflation, and the result was applied to the SUSENAS Core to determine the poverty headcount. Since 2003, the poverty line calculation

has been based solely on the SPCM, and the poverty headcounts for urban and rural provinces are generated from this calculation. However, from 2003 to 2006, the sample size was only 10,000 households, resulting in a potential small-sample problem. Fortunately, from 2007 to 2010, the sample size had increased to approximately 65,000 households, and the CBS plans to further increase the sample size in the future.

In accordance with the CBS, this study employs the SUSENAS Panel Consumption Module of 2008, 2009, and 2010 for poverty line calculations. All data were collected from February to March for each year. I obtained the data from the Central Bureau of Statistics' Dissemination Unit (i.e., data sales and customer service) in September 2010. For each year of the SUSENAS, there are three parts: food expenditures, non-food expenditures, and a summary of food and non-food expenditures. The food expenditure part records household consumption of 215 types of food, whereas the non-food expenditure part surveys household expenses for 93 types of non-food, including health, education, and housing expenses. Total expenditures are the sum of food and non-food expenditures. Table 1.1 shows the summary statistics of monthly per capita expenditures (PCE) for all the data:

Table 1.1. Summary Statistics of PCE of the SUSENAS from the Dissemination Unit

Year	Variable	Observation	Mean	Standard Deviation	Min	Max
2008	PCE	66,724	386,382	382,937	41,350	30,800,000
2009	PCE	67,173	491,698	951,559	50,642	176,000,000
2010	PCE	66,516	494,845	495,007	42,742	27,500,000

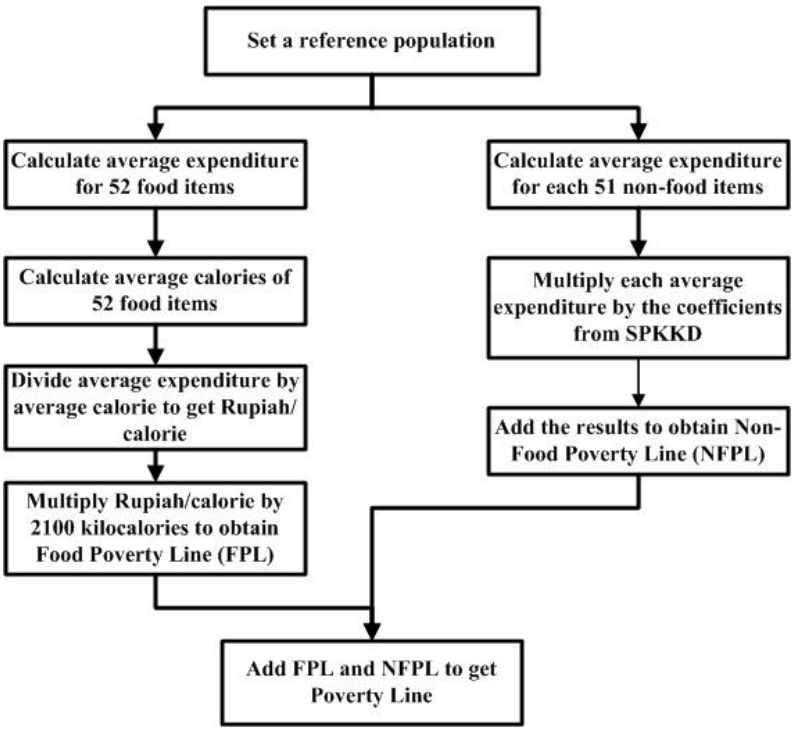
Table 1.2 shows the percentages of food and non-food expenditures for average-income and poor people. Whereas the poor spend most of their income on food, approximately 65%, average people spend 50% of their income on food. As households become richer, they spend less of their income on food and more on non-food items:

Table 1.2. Food and Non-food Expenditure Shares of Average and Poor People

	2008		2009		2010	
	Average	Poor	Average	Poor	Average	Poor
Food share expenditure	0.50	0.66	0.50	0.65	0.51	0.66
Non-food share expenditure	0.50	0.34	0.50	0.35	0.49	0.34

1.3.2 The Official Poverty Line Methodology

The CBS adopted the cost of basic needs approach to calculate the poverty line in 1998 and still applies the same method as of the writing of this paper. The cost of basis needs approach basically calculates the cost of a consumption bundle consisting of basic food and non-food items. To calculate the food poverty line, the cost of food items in the bundle is adjusted according to the nutritional requirement for good health, usually 2,100 kilocalories per person per day:



Source: The CBS

Figure 1.4. The Official Poverty Line Computation

The non-food poverty line is added to the food poverty line to obtain the total poverty line. In Indonesia, poverty lines are computed for urban and rural provinces, and the national poverty lines are the weighted average of the urban and rural provincial poverty lines. Figure 1.4 above summarizes the step-by-step method to calculate the poverty line.

The official procedure for calculating Indonesia's poverty line is explained in the following steps:

1. Set a reference population, which is 20% of the population whose incomes are above the temporary poverty line. The temporary poverty line is defined as the previous year's poverty line that has been increased with general inflation in urban (CPI). Analyzing the consumption of this reference population, we calculate the food and non-food poverty line.
2. Obtain the food poverty line (FPL), which is the sum average of expenditures on 52 basic food commodities consumed by the reference population.

   The basic formula for the food poverty line is as follows:

$$FPL_{jp} = \sum_{k=1}^{52} P_{jkp} Q_{jkp} = \sum_{k=1}^{52} V_{jkp}$$

   Where,

FPL_{jp}
$= food\ poverty\ line\ region\ j\ province\ p\ before\ it\ is\ equalized\ to\ 2100\ kilocalories$
$P_{jkp} = average\ price\ of\ commodity\ k\ in\ region\ j\ and\ province\ p$
$Q_{jkp} = average\ quantity\ of\ commodity\ k\ consumed\ in\ region\ j\ and\ province\ p$
V_{jkp}
$= average\ expenditure\ value\ or\ consumption\ of\ commodity\ k\ in\ region\ j, province\ p$
J = region (urban or rural)
$p = provinces$

3. Equalize FPL with 2100 kilocalories by multiplying 2100 by the implicit price average calories based on region j from the reference population:

$$\overline{HK_{jp}} = \frac{\sum_{k=1}^{52} V_{jkp}}{\sum_{k=1}^{52} K_{jkp}}$$

Where,

$K_{jkp} = average\ calories\ of\ commodity\ k\ in\ region\ j\ province\ p$

$\overline{HK_{jp}} = average\ calorie\ prices\ in\ region\ j\ province\ p$

$$FPL_{jp} = \overline{HK_{ip}}\ x\ 2100$$

Where,

$$FPL_{jp} = food\ minimum\ needs\ in\ region\ j\ that\ yields\ energy\ equal\ \frac{2100\frac{calories}{capita}}{day}$$

4. Calculate the non-food poverty line (NFPL) using the following formula:

$$NFPL_{jp} = \sum_{k=1}^{51} r_{kj}\, V_{kjp}$$

Where $NFPL_{jp}$ is the non-food poverty line in region j and province p; V_{kjp} is the consumption value per commodity/non-food subgroup in region j and province p based on the SUSENAS consumption module; r_{kj} is the commodity/non-food subgroup consumption ratio according to region adopted from the SPKKD 2004 and region j (urban or rural); k is a selective type of commodity.

5. Sum the food poverty line and the non-food poverty line to obtain the total poverty line:

$$PL = FPL + NFPL$$

The method seems very straightforward. However, it has certain drawbacks in setting the reference population, applying the urban CPI for both the urban and rural provincial poverty lines, and using average instead of median prices. These issues will be discussed later in this study.

1.3.3 Two Different Data Sets

Few people who have attempted to replicate the national poverty line are aware that there are in fact two different SUSENAS Panel Consumption Module data sets. One data set is used by

the CBS's Poverty Unit (PU) to calculate Indonesia's official poverty line, whereas the CBS's Dissemination Unit (DU) sells a different data set to public users. As a result, users outside of the CBS may face difficulties in replicating the official poverty line even though they employ the exact same official method and assumptions as those used by the CBS. In this paper, I show that this difficulty in fact occurs. I was able to obtain both data sets and thus could apply the same official method to both sets to demonstrate how significant the differences are:

Table 1.3. Comparison of Summary Statistics of the PU and the DU Data Sets

Dissemination Unit (DU)

Year	Variable	Observation	Mean	Standard Deviation	Min	Max
2008	PCE	66,724	386,382	382,937	41,350	30,800,000
2009	PCE	67,174	491,698	951,559	50,642	176,000,000
2010	PCE	66,516	494,845	495,007	42,742	27,500,000

Poverty Unit (PU)

Year	Variable	Observation	Mean	Standard Deviation	Min	Max
2008	PCE	66,724	386,379	382,933	41,378	30,800,000
2009	PCE	67,174	430,065	829,597	43,914	153,000,000
2010	PCE	66,516	494,845	495,007	42,742	27,500,000

Table 1.3 shows a summary of the statistical comparisons between data sets from the CBS's DU and the data set from the CBS's PU. There are slight differences between the 2008 DU data set and the 2008 PU data set. The mean, standard deviation, and minimum per capita expenditures are evidently not the same for both data sets. However, the 2009 DU data set and the 2009 PU data set show higher discrepancies, with the former having larger values of mean, standard deviation, and minimum and maximum than the latter. However, the 2010 data set shows no differences between the DU and PU data sets.

The 2009 DU data set has a high standard deviation due to possible outliers. Because we can see that the 2009 PU data set also has a high standard deviation compared to the 2008 and the 2010 data sets, it is safe to conclude that both the 2009 data sets might have an outlier

problem. Compared to the 2008 and 2010 SUSENAS from the PU, the maximum per capita expenditure in the 2009 SUSENAS is Rp 153,000,000, which is surprisingly high. Like other statistical offices in developing countries conducting household surveys, the CBS may also face obstacles to surveying the wealthy due to limited access to these income groups.

To further demonstrate the differences between the two data sets, the poverty headcount or P0s from 2008 to 2010 are calculated using both data sets shown in Table 1.4 below. Compared to the CBS's official poverty headcount (P0), our P0s using the SUSENAS data set from the PU are slightly different. The difference is quite significant for the 2008 P0. However, for the 2009 and 2010 P0s, the difference is 0.01 percentage point, which is likely due to rounding errors. Furthermore, using the data set from the DU, we estimated the P0 for three years and found a large difference in trend between the official P0 and the P0 calculated with the DU data set. Whereas the official P0 declined smoothly between 2008 and 2010, our P0 shows a substantial decline from 2008 to 2009, and it increased slightly between 2009 and 2010. It is not clear what factors contribute to this significant difference in trend. One can speculate that individual weight in the data indicating how many each individual represents in one survey area might be different. Regardless of the difference, the question is, if we think the DU data set is true, meaning it is free from any intentional adjustments, then why did the CBS not disclose to the public that the poverty rate had declined substantially between 2008 and 2009 and slightly increased from 2009 to 2010? In other words, the poverty rate trend should not always decline. Furthermore, high variations of level and of trends are evident when we observe provincial poverty lines and poverty rates. Again, official figures show smooth trends at provincial levels. A complete comparison between the DU and PU poverty lines is shown in Appendix A.1, and a comparison between the DU and PU P-α is in Appendix A.2.

Table 1.4. Comparison of the Poverty Headcount (P0) for Two Data Sets

	SUSENAS Poverty Unit Data Set			SUSENAS Dissemination Unit Data Set		
	2008 (P0)	**2009 (P0)**	**2010 (P0)**	**2008 (P0)**	**2009 (P0)**	**2010 (P0)**
Author's Calculation	15.30%	14.14%	13.32%	15.23%	13.31%	13.32%
CBS's Calculation	15.42%	14.15%	13.33%	N/A	N/A	N/A

Table 1.5 below shows the provincial poverty headcount (P0) rank comparison between the CBS's calculation using the PU SUSENAS data and our calculation using the DU SUSENAS data for 2008 and 2009. The provincial P0 rankings clearly differ between these two calculations in 2008 and 2009. For the 2008 P0 ranking, both calculations show that most provinces with the highest P0 are located in the eastern part of Indonesia. Our calculation shows that only two provinces in western Indonesia (i.e., Dista Yogyakarta and Nangroe Aceh Darussalam) have high poverty headcounts, whereas the CBS's calculation shows three provinces in western Indonesia that are included in the top ten list (i.e., Nangroe Aceh Darussalam, Lampung, and Bengkulu). Moreover, two provinces, Dista Yogyakarta and Sulawesi Barat, are not even in the CBS's P0 top ten list. Therefore, if one considers the DU SUSENAS and the PU SUSENAS, the PU data result in the exclusion of some provinces with the highest P0 (in this case, Dista Yogyakarta and Sulawesi Barat). This problem is known as exclusion error. The policy implication is that those excluded regions may not be prioritized in terms of poverty reduction budgets and national programs.

Table 1.5. The P0 Top Ten List for Two Data Sets 2008 and 2009

Rank	Province	2008 P0
1	PAPUA	42.66
2	PAPUA BARAT	37.31
3	MALUKU	31.28
4	GORONTALO	24.55
5	NUSA TENGGARA TIMUR	22.01
6	DISTA YOGYAKARTA	21.87
7	NUSA TENGGARA BARAT	20.52
8	SULAWESI TENGAH	20.31
9	NANGROE ACEH DARUSSALAM	19.92
10	SULAWESI BARAT	18.71

(a) Author's Calculation

Rank	Province	2008 P0
1	PAPUA	37.08
2	PAPUA BARAT	35.12
3	MALUKU	29.66
4	NUSA TENGGARA TIMUR	25.65
5	GORONTALO	24.88
6	NUSA TENGGARA BARAT	23.81
7	NANGROE ACEH DARUSSALAM	23.53
8	LAMPUNG	20.98
9	SULAWESI TENGAH	20.75
10	BENGKULU	20.64

(b) The CBS's Official P0

Rank	Province	2009 P0
1	PAPUA BARAT	43.93
2	MALUKU UTARA	30.95
3	PAPUA	24.24
4	SULAWESI BARAT	20.89
5	NUSA TENGGARA TIMUR	19.72
6	NANGROE ACEH DARUSSALAM	19.52
7	SULAWESI TENGAH	19.06
8	GORONTALO	17.50
9	SULAWESI TENGGARA	17.09
10	MALUKU	16.75

(a) Author's Calculation

Rank	Province	2009 P0
1	PAPUA	37.53
2	PAPUA BARAT	35.71
3	MALUKU	28.23
4	GORONTALO	25.01
5	NUSA TENGGARA TIMUR	23.31
6	NUSA TENGGARA BARAT	22.78
7	NANGROE ACEH DARUSSALAM	21.8
8	LAMPUNG	20.22
9	SULAWESI TENGAH	18.98
10	SULAWESI TENGGARA	18.93

(b) The CBS's Official P0

For the 2009 P0 ranking, our calculation shows that two provinces that were on the 2008 P0 top ten list were not on the 2009 list. The remainder of the list shows the same provinces with different rankings. However, the CBS's calculation shows that only one province (i.e., Bengkulu) that was on the 2008 P0 top ten list was not on the 2009 list. The same nine provinces on the 2008 list were still on the 2009 list but with slightly different rankings.

Ideally, there should be only one data set to calculate the poverty line in Indonesia, and public users outside the CBS should be able to easily replicate the official poverty number and poverty indices. With this practice, the CBS could maintain its credibility as an objective data provider in Indonesia. Therefore, the CBS should be more transparent in informing the public about its poverty line calculations so that the public can perform collective "checks and balances" and monitor the CBS's method for poverty line calculations.

However, two questions arise from these findings: why are there two different data sets,

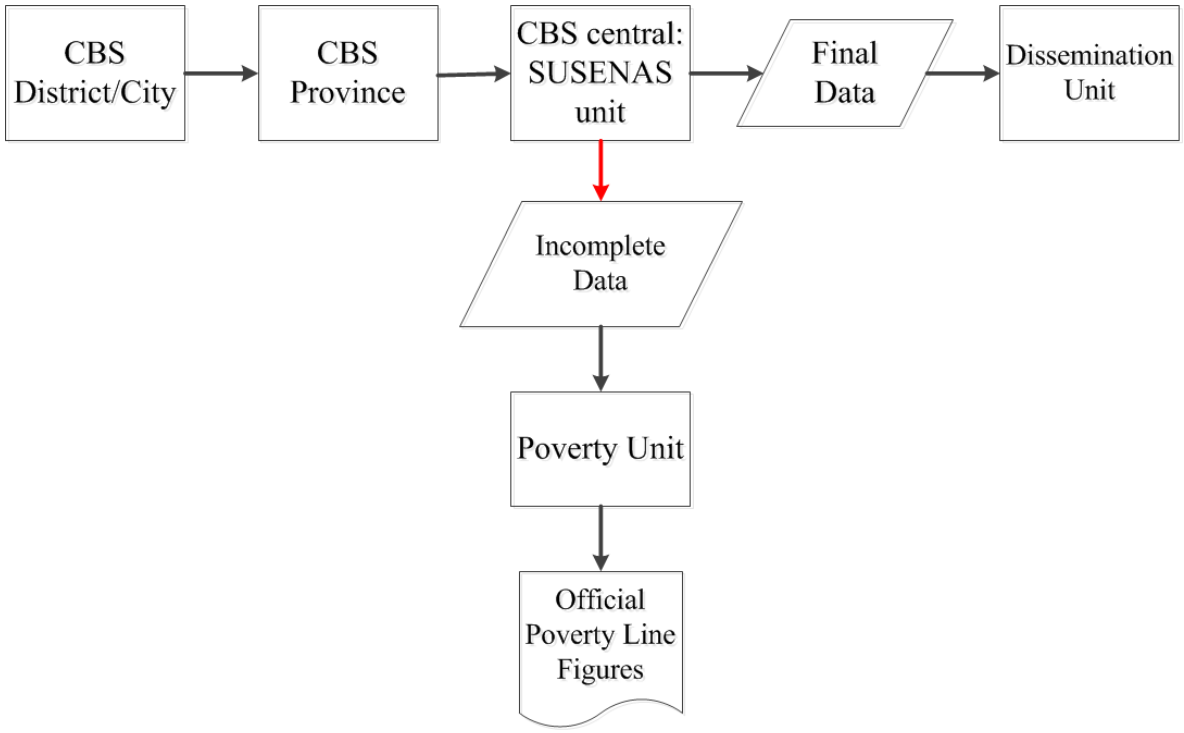
and more important, which data set is better and should be used? To answer the first question, we rely on the explanation of a researcher who works closely with the CBS and is well familiar with how the official poverty line is estimated. As mentioned, the SUSENAS Panel Consumption Module is collected annually between February and March across 33 provinces in Indonesia, and the number of households surveyed is more than sixty-six thousand. The CBS releases poverty statistics each July, and these numbers are mentioned in the annual presidential speech on August 17. Therefore, the period is relatively short between the time required to process the data from the field across Indonesia and the date of the publicly released official poverty figures, approximately five months.

According to the *Pedoman Pengolahan SUSENAS* 2006 (SUSENAS's data management guideline), the CBS's process of estimating Indonesia's poverty line is as follows (see Figure 1.5 for the flowchart). First, field surveys are conducted across Indonesia, and the CBS offices at the district level organize these surveys. All survey results are collected by the district offices, which receive and batch these data and send the data to the province offices that also perform receiving and batching. Next, the province offices send the data to the central office in Jakarta. The SUSENAS Unit at the central office conducts data entry, combines data from province offices, and performs statistical procedures, such as cleaning and "smoothing" to treat outliers in the data. The final data are sent to the Dissemination Unit to officially sell to the public in September. However, according to the researcher I spoke to[1], the data used by the Poverty Unit to estimate the poverty line is incomplete. That is, the SUSENAS unit has not finished finalizing the data, but because the Poverty Unit works within a tight deadline to release the poverty figures in July, the PU obtains the incomplete data from the SUSENAS unit, performs their own statistical process, and estimates the official poverty figures based on this data. In other words,

[1] The researcher requested not to disclose his name.

two different working units (i.e., the Poverty Unit and the SUSENAS Unit) conduct different data processing, resulting in two different data sets.

I personally asked a central employee of the CBS to verify this process. Until 2009, he was the head of the department that supervised the Poverty Unit. He explained that after the SUSENAS Unit finishes processing the data, it sends the final data to the Poverty Unit, which uses the data to estimate the poverty line. In the process, the Poverty Unit adjusts and modifies the data. However, the Poverty Unit does not send the adjusted data back to the SUSENAS Unit. As a result, two different data sets exist:



Source: SUSENAS's Data Management Guideline and Author's modification

Figure 1.5. Data flow of SUSENAS Panel Consumption Module

Although these statements are difficult to validate, they provide possible explanations for why two different data sets exist. If it is true that the poverty data compiled at the time of

announcement is incomplete, then it is clear that the data set sold to the public by the Dissemination Unit in September is probably better than the data set used by the Poverty Unit because the data in September are clean, final, and complete. Fortunately, this study's findings has helped the CBS to acknowledge the existence of two data sets, and the CBS had reconciled the 2010 SUSENAS data sets in the Poverty Unit and in the Dissemination Unit.

1.3.4 Sensitivity Analysis

The objective of a sensitivity analysis in this study is to determine how altered parameters in the poverty line calculation affect the poverty lines and poverty indices. The parameters in Indonesia's poverty line calculation include the reference population, inflation in the temporary poverty line computation, and the number of food and non-food items in the poverty basket. This paper systematically examines three parameters (i.e., the reference population, inflation, and the food poverty basket) and analyzes their effects on the poverty lines and the poverty indices. The data used for this sensitivity analysis is the SUSENAS Panel Consumption Module from the DU. The benchmark for the sensitivity analysis is the poverty lines and the poverty indices that are calculated using the same methodology and assumptions that the CBS uses in the DU's SUSENAS Consumption Module.

1.3.4.1 Reference Population

According to the CBS, the first step in calculating the poverty line is to set a reference population. A reference population is defined as 20% of the population that has per capita expenditures (PCE) above the temporary poverty line (Z^{t-1}), which is the previous year's poverty line adjusted for inflation, as shown in Figure 1.6. The CBS calculates this reference

population's mean expenditures on a predetermined food and non-food basket, which will result in the current year's poverty line. Therefore, a reference population plays an important role in determining the poverty line:

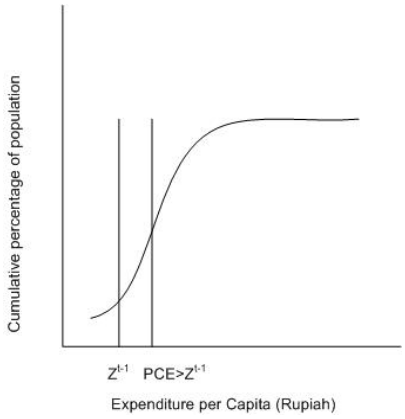


Figure 1.6. The Official Method of the Reference Population

One might ask why the CBS chose 20% above the temporary poverty line as the reference population. Why not 10%, 15%, or 25% above the temporary poverty line? Pradhan (2001) states that the decision to choose a reference population is subjective yet important. The CBS argues that its intention is to capture the near-poor population and examine their expenditures to determine the new poverty line. However, this near-poor population is not considered poor if measured by the temporary poverty line, Z^{t-1}. Therefore, instead of employing the poor as a reference population, the CBS employs the near-poor, who may have different consumption patterns than the poor. Choosing a reference population that is centered on the temporary poverty line is preferable to the official choice of reference population. This method ensures that the reference population represents both the poor and the near-poor.

Two types of sensitivity analysis on the reference population are as follows: First, instead of 20% of the population whose expenditures are greater than the temporary poverty line,

different numbers above the temporary poverty line are simulated. Second, instead of a fraction of the population above the temporary poverty line, the reference population is now x percent above and x percent below the temporary poverty line. Both types of sensitivity analysis still utilize the same food and non-food basket as the current CBS method (i.e., 52 types of food and 51 types of non-food commodities) and other assumptions used by the CBS.

1.3.4.2 Inflation in the Temporary Poverty Line

The CBS derives the urban inflation rate from the Consumer Price Index (CPI) of 66 cities in Indonesia to calculate the temporary urban and rural provincial poverty lines. To obtain the urban provincial inflation rate, the CBS averages the inflation rates of cities within that province. For example, if the CBS publishes the CPI for two cities in one province, then the average of these two cities' CPI must be calculated to obtain the urban provincial inflation rate.

According to the CBS, the March CPI is chosen based on similar timing with the SUSENAS survey conducted between February and March every year. Although the poverty lines are calculated for urban and rural provinces, the CBS uses *only the urban inflation rates* to calculate the urban and rural provincial temporary poverty lines, instead of using the urban and rural inflation rates, resulting in an urban bias. An urban bias occurs when one assumes that urban and rural areas have the same inflation rate. The higher the urban inflation, the higher the poverty line in urban and rural areas. This assumption is a major flaw in the official poverty line calculation. Table 1.6 shows the inflation numbers by province for the poverty line computation calculated by the CBS:

Table 1.6. Inflation by Province Used in the Official Method

Province	2008	2009	2010
Aceh	1.09	1.09	1.04
Sumatera Utara	1.07	1.07	1.04
Sumatera Barat	1.08	1.09	1.04
Riau	1.07	1.09	1.03
Jambi	1.06	1.09	1.05
Sumatera Selatan	1.11	1.07	1.03
Bengkulu	1.08	1.11	1.05
Lampung	1.09	1.12	1.05
Kepulauan Bangka Belitung	1.07	1.11	1.05
Kepulauan Riau	1.07	1.08	1.03
Daerah Khusus Ibukota Jakarta	1.08	1.07	1.04
Jawa Barat	1.07	1.08	1.03
Jawa Tengah	1.08	1.07	1.04
Daerah Istimewa Yogyakarta	1.09	1.08	1.04
Jawa Timur	1.09	1.08	1.04
Banten	1.09	1.09	1.04
Bali	1.07	1.09	1.04
Nusa Tenggara Barat	1.08	1.12	1.04
Nusa Tenggara Timur	1.06	1.09	1.07
Kalimantan Barat	1.10	1.09	1.05
Kalimantan Tengah	1.11	1.08	1.04
Kalimantan Selatan	1.09	1.08	1.05
Kalimantan Timur	1.11	1.09	1.07
Sulawesi Utara	1.08	1.09	1.03
Sulawesi Tengah	1.09	1.11	1.04
Sulawesi Selatan	1.08	1.10	1.04
Sulawesi Tenggara	1.08	1.16	1.01
Gorontalo	1.08	1.11	1.04
Sulawesi Barat	1.08	1.09	1.03
Maluku	1.07	1.06	1.07
Maluku Utara	1.13	1.08	1.04
Papua Barat	1.12	1.20	1.04
Papua	1.12	1.10	1.03

Source: The CBS

This paper uses the urban and rural inflation rates to investigate how this assumption affects the poverty headcount, the poverty gap, and poverty severity. Rural inflation rates are assumed to be 1 percentage point higher than urban inflation rates. The reason for this assumption is that the distance between rural areas and production centers is likely to be far, leading to higher prices of goods in rural than in urban areas. Table 1.7 shows the assumptions regarding urban and rural inflation rates used for the sensitivity analysis:

Table 1.7. Urban and Rural Inflation Rates

	2008		2009		2010	
Province	Urban	Rural	Urban	Rural	Urban	Rural
Aceh	1.091	1.101	1.093	1.103	1.043	1.053
Sumatera Utara	1.073	1.083	1.071	1.081	1.042	1.052
Sumatera Barat	1.076	1.086	1.094	1.104	1.038	1.048
Riau	1.073	1.083	1.085	1.095	1.027	1.037
Jambi	1.064	1.074	1.087	1.097	1.051	1.061
Sumatera Selatan	1.109	1.119	1.075	1.085	1.028	1.038
Bengkulu	1.078	1.088	1.105	1.115	1.050	1.060
Lampung	1.093	1.103	1.122	1.132	1.047	1.057
Kepulauan Bangka Belitung	1.066	1.076	1.107	1.117	1.053	1.063
Kepulauan Riau	1.073	1.083	1.077	1.087	1.031	1.041
Daerah Khusus Ibukota Jakarta	1.077		1.066		1.036	
Jawa Barat	1.071	1.081	1.081	1.091	1.032	1.042
Jawa Tengah	1.080	1.090	1.073	1.083	1.037	1.047
Daerah Istimewa Yogyakarta	1.090	1.100	1.081	1.091	1.037	1.047
Jawa Timur	1.088	1.098	1.076	1.086	1.037	1.047
Banten	1.090	1.100	1.093	1.103	1.036	1.046
Bali	1.071	1.081	1.093	1.103	1.043	1.053
Nusa Tenggara Barat	1.084	1.094	1.124	1.134	1.041	1.051
Nusa Tenggara Timur	1.064	1.074	1.095	1.105	1.075	1.085
Kalimantan Barat	1.103	1.113	1.087	1.097	1.053	1.063
Kalimantan Tengah	1.109	1.119	1.080	1.090	1.037	1.047
Kalimantan Selatan	1.086	1.096	1.078	1.088	1.053	1.063
Kalimantan Timur	1.111	1.121	1.095	1.105	1.067	1.077
Sulawesi Utara	1.077	1.087	1.089	1.099	1.032	1.042
Sulawesi Tengah	1.091	1.101	1.108	1.118	1.041	1.051
Sulawesi Selatan	1.080	1.090	1.103	1.113	1.037	1.047
Sulawesi Tenggara	1.084	1.094	1.162	1.172	1.014	1.024
Gorontalo	1.083	1.093	1.110	1.120	1.036	1.046
Sulawesi Barat	1.080	1.090	1.092	1.102	1.029	1.039
Maluku	1.071	1.081	1.064	1.074	1.067	1.077
Maluku Utara	1.129	1.139	1.082	1.092	1.035	1.045
Papua Barat	1.120	1.130	1.200	1.210	1.037	1.047
Papua	1.120	1.130	1.097	1.107	1.034	1.044

1.3.4.3. Number of Food Items in the Food Poverty Basket

The number of food items in the official food poverty basket is 52. The CBS selected these items in 1998 to represent the consumption pattern of the poor at that time. However, critics state that most food items in the basket are consumed by the urban poor, implying urban bias in the food item selection for this basket. Moreover, critics argue that this food poverty basket does not reflect different regional consumption patterns in Indonesia. For example, people in the eastern part of Indonesia consume more fish than those in the western region.

To select food items for a food poverty basket, a specific criterion is employed. Food items consumed by 20% of the lowest quintile of the population in urban and rural province are

selected. With this practice, an urban bias is minimized, and the food poverty basket reflects different regional consumption patterns. The number of food items selected according to this criterion is 103, compared to 52 items in the official food poverty basket. By comparing the differences in the poverty lines and indices, one might recognize the sensitivity of food poverty basket in measuring the poverty line.

1.3.5 Alternative Method for Calculating Indonesia's Poverty Lines

Having conducted the sensitivity analysis, we propose an alternative method that modifies the CBS's methodology. Table 1.8 shows a summary comparison between the CBS's method and the alternative method. The justifications for the use of the different assumptions follow:

Table 1.8. Comparison of the CBS's Official Method with an Alternative Method

No	Comparison Factor	The 1998 CBS Official Method	Alternative Method
1	Reference population	20% population above urban rural province TPL	15% population above and below urban rural province TPL
2	Temporary poverty line (TPL)	Last year's poverty line adjusted by this year's urban inflation calculated from CPI	Last year's poverty line adjusted by this year's urban and rural inflation calculated from CPI
3	Food basket	52 items	103 items capturing higher share of ready-to-eat food and regional consumption patterns
4	Food poverty line	Average expenditure per average calorie multiplied by 2100 kilocalories	Average expenditure using median price per average calorie multiplied by 2100 kilocalories.
5	Non-food poverty line	Average price adjusted by parameters from other survey	Ravallion Bidani's (1993) method to obtain total poverty line. Total poverty line is a scaled-up food poverty line.

Methodology Discussion:

1. The main intention of setting a reference population is to capture the poor and the near-poor consumption patterns. Therefore, an alternative method uses as a reference population 15% of the population whose expenditures are above and below the temporary poverty line. Although this choice is subjective, the sensitivity analysis indicated that a wealthier reference population of above and below a certain percentage will better capture the poor and near-poor.
2. Unlike the CBS method that employs only urban inflation to obtain the urban and rural temporary poverty lines, the alternative method differentiates urban and rural inflation to calculate the urban and rural temporary poverty lines, reducing the urban bias problem.
3. The food basket in the CBS method consists of 52 items set in 1998, whereas the food basket in the alternative method consists of 103 items. Consumption patterns have dramatically changed since 1998, mostly regarding the following items:
    - Currently, people tend to consume more ready-to-eat foods, such as instant noodles, due to limited time to cook and cheap prices. Table 9 shows a comparison between the number of food items in the CBS food basket and those in the alternative food basket. As shown, the alternative food basket contains two times more ready-to-eat food items than the 1998 food basket, suggesting that poor people currently consume more ready-to-eat foods.
    - Because the alternative food basket represents regional consumption patterns, more types of fish are included in the food basket. Fourteen types of fish are in the alternative poverty basket, whereas only five types of fish are included in the 1998

food basket. Hence, the alternative food basket takes into consideration better than the existing food basket the consumption patterns of the population in eastern Indonesia.

- Most poor people rarely eat meat. They eat meat only on special occasions, such as Islamic holidays (i.e., Ied Adha) and weddings. Nevertheless, five types of meat are in the 1998 food basket, indicating an incorrect assumption about the poor's meat consumption pattern. In the alternative food basket, only one type of meat is included.
- The poor in Indonesia spend a large share of their money on cigarettes. Approximately 6% of their expenditures are spent on cigarettes, according to the World Bank's publication," Making the New Indonesia Work for the Poor" (2004). The CBS only considers one type of cigarettes in the food basket, whereas there are five types of cigarettes in the alternative food basket.

This side-by-side comparison clearly shows that the CBS food basket might misrepresent the poor's consumption patterns. As a consequence, the poverty line might be too low, and the national poverty headcount might be underestimated. The alternative basket, however, is more likely to better represent the poor's consumption patterns. This basket illustrates that the poor consume mostly fish, vegetables, and ready-to-eat food.

As discussed in the sensitivity analysis section, the food items in the alternative food basket are determined by examining the consumption patterns of the lowest quintile of the population. The items selected are consumed by more than 20% of the lowest quintile in all urban and rural provinces. Based on this criterion, 103 out of 292 food items in the SUSENAS Panel Consumption Module are selected. The CBS does not provide an explanation to justify the 52 food items in the 1998 food basket. The food items selected seem to represent foods that were most consumed by the poor people

living in Java Island during that time. Therefore, a revision of the assumptions made in selecting items for the food basket is necessary and crucial.

Table 1.9. Comparison of the Number of Food Items in the CBS Food Basket and in the Alternative Food Basket

Food Type	Food Basket 1998	Food Basket Alternative	1998 Percentage	Alternative Percentage
Cereals	4	4	7.69	3.88
Tubers	3	5	5.77	4.85
Fish	5	14	9.62	13.59
Meat	5	1	9.62	0.97
Eggs and Milk	4	3	7.69	2.91
Vegetables	9	22	17.31	21.36
Legumes	3	4	5.77	3.88
Fruits	4	6	7.69	5.83
Oil and Fats	2	7	3.85	6.80
Spices	3	11	5.77	10.68
Miscellaneous items	2	2	3.85	1.94
Ready-to-eat food and Beverages	7	19	13.46	18.45
Tobacco & Betel	1	5	1.92	4.85
Total	**52**	**103**	100	100

Source: The CBS and Author's calculation

4. In the CBS's poverty method, the average prices of 52 food items are used to calculate the food poverty line. In comparison, the alternative method calculates the food poverty line by using the median prices of 103 food items. Median prices are more independent of a distribution shape compared with average prices and are also more stable because they are not affected by outliers.
5. The CBS chose 51 non-food items for the urban PL and 47 non-food items for the rural PL in its calculation of the non-food poverty line. Again, no clear justification for choosing those items is offered by the CBS. Furthermore, the reference population's expenditures on those items are adjusted with parameters from a different survey called the SPKKD (Survey Paket Komoditi Kebutuhan Dasar), which is updated every four years. The alternative method employs the Ravallion and Bidani (1994) poverty line

calculation approach using only the food poverty line. The total poverty line is simply the food poverty line scaled up with parameters from a regression in the SUSENAS rather than from an outside survey. This model is based on the notion that poor people spend most of their income on food and the remainder on non-food items.

The regression formula is as follows:

$$S_{ij} = \alpha_j + \beta_j \log\left(\frac{y_{ij}}{z_j^f}\right) + \varepsilon_{ij}$$

Where,
$S_{ij} = the\ food\ share\ of\ total\ expenditure\ of\ household\ i\ in\ region\ j$
$y_{ij} = per\ capita\ expenditure\ of\ household\ i\ in\ region\ j$
$z_j^f = the\ food\ poverty\ line$
$\alpha_j \& \beta_j = parameters\ to\ be\ estimated$
$\varepsilon_{ij} = error\ term$

After obtaining the estimated parameters, the poverty line is obtained as follows:

$$Z_j = z_j^f (2 - \alpha_j)$$

1.4 Results and Analysis

1.4.1 Results of Reference Population Sensitivity Analysis

1.4.1.1 The First Type of Reference Population: Share of Population With Expenditures Above the Temporary Poverty Line

Table 1.10. Poverty Index Results from the First Type of Reference Population Simulation

Reference Population	2008			2009			2010		
	P0	P1	P2	P0	P1	P2	P0	P1	P2
> 5% Population	12.49	2.13	0.57	9.32	1.47	0.37	11.26	1.84	0.48
> 10% Population	13.44	2.33	0.63	10.67	1.75	0.45	12.00	1.98	0.52
> 15% Population	14.29	2.51	0.68	11.89	2.00	0.52	12.65	2.10	0.55
> 20% Population	15.23	2.71	0.75	13.31	2.29	0.61	13.32	2.21	0.58
> 25% Population	16.35	2.95	0.82	14.63	2.57	0.70	14.47	2.46	0.66
> 30% Population	17.62	3.25	0.92	15.92	2.86	0.79	16.32	2.90	0.79

Table 1.10 presents the poverty index results of the first type of sensitivity analysis based on the SUSENAS Panel Consumption Module from 2008-2010. In all years, it is clear that

wealthier reference groups with expenditures greater than the temporary poverty line result in higher poverty lines and thus higher headcounts (P0), poverty gaps (P1), and poverty severity indexes (P2). The P0 gradually increases for a higher percentage of the reference population. Compared to the P1 and the P2, the P0 has the highest elasticity, meaning a significant increase in the percentage of the reference population results in a substantial rise in the P0:

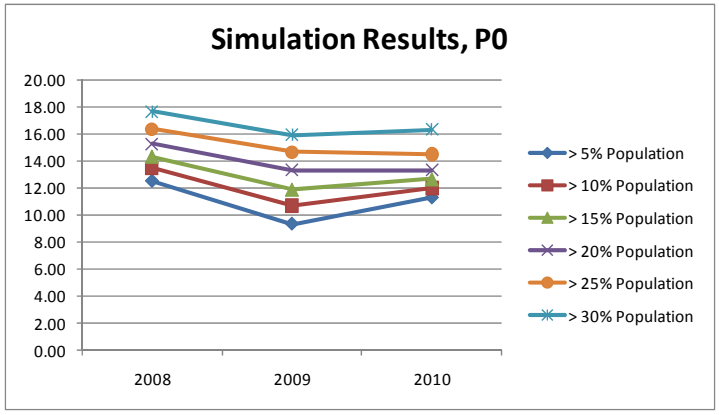


Figure 1.7. The P0 Simulation Results for Various Reference Populations 2008-2010

Figure 1.7 depicts the P0 simulation results for different percentages of the first type of reference population. Regardless of which reference population is used, the trends are all the same in the period of study. That is, the poverty headcount moderately improved from 2008 to 2009, but it increased slightly from 2009 to 2010. The magnitude of changes is different for each percentage of the reference population. Furthermore, the P1 and the P2 also indicate the same trend as the P0 but with different magnitudes of changes, as shown in Figure 1.8:

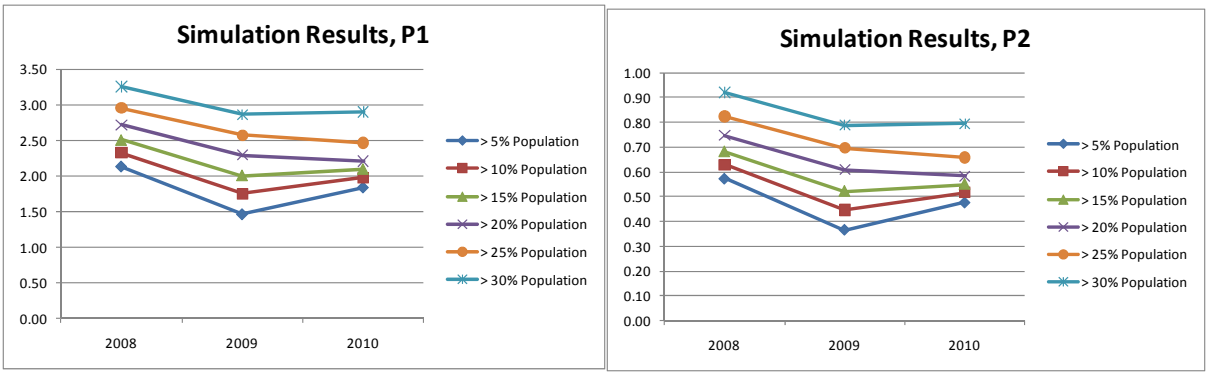


Figure 1.8. The P1 and P2 Simulation Results for Various Reference Populations 2008-2010

The first type of reference population considers that population whose expenditure is above the temporary poverty line or the near-poor. Changing the percentage of the reference population to above the temporary poverty line gradually makes the upper boundary larger, as illustrated in Figure 1.9. As a result, the poverty line, which is the mean food and non-food expenditures of the reference population, becomes much higher, causing P-α to be higher as well:

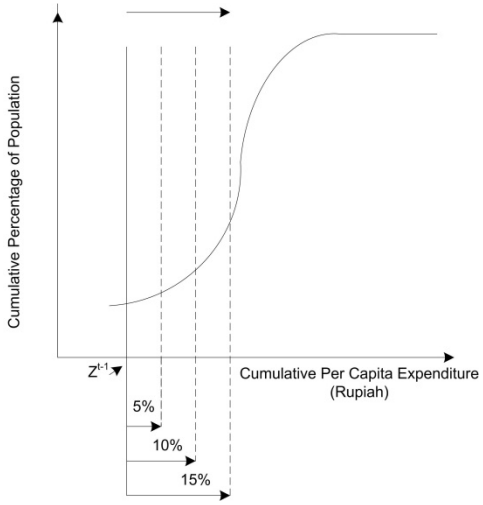


Figure 1.9. Illustration of the First Type of Reference Population Sensitivity Analysis

The SUSENAS's total number of observations is approximately 66,000 households, as indicated above in Table 1.2. Most likely, the CBS chose 20% as the reference population to avoid a small sample problem. As shown in Table 1.11, some provinces such as Maluku Utara and Papua Barat have samples below 500 observations, whereas other provinces have samples ranging from above 500 to 7,000 households. Small numbers of observations in some provinces are likely caused by lack of access to regions in those provinces and budget constraints. Hence, choosing a reference population that is less than 20% might be problematic because the samples per province would be small. For example, if a 5% reference population were chosen, then the reference population for Maluku Utara province would contain only 99 households. These small samples may underrepresent the population in that area and may result in inaccurate estimation

of the poverty line.

Table 1.11. SUSENAS Panel Consumption Module Total Number of Samples by Province

Province	2008	2009	2010
Aceh	1,955	1,933	1,904
Sumatera Utara	2,869	2,860	2,745
Sumatera Barat	1,745	1,762	1,674
Riau	1,527	1,623	1,588
Jambi	1,132	1,108	1,100
Sumatera Selatan	1,733	1,816	1,759
Bengkulu	1,007	965	996
Lampung	2,102	2,131	2,123
Kepulauan Bangka Belitung	788	795	793
Kepulauan Riau	762	778	723
Daerah Khusus Ibukota Jakarta	2,985	3,012	2,918
Jawa Barat	7,030	7,102	7,145
Jawa Tengah	7,441	7,428	7,463
Daerah Istimewa Yogyakarta	2,250	2,250	2,239
Jawa Timur	8,607	8,679	8,619
Banten	1,896	1,905	1,884
Bali	1,893	1,890	1,877
Nusa Tenggara Barat	2,144	2,132	2,149
Nusa Tenggara Timur	1,656	1,674	1,740
Kalimantan Barat	1,880	1,873	1,869
Kalimantan Tengah	1,103	1,126	1,102
Kalimantan Selatan	1,755	1,761	1,713
Kalimantan Timur	1,112	1,139	1,085
Sulawesi Utara	1,130	1,126	1,137
Sulawesi Tengah	1,113	1,144	1,108
Sulawesi Selatan	2,024	2,031	2,007
Sulawesi Tenggara	1,085	1,098	1,087
Gorontalo	782	751	779
Sulawesi Barat	556	566	558
Maluku	750	746	692
Maluku Utara	494	510	471
Papua Barat	416	478	437
Papua	1,002	982	1,032
Total	**66,724**	**67,174**	**66,516**

Although the small sample problem has been avoided by choosing 20% of the population whose expenditures are above the temporary poverty line, the reference group chosen still does not represent the poor. The next sensitivity analysis considers the shares of the population with expenditures above and below the temporary poverty line, capturing the poor and the near-poor's consumption patterns.

1.4.2.2 The Second Type of Reference Population: Share of Population With Expenditures Above and Below the Temporary Poverty Line

Table 1.12. P-α Results from the Second Type of Reference Population Simulation

Reference Population	2008			2009			2010		
	P0	P1	P2	P0	P1	P2	P0	P1	P2
± 5% TPL	10.54	1.76	0.46	7.51	1.14	0.28	9.94	1.57	0.40
± 10% TPL	10.31	1.71	0.44	7.90	1.21	0.29	9.70	1.51	0.38
± 15% TPL	10.39	1.72	0.44	8.99	1.42	0.35	9.72	1.52	0.38
± 20% TPL	10.97	1.83	0.47	10.23	1.65	0.42	10.17	1.60	0.40
± 25% TPL	11.87	1.98	0.52	11.38	1.90	0.49	10.90	1.73	0.44
± 30% TPL	13.00	2.22	0.59	15.92	2.86	0.79	12.44	2.01	0.52

Table 1.12 displays the second type of reference population simulation results and shows that in 2008 and 2010, as the reference population changes from plus/minus 5% of the temporary poverty line (TPL) to plus/minus 10% of the TPL, the P-α indices decline slightly. However, after that initial reference population change, the P-α indices increase as the reference population becomes larger. Furthermore, compared to the first type of sensitivity analysis, this second type of sensitivity analysis is less sensitive. That is, an increase in the size of the reference population results in a smaller change in the P-α, thus having lower elasticity than the first type.

Figure 1.10 shows that unlike the first type of reference population that shows the same trends of the P-α for all the various reference populations, the second type of reference population shows different trends of the P-α for different reference populations. One particular reference population, plus/minus 30% of the TPL, shows a different trend of the P-α compared to the rest of the reference populations in all years. That is, the P-α indices increased significantly from 2008 to 2009. Nevertheless, the P-α indices dropped substantially between 2009 and 2010. A possible explanation is that 30% above and below the temporary poverty line means that 60% of the population is the reference population. This group clearly is too large and does not represent the poor and the near-poor's consumption patterns:

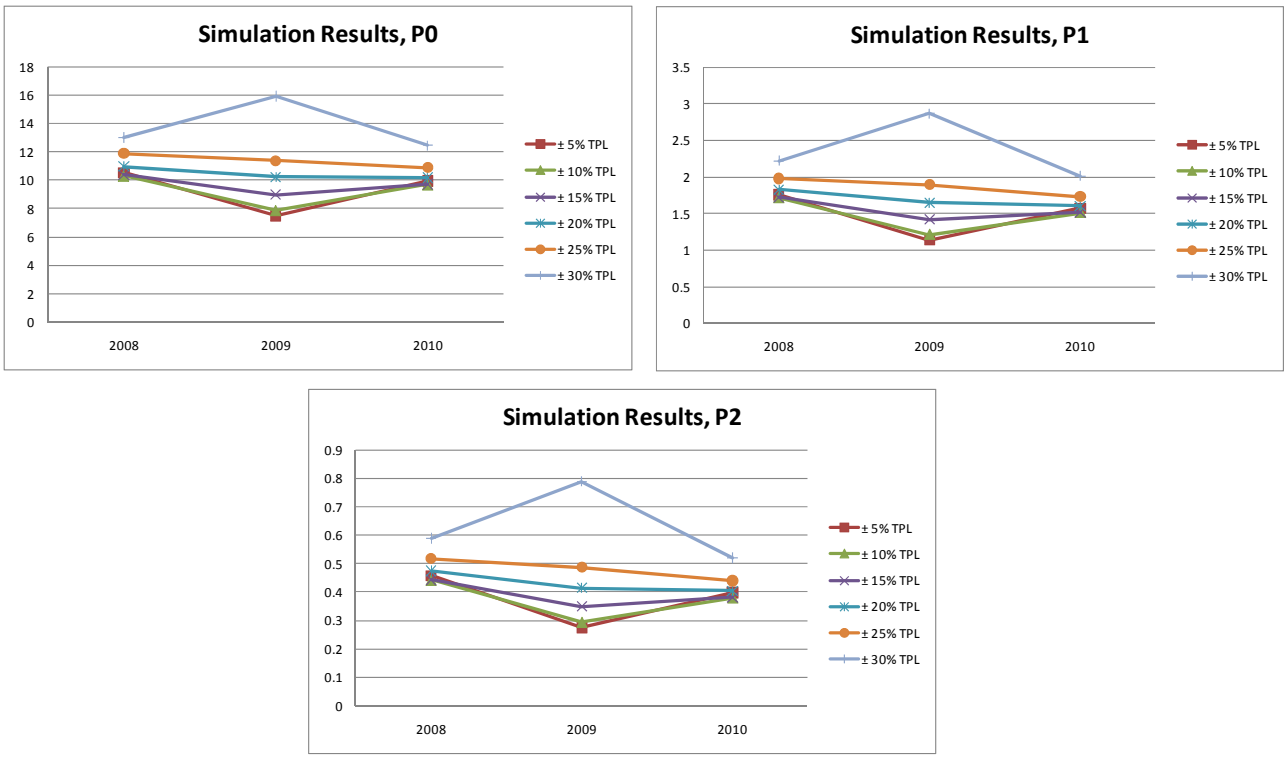


Figure 1.10. P0, P1, and P2 Simulation Results for Various Reference Populations 2008-2010

In sum, the second type of reference population is less sensitive than the first. That is, varying the percentage of the reference population with expenditures above and below the temporary poverty line results in a lower percentage point change of the P-α than is obtained by varying the percentage of the reference group with expenditures above the temporary poverty line. The decision of which reference population to use is undoubtedly imperative because it will largely determine the level of the poverty line and, thus, the official poverty number. Although the second type of reference population is less sensitive, we think it is more appropriate because it takes into account not only the near-poor but also the poor.

1.4.2 Urban and Rural Inflation Sensitivity Analysis Results

The benchmark poverty lines and poverty indices used for comparison are calculated using the SUSENAS Consumption Module from the DU and only the urban inflation rates used for the

urban and rural temporary poverty lines:

Table 1.13. Comparison Between Poverty Lines Using Urban & Rural Inflation and Poverty Lines Using Urban Inflation Only

Year	Urban and Rural Inflations			Urban Inflation Only		
	Urban	Rural	Total	Urban	Rural	Total
2008	211,406	159,197	184,420	211,406	158,890	184,261
2009	265,388	199,632	231,395	265,388	199,632	231,395
2010	233,047	192,266	211,964	233,047	191,789	211,717

With other criteria constant, applying the urban and rural inflation rates to obtain the temporary poverty lines used to determine the reference populations leads to a slightly higher rural poverty line than that obtained by applying only the urban inflation rate, as shown in Table 1.13. Higher rural inflation leads to a higher rural temporary poverty line, resulting in a wealthier reference population in the rural areas. As a consequence, the rural poverty line becomes higher, and the total or national poverty line increases as well. There are no changes in the urban poverty line as the urban inflation rate is assumed to be the same. In addition, the trends of all poverty lines for both assumptions are exactly the same; that is, all poverty lines increased from 2008 to 2009, and they declined between 2009 and 2010.

As expected, the effect of higher poverty lines is clearly higher poverty headcounts, poverty gaps, and poverty severity, which imply an indirect positive effect of higher inflation on poverty indices, as shown in Table 1.14. Similar patterns in poverty lines are evident in this comparison. Specifically, the rural poverty indices obtained by incorporating the urban and rural inflation assumptions are marginally higher than those obtained by including urban inflation only. Additionally, the trends of all poverty indices are the same with and without the rural inflation assumption.

Furthermore, for the sake of simplicity, I assumed that rural inflation is a function of

urban inflation. In reality, this might not be the case. Rural inflation can be a function of other factors such as natural disasters, weather, and crop harvests. In addition, to calculate inflation, our assumption still relies on the CBS's Consumer Price Index (CPI), an index that represents the price of goods and services consumed by average people in major cities in Indonesia. Therefore, a price index that takes into account the price of goods and services consumed by only the poor needs to be constructed to calculate price changes faced by the poor in urban and rural areas. This step will ensure that inflation specific to the poor, not average-income people, is used in the poverty line calculation.

Table 1.14. P-α Comparison Between Urban and Rural Inflation Assumptions and the Urban Inflation Assumption

(a) Using Urban and Rural Inflation

Year	Urban			Rural			Total		
	P0	P1	P2	P0	P1	P2	P0	P1	P2
2008	12.70	2.28	0.62	17.66	3.15	0.87	15.26	2.73	0.75
2009	11.51	2.04	0.55	15.16	2.57	0.68	13.40	2.32	0.62
2010	9.87	1.57	0.40	16.72	2.84	0.77	13.41	2.23	0.59

(b) Using Urban Inflation Only

Year	Urban			Rural			Total		
	P0	P1	P2	P0	P1	P2	P0	P1	P2
2008	12.70	2.28	0.62	17.60	3.12	0.86	15.23	2.71	0.75
2009	11.51	2.04	0.55	14.99	2.53	0.67	13.31	2.29	0.61
2010	9.87	1.57	0.40	16.54	2.80	0.75	13.32	2.21	0.58

The sensitivity analysis results of the reference population and rural inflation have previously shown that these parameters have positive effects on poverty line levels. Nonetheless, there are no clear justifications for why the CBS sets the near-poor instead of the poor as the reference population and why the CBS employs only urban inflation for both the urban and rural temporary poverty lines. The CBS should carefully reexamine its assumptions because those assumptions will significantly impact the poverty line and thus the poverty indices.

One interesting feature of Table 1.14 is the trend of the urban and rural poverty figures. The trend clearly shows that in rural areas, the poverty indices show a significant decline from 2008 to 2009 but a slight increase from 2009 to 2010, whereas in urban areas, the poverty indices show a smooth decline from 2008 to 2010, approximately 1 percentage point decrease per year. The trend of poverty indices in rural areas is exactly the same as that at the national level, highlighting the importance of population weight in estimating poverty figures.

1.4.3 Food Poverty Basket Sensitivity Analysis

Expanding the food poverty basket leads to an increase in the food poverty line because expenditures of the reference population on food items that are not in the official food poverty basket are now counted. Table 1.15 presents the total poverty lines generated from 103 food items and from 52 food items in the food poverty basket:

Table 1.15. Poverty Lines From 103 and 52 Food Items in Food Poverty Basket

Year	103 Food Items			52 Food Items		
	Urban	Rural	National	Urban	Rural	National
2008	242,767	178,636	209,617	211,406	159,197	184,420
2009	301,921	226,653	263,011	265,388	199,632	231,395
2010	288,008	224,874	255,369	233,047	192,266	211,964

As expected, all poverty lines generated using the larger number of food items in the food poverty basket are higher than those calculated using the official food poverty basket. The differences are significantly large for all poverty lines, suggesting that the number of food items included in the food poverty basket positively influences the poverty lines. In other words, the larger the food poverty basket, the higher the poverty line. Furthermore, the trends of the urban, rural, and national poverty lines are similar between the two different food poverty baskets. However, the magnitude of the poverty-line changes varies for both food poverty baskets. In

addition, the cost of living difference between urban and rural areas, a ratio of the urban poverty line to the rural poverty line, shows a slight difference for both food poverty baskets, as shown in Table 1.16. Basic food prices are more or less between 21% and 36% higher in urban than in rural areas:

Table 1.16. Ratio of Urban Poverty Line to Rural Poverty Line

	103 Food Items	52 Food Items
2008	1.36	1.33
2009	1.33	1.33
2010	1.28	1.21

The 103 food-item poverty basket leads to higher poverty lines than the 52 food-item poverty basket. As a result, the poverty incidences (P0) are also significantly higher, as shown in Figure 1.11. Moreover, the trends of the P0 are the opposite of those of the poverty lines for both food poverty baskets. Nonetheless, changes of the P0 using 103 food items are much larger than those of the P0 using 52 food items. In sum, a larger number of food items in the food poverty basket is highly sensitive to the poverty line calculation because the addition of more food items in the basket accounts for a significant increase in the food poverty line and thus in the total poverty line:

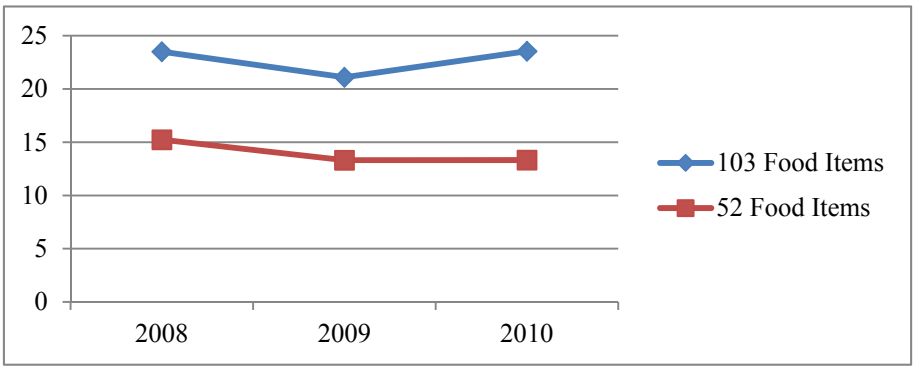


Figure 1.11. P0 for Two Different Food Poverty Baskets

Based on the exercise above, we conclude that compared with other assumptions, the number of food items in the food poverty basket has the most significant impact on estimating

the poverty line. More food items in the food poverty baskets lead to a higher poverty line and thus a higher poverty rate. The differences between the poverty rate of the official food basket and of the modified food basket are quite large. This finding suggests that the official poverty rate may underminestimate regional consumption patterns and changing food consumptions of the poor. It should be noted that the CBS established the 52 food-item basket in 1998 when Indonesia's economy was contracting due to the Asian Financial Crisis. Moreover, it is likely that the 52 food items represent the consumption patterns of people living in urban areas and in the western part of Indonesia. As a result, the existing food basket may not represent the actual expenditures of the poor then and now. In contrast, the food items in our food basket are selected based on a criterion in which only items consumed by at least 20% of the population of the bottom 20% are selected. We feel this criterion is sensible and helps to capture the changing food consumption patterns of the poor. Therefore, in our opinion, if the CBS, due to a limited budget, were to change only one assumption in its methodology, the number of food items in the food basket should be prioritized.

1.4.4 Alternative Method for Calculating Indonesia's Poverty Lines

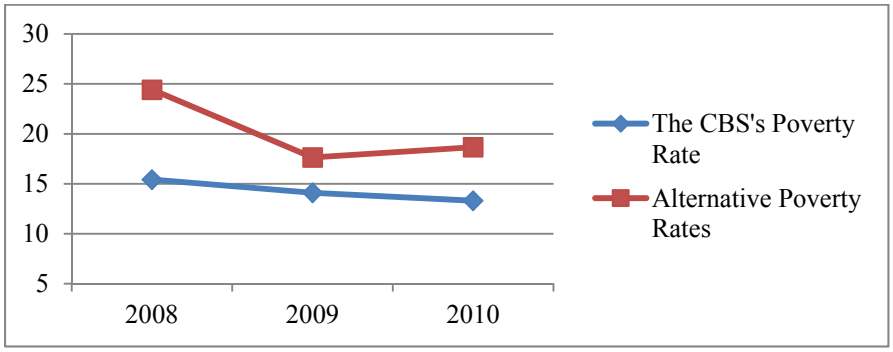


Figure 1.12. The CBS's Official Headcount and the Alternative Method Headcount

Taking into account the results of the sensitivity analysis, I develop an alternative poverty line calculation using different assumptions that might work better for counting the poor.

Figure 1.12 shows that the difference in the poverty headcount between the official and alternative methods is substantially large in 2008. The alternative headcount is 24.4%, whereas the official headcount is only 15.4%, implying a possible underestimation of the poor by 9 percentage points. The headcount differences in 2009 and 2010 are not as high as in 2008, with a 3.5 percentage point difference in 2009 and a 5.4 percentage point difference in 2010. The poverty headcount difference between the two methods represents poor people who might not be included in poverty reduction programs and thus might not receive necessary assistance from the government.

The headcount of the alternative method shows a very different trend compared to the official poverty headcount. The official poverty headcount illustrates a smooth decreasing trend, whereas the alternative headcount shows a significant drop from 2008 to 2009 but an increase from 2009 to 2010. The difference in trends between the official and the alternative methods might be problematic. Because the official poverty headcount shows a declining trend, policy makers might cut the poverty reduction budget and reallocate the funds to other objectives. However, the alternative method shows an increasing number of poor people. Therefore, instead of cutting the budget, policy makers should allocate more to poverty alleviation programs to anticipate an increase in poverty.

Figure 1.13 shows the differences in the number of poor people between the CBS and the alternative method for urban, rural, and national categories. As shown in Figure 1.13, there are significant differences between the CBS and the alternative method in the number of poor people nationally. The difference was much higher in 2008 than in both 2009 and 2010. In 2008, the difference shows that 20 million more people were poor according to the alternative method. The differences in 2009 and 2010 were more than 8 million and 12 million people, respectively.

Compared to the differences in the urban number of poor people, those differences in the rural number of the poor are higher in the period of study. However, clearly the differences in the national number of the poor are driven by the differences in the rural number of poor people:

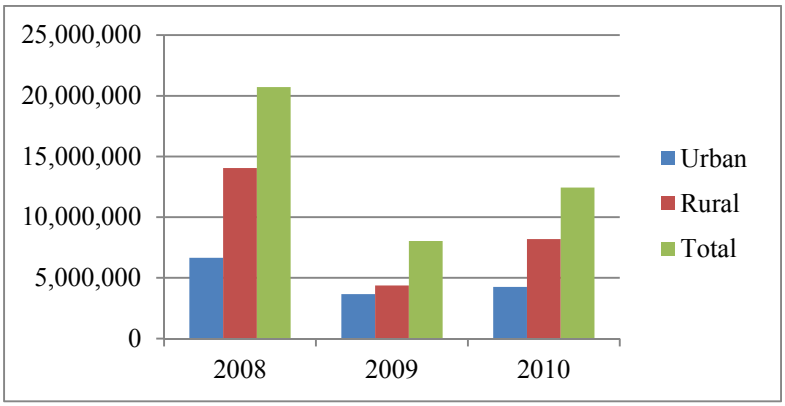


Figure 1.13. Differences in CBS and Alternative Method for Numbers of the Poor

Using the alternative method explained previously, Table 1.17 below shows that the rural poverty headcount is higher than the urban poverty headcount in most provinces in the period of study. The difference between the urban and rural headcounts varies across regions. For example, in 2010, the difference in Papua is extremely high, approximately 37 percentage points, whereas the difference in Sumatera Barat is only 0.4 percentage point. Some provinces with high population density, such as East Java and DI Yogyakarta, tend to have a wide disparity between the urban and rural headcounts. Moreover, the headcount differences between urban and rural areas in many provinces in the eastern part of Indonesia are considerably large, more than a 10-percentage point difference. A wide gap between the urban and rural poverty headcounts in Indonesia clearly shows that poverty reduction strategies are ineffective in reaching rural areas. Based on the data available, we can conclude that the poor are more concentrated in rural than in urban areas. Table 1.17 also shows that a majority of provinces in the eastern part of Indonesia have extremely high poverty incidences, which is not a surprising finding. Almost 30 to 40% of the population is poor in Maluku, Maluku Utara, Papua Barat, and Papua. However, the poverty

line is calculated based on expenditures on a predetermined set of goods. Most of the population in those regions lives in remote areas that have very limited access to markets, public health centers, and education facilities, and they depend heavily on nature for their food consumption (i.e., by hunting animals or by producing their own food). This population most likely has low income/expenditures, but they are self-sufficient and do not consider themselves poor. Nevertheless, these people will be considered poor by any monetary poverty measures:

Table 1.17. Alternative Method Poverty Headcount by Provinces

	2008			2009			2010		
Province	**Urban**	**Rural**	**Total**	**Urban**	**Rural**	**Total**	**Urban**	**Rural**	**Total**
ACEH	16.7	33.7	28.8	13.6	24.7	21.5	12.9	21.6	19.1
SUMATERA UTARA	19.6	19.4	19.5	15.0	21.1	18.3	14.5	19.1	17.0
SUMATERA BARAT	17.7	20.3	19.4	8.4	12.5	11.1	14.0	14.4	14.2
R I A U	12.0	20.4	16.2	14.8	20.9	17.8	11.3	19.2	15.2
J A M B I	15.3	20.7	18.9	14.6	14.0	14.2	18.4	15.2	16.3
SUMATERA SELATAN	22.1	29.2	26.4	15.5	19.0	17.7	14.1	23.3	19.8
BENGKULU	27.3	28.9	28.3	10.3	14.7	13.1	13.5	20.6	18.1
LAMPUNG	25.3	32.2	30.3	14.5	20.5	18.9	20.5	27.7	25.8
BANGKA BELITUNG	14.4	15.3	14.9	11.1	12.7	12.0	9.2	14.8	12.1
KEPULAUAN RIAU	8.3	11.2	9.7	6.3	9.0	7.6	7.9	16.8	12.1
DKI JAKARTA	9.4	.	9.4	7.4	.	7.4	9.3	.	9.3
JAWA BARAT	16.2	25.1	19.9	12.1	14.7	13.2	13.1	19.0	15.5
JAWA TENGAH	25.9	33.2	29.7	17.3	20.0	18.7	18.0	24.2	21.2
DI YOGYAKARTA	24.4	43.3	31.2	45.0	59.9	50.3	13.7	26.3	18.2
JAWA TIMUR	18.8	38.3	28.7	13.7	23.6	18.7	15.0	27.9	21.6
BANTEN	9.4	17.7	12.7	7.0	11.7	8.8	9.0	16.6	12.0
B A L I	5.0	9.5	6.9	2.1	5.3	3.5	3.6	7.8	5.3
NUSA TENGGARA BARAT	34.3	43.2	39.5	54.8	62.7	59.4	24.1	22.0	22.9
NUSA TENGGARA TIMUR	16.1	52.0	45.5	15.5	25.3	23.5	13.6	35.8	31.8
KALIMANTAN BARAT	26.1	25.0	25.3	15.7	22.8	20.8	16.3	26.5	23.6
KALIMANTAN TENGAH	17.9	16.8	17.2	10.4	13.5	12.4	9.1	23.4	18.6
KALIMANTAN SELATAN	14.3	21.5	18.5	14.7	14.3	14.5	9.2	14.7	12.4
KALIMANTAN TIMUR	13.7	27.9	19.1	12.1	16.0	13.5	13.5	19.9	15.9
SULAWESI UTARA	14.3	22.5	18.9	7.3	19.0	13.9	10.4	21.1	16.4
SULAWESI TENGAH	12.1	35.0	30.2	12.0	21.4	19.4	14.6	25.2	23.0
SULAWESI SELATAN	12.7	28.2	23.2	12.0	15.5	14.3	8.2	20.2	16.4
SULAWESI TENGGARA	12.8	38.5	32.6	17.4	40.8	35.4	7.2	32.8	26.9
GORONTALO	29.6	50.4	43.9	20.3	28.0	25.6	22.8	32.5	29.5
SULAWESI BARAT	17.1	39.9	32.3	11.4	32.9	25.7	12.7	23.4	19.8
M A L U K U	19.5	52.9	44.2	12.5	20.5	18.4	24.4	36.3	33.2
MALUKU UTARA	16.2	36.6	30.5	19.6	39.3	33.4	12.2	27.4	22.9
PAPUA BARAT	16.0	64.3	53.3	13.5	53.6	44.4	21.1	49.0	42.6
PAPUA	14.8	58.6	48.6	12.3	25.4	22.5	9.7	47.2	38.7
NASIONAL	**17.7**	**30.7**	**24.4**	**14.0**	**21.0**	**17.6**	**13.7**	**23.4**	**18.7**

1.5 Conclusion

Accurate and reliable poverty data support sound and effective policies for poverty alleviation efforts. This paper emphasizes the importance of examining more closely the data, methodology, and implications of the national poverty line and indices rather than simply accepting these figures as a given. A key finding of this study is the revelation of the two data sets from the CBS and their significant differences in 2008 and 2009. This finding explains why those outside of the CBS who attempt to replicate the official poverty figures often fail. There are two possible explanations for why two different data sets for estimating the poverty line exist. One explanation suggests that the data used for estimating the poverty indices announced in July are incomplete, but the Poverty Unit still uses the incomplete data and then adjusts or modifies the data to produce the official poverty lines and figures. However, a central employee of the CBS explains that the Poverty Unit uses the final data from the SUSENAS Unit and further processes the data to estimate the official figures. However, the Poverty Unit does not send back the data to the SUSENAS Unit. As a result, two different data sets exist. Fortunately, it is likely that this study encouraged the CBS to change or unify the data. The CBS has acknowledged the existence of two data sets and has unified the 2010 SUSENAS data set in the Poverty Unit and in the Dissemination Unit, as shown in this study.

The sensitivity analysis exercises in this study underline the importance of reexamining the setting of the reference population, the use of urban and rural inflation in determining the temporary poverty lines, and the number of food items in the poverty basket. Simulations of two types of reference population reveal that the first type (x% above the temporary poverty line) is more sensitive than the second type (x% above and below the temporary poverty line). However, we argue that the second type is more appropriate because it accounts for those below and above

or around the temporary poverty line. Moreover, with other criteria constant, applying the rural inflation rate to obtain the rural temporary poverty line leads to a slightly higher rural poverty line and poverty indices than that obtained in the benchmark. However, the assumption of rural inflation in this study is very conservative. In reality, rural inflation is likely to be much higher and thus has a positive and large impact on the rural poverty line. Therefore, the current official method that does not take into account rural inflation is severely flawed and should be revised immediately.

In addition, a larger number of food items in the poverty basket results in higher food poverty lines and thus higher total poverty lines. The number of food items in the food poverty basket was set in 1998 when Indonesia's economy was contracting due to the Asian Financial Crisis. Moreover, this food poverty basket likely represents the consumption patterns of people living in urban areas and in the western part of Indonesia. Alternatively, we introduce a different food poverty basket consisting of food items consumed by at least 20% of the bottom 20% of the income distribution across Indonesia, which may represent the current consumption patterns of poor people. We believe that this criterion is sensible and helps to capture changing food consumption patterns of the poor. Therefore, in our opinion, if the CBS, due to a limited budget, were to change only one assumption in its methodology, the number of food items in the food basket should be prioritized.

Furthermore, an alternative method was employed using different assumptions regarding the reference population, inflation, and the poverty basket. The resulting poverty line and indices for the period of 2008-2010 were not only higher but also showed a different trend than the official poverty line, suggesting an increase in poverty from 2009-2010, rather than the steady decline indicated by the official numbers.

Failure to properly calculate the poverty line and indices may lead to an inaccurate and misleading representation of the poor, which in turn may result in unwarranted policy interventions. Misguided policies from imprecise data, as perhaps can be seen in the recent government decisions to cut government expenditures and the poverty reduction budget in 2011, may end up exacerbating rather than alleviating poverty in Indonesia. Therefore, stakeholders in poverty figures, including the Indonesian government, researchers, and non-government institutions should actively and continuously perform "checks and balances" on the methodology used for poverty line calculations. The official poverty line figures should be easily replicated by those outside of the CBS so that the CBS does not lose its credibility, and, most importantly, so that the public can monitor the methodology.

Findings from this study also suggest that the methodology urgently requires an update to capture the changing consumption patterns of the poor. However, changing the methodology is likely to lead to a higher poverty line and thus a higher number of poor people. This could be viewed as a sign of failure in the current government and could lead to political turmoil. Changing the methodology requires not only strong political will on the part of the Indonesian government but also a careful and thoughtful plan to handle the effects of drastic change in the poverty figures. This reality might not be attractive to the current Indonesian government, but perhaps the next government will have the political will to update the methodology. In the transition period, the government may wish to have two different poverty lines in which one poverty line still uses the old methodology, whereas another poverty line employs new methodology as part of the socializing process. Acclimating stakeholders to the new updated methodology will likely be a great challenge but is essential for generating accurate poverty indices that are useful not only for policy makers but also for Indonesian society.

APPENDIX A

A.1 Comparison between the DU and PU Poverty Lines by province

Table A.1. Comparison between the DU and PU Poverty Lines

Province	2008 DU*			2008 PU**			2009 DU*			2009 PU**			2010 DU*			2010 PU**		
	Urban PL	Rural PL	Urban+ Rural	Urban PL	Rural PL	Urban+ Rural	Urban PL	Rural PL	Urban+ Rural	Urban PL	Rural PL	Urban+ Rural	Urban PL	Rural PL	Urban+ Rural	Urban PL	Rural PL	Urban+ Rural
Aceh	253,151	216,130	226,792	266,168	226,423	237,870	310,260	245,010	263,804	292,428	249,546	261,898	308,306	266,261	278,372	308,306	266,285	278,389
Sumatera Utara	221,786	167,381	192,465	218,333	170,829	192,732	284,624	203,227	240,756	234,712	189,306	210,241	247,547	201,795	222,889	247,547	201,810	222,898
Sumatera Barat	231,915	178,754	196,987	226,343	179,745	195,727	334,878	234,483	268,915	248,525	201,257	217,469	262,173	214,444	230,814	262,173	214,458	230,823
Riau	255,478	209,803	232,824	247,923	210,519	229,371	325,330	258,009	291,937	265,707	226,945	246,481	276,627	235,238	256,097	276,627	235,267	256,112
Jambi	224,566	162,298	182,474	223,527	162,525	182,291	297,476	231,811	253,086	244,516	178,107	199,623	262,826	193,816	216,175	262,826	193,834	216,187
Sumatera Selatan	224,908	170,677	191,664	229,552	176,181	196,835	274,477	199,349	228,423	247,661	190,109	212,381	258,304	198,550	221,674	258,304	198,572	221,687
Bengkulu	217,727	163,221	182,408	224,081	168,930	188,344	293,092	206,804	237,173	242,735	192,351	210,084	255,762	209,598	225,846	255,762	209,616	225,857
Lampung	201,763	154,006	166,902	203,685	160,549	172,197	284,729	191,558	216,717	224,168	175,734	188,812	236,098	189,936	202,401	236,098	189,954	202,414
Kepulauan Bangka Belitung	253,122	245,451	249,118	250,240	241,741	245,803	317,412	290,313	303,269	272,809	261,378	266,843	289,644	283,259	286,312	289,644	283,302	286,334
Kepulauan Riau	294,749	225,079	261,924	289,541	231,580	262,232	417,506	276,778	351,213	308,210	256,742	283,965	321,668	265,218	295,076	321,668	265,258	295,095
DKI Jakarta	312,270	0	312,270	290,268	.	290,268	390,262	0	390,262	316,936	.	316,936	331,169	.	331,169	331,169	0	331,169
Jawa Barat	198,729	152,727	179,777	190,824	155,384	176,223	232,442	183,313	212,201	203,751	175,193	191,985	212,210	185,310	201,127	212,210	185,335	201,138
Jawa Tengah	185,302	149,829	167,071	184,704	151,367	167,571	223,139	187,790	204,970	196,478	169,312	182,515	205,606	179,962	192,425	205,606	179,982	192,435
DI Yogyakarta	226,022	173,696	207,339	208,655	169,922	194,826	263,992	206,326	243,401	228,236	182,706	211,978	240,282	195,385	224,251	240,282	195,406	224,258
Jawa Timur	184,013	150,998	167,142	183,408	154,674	168,724	226,300	185,285	205,339	202,624	174,628	188,317	213,383	185,860	199,317	213,383	185,879	199,327
Banten	208,985	157,214	188,381	197,328	157,466	181,463	282,995	193,127	247,228	212,310	178,238	198,750	220,771	188,715	208,013	220,771	188,741	208,023
Bali	193,708	160,744	179,767	190,026	158,072	176,512	293,036	223,967	263,827	211,461	176,003	196,466	222,868	188,045	208,141	222,868	188,071	208,152
Nusa Tenggara Barat	189,301	140,493	160,944	193,241	147,451	166,638	215,606	178,122	193,828	213,450	164,526	185,025	223,784	176,261	196,173	223,784	176,283	196,185
Nusa Tenggara Timur	191,535	119,242	132,233	199,006	126,403	139,449	241,701	148,495	165,242	218,796	142,478	156,191	241,807	160,724	175,293	241,807	160,743	175,308
Kalimantan Barat	192,035	153,224	164,014	179,261	151,478	159,202	263,463	193,155	212,701	194,881	166,815	174,617	207,884	182,273	189,393	207,884	182,293	189,407
Kalimantan Tengah	213,325	173,396	186,972	196,354	176,059	182,959	284,406	215,217	238,745	209,317	199,157	202,612	220,658	212,764	215,448	220,658	212,790	215,466
Kalimantan Selatan	206,566	166,130	182,911	199,416	165,808	179,756	272,447	207,926	234,710	216,538	181,059	195,787	230,712	196,727	210,835	230,712	196,753	210,850
Kalimantan Timur	287,176	217,299	260,767	257,862	205,098	237,920	373,889	297,227	344,914	283,472	224,506	261,185	307,479	248,529	285,198	307,479	248,583	285,218
Sulawesi Utara	184,980	166,241	174,373	175,628	162,192	168,023	289,234	234,406	258,201	193,251	178,271	184,772	202,469	188,080	194,325	202,469	188,096	194,334
Sulawesi Tengah	205,505	157,715	167,752	196,229	159,882	167,516	275,032	209,213	223,038	217,529	182,241	189,653	231,225	195,774	203,220	231,225	195,795	203,237
Sulawesi Selatan	173,952	124,245	140,251	160,220	126,133	137,109	243,906	180,293	200,777	177,872	142,241	153,715	186,693	151,865	163,080	186,693	151,879	163,089
Sulawesi Tenggara	163,106	133,861	140,588	151,471	136,072	139,614	291,197	204,392	224,358	175,070	157,554	161,583	177,787	161,786	165,467	177,787	161,451	165,208
Gorontalo	170,735	140,026	149,639	154,987	143,235	146,914	263,711	210,120	226,900	173,850	156,873	162,189	180,606	167,144	171,359	180,606	167,162	171,371
Sulawesi Barat	159,726	146,431	150,873	156,041	143,071	147,404	226,928	190,448	202,634	175,901	156,866	163,224	182,206	165,902	171,348	182,206	165,914	171,356
Maluku	229,101	182,067	194,345	213,969	179,288	188,341	282,590	232,229	245,375	230,913	198,969	207,308	249,895	217,562	226,002	249,895	217,599	226,030
Maluku Utara	249,664	179,819	200,562	213,505	174,301	185,944	313,639	261,093	276,702	226,732	190,838	201,500	238,533	202,156	212,961	238,533	202,185	212,982
Papua Barat	254,896	233,219	238,159	244,807	231,254	234,343	385,968	300,679	320,117	304,730	269,354	277,416	319,170	287,469	294,694	319,170	287,512	294,727
Papua	298,281	227,609	243,723	264,625	220,171	230,307	368,741	267,962	290,940	285,158	234,727	246,225	298,285	247,522	259,096	298,285	247,563	259,128
Indonesia	**211,406**	**158,890**	**184,261**	**204,896**	**161,273**	**182,348**	**265,388**	**199,007**	**231,072**	**222,123**	**179,829**	**200,259**	**233,047**	**191,789**	**211,717**	**232,989**	**192,354**	**211,726**

Notes: *Calculation using Dissemination Unit data set

**Calculation using Poverty Unit data set

A.2. Comparison between the DU and PU P-Alphas by province

Table A.2 Comparison between the DU and PU P-Alphas

Province	2008 DU*			2008 PU**			2009 DU*			2009 PU**			2010 DU*			2010 PU**		
	Urban + Rural			Urban + Rural			Urban + Rural			Urban + Rural			Urban + Rural			Urban + Rural		
	p0	p1	p2	p0	p1	p2	p0	p1	p2	p0	p1	p2	p0	p1	p2	p0	p1	p2
Aceh	19.92	3.93	1.15	22.97	4.74	1.43	19.52	3.75	1.09	21.80	4.46	1.34	20.98	4.11	1.26	20.98	4.11	1.26
Sumatera Utara	12.04	2.11	0.56	12.43	2.14	0.57	14.21	2.58	0.70	11.51	1.92	0.50	11.31	2.04	0.57	11.31	2.04	0.57
Sumatera Barat	10.85	1.63	0.40	10.67	1.60	0.39	10.68	1.69	0.42	9.54	1.41	0.32	9.50	1.49	0.35	9.50	1.49	0.35
Riau	11.02	1.73	0.43	10.63	1.63	0.40	14.82	2.50	0.61	9.48	1.25	0.25	8.65	1.38	0.37	8.65	1.38	0.37
Jambi	9.32	1.57	0.42	9.32	1.56	0.41	11.37	1.99	0.53	8.77	1.38	0.36	8.34	1.05	0.23	8.34	1.05	0.23
Sumatera Selatan	15.95	2.80	0.75	17.85	3.19	0.86	13.24	2.34	0.64	16.28	3.06	0.86	15.35	2.63	0.71	15.47	2.63	0.71
Bengkulu	18.37	3.09	0.88	20.37	3.62	1.03	9.50	1.48	0.34	18.59	2.98	0.77	18.16	2.75	0.69	18.30	2.75	0.69
Lampung	18.07	3.27	0.85	20.93	3.81	1.02	16.49	2.88	0.78	20.22	3.94	1.12	18.94	2.98	0.72	18.94	2.98	0.72
Kepulauan Bangka Belitung	9.43	1.37	0.34	8.58	1.27	0.31	9.74	1.47	0.39	7.46	1.20	0.31	6.51	0.93	0.23	6.51	0.93	0.23
Kepulauan Riau	8.37	2.05	0.71	9.18	2.07	0.72	8.18	1.47	0.49	8.27	2.02	0.77	8.05	1.05	0.25	8.05	1.05	0.25
DKI Jakarta	6.08	1.03	0.28	4.29	0.72	0.19	6.07	0.98	0.25	3.62	0.57	0.14	3.48	0.45	0.11	3.48	0.45	0.11
Jawa Barat	13.82	2.31	0.62	13.03	2.17	0.58	10.31	1.66	0.42	11.96	1.95	0.50	11.27	1.93	0.52	11.27	1.93	0.52
Jawa Tengah	18.47	3.25	0.86	18.91	3.32	0.88	15.51	2.50	0.60	17.72	2.96	0.74	16.54	2.49	0.60	16.56	2.49	0.60
DI Yogyakarta	21.87	4.24	1.22	18.32	3.35	0.92	13.89	2.63	0.73	17.23	3.52	1.04	16.83	2.85	0.73	16.83	2.85	0.73
Jawa Timur	17.52	3.13	0.85	18.33	3.33	0.91	15.07	2.50	0.65	16.68	2.88	0.76	15.25	2.38	0.59	15.26	2.38	0.59
Banten	9.26	1.34	0.34	8.29	1.15	0.29	8.13	1.49	0.38	7.64	1.32	0.33	7.16	0.99	0.24	7.16	1.00	0.24
Bali	6.53	0.94	0.20	6.17	0.84	0.18	5.38	0.77	0.18	5.13	0.74	0.17	4.88	0.71	0.14	4.88	0.71	0.14
Nusa Tenggara Barat	20.52	3.79	1.06	23.32	4.39	1.25	15.86	3.02	0.84	22.78	5.15	1.68	21.55	3.77	1.01	21.55	3.77	1.01
Nusa Tenggara Timur	22.01	3.73	0.99	25.63	4.82	1.33	19.72	3.41	0.92	23.31	4.14	1.14	23.03	4.73	1.43	23.03	4.74	1.43
Kalimantan Barat	12.52	1.95	0.50	11.29	1.68	0.42	14.58	2.53	0.69	9.30	1.55	0.40	9.02	1.18	0.24	9.02	1.18	0.24
Kalimantan Tengah	9.24	1.46	0.36	8.27	1.33	0.33	6.89	1.08	0.25	7.02	1.03	0.22	6.77	1.02	0.24	6.77	1.02	0.24
Kalimantan Selatan	6.81	1.10	0.28	6.48	1.01	0.26	7.92	1.10	0.26	5.12	0.73	0.17	5.21	0.69	0.18	5.21	0.69	0.18
Kalimantan Timur	12.35	2.32	0.62	9.51	1.61	0.39	15.22	3.12	0.97	7.73	1.51	0.43	7.66	1.27	0.34	7.66	1.27	0.34
Sulawesi Utara	11.84	1.83	0.46	9.83	1.52	0.38	15.00	2.62	0.69	9.79	1.55	0.36	9.10	1.14	0.24	9.10	1.14	0.24
Sulawesi Tengah	20.31	4.19	1.36	20.35	4.27	1.39	19.06	4.24	1.41	18.98	4.09	1.37	18.07	3.09	0.80	18.07	3.09	0.80
Sulawesi Selatan	12.87	2.32	0.64	12.73	2.31	0.62	10.63	1.74	0.45	12.31	2.08	0.55	11.60	1.91	0.49	11.60	1.91	0.49
Sulawesi Tenggara	18.08	3.31	0.93	17.80	3.44	0.97	17.09	3.04	0.88	18.93	3.44	0.98	17.15	3.20	0.90	17.05	3.18	0.89
Gorontalo	24.55	4.51	1.21	24.33	4.55	1.26	17.50	2.93	0.72	25.01	4.59	1.27	23.19	4.14	1.00	23.19	4.14	1.00
Sulawesi Barat	18.71	3.07	0.78	17.54	2.72	0.68	20.89	4.12	1.08	15.29	2.47	0.60	13.58	1.55	0.35	13.58	1.55	0.35
Maluku	31.28	6.34	1.90	29.44	5.79	1.72	16.75	2.91	0.76	28.00	5.52	1.65	27.74	5.22	1.47	27.74	5.23	1.47
Maluku Utara	14.00	2.04	0.49	9.86	1.54	0.36	30.95	7.15	2.38	10.36	1.44	0.36	9.42	1.47	0.33	9.42	1.47	0.33
Papua Barat	37.31	9.56	3.66	35.12	9.29	3.55	43.93	13.99	5.70	35.71	9.75	3.57	34.88	10.47	4.30	34.88	10.47	4.30
Papua	42.66	12.77	4.98	40.20	11.70	4.43	24.24	4.15	1.06	37.41	9.07	2.98	36.80	9.35	3.37	36.80	9.36	3.37
Indonesia	**15.23**	**2.71**	**0.75**	**15.30**	**2.74**	**0.76**	**13.31**	**2.29**	**0.61**	**14.14**	**2.50**	**0.67**	**13.32**	**2.21**	**0.58**	**13.33**	**2.21**	**0.58**

Notes: *Calculated using Dissemination Unit data set

**Calculated using Poverty Unit data set

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CHAPTER 2

AN EVOLUTION OF INCOME POLARIZATION IN INDONESIA FROM 2000 TO 2010

2.1 Introduction

The differences between inequality and polarization have been discussed frequently in recent years. Although some polarization measures are derived from traditional inequality measures, these polarization measures capture different characteristics of income distribution and may not be consistent with the directions of the inequality measures. Esteban and Ray (1994), Foster and Wolfson (1992), and Tsui and Wang (1998) pioneered measures of polarization that attempted to capture clustering along income groups. These researchers developed polarization measures based on a set of axioms and have applied these measures to several countries. Furthermore, these income polarization measures serve as a basis for the development of social polarization measures (see Montalvo & Reynal-Querol 2002, Permanyer 2000, 2008). An important similarity among these polarization measures is that they emphasize on well-defined groups in a society. These measures concern an individual's interactions not only with other individuals in the same group but also with other individuals in other groups. Given heterogeneity among groups, higher homogeneity within groups may lead to higher polarization. However, given homogeneity within groups, higher heterogeneity across groups may result in higher polarization. At the same time, it could be the case that inequality is low.

According to Esteban and Ray (1994), there is a close link between "the phenomenon of polarization" and "the generation of tensions, the possibilities of articulated rebellion and revolt and the existence of social unrest in general" (p.820). This statement is consistent with the Marxian theory that addresses the formation of two well-defined and hostile groups in a society,

the bourgeoisie and the proletariat, and how this class struggle results in a proletarian revolution (Marx, 1977). Unfortunately, conventional inequality measures fail to capture polarization because inequality and polarization measures focus on different features of distribution. However, this fact does not mean that inequality and polarization *always* move in the opposite direction. In some cases, they could move in the same direction.

No studies on polarization in Indonesia have been found in the literature. This gap is understandable because the concept of polarization is relatively new in the literature. Serving as a complimentary measure rather than as a substitute for traditional inequality measures, polarization measures help to identify which regional dimensions have become more polarized or clustered over time. The key challenge is to convince stakeholders such as policy makers of the importance of these measures and how they differ from traditional inequality measures. By continuously monitoring the degree and trends of regional polarization, policy makers are more likely to detect early on the possibilities of social unrest, conflicts, and disintegration threats. As a result, policy makers can act accordingly to prevent these problems immediately.

The primary purpose of this paper is to examine the level and evolution of national, and regional polarization in Indonesia during 2000-10. In this study, we attempt to answer the following questions: What are the trends of national and regional inequality and polarization? Has Indonesian society become more polarized and more unequal over time nationally or regionally? How do trends of inequality indices compare to those of polarization indices? Are polarization and inequality consistent in their trends? What factors drive changes in polarization?

The following section will review polarization indices. The third section will discuss the sources of data and methodology. The fourth and fifth sections will present and discuss our empirical estimations at the national and regional levels, respectively. Finally, the last section

will conclude.

2.2 Measures of Polarization: A Literature Review

2.2.1 Income Polarization

Most studies agree that polarization and inequality are two different concepts.[2] Inequality measures the variance of an income distribution, whereas polarization measures "(income) clustering around local means." To better understand the difference between inequality and polarization, consider the following examples: Suppose a population is divided into four income levels, x_1, x_3, x_4, and x_6, with exactly the same population shares, p_1, p_3, p_4, and p_6, respectively (see Figure 2.1a). Now, consider a redistribution of income between x_1 and x_3 and between x_4 and x_6, which results in only two income levels, x_2 and x_5, with larger population shares than those prior to the income redistribution, p_2 and p_5 (see Figure 2.1b). Apparently, inequality has decreased, but polarization has increased. The society is now more polarized or more "clustered" because it is now divided into only two income levels -"poor" and "rich"- compared to the previous condition in which there were four income levels with similar population shares. This example illustrates that inequality decreases as polarization increases. Note that the population share or the weight of a group matters in this case:

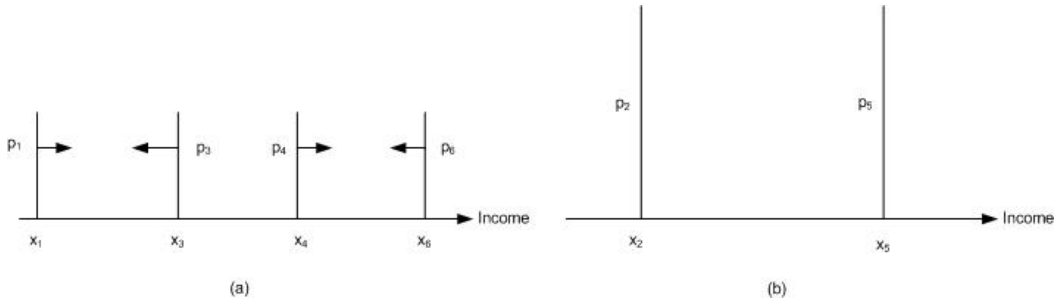


Figure 2.1. An Increase in Polarization yet a Decrease in Inequality

[2] See Esteban and Ray (1991,1994), Foster and Wolfson (1992), Wang and Tsui (2000), Esteban, Gradin, and Ray (2005), Kanbur and Zhang (2001).

However, polarization and inequality do not always move in opposite directions. Consider a society in which there are only two income levels with the same number of people in each level, as shown in Figure 2.2a. Suppose x_2 moves to the left to x_1, whereas x_5 moves to the right to x_6 (see Figure 2.2b). Clearly, inequality has increased. Nevertheless, polarization has also increased because the two different groups with different income levels have moved farther away from each other:

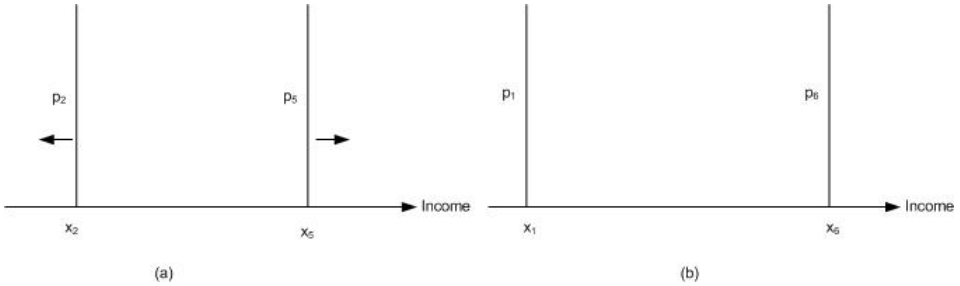


Figure 2.2. Increase in Inequality and Polarization

According to Esteban and Ray (2005), "In a very broad sense, there is agreement that polarization is designed to capture the appearance (or disappearance) of groups in a distribution" (p.2). Based on their observations, polarization measures are categorized into two broad families. The first family of polarization measures attempts to capture "the formation of any arbitrary number of groups." Examples of measures belonging to this family are those of Esteban and Ray (1991,1994), Duclos, Esteban, and Ray (2004), and Esteban, Gradin, and Ray (1999). However, the second broad family of measures examines "the existence of two groups only with the median income as the divide" (p.2). Foster and Wolfson (1992), Wolfson (1994), and Wang and Tsui (2000) provide examples of this family of measures. The first broad family is called "measures of polarization," and the second family is called "measures of bi-polarization." These two families of polarization measures are income polarization measures, and they capture the appearance (or disappearance) of income groups in a distribution of income. In contrast to these measures, social polarization measures require one to specify social groups such as regional,

ethnic, and religious groups before one can estimate these measures. Examples of social polarization measures are those of Montalvo and Reynal-Querol (2002, 2005a, 2005b), Permanyer (2008), and Permanyer and Ambrosio (2009). Figure 2.3 presents the classification of these polarization measures. More detailed notes on different polarization measures can be found in Appendix B.1.

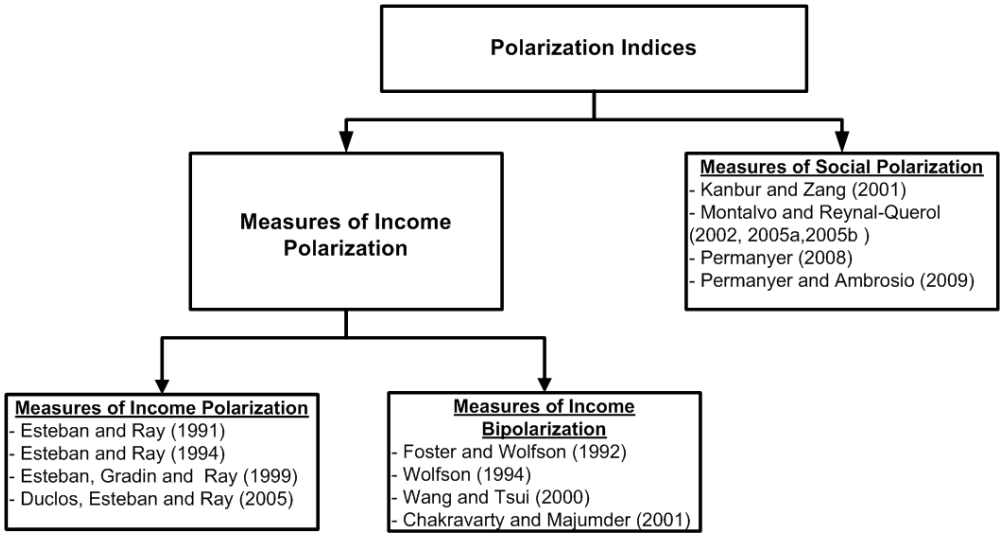


Figure 2.3.Classification of Polarization Measures

Both types of polarization measures consider three important properties according to Esteban and Ray (2005):

1. Polarization concerns groups so that when only one group is considered, polarization is small.
2. Polarization increases whenever "within-group" inequality declines.
3. Polarization rises when "between/across-group" inequality increases.

2.2.1.1 Measures of Income Polarization

In 1994, Esteban and Ray proposed an income polarization index based on an identification and alienation framework. An individual's feeling of identification is an increasing

function of the number of individuals with a similar level of income. The more people with the same level of income, the stronger an individual's feeling of identification. However, two individuals belonging to two different groups can feel very different from each other, and the greater the difference/distance, the greater the polarization that leads to social tension. The absolute income differences between individuals measures the alienation component. Therefore, the ER polarization index measures "the sum of all possible effective antagonisms between individuals" (Esteban & Ray 1994, p.831).

Four axioms must be satisfied for the ER polarization index to hold. A polarization index L is a real valued function defined on S, that is, L:S→R.[1] S is the set of income distributions. So, for a population of size n, an income distribution is given by a pair (p,x), where $x=(x_1,\ldots,x_k)$ and $p=(p_1,\ldots..,p_k)$. Different income levels are denoted by x_i, whereas the number of individuals with income exactly similar to x_i is denoted by p_i and $n=\sum_{i=1}^{k} p_i$. For all (p,x) in S, the functional value L(p,x) indicates the level of polarization with the distribution (p,x). An income distribution is constituted by three distinct values $x_1=0$, x_2, and x_3 and the corresponding population masses p_1, p_2, and p_3, respectively, where $x_1<x_2<x_3$.

Axiom 1: Let $p_0>p_2=p_3>0$. Fix $p_0>0$ and $x_2>0$. There exist $c_1>0$ and $c_2>0$ (possibly depending on p_1 and x_2) such that if $|x_2-x_3|< c_1$ and $p_2<c_2p_1$, then joining of the masses p_2 and p_3 at their mid-point, $(x_2+x_3)/2$ increases polarization (see Figure 2.4):

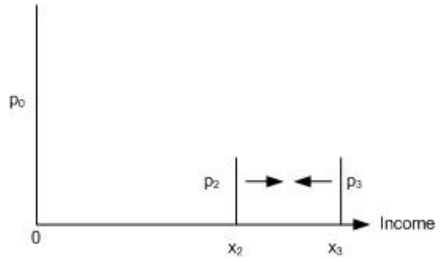


Figure 2.4. Axiom 1 Illustration

This axiom basically says that lower variation within groups and larger sizes of groups should increase polarization.

Axiom 2: Let $p_0,p_2,p_3>0$; $p_0>p_3$ and $|x_2-x_3|<x_2$. There exists $c_3>0$ such that if p_2 is moved to the right toward p_3 by an amount not exceeding c_3, polarization increases (see Figure 2.5). If heterogeneity among the groups increases, which is showed by the movement of one mass towards another mass, polarization is higher:

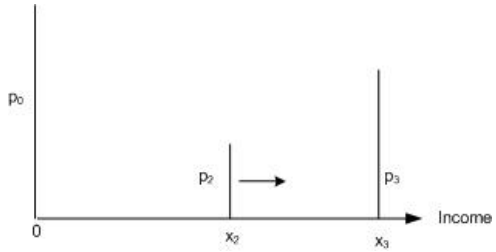


Figure 2.5. Axiom 2 Illustration

Axiom 3: Let $p_1,p_2,p_3>0$; $p_1=p_3$; and $x_2=x_3-x_2=c_4$. Any new distribution formed by shifting population mass from the central mass p_2 equally to the two lateral masses p_1 and p_3, each c_4 units of distance away, must increase polarization (see Figure 2.6). This axiom illustrates the disappearance of the middle class. That is, the middle class moves into the lower and upper tail of the distribution. As a result, polarization increases:

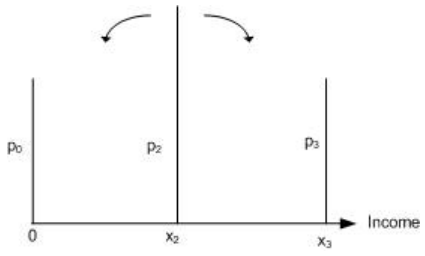


Figure 2.6. Axiom 3 Illustration

Axiom 4: if $P(F) \geq P(G)$ and $p > 0$, then $P(pF) > P(pG)$, where pFand pG represent population scalings of F and G, respectively. This axiom basically states that if one distribution has higher polarization than the other, then it will remain so even if we scale up or down the populations by the same amount (i.e., population-invariance principle).

Theorem 1: A polarization measure L_{ER} satisfies Axioms 1,2,3, and 4 if and only if it is in the following form:

$$L_{ER} = A \sum_{i=1}^{k} \sum_{j=1}^{k} p_i^{1+\alpha} p_j |x_i - x_j|$$

The value of α must be bounded from 0 to 1.6 for all axioms to be satisfied. Moreover, if α were equal to zero, then this measure would be the Gini index. In fact, the main purpose of raising the population weight to a power exceeding unity in the formula above is to differentiate this polarization measure from inequality measures such as the Gini index. The value of α can be treated as the degree of the "polarization sensitivity" of the measure. The larger the value of α, the greater the difference from inequality measures. A is a scalar equal to 100/μ, making the measure comparable to the Gini index ranging from 0 to 1.

Following their ER (1994) polarization measure, Esteban and Ray collaborated with Duclos to propose a new measure in which the relevant distributions can be described by density function instead of a "discrete, finite set of income groupings located in a continuous ambient space of possible income values." (Duclos, Esteban, Ray 2005, p.1739). The difference between Duclos, Esteban, Ray (DER) and the ER measure is that the DER index overcomes two major problems - conceptual and practical - in the ER (1994) measure. The conceptual problem is that the measure shows an "unpleasant discontinuity" caused by the use of the distribution of population on a discrete and distinct number of points. Furthermore, the practical difficulty is that the population is *exogenously* divided into k number of clusters to operate the measure. As a consequence, this feature limits the measure from being used for other interesting problems. Based on a new set of axioms, the DER index characterizes a measure of polarization, which is an extension and a refinement of the ER index applied to the case of continuous distributions.

Like the ER index, the DER index still measures the sum of all effective antagonisms in a population, and the index is written as follows:

$$P_\alpha(f) = \iint f(x)^{1+\alpha} f(y)|y - x|\, dydx$$

where α is in [0.25,1].

In their paper, DER also state that their measure could be extended to quantify social (non-income) polarization relying on identification and alienation frameworks. A hybrid polarization measure, which is a combination of the pure income polarization and the pure social polarization, is discussed. However, the researchers directly developed their income polarization measure into a hybrid measure without any axiomatic reasoning and called for further research on this issue.

2.2.1.2 Measures of Bipolarization

The measure of income bipolarization by Foster and Wolfson (1994) attempts to measure the disappearance of the middle class. Many studies, they argue, define the middle class based on an arbitrary range. Foster and Wolfson (FW) offer a range-free approach to measuring the middle class and polarization based on partial orderings. Their polarization index emphasizes two groups that are below and above the median income, and their index is based on two important features. First, "increased spread" leads to a higher degree of polarization. This feature characterizes a situation in which a distribution is more divergent from the middle position to the tails. That is, the *distance* between income groups below and above the median becomes greater. The common example of this feature is that the gap between the poor and the rich is greater as the poor get poorer and the rich get richer.

The second feature of the FW indices is "increased bipolarity," a situation in which

individuals with incomes below or above the median group become tighter or more concentrated. Like "increased spread," "increased bipolarity" leads to a higher degree of polarization as well. Furthermore, FW employed the Gini coefficient in their polarization indices and provided rigorous axiomatic characterizations for their indices.[3] Based on income data from the Luxembourg Income Study (LIS), the Survey of Consumer Finance (SCF), and the Current Population Survey (CPS), Foster and Wolfson illustrated the application of their indices and found that both inequality and polarization declined in Canada in the period of study (1981, 1987, 1988), whereas both inequality and polarization increased significantly in the U.S during that period of time, suggesting a disappearance of the middle class in the U.S.

A few years later, Tsui and Wang (2000) extended the work of Foster and Wolfson and proposed their own indices based on two features discussed in FW above. However, they critique the FW index because those measures employ an inequality index, the Gini coefficient, to measure polarization, which is a concept distinct from inequality. Through a set of axioms, Tsui and Wang prove that their bipolarization index is independent of the Gini index, unlike the FW index, and their index estimates the degree of "increased spread" and "increased bipolarity" to determine the level of polarization.

2.2.2 Social and Ethnic Polarization

The papers discussed above focus mainly on the measurement of income polarization. Nevertheless, income polarization is not the only cause of social conflicts. Thus, the notion of polarization must be extended to a broader context. An interesting extension might be social polarization in which social conflicts in a given population are determined by social factors and may be independent of the distribution of income. Although Kanbur and Zhang (2001) still focus

[3]See Foster and Wolfson (1994) for details.

on income distribution across social groups such as regional dimensions, they propose social polarization measures based on the decomposition of the Generalized Entropy inequality index. Including group homogeneity in their measure, Kanbur and Zhang (2001) propose a polarization index that incorporates both between-group and within-group inequality. The Kanbur Zhang index is the ratio of between-group and within-group inequality, which is estimated by decomposing the GE inequality index. In this measure, polarization is captured by comparing the average distance between the groups' income means and the income differences within groups.

Adopting the work of ER for a social context, Montalvo and Reynal Querol (2005a and 2005b) introduced a social polarization index with several limitations. First, the Reynal-Querrol index (RQ) is not derived from a set of axioms. Second, the index only considers the size of different groups (i.e., the identification component) but fails to take into account the role of the alienation component, an essential part of polarization. Montalvo and Querol faced the difficult problem of defining and measuring a distance function of alienation between groups. As a result, the researchers assume that all groups feel *equally* alienated from each other. Despite these limitations, the RQ index is applied to predict the occurrence of civil wars and to predict the growth rate of GDP per capita. In one paper, Montalvo and Querol (2007) conclude, "ethnically polarized countries have to endure longer civil wars than ethnically less polarized societies."

Permanyer (2008) presented his axiomatic social polarization indices, which overcome the problems in the RQ index and provide an empirical application of the Permanyer index and the RQ index for several countries. Using data from the World Value Surveys (WVS), Permanyer shows that the ranking of 79 countries in terms of religious polarization altered considerably when he included the alienation/distance between-individuals component in his index and compared it to the RQ index. This finding suggests that the alienation component is

indeed a crucial part that must be included in analyzing social polarization. The exclusion of the alienation component in the RQ index clearly undermines the true measure of social polarization in a society. Unfortunately, Permanyer does not show ethnic polarization in that study due to a lack of ethnic distribution data.

In 2009, Permanyer and Ambrosio extended Permanyer's work to social polarization indices that can be applied to categorical or ordinal data. The researchers claim that these indices are useful when cardinal data are not available to compute social polarization. In addition, the advantage of these new indices compared to other indices is that the values are decomposable, thus identifying the specific contribution of each social group to the level of polarization. Furthermore, an axiomatic characterization of the indices is presented in the paper, and the indices are used to compute social polarization in Chile based on an ordinal individuals' self-assessed health (SAH) variable measured on a 1 to 5 scale. One denotes the best possible health condition ("Excellent"), and five denotes the worst ("Very Poor"). It appears that the ranking between their new polarization indices and other polarization and inequality indices are substantially different, suggesting the overlapping of polarization and the difference between polarization and inequality measures.

A study by Gudrun (2008) applies the RQ index and the ER index to explain violent civil conflict. The data used in that study are derived from the Demographic and Health Survey between 1996 and 2004, and the number of countries used is 39 out of 86 countries. Based on data on the respondents' ethnic affinity in the DHS surveys, Gudrun calculates the RQ index of ethnic polarization in a given country and year. The socio-economic polarization is calculated by applying the ER index to household assets and education years due to the unavailability of income or consumption expenditure data. That study shows that there are significant positive

links between socio-economic polarization and violent civil conflict. However, the ethnic polarization and the combined ethnic and socioeconomic polarization are insignificant for explaining violent civil conflict. Because the ethnic polarization is measured by the RQ index, disregarding the alienation component, it is highly likely that the result is less accurate. The Permanyer index of social polarization, which considers the alienation component, is likely a better estimator than the RQ index.

Although many polarization studies focus on proposing new polarization measures and provide theoretical foundations, some studies apply those measures directly to data from several countries. Most studies are interested in examining how polarization and inequality behave. In some cases, polarization and inequality move in the same direction. However, other cases show that polarization and inequality move in the opposite direction. In the case of India, Noorbakhsh (2003) found that spatial inequality in production and consumption increased considerably in the period of study, suggesting a regional divergence instead of convergence. At the same time, ER and Wolfson indices showed an increasing trend as well. Fedorov (2002) showed that Russia experienced a rise in income inequality based on the Gini index and the GE(0), and income polarization also increased significantly from 1990 to 1999. Chakravaty and Majumder (2001) show that inequality increased slightly between 1987-88 and 1993-94, but polarization showed a decline in the state of Kerala in India, based on the Wolfson index and the Chakravaty-Majumder index, illustrating an opposite direction between inequality and polarization. A study by Makdissi et al. (2008) employs their own version of an ethnic polarization index based on income and ethnicity. The researchers' hypothesis is that these two dimensions may contribute to ethnic conflict in Ivory Coast. Their ethnic polarization measure is a ratio between the ER (1994) and the DER (2004) polarization indexes. The researchers applied their index to expenditure data

and decomposed the level of the polarization index to between- and within-group alienation. Based on their calculation, polarization decreased in the two-year periods of study, 1993 and 1998. Although they expected an increase in ethnic polarization due to the elimination of income redistribution across ethnic programs, they found that ethnic polarization significantly declined. The researchers concluded that minorities experienced a decline in polarization, whereas the politically dominant ethnic groups faced an increase in polarization, leading to the occurrence of conflict in 1999. Furthermore, religious polarization between Catholics and Muslims declined based on their index and might not contribute to conflict.

A rapid increase of the literature on polarization in recent years indicates scholars' growing interest in studying this phenomenon. Many studies of polarization attempt to offer axiomatic or non-axiomatic measures of either income or social polarization in a society, whereas numerous studies apply these measures directly to data from certain countries. Nevertheless, scholars agree that these polarization measures are different from inequality measures and that those measures are useful for detecting the degree of polarization in a society. In addition, scholars seem to agree that a higher level of either income or social polarization might contribute to the occurrence of social conflict. Therefore, by assessing the levels of both inequality and polarization, policy makers can design and implement policies that might decrease polarization and thus reduce or prevent future social conflicts in a society. Ideally, both polarization and inequality measures should be computed because they are likely to complement each other, meaning that one measure might capture what another measure cannot.

2.2.3 Inequality in Indonesia

To our best knowledge, there has been no study regarding income polarization in

Indonesia. In this section, we review several studies examining income inequality in Indonesia. In general, income inequality is not as popular as poverty issues in the literature on Indonesia. One reason is that there has been consensus that income inequality in Indonesia has been stable and constant based on consumption expenditures from the SUSENAS. Mishra (2009) points out that the constancy of income inequality was largely caused by the data quality and the reliability of the estimations.

However, a recent development is that income inequality has been rising substantially, and the Gini coefficient of 0.41 in 2011, according to Indonesia's statistical office, was the highest in history. A current perception is that unlike prior to the Asian financial crisis in 1998, Indonesia has experienced rapid growth with worsening income inequality in recent years. It is widely known that poverty has been declining, and the middle class in Indonesia has been growing rapidly. However, there is a question of why the decline in poverty has been very slow in spite of high economic growth. Answering this important question is beyond the scope of this paper. Nonetheless, we think that although the average expenditure has been steadily increasing, those at the top of the income distribution have experienced a much more rapid increase than those at the bottom. A standard policy response for rising income inequality is income redistribution, such as increasing taxes applied to the rich or to large corporations and assisting the poor via government transfers. Increasing taxes is less likely to be popular and will be opposed by those in power, who are mostly rich or close to the rich. The current government chooses the latter policy as indicated by the implementation of many anti-poverty programs. Nevertheless, issues with the implementation of these programs are recognizable, and the impacts of these programs are thus questionable.

At the regional level, many studies address not only the level and changes of inequality

but also which inequality, within- or between-inequality, contributes the most to overall inequality. Examining regional and ethnic inequality in Indonesia, Suryadarma et al. (2006) show that based on the Gini ratio of income and consumption, inequality in urban areas was much higher than that in rural areas in 2002 and 2004. Inequality in both urban and rural areas increased, yet the increase was much higher in urban areas in 2002 and 2004. The study finds no systematic inequality between ethnicities in Indonesia and concludes that ethnic inequality is not evident based on four indicators: access to education and health facilities, education outcomes, health outcomes, and income and consumption. In other words, ethnic disparity across four ethnic groups is not significant. Another important finding is that regional income and consumption inequality were relatively low across regions, suggesting more equal income distribution in those regions.

Akita et al. (1999) apply the Theil decomposition technique using the SUSENAS household expenditure data from 1987, 1990, and 1993 and find that within-province inequality contributed most to national inequality prior to the Asian financial crisis in 1998. Unlike most other studies that use expenditure per capita as a proxy for income, Akita et al. (1999) utilize household expenditure as a proxy for income. This paper suggests that within-group inequality was much higher than the between-group inequality for the urban-rural category. That is, within-group inequality made up more than 70% of the national Theil index.

Using deflated real expenditures that take into account regional price disparities, Suryadarma et al. (2005) estimate the Gini ratio and GE index from real expenditure data and show that *intra-group inequality* (i.e., within-group inequality) contributes most to rural-urban inequality from 1984 to 2002. The paper also suggests that in 1999, immediately following the Asian financial crisis, inequality between urban and rural groups narrowed, whereas in 2002, the

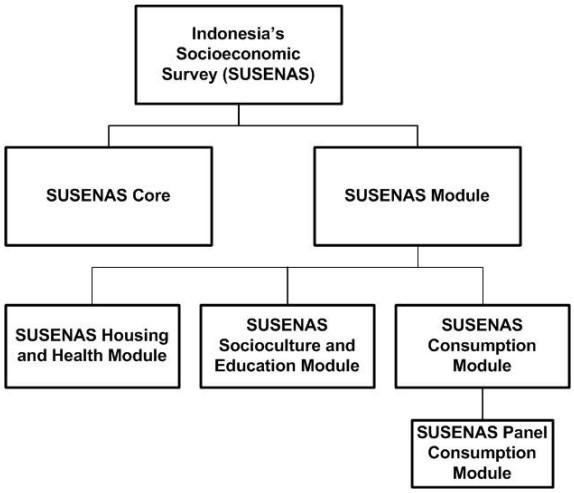
income gap between urban and rural groups increased by more than 50%.

Akita and Alisjahbana (2002) argue that in the pre-crisis period, regional income inequality sharply increased due to a significant increase in within-province inequality. Consistent with previous studies mentioned, this study shows that in 1998, regional income inequality dropped to its 1993-1994 level, and the decrease was mainly due to a change in between-province inequality. The study concludes that the Asian financial crisis affected urban Java and urban Sumatra the most.

2.3 Data And Methodology

2.3.1 Source: SUSENAS 2000 – 2010

In general, there are two types of SUSENAS: the SUSENAS Core and the SUSENAS Module (see Figure 2.7). The CBS conducts the SUSENAS Core annually, and it gathers socioeconomic information such as education, health, and expenditures from households and individuals. The number of households interviewed is more than 200,000, whereas the number of individuals is approximately 800,000:



Source: CBSFigure 2.7.SUSENAS Classification

There are three types of SUSENAS Module conducted alternately every three years. The first type is the SUSENAS Consumption Module (SCM), consisting of detailed information about households' total consumption/expenditures on food and non-food items. First collected in 1993, the SCM has been collected every three years in all provinces in Indonesia. Observation units are households and individuals, and the survey method is direct interview. Like the SUSENAS Core, the SCM is also used to calculate welfare indicators. In 2002, the CBS took a subset of the SUSENAS consumption module of approximately 10,000 households and called it the SUSENAS Panel Consumption Module (SPCM). These households are followed over time, and their detailed consumption/expenditures are recorded every year until the present.

The second and third types of SUSENAS Modules are the SUSENAS Sociocultural and Education Module (SCEM) and the SUSENAS Housing and Health Module (SHHM), respectively. The SCEM consists of detailed information ranging from household and society welfare, disability, individual socio-cultural and education characteristics, and social capital. This data is used to calculate education indicators and the Human Development Index (HDI). Moreover, the SHHM consists of detailed information regarding housing, public health, sources and amounts of household health expenses, children's health, smoking habits, and health history.

The following section discusses the advantages and disadvantages of the SUSENAS. Generally, in developing countries like Indonesia, household expenditures are employed to measure welfare and poverty because household income data are likely to be less reliable. Large samples and wide coverage are the key advantages of the SUSENAS. With more than 200,000 households sampled from across Indonesia, the SUSENAS is a good representation of the socioeconomic conditions of Indonesia's population. In addition, because the SUSENAS is conducted regularly, it can be used to examine changes in welfare over time, although it is

generally not designed for panel data. Usually, researchers prefer the Indonesia Family Life Survey (IFLS) if they want to use panel data at the household level.

An important caveat is that one must be very careful with the quality and the reliability of the data, especially data regarding poverty and income distribution in Indonesia. Several issues are well recognized in the literature. First, inconsistency is evident between total household consumption in the national account and total household expenditures. For instance, Yusuf (2007) finds that total household final consumption from the Input-Output Tables representing the supply side of the economy does not match the total household expenditures from the SUSENAS representing the demand side of the economy. The mismatch is very severe particularly for non-food expenditures. Reconciling the mismatch between data from the national accounts and those from SUSENAS, Yusuf (2007) estimates standard inequality measures with sampling weights accounting for the differences between the two sets of data and reports that expenditure inequality is highly underestimated, especially in urban regions.

Second, per capita expenditures in the SUSENAS may not reflect the "true" income distribution in Indonesia. It is highly likely that any income inequality measures are underestimated. This issue is associated with using expenditures as a proxy for income because rich households are likely to spend a small portion of their income and save most of the rest. In addition, the CBS surveyors' lack of access to rich households leads to scant numbers regarding the richest of the rich represented in the data. Third, although expenditure data are more reliable than income data in Indonesia, expenditure data may not be reliable due to certain assumptions. For instance, total household expenditures are estimated from food and non-food expenditures. For food expenditures, the CBS does not differentiate between purchased, home produced, and gifted food items. As a result, there is only one aggregate monetary value for each food item.

This might not be a good practice because in many parts of Indonesia, many households rely on their own food production and rarely or never purchase food at market prices. Thus, they might not know the monetary value of their home-produced food and thus provide inaccurate answers to the survey questions. Moreover, the CBS asks about prior month and prior year expenditures on several non-food items. However, the CBS uses the prior year's expenditures to estimate monthly non-food expenditures. This might be problematic because respondents tend to forget what they purchased in the prior year. Respondents are likely to remember what they paid for a car or a house in the prior year, yet they might not remember the price they paid for small inexpensive non-food items. As a consequence, survey respondents are likely to provide unreliable answers. Additionally, because the CBS's surveyors ask about the prior month's purchases of non-food items followed by the prior year's purchases, there might be a tendency to multiply the prior month's purchases to compute the prior year's purchases. Conversely, surveyors might ask about the prior year's purchases and divide it to obtain the prior month's purchases. These surveyors might also ask both questions and choose the highest amount. Regardless of which approach the surveyors adopt, there are potential biases in the non-food expenditure data.

Finally, inconsistency in the SUSENAS might be an issue. Variable names and definitions keep changing over time. Difficulties arise when data users examine the changes over time. The SUSENAS's questioners should be carefully monitored to search for changes. For example, in 2001 and 2002, one question was asked regarding expenditures on rent, utilities, and house maintenance, whereas beyond 2002, three questions were asked regarding expenditures on rent, utilities, and house maintenance. Therefore, if one wants to compare these expenditures over time, he or she should sum up all three variables to obtain the total. Despite its weaknesses,

the SUSENAS is still the most widely used household survey to represent Indonesia's population for the purpose of examining socioeconomic conditions.

In this study, we use both the SUSENAS Core and the Module to estimate national polarization and inequality, but we use only the SUSENAS Core to estimate regional polarization and inequality. The SUSENAS Core includes more observations than the SUSENAS Module (approximately 200,000 versus 60,000 households). Statistically speaking, compared with the Module, the Core might provide information closer to the true distribution of income due to its large sample. In addition, the Core is conducted every year, whereas the Module was conducted every three years prior to 2007. Therefore, using the Core, we can determine the annual levels and trends of polarization from 2000 to 2010. However, the Module is far more detailed than the Core. That is, the Module comprises a long list of questions regarding food and non-food items to obtain total expenditures, whereas the Core inquires about limited items and relies on aggregation. For instance, for the category of cereal, the Core inquires about household consumption of only two items: rice and others (corn, flour, etc.), whereas the Module inquires about consumption of eight items. Moreover, the Core inquires about household expenditures on certain items without considering quantity.

2.3.2 Methodology

Because this study concerns income polarization and inequality, it relies heavily on a per capita expenditure variable as a proxy for income and its distribution. National and regional polarization and inequality measures are estimated to examine patterns and differences in the behavior of polarization and inequality measures. Two popular and widely used inequality measures, the Gini and the GE index, are estimated (see Appendix B.2 for a discussion of these

inequality indices). Two income polarization measures that represent a different type of polarization, the Foster Wolfson (1992) and the Duclos, Esteban, and Ray (2005), are estimated for the sample period spanning 2000 to 2010. Additional income polarization indices are also calculated and are shown in Appendix B.10. Most polarization indices in this study are estimated using the Distributive Analysis Stata Package (DASP) in STATA 10. As discussed in the literature review, there are at least two types of polarization measure: income and social polarization. In this study, we focus only on income polarization measures, which are represented by the Foster-Wolfson index as an example of a bipolarization measure and by the Duclos-Esteban-Ray index as an example of a pure income polarization measure. However, we also estimate some social polarization measures: the Kanbur-Zhang index (see Appendix B.5 and B.7) and the Permanyer index (see Appendix B.6).

2.3.2.1 The Foster and Wolfson (1992) Polarization Index

Like the Gini index, the Foster Wolfson (FW) index, which falls into the category of bipolarization measures, is based on the Lorenz curve, and its value can take any real number between 0 and 1. The FW index is twice the area between the Lorenz curve and the tangent line at the median point. The formula is as follows:

$$FW = 2[2[0.5 - Lorenz(p = 0.5)] - Gini]\frac{\mu}{median}$$

where Lorenz(p=0.5) is the income share of the bottom half of the population; μ is the mean income, and Gini is the Gini index. According to Foster & Wolfson (2010), the FW formula above has two attractive interpretations. First, using the Lorenz curve, the formula represents the area underneath the curve and above the tangents to the curve at the median family. The median is used for normalization instead of the mean. Second, the index can be

expressed as a function of the "between-group" inequality minus the "within-group" inequality as measured by the Gini index, where the two groups are defined as groups above and below the median income. As a result, inequality and polarization move in the same direction when the inequality between these groups increases, holding the within-group constant. However, inequality and polarization move in opposite directions when within-group inequality rises (Foster & Wolfson 2010, p.250).

2.3.2.2 The Duclos, Esteban, and Ray (2005) Polarization Index

Overcoming the conceptual and practical problems with the ER (1994) polarization measure, Duclos, Esteban, and Ray (DER) propose an extension and a refinement of the ER index applied to the continuous distributions. The DER index measures the sum of all effective antagonisms in a population, and the index is written as follows:

$$P_\alpha(f) = \iint f(x)^{1+\alpha} f(y)|y - x|\, dydx$$

where α is in [0.25,1]; f(y) and f(x) denote the income density function. This formula can be written as

$$P_\alpha(F) = \int f(y)^\alpha g(y)\, dF(y)$$

where y denotes income and F(y) its distribution. The alienation effect is captured by the function g(y), whereas the identification effect is captured by the function $f(y)^\alpha$. Higher values of α mean that a larger weight is assigned to identification in the polarization index. The value of α requires a value judgment from the user of the DER polarization index. In this paper, the value of α is set to 1.

2.4. National Inequality and Polarization

Two inequality measures, the GE(0) and the Gini, and two polarization indices, Foster and Wolfson (1992) and Duclos, Esteban, and Ray (2005), are estimated from 2000 to 2010. The Foster and Wolfson (1992) polarization index represents a bipolarization measure, whereas the Duclos, Esteban, and Ray (2005) index represents a pure income polarization measure. Unlike social polarization indices, no social groups (such as regional or ethnic groups) were specified before applying these income and bipolarization measures. As mentioned above, this specification is the major difference between income and social polarization. The variable used is per capita real consumption expenditure, which is derived from per capita nominal consumption expenditure deflated by inflation. The step-by-step calculation of the deflators is presented in Appendix B.3.

Table 2.1 reports the overall inequality and polarization measures for Indonesia during the period 2000-10. Figure 2.8 shows the evolution of these measures relative to their 2000 values:

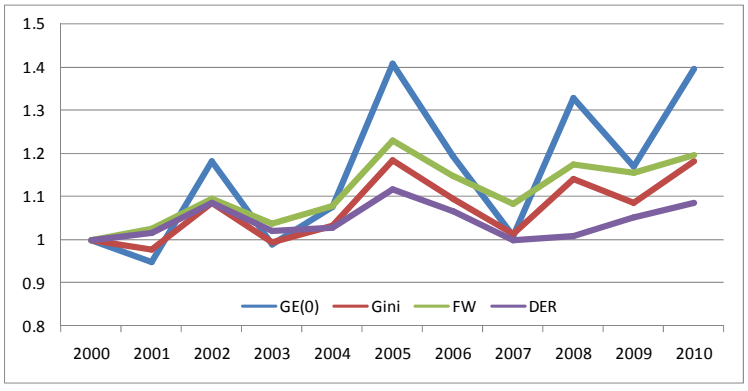


Table 2.1. Inequality and Polarization (National)

Year	GE(0)	Gini	FW	DER
2000	0.165	0.317	0.120	0.177
2001	0.156	0.310	0.123	0.180
2002	0.195	0.345	0.131	0.192
2003	0.163	0.316	0.124	0.181
2004	0.177	0.328	0.129	0.182
2005	0.232	0.376	0.147	0.198
2006	0.197	0.348	0.137	0.189
2007	0.166	0.321	0.129	0.177
2008	0.219	0.362	0.140	0.179
2009	0.193	0.345	0.138	0.187
2010	0.230	0.375	0.143	0.193
Growth	39.52	18.16	19.67	8.65

Figure 2.8. Inequality and Polarization (National)

Four features are evident in Table 2.1 and Figure 2.8. First, the overall trend for both inequality and polarization measures fluctuate similarly but at substantially different rates between 2000 and 2010. Three major spikes in 2002, 2005, and 2008 are evident for all measures. However, since 2000, all measures have increased significantly, with the GE showing the highest increase.

Second, in certain periods of study, polarization and inequality indices move in opposite directions, suggesting that they are indeed different indices measuring different features of distribution. For instance, between 2000 and 2001, polarization indices increased, whereas inequality indices declined. This occurred because inequality in different income groups (i.e., "within-group inequality") had risen in this period.

Third, although the DER and FW indices are two different types of polarization measure, in general, they exhibit similar patterns with different rates of change. The changes of the FW index were considerably larger than those of the DER index in this period of study because the FW is more sensitive to changes in several features of a distribution, such as the bottom half of the population's income shares, inequality within distribution, and median and mean values. However, the DER is a polarization index that applies to a continuous distribution and is estimated using nonparametric distribution for more than two income groups, resulting in less

major changes. In other words, the DER index is smoother than the FW index. Furthermore, both polarization indices (DER and FW) also show different directions in certain periods. For example, between 2008 and 2009, the DER showed an increase, whereas the FW exhibited a decrease.

Fourth, because the GE is very sensitive to changes in the lower tail of the distribution, its changes are larger than those of the Gini, implying substantial changes in the incomes of the poor relative to other income groups. The GE reached its highest value in 2005 compared to its value in 2000. The GE has risen by nearly 40%, whereas the Gini has grown by only 18% since 2000.

Regarding the Foster-Wolfson polarization index, Wang and Tsui (2000) criticize the FW index as another inequality index rather than a polarization index because to calculate the FW index, the Gini index is used. Wang and Tsui produce their own polarization index, which does not involve an inequality index. Our estimation of the Wang-Tsui (WT) polarization index is shown in Appendix B.4. Compared with the FW index, the WT index shows a slightly different trend. From 2000 to 2005, the WT index indicated an increasing trend and reached its highest peak in 2005. Between 2005 and 2007, the WT index declined considerably, whereas it steadily increased from 2007 to 2010. Similar to the FW index, the peaks of the WT index coincided with the fuel subsidy cuts in 2002, 2005, and 2008.

2.4.1 Expenditure Component Analysis

Despite differences between the FW and the DER indexes, their patterns of change are quite similar, with some exceptions in certain periods of study. However, it is more important to examine why the polarization indices show a substantial increase during this time period. One

possible explanation is that the expenditures of the rich have positively grown much faster than those of the poor since 2000. Table 2.2 shows the breakdown of total expenditures for the bottom 40% and the top 10% of the population. As shown in Table 2.2, the top 10% have experienced an 86% increase in their total real expenditures, whereas the bottom 40% have seen only a 49% increase, indicating considerably faster expenditure growth for the top 10% compared with the bottom 40%:

Table 2.2. Top 10% and Bottom 40% Expenditure Shares and Growths, 2000 and 2010

Food Items	Bottom 40%					Highest 10%				
	2000	2010	Growth 2000-2010 (%)	Share of total expenditure 2000 (%)	Share of total expenditure 2010 (%)	2000	2010	Growth 2000-2010 (%)	Share of total expenditure 2000 (%)	Share of total expenditure 2010 (%)
Rice	23,135	26,748	16	25	19	30,979	30,979	0	7	4
Legume	1,363	1,976	45	1	1	2,866	2,306	-20	1	0
Fish	7,485	9,696	30	8	7	24,914	29,360	18	6	4
Meat	1,772	1,644	-7	2	1	19,121	16,683	-13	4	2
Egg and milk	2,658	3,914	47	3	3	18,191	27,578	52	4	3
Veggetables	5,499	8,566	56	6	6	14,975	18,536	24	3	2
Nuts	3,392	3,228	-5	4	2	7,718	6,464	-16	2	1
Fruits	2,136	1,978	-7	2	1	14,875	16,167	9	3	2
Oil and fat	3,723	4,523	21	4	3	9,035	8,409	-7	2	1
Beverage ingredients	4,257	5,347	26	5	4	11,253	11,603	3	2	1
Spices	2,378	2,400	1	3	2	5,784	5,083	-12	1	1
Other foods	1,334	2,914	118	1	2	7,061	10,256	45	2	1
Ready foods and drinks	4,084	9,015	121	4	6	56,537	131,440	132	13	16
Alcohol	119	190	60	0	0	959	1,984	107	0	0
Tobacco	6,937	10,678	54	7	8	23,489	39,173	67	5	5
Total food expenditures	**70,271**	**92,816**	**32**	**75**	**67**	**247,756**	**356,023**	**44**	**55**	**42**
Non-food Items										
Housing	10,781	21,080	96	12	15	96,969	184,750	91	22	22
Goods and services	2,581	9,386	264	3	7	22,587	91,763	306	5	11
Education	1,820	3,639	100	2	3	19,543	32,131	64	4	4
Health	1,313	2,292	75	1	2	12,286	26,580	116	3	3
Clothing	4,291	4,609	7	5	3	18,221	21,953	20	4	3
Durable goods	1,166	1,513	30	1	1	19,839	54,843	176	4	7
Taxes and insurances	318	1,070	237	0	1	4,674	21,366	357	1	3
Party,ceremony,etc.	998	885	-11	1	1	9,110	12,288	35	2	1
Total nonfood expenditures	**23,267**	**46,640**	**100**	**25**	**33**	**203,228**	**481,717**	**137**	**45**	**58**
Total expenditures (pce)	**93,537**	**139,456**	**49**			**450,984**	**837,740**	**86**		

In terms of expenditure shares, the bottom 40% spent 75% of their total budget on food, whereas the top 10% spent only 55% on food in 2000. In 2010, the food share for the bottom 40% declined to 67% of their total budget. However, the food share for the top 10% fell faster than that of the bottom 40% from 55% to 42% of total expenditures. As expected, the bottom

40% spent 25% of their budget on rice, which is the main staple for many Indonesians. Expenditures on fish were approximately 8% of total expenditures in 2000 and declined to 7% in 2010. In contrast, in terms of spending on food item, the top 10% spent a large portion of their total expenditures on ready-to-eat food and drinks (i.e., bread, cookies, fried rice, instant noodles, chicken rice, beef bowls, etc.). One possible explanation is that most people in this group live in urban areas where there are many different options for food and drinks. In addition, due to their work, this population has limited time to cook, which means that they may have to purchase ready-to-eat food and drinks. Interestingly, both groups spent a large portion of their total expenditures on housing. The rich spent 22% of their total expenditures on housing, whereas the bottom 40% spent 12% of their expenditures on housing. It is likely that many people in the bottom 40% do not own houses and must rent them. In contrast, the top 10% is likely to own houses, and their housing expenditures are the estimated market prices if they rent their houses to someone else. Additionally, the growth of housing expenditures is above 90% between 2000 and 2010 for both groups. This finding might indicate a rising trend in housing values and thus increasing rents.

Furthermore, much of the expenditure growth for both groups has been driven by non-food expenditures. The bottom 40% spent twice more on non-food items in 2010 than in 2000, whereas the top 10% spent 137% higher on non-food items. For the bottom 40%, the top three non-food expenditure categories are goods and services, taxes and insurance, and education, respectively. Goods and services grew by 264% between 2000 and 2010. Major non-food items included in this category are fuel for vehicles and transportation costs, and these items' contributions to non-food expenditures are very large. For example, between 2005 and 2010, the bottom 40% spent 134% more on fuel and transportation costs. The price of fuel has risen

considerably since 2000 due to several fuel subsidy cuts, which will be discussed below. In addition, expenditures on taxes and insurance, which include land and building, vehicle taxes, and health and life insurance, have increased significantly by 237%. However, it is not clear which item in this category most contributes to growth. Meanwhile, the bottom 40% has spent twice more on education in 2010 than in 2000. This finding is not surprising given that more people become aware of the importance of education as an economy develops.

However, for the top 10%, the top three non-food expenditures are taxes and insurance, goods and services, and durable goods, respectively. Expenditures on taxes and insurance grew by 257% as this group's wealth and assets increased over time. The rich also demanded more goods and services. They spent more not only on fuel and transportation costs but also on leisure items, such as hotels, movie theaters, cable TVs, etc., and on household services, such as domestic helpers, gardeners, and drivers. Expenditures on these goods and services rose by 306% between 2000 and 2010. Moreover, the rich purchased more durable goods, including furniture, home appliances, jewelry, TV, cars, motorcycles. Expenditures on durable goods increased by 176%.

2.4.2 Fuel Subsidy Cuts

Based on the FW bipolarization measures, polarization increased considerably and showed spikes in 2002, 2005, and 2008. The FW bipolarization component breakdown in Table 2.5 further below reveals that the income share of those below the median per capita expenditure (i.e., median share L(0.5)) fell; thus, the relative median deviation, T, increased substantially in 2002, 2005, and 2008. This finding suggests that given the inequality in the country as indicated by the Gini index, the gap between those above and below the median widened in these years. As

a consequence, not only inequality but also polarization increased.

One possible explanation for increasing polarization is that during these years, the Indonesian government cut the fuel subsidy due to rising world oil prices. Many other factors might contribute to a significant increase in polarization in 2002, 2005, and 2008, yet we believe that fuel subsidy cuts have significant direct and indirect impacts on worsening polarization. Table 2.3 presents price changes of three types of fuel since 1993. In 2000, the price of premium fuel for vehicles was only Rp 1,150, but it increased to Rp 4,500 in 2009, an increase of nearly 300%. Premium fuel was the most common type of fuel consumed by both middle- and high-income people for their cars or motorcycles because it is partly subsidized by the government and is thus cheaper than other types of fuel with higher octanes. Meanwhile, the price of kerosene, which is consumed mostly by the poor, also increased from Rp 350 to Rp 2,500 from 2000 to 2008, an increase of more than 600%. In general, the poor use kerosene mostly for everyday cooking:

Table 2.3. Fuel Price Changes 1993-2010

Date	Premium (Rp/litre)	% Change	Kerosene (Rp/litre)	% Change	Solar (Rp/litre)	% Change
8-Jan-93	700		280		380	
5-May-98	1200	71	350	25	600	58
15-May-98	1000	-17	280	-20	550	-8
1-Oct-00	1150	15	350	25	600	9
16-Jun-01	1450	26	400	14	900	50
17-Jan-02	1550	7	600	50	1150	28
2-Jan-03	1810	17	700	17	1890	64
1-Mar-05	2400	33	2200	214	2100	11
1-Oct-05	4500	88	2000	-9	4300	105
24-May-08	6000	33	2500	25	5500	28
1-Dec-08	5500	-8	2500	0	5500	0
15-Dec-08	5000	-9	2500	0	4800	-13
15-Jan-09	4500	-10	2500	0	4500	-6
2-Jul-10	4500	0	2500	0	4500	0

Source: Abdini 2012

The status of Indonesia has changed from an exporter to an importer of oil since early 2002 due to low domestic production of oil. Fuel (and energy) subsidies comprised a large portion of Indonesia's budget and were the largest compared to China, India, Thailand, and South Korea. When global oil prices surge, the policy options are to maintain, raise, or reduce

the subsidy. Apparently, the last option was chosen by the Indonesian government in 2002, 2005, and 2008, leading to higher domestic fuel prices, as shown in Table 2.3. Based on the structural path analysis (SPA), Azis (2009) identifies transmission mechanisms that take into account the direct, indirect, and feedback effects from a price shock (i.e., fuel subsidy cut) on households in Indonesia. According to Azis (2009), chemical, paper, coal petroleum, textiles, and construction are the most oil-intensive sectors in Indonesia. These sectors are highly dependent on one other. That is, one sector generates a high multiplier effect on another sector. In addition, the effect of rising oil prices on Indonesia's chemical industry is lower output of this industry, which subsequently reduces the demand for production factors (capital and labor) directly and indirectly. Lower capital and labor demand ultimately creates downward pressure on wages and household income.

Furthermore, Azis (2009) argues that both high and low-income households in urban areas are most affected by the negative impacts of oil price hikes in chemical industries. The two most important channels are identified from chemical industries to urban high-income groups. First, a lower demand for coal and petroleum commodities involving intersectoral linkages leads to lower demand for incorporated capital, which ultimately reduces household incomes. Second, in the absence of intersectoral linkages, lower output in chemical industries directly translates to a decrease in unincorporated capital, which eventually reduces the income of urban high-income groups. Moreover, for urban low-income households, the most important channel is similar to the first channel for urban high-income households. The second most important channel proceeds from lower output of chemical industries to a decrease in demand for manufacturing labor, which eventually hurts the income of urban low-income households.

Our analysis can be extended by closely examining the consumption expenditure

breakdowns as previously for only the years in which polarization increased considerably: 2002, 2005, and 2008. Table 2.4 below shows the consumption patterns of the bottom 40% and the top 10% during the price shock years. It also presents the growth of expenditures for these two groups. One interesting feature is that the total expenditure growth of the bottom 40% was positive in 2002 and 2008 and yet negative in 2005. In contrast, the total expenditure growth of the highest 10% was positive in these years, although its growth in 2005 was not as high as in 2002 and in 2008. In addition, the magnitude of expenditure changes was much higher for the top 10% than for the bottom 40%. For example, in 2008, the expenditures of the bottom 40% grew only 3%, whereas the expenditures of the top 10% grew 23%. This finding suggests that price shocks such as fuel subsidy cuts had an insignificant impact on the consumption of the rich, whereas they affected the consumption of the poor as indicated by low and even negative growth in 2005. As a result, the gap between the mean expenditures of the poor and of the rich widened tremendously during the years in which price shocks occurred; thus, polarization increased significantly.

As discussed, non-food expenditure growth contributed significantly to overall expenditure growth for both groups. This finding is not surprising because expenditures on fuel, kerosene, and solar are aggregated in the goods and services category. The bottom 40% spent 70% more on this non-food category in 2005 than in 2004. Expenditures on many non-basic food and non-food items declined significantly. For example, meat consumption declined by 29%, and expenditures on clothing fell by 22% despite an unchanging consumption share. In sum, both food and non-food expenditures fell, and total expenditures thus declined as well in 2005 for the bottom 40%. This finding is consistent with the price changes of fuel, as shown in Table 2.3. In 2005, kerosene used mostly by the poor for cooking increased by 214%. Premium and solar

prices also increased significantly in 2005. Nonetheless, in 2008, overall expenditures still grew slightly, and the growth of food expenditures is greater than that of non-food expenditures. Ready-to-eat food and drinks and fruit expenditures contributed most to total expenditure growth in 2008. In addition, health and taxes and insurance expenditures grew considerably as well:

Table 2.4 Top 10% and Bottom 40% Expenditure Shares and Growths, Selected Years

Food Items	Bottom 40%									Highest 10%								
	Share 2001	Share 2002	Share 2004	Share 2005	Share 2007	Share 2008	Growth 2002	Growth 2005	Growth 2008	Share 2001	Share 2002	Share 2004	Share 2005	Share 2007	Share 2008	Growth 2002	Growth 2005	Growth 2008
Rice	23	24	19	20	23	18	17	0	-16	5	5	5	4	5	4	5	-6	-10
Legume	1	1	2	2	2	2	12	1	23	1	0	1	0	0	0	-3	-18	42
Fish	8	7	8	8	7	7	0	-5	7	5	4	4	4	4	4	-3	2	5
Meat	2	1	2	1	1	1	-17	-29	45	4	3	3	3	2	2	9	0	16
Egg and milk	3	3	3	3	3	3	3	-5	5	4	3	3	4	4	3	8	13	15
Vegetables	6	6	6	6	6	8	11	-3	39	3	3	3	2	3	3	7	1	26
Nuts	3	3	3	3	2	2	-5	-13	-3	1	1	1	1	1	1	-1	-8	10
Fruits	2	2	2	2	2	2	27	-16	61	3	3	3	2	2	3	24	-7	58
Oil and fat	4	4	4	4	4	5	7	-12	30	2	1	2	1	1	1	3	-8	18
Beverage ingredients	5	4	4	5	4	4	2	-4	-9	2	2	2	2	2	1	-1	-4	0
Spices	2	2	2	2	2	2	1	-9	12	1	1	1	1	1	1	14	-5	11
Other food	1	1	2	2	2	2	4	31	-13	1	1	1	2	1	1	14	28	-5
Ready food and drinks	5	5	5	5	5	11	15	4	123	14	13	11	12	11	17	14	19	88
Alcohol	0	0	0	0	0	0	-3	-8	-17	0	0	0	0	0	0	3	12	70
Tobacco	9	8	9	8	7	7	1	-11	-7	7	6	6	5	5	5	5	-7	2
Total food expenditures	74	**72**	69	**71**	69	**70**	**8**	**-4**	**5**	**53**	**47**	**47**	**43**	**43**	**44**	**8**	**4**	**25**
Non-food Items																		
Housing	12	14	17	16	15	19	30	-16	34	20	25	28	24	23	24	50	-2	29
Goods and services	3	3	3	5	6	8	19	70	-26	5	8	7	11	12	15	89	64	62
Education	2	2	2	2	2	2	2	14	0	4	3	4	4	4	4	9	7	35
Health	2	2	1	1	2	2	4	-9	133	3	3	3	3	3	4	7	9	79
Clothing	5	4	4	4	3	4	7	-22	-42	4	4	3	3	3	4	23	-3	54
Durable goods	1	1	1	1	1	2	-1	-10	-52	7	6	5	6	4	13	10	51	276
Taxes and insurances	0	0	0	0	0	1	13	31	52	1	1	1	2	2	2	51	89	41
Party,ceremony,etc.	1	1	1	1	1	1	2	-6	-7	3	3	2	2	1	3	18	17	163
Total nonfood expenditures	26	**28**	31	**29**	31	**30**	**18**	**-12**	**3**	**47**	**53**	**53**	**57**	**57**	**56**	**38**	**19**	**22**
Total expenditures (pce)							**11**	**-7**	**3**							**22**	**12**	**23**

The top 10% experienced a substantial increase in goods and services expenditures in 2002, 2005, and 2008. The highest increase in expenditures on this non-food category occurred in 2002. Moreover, in 2005, spending on taxes and insurance and goods and services grew by 89% and 64%, respectively, contributed most to the total expenditure growth. Interestingly, total food expenditures grew faster than total non-food expenditures in 2008. Spending on ready-to-eat food and drinks and on alcohol increased significantly, 88% and 70%, respectively.

Additionally, durable goods and party and ceremony expenditures increased by 276% and 163% in 2008.

Examining the food and non-food item shares to total expenditures, we find slight changes in the consumption patterns of both groups. The bottom 40% still spent approximately 70% of their money on food, whereas the top 10% spent more than 50% of their money on non-food items. In 2002, the share of food expenditures declined, yet the share of non-food expenditures increased for the bottom 40%. However, the opposite occurred in 2004-2005 and in 2007-2008. That is, the share of food expenditures slightly increased, whereas the share of non-food expenditures declined marginally. In contrast, for the top 10%, food shares dropped significantly in 2001-2002 from 53% to 47% and in 2004-2005 from 47% to 43%, whereas they increased slightly in 2007-2008 from 43% to 44%.

2.4.3 Allocating Savings from Fuel Subsidy Cuts to Anti-Poverty Programs

The government's decision to drastically cut fuel subsidies was followed by a series of compensating policies targeting the poor in 2005. A summary of these programs is shown in Appendix B.8. In general, lack of socialization, weak administrative capability, and poor targeting are issues regarding the implementation of these programs. For example, the government's anti-poverty program known as the BLT (i.e., unconditional cash transfers) in 2005 and 2008 most likely helped to smooth the consumption patterns of the poor only temporarily. Although the intention of this program was good, the implementation on the ground was not as expected. Data on how many people were eligible for the program were collected rapidly and reflected the bias of local elites, who included their families and relatives when they were asked about eligibility for the program in their regions.

Table 2.5 Number and Percentage of Households Receiving Compensation Programs in 2006

PCE Quintiles	BLT		RASKIN		KUR	
	Number of households	% of total beneficiaries	Number of households	% of total beneficiaries	Number of households	% of total beneficiaries
1	37,148	44.24	47,383	39.43	1,750	16.95
2	21,087	25.11	30,933	25.74	2,003	19.4
3	14,384	17.13	22,716	18.9	2,143	20.75
4	8,649	10.3	14,388	11.97	2,390	23.15
5	2,707	3.22	4,755	3.96	2,040	19.76
	83,975	100	120,175	100	10,326	100

SUSENAS Core 2006 = 277,202

As shown in Table 2.5, these three programs show substantial leakage. Targeting the poor, these programs clearly benefit not only the poor (defined as those in the bottom 40%) but also middle- and upper-income households (defined as those other than the bottom 40%). Of three anti-poverty programs, the program of subsidized rice for the poor, or RASKIN, was enjoyed by more than 120 million, or 40% of all households in the SUSENAS Core. Households in the highest and second highest quintile accounted for approximately 16 percent of the total recipients. Like the RASKIN, the BLT also shows substantial inclusion errors in which 13.5% of total beneficiaries were classified as the highest and second highest quintile. In addition, a large proportion of middle-income households received this cash transfer program. In sum, the government transfers targeting the poor suffer from substantial leakage, benefitting non-poor households.

Rosfadhila et al. (2011) report that the implementation of the BLT in 2008 improved compared to that in 2005. Although the role of the implementing institutions improved, coordination among institutions at different levels was still an issue. Other problems include lack of socialization, domination of local apparatuses in verifying BLT beneficiaries, and significant cuts in total amounts allocated to the beneficiaries. Despite these issues, we believe that a series of government transfers to the poor through these anti-poverty programs may have improved the

consumption patterns of the poor (and the non-poor) when there was a price shock such as the fuel subsidy cut, although the magnitude of these effects was not as large as expected. Polarization likely improved to some extent from 2005 to 2007 and from 2008 to 2009 due to these transfers.

Based on our discussion of expenditure components and their growth, we conclude that the rich seem to be "immune" from price shocks such as fuel subsidy cuts. The rich maintain their standard of living and continue to spend their money mostly on non-food items during periods of rising prices. Only in 2005, expenditures of the top 10% grew slightly by 12%, but in 2002 and in 2008, their expenditures grew more than 20%. In contrast, the poor were impacted most severely by price shocks. Their expenditures either declined or grew only slightly. As a consequence, the gap between the average expenditures of the poor and those of the rich became larger and larger over time. This clearly led to an increase in polarization.

The empirical evidence above suggests that Indonesia as a whole has become more polarized and unequal in terms of income distribution since 2000. This process is mainly due to the fact that the consumption expenditures of the rich grew much faster than those of the poor. A significant increase in the FW polarization index between 2000 and 2010 is largely due to "increased spread." However, an increase in this index may also imply a disappearance of the middle class. A popular notion in recent years claims that the middle class in Indonesia has grown rapidly in the last decade. Clearly, this idea contradicts the notion of a disappearing middle class based on increases in the FW polarization index. The middle class, especially in the context of Indonesia and how it differs from the FW bipolarization concept, will be further discussed in the following section.

2.4.4 The Emergence of Indonesia's Middle Class

In the last decade, Indonesia has enjoyed rapid economic growth, and its economy continued to grow even during the global financial crisis in 2008-2009. According to the ADB (Chun, 2010) and the World Bank (2011), one implication of this growth is the apparent emergence of the middle class in Indonesia. In 2003, Indonesia's middle class was estimated as approximately 38% of the population, or approximately 81 million people, but in 2010, the middle class increased to 56% of the population, or approximately 131 million people (World Bank, p.39). In addition, the number of people with expenditures between $2 and $6 per day showed the highest increase compared to those with higher expenditures.

There are three different approaches for estimating the middle class: the absolute, relative, and hybrid approaches. The ADB and the World Bank used the absolute approach for Indonesia. That is, they established a specific arbitrary range of income/expenditures to define the middle class. Those in the population with per capita expenditures between $2 and $20 per day are considered middle class. Using the 2005 Purchasing Power Parity (PPP) rate, the ADB and the World Bank converted $2 and $20 into Indonesian Rupiah and applied this to the distribution of income from the SUSENAS. Therefore, the cutoff points are relatively fixed over time. It is clear that if incomes grow, then more people will fall into this middle class category. In other words, given inequality in the distribution, if the income distribution shifts to the right while the cutoff points are relatively constant, then the number of middle class people will grow (Figure 2.9). In addition, the absolute range for defining the middle class is very large as indicated by the fact that more than half of Indonesia's population is considered middle class in 2010 (more than 100 million):

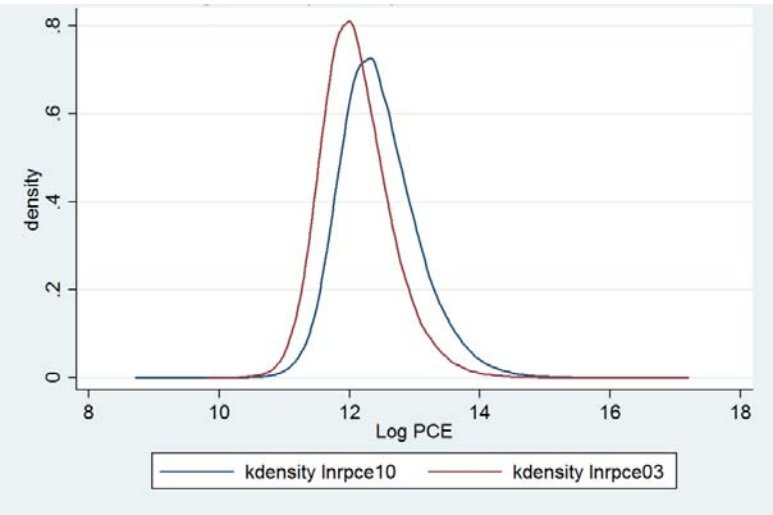


Figure 2.9. Income Distribution 2003 & 2010

Several characteristics of this middle class in developing countries are as follows: First, the middle class is highly concentrated in urban areas and is regionally concentrated. Second, this group is likely to be better educated and is more likely to send their children to school (Chun 2010). Third, middle class people are more likely to have salaried jobs in non-agricultural sectors, to migrate, to have smaller family sizes, and to spend more on health care. Fourth, in rural areas, the middle class is more likely than the poor to be involved in non-agricultural activities and to be local entrepreneurs (Banerjee and Duflo 2008).

According to the ADB and the World Bank, the middle class in Indonesia has been rising rapidly in the last decade. Nevertheless, the FW bipolarization index indicates that bipolarization has increased since 2000, which implies that the middle class is disappearing. Why do these two measures have conflicting results? A possible explanation is that these measures have different definitions of the middle class and emphasize different things. As discussed, the ADB and the World Bank version of the middle class is *an absolute measure* and has a very wide range from $2 to $20. In the last decade, Indonesia's economy grew on average approximately 5% per year. Clearly, based on this measure, the number of people in the middle class rose significantly given

that the income distribution shifted while the cutoff points were relatively constant over time.

However, using the median as a reference point, Foster and Wolfson (1992, 1994, 2010) argue that a middle class is a group around the middle of the distribution (i.e., median). One of their propositions is that a polarization index is a function of between-group and within-group inequality as measured by the Gini index (Foster Wolfson 2010). This index has a nice interpretation: polarization equals between-group inequality, or "increased spread," minus within-group inequality, or "increased bipolarity," normalized by the ratio of the mean and median. Groups considered in this index are below and above the median income. When the distance between these two groups becomes farther, polarization and inequality tend to rise. Nonetheless, when inequality increases in those two groups (i.e., "increased bipolarity"), polarization tends to decline. Therefore, the key difference between the middle class of Foster Wolfson and that of the World Bank and the ADB is that the FW index uses the median as a cut-off point for income groups, whereas the WB and ADB use their absolute $2 and $20 range as their cut-off points. Different years will result in different medians because the distribution of income will be different, whereas the $2 and $20 range is relatively constant for each year.

Table 2.6 shows Indonesia's income distribution between 2000 to 2010. The mean and median show increasing trends. The distribution also shows an upward trend and is positively skewed. Furthermore, those at the top of the income distribution experienced faster growth in their income shares compared with those at the lowest distribution between 2000 and 2010, as discussed above. As a result, polarization increased substantially during the study period.

Moreover, as shown in Table 2.6, the percentage of the population in the middle class for several given income ranges has declined. The relative median deviation denoted by T shows that the gap between the above and below median groups has widened over time. Both between-

and within-group inequality have increased since 2000. However, between-group inequality grew faster than within-group inequality, resulting in an increase in the Foster Wolfson polarization. Therefore, based on these results, we may conclude that the middle class in Indonesia has declined in the last decade:

Table 2.6. Indonesia's Income Distribution 2000-2010

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Mean income μ	152,824	161,631	194,793	195,555	185,343	196,298	211,167	210,798	263,555	260,396	309,871
Median income *m*	122,773	130,213	148,901	157,259	146,868	144,101	161,323	168,089	203,466	200,423	227,212
Median income/Mean income (m/μ)	0.80	0.81	0.76	0.80	0.79	0.73	0.76	0.80	0.77	0.77	0.73
Skewness ($1 - m/\mu$)	0.20	0.19	0.24	0.20	0.21	0.27	0.24	0.20	0.23	0.23	0.27
Quantiles (shares in total per capita income)											
Q1	8.91	9.14	8.45	8.95	8.62	7.61	8.23	8.70	7.17	8.26	7.66
Q2	12.62	12.78	11.92	12.66	12.38	11.18	11.81	12.38	11.83	11.86	11.17
Q3	16.11	16.18	15.36	16.13	15.91	14.76	15.36	16.01	15.54	15.47	14.74
Q4	21.29	21.33	20.78	21.31	21.21	20.58	21.04	21.64	21.48	21.16	20.56
Q5	41.08	40.57	43.49	40.94	41.87	45.87	43.57	41.27	43.98	43.26	45.86
D9	14.43	14.38	14.58	14.44	14.50	14.89	14.89	14.97	14.92	14.86	14.83
D10	26.65	26.19	28.91	26.50	27.37	30.99	28.68	26.30	29.06	28.39	31.04
V19	9.50	9.41	9.85	9.46	9.57	10.22	10.02	9.87	9.95	10.01	10.30
V20	17.15	16.78	19.06	17.04	17.80	20.77	18.66	16.43	19.10	18.38	20.73
Gini (*G*)	0.32	0.31	0.34	0.32	0.33	0.38	0.35	0.32	0.36	0.34	0.37
% of the population with incomes …											
< 40% of median income	1.78	1.10	1.20	1.18	1.76	2.51	1.70	1.62	5.10	1.97	2.30
< 50% of median income	5.53	3.82	4.30	4.10	5.12	6.76	5.24	5.17	10.03	5.77	6.36
< 60% of median income	12.37	9.14	10.19	9.45	11.01	13.42	11.37	11.42	14.51	12.15	12.93
60% to 75% of median income	13.90	11.92	12.71	11.86	12.10	12.50	12.23	12.45	9.59	12.60	12.40
75% to 100% of median income	23.21	22.20	21.99	21.95	21.47	20.06	20.80	21.20	20.41	20.62	20.00
100% to 125% of median income	16.96	17.30	16.61	17.49	16.73	15.05	15.70	16.26	15.57	15.43	14.99
125% to 150% of median income	10.81	12.02	11.12	11.74	11.49	10.36	10.61	11.04	10.81	10.48	10.22
150% to 200% of median income	11.45	13.32	12.42	13.17	12.81	11.99	12.16	12.46	12.55	12.00	11.91
> 200% of median income	11.29	14.10	14.96	14.35	14.38	16.62	17.12	15.17	16.56	16.73	17.55
% of the population in the middle class given income range …											
75% to 150% of median income	50.98	51.52	49.72	51.17	49.69	45.47	47.12	48.49	46.79	46.53	45.21
75% to 125% of median income	40.18	39.50	38.60	39.44	38.20	35.11	36.50	37.46	35.99	36.05	34.99
50% to 150% of median income	71.73	68.76	68.32	68.39	67.69	64.63	65.48	67.19	60.86	65.50	64.17
Polarization FW											
Median share *L*(0.5)	0.29	0.30	0.28	0.29	0.28	0.26	0.27	0.29	0.26	0.27	0.26
Relative median deviation *T*	0.41	0.41	0.44	0.42	0.43	0.48	0.45	0.42	0.47	0.45	0.48
Gini Between	0.21	0.20	0.22	0.21	0.22	0.24	0.23	0.21	0.24	0.23	0.24
Gini Within	0.11	0.11	0.12	0.11	0.11	0.13	0.12	0.11	0.13	0.12	0.14
Polarization index *P*	0.120	0.123	0.131	0.124	0.129	0.147	0.137	0.129	0.140	0.138	0.143

The discussion above reveals that different middle class measures yield different results. The result really depends on what one attempts to measure. The absolute middle class measure

by the ADB and the World Bank resulted in a rising middle class as the economy continues to grow rapidly. Nevertheless, the FW polarization measure shows that the distance between those in the above- and below-median income groups has significantly increased over time, and in these two groups, income has become more homogenous (i.e., increased bipolarity), implying a decline in the number of those around the middle. Comparing these two measures of the middle class, one can see that the ADB and the World Bank version of the middle class indicates a promising picture of the economy, whereas the FW version of the middle class shows the opposite.

2.4.5 National Polarization and Inequality Based on the SUSENAS Panel Consumption Module: A Different Story?

In the previous section, we demonstrated and discussed national polarization and inequality based on estimations from the SUSENAS Core from 2000 to 2010. Our results show that polarization and inequality indices fluctuated, disagreed in their directions in certain periods, and soared when there was a price shock. In addition, these indices show an increasing trend, and we conclude that Indonesia has become a more polarized and unequal society since 2000. What if we employ a different data set (i.e., the SUSENAS Panel Consumption Module or the SPCM) and estimate polarization and inequality? Will we obtain different results? If yes, how will the results differ from those of the SUSENAS Core?

As mentioned above in the data discussion, the SPCM collects detailed data on consumption expenditures. Households are surveyed regarding how much they spend on a long list of food and non-food items. Total household expenditures are simply the sum of the money value of food and non-food items. In contrast to this method, the SUSENAS Core inquires about a shorter list of household expenditures on food and non-food items and relies on aggregations. Whereas the SUSENAS Core is conducted every year with a larger sample of households, the

SPCM was conducted every three years prior to 2007 with smaller samples. In this study, the SPCM data from 2002 to 2010 are used. The SPCM data from 2002 and 2005 consist of approximately 10,000 households, whereas the SPCM 2007-2010 data include approximately 66,000 households.

Figure 2.10 presents expenditure shares of the top and bottom 20%. This figure clearly indicates an increasing trend of expenditure shares of the rich. Between 2005 and 2007, the expenditure share of the rich jumped considerably from 43.6% to 45.6%. It declined slightly from 2007 to 2008 but steadily increased to 45.1% in 2010. Overall, since 2000, the rich in Indonesia have been getting richer, and this is consistent with our results from the SUSENAS Core. The speed of these changes is remarkably high. Keep in mind that the SUSENAS fails to include the richest of the rich. In effect, polarization and inequality estimations in this study are most likely to underestimate the real polarization and inequality in Indonesia. In contrast, the poor have seen their expenditure share fall steadily since 2000. The share of the poor fell substantially from 2002 to 2007 and rose slightly before it fell from 2007 to 2010. This figure illustrates an "increased spread" in which the rich are getting richer while the poor are getting poorer:

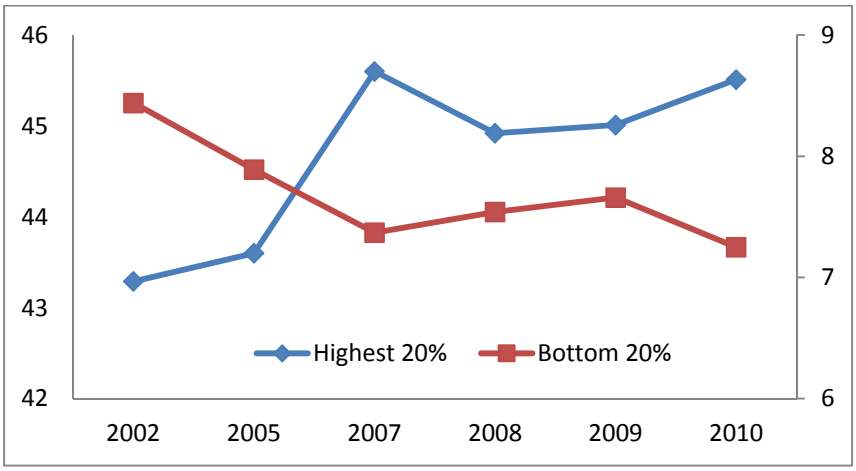


Figure 2.10 Trend of Expenditure Share of Highest 20% and Bottom 20%

Table 2.7 and Figure 2.11 show inequality and polarization indices based on the SPCM from 2002 to 2010. Several features are apparent from the table and figure. First, the trends of polarization and inequality are slightly different. For example, the FW fell steadily from 2005 to 2009 after it soared to a high level in 2005. In contrast, both the GE and Gini rose significantly between 2002 and 2007, fell steadily from 2007 to 2009, and increased between 2009 and 2010. Second, although the FW[4] and DER measure polarization, they show different trends. This finding illustrates that bipolarization and pure polarization measures do not always agree in terms of direction and trend. Whereas the FW index emphasizes two income groups, the DER index concerns more than two income groups in a distribution. Finally, all indices except the DER have risen substantially since 2002, with the GE showing the highest increase:

Table 2.7 Inequality and Polarization Indices Based on SPCM

	GE	Gini	FW	DER
2002	0.190	0.342	0.147	0.198
2005	0.220	0.352	0.169	0.216
2007	0.230	0.377	0.164	0.203
2008	0.221	0.369	0.160	0.202
2009	0.221	0.368	0.157	0.203
2010	0.233	0.378	0.171	0.204
Growth (%)	22.76	10.47	16.64	2.82

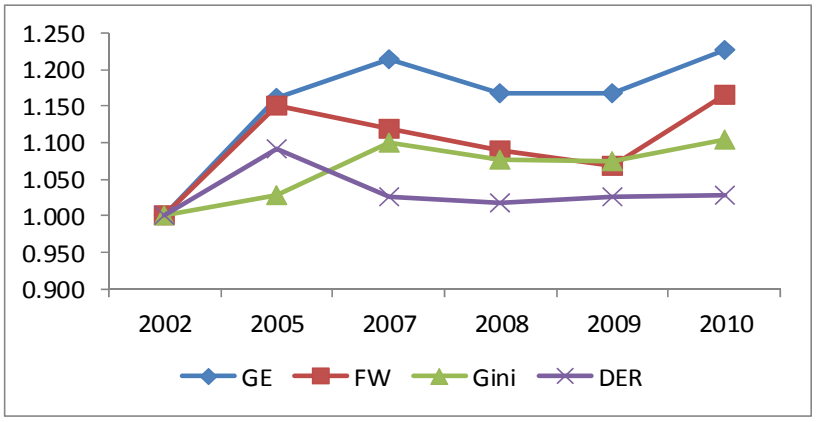


Figure 2.11 Graph of Inequality and Polarization Indices estimated from SPCM

[4] The Wang-Tsui bipolarization index is also estimated, but the trend is very similar to that of the FW.

Our next step is to compare the polarization and inequality indices estimated from the SPCM and from the SUSENAS Core (SC). Table 2.8 shows these comparisons, and graphs are shown in Appendix B.9. In terms of magnitude, the polarization indices from the SPCM are much higher than those from the SC. However, what is interesting is that the trends are slightly different. Unlike those from the SC, the polarization indices from the SPCM do not always show an increase when there was a price shock. Between 2007 and 2008, both polarization indices from the SC experienced an increase, whereas polarization indices from the SPCM fell slightly. These patterns also apply to inequality measures with greater changes. In our view, those polarization indices from the SC are more reasonable because they capture at least some immediate effects of higher fuel prices. Regardless of these differences, our conclusion still holds; Indonesia has become more polarized and unequal over time.

Table 2.8. Comparison of Inequality and Polarization from the SCM and SC

	SUSENAS Consumption Module				SUSENAS CORE			
	GE	Gini	FW	DER	GE	Gini	FW	DER
2002	0.190	0.342	0.147	0.198	0.195	0.345	0.131	0.192
2005	0.220	0.352	0.169	0.216	0.232	0.376	0.147	0.198
2007	0.230	0.377	0.164	0.203	0.166	0.321	0.129	0.177
2008	0.221	0.369	0.160	0.202	0.219	0.362	0.140	0.179
2009	0.221	0.368	0.157	0.203	0.193	0.345	0.138	0.187
2010	0.233	0.378	0.171	0.204	0.230	0.375	0.143	0.193

2.5. Regional Inequality and Polarization

This section discusses changes in polarization and inequality from 2000 to 2010 by regional groupings. Like those measures for national income distribution, similar polarization and inequality measures are applied to the regional groupings. The main objectives are to analyze how polarization and inequality behave over time and to compare inequality and polarization indices within each region. Following regional classifications in other regional

studies, this paper analyzes regional inequality and polarization through five types of regional dimensions in Indonesia:

2.5.1 Urban and rural regions.

2.5.2 Western Indonesia and Eastern Indonesia.

2.5.3 Java-Bali Island and outside Java-Bali.

2.5.4 Jakarta and non-Jakarta provinces.

2.5.5 Natural resource-rich provinces, including East Kalimantan, Riau, and Papua versus non-natural resource-rich provinces.

The components of the Foster Wolfson (FW) polarization index for each region are shown in Appendix B.11.

2.5.1 Urban and Rural Indices

Table 2.9 presents the evolution of urban and rural inequality and polarization indices, and Figure 2.12 illustrates these measures' changes relative to their values in the year 2000. The fluctuations of urban polarization and inequality indices are very similar during the period of study, yet the rates of change differ. The directions of the polarization measures agree with those of the inequality measures in most periods. In some periods, however, the directions of polarization and inequality measures are opposed. For example, between 2008 and 2009, polarization measures show an increase, whereas inequality measures show a large drop. This finding suggests that the within-income-groups inequality in the distribution declined during that period. Furthermore, the patterns of all measures are remarkably similar to the national patterns. This result is not surprising because 65% of national income came from urban areas in 2010, compared with 53% in 2000:

Table 2.9. Urban and Rural Inequality and Polarization Indices

Urban					Rural				
Year	GE(0)	Gini	FW	DER	Year	GE(0)	Gini	FW	DER
2000	0.182	0.334	0.124	0.179	2000	0.103	0.252	0.100	0.161
2001	0.164	0.318	0.124	0.179	2001	0.094	0.240	0.100	0.164
2002	0.207	0.354	0.135	0.191	2002	0.102	0.250	0.101	0.165
2003	0.173	0.325	0.127	0.180	2003	0.099	0.245	0.101	0.163
2004	0.184	0.333	0.128	0.181	2004	0.106	0.252	0.103	0.163
2005	0.243	0.384	0.152	0.198	2005	0.131	0.283	0.119	0.173
2006	0.202	0.352	0.142	0.188	2006	0.115	0.265	0.111	0.168
2007	0.169	0.323	0.131	0.174	2007	0.101	0.250	0.107	0.161
2008	0.227	0.368	0.139	0.176	2008	0.142	0.289	0.116	0.165
2009	0.199	0.350	0.141	0.184	2009	0.119	0.270	0.114	0.169
2010	0.239	0.382	0.147	0.194	2010	0.124	0.275	0.116	0.170
Growth	31.330	14.518	18.128	8.461	Growth	19.859	9.142	16.411	5.696

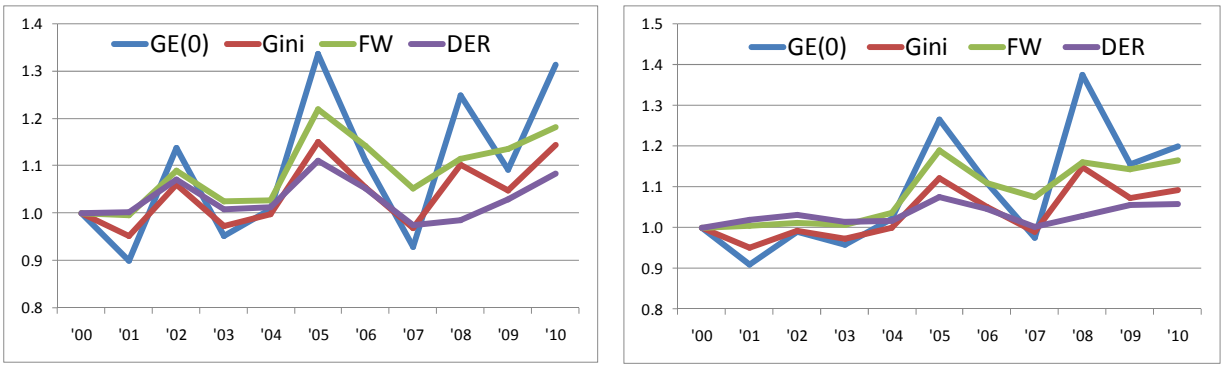


Figure 2.12. Urban (left) and Rural (right) Inequality and Polarization Indices

In contrast, in rural regions, inequality indices fluctuated while polarization indices remained constant in the beginning of the period. For example, polarization measures were relatively stable while inequality measures showed a w-shaped pattern between 2000 and 2003. Polarization measures in rural areas fluctuated between 2007 and 2010, whereas polarization indices in urban regions showed an upward trend.

Within urban areas, both income inequality and income polarization increased significantly since 2000. GE(0) showed the highest growth at 31.33% and grew more rapidly than another inequality measure, Gini. Meanwhile, income polarization as indicated by the FW

index showed the second highest growth, and the FW increased faster than the DER. Similarly, within rural areas, the highest growth is the GE(0), and the second highest growth is the FW. The GE(0) rose faster than Gini, and the FW increased faster than the DER.

However, the differences in growth between polarization and inequality indices in rural areas were not as large as those in urban areas. For example, the growth difference between the GE(0) and the FW in rural areas was only approximately a little more than 3 percentage points, whereas the growth difference between the GE(0) and the FW in urban areas was approximately 13 percentage points. In addition, comparing growth of indices in urban and rural regions, we can see that inequality and polarization measures grew much faster in urban than in rural areas since 2000. For example, the FW in urban areas grew by 18.1%, whereas in rural areas it increased by 16.4%.

In sum, urban and rural regions became more polarized and more unequal in terms of income in the last decade. A widening gap between the poor and the rich (i.e., "increased spread," higher "alienation," higher "between-group inequality") may be responsible for an increase in polarization and inequality in both urban and rural areas. In addition, when there was a major price shock, polarization and inequality worsened in both regions. Regions' different responses to price shocks are translated to different levels and changes in polarization and inequality measures. Regions with higher income shares, in this case urban areas, are more likely than other regions to show trends that are similar to the national polarization and inequality measures. Finally, polarization and inequality have worsened much more rapidly in urban than in rural regions since 2000.

2.5.2 West and East Indices

Table 2.10 presents the evolution of western and eastern inequality and polarization measures, and Figure 2.13 illustrates the evolution of these measures during the period of study:

Table 2.10. Eastern and Western Inequality and Polarization Indices

East					West				
Year	GE(0)	Gini	FW	DER	Year	GE(0)	Gini	FW	DER
2000	0.164	0.317	0.123	0.171	2000	0.164	0.317	0.118	0.180
2001	0.164	0.318	0.130	0.175	2001	0.154	0.308	0.120	0.184
2002	0.165	0.319	0.126	0.180	2002	0.197	0.346	0.131	0.196
2003	0.144	0.298	0.121	0.173	2003	0.165	0.317	0.124	0.183
2004	0.158	0.312	0.129	0.173	2004	0.178	0.329	0.128	0.186
2005	0.217	0.365	0.145	0.191	2005	0.231	0.376	0.145	0.201
2006	0.192	0.344	0.141	0.186	2006	0.196	0.347	0.135	0.193
2007	0.166	0.321	0.133	0.175	2007	0.165	0.320	0.127	0.180
2008	0.210	0.354	0.141	0.178	2008	0.219	0.362	0.137	0.181
2009	0.195	0.346	0.145	0.184	2009	0.191	0.344	0.135	0.190
2010	0.233	0.377	0.148	0.188	2010	0.229	0.374	0.141	0.197
Growth	42.124	18.855	20.305	9.820	Growth	38.929	17.997	19.290	9.084

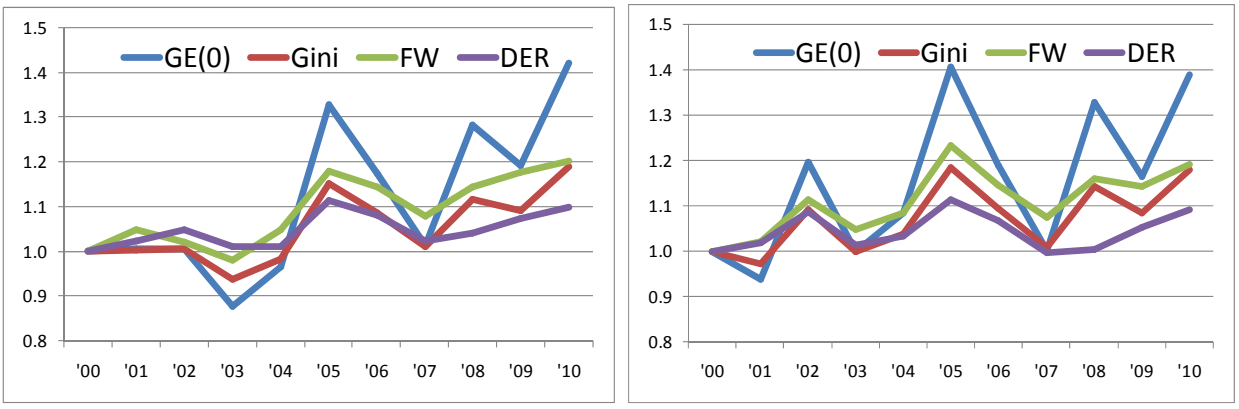


Figure 2.13.Eastern (left) and Western (right) Polarization and Inequality Indices

Inequality and polarization measures in the east show almost identical trends in most periods. Similar directions of polarization and inequality measures were caused by larger gaps between income groups in the distribution. However, between 2008 and 2009, polarization measures rose while inequality measures decreased. This is caused by a decline in within-group inequality in this period. Furthermore, compared to other indices, the GE(0) showed the highest

growth since 2000, and the FW was the second highest growth. The GE(0) rose more rapidly than the Gini, and the FW increased more rapidly than the DER. In addition, the FW has a slightly different pattern compared to the DER in one period. That is, the FW declined while the DER increased between 2001 and 2002.

Similarly, in the west, the GE(0) had the highest growth, and the FW had the second highest growth during the period of study. Between two polarization measures, the FW showed larger changes than the DER from 2000 to 2010. This result is due to the differences in what these measures estimate. The FW index measures "increased spread" and "increased bipolarity" in a discrete distribution (i.e., above and below median), whereas the DER measures "the sum of effective antagonism" in a continuous distribution. Moreover, as in the urban areas discussed previously, the west showed trends nearly identical with the national trends because it accounts for more than 80% of the total income shares. Furthermore, in the early period (2000-2001), polarization increased, whereas inequality declined.

Comparing polarization and inequality indices between the east and the west, we can see that in general, inequality and polarization in the east increased more rapidly than in the west since 2000. For example, the FW in the east showed an increase of 20.3%, whereas the FW in the west showed an increase of 19.2%. In short, both regions experienced a significant increase in inequality and polarization.

2.5.3 Java Bali and Outside Java Bali Indices

Table 2.11 presents the inequality and polarization measures of Java Bali and outside Java Bali, and Figure 2.14 graphs the evolution of these measures:

Table 2.11. Java Bali and Non-Java Bali Inequality and Polarization Indices

JavaBali					Other Islands				
Year	GE(0)	Gini	FW	DER	Year	GE(0)	Gini	FW	DER
2000	0.170	0.322	0.122	0.187	2000	0.155	0.308	0.118	0.170
2001	0.165	0.319	0.127	0.193	2001	0.140	0.292	0.120	0.172
2002	0.213	0.361	0.142	0.212	2002	0.153	0.307	0.124	0.177
2003	0.173	0.325	0.129	0.191	2003	0.143	0.295	0.120	0.174
2004	0.188	0.338	0.134	0.195	2004	0.153	0.306	0.126	0.174
2005	0.246	0.387	0.156	0.216	2005	0.201	0.351	0.143	0.187
2006	0.208	0.358	0.146	0.203	2006	0.174	0.327	0.133	0.182
2007	0.179	0.334	0.141	0.194	2007	0.143	0.297	0.125	0.169
2008	0.237	0.378	0.155	0.197	2008	0.192	0.337	0.134	0.171
2009	0.205	0.356	0.145	0.203	2009	0.174	0.327	0.135	0.180
2010	0.229	0.374	0.156	0.217	2010	0.233	0.377	0.138	0.182
Growth	34.544	16.140	28.264	16.141	Growth	50.297	22.433	17.017	7.159

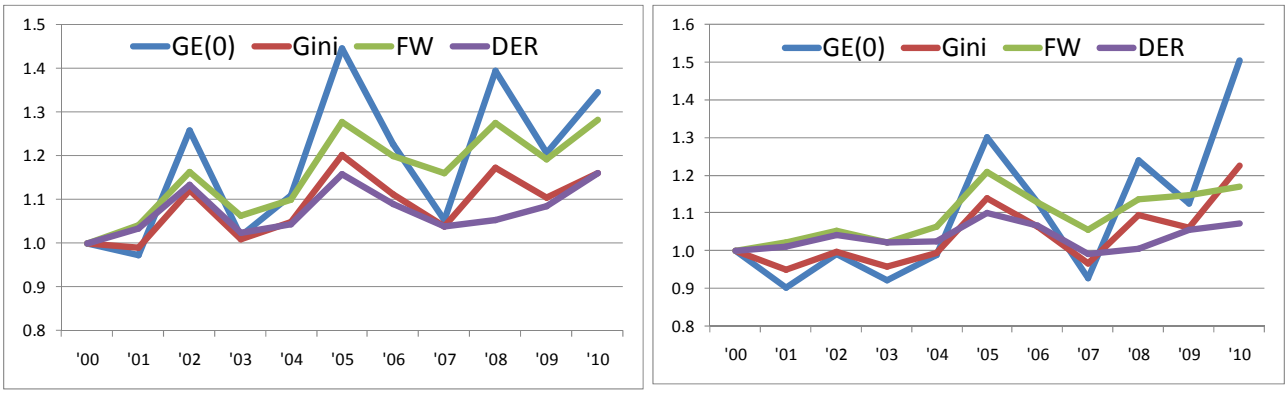


Figure 2.14. Java Bali (left) and Non-Java Bali (right) Inequality and Polarization Indices

Within Java Bali, trends of polarization and inequality are similar to national trends because Java Bali account for more than 60% of the national income. In addition, in most periods, polarization and inequality indices moved in similar directions. Only in two periods, between 2000 and 2001 and between 2008 and 2009, polarization and inequality indices moved in opposite directions. Furthermore, inequality showed the highest increase, whereas polarization represented by the FW index was the second highest. Between two inequality measures, the

GE(0) grew more rapidly than the Gini, whereas between two polarization indices, the FW grew much faster than the DER.

In contrast, trends of polarization and inequality indices in non-Java-Bali regions are completely different than national trends or those in Java and Bali. For example, there were only two spikes in inequality indices, whereas there were three spikes for Java Bali. Furthermore, in some periods, polarization and inequality indices moved in different directions. For instance, between 2008 and 2009, polarization increased while inequality declined. This is probably due to a decline in within-group inequality of relevant income groups that the FW and the DER measures assumed. In terms of growth (changes), the GE(0) rose by 50%, representing remarkable growth. Unlike in Java Bali, the second highest growth was the Gini index in non-Java Bali.

Comparisons of inequality reveal that non-Java Bali experienced a more rapid increase than Java Bali. However, in terms of polarization, non-Java Bali experienced less rapid growth than Java Bali. In conclusion, both regions became more polarized and more unequal since 2000. However, trends of polarization and inequality indices in both regions differ. Whereas trends in Java Bali are similar to the national trends, those in non-Java Bali are very different. Additionally, inequality in non-Java Bali grew faster than in Java Bali, whereas polarization in non-Java Bali increased less rapidly than in Java Bali.

2.5.4 Jakarta and Outside Jakarta Indices

As the capital of Indonesia, Jakarta is a major metropolitan city where business activities, especially services, are concentrated. Jakarta generates nearly 18% of the Indonesian GDP. Because some of Jakarta's inhabitants work in high-paying jobs or own firms, it is highly likely

that the income gap is relatively high compared to other provinces. Significant income inequality and urbanization are evident and may contribute to problems such as slump areas, floods, and high crime rates. Table 2.12 presents the inequality and polarization measures for Jakarta and outside Jakarta, and Figure 2.15 graphs these measures:

Table 2.12. Jakarta and Non-Jakarta Inequality and Polarization Indices

Jakarta					Other Provinces				
Year	GE(0)	Gini	FW	DER	Year	GE(0)	Gini	FW	DER
2000	0.236	0.378	0.137	0.204	2000	0.146	0.300	0.116	0.172
2001	0.158	0.314	0.129	0.192	2001	0.144	0.297	0.119	0.177
2002	0.261	0.394	0.145	0.238	2002	0.161	0.315	0.125	0.182
2003	0.166	0.313	0.118	0.198	2003	0.145	0.297	0.119	0.176
2004	0.232	0.369	0.131	0.226	2004	0.151	0.304	0.125	0.176
2005	0.274	0.407	0.143	0.233	2005	0.204	0.354	0.142	0.191
2006	0.220	0.365	0.137	0.212	2006	0.173	0.326	0.133	0.184
2007	0.148	0.299	0.116	0.182	2007	0.149	0.304	0.125	0.173
2008	0.218	0.363	0.135	0.227	2008	0.200	0.346	0.137	0.175
2009	0.195	0.346	0.142	0.198	2009	0.176	0.329	0.134	0.183
2010	0.261	0.400	0.159	0.232	2010	0.203	0.353	0.139	0.188
Growth	10.516	5.826	16.146	13.512	Growth	38.903	17.694	20.132	8.995

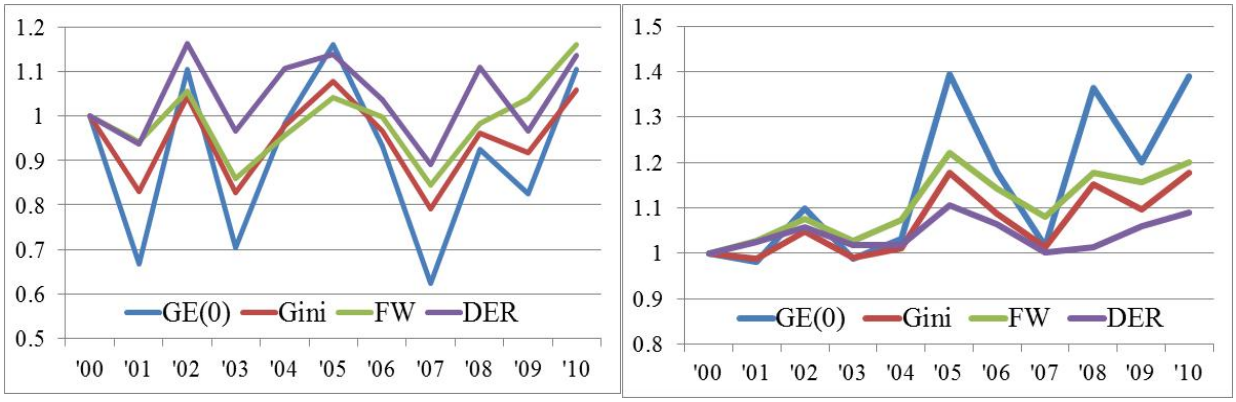


Figure 2.15. Jakarta (left) and Non-Jakarta (right) Inequality and Polarization Indices

Within Jakarta, polarization and inequality indices show high volatility and instability during the period of study. However, trends for all measures except the GE(0) tended to be similar. As shown, the trend of the GE(0) was very volatile compared to those of other indices.

Spikes were often followed by large drops. These radical changes were largely due to the fact that the GE(0) is highly sensitive to changes in the lower tail of the distribution. Furthermore, in terms of the direction of the indices, all inequality and polarization indices tended to agree in most periods. Nevertheless, between 2008 and 2009, the FW increased, whereas other indices declined. Moreover, unlike in the other regions discussed above, polarization increased more rapidly than inequality in Jakarta. The FW had the highest growth, and the DER showed the second highest growth.

Within non-Jakarta regions, trends of polarization and inequality resemble the national trends. In most periods, polarization and inequality agreed in their directions. In some periods, however, polarization and inequality moved in opposite directions. Moreover, similar to the results for some regions discussed above, within non-Jakarta regions, the GE(0) showed the highest growth, and the FW experienced the second highest growth since 2000.

Furthermore, inequality in non-Jakarta increased more rapidly than that in Jakarta since 2000. However, the FW in non-Jakarta grew slightly faster than that in Jakarta, whereas the DER in non-Jakarta increased less rapidly than that in Jakarta.

In sum, both Jakarta and other provinces became more polarized and more unequal since 2000. Within Jakarta, the increase in polarization was much higher than the increase in inequality. In contrast, within non-Jakarta provinces, the GE(0) had the highest growth compared with other indices, and the second highest growth was the FW. Across regions, inequality in non-Jakarta provinces rose more rapidly than that in Jakarta. However, the FW of non-Jakarta provinces was higher than that of Jakarta, whereas the DER of non-Jakarta provinces was less than that of Jakarta.

2.5.5 Natural Resource-Rich (NRR) and Non-Natural Resource-Rich (NNRR) Provinces

Four provinces in Indonesia can be classified as natural resource-rich provinces: Aceh, Riau, East Kalimantan and Papua. This classification is based on high contributions of mining (e.g., oil, gas, and minerals) to the provinces' GDP. Usually, the contribution of the mining sector to the regional GDP is more than 30% of the total GDP (see Appendix B.12). However, this high contribution of mining to the total output has declined over time. For example, Riau province's share of mining to its GDP was 64.3% in 2000 but 48.68% in 2010.

Table 2.13 presents the trends of the inequality and polarization measures for natural resource-rich provinces (NRR) and non-natural resource-rich provinces (NNRR), and Figure 2.16 graphs these measures:

Table 2.13. Natural Resource-Rich and Non-NRR Inequality and Polarization Indices

Natural Resource-Rich Provinces					Other Provinces				
Year	GE(0)	Gini	FW	DER	Year	GE(0)	Gini	FW	DER
2000	0.171	0.324	0.120	0.180	2000	0.162	0.315	0.118	0.177
2001	0.183	0.329	0.125	0.169	2001	0.154	0.307	0.120	0.181
2002	0.157	0.310	0.121	0.182	2002	0.194	0.344	0.129	0.194
2003	0.169	0.320	0.133	0.173	2003	0.162	0.314	0.121	0.181
2004	0.183	0.333	0.138	0.179	2004	0.176	0.326	0.126	0.182
2005	0.223	0.367	0.153	0.183	2005	0.230	0.374	0.143	0.198
2006	0.199	0.348	0.148	0.184	2006	0.195	0.346	0.134	0.189
2007	0.172	0.323	0.139	0.168	2007	0.164	0.320	0.126	0.177
2008	0.208	0.347	0.146	0.174	2008	0.217	0.361	0.136	0.180
2009	0.190	0.340	0.150	0.183	2009	0.191	0.343	0.135	0.186
2010	0.221	0.365	0.151	0.185	2010	0.230	0.375	0.141	0.194
Growth	29.013	12.538	26.093	2.649	Growth	41.799	19.154	18.961	9.516

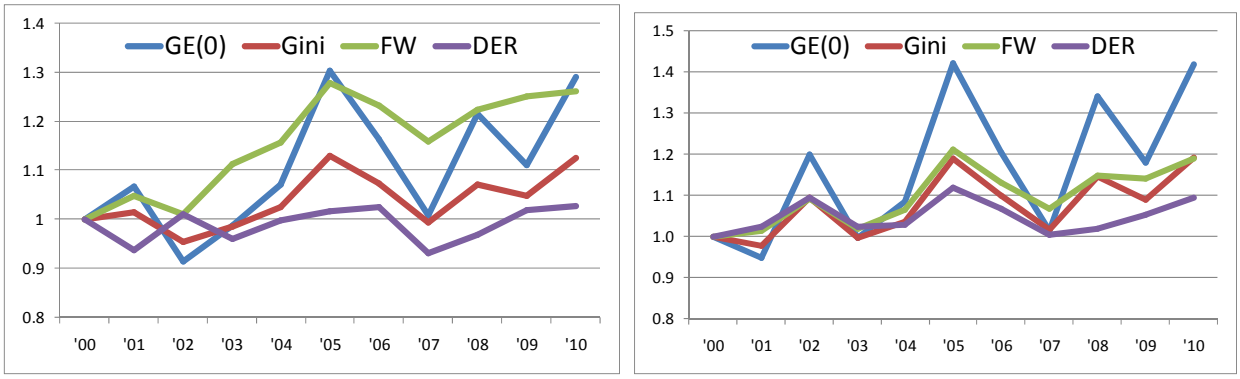


Figure 2.16. Natural Resource-Rich (left) and Non NRR (right) Inequality and Polarization

As in prior results shown above, regions with a large share of the national income tend to mimic the trends of the national polarization and inequality measures. As shown in the right panel of Figure 2.16, non-natural resource-rich provinces exhibited trends similar to the national trends. In most periods, polarization and inequality indices tended to move in similar directions. Nonetheless, in two periods, they moved in opposite directions. In terms of growth, the GE(0) showed the highest growth, and the FW showed the second highest growth.

Within natural resource-rich (NRR) provinces, several features are apparent (Figure 2.14, left panel). First, compared to its value in 2000, the FW showed large changes and an upward trend. In most periods, the FW moved in the same directions as the other inequality measures, suggesting that an increase in between-group inequality or "increased spread" was the chief driver of the rising FW index. Nonetheless, in some periods, the FW moved in the opposite direction from other inequality indices, suggesting rising within-group inequality. Second, in some periods, the FW's directions do not agree with those of the DER. For instance, between 2000 and 2001, the FW increased while the DER declined substantially. Third, similar to those regions in non-NRR provinces, the GE(0) experienced the highest growth since 2000, and the FW showed the second highest growth.

Comparing polarization and inequality indices across regions shows that inequality within non-NRR provinces rose more rapidly than that within NRR provinces. In addition, the FW within non-NRR provinces increased less rapidly than that within NRR provinces. Nevertheless, the DER within non-NRR provinces rose more rapidly than that within NRR provinces since 2000.

Based on the results above, we may conclude that within both regions, polarization and inequality rose substantially since 2000. More specifically, the gap between the rich and the poor significantly widened in the last decade. In addition, although inequality within the poor and the rich groups has been relatively stable, it sometimes declines and drives polarization up while inequality goes down. Across regions, inequality in the non-natural resource-rich provinces grew faster than that in the natural-resource-rich provinces. In addition, bipolarization in the non-natural resource-rich provinces as measured by the FW rose less rapidly than that in the natural-resource-rich regions. However, the DER within non-NRR provinces rose more rapidly than that within NRR provinces since 2000.

2.5.6 Remarks on National and Regional Income Polarization and Inequality

There is no doubt that Indonesia has experienced a period of relatively high economic growth in the last decade. This growth has been instrumental in reducing poverty in Indonesia. However, this growth may also be associated with worsening income distribution. As demonstrated in the exercise above, there are movements between and within income groups. Comparing polarization and inequality measures at the national and regional levels, we can see that polarization and inequality have risen significantly in the last decade, although we see some volatile movements in the period of study. We also find that within all regions except Jakarta,

inequality as indicated by the GE(0) grew more rapidly than polarization.

As discussed, polarization and inequality are two different concepts. Indeed, in the exercise above, we see that in some periods, polarization and inequality move in opposite directions. Nevertheless, in analyzing polarization, one is likely to employ inequality terms such as between-group and within-group inequality because income polarization concerns interactions between income groups and within income groups in the distribution. In terms of the direction of polarization and inequality, we conclude the following: Given within-group inequality, when between-group inequality rises (declines), polarization and inequality move in the same direction. Conversely, given between-group inequality, when within-group inequality increases (declines), polarization and inequality do not agree in their directions. In the case of Indonesia, between-group inequality is likely to be the main driver of polarization. This finding is consistent with other studies and with a popular perception that the gap between the poor and the rich has been widening over time, or in the Foster-Wolfson term, an "increased spread" has occurred. However, polarization measures take into account not only between-group inequality but also within-group inequality. This is why in some periods, polarization measures were rising while inequality measures were declining. In other words, inequality measures are only one aspect of polarization measures.

Therefore, in the case of Indonesia, compared with the DER index, the Foster Wolfson polarization index captures to a greater degree the main concern in Indonesia about the widening gap between the poor and the rich. The FW index also captures "increased bipolarity" or increased within-group inequality when inequality measures fail to capture this. More important, the key advantage of the Foster Wolfson index over the DER is that it is relatively easier to calculate and interpret than the DER given that the FW index requires readily available statistics,

such as the mean, the median, and the Gini index.

Another important observation is that whenever there was a price shock such as a fuel subsidy cut, polarization worsened considerably at either the national or regional level. Taking the results of the polarization estimations at face value, we observe dramatic changes in the value of all indices during price shocks due to drastic changes in the consumption patterns of the poor. As shown previously, the real expenditures of the poor either grew slightly (single digit percentage) or fell to some extent, whereas the expenditures of the rich surged substantially (double digit growth) during the price shock. This finding suggests that the poor responded to shocks by shifting their consumption patterns by, for example, reducing their consumption of meat and fruit. On the contrary, it seems that the rich were not affected at all by price shocks. They do not seem to change their consumption patterns to adjust to changing prices.

Examining the regional levels, we notice that in some regions, polarization has worsened more rapidly than in other regions since 2000. These regions include eastern Indonesia, urban regions, Java Bali, non-Jakarta provinces, and natural resource-rich provinces. Although we do not suggest a causal link between polarization and conflict, it is in these regions that social conflicts occur frequently.

2.6 Conclusion

At the national and regional levels, polarization and inequality show volatile and very dynamic movements. However, one thing is clear: polarization and inequality have risen rapidly since 2000. This finding suggests that Indonesian society as a whole and regionally has become rapidly more polarized and more unequal in terms of consumption expenditures over time. According to several polarization and inequality indices, polarization and inequality move in the

same direction (or show a similar trend) most of the time. However, there are some periods in which polarization and inequality conflict in terms of their directions, suggesting that polarization and inequality indeed measure different features of the distribution. Based on this exercise, we conclude that the directions of polarization and inequality measures depend on which inequality component, between- or within-group inequality, changes the most. Given within-group inequality, when between-group inequality increases (decreases), polarization and inequality move in a similar direction. Conversely, given between-group inequality, when within-group inequality increases (decreases), polarization and inequality move in opposite directions. Furthermore, regions with a large share of total consumption expenditures tend to have trends in polarization and inequality that are similar to national trends.

Two polarization measures are estimated in this study. The Foster Wolfson index represents a "bipolarization" measure, whereas the Duclos Esteban Ray index represents a "pure income polarization" measure. The FW index only considers two income groups, whereas the DER considers several income groups in the income distribution. In the case of Indonesia, the Foster Wolfson polarization index captures the public's main concern in Indonesia about the widening gap between the poor and the rich (i.e., "increased spread") to a greater degree than does the DER index, which emphasizes multiple income groups. The FW index also captures "increased bipolarity" or increased within-group inequality when inequality measures fail to capture this. More important, the key advantage of the Foster Wolfson index over the DER is that it is relatively easier to calculate and interpret because it requires readily available statistics, such as the mean, the median and the Gini index. These advantages might be useful for socializing policy makers to the idea of polarization.Nonetheless, a disadvantage of the Foster Wolfson index is that it requires the Gini index, which is an inequality measure. Wang and Tsui

(2000) identified this disadvantage and proposed a polarization index that is a generalization of the FW index and does not require any traditional inequality measures. We estimate the Wang and Tsui polarization index as well and find similar increasing trends at the national and regional levels.

One possible explanation for why polarization has increased substantially over time is that the expenditures of the rich have risen much faster than those of the poor since 2000. Much of the expenditure growth for both groups has been driven by non-food expenditures. Fuel subsidy cuts occurred in 2002, 2005, and 2008 led to an increase in both groups' expenditures in the goods and services category. During these high prices regimes, the rich still maintained their standard of living by consuming their regular food and non-food items, whereas the poor adjusted and decreased their consumption. As a consequence, the expenditure gap between the rich and the poor became larger over time, leading to an increase in polarization.

We believe that based on our samples, despite issues with the implementation of anti-poverty programs, these programs may have contributed to improvements in the consumption of the poor when there was a price shock such as a fuel subsidy cut, although the magnitude of these effects was not as large as expected. It is likely that these transfers might assist the poor (and the non-poor due to large leakages) in coping with rising prices, especially food prices, and reduce polarization temporarily. Fuel subsidy cuts saved the government's budget from deteriorating; however, they clearly exacerbated polarization indicating that maintaining the government's fiscal position was prioritized over improving socioeconomic conditions.

Furthermore, an increasing trend of the FW index might be perceived as a disappearance of the middle class. Based on the FW index, polarization has increased since 2000 at the national level, suggesting that the middle class has declined. However, one popular perception is that

Indonesia has seen its middle class grow rapidly in the last decade, based on an absolute measure of the middle class (those who spend from $2 to $20 per day). This finding clearly does not agree with the notion of a disappearing middle class based on the FW polarization index. A rising middle class is likely to be viewed as an indicator of how successful a country's government is in terms of economic development. Comparing these two measures, one can see that the absolute measure of the middle class indicates that most people are better off due to high economic growth (i.e., inclusive growth), whereas the FW version of the middle class shows the opposite (i.e., exclusive growth). The main point is that different measures lead to different results, and one measure may or may not agree with another measure.

In this study, we also estimate polarization and inequality indices based on a different data set, that is, the SUSENAS Panel Consumption Module (SPCM). Unlike the SUSENAS Core (SC), the SPCM was conducted every three years prior to 2007, and the samples were smaller than the SC (approximately 10,000 households). However, the key advantage of the SPCM is that it provides a detailed breakdown of household expenditures. In addition, because the SPCM is a panel data set, one can observe consumption expenditure mobility or changes in the expenditures of certain households across time. Our results indicate that the trends of polarization estimated from either the SPCM or the SC differ only slightly. The trends move in opposite directions only between 2005 and 2007. Nevertheless, both data sets show that polarization has significantly increased over time. Interestingly, the trends of the inequality measures from these data sets are completely different. The inequality indices estimated from the SC are more volatile and erratic compared to those from the SPCM. Further studies are needed to verify these differences and seek the causes of the differences.

An important caveat regarding the SUSENAS data set is that one should be very careful

with the quality and the reliability of the data, particularly when examining an income distribution in Indonesia. Several problems are as follows: First, total household expenditures from the SUSENAS are less than total household consumption in the national account, especially on non-food expenditures. As one study suggests, this issue leads to underestimation of consumption inequality. Second, the absence of the ultra-rich in the SUSENAS, due mostly to lack of access during the survey, results in underrepresentation of this group in the true distribution of income. Third, the CBS does not differentiate between purchased, home produced, and gifted food items. There is only one aggregate monetary value for each food item. Finally, variables and definitions continue to change over time, resulting in confusion if one examines changes over time.

Given the level and the trend of polarization, we believe that there are three important issues for further study: First, factors and mechanisms that directly and indirectly affect polarization are still unclear. Based on our casual observation, we argue that price shocks may lead to worsening polarization. However, formal approaches need to be explored to verify this link. Rising polarization can be regarded as an outcome of interactions among many factors in a complex and large system. Identifying these factors will be a crucial step and will be fruitful especially if one attempts to decrease polarization. Second, one may perceive polarization as one of many factors affecting other things. A close link between rising polarization and social unrest has been well documented in the literature. As stated in the introduction of this paper, it is the link between polarization and social unrest that motivates scholars to develop polarization indices. Nevertheless, empirical studies examining this link in Indonesia are almost nonexistent. In our next chapter, we explore the effect of polarization on economic growth. Our aim is to present empirical evidence to test our hypothesis that polarization indeed has a negative impact

on economic growth in Indonesia.

Assuming that rising polarization has short-term and long-term negative implications, we suggest that policy makers continuously monitor the degree and trends of polarization at the national and regional levels. Of course, attempts to decrease polarization will not be easy due to the complexity of Indonesia's political and economic system. However, the Indonesian government needs to step up and lead these efforts with concrete and comprehensive action plans before rising polarization leads to significant social unrest or regional disintegration, both of which have occurred in Indonesia's history.

APPENDIX B

B.1 Summary of Polarization Measures

Table B.1 Summary of Polarization Measures

No	Name	Year	Type	Formula	Group Based	Country Application
1	Esteban & Ray	1991 1994	income polarization	$L_{ER} = A\sum_{i=1}^{k}\sum_{j=1}^{k} p_i^{1+\alpha} p_j \lvert x_i - x_j \rvert$	No	China, Russia
	Income groups only,use natural logarithm of income,discrete.Identify number&the support interval of each disjoint income group,identification-alienation framework. α ϵ (0,1.6]					
2	Esteban, Gradin & Ray	1999	income polarization	$P(f,\alpha,\beta) = ER(\alpha,\rho^*) - \beta[G(f) - G(\rho^*)$	No	OECD countries, Argentina,PWT, Latin America,Spain
	Requires between-group and within-group Gini and the second term is corrected for error made in clustering distribution into groups, number of groups used is left to the researcher.					
3	Duclos, Esteban, & Ray	2005	income polarization	$P_\alpha(f) = \iint f(x)^{1+\alpha} f(y) \lvert y - x \rvert dydx$	No	Latin America, Argentina,Ivory Coast, 21 countries from LIS data
	Pure income polarization,continuous distribution allows for individuals not to be clustered around discrete income intervals, lets the area of identification influence be determined by non-parametric kernel techniques, avoiding arbitrary choices. α ϵ [.25,1]					
4	Foster & Wolfson Wolfson	1992 1994	bi-polarization	$P^{FW} = 2[2[0.5 - Lorenz(p=0.5)] - Gini]\frac{\mu}{median}$ $FW = (Gini^B - Gini^W)\frac{\mu}{median}$	No	US, Canada, PWT, Argentina
	Requires Gini index, Increased spread (the rich becoming rich & the poor becoming poorer) and increased bipolarity (the poles are more well-defined) framework.					
5	Tsang & Wui	2000	bi-polarization	$P^{TW} = \frac{\theta}{N}\sum_{i=1}^{N}\left\lvert\frac{x_i - m(\boldsymbol{x})}{m(\boldsymbol{x})}\right\rvert$	No	China
	Their comment: incorrect to use Gini since polarization different than inequality. Develop a class of generalized FW indices.					
6	Chakravarty & Majumder	2001	bi-polarization	$P^{CM} = \frac{E^k(x_+) + 2\lambda(x_+) + E^k(x_-) - B\big(m(x)\big)\lambda(x_-)}{2m(x)} + H(m(x))$	No	Rural & Urban India
	Use Atkinson, Kolm, Sen ethical inequality index to develop polarization index that relates to the Wolfson polarization index					
7	Kanbur & Zhang	2001	social polarization	$P^{KZ} = \frac{I(\mu_1 e_1, \ldots, \mu_K e_K)}{\sum_{g=1}^{K} w_g I_g}$	Yes	China,Russia
	Derived from GE index decomposition, Requires exogenous social-group					
8	Montalvo & Reynal-Querol	2002 2005a&b	social polarization	$P^{RQ} = 1 - \sum_{i=1}^{K}\left[\frac{0.5 - \pi_i}{0.5}\right]^2 \pi_i$	Yes	Ethnicity in countries
	Take into account only the size of groups, not the feeling of alienation between them. No axiomatic approach. Focus on ethnic pol.as explanatory variable of civil wars.					
9	Permanyer	2008	social polarization	$P_\alpha(\boldsymbol{f}) = \sum_{i=1}^{K}\sum_{j=1}^{K}\iint T\big(\iota(x), a(x,y)\big) f_i(x) f_j(y)\, dydx$	Yes	79 countries, the World Value Surveys
	Generalization of RQ index, Requires exogenous social-group K that are assumed to be density functions (one for each population subgroup). Computed Religion polarization index.					
10	Permanyer & Ambrosio	2000	social polarization	$P_\alpha(\boldsymbol{f}) = \sum_{i=1}^{K}\sum_{j=1}^{K}\iint N_s N_t T(s,a)\, dydx$	Yes	Chile
	Requires exogenous social-group K. Social polarization measures for cardinal and categorical or ordinal data.					

B.2 Gini and GE Index

Gini Index

The Gini index is the most widely used measure of inequality and is based on the Lorenz curve, a cumulative frequency curve that evaluates the distribution of income/expenditures with a uniform distribution that represents equality (Haughton and Khandker, 2009). The Gini index is one of the strongly Lorenz-consistent inequality measures, and it satisfies all of the following properties (Fields, 2001):

- Anonymity holds because if we permute the income distribution, we obtain the same Lorenz curve and hence the same Gini coefficient.
- Income homogeneity holds because if everyone's income is multiplied by the same positive scalar multiple λ, the Lorenz curve is unchanged; therefore, the Gini coefficient is unchanged as well.
- Population homogeneity holds because if we replicate the population an integral number of times, the new points will lie along the straight lines connecting the original points; therefore, the Lorenz curve will be the same, and the Gini coefficient will be unchanged.
- Pigou-Dalton Transfer sensitivity holds because under this criterion, the transfer of income from rich to poor reduces measured inequality.

The Gini index is easy to interpret and used very often empirically. However, its limitations are as follows (Haughton and Khandker, 2009):

1. It is not decomposable or additive across groups. That is, the national Gini index is not equal to the sum of the Gini index of its subgroups. For instance, one might be able to calculate the eastern and western Indonesia's Gini, but he or she could not determine how much each region contributes to the national Gini index.
2. Statistical testability: one should be able to test for the significance of changes in the index over time. This problem, however, can be overcome by using bootstrap techniques.

GE Index

The generalized entropy (GE) inequality index is strongly-Lorenz-consistent and is an inequality measure that satisfies the same properties as the Gini index. The general formula for the GE measure is as follows:

$$GE(\alpha) = \frac{1}{\alpha(\alpha-1)}\left[\frac{1}{N}\sum_{i=1}^{N}\left(\frac{y_i}{\mu}\right)^{\alpha} - 1\right]$$

Where y_i is ith income, μ is the total sample mean, and α is the weight given to distances between incomes at different parts of the income distribution and can take any real value between zero and infinity. For lower values of α, the GE is more sensitive to changes in the lower tail of the distribution, and for higher values of α, the GE is more sensitive to changes that affect the upper tail. The most widely used values of α are 0,1, and 2. The formula for Theil's T index or the GE(1) is as follows:

$$GE(1) = \frac{1}{N}\sum_{i=1}^{N}\frac{y_i}{\mu}ln\left(\frac{y_i}{\mu}\right)$$

Theil's L index is the GE(0) and is sometimes referred to as the mean log deviation measure:

$$GE(0) = \frac{1}{N}\sum_{i=1}^{N}ln\left(\frac{y_i}{\mu}\right)$$

B.3 Calculation of Deflator

An important step in estimating polarization indices is converting nominal per capita expenditure to real per capita expenditure. In doing so, I use the CPI as the deflator instead of the regional GDP deflator. Following best practice in other countries, Indonesia's Central Bureau of Statistics (CBS) changes the CPI's base year every five years to capture the changing consumption patterns of Indonesia's population. The CBS also adds more cities, which have different weights, to estimate the level of the national CPI and CPI's changes over time. With 1996 as the base year, the number of cities was 42, whereas in 2002, the number of cities was 45. The last base year was 2007 with 66 cities representing Indonesia. From 2000 to 2011, the number of provinces has increased from 30 to 33 due to decentralization. My data are per capita expenditures from 2000 to 2010, and I used 2002 as my base year. I also specify the number of provinces as 26, which is the number of provinces prior to decentralization (it was 27 in the Suharto era, but after the fall of Suharto in 1998, Indonesia lost Timor Timur). The simple formula below shows how I deflate the per capita expenditures:

$$\textbf{Real per capita expenditure} = \frac{\textbf{nominal per capita expenditure in Rupiah}}{\textbf{CPI/100}}$$

Steps to deflate per capita expenditures from 2000 to 2010 with 2002 as the base year:

1. Calculate the yearly inflation of 42 cities in 2000 and 2001 based on the base year 1996=100.
2. Divide CPI=100 in 2002 by the yearly inflation in 2001 to obtain the CPI in 2001 based on the base year 2002.
3. Divide the CPI in 2001 from number 2 by yearly inflation in 2001 to obtain the CPI in 2000 based on the year 2002. For example,

	2000	2001	2002		2001	2002 (CPI1996)	2002
Lhokseumawe	83.52	93.26	103.51		1.117	1.110	1

4. Divide the CPI in 2000 and 2001 by the CPI in 2002 to obtain the deflator for the years 2000 and 2001 (in this case, 0.807 and 0.901).
5. To obtain the deflator for the years 2003 through 2007, divide the CPI of 45 cities by 100.
6. Because 2007 is the new base year, I calculate yearly inflation from 2008 to 2010.
7. To obtain the CPI from 2008 to 2010 that is based on the base year 2002, I multiply CPI in 2007 by yearly inflation (base year 2007=100). For example,

Inflation year on year (percentage)

	2006	2007	2008	2009	2010		2008*	2009*	2010*
Lhokseumawe	151.47	157.8	174.006	180.102	188.450		1.103	1.035	1.046

* Base year 2007 = 100

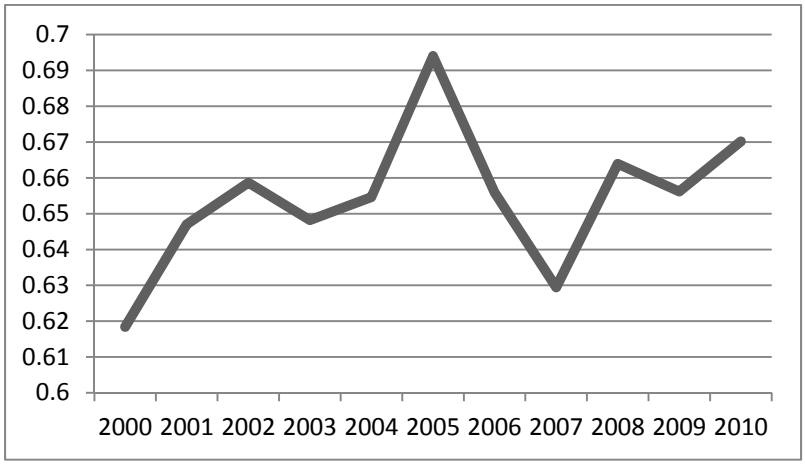
8. Again, to obtain the deflator for the years 2008 to 2010, I divide the CPI in step 7 by 100.
9. the data are CPI for cities in Indonesia, I average the deflators to provincial deflators. I do this for 45 cities (I exclude 21 additional cities for the CPI base year 2007)
10. I merge the deflator data with SUSENAS 2000 to 2010 and estimate the polarization indices.

B.4 Wang Tsui Polarization Index

Table B.4

	Wang Tsui
2000	0.618
2001	0.647
2002	0.659
2003	0.648
2004	0.655
2005	0.694
2006	0.656
2007	0.629
2008	0.664
2009	0.656
2010	0.670
Growth	8.37

Figure B.4 Wang Tsui Polarization



B.5 Regional Polarization Based on Kanbur Zhang Index

Using the ratio of between- and within-inequality components, which are estimated by decomposing the national GE index, Kanbur and Zhang (KZ) propose an alternative measure that captures social polarization in the exogenously given non-income groupings. Unlike income polarization measures that concern income groups, the KZ polarization measure emphasizes social groups such as regions, ethnicity, and religions. Before employing this measure, one needs

to specify the social groups. In this paper, the KZ polarization indices for regional and ethnic groupings are estimated and analyzed. The results of the KZ indices based on regional groupings are presented in Table B.5:

Table B.5. GE(0) Inequality Decomposition and Kanbur Zhang Polarization Measure

Year	Urban-Rural			West-East			JavaBali-Other Islands			Jakarta-Other Provinces			NRR-NNRR Provinces		
	B	W	B/W	B	W	B/W	B	W	B/W	B	W	B/W	B	W	B/W
2000	17.48	82.52	0.21	0.19	99.81	0.0019	0.08	99.92	0.0008	8.85	91.15	0.0971	1.38	98.62	0.0140
2001	20.15	79.85	0.25	0.35	99.65	0.0035	0.54	99.46	0.0055	7.69	92.31	0.0834	0.91	99.09	0.0092
2002	22.78	77.22	0.29	1.02	98.98	0.0103	1.74	98.26	0.0177	14.98	85.02	0.1762	0.82	99.18	0.0082
2003	19.95	80.05	0.25	0.90	99.10	0.0091	1.16	98.84	0.0117	10.75	89.25	0.1204	0.55	99.45	0.0056
2004	21.35	78.65	0.27	1.08	98.92	0.0109	1.56	98.44	0.0158	13.02	86.98	0.1496	0.54	99.46	0.0054
2005	22.15	77.85	0.28	1.01	98.99	0.0102	1.31	98.69	0.0133	10.60	89.40	0.1185	0.73	99.27	0.0074
2006	22.12	77.88	0.28	0.75	99.25	0.0075	0.95	99.05	0.0095	11.23	88.77	0.1265	0.59	99.41	0.0059
2007	21.25	78.75	0.27	0.90	99.10	0.0090	0.83	99.17	0.0084	10.49	89.51	0.1172	0.76	99.24	0.0076
2008	16.20	83.80	0.19	0.72	99.28	0.0073	0.07	99.93	0.0007	8.42	91.58	0.0919	1.02	98.98	0.0103
2009	17.98	82.02	0.22	0.38	99.62	0.0039	0.20	99.80	0.0020	8.42	91.58	0.0919	0.77	99.23	0.0078
2010	20.76	79.24	0.26	0.29	99.71	0.0029	0.29	99.71	0.0029	10.42	89.58	0.1163	0.27	99.73	0.0027
Growth (%)	15.81	-4.14	19.16	34.47	-0.10	34.53	72.52	-0.21	72.58	15.09	-1.76	16.55	-410.86	1.11	-416.61

Several observations are evident based on Table B.5. First, in general, within-group inequality dominates income inequality in Indonesia regardless of the regional dimensions that we use. This is consistent with other studies that decompose Indonesia's income inequality (see Akita 2003). A large share of the within-group inequality component in overall inequality simply suggests that there are high variations of income within each region considered. Depending on regional dimensions, the contribution of within-group inequality to national inequality is relatively high, between 77% and 99%. It is clear from Table B.5 that a high contribution of within-group inequality given between-group inequality leads to a low value in the polarization index because within-group inequality is the denominator in the KZ index. For instance, for the urban-rural dimension, the within-group inequality contribution to national inequality is between 75% and 83%. In contrast, between-group inequality accounted for approximately 20% of national inequality. As a result, the polarization index is approximately 0.2. In contrast, the polarization index for the West-East measure is very low due to a higher percentage of within-group inequality, approximately 99% of national inequality. This finding suggests that we are not able to compare the KZ index across different regional dimensions. However, we could say that the regional dimension in question has become more or less polarized since 2000.

Second, regional polarizations vary in changes and direction and depend on which regional classification is used. Figure B.5 shows a comparison between the urban-rural and Jakarta-other provinces for the KZ indices. As shown, two indices have different trends, although in some periods, the trends are similar. For example, from 2000 to 2001, urban-rural polarization increased, whereas polarization in the Jakarta-other provinces declined slightly. However, between 2001 and 2004, polarization for both regional groupings showed similar trends:

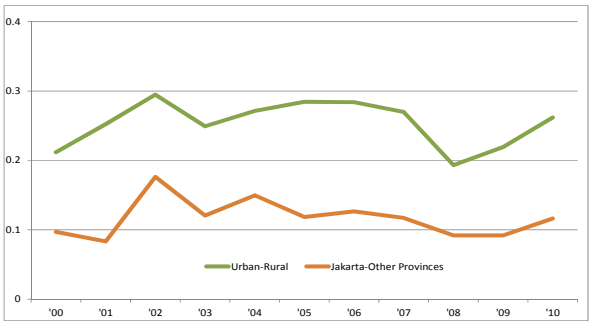


Figure B.5. Urban-rural and Jakarta-others Polarization and National Inequality

Third, despite a higher contribution of within-group inequality to national inequality relative to between-group inequality, changes in between-group inequality drive changes in the KZ index for all regional dimensions considered. In other words, changes in between-group inequality are often greater than changes in within-group inequality for all regional dimensions. Meanwhile, the trends of within-group inequality for all regional dimensions are similar to those of national inequality. Most important, within-group inequality shows an increasing trend.

Finally, comparing only two points in time, 2000 and 2010, we can see that all regional dimensions except the natural resource-rich province-other dimension increased substantially (see growth in Table 11).The Java Bali-others shows the largest increase since 2000, whereas the Jakarta-other province has the smallest growth in the polarization index. In short, almost all regional dimensions have become more polarized since 2000.

To summarize, within-group inequality shows the largest contribution to income inequality in Indonesia regardless of the regional dimensions that we use. Nonetheless, in general, changes in between-group inequality drive changes in the polarization index. That is, changes in between-group inequality are often greater than changes in within-group inequality. As a result, trends of the polarization index are similar to those of between-group inequality.

Furthermore, when one observes only two points in time, 2000 and 2010, polarization increased substantially for all regional dimensions except the natural resource-rich province-others dimension, suggesting that almost all regional dimensions became more polarized since 2000.

B.6 Regional Polarization Based on Permanyer Index

As discussed above, the Permanyer index is classified as a social polarization index. Permanyer developed this index as an extension of the Duclos, Esteban, and Ray income polarization index. Instead of income, Permanyer considers what he calls “radicalism degree,” which can be measured with his polarization index. Several alternative theorems/polarization indices were developed with an axiomatic approach. Like the DER index, the Permanyer index is “the sum of effective antagonism” and considers not only the feeling of alienation between an individual belonging to one group and an individual from another group but also alienation

between individuals within the same group. Although the Permanyer index is a social polarization index, we applied it to income distribution as if it were an income polarization index because we would like to compare the results with those of the Kanbur Zhang index:

Table B.6 Permanyer Polarization Measures

Year	Urban-Rural			West-East			JavaBali-Other Islands			Jakarta-Other Provinces			NRR-NNRR Provinces		
	B	W	Pol.	B	W	Pol.	B	W	Pol.	B	W	Pol.	B	W	Pol.
2000	0.379	0.093	0.472	0.259	0.149	0.408	0.337	0.091	0.428	0.066	0.313	0.379	0.068	0.310	0.378
2001	0.385	0.096	0.482	0.263	0.148	0.411	0.326	0.100	0.426	0.056	0.326	0.382	0.146	0.256	0.403
2002	0.396	0.092	0.488	0.235	0.175	0.410	0.330	0.102	0.432	0.075	0.334	0.409	0.115	0.302	0.417
2003	0.384	0.092	0.476	0.249	0.154	0.403	0.323	0.102	0.425	0.062	0.323	0.385	0.155	0.249	0.404
2004	0.382	0.093	0.475	0.247	0.151	0.398	0.308	0.111	0.419	0.063	0.323	0.387	0.169	0.233	0.403
2005	0.362	0.105	0.468	0.244	0.155	0.399	0.308	0.111	0.419	0.060	0.353	0.414	0.113	0.304	0.417
2006	0.369	0.103	0.471	0.243	0.158	0.401	0.291	0.125	0.415	0.057	0.341	0.397	0.160	0.249	0.409
2007	0.365	0.099	0.464	0.252	0.142	0.394	0.290	0.118	0.408	0.053	0.321	0.374	0.158	0.235	0.393
2008	0.326	0.103	0.429	0.225	0.143	0.368	0.258	0.120	0.378	0.048	0.325	0.373	0.146	0.238	0.384
2009	0.356	0.107	0.463	0.250	0.148	0.397	0.279	0.127	0.405	0.050	0.340	0.390	0.156	0.245	0.401
2010	0.356	0.092	0.448	0.249	0.149	0.398	0.270	0.134	0.404	0.047	0.353	0.400	0.151	0.253	0.405
Growth	-6.121	-1.093	-5.131	-4.003	-0.234	-2.625	-19.949	47.349	-5.647	-28.968	12.782	5.511	123.408	-18.240	7.180

Table B.6 shows the results for the Permanyer index among regional dimensions. In general, polarization of the west-east, urban-rural, and Java Bali-others dimensions shows a declining trend. However, polarization of the Jakarta-others and natural resource-rich province-others dimensions indicates an increasing trend. Almost all regional dimensions show a substantial drop between 2007 and 2008 and a significant rise from 2008 to 2009. This large fall and rise are likely due to between-group inequality or the alienation component movements as shown in Table B.6.

Unlike the KZ index discussed above, the Permanyer index shows different patterns. Based on the components of the KZ index, the contribution of within-group inequality to overall inequality is larger than that of between-group inequality for all regional dimensions except the NRR-NNRR provinces. However, examining the components of the Permanyer index, one can see that the contribution of between-group polarization to overall polarization is much larger than that of within-group polarization for the west-east, urban-rural, and Java Bali-others dimensions. In addition, the trends of both components vary greatly for different regional dimensions.

B.7 Ethnic Polarization

In this section, we present the KZ ethnic polarization index and its components, as shown in Table B.7a below. Based on the available ethnicity data from the SUSENAS 2002-2005, we can see that polarization between ethnic groups dropped from 2002 to 2004. However, polarization increased slightly between 2004 and 2005. Compared to the national inequality and polarization measures, the KZ polarization index shows a completely different trend. Whereas

the national inequality and polarization measures showed an increasing trend since 2003, polarization across ethnic groups showed a downward trend between 2002 and 2004 before it increased from 2004 to 2005:

Table B.7a The KZ index for Ethnic Polarization

	Between	Within	KZ index
2002	6.36	93.64	0.068
2003	5.89	94.11	0.063
2004	3.87	96.13	0.040
2005	4.40	95.60	0.046

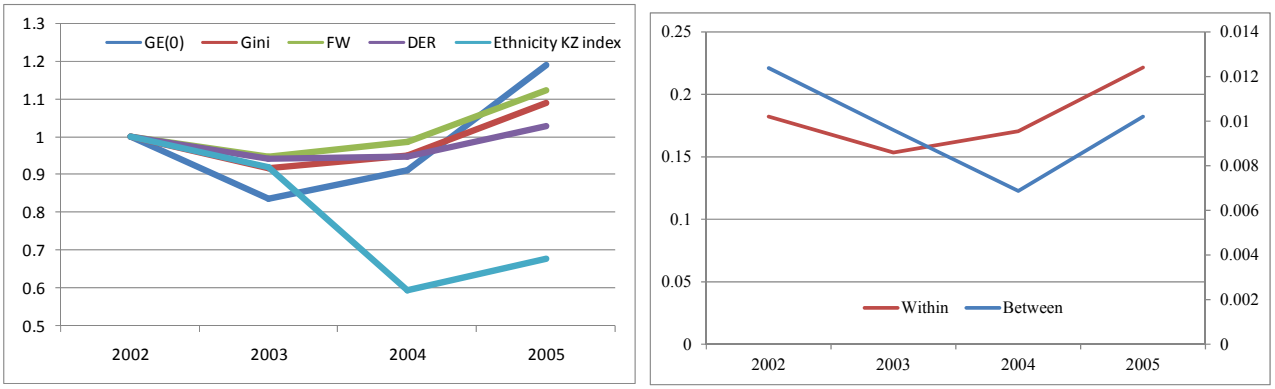


Figure B.7 The KZ Ethnic Polarization Index, National Polarization and Inequality Indices (left), and Within- and Between-group Inequality of the KZ Index (right).

Furthermore, similar to the results of the regional KZ index discussed above, the within-group component of the KZ ethnic polarization index is the largest contributor to inequality. However, the polarization trend is similar to the within-group inequality trend, as shown in Figure B.7 in the right panel. For example, between 2002 and 2003, the index experienced a slight drop given that both between and within-group components declined. Nevertheless, from 2003 and 2004, a decrease in polarization was caused by a decrease in between-group components and an increase in within-group components. Based on the results above, we may conclude that Indonesian society became ethnically less polarized from 2002 to 2005:

Table B.7b Several Key Statistics of Ethnic Groups

	2002				2003				2004				2005			
	Pop. Share	Mean PCE	Income share	Gini	Pop. Share	Mean PCE	Income share	Gini	Pop. Share	Mean PCE	Income share	Gini	Pop. Share	Mean PCE	Income share	Gini
Melayu	0.059	182,641	0.055	0.304	0.059	187,669	0.056	0.289	0.058	177,340	0.055	0.306	0.056	190,154	0.055	0.345
Javanese	0.437	189,378	0.425	0.341	0.431	189,567	0.418	0.311	0.433	184,157	0.430	0.329	0.440	191,226	0.429	0.364
Madurese	0.037	143,028	0.027	0.265	0.039	151,644	0.030	0.248	0.035	137,068	0.026	0.260	0.036	144,144	0.027	0.334
Dayak	0.012	164,227	0.010	0.284	0.011	180,679	0.010	0.285	0.011	162,385	0.010	0.292	0.013	166,652	0.011	0.307
Bugis/Makassar	0.040	171,171	0.035	0.302	0.039	181,035	0.036	0.281	0.040	167,617	0.037	0.307	0.041	171,456	0.035	0.351
Chinese	0.017	453,637	0.040	0.381	0.013	504,973	0.032	0.396	0.011	422,466	0.025	0.368	0.011	522,795	0.030	0.433
Others	0.389	196,402	0.392	0.338	0.409	199,458	0.417	0.309	0.411	187,866	0.417	0.321	0.402	201,624	0.413	0.377

Table B.7b presents several key statistics of ethnic groups. The Javanese ethnic group has the largest population share and generates more than 40% of Indonesia's total income. In contrast, the income share of the Chinese ethnic group is only 4%, yet their average per capita expenditure is the highest among the ethnic groups. In addition, within the Chinese group, income inequality is quite high and shows a significant rise between 2002 and 2005. Therefore, not only did the income gap between the Chinese and other ethnic groups widen, but the income gap within the Chinese group was also remarkably high:

B.8 Summary of Anti-Poverty Programs

Table B.8 Summary of Anti-Poverty Programs

No	Program Name	Information	Target	Coverage	Period	Evaluation
1	RASKIN (Beras untuk keluarga miskin)	Subsidized rice for the poor	Very poor, poor and near poor	17.5 million households	1998	Mistargeting, poor quality of rice in some places, and higher than set prices due to high administration & transportation costs in the distribution. (Hastuti et al, 2012)
2	BSM (Bantuan Siswa Miskin)	Scholarship for poor students	Primary and secondary students	8 million students	2005	Poor socialization, insufficient funds to cover school expenses and unreliable time of disbursement are some issues with this program.
3	BOS (Bantuan Operasional Sekolah)	School operational grants to primary and junior high schools.	All schools with poor and non-poor students	Around 38 million students in 2005 Around 30 million students in 2006	Since mid-2005	No evidence in improving access to schooling for the poor and in increasing enrolment rates (Suharyo et al, 2006). Lack of understanding of the program guidelines leading to different interpetations among implementers on the ground.
4	BLT (Bantuan Langsung Tunai)	Direct cash transfers: no strings attached cash transfers of around $10 per month	Very poor households	15 million households in 2005	One year in 2005; Seven months in 2008	BLT led to social conflicts due to unclear and untransparent process in verification of beneficiaries. Lack of socialization, lack of coordination among central and local institutions, and large cut of total amount are some issues. (Rosfadhila et al 2011)

Table B.8 Summary of Anti-Poverty Programs (continued)

No	Program Name	Information	Target	Coverage	Period	Evaluation
5	PNPM (Program Nasional Pemberdayaan Masyarakat Mandiri)	Block grants for subdistricts involving participation of community members	Poor villages	All subdistricts in 2009	Since 2002	High economic returns and low costs of rural infrastructure projects (Alatas, 2005; Torrens, 2005). Maintaining infrastructures periodically requires high-skilled labor, which most villages do not have.
6	PKH (Program Keluarga Harapan)	Cash transfers with specific education and health conditions	Poor households	Around 7,000 household in pilot project Later PKH covers 1.5 million households	Since 2007	One study shows that PKH led to an increase in visits to health centers, in monitoring of children's development, and in immunizations, but there are insignificant impacts of the program on education indicators such as absence rates. (BAPPENAS, 2009). Regions with lack of health centers and schools are excluded.
7	KUR (Kredit Usaha Rakyat)	Non-collateral microcredit	Small and medium enterprise (SME)		Since 2007	More middle-income than lower-income groups enjoyed the program. It is mostly used in trade sectors instead of in agriculture, in which most poor households work.
8	ASKESKIN (Asuransi Kesehatan Miskin)	Health insurance covering basic healthcare and hospital inpatients	Poor households	60 million households with budget of around US $400 million in 2005	Since 2005	Lack of explanation of procedures to beneficiaries, of administrative procedures, and of responsibilities of healthcare providers (Bachtiar et al. 2006).

B.9 Comparison of Polarization and Inequality Indices from SPCM and SUSENAS Core

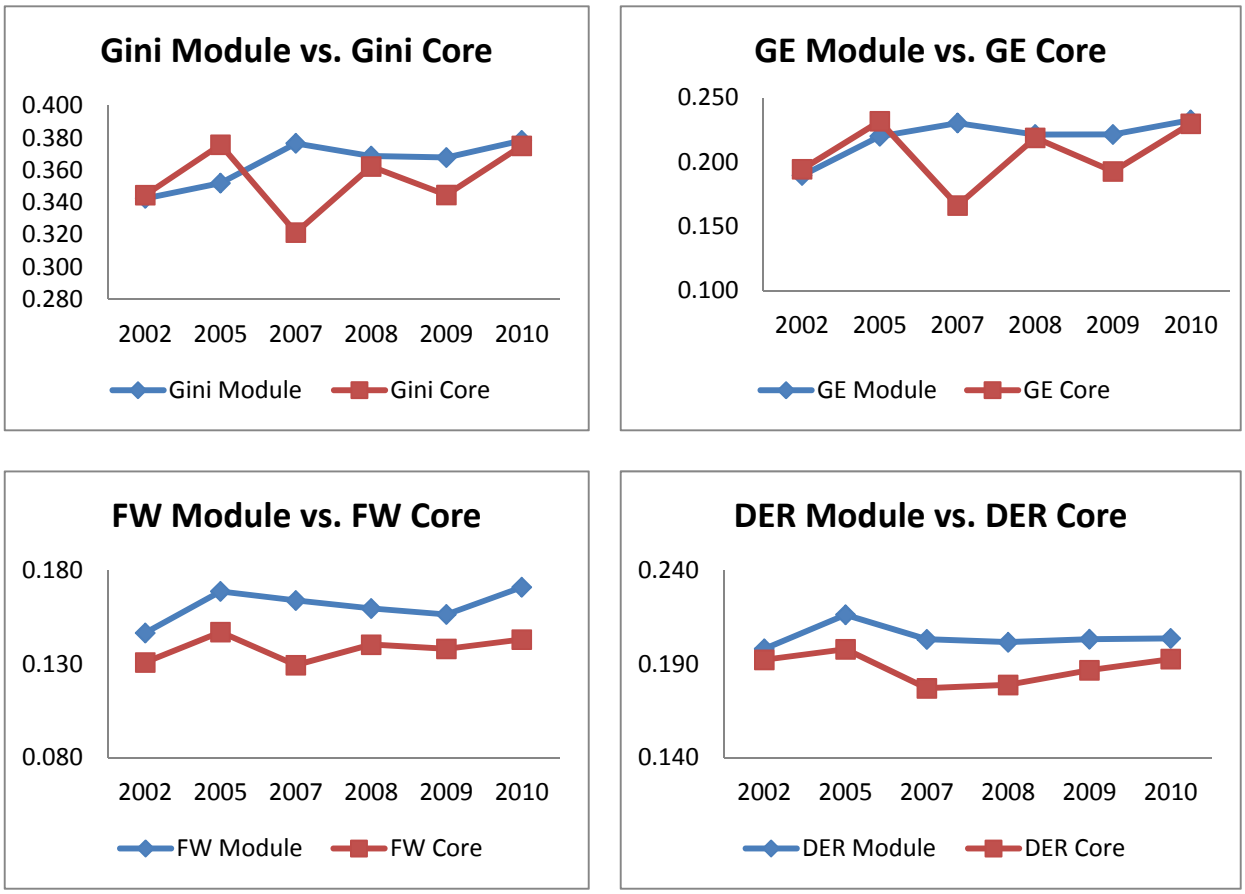


Figure B.9 Comparison of Polarization and Inequality Indices from SPCM and SUSENAS Core

B.10 Other Polarization Measures

Table B.10a Gradin Esteban Ray Polarization Index

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
urban	0.070	0.070	0.077	0.071	0.073	0.084	0.080	0.071	0.082	0.078	0.085
rural	0.056	0.057	0.057	0.057	0.059	0.067	0.064	0.059	0.071	0.066	0.067
west	0.067	0.068	0.075	0.070	0.073	0.080	0.076	0.069	0.078	0.075	0.079
east	0.067	0.070	0.070	0.067	0.069	0.082	0.086	0.076	0.088	0.085	0.091
javabali	0.070	0.072	0.082	0.074	0.077	0.088	0.081	0.076	0.086	0.080	0.087
nonjavabali	0.065	0.067	0.069	0.067	0.069	0.078	0.077	0.069	0.080	0.077	0.081
jakarta	0.078	0.072	0.091	0.073	0.085	0.091	0.084	0.069	0.081	0.079	0.092
nonjakarta	0.065	0.067	0.070	0.067	0.069	0.079	0.077	0.070	0.080	0.077	0.081
provnrr	0.069	0.068	0.068	0.072	0.075	0.082	0.079	0.073	0.080	0.079	0.081
nonprovnrr	0.067	0.072	0.075	0.069	0.072	0.081	0.079	0.072	0.082	0.078	0.084

Table B.10b Reynal Querol Polarization Index

	Urban-Rural	West-East	JavaBali-others	Jakarta-others	Provnrr-others
2000	0.969	0.460	0.911	0.969	0.134
2001	0.985	0.497	0.939	0.985	0.177
2002	0.993	0.455	0.934	0.993	0.157
2003	0.975	0.495	0.952	0.975	0.248
2004	0.982	0.499	0.954	0.982	0.257
2005	0.986	0.500	0.943	0.986	0.185
2006	0.985	0.487	0.956	0.985	0.253
2007	0.986	0.484	0.956	0.986	0.258
2008	0.999	0.490	0.961	0.999	0.264
2009	0.999	0.491	0.963	0.999	0.267
2010	1.000	0.502	0.964	1.000	0.287

B.11 Foster Wolfson Decomposition by Region

Table B.11 Foster Wolfson Decomposition

Gini	east	west	urban	rural	otherwise	jakarta	otherwise	JavaBali	otherwise	provnrr
2000	0.317	0.317	0.334	0.252	0.300	0.378	0.308	0.322	0.315	0.324
2001	0.318	0.308	0.318	0.240	0.297	0.314	0.292	0.319	0.307	0.329
2002	0.319	0.346	0.354	0.250	0.315	0.394	0.307	0.361	0.344	0.310
2003	0.298	0.317	0.325	0.245	0.297	0.313	0.295	0.325	0.314	0.320
2004	0.312	0.329	0.333	0.252	0.304	0.369	0.306	0.338	0.326	0.333
2005	0.365	0.376	0.384	0.283	0.354	0.407	0.351	0.387	0.374	0.367
2006	0.344	0.347	0.352	0.265	0.326	0.365	0.327	0.358	0.346	0.348
2007	0.321	0.320	0.323	0.250	0.304	0.299	0.297	0.334	0.320	0.323
2008	0.354	0.362	0.368	0.289	0.346	0.363	0.337	0.378	0.361	0.347
2009	0.346	0.344	0.350	0.270	0.329	0.346	0.327	0.356	0.343	0.340
2010	0.377	0.374	0.382	0.275	0.353	0.400	0.377	0.374	0.375	0.365

Mean	east	west	urban	rural	otherwise	jakarta	otherwise	JavaBali	otherwise	provnrr
2000	143,225	154,289	197,235	121,691	145,978	313,037	149,461	154,638	150,647	213,554
2001	148,929	163,789	207,705	125,560	154,912	303,148	153,102	166,781	159,580	203,681
2002	164,562	199,346	257,675	141,866	180,847	486,588	174,285	206,893	192,321	252,732
2003	170,703	199,756	254,621	152,557	185,862	429,558	180,685	205,102	193,229	228,195
2004	158,806	189,886	244,148	140,578	174,395	446,935	168,439	196,283	183,017	216,709
2005	165,283	201,620	267,131	140,486	184,152	480,105	177,076	208,122	193,491	251,082
2006	184,016	215,652	281,847	155,995	198,923	496,254	195,388	221,471	208,273	250,904
2007	183,441	215,279	274,243	160,930	200,263	457,685	197,243	219,669	207,748	251,821
2008	228,691	269,370	335,067	196,333	250,145	591,943	257,946	267,323	258,334	331,911
2009	236,505	264,391	330,199	194,657	248,178	561,521	251,638	266,317	256,208	314,491
2010	283,404	314,438	402,530	215,846	290,846	744,450	283,404	314,438	306,586	348,777

Median	east	west	urban	rural	otherwise	jakarta	otherwise	JavaBali	otherwise	provnrr
2000	116,238	123,721	155,379	106,676	120,144	226,930	122,925	122,664	121,353	170,308
2001	121,043	131,560	168,425	111,425	127,173	238,939	127,958	131,489	128,793	166,146
2002	132,281	151,611	198,058	123,904	144,744	343,121	142,773	153,017	146,700	206,369
2003	141,509	159,886	205,359	135,015	153,709	342,638	150,691	161,772	155,496	187,389
2004	130,641	149,542	194,581	124,094	143,330	328,040	139,081	152,230	145,142	173,943
2005	124,957	147,498	196,664	118,969	140,270	333,097	136,964	148,797	142,083	193,454
2006	143,330	164,241	218,398	134,445	157,287	370,742	155,276	165,551	159,256	198,334
2007	148,744	171,094	222,493	141,512	163,971	388,186	165,259	170,030	165,641	209,284
2008	182,690	207,294	265,419	173,440	198,468	423,396	210,442	198,446	199,315	276,327
2009	184,762	202,947	255,514	166,404	195,732	434,449	201,936	199,477	197,127	254,673
2010	210,494	230,005	296,334	183,876	221,058	514,085	226,563	227,804	224,223	272,197

T	east	west	urban	rural	otherwise	jakarta	otherwise	JavaBali	otherwise	provnrr
2000	0.417	0.412	0.432	0.340	0.396	0.477	0.405	0.419	0.410	0.420
2001	0.423	0.405	0.418	0.329	0.395	0.415	0.393	0.419	0.404	0.432
2002	0.420	0.446	0.458	0.338	0.415	0.496	0.409	0.466	0.443	0.408
2003	0.398	0.416	0.428	0.334	0.396	0.407	0.396	0.427	0.411	0.429
2004	0.418	0.430	0.435	0.343	0.406	0.465	0.409	0.442	0.426	0.444
2005	0.475	0.482	0.496	0.383	0.461	0.506	0.461	0.498	0.480	0.485
2006	0.454	0.450	0.462	0.360	0.431	0.467	0.433	0.467	0.449	0.465
2007	0.429	0.421	0.429	0.344	0.407	0.397	0.402	0.444	0.420	0.438
2008	0.467	0.468	0.478	0.392	0.455	0.460	0.447	0.493	0.466	0.469
2009	0.460	0.447	0.459	0.368	0.435	0.456	0.435	0.465	0.447	0.461
2010	0.487	0.477	0.491	0.374	0.459	0.509	0.487	0.487	0.478	0.483

FW Pol.	east	west	urban	rural	otherwise	jakarta	otherwise	JavaBali	otherwise	provnrr
2000	0.123	0.118	0.124	0.100	0.116	0.137	0.118	0.122	0.118	0.120
2001	0.130	0.120	0.124	0.100	0.119	0.129	0.120	0.127	0.120	0.125
2002	0.126	0.131	0.135	0.101	0.125	0.145	0.124	0.142	0.129	0.121
2003	0.121	0.124	0.127	0.101	0.119	0.118	0.120	0.129	0.121	0.133
2004	0.129	0.128	0.128	0.103	0.125	0.131	0.126	0.134	0.126	0.138
2005	0.145	0.145	0.152	0.119	0.142	0.143	0.143	0.156	0.143	0.153
2006	0.141	0.135	0.142	0.111	0.133	0.137	0.133	0.146	0.134	0.148
2007	0.133	0.127	0.131	0.107	0.125	0.116	0.125	0.141	0.126	0.139
2008	0.141	0.137	0.139	0.116	0.137	0.135	0.134	0.155	0.136	0.146
2009	0.145	0.135	0.141	0.114	0.134	0.142	0.135	0.145	0.135	0.150
2010	0.148	0.141	0.147	0.116	0.139	0.159	0.138	0.156	0.141	0.151

B.12 Contribution of mining and quarrying sector in total regional GDP

Table B.12 Contribution of mining and quarrying sector in total regional GDP

Code	Province Name	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
11	Aceh	30.95	24.99	34.72	36.14	30.38	26.15	25.09	20.27	15.57	8.68	7.89
12	Sumatera Utara	1.90	1.60	1.52	1.43	1.21	1.22	1.20	1.23	1.23	1.19	1.18
13	Sumatera Barat	3.82	3.66	3.56	3.42	3.35	3.26	3.17	3.13	3.09	3.10	3.10
14	Riau	64.30	61.83	60.49	58.63	56.28	55.38	54.20	52.34	51.49	49.99	48.68
15	Jambi	64.30	61.83	60.49	58.63	13.15	12.59	11.02	11.31	12.10	11.52	12.29
16	Sumatera Selatan	31.49	31.30	30.31	29.22	28.04	26.86	25.62	24.27	23.45	22.89	21.97
17	Bengkulu	3.33	3.15	3.13	3.10	3.14	3.18	3.20	3.52	3.48	4.69	3.81
18	Lampung	2.60	2.54	4.12	4.23	3.62	3.05	2.76	2.52	2.36	2.04	1.86
19	Kepulauan Bangka Belitun	13.33	13.05	14.07	19.87	18.66	17.32	16.61	15.86	15.04	14.72	14.15
21	Kepulauan Riau	20.17	13.68	9.56	8.24	7.40	6.92	6.59	6.11	5.57	5.44	5.13
31	DKI Jakarta	0.57	0.53	0.49	0.40	0.35	0.31	0.30	0.28	0.27	0.25	0.24
32	Jawa Barat	4.63	4.23	3.81	3.75	3.35	2.94	2.71	2.44	2.35	2.45	2.32
33	Jawa Tengah	0.96	1.00	1.00	1.00	0.98	1.02	1.11	1.12	1.10	1.11	1.12
34	DI. Yogyakarta	0.87	0.84	0.81	0.78	0.75	0.72	0.72	0.76	0.72	0.69	0.67
35	Jawa Timur	2.06	2.04	2.02	1.97	1.90	1.96	2.01	2.09	2.17	2.21	2.27
36	Banten	0.10	0.11	0.10	0.10	0.10	0.10	0.10	0.11	0.10	0.11	0.11
51	Bali	0.67	0.65	0.64	0.65	0.65	0.64	0.62	0.60	0.58	0.58	0.65
52	Nusa Tenggara Barat	26.35	29.55	29.54	28.51	29.26	27.67	26.15	25.61	22.65	26.00	27.32
53	Nusa Tenggara Timur	1.55	1.50	1.47	1.44	1.38	1.37	1.33	1.31	1.30	1.29	1.29
61	Kalimantan Barat	1.30	1.30	1.28	1.25	1.22	1.21	1.20	1.34	1.65	1.71	1.76
62	Kalimantan Tengah	6.49	6.25	4.83	3.09	3.91	6.45	8.17	8.68	8.73	9.22	9.68
63	Kalimantan Selatan	20.72	21.02	21.57	21.56	21.00	21.61	22.12	21.92	22.15	21.80	22.21
64	Kalimantan Timur	34.78	35.30	37.34	37.79	37.61	38.14	38.60	38.95	39.27	40.11	41.47
71	Sulawesi Utara	7.43	7.29	6.70	5.97	5.52	5.20	5.16	5.27	5.36	5.24	5.05
72	Sulawesi Tengah	1.99	1.94	1.89	1.84	1.78	2.08	2.59	3.30	3.76	3.50	3.43
73	Sulawesi Selatan	9.99	10.05	9.28	9.78	10.14	10.02	10.01	10.06	9.06	8.14	8.77
74	Sulawesi Tenggara	3.96	3.56	4.29	6.03	5.65	5.72	5.01	5.75	5.19	5.11	5.81
75	Gorontalo	0.76	0.83	0.88	0.95	0.92	0.94	0.98	1.02	1.04	1.11	1.14
76	Sulawesi Barat	0.53	0.53	0.56	0.57	0.56	0.53	0.54	0.63	0.91	1.02	0.93
81	Maluku	0.79	0.85	0.86	0.85	0.84	0.83	0.82	0.71	0.72	0.71	0.73
82	Maluku Utara	5.24	5.24	5.16	5.04	4.91	4.77	4.72	4.93	4.79	4.17	4.16
91	Papua Barat	25.53	23.48	22.67	22.03	21.04	20.75	19.49	18.32	17.20	16.05	12.55
94	Papua	68.17	69.29	68.40	66.21	54.48	64.61	53.51	51.58	45.29	49.47	41.89

*Red boxes indicate provinces considered as natural resource-rich provinces.

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CHAPTER 3

IS INCOME POLARIZATION HARMFUL FOR ECONOMIC GROWTH?

3.1 Introduction

Economists have long examined the link between economic growth and income inequality. Theoretical and empirical studies continue to increase. However, empirical studies show mixed results. Most studies confirm that income inequality does have a negative effect on economic growth, whereas other studies find a positive association. Various estimation methods, different periods of data (i.e., short and long term), and various units of analysis (i.e., countries, states, provinces) are employed, and results vary.

In contrast, the relationship between economic growth and income polarization has not been explored extensively. Many studies tend to focus on the differences between inequality and polarization and attempt to show that both inequality and polarization are two different concepts. Only a few studies use income/non-income polarization as an explanatory variable. For example, one study directly tests the effect of ethnic polarization on civil wars (Montalvo, 2002). Another study uses the reduced form of growth model to test the negative effect of income polarization on growth and finds a significant relationship between these two variables (Ezcurra, 2009).

Indonesia has enjoyed rapid economic growth in the last few years. However, differences in growth are quite substantial across Indonesia. Why do some regions in Indonesia have good performance (i.e., high growth), whereas others persistently show poor performance? Is income polarization harmful for growth? Do institutions affect growth and polarization? This study will attempt to answer these questions. We are aware that this is not an easy task given that there are many factors that might explain differences in growth. To complicate the matter, growth may sometimes have possible effects on those explanatory variables. Despite this issue, the current

literature on growth provides a guideline and a starting point. To my knowledge, no studies have examined the relationship between income polarization and growth in Indonesia. Therefore, this paper will contribute to the literature by examining closely the link between regional income polarization and economic growth in Indonesia.

The paper is organized as follows: The following section will review studies on growth, inequality, and polarization. The third section will discuss the data used. The fourth section will discuss regional growth and polarization patterns. The fifth section will explain the estimation strategy employed. The sixth section will discuss the empirical results, and the seventh section will present a discussion on growth, polarization, and institutions. Finally, the last section will conclude.

3.2 Economic Growth, Income Inequality, and Income Polarization

Endogenous growth models are discussed very often in the literature, and many primary explanatory variables such as savings rates, preferences, and human capital are proposed to explain variations in economic outcomes across countries. However, in this section, we will limit our discussion by reviewing only studies that discuss the link between economic growth and income inequality. The second part will review studies that examine the relationship between economic growth and income polarization.

3.2.1 Economic Growth and Income Inequality

In the1990s and early 2000s, empirical studies that tested the relationship between economic growth and income inequality grew exponentially (i.e., the effect of income inequality on economic growth). Most studies using largely different data and various estimation techniques found that highly unequal income distributions had a harmful effect on growth (see

Barro 1991, 2000, Alesina & Rodrik, 1994, Persson & Tabellini, 1994). In addition, most studies observed a negative association between economic growth and income inequality across countries over a long period of time. Generally, economic growth was estimated using average per capita growth rates, whereas the Gini index was often used to estimate a country's inequality in income distribution. Control variables included, for example, level of democracy, human capital (e.g., primary-school enrollment, secondary-school enrollment), demographic variables such as total fertility rates and mortality rates, and regional dummy variables such as Africa and Latin America. However, several studies showed opposing results, revealing a positive link between growth and inequality (see Li and Zou, 1998, Forbes, 2000, and Deininger and Olinto, 2000). According to Knowles (2005), studies that found a positive relationship emphasized short periods of time (e.g., five years), whereas those that observed a negative link employed data spanning long periods of time (e.g., ten years or more). Therefore, theoretical and empirical evidence thus far shows inconclusive results regarding the relationship between income inequality and economic growth.

Figure 3.1 shows several plausible mechanisms both from inequality to growth and from polarization to growth. We will first discuss the former mechanism (i.e., inequality to growth). Barro (2000) classifies into four broad categories several possible mechanisms explaining the relationship between inequality and economic growth: 1.Credit-market imperfections, 2. Political economy, 3. Sociopolitical unrest, and 4. Savings rates. A brief discussion of these categories follows.

First, according to credit market imperfection theories, access to credit is limited and depends on level of income and on ownership of assets that can be used as collateral. If individuals' access to credit markets affects physical and human capital investment, then the

distribution of assets and income will determine the number of people who will make such investments. In countries/regions with more unequal distributions of asset and income, fewer individuals will make such investments, resulting in lower physical and human capital levels. As a consequence, growth declines.

Second, political economy theories suggest that in countries/regions with unequal income distributions, median voters demand more redistribution of incomes through higher income taxes for the rich. Because higher income taxes are often assumed to have distortionary effects on an economy, investments are likely to decrease. As a result, growth declines (Knowles 2005).

The third argument is that inequality may cause sociopolitical instability. The negative effect of this instability is a decline in investment and, thus, lower growth. Finally, the last argument is that the level of savings rates will affect growth. Given that generally, savings rates increase with the level of income, an increase in inequality tends to raise investments, which in turn enhances growth. Note that this argument assumes that domestic investment depends on national savings (i.e., more saving equals more investment), and the economy is partly closed. Furthermore, Nissanke and Thorbecke (2008) suggest that sociopolitical instability, disruptive rent-seeking behaviors, and high transaction costs are various conditions through which higher inequality lowers growth.

Keefer and Knack (2002) provide a slightly different mechanism. They argue that higher polarization (or inequality - they use these terms interchangeably) leads to a less stable policy environment in which there is increasing future risk of deviating from current government policies. They test this claim by determining the effect of polarization, proxied by income Gini and land Gini, on institutions, proxied by security of property rights index across countries. Given that in highly polarized societies, there is increasing uncertainty (i.e., risk of less

protection of property rights), the responses of economic agents to this uncertainty are to reduce the scope of their economic activities, to organize their businesses to reduce risk exposure, and to invest in firms with less risk. As a result, these reactions lead to a lower rate of growth. The researchers' empirical results show that income inequality, land inequality, and ethnic tensions (all are proxies for polarization) have an inverse relationship with property right security. Moreover, the addition of the property right security index in the growth regressions leads to a considerable decrease in the inequality coefficient. This result indicates that polarization negatively affects growth because it causes a less secure policy environment in the economy.

Li and Zou (1998) report a possible positive correlation between inequality and growth in their theoretical and empirical models. They argue that government revenues from income taxation are used for not only production but also for public goods. In countries in which inequality is low, governments may impose a higher tax rate, and because higher tax is assumed to be a distortion in an economy, growth is lower. Other studies also observe this positive association between inequality and growth. Forbes (2000) observes that an increase in a country's income inequality is positively associated with subsequent growth in the short and medium run. Both Li and Zou and Forbes use panel data structures in their analysis, but they use different estimators, namely, a fixed effect and random effect versus the Arrelano and Bond fixed-effect estimator. In sum, the relationship between inequality and growth is complex and ambiguous. This complex relationship can show either a positive or a negative association depending on many factors, such as estimation techniques, data quality, and period length.

Some studies in the literature on growth and inequality suggest that growth may have an effect on income inequality. In his seminal paper, Kuznet (1963) used data from three developed countries (USA, Germany, and Britain) and showed an inverted U-shaped relation between

income inequality and GNP per capita. This so-called Kuznet hypothesis argues that due to urbanization and industrialization in the early stages of development, income inequality should increase but should decrease in later stages due to a higher share of the rural labor force working in industries.

In chapter three of his book, "Distribution and Development: A New Look at the Developing World," Fields (2001) provides a great literature survey on the link between economic growth and income inequality. He asserts that most early studies confirmed the Kuznet hypothesis because of "the particular economic method used (ordinary least squares) and because the highest inequality countries are all middle-income Latin American ones" (p.63). When one takes into account changes in individual countries over time, the Kuznet hypothesis is likely to be rejected. For instance, using the fixed-effect approach, Fields and Jakubson (1994) find a U-shaped instead of an inverted U-shaped curve across countries and across periods. They compare their results using OLS and their results using the fixed-effect technique. Their OLS results indicate a statistically significant inverted U-shaped curve, whereas their fixed-effect results show a statistically significant U curve. They argue that the striking difference between the two results from different estimation procedures occurs because "what is going on *within* countries is different from what is going on *across* countries" (p.43). Fields (2001) argues that "It is not the rate of economic growth or the stage of economic development that determines whether inequality increases or decreases" (p.69). Rather, policy choices and structural factors such as the basic nature of the economic system (e.g., socialist vs. non-socialist), the output structure (e.g., agriculture vs. non-agriculture), and regional patterns (e.g., Latin America vs. non Latin America) partly determine changes in inequality. In other words, it is not growth per se but what a country does that determines changes in inequality.

3.2.2 Economic Growth and Income Polarization

Unlike studies examining the relation between inequality and growth, studies on the relation between polarization and growth are very limited, but there have been several attempts to explore the link. For India, Motiram and Sarma (2011) observe a positive link between polarization and growth. Examining a scatter plot of changes in polarization and growth, they conclude that states with higher growth rates are also those with higher increases in polarization. However, the researchers advise "caution in interpreting this as a casual linkage" (Motiram and Sarma, 2011, p.26). They also find a positive correlation between changes in inequality and growth.

Furthermore, Ezcurra (2009) finds that high initial income polarization is associated with low subsequent growth in the European Union (EU). Different numbers of income groups used in the Esteban, Gradin, and Ray polarization index do not change this negative link. This negative association is quite robust to various model specifications that include control variables such as initial GDP per capita, human capital, sectoral employment, population density, and market potential. An important difference between Motiram and Sarma (2011) and Ezcurra (2009) is that the former study examines the relation between changes in polarization and growth, whereas the latter, following studies in inequality and growth, observes a link between initial polarization level and long-term economic growth.

Most studies about income inequality and growth use the Gini index to measure disparities in distribution of income. As one of the traditional inequality measures, the Gini index captures the gap between the rich and the poor in a region. However, it does not consider other features of distribution such as polarization. Traditional inequality measures do not take into account "clustering" or the concentration of income around an average or around two or more

well-defined poles in a distribution, which is exactly what polarization is. In some cases, polarization is likely to be more relevant than inequality in affecting growth. Consider, for example, a situation in which there are two income groups above the median and two groups below the median. Suppose that those two groups become only one group above the median and one group below the median. Clearly, inequality has decreased, but polarization has increased.

This study draws heavily from previous studies of inequality and growth, which means that the theoretical arguments explaining the link between polarization and growth might be very similar to those arguments explaining the link between inequality and growth. In this study, we test the following mechanism from polarization to growth: High polarization in an economy might affect sociopolitical stability given that a highly polarized society is prone to social unrest, which in turn will not only lower investment but also disrupt economic activities. As a result, growth is lower. Note that this mechanism is similar to that of the second argument about inequality and growth, discussed above. In this paper, we will test this path from polarization to growth, as shown in Figure 3.1:

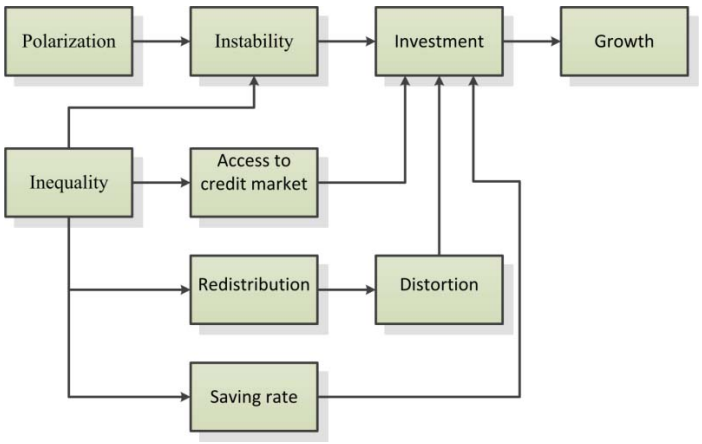


Figure 3.1. Polarization, Inequality, and Growth Mechanisms

In addition, empirically, model specifications are also similar to those in the growth literature. Although most studies examine the inequality-growth nexus across countries, this

study observes the polarization-growth relationship across provinces in Indonesia. For Indonesia, we believe that income polarization is currently more relevant than income inequality because polarization captures not only a widening gap between the rich and the poor but also a concentration of income within those groups, especially within the rich group.

3.3 Data

For this study, three data types are used. First, per capita gross domestic regional product (GDRP) data are obtained from the Directorate of National and Regional Balance at the Central Bureau of Statistics (CBS). In this study, growth as a dependent variable is a five-year average of the GDRP per capita at the province level. The second type of data is the SUSENAS Core, which is a national household survey conducted every year, with more than 200,000 observations prior to 2010. Our variable of interest, the Foster-Wolfson polarization index, and most of the independent variables employed in this study are estimated from the SUSENAS Core. Third, employment shares in the formal sector are calculated from the SAKERNAS, an annual household survey designed to collect information about the labor force in Indonesia.

As mentioned, the primary goal of this paper is to analyze the relationship between polarization and economic growth. The unit of analysis in this study is the province. The reasons for choosing the province instead of smaller jurisdictions are as follows: First, the provincial data are arguably smoother than district data. That is, compared with district data, the provincial data are likely to consist of less extreme values that severely affect estimations. For this reason, more studies of Indonesia utilize provincial rather than district data. However, the trade-off is that the statistical power of provincial data is significantly less than that of district data. For example, the number of provinces in Indonesia used in the paper is 26, whereas there are more than 400 districts in Indonesia. One caveat is that aggregating data to the provincial level is not necessarily

an advantage because we are likely to lose a great deal of information.

Second, official figures, such as unemployment and job opportunities, are estimated from the SAKERNAS. The data are representative only at the province level, meaning that if we estimate labor force-related variables below the provincial level, those variables do not represent the population in that region. As a consequence, estimations are less accurate. Therefore, we estimate our provincial employment share variables from the SAKERNAS.

In the following section, we will discuss more specifically the variables included in the model. The Gross Domestic Regional Product (GRDP) can be calculated with three approaches. The first is the production approach in which GRDP is simply the value of final goods and services produced in the economy during a given period. Another definition of the GRDP according to the production approach is that the GRDP is the sum of value added to the economy during a given period. Value added is calculated by subtracting the value of intermediate goods from the value of a firm's production. The second approach uses expenditures. The GRDP is the sum of domestic consumption (C), investment (I), the government's expenditures (G), and the differences between exports and imports (X-M). In this study, we use two components of the GRDP estimated with the expenditure approach: the government's consumption and investment. Both variables are in the form of a ratio of the total GRDP per province. Finally, the last method is the income approach in which the GRDP is the sum of the total income generated in the economy, such as rents, profits, wages, and interest. Our dependent variable is the growth of per capita GRDP, which is the ratio between the provincial GRDP and its total population. We use real GRDP with 2000 constant prices in which the nominal GRDP is divided by the GDP deflator to make the GRDP comparable across time.

Our control variables include employment shares in agriculture and the mining sector.

These variables indicate the ratio of the number of people working in a certain sector to the total number of workers in all sectors. Nine sectors considered in this study include the following:

1. Agriculture, Forestry, Hunting and Fishing
2. Mining and Quarrying
3. Manufacturing
4. Electricity, Gas, and Water
5. Construction
6. Wholesale, Retail, Restaurants, and Hotels
7. Transportation, Warehousing, and Communication
8. Finance, Insurance, Rental Enterprises Building, Land, and Business Services
9. Social Service, Social and Individual

In defining a workforce, the CBS divides the population into two groups: 1. The population group below 15 years of age, which is considered a non-productive group, 2. The population group above 15 years of age, which is considered a productive group. According to the CBS, a person is considered working if he or she is above 15 years old, currently works, has a job but is currently not working, or does not have a job but is looking for one. Conversely, those above 15 years old who are not considered part of the workforce are those in school, homemakers, etc.

Another control variable is the average years of education or schooling, which is the average years of formal education for those above 15 years old in a region (in this study, a province). The CBS calculates this number based on a population census (SP), a population survey between censuses (SUPAS), and a socioeconomic household survey (SUSENAS). To calculate the average years of education, the CBS needs information on school participation, the highest level of education (currently or previously attended), the highest level of diploma, and

the highest grade of education (currently or previously attended). The interpretation of this indicator is straightforward. For example, in 2010, the average year of education was 7.9 years for all of Indonesia. This means that on average, Indonesia's population above 15 years old completed formal education until the second grade of junior secondary school.

The inflation variable represents changes in the Consumer Price Index (CPI) in a province. The CBS collects information on the prices of goods and services in 66 major cities across Indonesia. The base year for the current CPI is 2007. The CBS's surveyors visit several traditional and modern markets (e.g., supermarket) and conduct direct interviews. The Laspeyres formula is used to estimate Indonesia's CPI. Note that the CPI represents general prices in urban areas but not in rural areas.

3.4 Regional Growth and Polarization Patterns

Before we analyze our data using an econometric model, it is useful to observe the patterns of regional growth and polarization in Indonesia. Table 3.1 shows growth in the GRDP per capita by province for two periods (2000-2005 and 2006-2010) and for all periods (2000-2010) using 2000 constant prices.

Table 3.1. Provincial Growth (%) 2000-2010

Province	Period 1 2000-2005	Period 2 2006-2010	All Period 2000-2010
Aceh	2.452	-3.621	-0.585
North Sumatera	3.522	5.252	4.387
West Sumatera	3.457	4.670	4.063
Riau	-2.335	1.466	-0.434
Jambi	3.530	3.531	3.530
South Sumatera	4.246	3.288	3.767
Bengkulu	5.139	4.070	4.604
Lampung	3.698	3.986	3.842
Kepulauan Bangka Belitung	4.837	1.877	3.357
Sumatera	***3.172***	***2.724***	***2.948***
DKI Jakarta	3.814	4.448	4.131
West Java	2.689	3.821	3.255
Central Java	4.051	5.181	4.616
DI Yogyakarta	2.904	3.945	3.425
East Java	3.719	5.382	4.550
Banten	3.013	5.393	4.203
Bali	2.441	3.716	3.079
Java-Bali	***3.404***	***4.054***	***3.729***
West Kalimantan	3.801	3.413	3.607
Central Kalimantan	3.830	3.675	3.753
South Kalimantan	4.216	3.670	3.943
East Kalimantan	-0.582	-0.824	-0.703
Kalimantan	***2.816***	***2.484***	***2.650***
North Sulawesi	2.454	6.411	4.432
Central Sulawesi	5.089	5.435	5.262
South Sulawesi	4.937	5.562	5.250
Southeast Sulawesi	5.559	0.396	2.978
Gorontalo	4.130	5.354	4.742
Sulawesi	***4.434***	***4.632***	***4.533***
West Nusa Tenggara	4.145	4.080	4.112
East Nusa Tenggara	2.429	3.041	2.735
Maluku	1.300	1.594	1.447
North Maluku	-0.829	3.682	1.426
Papua	2.917	-5.759	-1.421
Eastern Indonesia	***1.992***	***1.327***	***1.660***
Indonesia	**3.259**	**4.177**	**3.74**

3.4.1 Provincial Growth

As shown at the bottom of column four in Table 3.1, Indonesia's average national growth between 2000 and 2010 is 3.74%. It is more convenient to analyze the data by island/region groupings consisting of five islands: Sumatera, Java-Bali, Kalimantan, Sulawesi, and eastern Indonesia. From 2000 to 2010, provinces in Sulawesi Island on average outperformed other

provinces in other islands. Sulawesi's growth is higher than national growth (4.53% versus 3.74%). Within Sulawesi, central Sulawesi had the highest growth in Indonesia. In this 10-year period, Sulawesi is the only region whose growth is above national growth. Despite being the most populous regions in Indonesia, the Java-Bali Islands recorded growth slightly below national growth. However, major provinces such as Jakarta, Central Java, East Java, and Banten grew more than 4%, which is higher than national growth. Furthermore, provinces in Sumatera, Kalimantan, and eastern Indonesia on average grew at a rate considerably slower than the national growth rate. For example, only two provinces in the eastern region, Gorontalo and West NusaTenggara, outperformed national growth and had the highest growth among provinces in eastern Indonesia. Moreover, two provinces, Aceh and East Kalimantan, showed negative growth (-.585 % and -0.703%). It is not surprising that Aceh showed negative growth because it had experienced conflict for a long time, and only recently, the conflict between the government and the rebellious faction that wanted to separate this province from Indonesia was resolved. On the contrary, East Kalimantan, which is known as a natural resource-rich province, showed negative growth during the period of study. Note, however, that East Kalimantan is one of the provinces with the highest per capita GRDP and one of the largest contributors to Indonesia's GDP.

Breaking the 10 year-period into two five-year periods, we can see changes in the five-year average growth for each province and region (Table 3.1, columns two and three). As previously, Sulawesi was consistently the highest growth region in Indonesia in both periods. Sulawesi's growth was significantly higher than national growth. In fact, no other region matches Sulawesi's high growth, not even Java-Bali. Within the region, North Sulawesi showed a dramatic change in growth between two periods (from 2.45% in period 1 to 6.411% in period

2). Although Southeast Sulawesi had the highest growth in period 1, its growth fell significantly to 0.39% in period 2 from 5.55% in period 1.

Furthermore, only Java-Bali experienced an increase in growth from period 1 to period 2. All other regions or islands experienced a decline in their five-year average growth from period 1 to period 2. Sumatera's growth fell drastically from 3.17% in period 1 to 2.72% in the later period. A large decline in several provinces' growth in the Sumatra region led to average growth declines in this region. For example, Bengkulu province experienced a considerable drop in growth between the two periods (5.13% in period 1 versus 4.070% in period 2). Eastern Indonesia consistently experienced low growth, and its growth fell slightly from 2.34% in period 1 to 1.99% in period 2. Although almost all provinces in eastern Indonesia experienced an increase in growth from period 1 to period 2, Papua province showed a significant drop between the two periods, resulting in a large decline in the region's average growth. We provide maps illustrating growth patterns in Indonesia in Appendix C.1.

3.4.2 Provincial Polarization

Figure 3.2 below presents the level of the Foster-Wolfson polarization index in 2000 and its changes between 2000 and 2005 by province (see Appendix C.2 for provincial polarization values and changes). Several features are apparent in Figure 3.2. First, Indonesia became more polarized in 2005 from 2000. Almost all provinces experienced an increase in polarization but at different rates. In most provinces, polarization grew more than 11% from the polarization level in 2000. At the national level, the polarization index more than doubled in just five years. Second, within the Java-Bali Islands, DI Yogyakarta province had the largest increase in polarization at 66%, whereas DKI Jakarta province showed the smallest increase despite its high

level of polarization in 2000. Meanwhile, West and East Nusa Tenggara had low levels of polarization in 2000, yet these provinces saw a rapid increase in polarization during this period (27.33% and 56.63%, respectively). Third, the most resource-rich provinces of Riau, East Kalimantan, and Papua had the highest levels of polarization in 2000. However, changes in polarization vary across these resource-rich provinces, with Papua experiencing an increase of almost 35% in five years. Fourth, on average, provinces in Kalimantan Island experienced the lowest increase in polarization during the period. Fifth, several provinces, such as Papua, Banten, and DI Yogyakarta, show the highest polarization in either period. Overall, in 2000, many provinces in Indonesia had high polarization, and natural resource-rich provinces tended to have high polarization. More importantly, from 2000 to 2005, many provinces became increasingly more polarized at rapid rates:

Figure 3.2a. Regional Patterns of Foster-Wolfson Polarization Index in 2000

Figure 3.2b. Changes in Foster-Wolfson Polarization Index 2000-2005

3.4.3 Provincial Growth and Polarization

Next, we extend our analysis to the relationship between growth and polarization. Provinces with above-average growth are considered high growth, whereas those with below-average growth are considered low growth. Similarly, provinces with a polarization index above average are considered high, whereas those with a polarization index below average are considered low. Table 3.2 shows the relationship between polarization and growth. Using a nonparametric statistics approach, we test several combinations of different periods of growth (four periods: 1995-2000, 2000-2005, 2005-2010, and 2000-2010) and different periods of polarization (three polarization indices: 2000, 2005, and 2010). We summarize and discuss the results in this section. Our detailed estimation results are shown in Appendix C.3.

Table 3.2. The Relationship between Initial Polarization and Growth, 2000 and 2005

		2000				2005	
		Low Polarization	**High Polarization**			**Low Polarization**	**High Polarization**
2000-2004	**Low Growth**	Aceh Jawa Barat Bali Sulawesi Utara Maluku Maluku Utara Nusa Tenggara Timur	Riau DI Yogyakarta Banten Kalimantan Timur Papua	**2005-2010**	**Low Growth**	Aceh Riau Kepulauan Bangka Belitung Maluku	Nusa Tenggara Timur Kalimantan Timur Sulawesi Tenggara Papua
	High Growth	Sumatera Utara Sumatera Barat Jambi Sumatera Selatan Bengkulu Lampung Kepulauan Bangka Belitung Jawa Tengah Jawa Timur Nusa Tenggara Barat Kalimantan Tengah Kalimantan Selatan Sulawesi Selatan	DKI Jakarta Kalimantan Barat Sulawesi Tengah Sulawesi Tenggara Gorontalo		**High Growth**	Sumatera Utara Sumatera Barat Jambi Sumatera Selatan Bengkulu Jawa Tengah Nusa Tenggara Barat Kalimantan Barat Kalimantan Tengah Kalimantan Selatan Sulawesi Tengah Gorontalo Maluku Utara	Lampung DKI Jakarta Jawa Barat Jawa Timur Banten Bali Sulawesi Utara Sulawesi Selatan DI Yogyakarta

Several key observations are as follows: First, most provinces in Indonesia are in the low polarization-high growth category in both periods. Many provinces such as North Sumatera, West Sumatera, Jambi, and South Sumatera, all of which are located in Sumatera Island, consistently fall within this category in both periods. Nevertheless, some provinces move into another category over time, suggesting the dynamic of this relationship. For instance, Lampung was in the low polarization-high growth category in 2000, yet it moved to the high polarization and high growth category in 2005. Second, there were five provinces that fall into the high polarization and low growth category in 2000. Two provinces are located in Java Island, whereas the rest are outside Java. In 2005, fewer provinces were in this category, yet all of them were located off Java. Papua and East Kalimantan in particular are always in this category. Third, as the capital of Indonesia, DKI Jakarta province is characterized as a high polarization and high growth province in both periods. Fourth, more provinces in 2005 than in 2000 fell into the high-

polarization and high-growth category. Half are within Java.

As mentioned, we estimate nonparametric statistics for different periods of growth and polarization, and we summarize the results in Table 3.3. Two nonparametric tests are conducted: Pearson chi2 and Fisher's exact test. Both tests determine whether there is a relationship between growth and polarization. The tests do not tell us how strong the relationship is and whether the relationship is positive or negative. The Pearson chi2 requires each cell to contain at least five units, whereas the Fisher's exact test does not require this. In our case, our null hypothesis is that growth is independent of polarization. If the p-value is significant, then we reject the null hypothesis, and we can state that there is a relationship between growth and polarization. Our test results indicate that there is only one statistically significant relationship, namely, between growth in 2000-2005 and polarization in 2005. This result suggests that previous growth performance may have been associated with the present level of polarization, but we do not know the direction of the relationship. Five provinces fall into the category of high growth and high polarization, and 13 provinces fall into the category of high growth and low polarization. Due to the limitation of the non-parametric statistics, we further extend our analysis using a parametric estimation later in the paper.

Table 3.3. Non-parametric Statistics: Growth & Polarization

Pearson Chi2

		FW Polarization Index		
		2000	2005	2010
Growth	1995-2000	1.09		
	2000-2004	0.63	4.43*	
	2005-2010		0.20	0.64
	2000-2010	0.71		0.06

Fisher's Exact

		FW Polarization Index		
		2000	2005	2010
Growth	1995-2000	0.44		
	2000-2004	0.46	0.06*	
	2005-2010		0.70	0.67
	2000-2010	0.43		1.00

*** p<0.01, ** p<0.05, * p<0.1

3.5 Estimation

In several studies of growth-inequality, such as that of Barro (2000), the growth and the inequality equations are estimated separately. The growth equation is estimated with the usual variables, such as initial level of education, institutions, and level of development, whereas inequality is often determined by similar explanatory variables or slightly different variables than those used in the growth equation. Our approach is to estimate these equations simultaneously using the Seemingly Unrelated Regression (SUR) technique as in Lundberg and Squire (2003). An important reason for estimating these equations simultaneously is that we want to test whether growth and polarization are simultaneously determined. In other words, we believe that growth and polarization are outcomes of processes occurring at the same time. Therefore, we should estimate them simultaneously. The first equation is the growth equation, which estimates the effects of certain explanatory variables on economic growth. The second equation is the income polarization equation, which accounts for several explanatory variables of income polarization. By using the SUR approach, we allow error terms to be correlated across equations. Our standard equations are as follows:

$$\Delta y_{it} = \boldsymbol{S'}_{it}\boldsymbol{\alpha} + \boldsymbol{X'}_{it}\boldsymbol{\beta} + u_{it} \quad (1)$$

$$FW_{it} = \boldsymbol{S'}_{it}\boldsymbol{\gamma} + \boldsymbol{Z'}_{it}\boldsymbol{\Psi} + e_{it} \quad (2)$$

where Δy_{it} is the provincial five-year average per capita GRDP growth between 2000 and 2010. $\boldsymbol{X}$ consists of a vector of growth explanatory variables: initial per capita GRDP (log form), employment share in agriculture, employment share in mining, average of years of education, the share of investment in the GRDP, institutions, the share of government spending in the GRDP, and provincial inflation. In equation (2), the Foster-Wolfson index is the dependent variable, whereas $\boldsymbol{Z}$ is a vector of the polarization independent variables. Meanwhile, $\boldsymbol{S}$ is a vector of

variables that are common to both equations. Furthermore, these equations assume that variables included in $\boldsymbol{Z}$ are uncorrelated with growth and that variables in $\boldsymbol{X}$ are also uncorrelated with polarization (i.e., orthogonal assumption).

Following Lundberg and Squire (2003), we drop orthogonal assumptions and allow growth to enter the polarization equation and polarization to enter the growth equation:

$$\Delta y_{it} = \boldsymbol{S'}_{it}\boldsymbol{\alpha} + \boldsymbol{X'}_{it}\boldsymbol{\beta} + \lambda FW_{it} + u_{it} \quad (3)$$

$$FW_{it} = \boldsymbol{S'}_{it}\boldsymbol{\gamma} + \boldsymbol{Z'}_{it}\boldsymbol{\Psi} + \xi \Delta y_{it} + e_{it} \quad (4)$$

With these equations, we can simultaneously test the effect of polarization on growth and of growth on polarization. Lundberg and Squire argue that equations (3) and (4) have a multicollinearity problem. However, we have checked for this issue and found no evidence of multicollinearity in our estimates.

Before we present our estimation results, it is important to discuss variables included in our models. Our measure of polarization is the Foster-Wolfson (FW) index, and we estimate the provincial FW index for 2002 and 2008 for our regression analysis. This index falls in the category of the income bipolarization measure. As its category name indicates, the FW index concerns two income groups in a distribution, namely, those below the median and those above the median income. When this index increases in value, it can be interpreted as the disappearance of the middle class. Like other income polarization measures, the FW index can be regarded as a function of between- and within-group inequality. The between-group inequality has a positive relationship with the index. That is, holding within-group inequality constant, we observe that as the distance between those above and below the median becomes larger ("increased spread"), polarization will increase. On the contrary, holding between-group inequality constant, we observe that when inequality within two groups declines or groups become more homogenous in

income ("increased bipolarity"), polarization will rise. The formula is as follows:

$$FW = 2[2[0.5 - Lorenz(p = 0.5)] - Gini]\frac{\mu}{median}$$

where Lorenz(p=0.5) is the income share of the bottom half of the population: μ is the mean income: Gini is the Gini index ranging from 0 (perfect equality) to 1 (perfect inequality). The key advantages of this particular index are as follows: First, it can be calculated from readily available statistics such as the mean, the median, and the Gini index. Nonetheless, Wang and Tsui (2000) argue that the Foster and Wolfson approach of employing an inequality measure (i.e., Gini) to estimate polarization is problematic. Second, the FW index is relatively easy to interpret, making this index attractive compared to other complex measures. Third, we can decompose the Gini into between- and within-Gini and analyze which component of the FW index contributes the most to an increase or decrease in this particular index. Due to these advantages, we choose the FW index as our proxy for polarization. In contrast, Ezcurra (2009) used the Esteban, Gradin, and Ray polarization index and partitioned income distribution into two, three, and four income groups. He shows that the negative relationship between growth and polarization does not depend on the number of income groups used to estimate the polarization index. As discussed, higher polarization is associated with an increase in social unrest. A highly polarized society is likely to experience social unrest. This instability will likely reduce investments. In effect, growth may decline. Based on this line of argument, we expect the relationship between growth and polarization to be negative. That is, those provinces with high a polarization level are likely to experience low subsequent growth.

Following previous studies, we choose and combine several independent variables as control variables, including initial per capita GRDP (log form), employment share in agriculture, employment share in mining, average of years of education, the share of investment in the

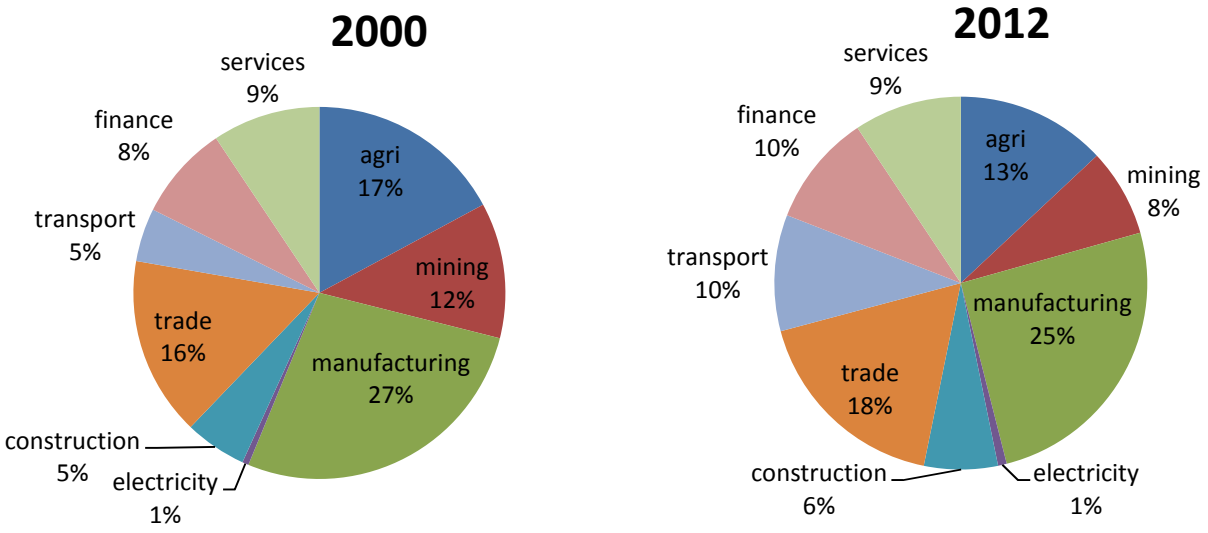
GRDP, and the share of government spending in the GRDP. Summary statistics and a correlation matrix are in Appendix C.4. Because our sample is small, we attempt to keep our model simple. That is, we attempt to keep the number of explanatory variables to a minimum for each equation. By doing so, we avoid a multicollinearity problem in our model and still have reasonable statistical power. Therefore, we carefully select our explanatory variables and ensure that they are based on well-grounded theories available in the literature. The following discussion will discuss the significance of these variables that are included in the model specification.

The initial value of per capita GRDP serves as the state of development proxy. It specifically tests a β convergence hypothesis, which argues that regions with lower growth will grow faster than those that started with higher growth. Studies by Barro (1991, 2000) and Alesina and Rodrik (1994), for example, support this convergence hypothesis across countries. In a study of Indonesia, Hill, Resosudarmo, and Vidyattama (2008) find a statistically highly significant convergence of provincial per capita GRDP between 1975 and 2002. However, they find that convergence is absent in the non-mining provincial per capita GRDP, whereas there is a weak convergence for household expenditures during the period of study. Based on this result, we expect to see a convergence in our model as indicated by a negative sign of the coefficient of initial per capita GRDP.

Unlike Ezcurra (2009), who uses initial population shares with secondary and tertiary education as indicators of human capital, we use only one variable: average years of education for those above 15 years of age. In the growth literature, human capital is considered an important factor for explaining growth. The human capital theory suggests that regions with larger stocks of human capital will grow faster than those with lower levels of human capital. For instance, using a modified (augmented) Solow model that takes into account human capital,

Mankiw, Romer, and Weil (1992) find that the relationship between growth and human capital is positive and that the inclusion of a human capital variable in the endogenous growth model helps to explain variation in growth better than the standard model explains such variation. Therefore, we expect a positive sign of the coefficient for this variable. Furthermore, we also include education as our explanatory variable in the polarization equation. We expect that more people with better education will lead to a decrease in polarization.

Employment shares in the agricultural and mining sectors are used to estimate regional specialization. These variables are indicators of productive structure in different regions. Some regions may have agricultural sector employment as a growth engine, whereas other regions may have more employment in the mining sector (i.e., specialization). Our sample indicates that the average employment share in agriculture is more than 50%. This result suggests that a large share of laborers work in this primary sector across Indonesia. Furthermore, the average employment share in mining is only 3% across Indonesia, and over time, the employment share in this sector has shrunk as ore, coal, minerals, etc., are depleting. Only certain resource-rich provinces like Riau and Kepulauan Bangka Belitung still maintain a high employment share in mining over time. Note that in this sector, value-added products are very limited; most of the time, firms directly export raw mining materials without any value-added process. According to our data in Appendix C.3, resource-rich provinces such as Aceh, East Kalimantan, and Papua experience low growth despite their high per capita GRDP. More important, there has been a significant shift in Indonesia's structural economy. The shares of the agricultural and mining sectors in the GDP have been declining over time, as shown in Figure 3.3. Therefore, we expect that employment shares in the agricultural and mining sectors will decline over time and that their effect on growth will be negative:



Source: CEIC

Figure 3.3. Share of Nine Sectors in GDP 2000 and 2012

The share of investment in the GRDP is the ratio of gross capital formation to total GRDP. Investment is expected to have a positive effect on growth. Some studies discuss the direction of causation, that is, that growth might affect investment (see Barro, 1996). Provinces with high growth are likely to attract more investments. In the case of Indonesia, Vidyatamma (2010) finds that investment has no significant effect on growth. He notes that his finding is in line with other studies on developing countries such as Brazil and Vietnam.

The share of government spending in the GRDP is another common variable for explaining growth, especially in cross-country studies. Generally, the share of government spending in the GRDP is negatively correlated with economic growth. Barro (2000), for example, finds that countries with a high share of government spending (in education and defense) in their GDP experience lower growth. Lunberg and Squire (2003) find no significant relationship between government spending and growth, although the coefficient is negative. At the subnational level, Vidyatamma (2010) reports a significantly negative effect of government spending on growth in Indonesia. Therefore, we expect to obtain a similar result.

Inflation is one of our explanatory variables for both growth and polarization. High

inflation reduces purchasing power, which in turn negatively affects aggregate demand. As a consequence, total output declines. At the same time, despite higher prices, the rich still maintain their standard of living and continue to spend. Because our polarization is estimated using per capita expenditures, we expect higher polarization in provinces with high inflation. Therefore, we expect inflation to negatively affect growth but to positively affect polarization.

In our polarization equation, the sum of exports and imports over GRDP is a variable not in the growth equation. This variable is usually used as a proxy for openness. Barro (2000), for example, reports that the degree of openness is positive and statistically significant in explaining income inequality across countries between 1960 and 1990. Countries that were more open in trade experienced a higher increase in their income inequality after controlling other factors. This is probably due to the fact that skilled labor is more beneficial than unskilled labor in the context of increasing trade. Thus, based on this, the sign for this variable is expected to be positive.

An important variable appearing in both equations is an index of institutions based on people's perceptions, mostly from the private sector. A high value of this index means that businessman, entrepreneurs, and business managers have a positive view of institutions. In our estimation, the institution index that we used comes from 2002 and 2004 surveys. Because this index is available at district levels, we estimate a weighted average using per capita GRDP as a weight to obtain an institution index at the provincial level.

Our institution index comes from the KPPOD, an independent organization that monitors local autonomy in Indonesia. The KPPOD has conducted the "Doing Business in Indonesia" annual survey in more than 200 districts in Indonesia since 2002. The goals of the survey are to provide information needed to make investment decisions in regions across Indonesia, to encourage healthy competition among regions to attract investments, and to monitor local

processes of autonomy.

The institution index consists of four variables, including legal certainty, apparatus and service, local regulation, and local finance. The legal certainty variable emphasizes the consistency of rules and law enforcement in the region, whereas the apparatus and service variable refers to how well local apparatuses enforce rules and how well they provide services related to business, such as business permit handling. The local regulation variable refers to "all formal policies or implementing rules that are stipulated and established by local government in regulating the activity of business community, and investment" (KPPOD 2003, p7). Finally, the local finance variable refers to "all policies, strategies, and techniques applied by local government to generate funds, and in allocating the funds to finance its function or duty as local government (service delivery, development initiatives, etc.)" (KPPOD 2003, p8).

We believe that institutions play an important role in determining growth and income polarization in a region, especially after the decentralization that occurred in 2000, because currently, local governments at the district level have more political power than before. According to Azis (2008), many countries experienced slower growth after decentralization occurred. Stagnant or deteriorating social indicators often followed lower growth. Taking into account a set of institutional factors such as local accountability, people's participation, and poverty-income distribution, he argues that local capture, a situation in which local leaders are taken "hostage" by local elites, has an ambiguous effect on the decentralization outcome. The type of local leader determines the effect of local capture on the decentralization outcome. A higher degree of local capture is not always associated with negative welfare outcomes. In some cases, a high level of local capture produces positive outcomes. This finding suggests that the system may lead to multiple equilibria. Furthermore, the absence of an incentive system based on

a stick-and-carrot approach may also explain why many countries showed a disappointing performance after decentralization. We would expect that strong and "good" institutions (as indicated with a high value of the index) in a region are associated with high growth and low income polarization. Appendix C.6 provides an overview of this index.

3.6. Empirical Results

We present our first estimation in Table 3.4. The growth (1) and polarization (2) equations are estimated simultaneously. In the growth equation, the level of development (i.e., initial level of per capita GRDP) and the employment shares in agriculture and in mining are statistically significant for explaining growth. In contrast, education, government spending and investment, and inflation have no significant effect on growth despite their correct signs in this model. In addition, the institution index and the year 2005 dummy are insignificant as well.

The initial GRDP is negative and statistically significant for explaining growth. This result indicates that a convergence process occurs in Indonesia. Some provinces that began with low initial per capita GRDP are "catching up" and showing high economic growth. In contrast, provinces with high initial per capita GRDP experience slower growth over time. These results are consistent with those of Hill, Resosudarmo, and Vidyattama (2008), who report a statistically highly significant convergence of provincial per capita GRDP between 1975 and 2002. Appendix C.3 discusses in more detail the relationship between the initial GRDP and subsequent growth and changes in this relationship over time. We categorize provinces into four categories: low GRDP-high growth (catching up provinces), low GRDP-low growth (losing provinces), high GRDP-high growth (winning provinces), and high GRDP-low growth (falling behind provinces).

Table 3.4. SUR Results for Equations 1 and 2

Growth	**(1)**
Initial income (per capita GRDP)	-0.0561***
	(0.0122)
Average years of education	0.00437
	(0.00352)
Employment share in agriculture	-0.0467**
	(0.0191)
Employment share in mining	-0.122**
	(0.0570)
Share of Gov.expenditures in GRDP	0.00381
	(0.0455)
Share of investment in GRDP	-0.000231
	(0.0364)
Inflation	-0.00103
	(0.00122)
Institution	0.0889
	(0.236)
Year 2005 dummy	0.00230
	(0.00833)
Constant	0.247***
	(0.0486)
Observations	52
Adjusted R-squared	0.442

Polarization	**(2)**
Average years of education	0.000654
	(0.00438)
Inflation	0.00113
	(0.00166)
Export plus import/GRDP	0.00342
	(0.0120)
Institution	-1.245***
	(0.203)
Constant	0.170***
	(0.0336)
Observations	52
Adjusted R-squared	0.458
Standard errors in parentheses	
*** p<0.01, ** p<0.05, * p<0.1	

As shown in Table 3.4, the employment shares in the agricultural and mining sectors show an inverse relationship with growth. This means that provinces specializing in agriculture and mining are associated with lower subsequent growth. The negative effects of the employment share in mining are much higher than those of the employment share in the agricultural sector. These results are as expected. A combination of rapid inflow of inexpensive imported agricultural products (mostly from China) and rising land conversion from agricultural use to other uses may lead to a decrease in agricultural sector employment, which in effect lowers growth. In the mining sector, the rapid depletion of natural resources (especially given that currently, local governments at district levels can issue mining permits in its areas) and shifts from labor to modern mining technologies are likely to result in lower employment in this sector and, hence, lower growth. This is especially true in natural resource-rich provinces such as East

Kalimantan. These two variables might indicate that Indonesia has been experiencing a structural sectoral change in which sectors such as manufacturing, trade, and services contribute more to growth than primary sectors such as agriculture and mining.

In the polarization equation (2), we find that the institution index is the only statistically significant variable. The index shows a negative relationship with polarization, as expected. Those provinces with better institutions are associated with lower polarization. Provinces with business-friendly environments tend to attract more businesses, which generates employment and creates positive multiplier effects on local economies. It is likely that provinces with better institutions employ their tax revenues to provide better public goods and better social assistance that potentially lower polarization in the regions.

Next, we present the results of equations 3 and 4 in Table 3.5. Recall that we inserted the polarization index into the growth equation and the growth variable into the polarization equation. Our results show that holding other things constant, we find that higher polarization is associated with lower growth. The negative effect of polarization on growth is consistent with what Ezcurra (2009) finds. Although he uses a different polarization index, he reports a negative effect of polarization on growth in the European Union (EU). Furthermore, initial income, the employment share in agriculture, and the employment share in mining continue to be statistically significant as in the previous results. As in the previous results, the relationship between growth and these three variables is negative.

In the polarization equation (4), the results indicate a highly statistically significant inverse relationship between polarization and growth. Provinces with high growth are associated with low polarization. Conversely, provinces with low growth are associated with high polarization. It seems that our results indicate a feedback effect between growth and polarization,

suggesting a vicious cycle. Provinces with high polarization tend to experience low growth, which in turn exacerbates the level of polarization within these regions. Furthermore, our results also indicate that the institution index is negative and statistically significant for explaining polarization. It is clear that the coefficient of the institution index is much larger than that of growth (-1.309 vs. -0.444), suggesting the importance of institutions in this equation. Combining our findings regarding growth and institutions in determining polarization, we may conclude that higher growth may lead to lower polarization if there is an improvement in institutions. We will discuss institutions in more detail later in the paper:

Table 3.5. SUR Results for Equations 3 and 4

Growth	**(3)**
Polarization	-0.339***
	(0.0989)
Initial income (per capita GRDP)	-0.0528***
	(0.0119)
Average years of education	0.00427
	(0.00339)
Employment share in agriculture	-0.0450**
	(0.0186)
Employment share in mining	-0.120**
	(0.0558)
Share of Gov.expenditures in GRDP	0.00545
	(0.0443)
Share of investment in GRDP	0.00104
	(0.0353)
Inflation	-0.000776
	(0.00117)
Institution	-0.297
	(0.230)
Year 2005 dummy	0.00398
	(0.00881)
Constant	0.292***
	(0.0482)
Observations	52
Adjusted R-squared	0.458

Polarization	**(4)**
Growth	-0.444**
	(0.173)
Average years of education	0.00187
	(0.00433)
Inflation	0.000393
	(0.00165)
Export plus import/GRDP	-0.0104
	(0.0137)
Institution	-1.309***
	(0.201)
Constant	0.197***
	(0.0345)
Observations	52
Adjusted R-squared	0.474
Standard errors in parentheses	
*** p<0.01, ** p<0.05, * p<0.1	

Our next step is to check the robustness of the models by adding some independent variables to the growth equation. However, we avoid adding too many variables due to our limited sample and due to the risk of potentially having a multicollinearity problem in our model. Table 3.6 presents the results of our robustness check.

In the growth equation (5), we add to the growth equation only a dummy variable for several provinces located in the eastern part of Indonesia. These provinces include West Nusa Tenggara, East Nusa Tenggara, Maluku, North Maluku, and Papua.[5] An important common feature of these provinces is that most have lower growth than the national average. For instance, West Nusa Tenggara and East Nusa Tenggara are considered isolated provinces due to their disadvantaged geographic location. Poor transportation and poor infrastructure are also main features of these provinces. As a consequence, their economies grow more slowly than other provinces. However, as shown in Appendix C.3, West Nusa Tenggara grew above the national average between 2005 and 2010, whereas growth remained low for East Nusa Tenggara. Furthermore, Papua is considered a province with abundant natural resources, and it has high per capita GRDP. Nevertheless, the provincial output is largely driven by natural resources, and most of Papua's local inhabitants do not benefit from the natural resource extractions. From 2005 to 2010, the average growth has been negative. Based on the results of equation (5), we find no significant association between those provinces located in the eastern part of Indonesia and growth. Despite this result, polarization and some control variables remain statistically significant as in previous results.

[5] We exclude provinces in the Sulawesi Island from the eastern dummy because most of these provinces had growth above the national average during the period of study.

Table 3.6 Robustness Check Results

Growth	**(5)**	**(7)**	**(9)**
Polarization	-0.338***	-0.265**	-0.347***
	(0.0991)	(0.108)	(0.101)
Initial income (per capita GRDP)	-0.0522***	-0.0445***	-0.0519***
	(0.0133)	(0.0130)	(0.0121)
Average years of education	0.00416	0.00437	0.00455
	(0.00356)	(0.00332)	(0.00346)
Employment share in agriculture	-0.0444**	-0.0372*	-0.0439**
	(0.0194)	(0.0190)	(0.0188)
Employment share in mining	-0.120**	-0.0908	-0.124**
	(0.0559)	(0.0583)	(0.0565)
Share of Gov.expenditures in GRDP	0.00790	0.00812	0.00984
	(0.0501)	(0.0435)	(0.0456)
Share of investment in GRDP	0.00155	0.00198	-0.00144
	(0.0356)	(0.0346)	(0.0358)
Inflation	-0.000824	-0.000345	-0.000845
	(0.00125)	(0.00118)	(0.00118)
Institution	-0.298	-0.270	-0.321
	(0.230)	(0.226)	(0.237)
Year 2005 dummy	0.00396	0.00253	0.00357
	(0.00881)	(0.00868)	(0.00885)
Eastern Province dummy	-0.000569		
	(0.00541)		
Population Growth		-0.00365	
		(0.00251)	
Urban share			-5.25e-05
			(0.000132)
Constant	0.291***	0.247***	0.291***
	(0.0505)	(0.0562)	(0.0481)
Observations	52	52	52
Adjusted R-squared	0.488	0.510	0.490

Polarization	**(6)**	**(8)**	**(10)**
Growth	-0.444**	-0.438**	-0.444**
	(0.173)	(0.173)	(0.173)
Average years of education	0.00188	0.00186	0.00188
	(0.00433)	(0.00433)	(0.00433)
Inflation	0.000392	0.000403	0.000392
	(0.00165)	(0.00165)	(0.00165)
Institution	-1.309***	-1.308***	-1.309***
	(0.201)	(0.201)	(0.201)
Export plus import/GRDP	-0.0105	-0.0103	-0.0105
	(0.0137)	(0.0137)	(0.0137)
Constant	0.197***	0.196***	0.197***
	(0.0345)	(0.0345)	(0.0345)
Observations	52	52	52
Adjusted R-squared	0.474	0.475	0.474

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

In the next robustness check, we include population growth in the growth equation. Given growth of the GRDP, faster population growth intuitively leads to lower growth because in this study, we use growth of per capita GRDP, which is a ratio of the GRDP to the total population in a province. Our results in equation (7) indicate that there is no significant relationship between population growth and economic growth. The negative sign of the coefficient is as expected. This finding is not unique to our study. Vidyatamma (2010) also finds that the link between the population growth rate and economic growth is insignificant. Regardless, our results suggest that our primary variable of interest, polarization, is still significant, although the magnitudes of the coefficients are different than those in the earlier model. In the polarization equation (8), the results are similar to those in the previous models. That is, only growth and the institution index are highly statistically significant.

In our last robustness check, we include the urban population share in a province in the growth equation. Similar to population growth, the urban population share does not show a significant relationship with economic growth. Nevertheless, the relationship between growth and polarization remains negative and statistically significant after we control for the urban population share in the growth equation. In addition, the coefficient of the polarization index in the growth equation (9) is slightly larger than that of the polarization index in the growth equation (3). In the polarization equation (10), the results are similar to those in the previous models.

In sum, based on our robustness check, our results are quite robust. That is, adding more control variables does not change the negative relationship between polarization and growth in the growth and polarization equation. In addition, the growth and institution index in the polarization equation remains highly significant despite additional variables in the growth

equation.

Although the determinants of growth and their rationales for explaining growth are discussed extensively in the literature, in our view, the discussions of the determinants of income polarization are neglected and scarce. Most studies of polarization emphasize the development of the polarization index and rarely discuss factors influencing income polarization. In the previous polarization equation, we include some covariates to explain polarization based on the determinants of income inequality in the literature. In our view, this step is quite reasonable due to the scarcity of literature on the determinants of income polarization. Nonetheless, we conduct an experiment in which we include similar independent variables in the growth and polarization equation. Further research is needed to explore mechanisms that explain how these variables affect polarization.

As indicated in Table 3.7, our primary hypothesis that polarization negatively affects growth is still supported by the results of equation (11). In addition, growth has a negative effect on polarization as well. In the growth equation (11), control variables such as initial income and the employment shares in the agricultural and mining sectors remain statistically significant, like those in previous equations. The magnitudes of these variables are slightly higher than those of the variables in previous equations. Based on the polarization equation (12), institution is still significant and negative. As previously, the effect of institution on polarization is quite large. Furthermore, the employment share in primary sectors shows an inverse relationship with polarization. That is, the more people working in these sectors, the less polarization exists. This is an interesting finding. As mentioned, nearly half of the total employment is in the agricultural sector. It is also well known that most poor people in Indonesia live in rural areas and are farmers. Increasing the number of people working in the agricultural and mining sectors could

lead to lower polarization, although at the same time, this may hinder the growth prospect. Therefore, the tradeoff is evident.

The share of local government spending in the GRDP shows a significant and positive relationship with polarization. One interpretation is that local governments do not spend their budget on activities that raise the incomes of the poor. This finding is consistent with the fact that in many regions in Indonesia, almost more than half of the total local budget is spent on salaries, benefits, and official trips (or *perjalanan dinas*) of local civil servants. In addition, recently, numerous incumbent local leaders have financed their reelection campaigns with funds allocated for social assistance. Therefore, it is most likely that large but unproductive local budgets are contributing to rising polarization:

Table 3.7. SUR Results for Growth and Polarization Equations with Similar Covariates

Growth	(11)
Polarization	-0.402***
	(0.0965)
Initial income (per capita GRDP)	-0.0477***
	(0.0118)
Average years of education	0.00380
	(0.00340)
Employment share in agriculture	-0.0510***
	(0.0189)
Employment share in mining	-0.142**
	(0.0566)
Share of Gov.expenditures in GRDP	0.0281
	(0.0445)
Share of investment in GRDP	-0.00165
	(0.0358)
Inflation	-0.000966
	(0.00117)
Institution	-0.358
	(0.226)
Year 2005 dummy	0.00368
	(0.00858)
Constant	0.291***
	(0.0479)
Observations	52
Adjusted R-squared	0.469

Polarization	(12)
Growth	-0.673***
	(0.167)
Average years of education	0.000478
	(0.00459)
Employment share in agriculture	-0.0505*
	(0.0272)
Employment share in mining	-0.170**
	(0.0824)
Share of Gov.expenditures in GRDP	0.116**
	(0.0547)
Share of investment in GRDP	-0.00975
	(0.0524)
Inflation	-0.00106
	(0.00162)
Export plus import/GRDP	-0.00213
	(0.0141)
Institution	-1.123***
	(0.203)
Constant	0.234***
	(0.0453)
Observations	52
Adjusted R-squared	0.522

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Previously, we divided the growth period into two periods, 2000 to 2004 and 2005-2010, in which polarization is the polarization index in 2002 and 2008, and the control variables are their values in the initial periods, 2000 and 2005. Now, we consider only one period of growth, 2000 to 2010, which can be viewed as long-term growth. Table 3.8 presents our OLS estimation of the growth equation for the growth period 2000 to 2010. Unlike previous samples, our current samples include only 26 provinces. Holding other things constant, we see that polarization has a negative effect on long-term growth. Compared to previous results, the magnitude of the coefficient of polarization is substantially lower. We may conclude that polarization has a significantly larger negative effect on growth in the short run than in the long run:

Table 3.8. OLS Results of Growth Equation

Growth	(12)
Polarization	-0.152*
	(0.0851)
Initial income (per capita GRDP)	-0.0627***
	(0.00819)
Average years of education	0.00786**
	(0.00307)
Employment share in agriculture	-0.0267
	(0.0379)
Employment share in mining	0.0437
	(0.179)
Share of Gov.expenditures in GRDP	-0.00782
	(0.0658)
Share of investment in GRDP	0.000152
	(0.0310)
Inflation	0.000698
	(0.00180)
Institution	-0.173
	(0.206)
Constant	0.249***
	(0.0629)
Observations	26
Adjusted R-squared	0.632

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Regarding the control variables in equation (12) in Table 3.8, we see that the convergence process across regions is evident in the long run. Interestingly, the role of education in explaining growth was previously absent. However, based on equation (12), education has a positive impact on long-term growth. In addition, only the initial income and average years of education are statistically significant, whereas the rest of the control variables are not.

Prior to testing the link between income polarization and growth using the provincial data, we performed a similar exercise using the district data. Different approaches including OLS and fixed-effect estimators are applied to two years of panel data (2000 and 2005). Despite the data's high statistical power (that is, the number of observations is more than 500), certain data issues are evident. First, the data source for the sectoral employment shares is the SUSENAS, a socioeconomic household survey, given that the SAKERNAS, a specific household survey of the labor force, is representative only at the provincial level. This means that employment shares estimated from the SUSENAS are not as accurate as those estimated from the SAKERNAS. As a result, these variables might be under or over estimated. Second, due to decentralization, there are many new districts formed. Because our district sample examines two periods of time (2000-2004) and (2005-2010), there have been many changes in the number of districts. New districts are usually separated from existing districts. If we follow districts over time, the data are likely not comparable. For example, the population living in the original district measured in the initial period, e.g., in 2000 might be completely different in 2005. However, the difference is mostly caused by the formation of new district(s) from the original district. Third, variations across districts are very high. Compared to provincial data on, for example, growth, districts' data on growth are less smooth, meaning the data consist of many influential observations that might severely bias estimation.

Despite the limitations of district data, we present our results in Appendix C.7. The results should be interpreted with caution and may not be accurate due to the above-mentioned problems. However, we present the results to contrast them with those obtained from the provincial data. In general, from both pooled OLS and fixed-effect models, we find that higher initial polarization is associated with higher subsequent growth after controlling sectoral employment, education, level of development, and the labor participation rate. Therefore, in contrast with our results from the provincial data, the results from the district data show that polarization is not harmful for growth at the district level. Further studies are needed to address the issues discussed above and to confirm whether the link between polarization and growth is negative or positive at the district level.

3.7. Discussion: Institutions, Polarization, and Growth

In the previous section, we revealed key factors that explain provincial growth and factors that determine polarization. Our results support our primary hypothesis that income polarization is harmful for subsequent growth, and these results are robust to several different specifications in the growth equation. The evidence also indicates a feedback effect in which growth negatively affects polarization, resulting in a vicious cycle. In essence, provinces with a high level of polarization tend to experience low economic growth, which exacerbates polarization. This finding suggests that the relationship is indeed complex.

Furthermore, our results indicate that the relationship between institutions and polarization is statistically significant and negative. However, the effect of institutions on growth is insignificant. Therefore, there is an indication that institutions do not directly affect growth, yet they affect polarization directly. In other words, institutions play an important role in

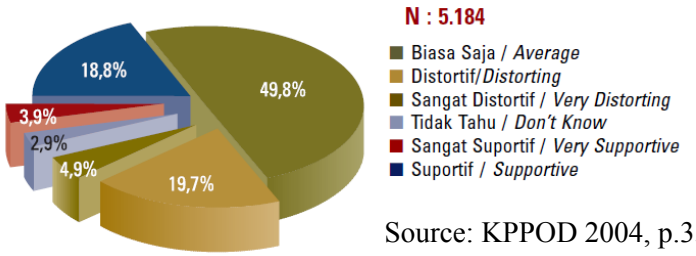
explaining polarization, which negatively affects growth. Next, we discuss further the role of institutions in explaining polarization in Indonesia.

We begin with definitions of institutions. North (1990) defines institutions as "the humanly devised constraints that structure political, economic and social interaction. They consist of both informal constraints (sanctions, taboos, customs, traditions, and codes of conduct) and formal rules (constitutions, laws, property rights)" (p.97). Alternatively, we can think of institutions as the "rules of the game." North (1990) writes that the role of institutions is "to create order and reduce uncertainty in exchange. Together with the standard constraints of economics they define the choice set and therefore determine transaction and production costs and hence the profitability and feasibility of engaging in economic activity" (p.97).

North's definition of institution fits nicely with our institution index, which consists of four variables as a proxy for institutions, particularly regional or local institutions in Indonesia. The index includes legal certainty, regional finance, government services, and local regulations. These four institutional variables fall into formal constraints according to North's definition. The local business community at the city or district level assesses these variables based on their perceptions of doing business in the region. These institutional variables are within the control of the local government (i.e., policy variables). Unlike natural endowments and geographic locations, these institutional variables are largely influenced by what local governments choose to do in terms of attracting domestic and foreign investors. Moreover, we think that this institution index is a good proxy for institution because it is based on the local business community's perception of how the rules of the game affect their businesses.

Of the four variables, local regulation has the highest weight, meaning the local business community places more emphasis on this variable than on other indicators. In 2004, a substantial

number of business owners (almost one third of total respondents as shown in Figure 3.4) reported that local regulations impeded their business activities (KPPOD 2004). Many local business participants complained of how local governments excluded them from the processes of policy formulation. They were only invited into the socialization of the policy, and their input was often disregarded. More important local regulations often resulted in higher taxes, fees, and levies, which significantly added to the cost structures of local businesses. Besides legal levies, illegal levies were also evident in many regions. The average illegal levies in 2004 were 64.25% of the total legal fees for a business permit (KPPOD 2004).



Source: KPPOD 2004, p.35

Figure 3.4 Quality of Regional Regulations According to Business Operators

Many regions still have problematic local regulations that lead to higher transactional, operational, and productions costs according to the KPPOD (2011). Most of these problematic local regulations regulate commodity trade. For instance, in South and West Kalimantan and Sumatera, local regulations impose substantial levies on crude palm oil. In addition, there are also levies simply for transporting commodities across regions. This example illustrates how Indonesia still faces a problem of a high cost economy in many regions. In effect, firms' profit margins are likely to be squeezed, which might result in lower rates of expansion and less local employment, potentially raising income polarization.

However, we have to differentiate between small, medium and large firms. Unproductive tax and levies may lower small and medium firms' profits but they may not have significant

impacts on large firms' profitability. Weak local institutions tend to favor large firms whose owners are usually politically and economically powerful. The collusions between local leaders and large firms are evident across Indonesia. Local autonomy allows local leaders at the district level or *Bupati* to directly issue, for example, mining and palm oil plantation business permits favoring big companies. The issuances of such permits often disregard environmental degradation. For example, many large companies obtain permits to use lands in the conservation and protected areas across Indonesia. Therefore, weak institutions might not be beneficial for local small and medium firms yet they are likely to favor large companies, potentially leading to environmental degradation and higher polarization.

Moreover, despite increasing transfers from the central government to local governments, local regulations are often regarded as an easy way to raise local revenues. However, higher local revenues do not necessarily translate to more public goods provisions. Instead, higher local revenues may indicate a "bigger pie" to be corrupted, leading to a potentially polarized society. In sum, local institutional reform is a necessary condition to lower polarization which has a positive effect on regional growth. However, without an incentive system based on a stick-and-carrot approach as suggested in Azis (2008), local institutional reform is far fetch.

3.8. Conclusion

In this paper, we attempt to answer an important question: Why do some regions in Indonesia perform more poorly than others? Many factors that might explain differences in economic outcomes have been proposed in the literature. Social scientists have attempted to endogenize growth and have called the framework "endogenous growth." Although studies that use income inequality as an explanatory variable for growth are abundant, only a few studies

examine polarization as a determinant of growth at the sub-national level. Therefore, this study contributes to the literature by using regional data to analyze the relationship between polarization and economic growth in Indonesia.

Controlling the usual factors found in the growth literature, we find that higher polarization is associated with lower growth. This study also shows that provinces with high polarization tend to have lower growth, which exacerbates polarization in those regions, suggesting a persistent vicious cycle. Initial income, the employment share in agriculture, and the employment share in mining are statistically significant control variables that explain differences in regional growth. In addition, according to the polarization equation, better institutions within provinces are associated with lower regional polarization. Comparing the effects of significant variables in the polarization equation, we see that the effect of institutions is much larger than that of growth on polarization. Combining these findings, we conclude that higher is associated with lower polarization if there is a significant improvement in institutions. Furthermore, our results are quite robust to different model specifications (i.e., additional control variables).

We also develop understanding of the link between institutions and polarization. Our discussion focuses on local regulations because local business communities across Indonesia consider such regulations the most important institutional variable influencing their businesses. One study by the KPPOD suggests that local regulations are often viewed by local governments as an easy way to raise regional revenue. This practice has been ongoing until now. From the perspective of small-to-medium businesses, higher local taxes, levies, and fees have contributed to local firms' economic burdens, resulting in lower profit margins, less investment, and less employment but they may not have significant impacts on large firms' profitability. From the perspective of large firms, weak institutions are likely to benefit them. The collusions between

local leaders and large companies often result in environmental degradations and contribute to higher polarization.

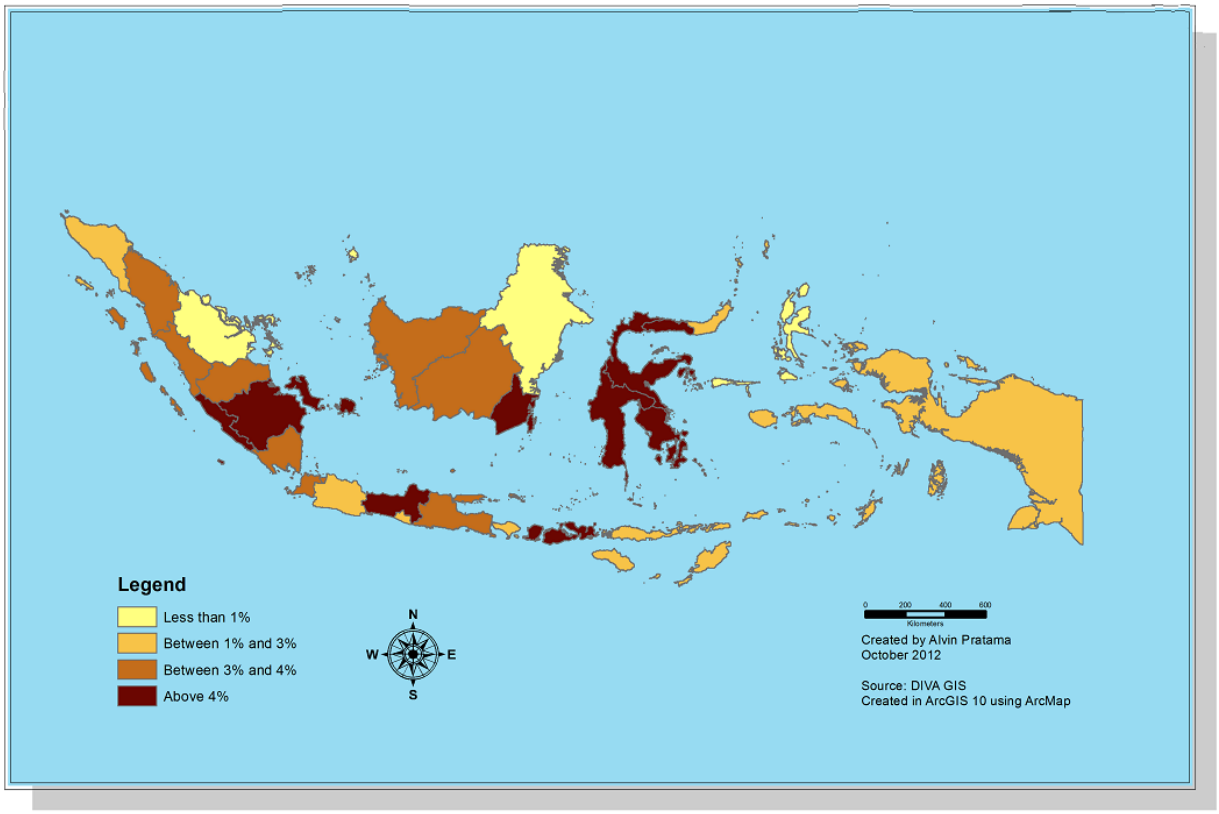
From this study, we have learned that answering the growth question is not an easy task. Many factors, mechanisms, and theories have been proposed in the literature to explain differences in growth. In the case of Indonesia, we find that a high level of polarization is associated with poor performance, which, in turn, may exacerbate polarization, leading to a vicious cycle. Institutional factors, or the "rules of the game," clearly play an important role in reducing polarization. The local governments across Indonesia should continuously improve their institutional factors, particularly local regulations, to decrease polarization, which will improve regional growth performance. This institutional reform requires an incentive system based on a stick-and-carrot approach. To the extent that rising polarization could be harmful from the perspectives of socio-political and future growth prospect, the importance of countering this trend of rising polarization should be seriously considered in efforts to promote growth.

The limitations of this study are as follows: First, because the unit of analysis in this study is the province, we have limited observations. Our strategy is to pool the data and only estimate variations across provinces (i.e., between variations) because we only have two year-long periods. Second, we use only one type of polarization index. Different polarization indices should be tested in the future to check whether our results are robust. Third, our growth variable employs an average of five-year GRDP per capita. We think it would be much better if we use the GRDP excluding oil and gas per capita growth because variations in growth may not be too high as in the regular GRDP.

APPENDIX C

C.1 Regional Patterns of Growth

Figure C.1 Indonesia's Average Per Capita GRDP Growth 2000-2004



C.2 Regional Patterns of Polarization

Table C.2 Changes in Polarization by Region

Province	FW 2000	FW 2005	FW changes (%)
Aceh	0.107	0.130	21.07
North Sumatera	0.104	0.140	35.18
West Sumatera	0.108	0.137	26.76
Riau	0.119	0.124	4.70
Jambi	0.100	0.136	35.48
South Sumatera	0.110	0.134	22.38
Bengkulu	0.097	0.133	36.79
Lampung	0.106	0.151	42.54
Kepulauan Bangka Belitung	0.102	0.140	37.85
Sumatera	***0.106***	***0.136***	***28.66***
DKI Jakarta	0.135	0.147	9.63
West Java	0.113	0.154	36.19
Central Java	0.096	0.123	27.89
DI Yogyakarta	0.119	0.197	65.98
East Java	0.106	0.145	36.83
Banten	0.138	0.169	22.04
Bali	0.108	0.147	36.90
Java-Bali	***0.116***	***0.155***	***32.94***
West Kalimantan	0.124	0.129	3.65
Central Kalimantan	0.101	0.131	29.17
South Kalimantan	0.111	0.128	15.46
East Kalimantan	0.126	0.153	21.85
Kalimantan	***0.115***	***0.135***	***17.03***
North Sulawesi	0.113	0.155	37.40
Central Sulawesi	0.117	0.135	15.70
South Sulawesi	0.106	0.148	40.07
Southeast Sulawesi	0.116	0.161	38.91
Gorontalo	0.125	0.143	13.71
Sulawesi	***0.115***	***0.148***	***28.65***
West Nusa Tenggara	0.103	0.131	27.33
East Nusa Tenggara	0.103	0.161	56.63
Maluku	0.111	0.119	7.14
Maluku Utara	0.109	0.104	-4.55
Papua	0.159	0.214	34.83
Eastern Indonesia	***0.117***	***0.146***	***24.728***
Indonesia	**0.084**	**0.176**	**109.27**

C.3 Nonparametric Statistics: Growth and Polarization

1. a. Polarization 2000 and Growth 2000-2004 in percentages

	High pol	Low pol	Total
High growth	27.78	72.22	100
Low growth	41.67	58.33	100
Total	33.33	66.67	100

Pearson chi2(1) = 0.6250 Pr = 0.429
*Not significant, no statistically significant relationship between growth and polarization
Fisher's exact = 0.461
*Not significant, no statistically significant relationship between growth and polarization

b. Polarization 2005 and Growth 2005-2010 in percentage

	High pol	Low pol	Total
High growth	40.91	59.09	100
Low growth	50	50	100
Total	43.33	56.67	100

Pearson chi2(1) = 0.1974 Pr = 0.657
*Not significant, no statistically significant relationship between growth and polarization
Fisher's exact = 0.698
*Not significant, no statistically significant relationship between growth and polarization

2. a. Growth 1995-2000 and Polarization 2000 in percentages

	High pol	Low pol	Total
High	41.18	58.82	100
Low	23.08	76.92	100
Total	33.33	66.67	100

Pearson chi2(1) = 1.0860 Pr = 0.297
*Not significant, no statistically significant relationship between growth and polarization
Fisher's exact = 0.440
*Not significant, no statistically significant relationship between growth and polarization

b. Growth 2000-05 and Polarization 2005 in percentages

	High pol	Low pol	Total
High	27.78	72.22	100
Low	66.67	33.33	100
Total	43.33	56.67	100

Pearson chi2(1) = 4.4344 Pr = 0.035
*Significant, there is a statistically significant relationship between growth and polarization

Fisher's exact = 0.061
*Significant, there is a statistically significant relationship between growth and polarization

3. a. Growth 2005-2010 & Polarization 2010

	High pol	Low pol	Total
High growth	40.91	59.09	100
Low growth	25	75	100
Total	36.67	63.33	100

Pearson chi2(1) = 0.6394 Pr = 0.424
*Not significant, no statistically significant relationship between growth and polarization
Fisher's exact = 0.672
*Not significant, no statistically significant relationship between growth and polarization

b. Growth 2000-2010 & Polarization 2010

	High pol	Low pol	Total
High growth	38.1	61.9	100
Low growth	33.33	66.67	100
Total	36.67	63.33	100

Pearson chi2(1) = 0.0615 Pr = 0.804
*Not significant, no statistically significant relationship between growth and polarization
Fisher's exact = 1.000
*Not significant, no statistically significant relationship between growth and polarization

c. Growth 2000-2010 & Polarization 2000

	High pol	Low pol	Total
High growth	28.57	71.43	100
Low growth	44.44	55.56	100
Total	33.33	66.67	100

Pearson chi2(1) = 0.7143 Pr = 0.398
*Not significant, no statistically significant relationship between growth and polarization
Fisher's exact = 0.431
*Not significant, no statistically significant relationship between growth and polarization

** As can be seen, the relationship between growth and polarization is significant only for growth 2000-05 and polarization 2005

C.4 Provincial Growth and Initial GRDP per capita

In this section, we compare provincial growth and initial GRDP per capita and examine their changes. We define high-growth regions as those with growth above national growth and high-GRDP per capita regions as those with GRDP per capita above the national GDP per capita. Four categories are as follows: First, winning regions are those regions that start with high initial GRDP per capita and have high subsequent growth. Second, catching-up regions are those regions that have low initial GRDP per capita and have high growth. Third, falling-behind regions are those with high initial GRDP per capita and low growth. Finally, losing regions are those with low initial GRDP per capita and low growth. We will examine three comparisons: 1. GRDP per capita in 2000 and growth from 2000 to 2010; 2. GRDP per capita in 2000 and average growth from 2000 to 2005; 3. GRDP per capita in 2005 and average growth from 2005

to 2010.

Table C.4a shows our first comparison between the GRDP per capita in 2000 and growth from 2000 to 2010. Only one province falls into the winning region category, and it is not surprising that this winning province is Jakarta, the capital of Indonesia. According to this table, half of the provinces in Indonesia are losing regions. Many provinces in Sumatera, Java-Bali, Kalimantan, and Eastern Indonesia fall into this category. None of the provinces in Sulawesi are categorized as losing regions (all of them are catching-up regions). In contrast, all provinces in Eastern Indonesia are losing regions. Five of 30 provinces can be categorized as falling-behind regions. Most of these provinces are located in Sumatera:

Table C.4a Initial GRDP per capita 2000 and Growth 2000-2010

		Initial GRDP per capita (2000)		
		High	Low	Total
Growth 00-10	High	1	9	10
	%	3	30	
	Low	5	15	20
	%	17	50	
	Total	6	24	30

Our second and third comparisons are shown in Table 3.9. Unlike the previous table, this table shows a province's change of status between two periods of time. In this case, growth is shown in five-year averages instead of ten-year averages as in the previous table. Table C.4b on the left panel is very similar to Table C.4a. That is, half of the provinces are losing regions, and 30% of the provinces are catching-up regions. The main differences are more winning regions and less falling-behind regions in Table C.4b. However, when we compare the left and right panels, we clearly see that a significant number of provinces have experienced a change of status. The right panel shows that the number of catching-up regions increased from nine to 16 provinces. This reveals that more than half of the provinces in Indonesia fall into this category. A significant decline in the number of losing regions in the second period is evident. In the first period (left panel), half of the provinces are considered losing regions, whereas in the second period (right panel), only 10% of the provinces are categorized as losing regions. The number of winning regions has increased from three to six provinces. However, the number of falling-behind regions has also slightly increased to five provinces from three provinces in the previous period. It is clear from these tables that the status of the provinces is highly dynamic over time. Nevertheless, from these tables, we cannot pinpoint which provinces experience a change of status and which provinces show consistency in terms of their status.

Table C.4b. Initial GRDP per capita 2000 and 2005 and Growth 2000-2005 and 2006-2010

		Initial GRDP per capita (2000)		
		High	Low	Total
Growth 00-05	High	3	9	12
	%	10	30	
	Low	3	15	18
	%	10	50	
	Total	6	24	

		Initial GRDP per capita (2005)		
		High	Low	Total
Growth 05-10	High	6	16	22
	%	20	53	
	Low	5	3	8
	%	17	10	
	Total	11	19	30

Table C.4b provides additional information about this change of status by province. Focusing on the last two columns, we can see that status changes vary across provinces. Several key features of Table C.4c are as follows: First, most provinces in Sulawesi are consistently

categorized as catching-up regions in period 1 and period 2. Only North Sulawesi is considered as a losing region in period 1, yet it became a catching-up region in period 2. Second, many provinces considered as losing regions (i.e., low initial GRDP per capita, low subsequent growth) experienced a change of status to catching-up regions in period 2, suggesting encouraging developments in these regions. For example, three out of four provinces in Kalimantan were losing regions in period 1, yet they transformed into catching-up provinces in period 2. This finding suggests that if we only compare GDRP per capita in 2000 and average growth between 2000 and 2010, we miss this change of status and generate a misleading conclusion. Third, only the Jakarta province was able to maintain its status in period 1 and period 2. The Riau and Papua provinces were winning regions (i.e., high initial GRDP per capita, high growth) in period 1, yet their statutes changed dramatically to falling-behind regions (i.e., high initial GRDP per capita, low growth). Fourth, two provinces in Sumatra, namely, Aceh and Bangka Belitung, showed no change of status. Both were considered as falling-behind regions in both periods.

Table C.4c. Change of Status by Province

Province	GDRP/capita 2000	GDRP/capita 2005	Growth Status 2000-2010	Growth Status 2000-2005	Growth Status 2005-2010	Status 2000-2010	Status 2000-2005	Status 2005-2010
Sumatera:								
Aceh	High	High	Low	Low	Low	falling behind	falling behind	falling behind
North Sumatera	Low	High	High	High	High	catching up	catching up	catching up
West Sumatera	Low	Low	Low	Low	High	losing	losing	catching up
Riau	High	High	Low	High	Low	falling behind	winning	falling behind
Jambi	Low	Low	Low	Low	High	losing	losing	catching up
South Sumatera	Low	High	Low	High	High	losing	catching up	catching up
Bangka Belitung	High	High	Low	Low	Low	falling behind	falling behind	falling behind
Bengkulu	Low	Low	High	High	High	catching up	catching up	catching up
Lampung	Low	Low	Low	Low	High	losing	losing	catching up
Java-Bali:								
Jakarta	High	High	High	High	High	winning	winning	winning
West Java	Low	Low	Low	Low	High	losing	losing	catching up
Banten	Low	Low	Low	Low	Low	losing	losing	losing
Central Java	Low	Low	High	High	High	catching up	catching up	catching up
Yogyakarta	Low	Low	Low	Low	High	losing	losing	catching up
East Java	Low	High	High	High	High	catching up	catching up	catching up
Bali	Low	Low	Low	Low	High	losing	losing	catching up
Kalimantan:								
West Kalimantan	Low	Low	Low	Low	High	losing	losing	catching up
Central Kalimantan	Low	High	Low	Low	High	losing	losing	catching up
South Kalimantan	Low	High	Low	Low	High	losing	losing	catching up
East Kalimantan	High	High	Low	Low	Low	falling behind	falling behind	losing
Sulawesi:								
North Sulawesi	Low	Low	High	Low	High	catching up	losing	catching up
Gorontalo	Low	Low	High	High	High	catching up	catching up	catching up
Central Sulawesi	Low	Low	High	High	High	catching up	catching up	catching up
South Sulawesi	Low	Low	High	High	High	catching up	catching up	catching up
Southeast Sulawesi	Low	Low	High	High	High	catching up	catching up	catching up
Eastern Indonesia:								
West Nusa Tenggara	Low	Low	Low	Low	High	losing	losing	catching up
East Nusa Tenggara	Low	Low	Low	Low	Low	losing	losing	losing
Maluku	Low	Low	Low	Low	Low	losing	losing	losing
North Maluku	Low	Low	Low	Low	High	losing	losing	catching up
Papua	High	High	Low	High	Low	falling	winning	falling

C.5 Summary Statistics and Correlation Matrix

Table C.5a Summary Statistics

	Mean	Std. Dev.	Min	Max
Growth	0.032	0.023	-0.058	0.064
Polarization	0.137	0.031	0.071	0.220
Initial income (per capita GRDP)	3.751	0.286	3.248	4.525
Average years of education	7.254	0.934	5.280	9.880
Employment share in agriculture	0.540	0.159	0.006	0.807
Employment share in mining	0.029	0.041	0.001	0.289
Share of Gov.expenditures in GRDP	0.124	0.074	0.025	0.456
Share of investment in GRDP	0.185	0.081	0.028	0.426
Inflation	8.489	2.171	2.510	15.600
Institution	0.041	0.016	0.017	0.084
Eastern Province dummy	0.467	0.503	0.000	1.000
Population Growth	1.535	1.653	-6.289	5.440
Urban share	38.650	16.792	15.460	100.000

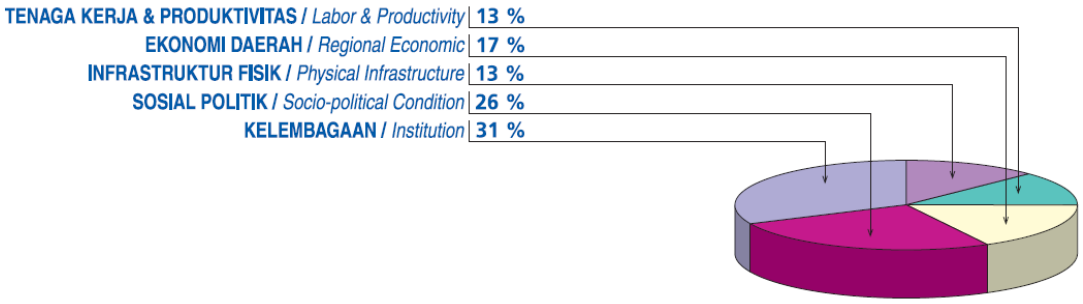
Table C.5b Correlation Matrix

	grow	fw	loggdp	edu	agri	mining	govpdb	invest	inflation	inst	exim	popgrowth	urban	east
grow	1													
fw	-0.1505	1												
loggdp	-0.5682	0.1361	1											
yearsofedu	-0.0356	0.1812	0.4086	1										
agriemploy	-0.0227	-0.1742	-0.3939	-0.4841	1									
miningemploy	-0.2222	-0.2408	0.2329	0.2377	-0.3316	1								
govpdb	0.3137	0.1573	-0.5376	-0.0139	0.2525	-0.2514	1							
investpdb	0.054	0.1206	-0.1333	-0.0152	0.0067	0.0263	0.4087	1						
inflation	-0.145	0.1839	0.2139	0.2237	-0.0639	-0.1294	0.1878	0.1645	1					
inst	-0.0305	-0.6707	-0.1126	-0.2142	0.1856	0.2113	-0.0892	-0.1258	-0.1631	1				
exim	-0.4736	0.1813	0.6865	0.3111	-0.2675	0.2579	-0.4325	-0.2899	0.0672	-0.1877	1			
popgrowth	-0.5588	0.341	0.5316	0.2301	-0.0805	0.2286	-0.1525	0.043	0.3075	-0.1118	0.412	1		
urbanshare	0.023	-0.0588	0.0288	0.1509	0.1239	-0.1548	0.1294	-0.1142	-0.0448	-0.1287	0.2758	0.0213	1	
east	-0.0869	0.0912	-0.0801	-0.2814	0.3477	-0.1116	0.3618	0.2522	-0.1677	-0.0192	0.0418	0.0544	0.1887	1

C.6 KPPOD Institution Index

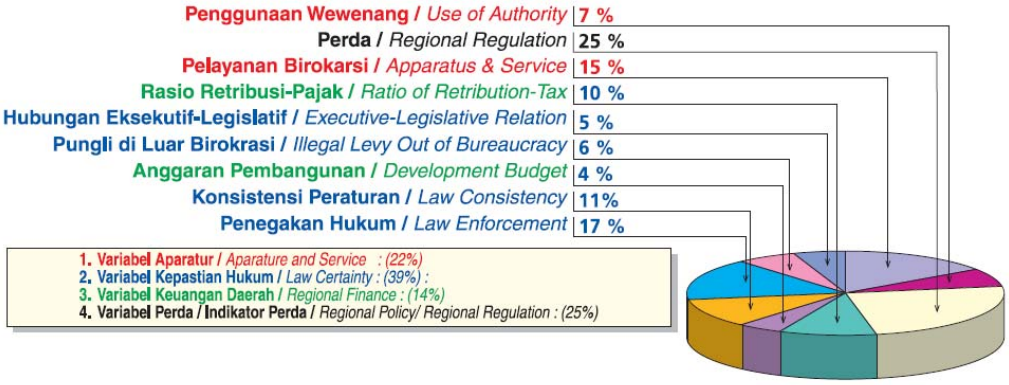
As mentioned, the total index that measures regional investment attractiveness consists of five key factors: 1) Institution; 2) Socio-political conditions; 3) Regional economics; 4) Labor and productivity; 5) Physical infrastructure. As the organization estimating this index, the KPPOD selects these factors determining regional investment attractiveness based on literature surveys and discussions with experts. According to the KPPOD, those five variables can be classified into two categories: policy variables (institution and sociopolitical variable) and endowment variables (the other three). As shown in Figure C.6a, institution factor has the highest weight (31%), suggesting it is the most important factor according to the perceptions of businessmen and well-known economists. The weight of factors in the total index is determined with the Analytical Hierarchy Process (AHP) based on the perceptions of experts and those in the private sector.

Figure C.6a Weight of Rating Factors



In this study, we use only the institution index that consists of four variables: 1) Apparatus and service; 2) Law certainty; 3) Regional finance; 4) Regional policy or regulation. The first three variables consist of several indicators. Figure C.6b shows the weight of each indicator and variable. As shown, the law certainty variable has the highest weight (39%), followed by the regional policy or regulation variable (25%):

Figure C.6b Weight of Variable and Indicator



Primary and secondary data are used to estimate the total index. Primary data include data on the weights and magnitude of the factors, variables, and indicators explaining investment attractiveness based on the perceptions of business communities. The weight for each factor, variable, and indicator is based on face-to-face interviews using the AHP questionnaire with local business respondents in each survey area (20 areas), several national businessmen, and some economists from Jakarta. These weights are relatively constant over time so that the index is comparable across time. Primary data are collected by visiting several regions (20 regions in 2002) and by sending out questionnaires to some regions (e.g., 114 regions in 2002) to obtain respondents' perceptions. Using SPPS and Excel, these primary data are ranked to determine the intensity of each indicator in the Likert scale of 1 (worst) to 5 (best). Secondary data are also ranked by their intensity in the Likert scale. The results are then reviewed, discussed, and judged by a panel of experts consisting of regional businessmen and economists. The panel of experts makes a final decision on the intensity of each indicator, which is then processed by the "Expert Choice" software. Table C.6c summarizes the type and source of data for each indicator in the institution index:

Table C.6c. Type and source of indicator

NO.	FACTOR - VARIABLE - INDICATOR	TYPE OF DATA	SOURCE OF DATA
A. INSTITUTIONAL FACTOR			
1. Variable of Law Certainty			
1	Consistency of Regulations	Primary Data	Perception of Business Community and *Panel Judgement*
2	Law Enforcement	Primary Data	Perception of Business Community and *Panel Judgement*
3	Ilegal Levy Outside Bureaucracy	Primary Data	Perception of Business Community and *Panel Judgement*
4	Excecutive - Legislative Relations	Primary Data	Perception of Business Community and *Panel Judgement*
2. Variable of Apparatus and Service			
5	Service Procedure	Primary Data	Perception of Business Community and *Panel Judgement*
6	Abuse of Authority	Primary Data	Perception of Business Community and *Panel Judgement*
3. Variable of Regional Finance			
7	Ratio of Retribution to Tax	Secondary Data	Regency/City Regional Budget Year 2001-2002
8	Ratio of Development Budget to APBD	Secondary Data	Regency/City Regional Budget Year 2001-2002
4. Variable of Regional Regulation			
9	Legal Product of the Region (Tax and Retribution)	Analysis of Regional Regulation	Regency/City Regional Regulations, Decisions of the Regents

Source: KPPOD 2002, p.101.

C.7 Results from District Data

Table C.7 Results from District Data

	Pooled OLS					Fixed Effect				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Constant	0.0224***	0.126***	0.129***	1.542	2.238	0.0135	0.397***	1.224***	4.500	1.421
	(0.00837)	(0.0188)	(0.0265)	(2.732)	(2.550)	(0.00894)	(0.0827)	(0.0935)	(3.115)	(2.922)
FW pol index	0.181**		0.285***	0.259***	0.276***	0.263***		0.228***	0.299***	0.142*
	(0.0791)		(0.0795)	(0.0807)	(0.0828)	(0.0838)		(0.0838)	(0.0839)	(0.0810)
Log GRDP per capita		-0.00990***	-0.0145***	-0.0126***	-0.0133***		-0.0420***	-0.124***	-0.116***	-0.137***
		(0.00223)	(0.00273)	(0.00271)	(0.00284)		(0.00978)	(0.0101)	(0.0101)	(0.00986)
Population share with primary education			-6.76e-05		0.000131			-0.00233***		-0.00170***
			(0.000256)		(0.000255)			(0.000315)		(0.000344)
Population share with secondary education			0.000189		0.000306			-0.00219***		-0.00159***
			(0.000184)		(0.000199)			(0.000269)		(0.000280)
Employment share in agriculture				-0.0145	-0.0216				-0.0372	-0.00263
				(0.0273)	(0.0255)				(0.0310)	(0.0292)
Employment share in mining				-0.0152	-0.0222				-0.0342	-0.00108
				(0.0273)	(0.0255)				(0.0303)	(0.0285)
Employment share in manufacturing				-0.0149	-0.0220				-0.0372	-0.00268
				(0.0273)	(0.0255)				(0.0310)	(0.0292)
Employment share in nontradable sector				-0.0143	-0.0215				-0.0362	-0.00207
				(0.0273)	(0.0255)				(0.0310)	(0.0292)
Labor participation rate				0.000403**	0.000465***				0.00255***	0.00172***
				(0.000175)	(0.000165)				(0.000280)	(0.000287)
Observations	669	669	669	669	669	524	524	524	524	524
R-squared	0.017	0.048	0.097	0.113	0.117	0.016	0.146	0.499	0.475	0.567

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

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