



International Journal of Social Economics

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Article information:

To cite this document:

Indra Indra, Suahasil Nazara, Djoni Hartono, Sudarno Sumarto, (2018) "Expenditure inequality and polarization in Indonesia, 2002-2012", International Journal of Social Economics, <https://doi.org/10.1108/IJSE-02-2017-0051>

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Expenditure inequality and polarization in Indonesia, 2002-2012

Expenditure
inequality and
polarization

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Received 29 June 2017
Revised 11 December 2017
Accepted 5 February 2018

Abstract

Purpose – The purpose of this paper is to investigate the relationships between expenditure inequality and expenditure polarization in Indonesia during the post-reformation era in 2002–2012. It also explores the various dimensions of regional groups; and finds out in which dimension did the expenditure inequality and polarization occur in Indonesia during the period.

Design/methodology/approach – Gini index was employed to measure expenditure inequality and a number of developed polarization measurement was applied to investigate the linkage between inequality and polarization at national levels. It also applied a polarization index based on inequality decomposition to investigate how the polarization occurs in the regional dimension. It covered several groups of regional dimensions; those are rural and urban areas; eastern and western regions, as well as natural resource-rich provinces and non-natural resource-rich provinces.

Findings – This study found that expenditure inequality and polarization in Indonesia have moved in line, showing an increasing trend during the observation period. In the regional context, the greatest rise was in the region with low initial levels of expenditure inequality and polarization. The trends in each of the regional dimension showed a convergent pattern. It also showed that a significant portion of total polarization was attributed to expenditure differences between urban and rural areas rather than the other groups of regions.

Research limitations/implications – The similar upward movement of expenditure inequality and polarization indicates that not only the differences between groups of expenditure are getting larger, but also the identification of the within groups expenditure are getting stronger. Since the high degree of inequality and polarization are closely related to conflict among groups of communities, this finding is a strong message to the policymaker that the development process in Indonesia during 2002–2012 tended to encourage the creation of social instability.

Practical implications – This study provides an evaluation for further development of social economy in Indonesia.

Originality/value – This paper attempts to give an overview of the relationship between expenditure inequality and polarization in Indonesia during 2002–2012. It also tries to reveal in which regional dimension, expenditure inequality and polarization occurred in Indonesia during the mentioned period. The issues have not been examined in previous empirical studies in Indonesia.

Keywords Indonesia, Inequality, Polarization, Regional differences

Paper type Research paper

1. Introduction

As a developing country, Indonesia is not only abundant in population that is the largest among the ASEAN countries, but also the most diverse in ethnicities and religions. Indonesia is an archipelagic country, with its natural resources which may be varied across regions. Having various characteristics of the population living in urban and rural areas



that are working in various sectors, Indonesia is a large and diverse nation. Diversity is a valuable asset; but it could potentially lead to inequality and polarization that would trigger social instability, such as conflicts among groups of communities[1]. Special attention from the policymakers should, therefore, be given to those impacts. Prevention and mitigation of the negative impacts that may arise from those two distributions measures will certainly require an appropriate policy design. In this case, information on various dimensions to see the phenomenon as a whole is absolutely necessary.

So far, studies on the negative aspects of expenditure distribution in Indonesia are mostly dominated by the issues of inequality using standard measurements, such as Gini index and Theil index[2]. This is understandable because the concept of polarization as an approach to analyze the distribution of expenditure is relatively new in the Indonesian context[3]. Based on the data of 2008–2010 National Household Survey (SUSENAS), Hayashi *et al.* (2012) conducted a study on expenditure inequality in Indonesia from the spatial (urban-rural) perspective, using several methods of inequality decomposition, such as: Theil index by population subgroups; the Gini index based on the components of expenditure; and the Blinder-Oaxaca decomposition method. It was found that a substantial portion of expenditure inequality was attributed to inequalities within urban and rural areas during the period. The contribution of between-sector inequality increased conspicuously, suggesting that there were prominent differences in the distribution of per capita household expenditures between the urban and rural areas.

Yusuf *et al.* (2014) presented an analysis of the trend of expenditure inequality using the SUSENAS data of 1993–2013. In the study, the analysis was carried out not only at the national level but also at the regional level, focusing on a comparison between the urban-rural areas and Java-Non Java regions. The study found that Indonesia experienced trends of inequality movement both diverging and converging at the same time. The increase in inequality encountered diverging. The inequality rates of provinces (or regencies) with a lower inequality grew faster than those of other areas with a higher inequality, or convergent. It also found that the increase in the inequality degree in Indonesia seemed obvious after the crisis period (reformation era), while it tended to be stable and moderate before the crisis.

Unlike studies of expenditure inequality, the studies of expenditure polarization in Indonesia are very limited. The differences between the two have been widely addressed in several literatures, including Foster and Wolfson (1992), Esteban and Ray (1994), Esteban *et al.* (2007) and Duclos *et al.* (2004). Polarization has different perspective from inequality in explaining the expenditure distribution. While inequality focuses on the differences between individuals aggregately, polarization is able to explain the differences between homogenous groups in a population. Using polarization can show the differences between groups consisting of individuals with the same socio-economic characteristics. Therefore, polarization can be used as a complement in analyzing the distribution of expenditure.

Foster and Wolfson (1992) suggested the relationship between expenditure inequality and polarization in two axioms: within-group transfer (WGT) and between-group transfer (BGT). These axioms assumed that a population can be partitioned in two income groups (lower and upper) based on the median income. In the WGT axiom, income transfers occurring in each of the same groups would make inequality and polarization move to the opposite; whereas the BGT axiom captured that the size of the polarization and inequality would move in the same direction if there is a transfer from a different income group. By identifying the patterns of expenditure inequality and polarization, it can be examined how the direction of expenditure inequality and polarization occurred in Indonesia during the period. The movements of expenditure inequality and polarization, whether leading to BGT or WGT axiom, will implicate to the evaluation of the future socio-economic development in Indonesia.

To enrich literatures about the expenditure distribution in Indonesia, this study attempts to overview the linkage between expenditure inequality and expenditure polarization over the post-reformation era (2002–2012). It identifies whether the expenditure inequality and polarization in Indonesia exhibited a similar pattern over the period. It can be used as “early warning system,” whether the process of economic development in Indonesia during the period tended to reduce the expenditure inequality and polarization and its gap, or conversely, it strengthened the degree of expenditure inequality and polarization and its gap. Since the high degree of inequality and polarization are closely related to social instability, the movements of both distributional measures should be considered by the policymakers.

This paper also analyzed the polarization index based on inequality decomposition to investigate how the polarization occurred in the regional dimensions: rural and urban areas; eastern and western regions, as well as natural resource-rich provinces and non-natural resource-rich (NRR-NNRR) provinces. It is aimed to find out the different patterns in the expenditure inequality and polarization within each dimension, and at the same time to investigate in which dimension inequality and polarization occurred in Indonesia. So far, no other empirical study has examined the relations between expenditure inequality and polarization in Indonesia, nor discussed the factors behind the changes of expenditure inequality and polarization in the regional context.

The rest of the paper is organized as follows: Section 2 provides methodological approach consist of the data and the measurement of inequality and polarization index as well as the measurement of polarization index based on inequality decomposition to recognize how the polarization occurred in the regional dimension. Section 3 presents the results of the trends of expenditure inequality and polarization at the national level and their relations. Section 4 focuses on the results of the regional dimension’s analysis. The final section provides a summary of the main findings.

2. Methodological approach

The analysis in this study covers national and regional levels. At the national level, the analysis focused on the relationship between expenditure inequality and polarization during 2002–2012. It was intended to investigate whether the trends of expenditure inequality and polarization had a similar pattern? In doing so, we computed the Gini index and four developed polarization indices every year during the period. Moreover, we used simple correlation capturing by scatter plot between expenditure inequality and expenditure polarization to identify whether both distributional measures had a similar movement over the period.

At the regional level, three groups of the region were classified: urban-rural areas, east-western regions, and NRR-NNRR provinces. The urban-rural area was identified by the regions where an individual (or household) lives. Moreover, the provinces in the western region consist of those on the Island of Sumatra and Java, and the rest were grouped into the provinces belong to the eastern region. Meanwhile, the NRR-NNRR provinces were classified based on the contribution of mining and quarrying (e.g. oil, gas, and mineral) to the provinces’ GDP. The NRR provinces are the provinces with more than 70 percent of the national GDP from mining and quarrying sectors. These provinces are Riau, East Kalimantan, South Sumatra, Papua and Aceh, while the remaining provinces are categorized as NNRR provinces. As in the national level, we also employed the Gini index and four polarization measures for each regional dimension. Dividing the regional dimensions into three groups of regions is aimed to determine the differences of the inequality and polarization patterns in each dimension. We also decomposed polarization by different subgroups of the regional dimension using Zhang-Kanbur (ZK) index. This makes it possible to recognize at which group dimensions’ polarization occurred.

One of the advantages of this paper is the use of consistent individual per capita expenditure data for measuring the inequality and polarization during 2002-2012. The data were obtained from the National Household Survey (SUSENAS) where individual expenditure data were proxied by household per capita expenditure. This is important because according to Yusuf *et al.* (2014), so far, BPS (Statistics of Indonesia) used grouped data to measure inequality until 2009, and this might underestimate inequality up to then. Therefore, the trends of inequality and polarization provided in this study can be compared throughout the observation period.

The measurements of expenditure inequality and polarization

As described above, trends in national expenditure inequality were analyzed by computing Lorenz-consistent inequality measures, i.e. the Gini index. The Gini index is the most common reference to measure the inequality in many literatures since it can offer good benchmarking values. Moreover, several developed polarization measures were also applied to analyze the trends in national expenditure polarization. In observing distribution polarization in general, it should be understood that inequality and polarization are actually two distinct concepts; the first relates to the overall distribution, the latter implies the existence of grouping in a distribution. Polarization can be said as a distributional phenomenon when populations can be grouped into clusters; members are similar within each cluster but they are different between cluster members. On the other hand, inequality does not impose such grouping conditions in distribution. As stated by Foster and Wolfson (1992), this distinction makes both distributional measures can move to the same or opposite direction. Despite having a different perspective, inequality and polarization can be used to see the dynamics of expenditure distribution over time.

In this study, the Gini index was estimated using relative deprivation approach proposed by Araar (2006). The relative deprivation can be defined as the differences between the desired situation and actual situation of an individual. In this study, the relative deprivation can be easily represented as expenditure differences between individuals in a population. By using this approach, the Gini index was measured as the ratio between the average of expected relative deprivation ($\bar{\delta}$) and mean expenditure (μ):

$$G = \frac{\sum_{i=1}^N \bar{\delta}_i}{\mu_y N} = \frac{\bar{\delta}}{\mu}, \quad (1)$$

where $\bar{\delta}_i = \sum_{j=1}^N (y_j - y_i)_+ / N$, $(y_j - y_i)_+ = y_j - y_i$ for $y_i < y_j$ and $(y_j - y_i)_+ = 0$ otherwise, y_i is expenditure of individual i , and N is a number of population.

Moreover, instead of using single polarization measurement, this study employed the various measurements of polarization indexes arising from disparate literature; those are Foster-Wolfson (FW) index, Esteban-Ray (ER) index, the Esteban-Gradin-Ray (EGR) index, and Duclos-Esteban-Ray (DER) index. The use of various polarization measures is expected to provide various results and enrich the analysis of polarization in Indonesia. The polarization indices measurements and the differences are briefly described as follows.

Foster and Wolfson (1992) proposed an index capturing bipolarization around the median point of expenditure. It focuses on two groups of equal size. The FW index is expressed as follow:

$$P_{FW} = \frac{2\mu}{m} [T - G], \quad (2)$$

where G is the Gini index, $T = (\mu^H - \mu^L) / \mu$ is relative median deviation, μ is mean expenditure of the population, μ^L and μ^H are mean expenditure of lower group of individuals below the

median and mean expenditure of higher group of individuals above the median, respectively. Hence, the value of T will be equivalent to twice the area between the Lorenz curve and the tangent line at the median point, $T = 2[0.5 - L(p = 0.5)]$. Like the Gini index, the FW index calculation is also based on the Lorenz curve, thus the FW index which is stated in (2) can take any real number between 0 and 1.

Unlike that measure for FW index, the ER index allows the population to be divided into k groups of potentially different size of expenditure. This index is developed within the framework of identification and alienation (Esteban and Ray, 1994). The ER index is represented as:

$$P_{ER}^{\alpha}(x) = A \sum_{i=1}^k \sum_{j=1}^k \pi_i^{1+\alpha} \pi_j |y_i - y_j|, \quad (3)$$

where y_i denotes expenditure of individual i , π_i denotes share of individual population with expenditure levels y_i , α is a parameter that expresses the degree of polarization sensitivity, and $\alpha \in (0, 1, 6][4]$, and A is a scalar equivalent to $1/(2\mu)$, which makes the polarization values compared to Gini index ranges from 0 to 1.

One drawback of ER index is the measurement resulting from neglecting the information about intra-group expenditure distribution. Later modified the ER index by incorporating information regarding intra-group dispersion. The EGR index is expressed as follow:

$$P_{EGR} = P_{ER} - \beta[G(f) - G(\rho)], \quad (4)$$

where $G(f)$ is the Gini index measured the ungrouped data, $G(\rho)$ is the Gini index for the grouped data, and $\beta > 0$ expressing the level of importance or weight in the grouping error.

Furthermore, Duclos *et al.* (2004) proposed the DER polarization index. Compared with ER and EGR indices, one of the advantages of the DER index is that it could be defined in a continuous form and does not require the definition of the number of group arbitrarily. The DER index is formulated as follow:

$$P_{DER}(f, \alpha) = \int \int f(x)^{1+\alpha} f(y) |y-x| dy dx, \quad (5)$$

where $f(x)$ expresses the density function of expenditure (x); $|y-x|$ is an alienation (expenditure differences) between two individuals; α is a normative parameter capturing the level of polarization sensitivity. The value of α is on the interval $[0, 25, 1]$ so that the Equation (5) meets polarization axioms (see Duclos *et al.*, 2004).

However, the above polarization measurements are mainly intended to analyze the dynamics of expenditure distribution focusing on the identification of "clustering around extremes," without being able to explain the contribution of the groups defined exogenously against polarization. In many cases, an analysis is made to find out how the dynamics of polarization occurs between groups of regions, such as urban-rural areas, east-west regions, or socio-economic groups (i.e. education, ethnicity, religion, gender, etc.). In other words, the above polarization measurements are unable to explain to which group dimension the polarization takes place. To overcome this limitation, Zhang and Kanbur (2001) constructed an index of polarization which requires a prior specification of clusters (groups of regions), measures the extent of inequality between these clusters, and hence, polarization in the overall distribution.

The ZK index is considered to address the issue of linkages between inequality and the social dimension in a broad sense. Economic inequality can be said to be socially embedded when the rich and the poor are distinguished not only by their wealth or expenditure

but also by their language, ethnicity, race or other social characteristics (Mogues and Carter, 2005). Thus, the ZK index focuses not only on the group's expenditure but also other characteristics of the group, such as social and regional characteristics. This method could also explain how the groups are considered to be exogenously polarized. This measurement is derived from the General Entropy (GE) index. For K exogenously given groups the GE can be decomposed into within-group and between-group components as (see Zhang and Kanbur, 2001):

$$GE = \sum_{g=1}^K w_g I_g + I(\mu_1 e_1, \dots, \mu_K e_K), \quad (6)$$

where:

$$w_g = \begin{cases} f_g (\mu_g / \mu)^c & ; c \neq 0, 1 \\ f_g (\mu_g / \mu) & ; c = 1 \\ f_g & ; c = 0 \end{cases}, \quad (7)$$

and I_g is inequality in the group- g , μ_g is the mean of the group- g , and e_g is a vector of 1's of length n_g , where n_g is the of population of the group- g . The ZK polarization index is defined as the ratio of the between-group and within-group components:

$$P_{ZK} = \frac{I(\mu_1 e_1, \dots, \mu_K e_K)}{\sum_{g=1}^K w_g I_g}. \quad (8)$$

The numerator and denominator in (8) consecutively express within-group and between-group components of the GE index. The Equation (8) explains that if within-group inequality is relatively small, then the small change in within-group inequality will lead the difference between the groups become larger, which makes the polarization become higher. In the same way, the increasing of between-group indicated by the larger differences between groups of regions will make the polarization become higher.

3. The linkages between expenditure inequality and polarization

Table I presents the calculation of the national Gini index and four polarizations indices throughout 2002–2012, namely the ER index with $\alpha = 1$, EGR index with $\alpha = 1, \beta = 1$ and DER index with $\alpha = 1$ [5]. During the period, all indices had similar movements with three

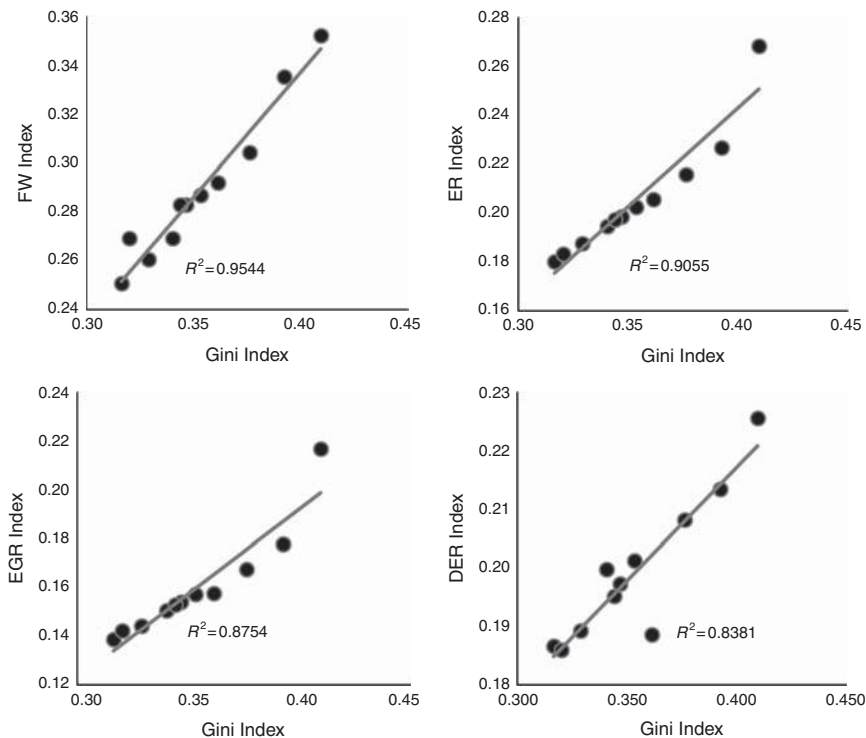
Year	Gini	FW	ER ($\alpha = 1$)	EGR ($\alpha = 1, \beta = 1$)	DER ($\alpha = 1$)
2002	0.340	0.269	0.195	0.151	0.200
2003	0.316	0.251	0.180	0.139	0.187
2004	0.329	0.261	0.188	0.144	0.189
2005	0.376	0.304	0.216	0.168	0.208
2006	0.347	0.283	0.199	0.154	0.197
2007	0.320	0.269	0.184	0.142	0.186
2008	0.361	0.292	0.206	0.157	0.189
2009	0.344	0.283	0.197	0.153	0.195
2010	0.353	0.287	0.203	0.157	0.201
2011	0.393	0.335	0.227	0.178	0.213
2012	0.409	0.352	0.269	0.217	0.226

Source: SUSENAS Core (calculated)

Table I.
National inequality
and polarization,
2002–2012

distinct phases: during 2002–2005 the movements of these indices tended to increase, then moved down to 2007, and went up again in 2008–2012. Two major spikes in 2005 and 2008 were evident for all indices. Although they fluctuated, but overall, those indices have substantially risen since 2002. The indices of Gini, FW, ER, EGR, and DER increased to an average of 2.19, 3.06, 3.09, 3.71 and 1.36 percent per year, respectively. These findings indicate that despite Indonesia's economy and per capita income continued to show a positive growth throughout 2002–2012[6], but the expenditure of Indonesian people tended to be unequal and polarized. However, although the four polarization indices are different types of polarization measurements, in general, along with the movements of the Gini index, they exhibited similar patterns with different rates of change. This evidence is also shown by the scatter plot matrix indicating positive linear correlations between those indices (see Figure 1).

The phenomena of inequality and polarization that arose simultaneously in Indonesia during 2002–2012 can be explained by several factors. First, the level of expenditure of the upper-middle group was growing faster than that of the lower-middle groups. Even the growth rate of expenditure of the lower group could be considered to decline. Throughout 2002–2012, the growth of the upper group (20 percent above) increased for an average of 1.32 percent per year; While the growth rate of the lower group (40 percent lower) experienced a slowdown with an average of 1.7 percent per year (see Figure 2). Second, the upward trend of inequality and polarization in Indonesia was also indicated by the shift of the middle group. Based on the kernel density function (see Figure 3), this evidence was shown by a substantial shift of individual expenditure distribution toward the right tail of



Source: SUSENAS Core (calculated)

Figure 1.
Scatter plot between
inequality and
polarization

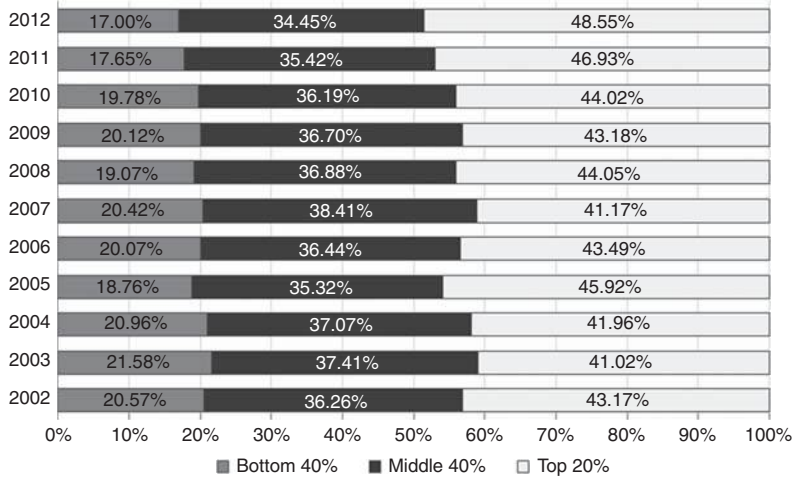


Figure 2. Shares of total expenditure by groups, 2002–2012

Source: SUSENAS Core (calculated)

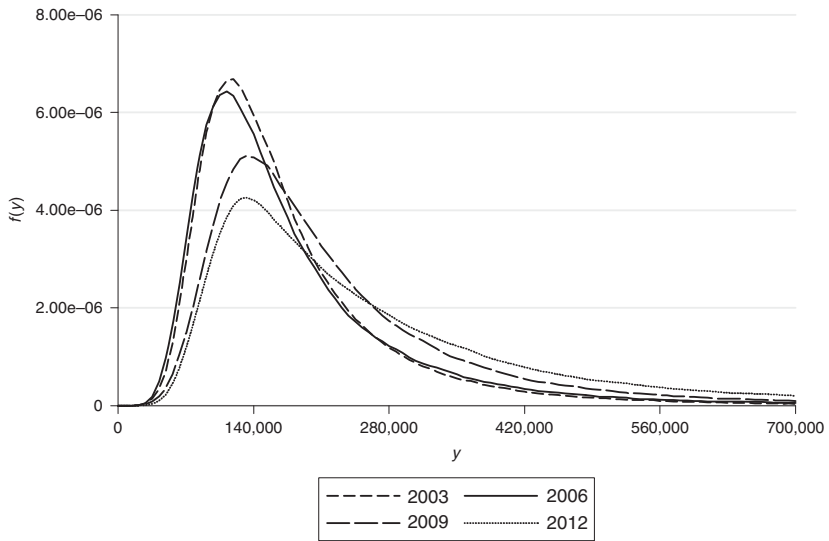


Figure 3. Density curve of national expenditure (2002 = 100), 2003–2012

Source: SUSENAS Core (calculated)

the distribution over 2003–2012. The middle group shown by expenditure ranging around the peak of the density curve declined steadily during the period. In such case, the middle group moved toward the upper group rather than to the lower group.

Third, in the context of FW index, increased polarization is indicated by the rise of relative deviation components (*T*) and Gini between (*GB*) components. Throughout 2002–2012, these two components increased by 2.1 percent averagely per year (see Table II). The *T* and *GB* components indicated an increase in inequality between groups in the same way as the components of alienation. This evidence demonstrated the increasing spreads as described by Foster and Wolfson (1992). Table II also highlights that the increase in

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polarization

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
L($p = 0.5$)	0.278	0.291	0.284	0.256	0.272	0.286	0.263	0.273	0.269	0.243	0.234
T	0.444	0.417	0.432	0.488	0.455	0.428	0.474	0.453	0.462	0.514	0.532
GB	0.222	0.209	0.216	0.244	0.228	0.214	0.237	0.227	0.231	0.257	0.266
GW	0.118	0.108	0.113	0.132	0.119	0.106	0.124	0.117	0.122	0.136	0.143
G	0.340	0.316	0.329	0.376	0.347	0.320	0.361	0.344	0.353	0.393	0.409
Mean	191,897	204,647	206,001	255,267	293,386	312,663	455,531	444,155	498,131	581,641	651,437
(2002 = 100)	183,256	185,208	174,762	185,201	199,066	198,949	261,343	247,487	259,883	292,686	314,300
Median	147,517	164,351	162,915	187,150	224,612	249,542	351,748.8	342,764	378,286	420,193	453,095
(2002 = 100)	140,625	148,715	138,114	135,345	151,720	158,151	201,320	190,171	196,226	209,922	217,077
FW	0.269	0.251	0.261	0.304	0.283	0.269	0.292	0.283	0.287	0.335	0.352

Source: SUSENAS Core (calculated)

Table II.
Components of
Foster-Wolfson index,
2002–2012

inequality and polarization in Indonesia was accompanied by an increase in mean and median expenditure. These findings show the fact that the increasing inequality and polarization in Indonesia during the period was not a phenomenon in which the rich get richer and the poor get poorer. However, this condition is because the expenditure level of the upper group grew faster than that the lower group, which in turn increased the alienation of the two groups.

Overall, the finding at national level showed the increasing trend of expenditure inequality during the post-reformation (2002–2012). This finding is in line with the result of Yusuf *et al.* (2014); but, surprisingly, the trend of expenditure polarization also increased at the same time. From this evidence, it can be said that the expenditure inequality and polarization in Indonesia moved in line, showing an increasing trend during the period. The findings obviously explained that the differences between groups of expenditure were getting larger, and so was the identification of the within groups expenditure getting stronger over the period. Since high degree of inequality and polarization are closely related to conflict among groups of communities, this finding is a strong message to the policy makers that the development process in Indonesia during 2002–2012 encouraged the creation of social instability.

4. The regional dimensions of expenditure inequality and polarization

An analysis of expenditure inequality and polarization was applied at the regional level (a group of regions). In this study, the regional dimensions were divided into three types of regions: rural and urban areas, eastern and western regions, and NRR provinces and NNRR provinces. It is aimed to find out the dynamics of regional inequality and polarization over time, while at the same time to compare their trends between groups of regions. This analysis overviewed the trends of expenditure inequality and polarization in each regional dimension whether they have a convergent pattern or not. In addition, the ZK index was applied to those regional dimensions to determine which regional dimension was becoming more polarized. The polarization indices discussed above presented only the existence, trends and the degree of polarization without providing information on how the regional dimensions explained polarization. The regional dimensions divided into several groups of regions can be used to explain how polarization occurs in that dimension. To this end, this study also examined the trends of ZK index to determine how the dynamics happened.

The Gini index and four polarization indices (ER index with $\alpha = 1$, EGR index with $\alpha = 1$, $\beta = 1$ and DER index with $\alpha = 1$) were calculated for each of the three regional dimensions and the results are presented in Figures 4, 8 and 12. According to Figure 4, the degrees of inequality and polarization in urban area were raising faster than that in the rural area.

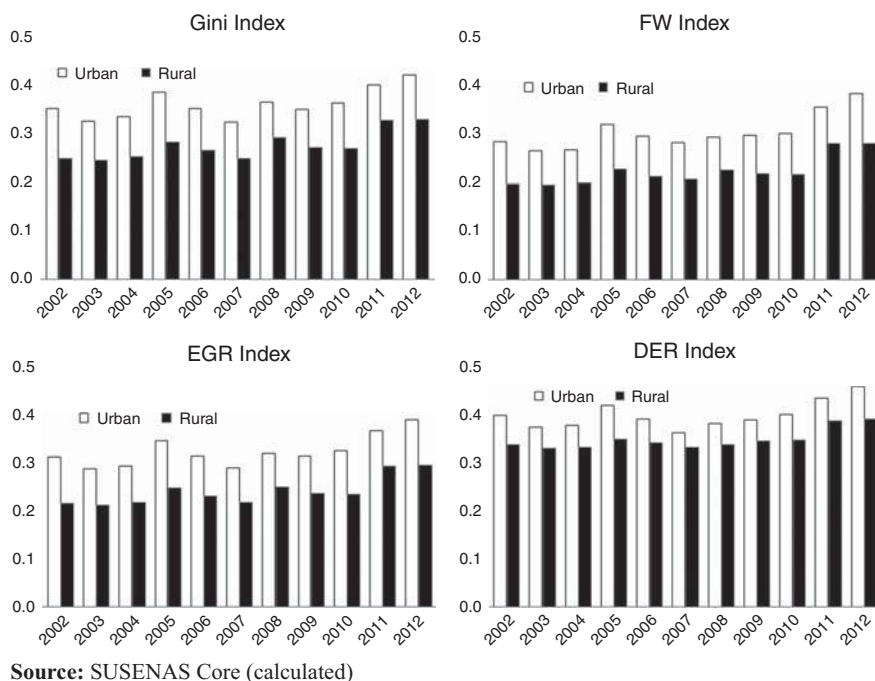
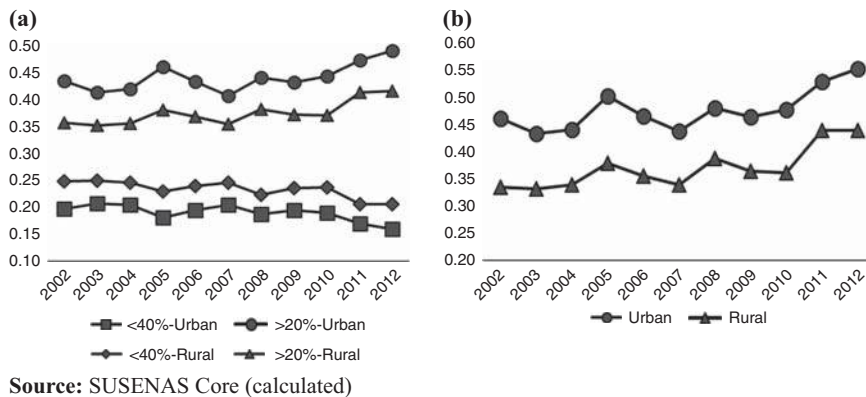


Figure 4. Urban-rural inequality and polarization indices, 2002–2012

In that period, the average of Gini index in urban areas was 0.361, while in rural areas was 0.276. The average indices of FW, EGR and DER in urban areas were 0.303, 0.161 and 0.197, respectively, whereas in rural areas were 0.222, 0.120 and 0.172, respectively. The estimation results indicated that urban society became unequal and polarized than that the rural in term of expenditure. The estimation results presented in Figure 10 exhibited interesting evidence. Although the index of inequality in the rural area was lower, the growth rate climbed faster than in the urban areas. Throughout 2002–2012, the average growth of Gini index in the rural areas reached 3.22 percent per year, whereas in the urban was 2.19 percent per year. Moreover, the growth rate of the polarization of FW, EGR, DER indices in the rural area were 4.01, 3.59 and 1.53 percent, respectively, while in the urban area were 3.40, 2.62 and 1.61 percent, respectively.

The levels of expenditure inequality and polarization that were higher in urban areas can be partly explained by several indications. First, the relative deviation components (T) in urban areas were found higher than that the rural areas (see Figure 5(b)). This evidence was also shown by the significant gap between the portion of individual expenditure with 40 percent lower and 20 percent higher in urban areas (see Figure 5(a)). Second, based on Figures 6 and 7, it can be seen that the change of the lower-middle group to the upper-middle group in urban areas was faster than that in rural areas. This is indicated by the right tail of the density curve in urban areas moving faster to the right tail of the distribution throughout 2003–2012.

Moreover, as can be seen from Figure 8, the trend in the western region was slightly higher than that in the eastern region over 2002–2012. However, expenditure inequality and polarization in the eastern region grew faster than that in the western region. Throughout the period, the average growth of Gini index in the eastern region was around 2.87 percent per year, while in the western region was 2.07 percent per year. Moreover, the average



Expenditure inequality and polarization

Figure 5. (a) Expenditure shares and (b) relative deviation by urban-rural, 2002–2012

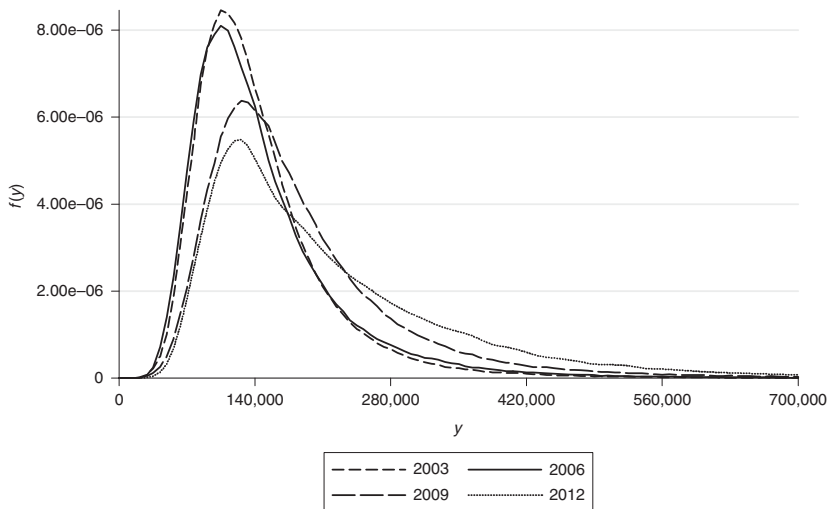


Figure 6. Density curve of rural expenditure (2002 = 100), 2003–2012

growth rates of the FW, EGR, DER indices in the eastern region were 3.93, 3.28 and 1.78 percent per year, respectively, while in the western region were 2.83, 2.39 and 1.36 percent per year, respectively. The fact that the levels of inequality and polarization between eastern region and western region are quite similar can be fairly explained by two evidences. First, the average relative deviation component (T) in the two regions was relatively the same, which was about 0.46 percent per year (see Figure 9(b)). This fact was demonstrated by the gap between the shares of expenditure of individuals; those with 40 percent of higher income compare to those with 20 percent of lower income in both areas (see Figure 9(a)). Second, both in the western and in the eastern regions, the density curve of expenditure was not much different (see Figures 10 and 11). This indicates that the distributions of expenditures in both regions were relatively similar. These two facts revealed that the inequality and polarization in the two regions were similar throughout 2002–2012.

Similar to the east-west regions, the trends of inequality and polarization in the NRR and the NNRR provinces were relatively the same (see Figure 12). The average growth rate of

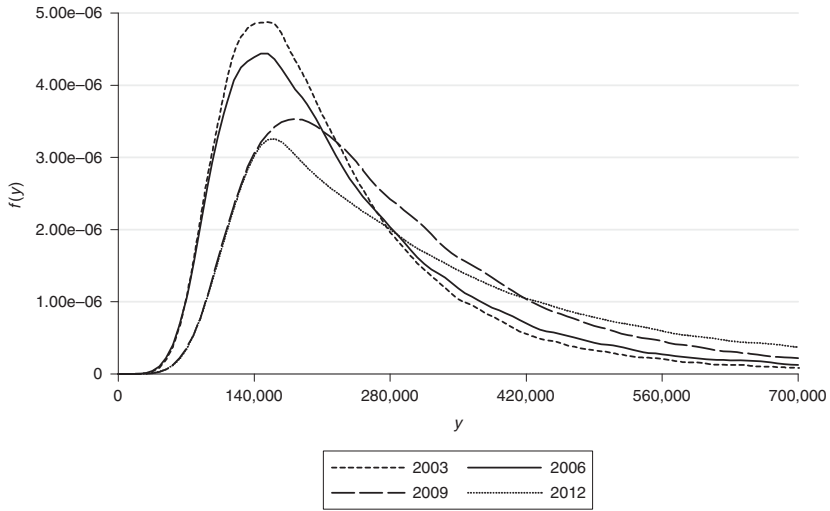


Figure 7. Density curve of urban expenditure (2002 = 100), 2003-2012

Source: SUSENAS Core (calculated)

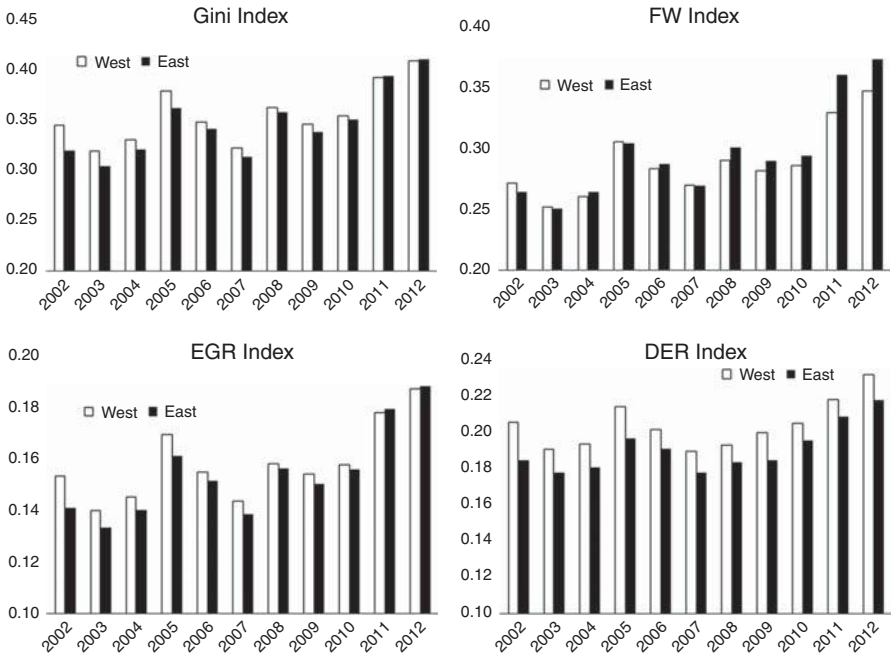
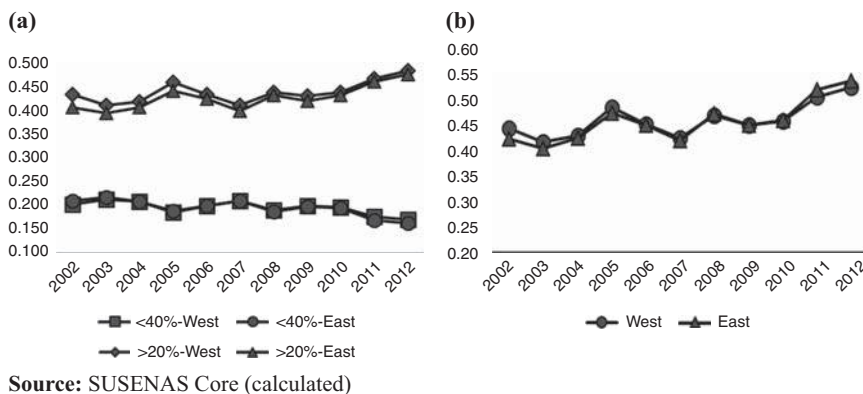


Figure 8. East-West inequality and polarization indices, 2002-2012

Source: SUSENAS Core (calculated)

Gini index in the NRR and the NNRR provinces was around 2.2 percent per year. It was found that the polarization indices in the NRR provinces were growing faster than in the NNRR provinces. The average growth of the FW, EGR and DER indices in the NRR provinces were found around 3.2, 2.7 and 1.5 percent, respectively, while in the NNRR



Expenditure inequality and polarization

Figure 9.
(a) Shares of expenditure and (b) relative deviation of east-west regions, 2002–2012

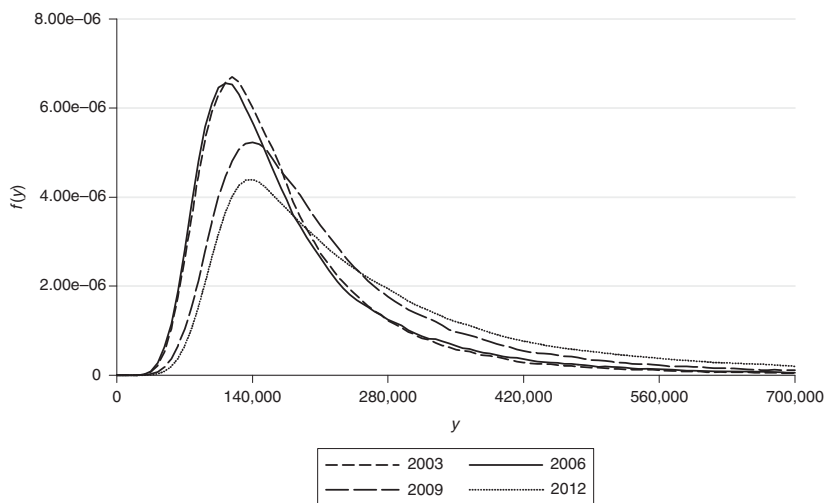


Figure 10.
Density curve of western expenditure (2002 = 100), 2003–2012

provinces their growth reached by 2.4, 2.2 and 1.2 percent, respectively. The fact that the degrees of inequality and polarization in the two province groups are quite similar can be traced by several factors. First, the average relative deviation components (T) in the two regions were relatively the same, which was about 0.46 in the NNRR provinces and 0.45 in the NRR provinces (see Figure 13(b)). This fact was shown by the gap between the expenditure shares of individuals; with 40 percent of lower income and 20 percent of higher income in these regions (see Figure 13(a)). Second, the density curves of expenditure for the two regions are also quite similar (see Figures 14 and 15). This indicates the distribution of expenditures in the two regions was not much different.

According to the results above, it can be concluded that the significant gaps of expenditure inequality and polarization between two regions in each of dimension were captured by the urban-rural area. This evidence corroborates the results of Hayashi *et al.* (2012) who found that a substantial portion of expenditure inequality was attributed to inequalities within urban and rural areas during the period of 2008–2010. Another insight

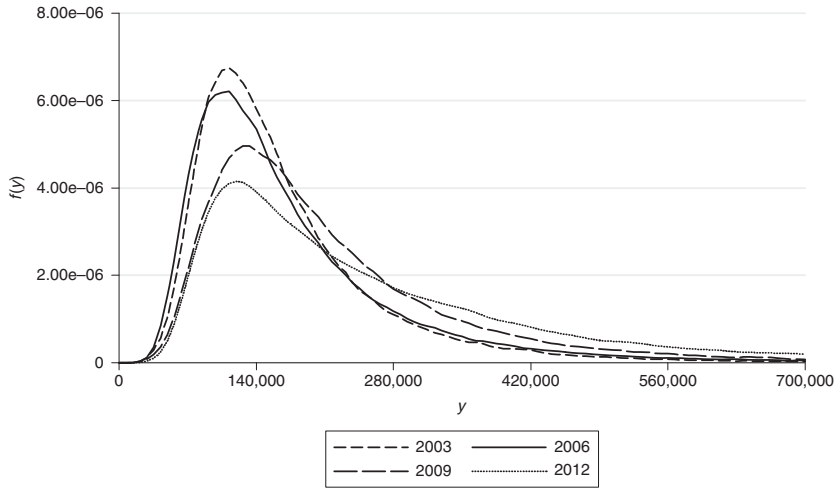


Figure 11.
Density curve of eastern expenditure (2002 = 100), 2003-2012

Source: SUSENAS Core (calculated)

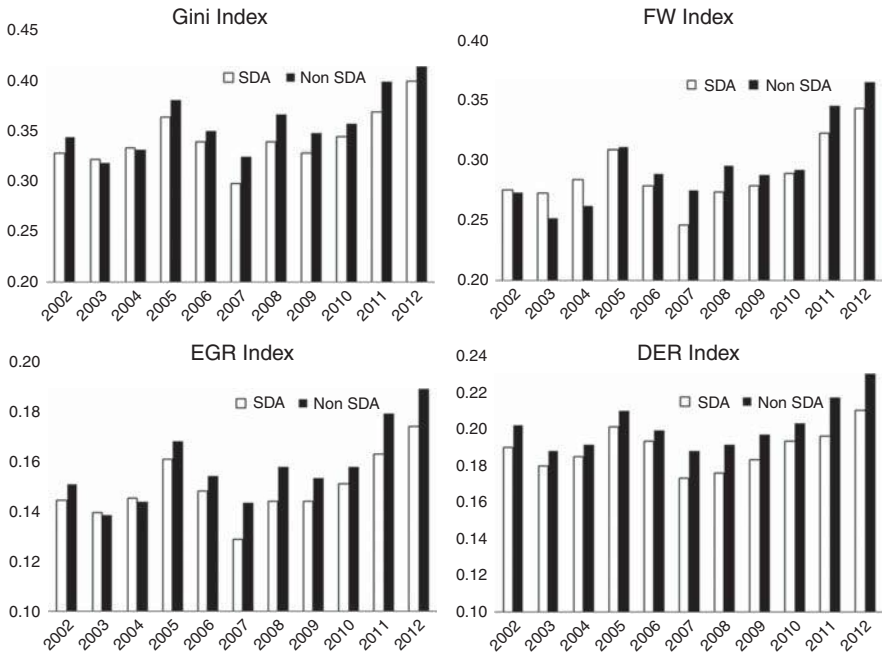
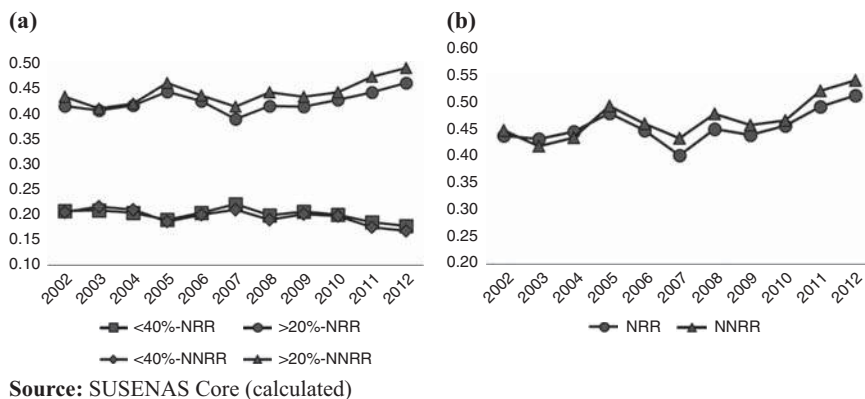


Figure 12.
NRR-NNRR inequality and polarization indices, 2002-2012

Source: SUSENAS Core (calculated)

could also be viewed through the rates of expenditure inequality and polarization over 2002-2012. It is obvious that the greatest rise of expenditure inequality and polarization was in the region with low initial levels of inequality and polarization. This evidence shows that the trends in each of the regional dimension experienced a convergent pattern.



Expenditure inequality and polarization

Figure 13.
(a) Expenditure shares and (b) relative deviation of NRR-NRR provinces, 2002–2012

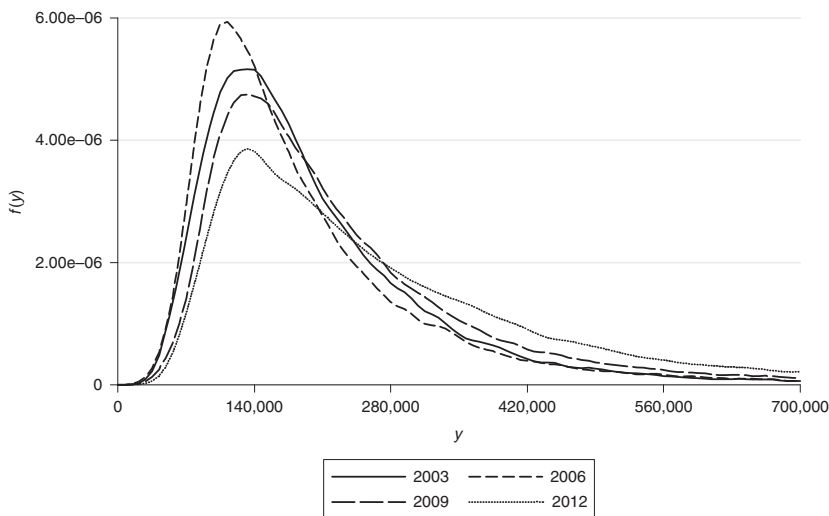


Figure 14.
Density curve of NRR provinces expenditure (2002 = 100), 2003–2012

Source: SUSENAS Core (calculated)

This finding is similar with Yusuf *et al.* who found that provinces (or regencies) with lower inequality experienced a faster inequality growth rate than the areas with higher inequality, or convergent.

Furthermore, the results of ZK index measurements throughout 2002–2012 with various regional dimensions are presented in Table III. According to Table III, the ZK index in the urban-rural groups was the highest among the other groups of regions. The ZK indexes based on the east-west dimension and the NRR-NRR provinces dimension turned out to be relatively small. It means that a significant portion of total polarization was attributed to expenditure differences between urban and rural areas rather than the other groups of regions. This evidence indicates that the driving force behind regional polarization in Indonesia was explained by the urban-rural dimension. The polarization in Indonesia was mainly due to the differences in expenditure levels between rural and urban dimension rather than in the other dimensions. This finding can be understood because in the context

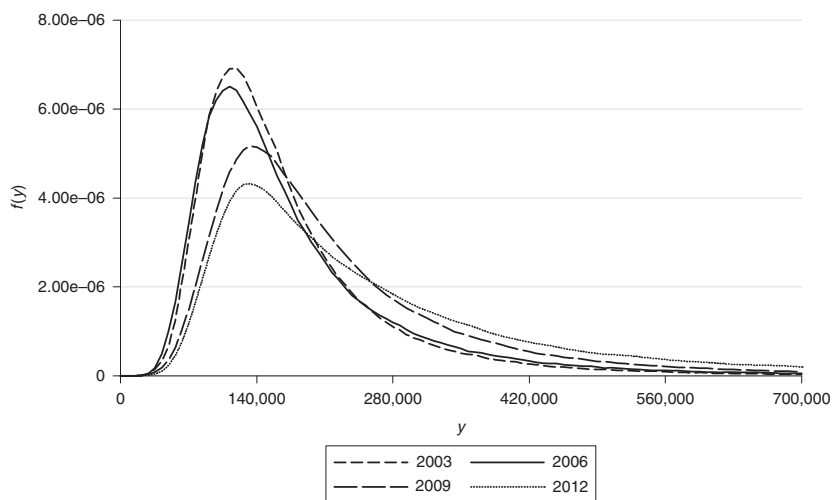


Figure 15.
Density curve of
NNRR provinces
expenditure
(2002 = 100),
2003–2012

Source: SUSENAS Core (calculated)

Year	Urban-Rural	East-West	NRR-NNRR
2002	0.2097	0.0039	0.0008
2003	0.1952	0.0033	0.0008
2004	0.2038	0.0035	0.0014
2005	0.2092	0.0051	0.0005
2006	0.2161	0.0031	0.0017
2007	0.2235	0.0033	0.0024
2008	0.1600	0.0018	0.0057
2009	0.1701	0.0006	0.0033
2010	0.1689	0.0004	0.0026
2011	0.1134	0.0001	0.0019
2012	0.1276	0.0001	0.0010

Source: SUSENAS Core (calculated)

Table III.
Zhang-Kanbur
polarization index by
dimension regions,
2002–2012

of Indonesia, as the economy was improving and stable during 2002–2012, the urban region that was better structurally adapted to these changes and benefited more. Moreover, urban areas with labor structure dominant in the manufacturing as well as in trade and services sectors tended to have a higher level of income than workers in rural areas who generally work in the agricultural sector.

5. Conclusion

Utilizing the consistent individual per capita expenditure, the study found that national expenditure inequality and polarization increased significantly during the post-reformation era (2002–2012). The upward trend in expenditure inequality and polarization seemed to have a similar pattern. This evidence indicates that not only the expenditure differences among individuals became unequal, but the degree to which individuals are grouped into different poles according to their expenditures also intensified. According to Foster and Wolfson (1992), the findings were in line with the BGT axiom, if there was a transfer from a lower group to the upper group that reduced the portion of the lower group's expenditure.

However, the existing reality above did not appear as described in the BGT axiom, or it is not a phenomenon in which the rich get richer and the poor get poorer. This study suggested that the increase of inequality and polarization has been accompanied by a rise in the median and the mean of expenditure of each group. This evidence indicates that the expenditure of all groups showed a positive growth on average during the period, including the lower group. In this case, the enhancement of inequality and polarization is mainly explained by the level of expenditure of the upper group that is growing faster than that of the lower group. The similar upward movements of expenditure inequality and polarization might conclude that not only the differences between groups of expenditure were getting larger, but also the identification of the within groups expenditure was getting stronger. This is a strong message to the policy makers that the development process in Indonesia during 2002–2012 encouraged the creation of social instability.

The analysis results from the regional dimensions' reveal that the post reformation-era saw a dramatic difference in the degree of inequality and polarization along urban-rural dimensions. The results of ZK polarization index also corroborate this finding. It shows that the degree of polarization of urban-rural areas was far greater than in the two other regional dimensions. It can be summarized that the polarization in Indonesia occurred in the urban-rural dimension rather than in the east-west and NRR-NNRR dimensions. Another interesting finding from the analysis of regional dimensions is that the rate of inequality and polarization in the region that has a lower inequality and polarization grew faster. This is shown by the ZK polarization index for all regional dimensions that declined throughout 2002–2012, which indicates the degree of expenditures difference between the groups in each regional dimension decreased over time. This evidence concludes that the trends of expenditure inequality and expenditure polarization between groups of regions have convergent patterns.

Notes

1. Some studies stated that inequality and polarization may cause social and economic instability, among others were Alesina and Tabellini (1989), Alesina and Drazen (1991), Turzi (2008), Alesina and Perotti (2013), Alesina and Rodrik (1994), Esteban and Ray (2011), Gasparini *et al.* (2008).
2. Among others were Hayashi *et al.* (2012) and Yusuf *et al.* (2014).
3. In the context of Indonesia, expenditure inequality can be used as a proxy for income inequality, given the unavailability of household income data. This approach was used by the Statistics of Indonesia (BPS) to measure the income inequality based on expenditure data of Susenas.
4. This delimitation is meant to get the four ER polarization axioms fulfilled (see Esteban and Ray, 1994).
5. The value of α and β require a value judgment from the user of the polarization indices, but the values must be lie between the limits defined by each polarization measure. In this paper, the value of α and β are set to 1.
6. Based on BPS data, the average economic growth in Indonesia reached 5.57 percent annually, whereas the per capita income increased from US\$992 in 2002, to US\$3.910 in 2012.

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