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Structural Changes and Regional Income Inequality in Indonesia: A Bi-dimensional Decomposition Analysis*

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Abstract

This paper analyzes the changes in determinants of inter-provincial income inequality in Indonesia from 1983 to 2004 associated with structural changes using the bi-dimensional decomposition method of a *population-weighted* coefficient of variation. The method unifies two inequality decompositions by regional groups and GRP components (industrial sectors) and thus enables us to assess the contributions of GRP components to within-region and between-region inequalities, as well as to overall inequality. As the share of mining has decreased, the spatial distribution of manufacturing has played a more important role in the inequality of Sumatra and Kalimantan, while the primacy of Jakarta, with strong urbanization economies, facilitated by globalization and trade and financial liberalization, has determined much of Java-Bali's inequality and, therefore, overall inequality in Indonesia.

Keywords: Structural Change, Regional Income Inequality, Indonesia, Bi-dimensional Decomposition, Weighted Coefficient of Variation

JEL classification: O18, R11, R12

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1. Introduction

Indonesia has undergone substantial structural changes in the last two decades. The GDP share of agriculture was 21% in 1983 at constant 2000 prices, but it declined to 16% in 2004 (Table 1). The mining sector also experienced a significant decrease in GDP, from 19% to 10%. Meanwhile, the manufacturing sector raised its GDP share conspicuously from 16% to 26%. Though not as significant as manufacturing, the tertiary sector also increased its share from 37% to 42% in the same period. Trade structure has undergone an even more radical change. Before the 1980s, the mining sector accounted for almost 70% of total exports, but its share declined substantially and in 2005, the share of non-mining exports amounted to more than 70%.

These structural changes were associated with the changes in the geographical distribution of economic activity. In 1983, the GDP share of the resource-rich region of Sumatra was 27%, while the Java-Bali region accounted for 58% of total GDP including the mining sector (Table 2). Sumatra's share has since then been reduced, dropping to 22% in 2004, due mainly to the declining role of oil and natural gas production. At the same time, the Java-Bali region increased its GDP share to 61%. There were also noticeable changes at the provincial level. For example, the province of West Java raised its GDP share by more than 3 percentage points between 1983 and 2004, whether the mining sector is included or not. The conflict-ridden province of Aceh, which also was affected by the 2004 Tsunami, conversely saw its GDP share reduced by more than 2 percentage points. These changes in the spatial distribution of economic activity and industrial structure should have had certain implications for intra- and inter-regional income inequalities.

The main purpose of this paper is to analyze the changes in determinants of inter-provincial income inequality from 1983 to 2004 in Indonesia associated with the structural changes described previously. This is done by decomposing inter-provincial inequality in per capita gross regional product (GRP) by regional groups and GRP components (i.e., industrial sectors) using a *population-weighted* coefficient of variation as a measure of regional inequality.

It is well known that the coefficient of variation, if it is squared, belongs to the generalized entropy class of inequality measures and is strongly Lorenz-consistent, satisfying four desirable properties as a measure of inequality including the principle of anonymity, income homogeneity, population homogeneity and the Pigue-Dalton

principle of transfers (Anand, 1983; Fields, 2001). Furthermore, overall income inequality, as measured by the squared coefficient of variation, is additively decomposable by both population subgroups and income components. In other words, overall inequality can be decomposed into a weighted sum of within-group inequalities and the between-group inequality (Shorrocks, 1980), and also expressed as the sum of the contributions associated with different income components (Shorrocks, 1982).

When we measure regional inequality, three types need to be distinguished (Kanbur and Venables, 2005; Milanovic, 2005). The first type of regional inequality refers to unweighted variation in per capita income across regions, while the second type concerns *population-weighted* variation. The first type compares regions in terms of their per capita income while ignoring their population size. This, therefore, is not a measure of inequality among individuals, so it is constructive to consider the second and third types of regional inequality. In his seminal article, Williamson (1965) introduced a *population-weighted* coefficient of variation. Williamson's *population-weighted* coefficient of variation is an example of the second type. The third type of regional inequality uses individuals as the unit of analysis and estimates the contribution of variation in per capita income across regions, or between urban and rural areas, to income variation across all individuals. It considers within-region interpersonal inequalities as well as between-region inequality.

This study employs the bi-dimensional decomposition method of regional inequality by regional groups and GRP components based on the *population-weighted* coefficient of variation. The bi-dimensional decomposition method unifies the two decomposition methods discussed above, thus enabling us to analyze the contributions of GRP components to within-region and between-region inequalities, as well as to overall regional inequality, in a coherent framework. The study measures inter-provincial inequality not only with the *population-weighted* coefficient of variation, but additionally with Theil indices, which also belong to the generalized entropy class, to confirm the robustness of the results. Theil indices are especially useful in an analysis of regional group decomposition.

There have been a number studies on regional disparities in Indonesia since the pioneering work of Esmara (1975), reflecting continued interest in how income or

welfare is distributed among sub-national units in a spatially diverse, archipelagic country with about 350 ethnic groups.[1] The first attempt in estimating regional income inequality was made by Esmara (1975) using provincial GRP and population data for 1968-72. This study was followed by Uppal and Budiono (1986), Akita (1988), Akita and Lukman (1995), Milanovic (2005) and Hill, Resosudarmo and Vidyattama (2008) using the updated sets of provincial GRP data for 1976-80, 1975-83, 1975-92, 1983-2001 and 1975-2004, respectively. They employed Williamson's *population-weighted* coefficient of variation or the *population-weighted* Gini coefficient to measure inter-provincial inequality in per capita GRP. Among these studies, Akita (1988) and Akita and Lukman (1995) conducted a decomposition analysis by industrial sectors (i.e., by GRP components) to examine the extent to which each industrial sector contributes to overall inter-provincial inequality.

Tadjoeddin, Suharyo and Mishra (2001) and Akita and Alisjahbana (2002) measured regional income inequality for 1993-98, but used district-level[2] GRP data rather than provincial GRP data. While Tadjoeddin, Suharyo and Mishra (2001) estimated overall regional inequality based on district-level per capita GRP using the Gini coefficient, Theil indices and the *population-weighted* coefficient of variation, Akita and Alisjahbana (2002) conducted a two-stage inequality decomposition analysis to investigate the contribution of between-region and between-province inequalities to overall regional inequality, as measured by the Theil indices based on district-level per capita GRP.

Our study differs from previous research in its focus and methodology. While it uses provincial GRP data by industrial sectors like Akita (1988) and Akita and Lukman (1995), it decomposes inter-provincial inequality by regional groups and GRP components simultaneously in a unified framework using the bi-dimensional decomposition method of the squared *population-weighted* coefficient of variation, where these studies decomposed inter-provincial inequality by GRP components only.

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[1] See, for example, Hughes and Islam (1981), Uppal and Budiono (1986), Akita (1988), Azis (1990), Hill (1992), Akita and Lukman (1995), Garcia and Soelistianingsih (1998), Akita and Lukman (1999), Skoufias (2001), Tadjoeddin, Suharyo and Mishra (2001), Akita and Alisjahbana (2002), Milanovic (2005), Resosudarmo and Vidyattama (2006), Sakamoto (2007), Akita and Miyata (2008), Hill (2008), Hill, Resosudarmo and Vidyattama (2008) and McCulloch and Sjahrir (2008).

[2] Kabupaten and Kota districts

Our study considers nine industrial sectors and employs a decomposition equation involving the weighted coefficient of covariation between total per capita GRP and per capita GRP from each industrial sector. Akita (1988) and Akita and Lukman (1995) considered three industrial sectors, i.e., primary, secondary, and tertiary sectors, and was based on a decomposition equation involving the weighted coefficient of variation for each industrial sector and the weighted coefficient of covariation between a pair of industrial sectors. We should note that sectoral GRP data are not available at the district-level; thus, one cannot perform a sectoral decomposition analysis with district-level GRP data.

Among the studies addressing the third type of spatial inequality mentioned previously, Akita and Lukman (1999) used household expenditure data for 1987, 1990 and 1993 from the National Socio-Economic Survey (*Susenas*) to estimate the contribution of inter-provincial inequality to overall household expenditure inequality. Tadjoeddin, Suharyo and Mishra (2001) performed a similar decomposition analysis using updated *Susenas* data. According to these studies, inter-provincial inequality accounted for around 15-20% of overall household expenditure inequality in the 1990s, showing that much of the inequality among households can be attributed to within-province inequalities. In connection to this, Akita and Lukman (1999) suggested the significance of urban-rural disparity in explaining within-province inequalities, whereas Akita and Miyata (2008) pointed out that a disparity in educational attainment among urban households is another important determinant of household expenditure inequality. Our study focuses on inter-provincial income inequality despite within-province inequalities accounting for a much larger proportion of income inequality among households, since reducing inter-regional inequality is one of the most important policy issues in Indonesia.

The paper is organized as follows. The method applied is described in the next section, while Section 3 estimates inter-provincial inequality from 1983-2004 using the two Theil indices and the *population-weighted* coefficient of variation. Section 4 presents the results of the bi-dimensional decomposition analysis. The final section gives a summary of the results and policy implications.

2. Method and the Data

2.1. Bi-dimensional Decomposition of the Squared Population-Weighted Coefficient of Variation

This sub-section will obtain the bi-dimensional decomposition of the squared *population-weighted* coefficient of variation by regional groups and GRP components (see Figure 1 for the framework of the bi-dimensional decomposition method).

Suppose there are *m* regions in an economy, where region *i* contains h_i provinces. Therefore, there are $\sum_{i=1}^{m} h_i$ provinces in the economy as a whole. Let

$\bar{y}_{ij}$, N_{ij}, $N_i = \sum_{j=1}^{h_i} N_{ij}$, $Y_i = \sum_{j=1}^{h_i} N_{ij}\bar{y}_{ij}$, $\bar{Y}_i = Y_i / N_i$, $N = \sum_{i=1}^{m}\sum_{j=1}^{h_i} N_{ij}$, $Y = \sum_{i=1}^{m}\sum_{j=1}^{h_i} N_{ij}\bar{y}_{ij}$

and $\bar{Y} = Y / N$ denote, respectively, the per capita GDP of province *j* in region *i*, the population of province *j* in region *i*, the total population of region *i*, the total GRP of region *i*, the per capita GRP of region *i*, the total population of all provinces, the total GRP of all provinces and the per capita GRP of all provinces. Overall inequality in per capita GRP among provinces can then be measured by the square of the *population-weighted* coefficient of variation (abbreviated as the squared WCV hereafter) as follows:

$$CV(\mathbf{Y})^2 = \frac{1}{\bar{Y}^2}\sum_{i=1}^{m}\sum_{j=1}^{h_i}\frac{N_{ij}}{N}(\bar{y}_{ij}-\bar{Y})^2 ,$$

where $\mathbf{Y} = (\mathbf{Y}_1, \mathbf{Y}_2, \ldots, \mathbf{Y}_m)$ and $\mathbf{Y}_i = (\bar{y}_{i1}, \bar{y}_{i2}, \ldots, \bar{y}_{ih_i})$.

Inequality in per capita GRP among provinces can also be measured by the following generalized entropy class of measures:

$$GE_\alpha(\mathbf{Y}) = \frac{1}{\alpha(\alpha-1)}\sum_{i=1}^{m}\sum_{j=1}^{h_i}\frac{N_{ij}}{N}\left[\left(\frac{\bar{y}_{ij}}{\bar{Y}}\right)^{\alpha}-1\right] \quad \text{where} \quad \alpha \neq 0, 1 . \qquad (1)$$

When $\alpha = 2$, we have

$$GE_2(\mathbf{Y}) = \frac{1}{2}\sum_{i=1}^{m}\sum_{j=1}^{h_i}\frac{N_{ij}}{N}\left[\left(\frac{\bar{y}_{ij}}{\bar{Y}}\right)^{2}-1\right] = \frac{1}{2\bar{Y}^2}\sum_{i=1}^{m}\sum_{j=1}^{h_i}\frac{N_{ij}}{N}(\bar{y}_{ij}-\bar{Y})^2 = \frac{1}{2}CV(\mathbf{Y})^2 .$$

Therefore, the squared WCV belongs to the generalized entropy class of measures

and can be additively decomposed as follows:

$$\mathrm{CV}(\mathbf{Y})^2 = \sum_{i=1}^{m}\left(\frac{N_i}{N}\right)\left(\frac{\overline{Y}_i}{\overline{\overline{Y}}}\right)^2 \mathrm{CV}(\mathbf{Y}_i)^2 + \mathrm{CV}(\overline{\mathbf{Y}})^2 = \mathrm{CV}_W + \mathrm{CV}_B, \qquad (2)$$

where $\mathrm{CV}(\mathbf{Y}_i)^2 = \frac{1}{\overline{Y}_i^2}\sum_{j=1}^{h_i}\frac{N_{ij}}{N_i}(\overline{y}_{ij} - \overline{Y}_i)^2$ is the within-region inequality of region *i* and $\overline{\mathbf{Y}} = (\overline{Y}_1, \overline{Y}_2, \ldots, \overline{Y}_m)$. $\mathrm{CV}_W = \sum_{i=1}^{m}\left(\frac{N_i}{N}\right)\left(\frac{\overline{Y}_i}{\overline{\overline{Y}}}\right)^2 \mathrm{CV}(\mathbf{Y}_i)^2$ is the within-region component, which is a weighted sum of within-region inequalities, while $\mathrm{CV}_B = \mathrm{CV}(\overline{\mathbf{Y}})^2 = \frac{1}{\overline{\overline{Y}}^2}\sum_{i=1}^{m}\frac{N_i}{N}(\overline{Y}_i - \overline{\overline{Y}})^2$ is the between-region component that measures inequality in per capita GRP among *m* regions. We should note that the within-region component is not a weighted average of within-region inequalities, because the weights do not sum to unity. Richer-than-average regions have weights greater than their GRP shares, while poorer-than-average regions have weights smaller than their GRP shares.

Suppose next that total provincial GRP consists of *K* GRP components (i.e., GRP from *K* industrial sectors) as follows:

$$\overline{y}_{ij} = \overline{y}_{ij1} + \overline{y}_{ij2} + \cdots + \overline{y}_{ijK} \quad \text{and} \quad \overline{Y}_i = \overline{Y}_{i1} + \overline{Y}_{i2} + \cdots + \overline{Y}_{iK},$$

where $\overline{Y}_{ik} = 1/N_i \sum_{j=1}^{h_i} N_{ij}\overline{y}_{ijk}$. Then, the within-region inequality of region *i*, as measured by the squared WCV, can be additively decomposed as follows:

$$\mathrm{CV}(\mathbf{Y}_i)^2 = \sum_{k=1}^{K} z_{ik}\mathrm{COV}(\mathbf{Y}_i, \mathbf{Y}_{ik}). \qquad (3)$$

In this equation, $\mathrm{COV}(\mathbf{Y}_i, \mathbf{Y}_{ik}) = \frac{1}{\overline{Y}_i\overline{Y}_{ik}}\sum_{j=1}^{h_i}\frac{N_{ij}}{N_i}(\overline{y}_{ij} - \overline{Y}_i)(\overline{y}_{ijk} - \overline{Y}_{ik})$ is the weighted coefficient of covariation between total GRP and GRP from component *k* in region *i* and $z_{ik} = \overline{Y}_{ik}/\overline{Y}_i$ is the GRP share of component *k* in region *i*, where $\mathbf{Y}_{ik} = (\overline{y}_{i1k}, \overline{y}_{i2k}, \ldots, \overline{y}_{ih_ik})$.

Similarly, the between-region inequality can be decomposed as follows:

$$\mathrm{CV}(\overline{\mathbf{Y}})^2 = \sum_{k=1}^{K} z_k \mathrm{COV}(\overline{\mathbf{Y}}, \overline{\mathbf{Y}}_k). \quad (4)$$

In this equation, $\mathrm{COV}(\overline{\mathbf{Y}}, \overline{\mathbf{Y}}_k) = \frac{1}{\overline{Y}\overline{Y}_{*k}} \sum_{i=1}^{m} \frac{N_i}{N} (\overline{Y}_i - \overline{Y})(\overline{Y}_{ik} - \overline{Y}_{*k})$ is the weighted coefficient of covariation between total GRP and GRP from component *k* in the nation and $z_k = \overline{Y}_{*k} \big/ \overline{Y}$ is the GRP share of component *k* in the nation, where $\overline{\mathbf{Y}}_k = (\overline{Y}_{1k}, \overline{Y}_{2k}, \ldots, \overline{Y}_{mk})$ and $\overline{Y}_{*k} = 1 \big/ N \sum_{i=1}^{m} N_i \overline{Y}_{ik}$.

Substituting equations (3) and (4) into (2), we have:

$$\mathrm{CV}(\mathbf{Y})^2 = \sum_{i=1}^{m} \left(\frac{N_i}{N} \right) \left(\frac{\overline{Y}_i}{\overline{Y}} \right)^2 \sum_{k=1}^{K} z_{ik} \mathrm{COV}(\mathbf{Y}_i, \mathbf{Y}_{ik}) + \sum_{k=1}^{K} z_k \mathrm{COV}(\overline{\mathbf{Y}}, \overline{\mathbf{Y}}_k) = \mathrm{CV}_W + \mathrm{CV}_B .$$

Dividing both sides of this equation by $\mathrm{CV}(\mathbf{Y})^2$, we obtain:

$$1 = \sum_{i=1}^{m} \left(\frac{N_i}{N} \right) \left(\frac{\overline{Y}_i}{\overline{Y}} \right)^2 \sum_{k=1}^{K} z_{ik} s_{ik} + \sum_{k=1}^{K} z_k \bar{s}_k , \quad (5)$$

where $s_{ik} = \frac{\mathrm{COV}(\mathbf{Y}_i, \mathbf{Y}_{ik})}{\mathrm{CV}(\mathbf{Y})^2}$ and $\bar{s}_k = \frac{\mathrm{COV}(\overline{\mathbf{Y}}, \overline{\mathbf{Y}}_k)}{\mathrm{CV}(\mathbf{Y})^2}$.

In equation (5), $\left(\frac{N_i}{N} \right) \left(\frac{\overline{Y}_i}{\overline{Y}} \right)^2 z_{ik} s_{ik}$ is the contribution of the within-region inequality of GRP component *k* in region *i* to overall inequality, while $z_k \bar{s}_k$ is the contribution of the between-region inequality of GRP component *k* to overall inequality. Therefore, there are *mK* + *K* components altogether.

For the within-region inequality of region *i*, we define $v_{ik} = \frac{\mathrm{COV}(\mathbf{Y}_i, \mathbf{Y}_{ik})}{\mathrm{CV}(\mathbf{Y}_i)^2}$, while for the between-region inequality, we define $\bar{v}_k = \frac{\mathrm{COV}(\overline{\mathbf{Y}}, \overline{\mathbf{Y}}_k)}{\mathrm{CV}(\overline{\mathbf{Y}})^2}$. v_{ik} and $\bar{v}_k$ are called the relative concentration coefficient of component *k* for the within-region inequality of region *i* and the relative concentration coefficient of component *k* for the between-region inequality, respectively. If $v_{ik} > 1$, then component *k* is an inequality-increasing component in region *i*, while if $v_{ik} < 1$, then component *k* is an inequality-decreasing component in region *i*. Similarly, if $\bar{v}_k > 1$,

then component *k* is an inequality-increasing component for the between-region inequality, while if $\bar{v}_k < 1$, then component *k* is an inequality-decreasing component for the between-region inequality. We should note that between s_{ik} and v_{ik} we have the relationship $s_{ik} = \frac{CV(\mathbf{Y}_i)^2}{CV(\mathbf{Y})^2} v_{ik}$. Similarly, between $\bar{s}_k$ and $\bar{v}_k$, we have $\bar{s}_k = \frac{CV(\overline{\mathbf{Y}})^2}{CV(\mathbf{Y})^2} \bar{v}_k$.

Equation (1) presents the generalized entropy class of measures when $\alpha \neq 0,1$. However, when $\alpha = 0 \text{ and } 1$, the measure is expressed, respectively, as:

$$GE_0(\mathbf{Y}) = L = \sum_{i=1}^{m}\sum_{j=1}^{h_i} \frac{N_{ij}}{N} \ln\left(\frac{\overline{Y}}{\overline{y}_{ij}}\right) \quad \text{and} \quad GE_1(\mathbf{Y}) = T = \sum_{i=1}^{m}\sum_{j=1}^{h_i} \frac{N_{ij}}{N}\frac{\overline{y}_{ij}}{\overline{Y}} \ln\left(\frac{\overline{y}_{ij}}{\overline{Y}}\right).$$

$GE_0(\mathbf{Y})$ is usually termed the Theil index L (Theil's second measure or the mean logarithmic deviation), while $GE_1(\mathbf{Y})$ is the Theil index T (Theil's first measure). These two measures are additively decomposable by population sub-groups as follows, though they are not additively decomposable by GRP components.

$$L = \sum_{i=1}^{m} \frac{N_i}{N} L_i + \sum_{i=1}^{m} \frac{N_i}{N} \ln\left(\frac{\overline{Y}}{\overline{Y}_i}\right) = L_W + L_B \quad \text{and} \tag{6}$$

$$T = \sum_{i=1}^{m} \frac{N_i}{N}\frac{\overline{Y}_i}{\overline{Y}} T_i + \sum_{i=1}^{m} \frac{N_i}{N}\frac{\overline{Y}_i}{\overline{Y}} \ln\left(\frac{\overline{Y}_i}{\overline{Y}}\right) = T_W + T_B, \tag{7}$$

where $L_i \text{ and } T_i$ are the within-region inequalities of region *i* as measured by the Theil indices L and T, respectively.

This study uses these two Theil indices in addition to the *population-weighted* coefficient of variation to measure inter-provincial inequality in per capita GRP and conduct a decomposition analysis by regional groups.

2.2. The Data

This study measures regional inequality in Indonesia from 1983 to 2004 using provincial GRP data from *The Gross Regional Domestic Product of Provinces in Indonesia by Industrial Origin* (Central Bureau of Statistics, various issues). Nominal provincial GRP data are converted to real GRP data at constant 2000 prices to examine real changes. To conduct a decomposition analysis by regional groups,

we divide Indonesia, which consists of 26 provinces, into three regions.[3] Region 1 includes the Sumatra and Kalimantan provinces, Region 2 the Java and Bali provinces and Region 3 the Sulawesi and eastern provinces. Region 1 is rich in natural resources (e.g., crude oil and natural gas); it accounts for more than 70% of national GDP generated by the mining sector. Manufacturing activities are concentrated in Region 2, which claims more than 65% of national GDP from manufacturing. Region 3 is agriculture-based, where 30% of its total GRP is generated by the agricultural sector, much larger than agriculture's share in Indonesia as a whole at 15%.

The provincial GRP data set provides information for nine industrial sectors: agriculture (sector 1), mining (sector 2), manufacturing (sector 3), electricity/gas/water (sector 4), construction (sector 5), trade/hotel/restaurant (sector 6), transportation/communication (sector 7), financial and business services (sector 8) and other services (sector 9). This study uses these nine sectors in the decomposition of inequalities by GRP components. The secondary sector includes sectors 3 through 5, while the tertiary sector includes sectors 6 through 9. As in the previous studies, inter-provincial inequality is measured based on GRP including and excluding the mining sector. The latter GRP figure is frequently used in Indonesia due to the presence of extractive activities that have much less effect on provincial economic welfare, because a large proportion of the returns to extractive activities belong to the central government and foreign and domestic owned mining companies (Hill, 2008), especially before 2001, when the central government started to decentralize economic resources and power.

3. Inter-provincial Inequality

Figure 2 presents inter-provincial inequality in per capita GRP including and excluding the mining sector from 1983 to 2004, as measured by the Theil L and T indices and the *population-weighted* coefficient of variation (WCV). When the mining sector is included, inter-provincial inequality exhibits a declining trend over

[3] Since two decentralization laws were passed in 1999 (Law 22 on Regional Administration and Law 25 on the Fiscal Balance between the Central and the Regional Governments), the number of provinces has increased from 26 (excluding East Timor) to 33. In our study, however, 33 provinces have been consolidated back to 26 provinces for longer-term comparability.

the period. This coincides with the results obtained by Akita and Lukman (1995) and Hill, Resosudarmo and Vidyattama (2008). The ratio of the highest to lowest per capita GRP including mining (East Kalimantan versus East Nusa Tenggara) was 21 in 1983, but decreased to 14 in 2004.

Four distinct sub-periods can be discerned with respect to the trend of inter-provincial inequality in per capita GRP including mining. The first sub-period is between 1983 and 1989, in which inter-provincial inequality fell sharply from 1.16 to 0.86 according to the squared WCV (from 0.26 to 0.21 by the Theil L index). The ratio of highest to lowest per capita GRP fell from 21 to 18. The period 1989-1997 is the second sub-period, where inter-provincial inequality became stable at around 0.85 by the squared WCV. The third sub-period is the financial crisis period between 1997 and 1999, in which inter-provincial inequality fell conspicuously, although the ratio of highest to lowest per capita GRP (East Kalimantan versus East Nusa Tenggara) remained constant at around 16. Finally, the fourth sub-period is from 1999 to 2004, where inter-provincial inequality became stable again at around 0.75 by the squared WCV.

When mining is excluded, the levels of overall inter-provincial inequality are reduced substantially, and a slightly different trend is observed over the period. Overall inequality increased notably from 1983 to 1984, though this is due mainly to the rapid development of manufacturing activities in East Kalimantan. The second sub-period from 1989 to 1997 also recorded an increase in inter-provincial inequality, where the squared WCV rose from 0.71 to 0.80. This contrasts with cases where mining is included. The ratio of highest to lowest per capita GRP excluding mining (Jakarta versus East Nusa Tenggara) rose from 14.1 to 15.6 in this sub-period.

Interestingly, the difference between the values of overall inter-provincial inequality calculated based on GRP including and excluding mining got smaller; in 1983, it was 0.37 by the squared WCV, but declined to 0.03 in 2004 (0.09 and 0.02 by the Theil L index, respectively). This indicates the declining role of the spatial distribution of mining activities in inter-provincial inequality, as the GDP share of mining fell over the study period (Table 1).

4. Decomposition of Inter-provincial Inequality

4.1. Decomposition by Regional Groups

What are the determinants of inter-provincial inequality? To answer this question, this study first decomposes inter-provincial inequality into the within-region and between-region inequality components. Tables 3 and 4 present the results of the decomposition analysis including and excluding the mining sector, respectively. Whether measured by the Theil indices or the squared WCV, much of inter-provincial inequality is accounted for by the within-region inequality component. As the results do not qualitatively differ much whether the Theil indices or the squared WCV is used, we hereafter explain the results based on the squared WCV only.

When mining is included, both within-region and between-region inequality components declined significantly over the period, with the former declining from 1.07 to 0.71 and the latter from 0.09 to 0.03. Among the three regions, Region 1 experienced markedly reduced within-region inequality, from 1.16 to 0.58 (see Figure 3). This apparently contributed to a significant decrease in the within-region component and, consequently, overall inter-provincial inequality. Especially in the first sub-period from 1983 to 1989, Region 1's within-region inequality fell from 1.16 to 0.81. This sharp decrease is attributable to two natural resource rich provinces of East Kalimantan and Riau, the richest and second richest provinces in Region 1, respectively. In this sub-period, they experienced a zero or negative growth in per capita GRP including mining, while all the other provinces in Region 1 registered positive growth rates (Table 5). This again shows the declining role of the mining sector in inter-provincial inequality.

If we look at the contribution of each component, the within-region contribution increased gradually from 92% to 96% in the period, while the between-region contribution decreased. Region 2's contribution rose from 38% to 66%, while Region 1's declined from 53% to 29%. Compared to Regions 1 and 2, Region 3 had much smaller within-region inequality, reflecting the relatively high share of agricultural activities that are distributed evenly across provinces relative to population distribution. Therefore, Region 3 had a negligible contribution to overall inequality.

When mining is excluded, both within- and between-region inequality components did not change much over the period. As measured by the squared WCV, the within-region component decreased slightly from 0.76 to 0.68, while the between-region component remained constant at around 0.04 (Figure 3). As compared to the case where the mining sector is included, the value of Region 1's inequality is reduced substantially and its contribution to overall inequality was much smaller, at around 10-15%. Since Region 2 does not depend much on mining activities, its within-region inequality excluding and including mining was almost the same. Region 2's within-region inequality accounted for around 80-85% of overall inter-provincial inequality; thus, the trend of overall inequality coincides with that of Region 2 (Figure 3).

Interestingly, Region 2 raised its within-region inequality conspicuously in the second sub-period, whether mining is included or not. This apparently caused an increase in the within-region component and, therefore, in overall inequality in per capita non-mining GRP. The main factor seems to have been the relatively rapid development of non-mining activities in Jakarta, the richest province in Region 2 and second richest in Indonesia, following the introduction of a series of trade and financial liberalization measures to stimulate export-oriented manufacturing sectors in the mid to late 1980s (e.g., several deregulation packages and the 1986 devaluation).

In the financial crisis period, however, the trend reversed as Region 2's inequality declined sharply, resulting in a fall in the within-region component and overall inequality. Almost all provinces registered negative growth rates in per capita GRP including and excluding mining (Table 5). One of the main factors that caused the large decrease in Region 2's inequality seems to have been the much poorer performance of Jakarta. Jakarta's economy depends heavily on the construction and financial sectors, which were hit hardest by the crisis. This brought about a large negative growth rate in per capita GRP in Jakarta, at -9.5%, compared to around -6.0% for Indonesia as a whole (Table 5).

If we merge Jakarta and West Java in Region 2 and treat them as one province, having 25 provinces rather than 26, the value of overall inequality is reduced markedly. As measured by the squared WCV in non-mining GDP, inequality drops to

around 0.18-0.22 from above 0.7. Furthermore, in the second and third sub-periods, inequality did not change much over time. These observations suggest that when mining is excluded, the disparity between Jakarta and West Java was responsible for more than half of overall inequality among 26 provinces, and that the trends of overall inequality among 26 provinces in the second and third periods (i.e., increasing and decreasing trends, respectively) were determined mainly by the disparity between Jakarta and West Java.

4.2. Bi-dimensional Decomposition by Regional Groups and GDP Components

As described in Section 2, the squared WCV is decomposable not only by regional groups, but also GRP components. This enables us to analyze the contribution of each GRP component to within-region and between-region inequalities, and to overall regional inequality, in a coherent framework. Tables 6 and 7 present the results of the bi-dimensional decomposition analysis including and excluding the mining sector, respectively. When the mining sector is included, it is apparent that the decrease in the contribution of Region 1's within-region inequality was associated with a decrease in the contribution of the mining sector. Mining had the largest contribution at 47% in 1983, but this shrank substantially to 16% in 2004. On the other hand, the increase in the contribution of Region 2's within-region inequality was associated with an increase in the contribution of the manufacturing, trade and financial sectors.

Before the financial crisis, Region 2's contribution rose significantly from 38% to 64%, due to the rising contributions of the manufacturing, construction, trade, and financial sectors. During the financial crisis from 1997 to 1999, Region 2's contribution fell by 9 percentage points, while Region 1's contribution rose by 8 percentage points. The construction and financial sectors were mainly responsible for the decline in Region 2's contribution over this period.

In 2004, the financial sector had the largest contribution at 25%, but Region 2 claimed most of this contribution. Manufacturing had the second largest contribution, at 22% in 2004, but unlike the financial sector, Regions 1 and 2 shared its contribution. The mining and trade sectors had almost the same contribution at 16%, but while Region 1 explained most of mining's contribution, most of trade's

contribution was found in Region 2. In 2004, about a half of Region 1's within-region inequality was accounted for by inter-provincial inequality in per capita mining GRP. Inequality due to the tertiary sector, especially the financial and trade sectors, explained 77% of Region 2's within-region inequality. The rest of Region 2's within-region inequality was due to manufacturing and construction.

By excluding mining, inter-temporal changes were not as prominent. More than 80% of overall inequality was accounted for by Region 2's within-region inequality over the period. In Region 2, the financial sector had the largest contribution at around 30%, which was followed by trade and manufacturing. In the financial crisis period, Region 2's contribution fell by 5 percentage points, but the construction sector was mostly responsible for this decline. In 2004, about three quarters of Region 1's within-region inequality was accounted for by inequality in per capita manufacturing GRP, while about three quarters of Region 2's inequality was due to the tertiary sector.

If Jakarta and West Java are again merged into one province, then the contribution of Region 2's within-region inequality is reduced substantially, from more than 80% to 40% when mining is excluded. This indicates the significance of the disparity between Jakarta and West Java in Region 2's inequality and thus overall inequality. Conversely, Region 1's inequality and the between-region inequality contributions increased. When mining is excluded, the manufacturing sector accounted for more than 50% of overall inequality after the financial crisis, of which Region 1 was responsible for about 30 percentage points.

Now, which sectors serve as inequality-increasing or decreasing sectors in each region and between regions? Table 8 presents the relative concentration coefficient of each industrial sector for within-region inequalities and the between-region inequality. As discussed in Section 2, if a sector has a relative concentration coefficient greater (smaller) than one, then the sector is inequality-increasing (inequality-decreasing). Since the pattern does not change much over time, we present only the results in 2004. Table 8 also includes the relative concentration coefficients for Region 2's within-region inequality when Jakarta and West Java are merged into one province. The relative concentration coefficients exceeding 1.5 are highlighted to show which sectors are inequality-increasing.

As expected, when mining is included, the mining sector is an inequality-increasing sector in Region 1, reflecting the uneven spatial distribution of mineral resources relative to population (e.g., Aceh, Riau, South Sumatra and East Kalimantan). Manufacturing also serves as an inequality-increasing sector in Region 1. When mining is excluded, only manufacturing is inequality-increasing in Region 1. This indicates that as the share of mining declines, the spatial distribution of manufacturing activities plays a more important role in determining Region 1's within-region inequality.

In Region 2, the construction and financial sectors are inequality-increasing, regardless of the mining sector. However, if Jakarta and West Java are merged, the relative concentration coefficients of these sectors are reduced significantly, though the values are still greater than one. This indicates that the construction and financial sectors are mainly responsible for enlarging the disparity between Jakarta and West Java, and thus between Jakarta and the other Java-Bali provinces. In Region 3, mining is the only inequality-increasing sector, but when mining is excluded, the manufacturing and electricity/gas/water sectors become inequality-increasing.

A balanced spatial distribution relative to population is reflected in the agricultural sector, which is inequality-decreasing regardless of mining. The electricity/gas/water sector is also inequality-decreasing in within- and between-region inequalities, though only when mining is included. However, when mining is excluded, this sector becomes inequality-increasing in Region 3 inequality and the between-region inequality.

5. Conclusions

This paper has attempted to analyze the changes in determinants of inter-provincial income inequality in Indonesia based on the bi-dimensional decomposition method of a *population-weighted* coefficient of variation. The method unifies two inequality decompositions, by regional groups and GRP components, and thus enables us to assess the contributions of GRP components to within-region and between-region inequalities, as well as to overall inter-provincial inequality, in a coherent framework.

One of the major findings presented here is that with mining included, overall

inequality exhibited a declining trend. When mining is excluded, the levels of overall inequality were reduced substantially, but the difference between inequality values based on GRP including and excluding mining shrank over the study period, reflecting the declining share of the mining sector. There appears to have been significant absolute β convergence in per capita GRP among the 26 provinces over the study period when mining is included, but not with mining excluded. As pointed out by Hill, Resosudarmo and Vidyattama (2008), however, if we are confined to the period after the financial crisis, there was no evidence of absolute β convergence. Absolute β convergence before the financial crisis was apparently owing to the poorer performance of the resource-rich provinces of Aceh, Riau and East Kalimantana, which were among the top five provinces in per capita GRP including mining.

Each region exhibited a distinct trend with respect to its within-region inequality. When mining is included, Region 1 (Sumatra and Kalimanatan provinces) reduced its inequality markedly, especially before the financial crisis, due in large part to the declining share of mining. Conversely, Region 2 (Java and Bali provinces) raised its inequality in the second sub-period 1989-1997, regardless of mining, owing to relatively rapid development of non-mining activities in Jakarta following the introduction of a series of liberalization measures. However, in the financial crisis period, the trend reversed and Region 2's inequality declined sharply due to the much poorer performance of Jakarta. Jakarta's economy depends heavily on the construction and financial sectors, which were hit hardest by the crisis. This brought about a large, negative growth rate in per capita GRP in Jakarta. In the final sub-period from 1999, Region 2 again exhibited a rising trend, and in 2004, it had a much larger within-region inequality than Region 1, even if mining is included. With mining excluded, the disparity between Jakarta and West Java was responsible for more than half of overall inequality, and the inequality trends in the second and third periods were determined in large part by this disparity. Compared to Regions 1 and 2, Region 3 had a much smaller level of within-region inequality, reflecting the relatively high share of agricultural activities, which are distributed evenly across provinces relative to population distribution.

With mining included, the contribution of the within-region inequality

component increased gradually from 92% to 96%. However, if we look at each region's contribution, Region 1's contribution fell from 53% to 29%, while Region 2's increased from 38% to 66%. The decrease in Region 1's contribution was associated with a decrease in the contribution of mining, while the increase in Region 2's contribution was associated with a rise in the contribution of the manufacturing, trade and financial sectors. Prior to the financial crisis, the contribution of Region 2 grew significantly, owing to the rising contribution of the construction sector in addition to the manufacturing, trade and financial sectors. In the crisis period, however, Region 2's contribution fell by 9 percentage points, while Region 1's contribution rose by 8 percentage points. The construction and financial sectors were mainly responsible for the decrease in Region 2's contribution during this period. When mining is excluded, Region 2's within-region inequality dominated, accounting for more than 80% of overall inequality. The financial sector had the largest contribution, which was followed by trade and manufacturing. In 2004, about three quarters of Region 2's within-region inequality was attributed to the tertiary sector, while about three quarters of Region 1's inequality was accounted for by the manufacturing sector.

These observations suggest three major factors of inter-provincial inequality in Indonesia. The first is the uneven distribution of immobile natural resources across provinces. This was particularly prominent in Region 1, which includes the three resource-rich provinces of Aceh, Riau and East Kalimantan. Before the 1980s, natural resources had played a dominant role in Region 1's inequality as well as overall inequality. However, as the share of the mining sector has decreased, it has become less important affecting inequality.

The second factor is the primacy of Jakarta as the center of economic activities. With strong urbanization economies, facilitated by globalization and economic liberalization, Jakarta grew rapidly before the financial crisis, bringing about a rise in Region 2's within-region inequality. The financial crisis reversed this trend, however. Jakarta contracted markedly, and Region 2's inequality plunged. This rising and falling inequality was associated with the increasing and decreasing contributions of the construction, trade and financial sectors, which are concentrated in Jakarta. When Jakarta and West Java are hypothetically merged into one province, the extent of

Region 2's within-region inequality and its contribution to overall inequality declined substantially. This signifies the prominence of the disparity between Jakarta and West Java and, therefore, inequality between Jakarta and the other Java-Bali provinces in Region 2 where the construction, trade and financial sectors played an important role. The reduction of the disparity between Jakarta and the other Java-Bali provinces is essential to decreasing Region 2's inequality and overall inequality. However, this will not be easy to accomplish as the construction, trade and financial sectors enjoy agglomeration economies that Jakarta has nurtured under globalization and economic liberalization. Fiscal decentralization, which began in 2001, would be one way to mitigate the disparity, but its purported effects are uncertain. Another option would be the relocation of some manufacturing sectors to smaller urban areas outside Jakarta, where they could exploit localization economies. However, government policies should be designed not to interfere with private incentives, but to provide an environment that is conducive to such relocation.

The third factor is the spatial distribution of resource-oriented manufacturing industries (e.g., wood processing, plantation-based and mineral resource-based industries). These industries have high transportation costs for raw inputs relative to outputs and accordingly tend to be located where raw inputs are available. This results in an uneven spatial distribution relative to population distribution. At fairly early stages of economic development, Regions 1 and 3 are still dominated by resource-oriented manufacturing industries. In these regions, when mining is excluded, the manufacturing sector had a high relative concentration coefficient, meaning the sector was inequality-increasing. Therefore, as the share of mining decreases, the spatial distribution of the manufacturing sector will play a more important role in their within-region inequalities. To mitigate the inequalities, efforts should be made to decentralize non-resource-oriented manufacturing activities in off-Java provinces in accordance with regional differences in comparative advantage and by exploiting localization economies, where the improvement of transportation infrastructure would be essential.

Our study has several limitations. First, while the bi-dimensional decomposition method is found to be quite useful in identifying the determinants of inter-provincial inequality in a two dimensional framework, it is a descriptive and static method that

analyzes some aspects of regional income distribution at each point in time. In order to have a better understanding of the dynamics of regional inequality, it needs to be supplemented by exploratory approaches for regional income distribution such as kernel density estimation, Markov chain modeling, conditional and absolute β convergence analysis, spatial dependence analysis and so on (Rey and Janikas, 2005).

Second, since we did not employ a decomposition equation involving the weighted coefficient of covariation between a pair of industrial sectors, we were not able to examine how the regional income distributions of two industrial sectors are related. According to Akita and Lukman (1995), there was a significant positive relationship between the regional income distributions of the secondary and tertiary sectors, signifying that provinces with higher per capita GRP in the secondary sector also tend to have higher per capita GRP in the tertiary sector. Third, the sum of the weights used in the within-region inequality component of the squared WCV is greater than or equal to unity; thus, the contribution of the within-region inequality component to overall inequality is overestimated. Since a richer-than-average region has its weight greater than its GRP share, the contribution of its within-region inequality is also overestimated compared to the Theil indices.

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Figure 1. Framework of Bi-dimensional Decomposition of Inter-provincial Income Inequality

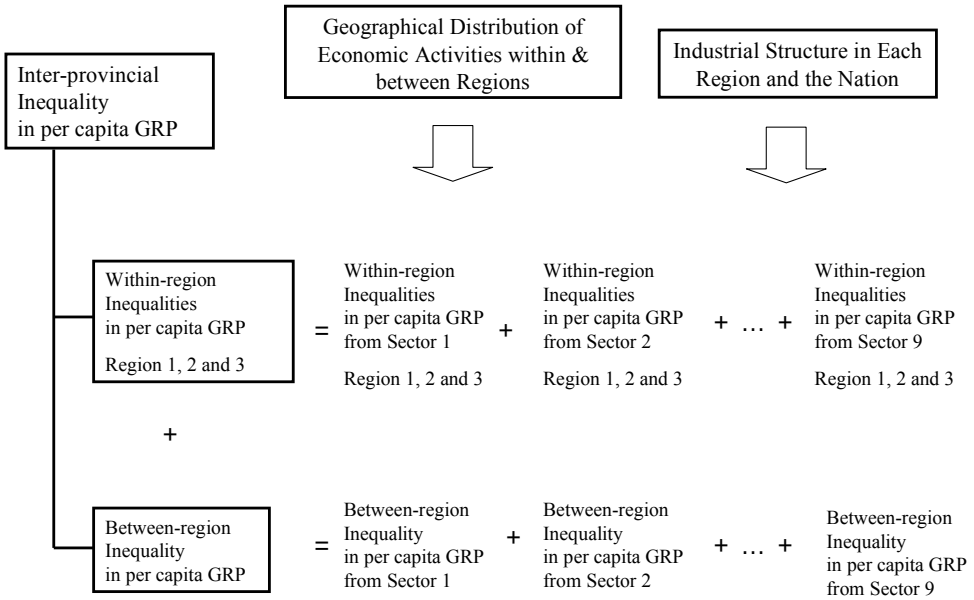
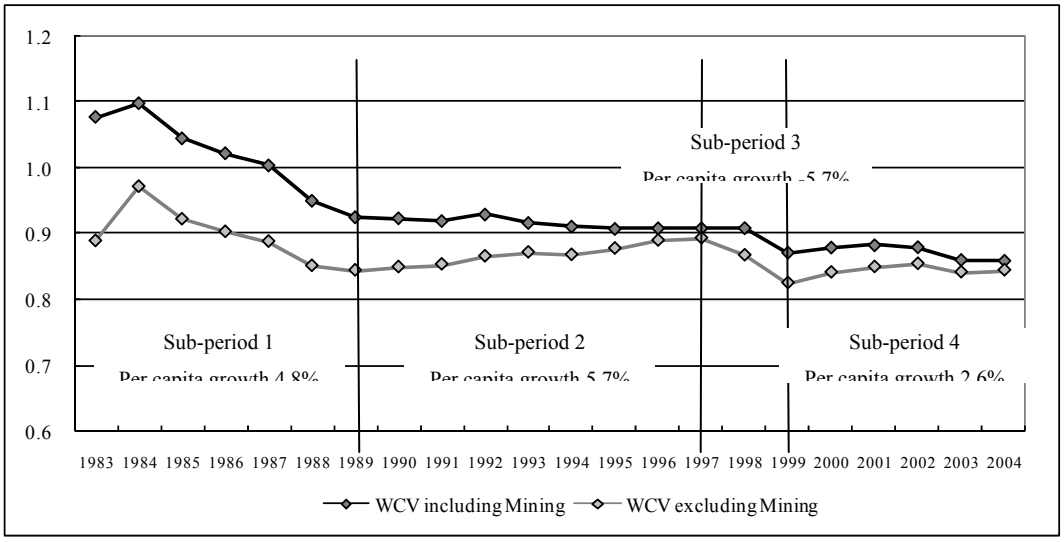


Figure 2. Overall Inter-provincial Inequality

Population-weighted Coefficient of Variation



Theil Indices

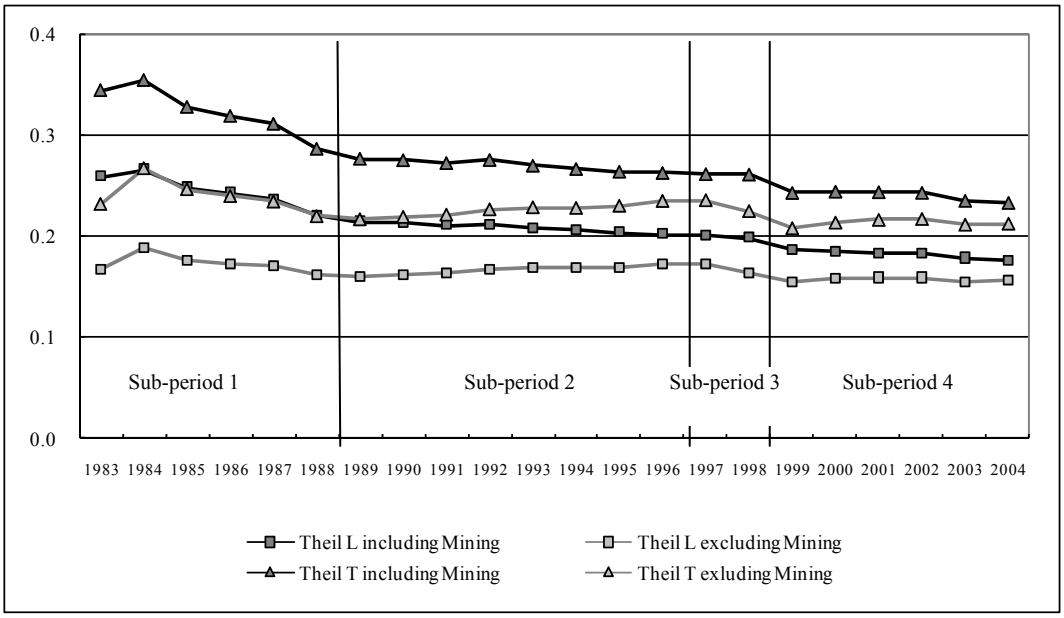
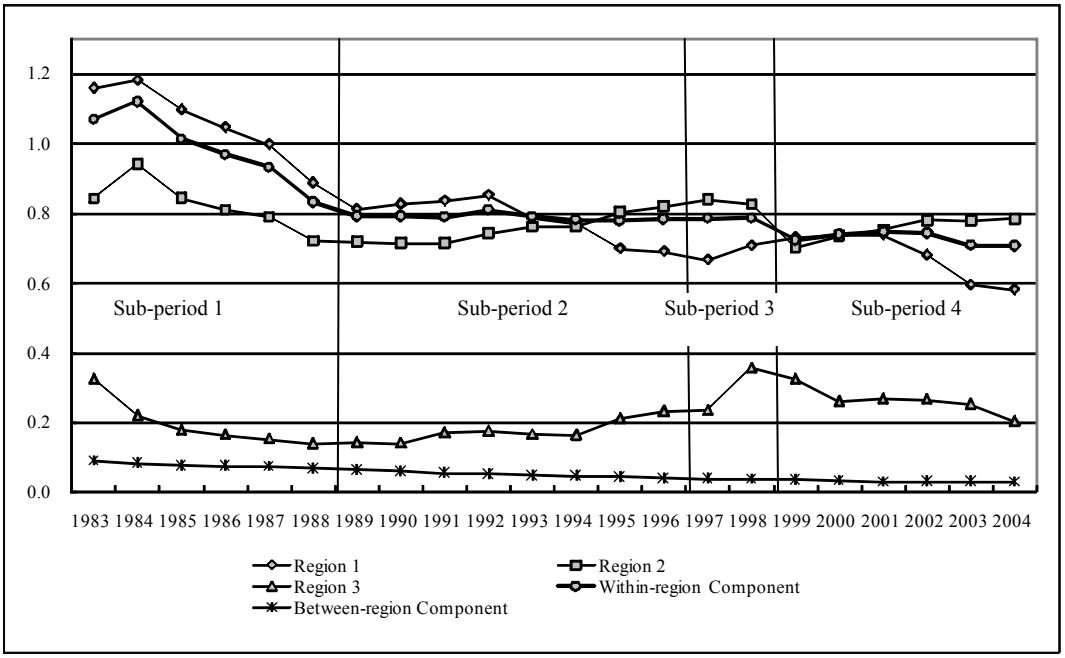


Figure 3. Within-region and Between-region Inequalities Squared Population-weighted Coefficient of Variation

Including Mining



Excluding Mining

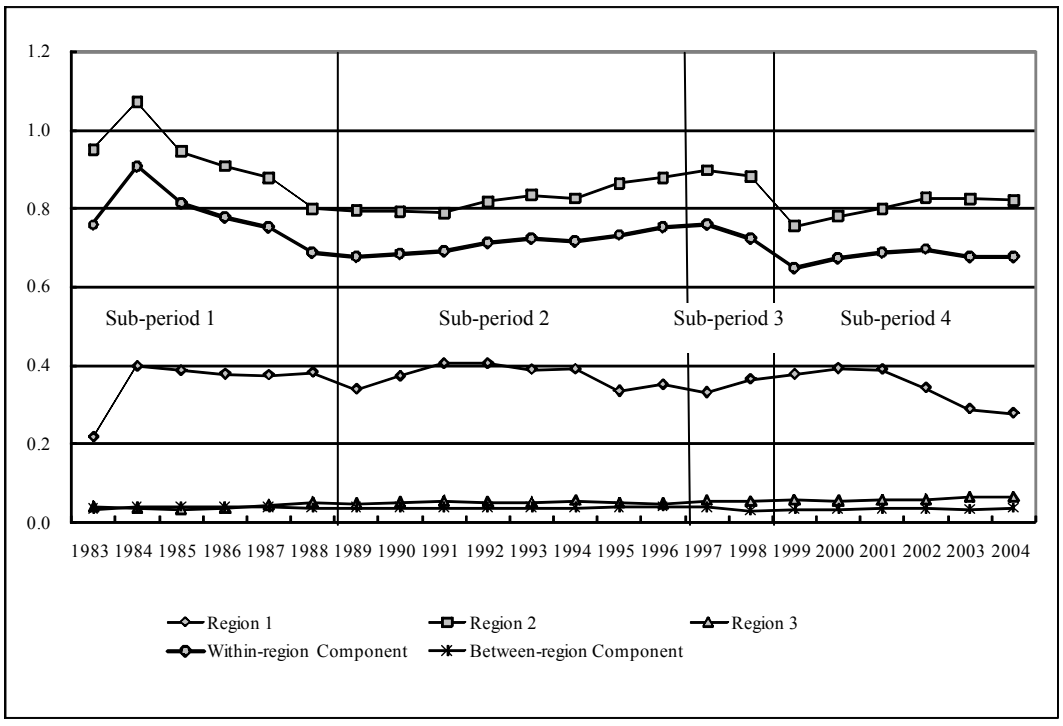


Table 1. Change in Industrial Structure in Indonesia
GDP including Mining

(in %)

			Secondary Sector				Tertiary Sector				
	1	2	3	4	5	Subtotal	6	7	8	9	Subtotal
1983	20.9	19.4	16.1	0.4	6.0	22.5	15.7	4.3	7.5	9.7	37.3
1990	18.6	14.6	21.8	0.5	5.8	28.2	16.4	4.3	9.4	8.6	38.6
1995	16.3	11.8	25.1	0.7	7.1	32.9	17.6	4.5	9.3	7.5	39.0
2000	16.6	11.7	26.4	1.0	5.1	32.5	17.5	5.1	8.3	8.3	39.2
2004	15.8	10.2	25.8	1.1	5.2	32.1	18.4	6.0	8.5	8.9	41.8

(Note) 1. agriculture, 2. mining, 3. manufacturing, 4. electricity/gas/water, 5. construction, 6. trade/hotel/restaurant, 7. transportation/communication, 8. financial and business services, and 9. other services

Table 2. GDP Share by Province and Region

(in %)

	GDP including mining		GDP excluding mining	
Province	1983	2004	1983	2004
Sumatra	26.9	22.1	18.9	19.2
Aceh	4.9	2.5	2.6	1.9
North Sumatra	4.5	5.1	5.0	5.7
West Sumatra	1.8	1.7	2.2	1.9
Riau	9.0	6.5	2.9	4.1
Jambi	0.6	0.7	0.7	0.7
South Sumatra	4.3	3.4	3.3	2.7
Bengkulu	0.3	0.4	0.4	0.4
Lampung	1.4	1.8	1.7	1.9
Kalimantan	9.2	9.1	6.4	7.5
West Kalimantan	1.1	1.4	1.4	1.5
Central Kalimantan	0.8	0.8	1.0	0.9
South Kalimantan	1.2	1.3	1.4	1.2
East Kalimantan	6.2	5.6	2.7	3.9
Jawa-Bali	57.5	61.1	68.0	66.3
Jakarta	17.3	17.4	21.4	19.2
West Java	14.6	17.9	15.2	18.8
Central Java	8.3	8.5	10.3	9.3
Yogjakarta	1.2	1.0	1.4	1.1
East Java	15.1	15.0	18.4	16.4
Bali	1.0	1.2	1.2	1.4
Sulawesi	3.3	4.4	3.9	4.5
North Sulawesi	0.8	0.9	1.0	0.9
Central Sulawesi	0.5	0.7	0.6	0.7
South Sulawesi	1.7	2.3	2.0	2.3
Southeast Sulawesi	0.4	0.5	0.4	0.5
Others	3.1	3.4	2.7	2.5
West Nusa Tenggara	0.7	0.9	0.8	0.7
East Nusa Tenggara	0.6	0.6	0.7	0.7
Maluku	0.6	0.3	0.7	0.4
Papua	1.3	1.5	0.6	0.8
Indonesia	100.0	100.0	100.0	100.0

Table 3. Decomposition of Inter-provincial Inequality by Regional Groups

Including Mining

Theil L

	Inequalities						% Contributions					
	WR1	WR2	WR3	WR	BR	Total	WR1	WR2	WR3	WR	BR	Total
1983	0.351	0.180	0.093	0.211	0.047	0.258	33.4	43.8	4.5	81.7	18.3	100
1989	0.270	0.160	0.058	0.175	0.039	0.214	32.3	45.8	3.5	81.6	18.4	100
1997	0.204	0.181	0.084	0.175	0.026	0.200	26.5	55.3	5.4	87.1	12.9	100
1999	0.209	0.157	0.107	0.164	0.022	0.186	29.4	51.3	7.4	88.1	11.9	100
2004	0.174	0.166	0.078	0.157	0.020	0.176	26.4	56.7	5.8	88.9	11.1	100

Theil T

	Inequalities						% Contributions					
	WR1	WR2	WR3	WR	BR	Total	WR1	WR2	WR3	WR	BR	Total
1983	0.405	0.252	0.116	0.299	0.045	0.344	42.5	42.2	2.2	86.9	13.1	100
1989	0.306	0.222	0.062	0.241	0.035	0.276	38.2	47.8	1.4	87.3	12.7	100
1997	0.242	0.253	0.095	0.238	0.022	0.260	28.9	60.2	2.5	91.5	8.5	100
1999	0.255	0.217	0.125	0.222	0.020	0.242	34.0	53.9	3.9	91.8	8.2	100
2004	0.209	0.234	0.085	0.215	0.017	0.232	28.1	61.7	2.8	92.6	7.4	100

Squared WCV

	Inequalities						% Contributions					
	WR1	WR2	WR3	WR	BR	Total	WR1	WR2	WR3	WR	BR	Total
1983	1.159	0.843	0.325	1.070	0.090	1.160	53.0	38.3	0.9	92.2	7.8	100
1989	0.813	0.720	0.143	0.792	0.064	0.856	43.8	48.2	0.5	92.5	7.5	100
1997	0.667	0.841	0.235	0.787	0.039	0.826	30.2	64.1	1.0	95.3	4.7	100
1999	0.731	0.703	0.325	0.724	0.037	0.760	38.3	55.0	1.9	95.2	4.8	100
2004	0.582	0.785	0.203	0.709	0.031	0.739	28.7	65.9	1.2	95.9	4.1	100

Table 4. Decomposition of Inter-provincial Inequality by Regional Groups

Excluding Mining

Theil L

	Inequalities						% Contributions					
	WR1	WR2	WR3	WR	BR	Total	WR1	WR2	WR3	WR	BR	Total
1983	0.079	0.194	0.020	0.144	0.024	0.168	11.6	72.8	1.5	85.9	14.1	100
1989	0.097	0.170	0.026	0.133	0.027	0.160	15.6	65.3	2.0	83.0	17.0	100
1997	0.098	0.189	0.030	0.145	0.027	0.172	14.7	67.1	2.3	84.1	15.9	100
1999	0.105	0.164	0.032	0.131	0.023	0.154	17.9	64.6	2.6	85.2	14.8	100
2004	0.088	0.171	0.035	0.131	0.025	0.156	15.1	65.8	3.0	84.0	16.0	100

Theil T

	Inequalities						% Contributions					
	WR1	WR2	WR3	WR	BR	Total	WR1	WR2	WR3	WR	BR	Total
1983	0.088	0.277	0.020	0.212	0.020	0.232	9.6	81.3	0.6	91.5	8.5	100
1989	0.120	0.240	0.024	0.194	0.022	0.217	14.7	74.3	0.7	89.7	10.3	100
1997	0.119	0.266	0.029	0.213	0.023	0.235	13.0	76.6	0.8	90.4	9.6	100
1999	0.132	0.229	0.030	0.189	0.019	0.208	17.1	72.7	1.0	90.8	9.2	100
2004	0.105	0.243	0.033	0.191	0.021	0.212	13.2	75.9	1.1	90.1	9.9	100

Squared WCV

	Inequalities						% Contributions					
	WR1	WR2	WR3	WR	BR	Total	WR1	WR2	WR3	WR	BR	Total
1983	0.216	0.951	0.040	0.758	0.033	0.792	7.1	88.5	0.2	95.8	4.2	100
1989	0.339	0.795	0.048	0.676	0.037	0.714	13.0	81.6	0.2	94.8	5.2	100
1997	0.330	0.899	0.056	0.761	0.039	0.799	10.5	84.4	0.2	95.2	4.8	100
1999	0.377	0.756	0.057	0.649	0.033	0.682	15.4	79.5	0.3	95.2	4.8	100
2004	0.278	0.822	0.064	0.678	0.036	0.714	10.4	84.3	0.3	95.0	5.0	100

Table 5. Annual Average Growth Rate of GRP per Capita

(in %)

	GRP including mining					GRP excluding mining				
	83-89	89-97	97-99	99-04	83-04	83-89	89-97	97-99	99-04	83-04
Sumatra	3.3	3.8	-5.4	1.8	2.3	4.9	5.8	-4.7	2.9	3.8
Aceh	4.5	0.5	-11.1	-0.2	0.2	4.6	4.8	-6.9	-0.1	2.4
North Sumatra	5.7	6.8	-6.5	3.0	4.2	6.5	7.3	-6.4	3.1	4.7
West Sumatra	3.6	5.8	-3.6	3.4	3.7	3.3	5.7	-3.3	3.5	3.6
Riau	-0.4	2.3	-5.1	-1.8	-0.2	4.1	5.5	-2.3	2.1	3.5
Jambi	4.3	5.9	-3.1	3.4	4.0	4.4	5.4	-5.2	2.8	3.5
South Sumatra	2.7	3.0	-5.9	3.3	2.1	3.4	4.0	-6.1	4.2	2.9
Bengkulu	4.2	5.0	-4.4	1.9	3.1	3.0	5.5	-4.7	1.9	3.0
Lampung	6.4	6.0	-2.1	2.6	4.5	6.5	5.8	-2.1	2.3	4.4
Kalimantan	2.6	5.4	-1.9	0.4	2.7	7.7	5.7	-3.0	0.1	4.0
West Kalimantan	7.0	6.3	-3.4	0.4	4.1	6.9	6.3	-3.5	0.4	4.1
Central	3.6	5.2	-6.9	0.4	2.4	3.7	4.8	-6.8	0.9	2.4
South Kalimantan	3.7	6.6	-3.0	2.4	3.8	4.1	5.4	-6.3	2.3	3.1
East Kalimantan	0.3	4.6	-1.6	-0.1	1.6	9.5	5.5	-2.0	-0.9	4.3
Jawa-Bali	5.7	6.3	-6.9	3.1	4.1	5.9	6.5	-7.0	3.2	4.2
Jakarta	4.3	7.3	-9.5	4.3	4.0	4.3	7.3	-9.5	4.1	4.0
West Java	5.8	5.9	-3.8	2.1	4.0	6.7	6.5	-3.9	2.6	4.6
Central Java	6.8	5.4	-5.7	3.4	4.2	6.8	5.4	-5.7	3.4	4.2
Yogjakarta	4.8	5.2	-6.0	3.4	3.6	4.8	5.2	-6.0	3.5	3.6
East Java	5.6	6.6	-6.9	3.4	4.2	5.6	6.7	-6.9	3.3	4.2
Bali	7.5	6.8	-3.4	2.0	4.8	7.7	6.8	-3.4	2.0	4.9
Sulawesi	5.5	6.7	0.6	2.9	4.8	5.0	6.6	0.0	2.8	4.6
North Sulawesi	4.0	6.9	-0.5	3.0	4.4	3.4	6.4	-1.8	3.3	4.0
Central Sulawesi	3.8	9.0	-3.5	2.5	4.7	3.8	9.1	-3.5	2.5	4.7
South Sulawesi	6.8	6.1	3.8	3.1	5.3	5.9	6.1	3.1	2.8	5.0
Southeast	4.6	5.9	-5.9	2.8	3.6	5.5	6.0	-5.9	2.4	3.8
Others	2.4	7.2	-3.1	2.3	3.7	4.7	6.2	-8.1	2.2	3.4
West Nusa	4.2	6.2	-1.9	7.1	5.0	4.3	6.1	-2.9	1.1	3.5
East Nusa	3.1	6.0	-3.3	3.6	3.7	3.0	6.0	-3.1	3.7	3.7
Maluku	6.2	5.5	-26.2	-0.1	0.8	6.1	5.3	-25.2	0.0	0.9
Papua	-1.7	9.2	4.3	-1.2	3.0	4.8	7.7	-3.8	2.6	4.5
Indonesia	4.8	5.7	-5.7	2.6	3.5	5.7	6.3	-6.0	2.9	4.1
Jakarta+West Java	5.0	6.3	-7.7	2.7	3.7	5.3	6.6	-7.9	2.9	3.9

Table 6. Bi-dimensional Decomposition of Inter-provincial Inequality by Regional Groups and GRP Components

Including Mining (in %)

In 1983

			Secondary				Tertiary					
Region	1	2	3	4	5	Subtotal	6	7	8	9	Subtotal	Total
WR1	2.1	41.0	7.8	0.0	0.4	8.2	1.1	0.5	0.2	-0.1	1.8	53.0
WR2	-1.9	-0.4	5.3	0.1	4.0	9.4	8.4	1.8	14.0	6.9	31.2	38.3
WR3	0.1	0.8	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.9
BR	0.4	5.7	1.3	0.0	0.1	1.4	0.1	0.2	-0.3	0.2	0.3	7.8
Total	0.7	47.1	14.4	0.1	4.5	19.0	9.7	2.6	13.9	7.0	33.2	100.0

In 1989

			Secondary				Tertiary					
Region	1	2	3	4	5	Subtotal	6	7	8	9	Subtotal	Total
WR1	2.0	27.4	11.6	0.0	0.5	12.2	1.7	0.3	0.4	-0.2	2.2	43.8
WR2	-2.4	-0.5	7.6	0.2	4.8	12.6	9.3	2.4	18.7	8.0	38.4	48.2
WR3	0.1	0.3	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.5
BR	0.4	4.2	2.0	0.0	0.0	2.0	0.4	0.2	0.0	0.3	0.9	7.5
Total	0.1	31.4	21.3	0.2	5.4	26.9	11.4	3.0	19.1	8.1	41.6	100.0

In 1997

			Secondary				Tertiary					
Region	1	2	3	4	5	Subtotal	6	7	8	9	Subtotal	Total
WR1	1.3	15.6	10.6	0.0	0.6	11.3	1.1	0.6	0.5	-0.2	2.0	30.2
WR2	-2.0	-0.4	9.3	0.3	10.6	20.1	12.1	3.3	23.7	7.2	46.4	64.1
WR3	0.1	0.7	0.1	0.0	0.1	0.2	0.0	0.0	0.0	0.0	0.0	1.0
BR	0.1	1.4	1.8	0.0	0.1	1.9	0.6	0.2	0.2	0.2	1.2	4.7
Total	-0.4	17.4	21.7	0.3	11.4	33.4	13.9	4.1	24.4	7.2	49.6	100.0

In 1999

			Secondary				Tertiary					
Region	1	2	3	4	5	Subtotal	6	7	8	9	Subtotal	Total
WR1	1.5	19.0	14.7	0.0	0.6	15.4	1.6	0.8	0.4	-0.3	2.5	38.3
WR2	-2.1	-0.4	8.1	0.3	6.7	15.0	10.9	3.1	21.4	7.0	42.4	55.0
WR3	0.2	1.4	0.1	0.0	0.1	0.1	0.0	0.0	0.0	0.1	0.1	1.9
BR	0.5	1.8	1.8	0.0	0.1	1.9	0.5	0.2	0.0	0.0	0.7	4.8
Total	0.0	21.8	24.7	0.3	7.5	32.5	12.9	4.1	21.8	6.9	45.7	100.0

In 2004

			Secondary				Tertiary					
Region	1	2	3	4	5	Subtotal	6	7	8	9	Subtotal	Total
WR1	1.0	13.9	11.1	0.0	0.6	11.7	1.2	0.8	0.4	-0.3	2.1	28.7
WR2	-2.1	0.2	9.4	0.3	7.1	16.8	14.0	5.3	24.1	7.7	51.1	65.9
WR3	0.1	0.8	0.1	0.0	0.1	0.1	0.0	0.1	0.0	0.0	0.1	1.2
BR	0.3	0.9	1.7	0.0	0.1	1.9	0.6	0.2	0.2	0.1	1.1	4.1
Total	-0.7	15.8	22.3	0.4	7.9	30.5	15.9	6.3	24.7	7.5	54.4	100.0

(Note) 1. agriculture, 2. mining, 3. manufacturing, 4. electricity/gas/water, 5. construction, 6. trade/hotel/restaurant, 7. transportation/communication, 8. financial and business services, and 9. other services.

Table 7. Bi-dimensional Decomposition of Inter-provincial Inequality by Regional Groups and GRP Components

Excluding Mining (in %)

In 1983

		Secondary				Tertiary					
Region	1	3	4	5	Subtotal	6	7	8	9	Subtotal	Total
WR1	1.2	4.4	0.0	0.2	4.6	0.8	0.4	0.2	-0.1	1.3	7.1
WR2	-4.2	12.1	0.3	9.0	21.4	19.3	4.2	32.0	15.7	71.2	88.5
WR3	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.1	0.2
BR	-0.1	1.4	0.0	0.2	1.7	1.1	0.2	0.7	0.6	2.6	4.2
Total	-2.9	17.9	0.4	9.5	27.8	21.2	4.8	32.9	16.3	75.1	100.0

In 1989

		Secondary				Tertiary					
Region	1	3	4	5	Subtotal	6	7	8	9	Subtotal	Total
WR1	1.5	9.0	0.0	0.3	9.4	1.5	0.4	0.4	-0.2	2.1	13.0
WR2	-3.9	12.7	0.4	8.0	21.1	15.5	4.0	31.4	13.5	64.4	81.6
WR3	0.1	0.1	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.1	0.2
BR	-0.1	2.0	0.0	0.2	2.2	1.3	0.2	0.9	0.6	3.1	5.2
Total	-2.4	23.7	0.4	8.6	32.8	18.4	4.6	32.8	13.9	69.6	100.0

In 1997

		Secondary				Tertiary					
Region	1	3	4	5	Subtotal	6	7	8	9	Subtotal	Total
WR1	0.9	7.5	0.0	0.4	8.0	0.9	0.5	0.4	-0.2	1.6	10.5
WR2	-2.5	12.1	0.3	13.8	26.3	15.9	4.3	31.1	9.5	60.7	84.4
WR3	0.1	0.1	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.1	0.2
BR	-0.6	2.2	0.1	0.3	2.5	1.4	0.2	0.9	0.3	2.8	4.8
Total	-2.1	21.8	0.4	14.6	36.9	18.2	5.0	32.4	9.7	65.2	100.0

In 1999

		Secondary				Tertiary					
Region	1	3	4	5	Subtotal	6	7	8	9	Subtotal	Total
WR1	1.1	11.6	0.0	0.5	12.1	1.3	0.7	0.4	-0.2	2.2	15.4
WR2	-3.0	11.4	0.4	9.6	21.4	15.7	4.4	30.8	10.2	61.1	79.5
WR3	0.1	0.1	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.1	0.3
BR	-0.4	2.4	0.1	0.2	2.7	1.3	0.1	0.8	0.2	2.5	4.8
Total	-2.2	25.5	0.5	10.4	36.4	18.3	5.4	32.0	10.2	65.8	100.0

In 2004

		Secondary				Tertiary					
Region	1	3	4	5	Subtotal	6	7	8	9	Subtotal	Total
WR1	0.7	7.6	0.0	0.4	8.0	0.9	0.6	0.3	-0.1	1.7	10.4
WR2	-2.7	11.9	0.4	9.1	21.4	18.0	6.8	31.0	9.9	65.6	84.3
WR3	0.1	0.1	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.1	0.3
BR	-0.5	2.4	0.1	0.2	2.7	1.5	0.2	0.9	0.2	2.8	5.0
Total	-2.5	22.0	0.5	9.7	32.3	20.3	7.7	32.2	10.0	70.2	100.0

(Note) 1. agriculture, 2. mining, 3. manufacturing, 4. electricity/gas/water, 5. construction, 6. trade/hotel/restaurant, 7. transportation/communication, 8. financial and business services, and 9. other services.

Table 8. Relative Concentration Coefficient in 2004

Including Mining

Sector	1	2	3	4	5	6	7	8	9
W-Region 1	0.2	2.1	1.6	0.2	0.5	0.3	0.5	0.4	-0.1
W-Region 2	-0.3	0.1	0.5	0.3	2.0	1.0	1.3	3.2	1.2
W-Region 3	0.4	3.6	0.6	0.3	0.8	0.2	0.6	0.1	0.3
B-Region	0.4	2.0	1.6	0.7	0.5	0.8	0.7	0.7	0.2

Excluding Mining

Sector	1	2	3	4	5	6	7	8	9
W-Region 1	0.2		2.4	0.5	0.7	0.5	0.8	0.6	-0.2
W-Region 2	-0.3		0.5	0.3	1.9	0.9	1.3	3.1	1.2
W-Region 3	0.9		1.8	1.6	1.5	0.6	1.2	1.0	0.7
B-Region	-0.6		1.7	1.9	0.6	1.4	0.6	1.9	0.5

Within Region 2: Jakarta and West Java Merged

Sector	1	2	3	4	5	6	7	8	9
Incl. mining	-0.5	2.0	1.1	1.3	1.3	0.7	1.2	2.5	0.9
Excl. mining	-0.5		1.1	1.3	1.4	0.8	1.2	2.5	1.0

(Note) 1. agriculture, 2. mining, 3. manufacturing, 4. electricity/gas/water, 5. construction, 6. trade/hotel/restaurant, 7. transportation/communication, 8. financial and business services, and 9. other services.