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Income Inequality in Indonesia

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1. Inequality in the Distribution of Household Expenditure[1]

1-1. Introduction

In his seminal article on economic growth and income inequality, Kuznets (1955) advanced the hypothesis that income inequality first increases and then decreases in relation to economic development, i.e., there is an inverted U-shaped relationship between income inequality and the level of economic development. Since then, a number of studies have been conducted to analyze the Kuznets hypothesis theoretically and empirically, with most empirical analyses using cross-country data due to the lack of time-series data of sufficient duration to test the hypothesis for an individual country.[2] While there exists a data comparability problem, especially when using cross-country data due to differences in the choice of recipient units, income concept, geographic coverage, etc., most studies generally confirmed the Kuznets hypothesis. According to Oshima (1992, 1994), most Asian countries seem to follow the Kuznets curve in income inequality, but the peak appears to have been reached when the economy was still predominantly agricultural with per capita incomes much lower than in the West. However, factors and forces underlying the Kuznets process are so diverse that one cannot expect to explain the process by a simple model.

The purpose of this section is to explore the factors and forces underlying income inequality in the distribution of household expenditure in Indonesia. This will be done using the Theil inequality decomposition technique with household expenditure data from the 1987, 1990, 1993, and 1996 National Socio-Economic Survey (*Susenas*). There are several factors that are considered as having affected income inequality. Since urban inequality is generally larger than rural inequality, a higher level of urbanization is likely to lead to a higher level of overall income inequality. Also, the urban-rural disparity should have a significant bearing on income inequality. For a similar reason, a higher proportion of better-educated groups would also lead to a higher level of overall income inequality, assuming that the income inequalities in these better-educated groups were higher than those of other groups. A larger income disparity between the better-educated groups and the other groups would also raise the overall level of inequality. Besides these factors, age distribution, interregional income disparity, and gender inequality should also influence the overall level of inequality. In this decomposition analysis, these factors are examined in turn.

It should be noted that *Susenas* collects data mainly on consumption expenditures rather than on incomes. However, welfare levels at any point in time are likely to be better indicated by current consumption expenditure than by current income. Furthermore, consumption expenditure is more reliable than income as an indicator of a household's 'permanent' income because it does not vary as much as income in the short term. However, since upper-income groups usually save a larger proportion of their incomes, the distribution of consumption expenditure is generally more equitable than the distribution of income.

As to the estimation of inequality indices (Gini and two Theil indices), we rely on decile information, not on the raw *Susenas* data, since we did not have access to the original data set. As a result, we consider all the households in a particular decile group as if they had the same mean expenditure of the group, thus ignoring the expenditure distribution within the group. This procedure yields a lower bound for the inequality indices. It should be noted

also that our study uses current price expenditure data, rather than constant price data (i.e., expenditure data adjusted for the differential impact of inflation on different expenditure groups and sectors), and thus, care should be taken to interpret the changes in inequality. As Asra (1989) noted, price adjustments will not only affect the magnitude of inequality values in any one period, but they may also reverse the trend of inequality indicated by current price data.

There have been numerous studies on poverty and income inequality in Indonesia, reflecting continued interest in how development benefits are distributed among different population sub-groups and regions.[3] Among them, Hughes and Islam (1981) conducted a decomposition analysis using several inequality indices (Atkinson, Theil and Log-Variance) with per-capita monthly expenditure data from the 1970 and 1976 *Susenas*. Our study, on the other hand, uses household monthly expenditure data from the 1987, 1990, 1993, and 1996 *Susenas*, and decomposes household expenditure inequality into within-group and between-group components according to age, education, household size, gender, province and location (urban-rural). It attempts to compare the results with those by Hughes and Islam, though the comparison is made only for the decomposition by location (urban-rural) and region since their analysis was confined to these two factors. It should be noted that since Hughes and Islam investigated the distribution of households by per capita household expenditure, our results are not directly comparable with theirs.

*1-2. The Data: National Socio-Economic Survey (***Susenas***)*

This section relies extensively on household expenditure data collected by the National Socio-Economic Surveys (*Susenas*) which have been conducted regularly by the Central Bureau of Statistics (BPS), and thus our results are subject to the reliability of the *Susenas* data.[4] First, it is widely believed that, in the surveys, non-food expenditures are progressively understated by larger-income households, especially in urban areas, and thus expenditure inequalities are underestimated if they are measured based on the *Susenas* data. Secondly, it is reported that there is a wide discrepancy between the total household expenditure estimated based on the *Susenas* data and the total private consumption expenditure from the national accounts. Thirdly, it is said that the survey months covered in the *Susenas* are different from one survey to another, and thus a care should be taken to interpret the *Susenas*'s time-series data of consumption expenditure. Nonetheless, this study uses *Susenas*, as it is the only source of information on household expenditures which cover the entire Indonesia.

The BPS conducted *Susenas* for the first time in 1963 in order to collect data on the demographic and socio-economic characteristics of household members, which include education, age, employment status, consumption expenditure and living condition.[5] Since then, a number of *Susenas* have been undertaken regularly. *Susenas* was intended to cover the entire Indonesia, but the early *Susenas* did not include all provinces. It was not until 1982 that it covered all provinces including East Timor. The first *Susenas* in 1963 covered only five Java provinces and selected 16,000 households as a sample. But the sample size increased gradually, and for the 1987, 1990, 1993, and 1996 *Susenas*, the sample size was 49,200, 49,000, 65,600 and 65,600 households, respectively.[6]

1-3. Trends in the Distribution of Household Expenditures over the Last Three Decades

Table 1 presents the trends in the distribution of household expenditures from 1964/65 to 1996 according to the Gini coefficient. It should be noted that the estimates of the Gini coefficient in the table are based on the distribution of individuals by per capita household

expenditures, rather than the distribution of households by household expenditures on which our study is based. Assuming that no data comparability problem exists over time, a slight, though not significant, declining trend is observed until 1990, especially after 1978, for the whole country; but there was an increasing trend after 1990. There was an increase in the Gini coefficient in 1978 at the height of the oil boom that started in 1973. According to Booth (1992), an increase in the relative price of non-traded goods resulting from the oil boom-induced real appreciation induced a shift of factors away from traditional, labor-intensive activities into sectors producing non-traded goods, and this not only widened urban-rural income disparities in favor of urban households but also raised urban inequality because most of the non-traded goods are produced in urban areas. While these factors seem to have caused a significant increase in the Gini coefficient, we should not ignore the fact that the 1978 estimate was based on a much smaller sample size compared to the other *Susenas* (only 6,300 households for the 1978 *Susenas*).[7]

Table 1

While the urban Gini coefficient has been quite stable over the period except 1978, the rural coefficient exhibits a clear decreasing trend, from 0.35 in 1964/65 to 0.27 in 1996. According to Table 2, the expenditure share of the bottom 20% household group has risen gradually, thus causing the rural Gini coefficient to decrease since most of the poorest households are in rural areas. This, together with high economic growth, explains Indonesia's success story in poverty alleviation, especially in rural areas. It should be noted that except for the first two years (1964/65 and 1969), rural inequality was consistently smaller than urban inequality.

Table 2

1-4. Inequality Decomposition by Population Subgroups

We use the two Theil indices (T and L) to measure inequality in the distribution of household expenditures as they are additively decomposable and satisfy several desirable properties as a measure of inequality in welfare, i.e., mean independence (or income-zero-homogeneity), the principle of population replication (or population-size independence), and the Pigou-Dalton principle of transfers (Bourguignon, 1979; Shorrocks, 1980). An inequality index is said to be additively decomposable if total inequality can be written as the sum of between-group and within-group inequality (See Appendix 1 for the detailed account of the additively decomposable Theil indices).[8] Mean independence implies that the index remains unchanged if everyone's expenditure is changed by the same proportion, while population-size independence means that the index remains unchanged if the number of households at each expenditure level is changed by the same proportion, i.e., the index depends only on the relative population frequencies at each expenditure level, not the absolute population frequencies. Finally, the Pigou-Dalton principle of transfers implies that any expenditure transfer from a richer to a poorer household that does not reverse their relative ranks in expenditures reduces the value of the index.

Using the decomposition equations (equation (A1-2)) described in Appendix 1, total inequality is decomposed into within-group and between-group components according to several socio-economic variables taken one at a time. The variables include location (rural-urban), region (province), age, education, household size, and gender, and the classification of households into population sub-groups is made based on the attributes of the household heads. It should be noted that we measure inequality in the distribution of households by household expenditures, not in the distribution of households by per capita household expenditures nor in the distribution of individuals by per capita household expenditures. Since the decomposition is made by using aggregated decile data and not by original household data, estimates of total inequality vary slightly from decomposition to

decomposition. In the following tables that present the results of the decomposition analysis, figures within parentheses are percentage contributions to total expenditure inequality.

Since households in upper expenditure classes tend to have a bigger household size, the level of inequality as measured by household expenditures is usually larger than by per capita household expenditures. According to the Gini coefficient, our estimates of inequality for 1987, 1990, 1993, and 1996 were, respectively, 0.372, 0.361, 0.378, and 0.387 (see Table 4 below), which were significantly larger than the BPS estimates of 0.32, 0.32, 0.34, and 0.36. The BPS used data based on the distribution of individuals by per capita household expenditures to estimate the Gini coefficient.

1-4-1. Decomposition by Location (Rural-Urban)

As is widely observed, mean household expenditure was larger for urban households than for rural households (Table 3). Mean urban household expenditure was almost twice as large as mean rural household expenditure, though there were some fluctuations between 1987 and 1996. Due to the large rural-urban disparity relative to within-group inequalities, the between-group component accounted for 22-24% of total inequality according to the Theil index T (Table 4).

Table 3 and Table 4

Urban inequality was larger than rural inequality and increased between 1987 and 1996. Combined with the shift of households from rural to urban areas, this raised the contribution of urban inequality to total inequality from 37.6 to 49.2%, as measured by the Theil index T (and from 25.2 to 35.2% as measured by the Theil index L), i.e., urban inequality has been playing an increasingly important role in overall expenditure inequality. On the other hand, rural inequality became less prominent as its contribution to total inequality fell from 39.6 to 28.5% as measured by the Theil index T. According to Hughes and Islam (1981), the contribution of urban inequality rose very sharply between 1970 and 1976: from 19.6 to 31.1% as measured by the Theil index T and from 14.8 to 20.1% as measured by the Theil index L. Though the increase has slowed down slightly, this tendency seems to have continued in the 1990s.[9]

Under the assumption that mean expenditure is larger for urban households than for rural households and that urban inequality is greater than rural inequality, one can show, given a constant urban-to-rural ratio in mean expenditures and constant within-location inequalities, that total inequality as measured by the Theil indices first increases and then decreases with the shift of households from rural to urban areas, i.e., total inequality follows the Kuznets process with respect to the share of urban households (for details, see Appendix 2). Thus, we can estimate the peak inequality values and the corresponding share of urban households on the Kuznets curve for each year. Table 4 provides the results for 1987, 1990, 1993, and 1996, whereas Figure 1 presents the estimated Kuznets curves for these four years using the Theil index T. In Figure 1, the actual index values are indicated by dark symbols on the Kuznets curves. It should be noted that a larger urban-to-rural ratio in mean expenditures leads to a more convex Kuznets curve, all else equal.

Figure 1

The main cause of reduced total inequality between 1987 and 1990 appears to be a fall in rural inequality. The rise in total inequality between 1990 and 1993 appears to be due mainly to an increase in urban-rural disparity, while the rise in total inequality between 1993 and 1996 seems to be due mainly to an increase in both rural and urban inequalities. On the 1996 Kuznets curve based on the Theil index T, inequality attains a peak value of 0.27 when the share of urban households reaches 55.3%, a much higher proportion than the current urbanization level of 35.7%. Therefore, further urbanization is likely to raise total inequality, all other things being equal.

1-4-2. Decomposition by Province

According to the decomposition result (Table 5), inter-provincial disparity accounted for 17-20% of total inequality when measured by the Theil index T and 15-18% when measured by the Theil index L.[10] However, inter-provincial disparity reflects, to some extent, urban-rural expenditure disparity, because the share of urban households varies among provinces, e.g., households in Jakarta were all classified as urban households, while in East Timor only 7.8% of households were in urban areas in 1996. Since urban mean household expenditure is usually larger than rural mean household expenditure, provincial mean household expenditure tends to be larger for provinces with a larger share of urban households; conversely, it tends to be smaller for provinces with a smaller share of urban households.

Table 5

Based on the Theil index T, the simple correlation coefficient between provincial mean household expenditures and provincial expenditure inequalities in 1996 (0.29) indicates that no significant relationship exists between them. For example, Riau, with the third highest mean household expenditure, after Jakarta and East Kalimantan, registered smaller-than-average inequality values, whereas West Nusa Tenggara with the lowest mean household expenditure, had larger-than-average inequality values.[11] In 1996, the relatively high inequality provinces are Jakarta, West Java, Yogyakarta, East Java, South Sulawesi, Southeast Sulawesi, East Timor, and Irian Jaya. The relatively low inequality provinces are Aceh, Jambi, Bengkulu, Central Kalimantan, and Maluku. Generally speaking, in 1996 Java and Sulawesi provinces registered relatively large intra-provincial inequality, whereas Sumatra and Kalimantan provinces had relatively low intra-provincial inequality. It should be noted that Sulawesi provinces raised their inequalities significantly between 1993 and 1996.

1-4-3. Decomposition by Age

Household income usually increases gradually with the age of the household head, but this is only up to a certain age. After reaching the peak, it starts to decrease as labor productivity falls. In Indonesia, reflecting, to some extent, the age-income relationship, the mean monthly household expenditure is shown to increase as the household heads become older, and it reaches a peak at between ages 45 to 49. Thereafter, it decreases. One of the main factors is that household size becomes larger as the household head gets older; but after the children become independent, it becomes smaller; as shown below, there is a positive association between household size and household expenditure.

The same pattern is observed for urban and rural households with the peak at age 45 to 49 and at age 40 to 44, respectively, in 1996; but the increase was much larger for urban as opposed to rural households. This is indicated by the ratio of the mean household expenditure between urban and rural households – there is an increasing trend until around ages 45-54. For the households whose heads are less than or equal to 19 years old, the ratio in the mean household expenditure between urban and rural households was only 1.1 in 1996. But, for those whose heads are 45 to 49 years old, the ratio was 2.2. The peak mean household expenditure was 3.1 times as large as the smallest for urban households, while it was 1.6 for rural households in 1996.

According to Table 6, which presents the decomposition results, the between-group component accounted for 4 to 5% of total inequality as measured by the Theil index T, thus indicating that disparities between age groups were not significant in the overall expenditure inequality. Within-age-group inequality appears to increase with the age of household heads. In 1996, it started at 0.209 for ages less than or equal to 19. After dropping to 0.166 at ages 25 to 29, it started to rise and peaked at age 60-64 at 0.321.

Table 6

1-4-4. Decomposition by Education

Since one's labor productivity is affected by the amount of knowledge, information, and skills acquired, education is considered to be one of the key determinants of income inequality. As expected, the mean monthly household expenditure is shown to increase with educational attainment. The mean expenditure for households with university education is 5.1 and 3.8 times as large as for those with no formal education and for those with only elementary education, respectively.[12] It should be noted that while, in 1987 and 1990, the mean expenditure was larger for households with vocational high school education than for households with general high school education, the order was reversed in 1993 and 1996. Possible factors for this anomaly include: an increase in the urban share of households with general high school education in conjunction with a decrease in the urban share of households with vocational high school education in the *Susenas* sample, an increase in the sample size (from 49,000 in 1987 and 1990 to 65,000 in 1993 and 1996), or a change in the definition of general and vocational high schools.

The urban-to-rural ratio in the mean household expenditure is very stable across the educational levels of household heads, with the value ranging from 1.4 to 2.1 in 1996, indicating that location and education have no significant interaction effects on mean expenditure. In other words, households whose heads have higher education are likely to have higher expenditures relative to those in the same location (rural or urban). It should be noted also that the share of urban households increases with the level of education, i.e., households with higher education are more likely to live in urban areas. In 1996, 85% of households with university education were in urban areas, whereas only 31% of households with elementary school education were in urban areas. Urban areas offer jobs that require higher skills and knowledge.

Table 7 provides the results of the Theil decomposition analysis with respect to education. The between-group component accounted for 30-33% of total inequality as measured by the Theil index T, thus suggesting that if there had been no disparities between educational levels in the mean expenditure, total expenditure inequality would have been much smaller. In other words, raising general educational levels would have a significant bearing on the reduction of overall inequality in Indonesia, *ceteris paribus*. Within-group inequalities for households with higher education increased over the study period, while those for households with elementary school or junior high school education remained rather stable. Export-oriented industrialization based on non-oil exports such as textile and plywood under a series of trade liberalization and deregulation policies seems to have facilitated income and expenditure inequalities among people with higher education, especially those with three-year college education or university education. On the other hand, the effects have been negligible among households with elementary school or junior high school education, i.e., the majority of people in Indonesia.

Table 7

1-4-5. Decomposition by Gender

The ratio of the mean expenditures of male-headed households versus female-headed households was approximately 1.5, thus indicating that gender inequality is not very large in Indonesia with regard to expenditure inequality. There are several factors that account for the inequality that does exist. First, male heads of households have higher educational attainments than female heads of households. According to the 1990 Population Census, 31% of males completed at least junior high school; the corresponding figure was 22% for females. Secondly, there is a difference in the types of occupations of male and female

workers. Thirdly, male-headed households have a larger household size than female-headed households.

According to Table 8, which presents the decomposition results, gender inequality is not a prominent factor in overall expenditure inequality, as the between-group component constituted only 3-4% of total inequality. In other words, the elimination of gender inequality will not reduce total expenditure inequality by very much. It is also apparent in the table that within-group inequality was larger for the female-headed households than male-headed households.

Table 8

1-5. Summary

This section attempted to provide an update on expenditure inequality and to investigate its factors and forces. This was done through the Theil decomposition technique using household expenditure data from the 1987, 1990, 1993, and 1996 National Socio-Economic Survey (Susenas). One of the main findings is that inter-provincial inequality has not been a major factor in overall national inequality as it contributed 17-20% to total inequality. Thus, policymakers should focus more on within-province inequality rather than between-province inequality in order to reduce overall national inequality. Since urban-rural expenditure inequality accounted for 22-24% of total inequality, reducing urban-rural disparities should be given higher priority. Since urban inequality is likely to play an increasingly important role in the determination of overall inequality, reducing urban inequality is another key factor in reducing overall inequality.

Another important finding is that education is a significant determinant of expenditure inequality, as the between-education component accounted for 30-33% of total inequality. Mean expenditure for households with university education is 5.1 and 3.8 times as large as for those with no formal education and for those with elementary education, respectively. Considering the fact that more than 60% of household heads had only elementary education or less, raising general educational levels would have a significant bearing on the reduction of overall inequality in Indonesia, *ceteris paribus*. However, we must recognize that the educational systems of developing countries may cause an increase in the level of inequality since the opportunity costs of elementary education is usually higher for poor students than for better-off students. Furthermore, the expected benefits of elementary education tend to be lower for poor students than for better-off students; thus, the poor are more likely to drop out during the early years of schooling (Todaro, 1992). This argument comes from the fact that children of poor families are usually needed to work on their family farms or business, and even if they are able to complete their elementary education, they are likely to have more difficulties in competing for jobs with the rich.

In contrast to education, gender inequality appeared to be insignificant in Indonesia, as the ratio of mean household expenditure between male-headed and female-headed households was only 1.5. The between-group component accounted for merely 3% of total inequality. Hence, the elimination of gender inequality in mean household expenditure will not reduce total inequality by very much. However, this seems to be an exception, since, in many developing countries, female-headed households are usually among the poorest due to the lack of access to better employment opportunities and capital.

There was a distinct pattern in the relationship between age and expenditure: the mean household expenditure increases as household heads became older until the ages of 45 to 49; thereafter, it decreases. However, expenditure disparities between age groups were not significant in the overall level of inequality as the between-age-group component accounted for 4-5% of total expenditure inequality. Household size tends to increase as the household head grows older, but after the children become independent, the household size becomes

smaller. Thus, adjusting household inequalities for household size should further reduce the contribution of the between-age-group component. It should be noted that within-age-group inequality tended to increase with the age of household heads, indicating that as household heads get older, those having better employment opportunities and jobs become richer, while others remain the same or become poorer. Finally, larger households tended to have higher household expenditure, as expected; but per capita household expenditure tended to decrease as household size increased.

2. Regional Income Inequality

2-1. Introduciton

In his seminal work on national development and regional inequality, Williamson (1965) predicts that regional income inequality will pass through three distinct phases as a nation moves through the early development stages to maturity. In the early stages of economic development, regional income inequality will increase, largely because of the disequilibrating effects of factor mobility. This will be followed by a period of stability, characterized by a relatively high level of inequality between regions. Finally, a lessening of regional inequality will set in as the national economy matures and equilibrating forces take effect. This overall process, if plotted against national economic development, will result in a bell-shaped or inverted U-shaped curve.

The early stages of development are also associated with rapid urbanization, though with a shift toward population dispersion as the economy matures. Other stylized facts in the process of development include industrialization, demographic transition, and changing inequality of income among population subgroups (Alonso, 1980). The concentration of population in and around large cities is usually accompanied by an increase in regional income inequality. Some researchers have argued that this population concentration and concurrent increase in regional inequality does not impede economic development, and may in fact favor it. Nonetheless, many national governments have introduced policies of balanced regional development.

Regional income inequality has received a great deal of public attention in Indonesia, mainly because of the persistence of large differentials between regions and provinces in socio-economic indicators. In 1997, Java island, representing slightly over 6% of Indonesia's land area, accounted for 58.6% of the total population and 64.1% of total GDP after excluding the oil and gas sector. In contrast, the resource-rich province of Irian Jaya, representing 20% of total land area, accounted for merely 1.0% of the total population and 1.6% of total GDP after excluding the oil and gas sector. In terms of per capita GDP after excluding the oil and gas sector, the richest province (Jakarta) was almost 9 times as large as the poorest (East Nusa Tenggara). Even within Java, large disparities exist in per capita GDP between Jakarta and the other provinces.

Since the pioneering work of Esmara (1975), a number of studies have added greatly to our understanding of economic development and regional income disparities in Indonesia (e.g., Uppal and Budiono, 1986; Islam and Khan, 1986; Akita, 1988; Hill and Weidemann, 1989; Azis, 1990; Hill, 1992; and Knaap and Kim, 1992). There is, however, a need for continual research into the extent and patterns of regional inequalities and development, as interregional equity is still a major concern of Indonesian development policies.

This section employs provincial and district-level GDP and population data to estimate regional income inequalities, as opposed to the previous section where household survey data on consumption expenditure are used to measure inequality in the distribution of household expenditure.

2-2. The Data: Provincial and District-Level Gross Domestic Product (GDP)

The Central Bureau of Statistics (BPS) publishes data on provincial GDP annually (*Provincial Income in Indonesia*, *Regional Income of Provinces in Indonesia*, or *Gross Regional Domestic Product of Provinces in Indonesia*). Three sets of time series data on provincial GDP by industrial origin are currently available. The first runs from 1975 to 1983 and provides data on provincial GDP at constant 1975 prices (1975-83 series); the second covers the period 1983-92, and contains data on provincial GDP at constant 1983 prices (1983-93 series); and the third covers the period 1993-99 and provides data on provincial GDP at constant 1993 prices (1993-99 series). BPS also publishes data on district-level GDP annually (*Gross Regional Domestic Product of Regencies/Municipalities in Indonesia*). Currently, time series data on GDP at constant 1993 prices from 1993 to 1998 are available. While the provincial GDP statistics provides GDP figures by sector (37 sectors), the district-level GDP statistics provides only total GDP figures and GDP figures after excluding the oil and gas sector,

It should be noted that regional GDP shows the amount of income generated within a region, rather than the income received by the region's inhabitants.[13] Often, much of the value added generated by a resource-rich region through extracting activities does not trickle-down to the people living there, but goes instead to other regions or abroad. For example, the bulk of income derived from oil and gas in Indonesia accrues to the central government, with only a small portion going to the governments and people of the producing regions. For this reason, like previous studies on regional income disparities in Indonesia, we exclude the mining sector in the estimation of regional income inequality as measured based on provincial data, where the mining sector includes oil/gas and non-oil/gas mining, quarrying, oil refining, and LNG, whereas we exclude the oil and gas sector in the estimation of regional income inequality as measured based on district-level data, where the oil and gas sector includes oil/gas mining, oil refining, and LNG.

2-3. Regional Income Inequality prior to the Financial Crisis

2-3-1. Regional Income Inequality based on Provincial GDP Data[14]

This subsection uses Williamson's weighted coefficient of variation (CV_w) to measure regional inequality. Based on provincial GDP and population data, it investigates longer-term trends in regional income inequalities before the financial crisis. A sectoral decomposition analysis is also performed to examine the extent to which each industrial sector contributes to the overall weighted coefficient of variation (see Appendix 3 for the detailed account of the Williamson's weighted coefficient of variation and its sectoral decomposition). We hope to gain a deeper understanding of the relationship between national development and regional inequalities.

Table 9 shows the results for CV_w including and excluding the mining sector. Estimates of CV_w are based on GDP at constant 1975 prices for 1975-83, constant 1983 prices for 1983-92, and constant 1993 prices for 1993-99. It should be noted that comparisons between the three sets of time series data are not particularly meaningful, since there are some differences between them.

Table 9

The major findings presented in Table 9 can be summarized as follows. First, there is a clear downward trend in CV_w when the mining sector is included, attributable mainly to the sector's declining share of GDP. Second, when the mining sector is excluded, no clear trends in CV_w can be discerned. Overall, CV_w is very stable, especially in 1983-92, when it stands at around 0.54-0.55. This result is remarkable considering the substantial structural

change experienced by Indonesia following successive external shocks such as the oil booms of the 1970s, the oil crisis, and the resulting deterioration in the terms of trade of the 1980s (Sundrum, 1986, 1988; Akita, 1991; Akita and Hermawan, 2000).

We are unable to say whether the CV_w estimates (after excluding the mining sector) are high by international standards because the value of CV_w depends on the size of the nation, the extent of regional division, the type of data used, and so on. However, the ratio in GDP per capita between the largest and the smallest provinces, of 9.7 in 1997 (while 5.6 in 1975 and 7.7 in 1992) indicates that large regional disparities still exist in Indonesia. Adjusting provincial GDP for price differentials using a cost-of-living index would reduce the CV_w estimates, as higher income provinces tend to have higher living costs. The reduction would be slight, however, since the coefficient of correlation between living costs and GDP per capita is very small.

Sectoral GDP per capita is now used to estimate the weighted coefficient of variation (CV_w) for each sector and the weighted coefficient of covariation (COV_w) between sectors (Table 10).[15] CV_w of the primary sector is small as compared to the other sectors, indicating that the primary sector has been developed fairly uniformly with population size. The secondary and tertiary sectors exhibit much higher values for CV_w, reflecting uneven development across provinces relative to population distribution. A slight downward trend can be observed for both secondary and tertiary sectors in 1983-92 and 1993-97.

Table 10

The estimates of COV_w provide an interesting picture of regional development. High positive values for COV_w between the secondary and tertiary sectors signify that provinces with higher GDP per capita in the secondary sector tend also to have higher GDP per capita in the tertiary sector. These sectors would thus seem to be complementary in their development. The primary sector records negative values for COV_w with both the secondary and tertiary sectors. Though very small, these negative values indicate a shift in value added from the primary to the secondary and tertiary sectors.

In order to evaluate which sector contributes most to the overall weighted coefficient of variation, we must look not only at CV_w and COV_w but also at the share of each sector in national GDP (see Equation (A3-3) in Appendix 3). Table 11 shows a clear shift in GDP from the primary to the secondary sector (and to the tertiary sector in 1975-83). The secondary sector's share, of only 12.3% in 1975 (evaluated at constant 1975 prices), increased to 25.3% in 1992 (evaluated at constant 1983 prices) and to 33.6% in 1997 (evaluated at constant 1993 prices). The share of the primary sector, meanwhile, fell by 9.8 percentage points in 1975-83, by 4.7 percentage points in 1983-92, and 2.9 percentage points in 1993-97. It is interesting to observe that the share of the tertiary sector was stable in 1983-92 and in 1993-97 at around 50%.

Table 11

This puts us in a better position to say which sector contributes most to the overall weighted coefficient of variation. Table 12 presents the results of a sectoral decomposition analysis, where shares are percentage shares of each component in equation (A3-3). It can be seen first that the tertiary sector accounted for 70-80% of the squared overall CV_w in 1975-83, 45-55% in 1983-92, and 45-50% in 1993-97. The large - though declining - share of the sector shows its significance in determining the overall level of regional inequality, as measured by CV_w in GDP per capita. Second, reflecting its growing income share, the share of the secondary sector has gradually increased. It surpassed the primary sector in 1979, and can be expected to play an increasingly important role in overall CV_w. Third, the share of covariation terms as a whole has been increasing steadily. This reflects not only a shift in GDP from the primary to the other sectors, but also the complementary and mutually strengthening development of the secondary and tertiary sectors.

Table 12

We can conclude from these observations that although the overall CV_w estimates (excluding the mining sector) have been fairly stable (especially in 1983-97), their structure has changed significantly.

2-3-2. Regional Income Inequality based on District-Level GDP Data

This subsection uses district-level GDP and population data, rather than provincial data, and employs a Theil index to measure regional income inequality. It explores factors determining regional income inequality by using the two-stage nested inequality decomposition method. The method is analogous to a two-stage nested design in the analysis of variance (ANOVA) and decomposes the overall regional inequality, as measured by a Theil index based on district-level GDP and population data, into three components: the between-region, between-province, and within-province inequality components (see Appendix 4 for the detailed account of the two-stage nested inequality decomposition method). Therefore, the method can analyze the contribution of within-province inequalities as well as between-province and between-region inequalities to the overall regional income inequality in a coherent framework. In the analysis, Indonesia is divided into five regions: Sumatra, Java-Bali, Kalimantan, Sulawesi, and Others.

Table 13 presents the result of the two-stage nested inequality decomposition analysis. Before the economic crisis, the overall regional income inequality increased significantly from 0.262 in 1993 to 0.287 in 1997. Decomposition of overall inequality into the within-province, between-province, and between-region components reveals that the increase was due mostly to the rise in the within-province inequality component; its contribution to the overall inequality thus rose from 45.5% to 49.7%. The between-region component also contributed to the increase but only slightly. On the other hand, the between-province component was very stable; thus, its contribution fell from 47.7% to 43.1%.

Table 13

Between-Region Inequality

Among the 5 regions (i.e., Sumatra, Java-Bali, Kalimantan, Sulawesi, and Others) Kalimantan had the highest per capita GDP over the 1993-97 period; this was followed by Java-Bali, Sumatra, Sulawesi, and Others (Table 14). The modest increase in the between-region inequality component in the pre-crisis period seems to have been due to an increasing disparity between Sumatra/Java-Bali/Kalimantan and Sulawesi/Others.

Table 14

Between-Province Inequalities

Though the between-province inequality component remained relatively constant over the 1993-97 period, each region recorded a distinct movement in between-province inequality.[16] Due largely to the existence of Jakarta, Java-Bali's between-province inequality was the highest. However, it exhibited a slight decreasing trend. The main factor behind the slight decrease seems to have been West Java's much faster per capita GDP growth rate compared to the other Java-Bali provinces. Accordingly, whereas West Java's per capita GDP was the second lowest among Java-Bali provinces in 1993, by 1997 it had become the third largest after Jakarta and Bali.[17]

According to the data on provincial GDP from *Gross Regional Domestic Product of Provinces in Indonesia by Industrial Origin*, West Java's non-oil and gas manufacturing grew very rapidly over the period; its annual average real GDP growth rate in non-oil and

gas manufacturing was 12.5%, which is much larger than the country's growth rate of 10.4% in non-oil and gas manufacturing. In West Java, non-oil and gas manufacturing accounted for 37.5% of total GDP after excluding the oil and gas sector in 1997; the comparable figure in Indonesia as a whole is 24.5%.

East Java had a similar growth pattern to West Java. Again, the non-oil and gas manufacturing sector was the engine of growth for the provincial economy as it recorded an annual average growth rate of 12% during 1993-97 and accounted for 30.2% of total GDP in 1997. Unlike West and East Java, Jakarta's GDP growth during 1993-97 was led by the construction sector, which experienced an annual average growth rate of 12.6% and accounted for 15.4% of the province's GDP in 1997. According to the data on provincial GDP from *Gross Regional Domestic Product of Provinces in Indonesia by Expenditure*, Jakarta's gross fixed capital formation grew rapidly at an average annual rate of 9.1% during 1993-97, contributing to the construction sector's high growth rate.

Contrary to the Java-Bali region, the regions of Sumatra, Kalimantan, and Sulawesi recorded rising levels of between-province inequality over the 1993-97 period. Kalimantan had the second highest between-province inequality next to Java-Bali and experienced a very slight increase. In Kalimantan, there are very large differences in per capita GDP between the richest province (East Kalimantan) and the other three provinces, and these differences seem to have increased in relative terms. In 1997, the ratio of the per capita GDP of the richest province to the poorest province was 2.4 in Kalimantan. In contrast, Sumatra's GDP is more evenly distributed among its provinces and population than in Kalimantan, but Sumatra's between-province inequality increased over the 1993-97 period. In Sumatra, the disparities between the richest province (North Sumatra) and the other seven provinces seem to have been increasing. While Sulawesi's GDP is more evenly distributed among its provinces and population than in Sumatra, it experienced a similar growth pattern to Sumatra and Kalimantan, in which the per capita GDP of the richest province (i.e., North Sulawesi) grew faster than in the other provinces. Thus, its between-province inequality rose over the 1993-97 period.

Within-Province Inequalities

The within-province inequality component increased significantly from 0.119 to 0.143 over the 1993-97 period.[18] As a result, its contribution to overall regional inequality increased from 45.5% to 49.7%. However, the increase was due mostly to the increases in the within-province inequalities of 4 provinces in particular: Riau, Jakarta, West Java, and East Java. Whereas their combined contribution to overall regional inequality was 31.8% in 1993, it had risen to 36.5% by 1997. Of the twenty-three other provinces, fifteen provinces experienced an increase in within-province inequality. However, their contributions to the increase in the within-province inequality component were all negligible.

Of the eight provinces in Sumatra, six provinces recorded an increase in within-province inequality over the 1993-97 period. However, only Riau experienced a significant increase, as its contribution to the overall regional inequality rose from 1.8% to 2.3%. In 1997, Riau had the highest level of within-province inequality in Sumatra, which was followed by West Sumatra and Lampung. The main reason why Riau had a very high level of inequality is due to Batam Island, which is located just 20 km southeast of Singapore and has received preferential treatment from the central government as an export-oriented industrial zone. Batam Island's per capita GDP of Rp12.8 million was much larger than other districts' per capita GDP after excluding the oil and gas sector. Riau's increasing within-province inequality is attributable mainly to the rising disparity between Batam Island and other districts.

Among Java-Bali provinces, all but Bali experienced an increase in within-province

inequality; in particular, Jakarta, West Java, and East Java recorded significant increases. In 1997, East Java had the highest level of within-province inequality, accounting for 20.9 percent of overall regional inequality. East Java's very high level of inequality is due to the existence of a few very rich districts: urban Kediri, urban Surabaya, and Gresik. With its limited population, urban Kediri's per capita GDP was the highest in the entire country at Rp22.3 million, which was significantly larger than Central Jakarta's per capita GDP at Rp16.8 million. While much lower than Kediri's, Surabaya and Gresik had per capita GDP of Rp5.7 and 3.8 million, respectively, both of which are significantly higher than most other districts in East Java.

Within Java-Bali, Central Java had the second highest level of within-province inequality in 1997. This is driven mainly by the districts of Kudus and urban Semarang, both of which had relatively high levels of per capita GDP (Rp5.0 and 4.2 million, respectively). West Java had the third highest level of inequality in 1997, which is much smaller than the levels recorded by Central Java and East Java. This is due to the fact that, unlike Central Java and East Java, which include the primary cities of Semarang and Surabaya, respectively, West Java does not include any dominant city and is relatively uniformly developed. In West Java, urban Tangerang had the highest level of per capita GDP (Rp5.3 million), which was followed by Bekasi (Rp3.4 million), Serang (Rp3.4 million), urban Cirebon (Rp3.3 million), and urban Bandung (Rp2.7 million). In other districts, per capita GDP ranged from Rp1.0 to 2.5 million.

Among Kalimantan provinces, West Kalimantan registered the highest level of within-province inequality in 1997. This is driven in part by urban Pontianak, which had the highest level of per capita GDP (Rp4.2 million). In other districts, per capita GDP ranged from Rp1.0 to 2.4 million. It is interesting to observe that while East Kalimantan had a very large per capita GDP (Rp4.6 million after excluding the oil and gas sector), its level of within-province inequality is one of the lowest in Indonesia (after excluding the oil and gas sector).

Among Sulawesi provinces, three provinces experienced a slight increase in within-province inequality. The province of South Sulawesi had the highest level of within-province inequality in 1997 due in large part to Ujung Pandang's per capita GDP of Rp2.5 million. Sulawesi, however, had a very even distribution of income not only across provinces but also within provinces. Finally, within Others, Irian Jaya had the highest level of within-province inequality in 1997.

2-4. Regional Income Inequality after the Financial Crisis

The Indonesian economy contracted by a substantial amount in 1998 due to the economic crisis. According to the district-level GDP data at 1993 constant prices, the national average per capita GDP after excluding the oil and gas sector fell by 11.9% in 1998 (Table 14); thus, per capita GDP in 1998 had retreated to the 1995 level.[19] However, the impact was very uneven across regions and provinces: while most provinces in Java recorded a reduction in per capita GDP of more than 10%, the effects were much less severe in the Outer Islands.

Overall regional income inequality, as measured by the Theil index T based upon district-level GDP and population data, declined from 0.287 in 1997 to 0.266 in 1998, which is essentially the same level as in 1993-94 (Table 13). The two-stage inequality decomposition analysis reveals that about three quarters of the decline was due to the decrease in the between-province inequality component; its contribution to the overall regional inequality decreased to 40.6% (from 43.1% in 1997).[20] Consequently, the contribution of the within-province inequality component to overall regional inequality rose sharply to 52.8% in 1998 (from 49.7%), although the inequality component itself recorded a

slight decrease. Finally, the between-region inequality component decreased also, but only slightly.

Between-Region Inequality

The economic crisis reduced Java-Bali's per capita GDP by 14.8% in 1998, bringing it to the same level as in 1994-95. Sumatra also experienced a large decrease in per capita GDP, but the decrease was not as significant as it was in Java-Bali; Sumatra's per capita GDP in 1998 had fallen to the same level as in 1995-96. On the other hand, the economic crisis does not seem to have affected Kalimantan and Sulawesi very much. As a result, the between-region inequality fell to 0.018 in 1998.

Between-Province Inequalities

Java-Bali's between-province inequality played a major role in the reduction of the between-province inequality component. This is translated into a fall in its contribution to the overall regional inequality from 38.6% to 35.1% (Table 13). Upon examining the trend in Java-Bali's between-province inequality since 1993, the decrease in 1998 is a continuation of the declining trend that existed before 1997, though the decrease between 1997 and 1998 is much larger than before and is due to different factors than those of the pre-crisis period, as explained below.

The economic crisis affected Jakarta in a significant way. In terms of GDP, Jakarta's economy contracted by 19% in 1998, or a reduction of almost 20% in per capita GDP. The resulting level is equivalent to the level that was recorded in 1993. The economies of West Java and East Java also contracted substantially, though the rates of decrease were not as large as in Jakarta.[21] The primary reason why Java-Bali recorded a significant decrease in between-province inequality between 1997 and 1998 appears to have been Jakarta's large decrease in per capita GDP relative to other Java-Bali provinces. This contrasts with the 1993-97 period, which experienced a slight decreasing trend in Java-Bali's between province inequality due to West Java's much faster per capita GDP growth rate compared to the other Java-Bali provinces.

To analyze regional differences in the growth rate of GDP between 1997 and 1998, a shift and share analysis was performed by using provincial GDP data from *Gross Regional Domestic Product of Provinces in Indonesia by Industrial Origin.*[22] The sector classification used in this analysis is: agriculture, non-oil and gas mining, non-oil and gas manufacturing, gas and water, construction, trade, transportation/communication, finance, and services. The results are presented in Table 15. The provinces of Jakarta, West Java, and East Java contracted at much faster rates than the nation as a whole; thus their GDP decrease exceeded the calculated decrease if these provinces had contracted at the same rate as the national rate (i.e., total growth minus regional share was negative for these provinces). However, there are differences in the pattern of contraction between Jakarta and the provinces of West Java and East Java: while the industry-mix shift component played an important role in the contraction of Jakarta, the competitive-shift component played a dominant role in the contraction of West Java and East Java.

Table 15

In Jakarta, the non-oil and gas manufacturing, finance, and construction sectors contributed significantly to a large negative industry-mix shift, signifying its unfavorable industrial structure, as the combined share of these three worst crisis-hit industries was about 60% in Jakarta. The declines in these 3 sectors in the country as a whole were 18.2%, 17.3%, and 33.3%, respectively, which were much larger than the negative growth rate of the total national economy. It should be noted that in Jakarta these three sectors contracted by 18.0%, 9.6%, and 38.3% respectively.

In West Java, the non-oil and gas manufacturing, finance, and construction sectors contributed to a large negative competitive shift, as their growth rates were -21.4%, -40.3%, and –46.2%, respectively. On the other hand, in East Java, the non-oil and gas manufacturing and trade sectors contributed significantly to its large negative competitive shift, as their growth rates were –24.3% and –17.8%, respectively. It should be noted that in West Java and East Java, the industry-mix shift component was also negative due to a very large negative growth in the non-oil and gas manufacturing and construction sectors whose combined GDP shares in West Java and East Java were 44% and 36%, respectively. Nonetheless, the industry-mix shift component was much less significant than the competitive shift component because of the prominence of the agricultural sector in these provinces.[23]

In contrast to Java-Bali, Kalimantan and Sulawesi both recorded an increase in between-province inequality in 1998. The reason seems to have been that the richest province in each region – East Kalimantan for Kalimantan and North Sulawesi for Sulawesi – performed better than the other provinces in each region, though all the provinces experienced negative growth in per capita GDP. According to the shift and share analysis, East Kalimantan and North Sulawesi had a positive total shift (= total regional growth - regional share of the national growth), and more than three-quarters of the total shift was accounted for by the competitive shift component. East Kalimantan and North Sulawesi seem to have had a competitive advantage in non-oil and gas manufacturing and trade. In North Sulawesi, these two sectors achieved large positive growth, whereas in East Kalimantan, they neither grew nor contracted.

Sumatra's between-province inequality was stable during 1997-98. Among Sumatra's provinces, Riau performed relatively well. In 1998, Riau became the richest province in Sumatra in terms of per capita GDP. Like East Kalimantan and North Sulawesi, Riau appears to have had a strong competitive advantage in non-oil and gas manufacturing and trade; its competitive shift component explained most of its total shift.

Within-Province Inequalities

In Java-Bali, all but Jakarta experienced a fall in within-province inequality (Table 13). Jakarta's within-province inequality rose in 1998, but this is a continuation of the trend that existed in the pre-crisis period. The reason why Jakarta experienced increasing within-province inequality over the 1993-98 period seems to have been a rising disparity between Central Jakarta, the second richest district in Indonesia next to urban Kediri, and the other Jakarta districts. In 1998, Central Jakarta experienced an 8% decrease in per capita GDP, while the other Jakarta districts recorded a 20%+ decrease. This implies, together with the fact that the districts in West Java adjacent to Jakarta (i.e., Tangerang, Bekasi and Bogor) recorded a 20%+ decrease in per capita GDP, that the economic crisis had unprecedented adverse effects on the greater Jakarta metropolitan region (Jabotabek). The severe economic downturn in Jabotabek would have had enormous direct and indirect effects not only on the other districts of Java-Bali but also on the Outer Islands, for Jabotabek generated about a quarter of total Indonesian GDP, after excluding the oil and gas sector and there exist numerous inter-industry linkages between Jabotabek and other regions, especially provinces in Java.

East Java had a slight decrease in within-province inequality, but it still had the highest level of inequality in all the provinces of Indonesia. Like Jabotabek, the crisis seems to have affected East Java's major urban area very adversely; the relatively rich districts of Surabaya, Sidoarjo, and Gresik experienced significant negative per capita GDP growth rates of –17%, -18%, and -13%, respectively. On the other hand, the richest district in Indonesia, Kediri, recorded only a minor reduction in its per capita GDP (-3%). Central Java's level of

within-province inequality decreased significantly; the 1998 level of inequality had almost retreated to the 1993 level. Again, the crisis hit Central Java's major urban areas the most: Semarang, Kendal, Demak, and Kudus recorded significant decreases in per capita GDP (-19%, -13%, -12%, and -13%, respectively). These observations, together with Jabotabek's very severe economic conditions in 1998, confirm that Indonesia's economic crisis was a crisis afflicting urban Java (Booth, 2000). However, the crisis also hit most of the other parts of the Java-Bali region, though to a lesser extent.

In Sumatra, all except West Sumatra and Riau experienced a fall in within-province inequality in 1998. In particular, Lampung recorded a significant decrease in its within-province inequality; this is due mainly to a substantial reduction in the per capita GDP of Bandar Lampung, the richest district in the province. Among Sumatra districts, Banda Aceh, Tebin Tinggi, Medan, Binjai, Sawah Lunto, Palembang, and Bandar Lampung registered relatively large decreases in per capita GDP (around -15%). But, Batam, the richest district in Sumatra, was not significantly affected by the crisis (4% decrease in per capita GDP). Like Java-Bali, the economic crisis seems to have hit major urban areas in Sumatra.

In Kalimantan, South Kalimantan recorded a significant increase in its level of within-province inequality. This is due to the fact that Kota Baru, the richest district in South Kalimantan, experienced positive growth in its per capita GDP (3%), while the second and third richest districts (Barito Kuala and Banjarmasin) recorded substantial decreases in their per capita GDP (-9% and -14%, respectively). It should be noted that among Kotamadyas in Kalimantan (i.e., Pontianak, Palangka Raya, Banjarmasin, Balikpapan, and Samarinda), only Banjarmasin had a large decrease in per capita GDP, signifying that the crisis did not have much adverse effects on urban Kalimantan.

In Sulawesi, all except South Sulawesi experienced a slight increase in within-province inequality in 1998. The main reason why South Sulawesi experienced a fall in within-province inequality is that Ujung Pandang, the richest district in South Sulawesi, experienced a significant decrease in its per capita GDP (-9%). In North Sulawesi, four out of seven districts (i.e., Minahasa, Sangile Talaud, Gorontalo, and Bitung) recorded increases in their per capita GDP, though the growth rates were much lower than the pre-crisis period (1% to 3% vs. 6% to 12%). The crisis affected other Sulawesi districts adversely, but the effects seem to have been uniform across districts.

2-5. Summary

As measured by a Theil index based on district-level GDP and population data, overall regional income inequality increased significantly over the 1993-1997 period (from 0.262 to 0.287), during which Indonesia achieved an annual average growth rate of more than 7 %. This finding does not contradict the fact that provincial GDP and population data from the provincial income statistics produced quite stable regional inequality over the same period because, according to the two-stage nested inequality decomposition analysis, the increase is due mostly to the increase in the within-province inequality component, especially in the provinces of Riau, Jakarta, West Java, and East Java.[24] The between-province inequality component increased too, but only very slightly, whereas the between-region inequality component was very stable. The within-province inequality component thus played an increasingly important role in the determination of overall regional income inequality, as measured using district-level data. In 1997, it accounted for about a half of overall regional income inequality, whereas the between-province and between-region inequality components contributed 43.1% and 7.2%, respectively.

In terms of per capita GDP, the economic crisis caused the Indonesian economy to revert to the 1995 level. The impacts were, however, very uneven across provinces and districts.

The overall regional income inequality, as measured using district-level data, declined to 0.266 in 1998 from 0.287 in 1997, which corresponded to the level prevailing in 1993-94. According to the two-stage nested inequality decomposition analysis, about three-quarters of the decline was due to the decrease in the between-province inequality component. The Java-Bali region played a prominent role in the decrease in this component through a significant decrease in its between-province inequality (from 0.167 to 0.146). Jakarta was the hardest-hit province in Indonesia due to its heavy reliance on the non-oil and gas manufacturing, finance, and construction sectors, which were most adversely affected by the crisis; Jakarta's per capita GDP decreased by almost 20%, reverting to the level that was recorded in 1993. The economies of other Java provinces also contracted significantly, but the impacts were not as severe as in Jakarta. As a result, the per capita GDP gap between Jakarta and the other Java-Bali provinces became smaller. In the Outer Islands, Sumatra experienced a 7% decrease in per capita GDP, but the economic crisis does not seem to have affected Kalimantan and Sulawesi very severely. As a result, the between-region inequality component fell to 0.18 in 1998 from 0.021 in 1997.

The economic crisis was borne disproportionately by Java-Bali's major urban areas. In Jakarta and West Java, Jabotabek districts were affected very severely; with the exception of Central Jakarta, these districts recorded a 20%+ decrease in per capita GDP. As a result, West Java experienced a fall in within-province inequality. Central Java and East Java also decreased their within-province inequalities; this is again due to a very large decrease in per capita GDP in their major urban districts. These observations confirm that Indonesia's economic crisis was a crisis afflicting urban Java. It should be noted, however, that, with the exception of Batam, Sumatra's major urban districts also experienced a relatively large decrease in per capita GDP. Thus, like Java-Bali, the crisis seems to have adversely affected Sumatra's urban areas.

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Appendix 1: Theil Indices and the Theil Inequality Decomposition Method

Suppose that the population of all households is grouped into mutually exclusive and collectively exhaustive socio-economic groups (different age groups, different education groups, etc.). Since we are working with aggregated expenditure data (decile data), the Theil indices, T and L, are defined, respectively, as:

$$T = \sum_i \sum_j \left(\frac{X_{ij}}{X} \right) \log \left(\frac{X_{ij}/X}{n_{ij}/n} \right), \text{ and}$$

$$L = \sum_i \sum_j \left(\frac{n_{ij}}{n} \right) \log \left(\frac{n_{ij}/n}{X_{ij}/X} \right), \qquad \text{(A1-1)}$$

where X_{ij} is the total expenditure of households in expenditure class j in group i,

X is the total expenditure of all households $\left(= \sum_i \sum_j X_{ij} \right)$,

n_{ij} is the total number of households in expenditure class j in group i, and

n is the total number of all households $\left(= \sum_i \sum_j n_{ij} \right)$.

Since n_{ij}/n is the population share of households in expenditure class j in group i and X_{ij}/X is the expenditure share of households in expenditure class j in group i, these indices compare population shares and expenditure shares for each cell (i,j) and thereby measure the extent of inequality in the distribution of household expenditures. It should be noted that the Theil index T uses expenditure shares as weights, while the Theil index L uses population shares as weights. Therefore, the former is sensitive to changes in the upper-expenditure categories while the latter to changes in the lower-expenditure categories.

According to Anand (1983, Appendix C), the Theil indices given in equation (A1-1) can be decomposed into within-group and between-group components as follows:

$$T = \sum_i \left(\frac{X_i}{X} \right) T_i + \sum_i \left(\frac{X_i}{X} \right) \log \left(\frac{X_i/X}{n_i/n} \right) = T_W + T_B, \text{ and}$$

$$L = \sum_i \left(\frac{n_i}{n} \right) L_i + \sum_i \left(\frac{n_i}{n} \right) \log \left(\frac{n_i/n}{X_i/X} \right) = L_W + L_B, \qquad \text{(A1-2)}$$

where

$$T_i = \sum_j \left(\frac{X_{ij}}{X_i} \right) \log \left(\frac{X_{ij}/X_i}{n_{ij}/n_i} \right),$$

$$L_i = \sum_j \left(\frac{n_{ij}}{n_i} \right) \log \left(\frac{n_{ij} / n_i}{X_{ij} / X_i} \right),$$

X_i is the total expenditure of households in group i $\left(= \sum_j X_{ij} \right)$, and

n_i is the total number of households in group i $\left(= \sum_j n_{ij} \right)$.

T_W is the within-group component of the Theil index T and is defined by a weighted average of within-group Theil indices T_i with the weights being the expenditure shares of the groups X_i / X, whereas T_B is the between-group component of the Theil index T and measures the extent of inequality due solely to differences in the group mean expenditures $x_i = X_i / n_i$. On the other hand, L_W is the within-group component of the Theil index L and is defined by a weighted average of within-group Theil indices L_i with the weights being the population shares of the groups n_i / n, whereas L_B is the between-group component of the Theil index L and measures the extent of inequality due solely to differences in the group mean expenditures x_i.

In addition to these two Theil indices, we use the Gini coefficient as another measure of inequality in the distribution of household expenditures. Though it is not additively decomposable (i.e., cannot be decomposed into within- and between-group components), it satisfies the properties of mean independence, population-size independence, and the Pigou-Dalton condition. The estimation of the Gini coefficient is based on the following formula:

$$G = 1 - \sum_{i=0}^{m-1} (F_{i+1} - F_i)(H_{i+1} + H_i), \qquad \text{(A1-3)}$$

where F_i is the cumulative population share of households up to expenditure class i,
H_i is the cumulative expenditure share of households up to expenditure class i,
$F_0 = H_0 = 0$, and
m is the number of expenditure classes.

Appendix 2: Decomposition by Location and the Kuznets Curve

For the decomposition of inequality by location (rural-urban), equation (A1-2) in Appendix 1 can be rewritten as:

$$T = \left[T_R + (T_U - T_R) \frac{\alpha x}{1 + (\alpha - 1)x} \right] + \left[\frac{(\alpha \log \alpha)x}{1 + (\alpha - 1)x} - \log(1 + (\alpha - 1)x) \right]$$

$$L = \left[L_R + (L_U - L_R)x \right] + \left[\log(1 + (\alpha - 1)x) - (\log \alpha)x \right] \qquad \text{(A2-1)}$$

where $\alpha \left(= \mu_U / \mu_R \right)$ = urban-to-rural ratio in mean household expenditures,
μ_U = mean household expenditure for urban households,
μ_R = mean household expenditure for rural households,

$x \left(= {}^{n_U}\!/_{n} \right)$ = share of urban households $(0 \leq x \leq 1)$,

T_U and L_U = urban expenditure inequality measured by the Theil index T and L, respectively, and

T_R and L_R = rural expenditure inequality measured by the Theil index T and L, respectively.

With constant α, T_i, and L_i $(i = R, U)$, T and L in (A2-1) can be viewed as a function of the share of urban households, x. Equation (A2-1) describes, in essence, the Kuznets process of urbanization and inequality. Based on past empirical evidence of income inequality including that in Indonesia, we can safely assume that $\alpha > 1$, i.e., mean household expenditure is larger in urban than in rural areas, and $T_U > T_R$ and $L_U > L_R$, i.e., urban inequality is larger than rural inequality. Under these assumptions, if the following condition holds:

$$T_U - T_R < (\alpha - 1) - \log\alpha,$$

then the Theil index T is convex with respect to x, and the peak is reached at

$$x_T^* = \frac{\alpha(T_U - T_R) + \alpha\log\alpha - (\alpha - 1)}{(\alpha - 1)^2}, \qquad 0 < x_T^* < 1. \qquad \text{(A2-2)}$$

Similarly, if the following condition holds:

$$L_U - L_R < \log\alpha - \left(\frac{\alpha - 1}{\alpha}\right),$$

then the Theil index L is convex with respect to x, and the peak is reached at

$$x_L^* = \frac{(L_U - L_R) + (\alpha - 1) - \log\alpha}{(\alpha - 1)\left(\log\alpha - (L_U - L_R)\right)}, \qquad 0 < x_L^* < 1. \qquad \text{(A2-3)}$$

Using equations (A2-1), (A2-2), and (A2-3), and with specific values for α, T_i, L_i $(i = R, U)$, we can estimate the peak inequality values, T^* and L^*, and the corresponding share of urban households, x_T^* and x_L^*.

Appendix 3: Weighted Coefficient of Variation and Its Sectoral Decomposition

Since the work by Williamson, the following weighted coefficient of variation (CV_w) has been widely used as a measure of regional income inequality.[25]

$$CV_w = \frac{1}{\bar{Z}}\sqrt{\sum_{i=1}^{n}(\bar{z}_i - \bar{Z})^2 \frac{P_i}{P}} \qquad \text{(A3-1)}$$

where P_i = population of the ith region,

P = national population,

$\bar{z}_i$ = income per capita of the ith region,

$\bar{Z}$ = national income per capita

$= \frac{1}{P}\sum_{i=1}^{n}\bar{z}_i P_i$

n = number of regions.

We use GDP as a substitute for income.[26] Since GDP is equal to the sum of sectoral GDPs, the squared weighted coefficient of variation (CV_w^2) can be decomposed as follows:

$$CV_w^2 = \sum_{j=1}^{m} s_j^2 \, CV_{wj}^2 + \sum_{j \neq k} s_j s_k \, COV_w(j,k) \qquad \text{(A3-2)}$$

where s_j = share of sector j in national GDP,

CV_{wj} = weighted coefficient of variation of sector j

$$= \frac{1}{\overline{Z}_j} \sqrt{\sum_{i=1}^{n} \left(\overline{z}_{ji} - \overline{Z}_j\right)^2 \frac{P_i}{P}}$$

$COV_w(j,k)$ = weighted coefficient of covariation between sector j and sector k

$$= \frac{1}{\overline{Z}_j} \frac{1}{\overline{Z}_k} \sum_{i=1}^{n} \left(\overline{z}_{ji} - \overline{Z}_j\right)\left(\overline{z}_{ki} - \overline{Z}_k\right) \frac{P_i}{P}$$

$\overline{Z}_j, \overline{Z}_k$ = national GDP per capita of sector j and sector k, respectively,

$\overline{z}_{ji}, \overline{z}_{ki}$ = GDP per capita of sector j and sector k in region i, respectively, and

m = number of sectors.

If there are three sectors, equation (A3-2) will be

$$\begin{aligned} CV_w^2 &= s_1^2 CV_{w1}^2 + s_2^2 CV_{w2}^2 + s_3^2 CV_{w3}^2 \\ &\quad + 2s_1 s_2 COV_w(1,2) + 2s_1 s_3 COV_w(1,3) + 2s_2 s_3 COV_w(2,3) \end{aligned} \qquad \text{(A3-3)}$$

This equation allows us to examine the extent to which each industrial sector contributes to the overall weighted coefficient of variation of GDP per capita. Since it includes covariation terms, it can also account for the magnitude and direction of covariations between sectors in the overall weighted coefficient of variation.

Appendix 4: Two-Stage Nested Inequality Decomposition Method

This appendix presents the two-stage nested inequality decomposition method as an extension of the one-stage inequality decomposition method, as presented in Appendix 1. We consider the following hierarchical structure of a country: region-province-district as shown. Using a district as the underlying regional unit, overall regional income inequality can be measured by the following Theil index (Theil index T).

$$T_d = \sum_i \sum_j \sum_k \left(\frac{y_{ijk}}{Y}\right) \log\left(\frac{y_{ijk}/Y}{p_{ijk}/P}\right), \qquad \text{(A4-1)}$$

where y_{ijk} is the income of district k in province j in region i,

Y is the total income of all districts $\left(= \sum_i \sum_j \sum_k y_{ijk}\right)$,

p_{ijk} is the population of district k in province j in region i, and

P is the total population of all districts $\left(= \sum_i \sum_j \sum_k p_{ijk}\right)$.

If we define T_{di} as follows to measure between-district income inequality for region i,

$$T_{di} = \sum_j \sum_k \left(\frac{y_{ijk}}{Y_i}\right) \log\left(\frac{y_{ijk}/Y_i}{p_{ijk}/P_i}\right), \qquad \text{(A4-2)}$$

then T_d in equation (A4-1) will be decomposed into

$$T_d = \sum_i \left(\frac{Y_i}{Y}\right) T_{di} + \sum_i \left(\frac{Y_i}{Y}\right) \log\left(\frac{Y_i / Y}{P_i / P}\right) \qquad \text{(A4-3)}$$

$$= \sum_i \left(\frac{Y_i}{Y}\right) T_{di} + T_{BR}$$

where Y_i is the total income of region i $\left(= \sum_j \sum_k y_{ijk}\right)$,

P_i is the total population of region i $\left(= \sum_j \sum_k p_{ijk}\right)$, and

$T_{BR} = \sum_i \left(\frac{Y_i}{Y}\right) \log\left(\frac{Y_i / Y}{P_i / P}\right)$ measures income inequality between regions.

Therefore, the overall regional income inequality T_d is the sum of the within-region component and the between-region component. Equation (A4-3) is the ordinary one-stage inequality decomposition equation.

Next, if we define T_{ij} as follows to measure within-province income inequality for province j in region i,

$$T_{ij} = \sum_k \left(\frac{y_{ijk}}{Y_{ij}}\right) \log\left(\frac{y_{ijk} / Y_{ij}}{p_{ijk} / P_{ij}}\right)$$

then T_{di} in equation (A4-2) can be further decomposed into

$$T_{di} = \sum_j \left(\frac{Y_{ij}}{Y_i}\right) T_{ij} + \sum_j \left(\frac{Y_{ij}}{Y_i}\right) \log\left(\frac{Y_{ij} / Y_i}{P_{ij} / P_i}\right) \qquad \text{(A4-4)}$$

$$= \sum_j \left(\frac{Y_{ij}}{Y_i}\right) T_{ij} + T_{pi}$$

where Y_{ij} is the total income of province j in region i $\left(= \sum_k y_{ijk}\right)$,

P_{ij} is the total population of province j in region i $\left(= \sum_k p_{ijk}\right)$, and

$T_{pi} = \sum_j \left(\frac{Y_{ij}}{Y_i}\right) \log\left(\frac{Y_{ij} / Y_i}{P_{ij} / P_i}\right)$ measures income inequality between provinces in region i.

By substituting T_{di} in equation (A4-4) into equation (A4-3), we obtain

$$T_d = \sum_i \left(\frac{Y_i}{Y}\right)\left[\sum_j \left(\frac{Y_{ij}}{Y_i}\right) T_{ij} + T_{pi}\right] + T_{BR}$$

$$= \sum_i \sum_j \left(\frac{Y_{ij}}{Y}\right) T_{ij} + \sum_i \left(\frac{Y_i}{Y}\right) T_{pi} + T_{BR}$$

$$= T_{WP} + T_{BP} + T_{BR} \qquad \text{(A4-5)}$$

Equation (A4-5) is the two-stage nested inequality decomposition equation, in which the overall regional income inequality is decomposed into the within-province component (T_{WP}), the between-province component (T_{BP}), and the between-region component (T_{BR}). The within-province component is a weighted average of within-province income inequalities (T_{ij}), while the between-province component is a weighted average of between-province income inequalities (T_{pi}).

Table 1

Trends in the Gini Coefficient
by Per Capita Household Consumption Expenditure

Year	Urban	Rural	Total
1964/65	0.34	0.35	0.35
1969/70	0.33	0.34	0.35
1976	0.35	0.31	0.34
1978	0.39	0.34	0.38
1980	0.36	0.31	0.34
1981	0.33	0.29	0.33
1984	0.32	0.28	0.33
1987	0.32	0.26	0.32
1990	0.34	0.25	0.32
1993	0.33	0.26	0.34
1996	0.36	0.27	0.36

Table 2

Expenditure Shares
(% of Total)

	Quintile						Decile	
	1	2	3	4	5	T20/B20	1	10
1969/70	7.5	11.5	15.9	22.5	42.6	5.7	3.0	27.3
1976	8.0	11.5	16.0	22.0	42.5	5.3	3.5	27.3
1978	7.3	10.8	14.8	21.8	45.3	6.2	2.8	30.5
1980	7.7	11.8	16.0	22.2	42.3	5.5	3.3	27.8
1981	8.3	12.2	15.6	21.8	42.1	5.1	3.5	27.6
1984	8.0	12.8	15.3	22.0	42.0	5.3	3.4	27.1
1987	9.2	11.7	15.6	21.8	41.7	4.5	3.7	27.0
1990	8.9	12.4	16.2	20.6	42.0	4.7	4.0	26.8
1993	8.9	11.5	15.5	21.4	42.8	4.8	3.7	28.1
1996	20.3		35.1		44.7			

(Note) T20/B20 is the ratio in the expenditure share of the top 20 percent quintile to the bottom 20 percent quintile.

Table 3

Mean Monthly Expenditure for Urban and Rural Households

Location	Mean Expenditure (1,000 Rp.)				No. of Households % Share			
	1987	1990	1993	1996	1987	1990	1993	1996
Urban	164	211	294	449	25.8	28.8	32.1	35.7
Rural	82	108	143	221	74.2	71.2	67.9	64.3
All	103	138	192	311	100.0	100.0	100.0	100.0
Ratio (U/R)	2.00	1.95	2.06	2.03				

Table 4

Inequality Decomposition by Location

	Theil T				Theil L				Gini			
Location	1987	1990	1993	1996	1987	1990	1993	1996	1987	1990	1993	1996
Urban	0.221	0.232	0.235	0.253	0.222	0.232	0.233	0.249	0.364	0.372	0.373	0.386
(% Share)	(37.6)	(43.0)	(45.2)	(49.2)	(25.2)	(29.9)	(31.3)	(35.2)				
Rural	0.162	0.150	0.153	0.164	0.161	0.151	0.153	0.164	0.313	0.302	0.304	0.315
(% Share)	(39.6)	(35.3)	(30.3)	(28.5)	(52.5)	(48.1)	(43.5)	(41.5)				
All Groups	0.241	0.238	0.257	0.272	0.228	0.223	0.239	0.253	0.372	0.361	0.378	0.387
W-Group	0.186	0.186	0.194	0.211	0.177	0.174	0.179	0.194				
(% Share)	(77.2)	(78.2)	(75.4)	(77.7)	(77.7)	(76.4)	(74.8)	(76.7)				
B-Group	0.055	0.052	0.063	0.061	0.051	0.049	0.060	0.059				
(% Share)	(22.8)	(21.8.)	(24.5)	(22.3)	(22.3)	(21.5)	(25.2)	(23.3)				
Peak Value												
Urban Share (%)	50.4	56.7	53.2	55.3	58.2	65.1	61.3	63.3				
Inequality	0.258	0.258	0.270	0.283	0.252	0.250	0.260	0.272				

Table 5

Inequality Decomposition by Province

	Theil T				Theil L				Gini			
Province	1987	1990	1993	1996	1987	1990	1993	1996	1987	1990	1993	1996
Aceh	0.182	0.129	0.200	0.152	0.178	0.128	0.196	0.155	0.333	0.279	0.344	0.303
N. Sumatra	0.183	0.142	0.174	0.186	0.177	0.142	0.165	0.178	0.327	0.293	0.313	0.329
W. Sumatra	0.160	0.178	0.222	0.193	0.164	0.182	0.214	0.200	0.312	0.328	0.355	0.342
Riau	0.142	0.147	0.144	0.194	0.140	0.145	0.142	0.181	0.291	0.296	0.296	0.334
Jambi	0.127	0.112	0.135	0.130	0.124	0.113	0.130	0.128	0.277	0.262	0.285	0.279
S. Sumatra	0.182	0.180	0.207	0.182	0.172	0.167	0.192	0.174	0.322	0.313	0.341	0.326
Bengkulu	0.120	0.147	0.149	0.168	0.112	0.139	0.138	0.165	0.261	0.293	0.290	0.317
Lampung	0.184	0.173	0.158	0.178	0.175	0.166	0.153	0.168	0.329	0.319	0.307	0.322
Jakarta	0.188	0.210	0.253	0.281	0.181	0.201	0.235	0.259	0.333	0.352	0.379	0.396
W. Java	0.223	0.246	0.221	0.261	0.215	0.223	0.214	0.257	0.360	0.358	0.359	0.391
C. Java	0.183	0.194	0.198	0.196	0.179	0.189	0.189	0.189	0.330	0.336	0.340	0.338
Yogyakarta	0.226	0.317	0.256	0.275	0.220	0.275	0.243	0.275	0.363	0.378	0.378	0.402
E. Java	0.267	0.227	0.269	0.222	0.241	0.207	0.238	0.213	0.381	0.351	0.379	0.360
Bali	0.222	0.198	0.204	0.208	0.209	0.189	0.197	0.198	0.356	0.342	0.347	0.346
W. Kalimantan	0.166	0.177	0.200	0.174	0.153	0.166	0.184	0.166	0.310	0.319	0.337	0.321
C. Kalimantan	0.137	0.141	0.146	0.162	0.132	0.138	0.137	0.152	0.288	0.296	0.290	0.305
S. Kalimantan	0.178	0.148	0.168	0.174	0.169	0.145	0.166	0.166	0.321	0.295	0.318	0.318
E. Kalimantan	0.164	0.163	0.214	0.188	0.162	0.161	0.211	0.190	0.306	0.312	0.354	0.338
N. Sulawesi	0.171	0.141	0.165	0.214	0.170	0.141	0.160	0.200	0.322	0.294	0.311	0.351
C. Sulawesi	0.172	0.158	0.183	0.205	0.166	0.150	0.175	0.191	0.326	0.305	0.331	0.344
S. Sulawesi	0.169	0.201	0.172	0.236	0.164	0.199	0.173	0.226	0.318	0.348	0.321	0.370
S.E. Sulawesi	0.205	0.212	0.176	0.225	0.197	0.195	0.168	0.211	0.349	0.350	0.318	0.359
W. Nusa Teng.	0.202	0.234	0.192	0.211	0.197	0.208	0.183	0.197	0.345	0.354	0.337	0.347
E. Nusa Teng.	0.205	0.203	0.170	0.223	0.183	0.187	0.158	0.205	0.342	0.344	0.314	0.354
E. Timor	0.106	0.233	0.300	0.233	0.111	0.217	0.264	0.219	0.258	0.367	0.404	0.369
Maluku	0.212	0.123	0.186	0.164	0.196	0.119	0.181	0.157	0.350	0.277	0.334	0.310
Irian Jaya	0.306	0.225	0.246	0.277	0.302	0.225	0.249	0.272	0.426	0.371	0.389	0.405
All Groups	0.247	0.245	0.266	0.281	0.232	0.227	0.243	0.259	0.372	0.361	0.378	0.387
W-Group	0.205	0.204	0.216	0.225	0.197	0.193	0.201	0.211				
(% Share)	(83.0)	(83.3)	(81.2)	(80.1)	(84.9)	(85.0)	(82.7)	(81.5)				
B-Group	0.042	0.041	0.050	0.056	0.035	0.034	0.042	0.048				
(% Share)	(17.0)	(16.7)	(18.8)	(19.9)	(15.1)	(15.0)	(17.3)	(18.5)				

Table 6
Inequality Decomposition by Age

Age Group	Theil T				Theil L				Gini			
(year)	1987	1990	1993	1996	1987	1990	1993	1996	1987	1990	1993	1996
≤ 19	0.136	0.183	0.166	0.209	0.136	0.172	0.159	0.198	0.292	0.325	0.315	0.350
20 - 24	0.137	0.124	0.135	0.179	0.131	0.120	0.130	0.167	0.286	0.273	0.284	0.321
25 - 29	0.159	0.161	0.156	0.166	0.154	0.153	0.148	0.158	0.309	0.309	0.304	0.314
30 - 34	0.186	0.180	0.186	0.205	0.176	0.171	0.174	0.193	0.330	0.326	0.329	0.345
35 - 39	0.202	0.195	0.201	0.213	0.193	0.185	0.190	0.200	0.345	0.337	0.343	0.351
40 - 44	0.233	0.203	0.232	0.229	0.224	0.196	0.221	0.219	0.370	0.346	0.368	0.366
45 - 49	0.243	0.235	0.268	0.273	0.237	0.229	0.252	0.259	0.379	0.373	0.391	0.395
50 - 54	0.265	0.242	0.281	0.297	0.255	0.240	0.269	0.285	0.391	0.379	0.401	0.413
55 - 59	0.279	0.253	0.293	0.312	0.267	0.248	0.281	0.303	0.401	0.385	0.410	0.424
60 - 64	0.296	0.247	0.275	0.321	0.283	0.248	0.266	0.310	0.411	0.383	0.398	0.428
65 +	0.293	0.266	0.314	0.309	0.286	0.267	0.301	0.304	0.413	0.397	0.422	0.424
All Groups	0.240	0.223	0.251	0.263	0.231	0.218	0.238	0.252	0.372	0.361	0.378	0.387
W-Group	0.229	0.214	0.238	0.251	0.219	0.208	0.225	0.239				
(% Share)	(95.5)	(95.7)	(95.0)	(95.5)	(95.1)	(95.4)	(94.5)	(95.1)				
B-Group	0.011	0.010	0.013	0.012	0.011	0.010	0.013	0.012				
(% Share)	(4.5)	(4.3)	(5.1)	(4.5)	(4.9)	(4.6)	(5.5)	(4.9)				

Table 7
Inequality Decomposition by Education

	Theil T				Theil L				Gini			
Education	1987	1990	1993	1996	1987	1990	1993	1996	1987	1990	1993	1996
No Formal Education	0.160	0.151	0.180	0.171	0.163	0.157	0.183	0.173	0.313	0.306	0.331	0.322
Elementary School	0.142	0.140	0.156	0.164	0.139	0.138	0.151	0.159	0.293	0.292	0.305	0.313
General Jr. HS	0.167	0.147	0.182	0.193	0.161	0.144	0.177	0.190	0.315	0.298	0.330	0.340
Vocational Jr. HS	0.201	0.181	0.177	0.173	0.200	0.178	0.169	0.171	0.347	0.330	0.324	0.323
General Sr. HS	0.181	0.158	0.231	0.215	0.176	0.160	0.230	0.213	0.329	0.312	0.371	0.359
Vocational Sr. HS	0.189	0.206	0.170	0.180	0.194	0.208	0.170	0.176	0.340	0.353	0.321	0.328
College (Two-Year)	0.157	0.158	0.174	0.202	0.157	0.159	0.173	0.195	0.307	0.311	0.325	0.345
College (Three-Year)	0.180	0.229	0.244	0.248	0.187	0.233	0.247	0.245	0.329	0.371	0.379	0.384
University	0.170	0.225	0.248	0.322	0.177	0.232	0.261	0.323	0.326	0.369	0.388	0.434
All Groups	0.235	0.234	0.265	0.287	0.224	0.219	0.244	0.259	0.372	0.361	0.378	0.387
W-Group	0.164	0.160	0.179	0.191	0.158	0.153	0.168	0.177				
(% Share)	(69.9)	(68.4)	(67.4)	(66.6)	(70.8)	(69.9)	(68.9)	(68.3)				
B-Group	0.071	0.074	0.086	0.096	0.065	0.066	0.076	0.082				
(% Share)	(30.1)	(31.6)	(32.6)	(33.4)	(29.2)	(30.1)	(31.1)	(31.7)				

Table 8

Inequality Decomposition by Gender

	Theil T				Theil L				Gini			
Gender	1987	1990	1993	1996	1987	1990	1993	1996	1987	1990	1993	1996
Male	0.222	0.207	0.232	0.247	0.211	0.198	0.217	0.233	0.359	0.349	0.365	0.377
Female	0.302	0.281	0.326	0.323	0.290	0.279	0.314	0.317	0.417	0.407	0.432	0.432
All Groups	0.238	0.221	0.248	0.261	0.230	0.217	0.238	0.251	0.372	0.361	0.378	0.387
W-Group	0.229	0.213	0.240	0.254	0.221	0.208	0.229	0.243				
(% Share)	(96.5)	(96.4)	(97.0)	(97.2)	(96.0)	(95.9)	(96.5)	(96.8)				
B-Group	0.008	0.008	0.007	0.007	0.009	0.009	0.008	0.008				
(% Share)	(3.5)	(3.5)	(3.0)	(2.8)	(4.0)	(4.1)	(3.5)	(3.2)				

Table 9

Weighted Coefficient of Variation in GDP per Capita at Constant Prices, 1975-99

Year	Including Mining	Excluding Mining
1975	1.257	0.429
1976	1.234	0.449
1977	1.238	0.451
1978	1.118	0.417
1979	1.034	0.441
1980	0.922	0.414
1981	0.849	0.433
1982	0.782	0.474
1983	0.782	0.490
1983	1.039	0.555
1984	0.985	0.565
1985	0.923	0.554
1986	0.904	0.543
1987	0.898	0.546
1988	0.856	0.538
1989	0.847	0.544
1990	0.818	0.545
1991	0.786	0.543
1992	0.774	0.541
1993	0.727	0.672
1994	0.727	0.673
1995	0.715	0.676
1996	0.707	0.677
1997	0.707	0.680
1998	0.721	0.651
1999	0.714	0.632

Table 10

Weighted Coefficient of Variation and Covariation in GDP per Capita at Constant Prices, 1975-99

	CV1	CV2	CV3	COV12	COV13	COV23	CV
1975	0.302	0.738	0.834	-0.083	-0.094	0.406	0.429
1976	0.335	0.808	0.834	-0.113	-0.089	0.485	0.449
1977	0.357	0.764	0.814	-0.095	-0.071	0.409	0.451
1978	0.328	0.812	0.724	-0.115	-0.068	0.410	0.417
1979	0.332	0.824	0.754	-0.103	-0.074	0.420	0.441
1980	0.315	0.769	0.722	-0.090	-0.090	0.374	0.414
1981	0.297	0.714	0.753	-0.091	-0.102	0.379	0.433
1982	0.297	0.744	0.794	-0.092	-0.111	0.424	0.474
1983	0.310	0.713	0.817	-0.111	-0.131	0.476	0.490
1983	0.318	0.936	0.804	-0.155	-0.104	0.720	0.555
1984	0.308	0.882	0.839	-0.146	-0.116	0.706	0.565
1985	0.298	0.922	0.787	-0.154	-0.110	0.697	0.554
1986	0.307	0.917	0.766	-0.155	-0.108	0.673	0.543
1987	0.328	0.899	0.758	-0.139	-0.097	0.652	0.546
1988	0.324	0.879	0.743	-0.136	-0.092	0.624	0.538
1989	0.322	0.878	0.748	-0.144	-0.098	0.627	0.544
1990	0.322	0.872	0.743	-0.147	-0.105	0.618	0.545
1991	0.333	0.858	0.737	-0.155	-0.113	0.604	0.543
1992	0.338	0.844	0.744	-0.169	-0.123	0.599	0.541
1993	0.374	0.791	0.944	-0.141	-0.149	0.712	0.672
1994	0.392	0.781	0.936	-0.152	-0.150	0.695	0.673
1995	0.401	0.783	0.937	-0.159	-0.151	0.694	0.676
1996	0.415	0.779	0.934	-0.169	-0.151	0.685	0.677
1997	0.451	0.779	0.924	-0.173	-0.142	0.675	0.680
1998	0.462	0.737	0.918	-0.154	-0.138	0.633	0.651
1999	0.448	0.734	0.894	-0.146	-0.136	0.610	0.632

(Notes)

CV = CVw excluding mining sector
CV1 = CVw of primary sector
CV2 = CVw of secondary sector
CV3 = CVw of tertiary sector
COV12 = COVw between primary sector and secondary sector
COV13 = COVw between primary sector and tertiary sector
COV23 = COVw between secondary sector and tertiary sector

Table 11

Share of Sector in GDP at Constant Prices, Excluding Mining, 1975-99 (%)

	Primary	Secondary	Tertiary	Total
1975	40.1	12.3	47.6	100
1976	39.4	12.8	47.8	100
1977	37.9	13.5	48.7	100
1978	36.8	14.6	48.5	100
1979	35.4	15.2	49.4	100
1980	34.9	15.8	49.3	100
1981	32.9	16.8	50.3	100
1982	30.8	18.0	51.2	100
1983	30.3	17.9	51.8	100
1983	29.2	20.4	50.4	100
1984	28.6	20.8	50.5	100
1985	27.9	21.6	50.4	100
1986	27.8	21.8	50.3	100
1987	27.2	22.4	50.4	100
1988	26.9	23.1	50.0	100
1989	26.2	23.7	50.1	100
1990	25.4	24.5	50.1	100
1991	24.7	25.0	50.3	100
1992	24.5	25.3	50.2	100
1993	20.0	30.4	49.6	100
1994	18.9	31.4	49.6	100
1995	18.4	32.4	49.1	100
1996	17.8	33.3	49.0	100
1997	17.1	33.6	49.4	100
1998	19.1	30.1	50.8	100
1999	19.7	29.6	50.7	100

Table 12

Share of Each Component in Weighted Coefficient of Variation, 1975-99 (%)

	CV1	CV2	CV3	COV12	COV13	COV23	CV
1975	8.0	4.5	85.7	-4.4	-19.5	25.8	100
1976	8.6	5.3	78.9	-5.7	-16.6	29.4	100
1977	9.0	5.2	77.0	-4.8	-12.8	26.4	100
1978	8.4	8.1	71.1	-7.1	-14.0	33.5	100
1979	7.1	8.1	71.4	-5.7	-13.3	32.4	100
1980	7.1	8.7	74.1	-5.8	-18.2	34.1	100
1981	5.1	7.7	76.3	-5.3	-18.0	34.2	100
1982	3.7	8.0	73.7	-4.5	-15.7	34.8	100
1983	3.7	6.8	74.8	-5.0	-17.1	36.9	100
1983	2.8	11.8	53.2	-6.0	-10.0	48.1	100
1984	2.4	10.6	56.3	-5.5	-10.5	46.7	100
1985	2.3	13.0	51.4	-6.1	-10.1	49.6	100
1986	2.5	13.6	50.4	-6.4	-10.2	50.2	100
1987	2.7	13.6	48.9	-5.7	-9.0	49.4	100
1988	2.6	14.3	47.7	-5.8	-8.6	49.8	100
1989	2.4	14.7	47.4	-6.0	-8.6	50.3	100
1990	2.3	15.4	46.6	-6.2	-9.0	51.0	100
1991	2.3	15.6	46.6	-6.5	-9.5	51.5	100
1992	2.3	15.6	47.6	-7.1	-10.3	51.9	100
1993	1.2	12.8	48.6	-3.8	-6.6	47.7	100
1994	1.2	13.3	47.7	-4.0	-6.2	48.0	100
1995	1.2	14.1	46.4	-4.2	-6.0	48.4	100
1996	1.2	14.6	45.6	-4.4	-5.7	48.6	100
1997	1.3	14.8	45.0	-4.3	-5.2	48.4	100
1998	1.8	11.6	51.3	-4.2	-6.3	45.7	100
1999	2.0	11.9	51.3	-4.3	-6.8	45.9	100

(Notes) As for Table 3-2.

Table 13. Two-Stage Nested Inequality Decomposition, 1993-1998 (excluding the Oil and Gas Sector)

Region	Province	1993		1994		1995		1996		1997		1998	
		Theil T	Contrib	Theil T	Contrib	Theil T	Contrib	Theil T	Contrib	Theil T	Contrib	Theil T	Contrib
Sumatra (73)		0.024	1.7%	0.025	1.7%	0.028	1.9%	0.028	1.8%	0.031	2.0%	0.032	2.3%
	1 DI Aceh (10)	0.019	0.1%	0.019	0.1%	0.019	0.1%	0.019	0.1%	0.020	0.1%	0.018	0.1%
	2 North Sumatra (17)	0.043	1.0%	0.042	1.0%	0.038	0.9%	0.037	0.8%	0.038	0.8%	0.034	0.8%
	3 West Sumatra (14)	0.082	0.7%	0.084	0.7%	0.090	0.7%	0.087	0.6%	0.088	0.6%	0.111	0.9%
	4 Riau (7)	0.225	1.8%	0.240	1.9%	0.257	2.0%	0.274	2.1%	0.299	2.3%	0.303	2.8%
	5 Jambi (6)	0.033	0.1%	0.033	0.1%	0.036	0.1%	0.037	0.1%	0.037	0.1%	0.036	0.1%
	6 South Sumatra (10)	0.032	0.4%	0.033	0.4%	0.034	0.4%	0.034	0.4%	0.036	0.4%	0.031	0.4%
	7 Bengkulu (4)	0.016	0.0%	0.016	0.0%	0.015	0.0%	0.014	0.0%	0.019	0.0%	0.016	0.0%
	8 Lampung (5)	0.066	0.5%	0.065	0.5%	0.074	0.5%	0.060	0.4%	0.065	0.4%	0.048	0.3%
Java-Bali (116)		0.172	43.4%	0.171	42.4%	0.170	41.0%	0.169	39.9%	0.167	38.6%	0.146	35.1%
	1 DKI Jakarta (5)	0.074	5.0%	0.079	5.2%	0.084	5.4%	0.089	5.6%	0.090	5.5%	0.118	7.1%
	2 West Java (25)	0.083	5.7%	0.088	6.0%	0.098	6.5%	0.101	6.7%	0.115	7.7%	0.101	6.8%
	3 Central Java (35)	0.161	6.7%	0.172	6.9%	0.178	6.8%	0.186	7.0%	0.187	6.7%	0.166	6.6%
	4 D I Yogyakarta (5)	0.059	0.3%	0.059	0.3%	0.062	0.3%	0.064	0.3%	0.069	0.3%	0.068	0.3%
	5 East Java (37)	0.311	19.3%	0.326	19.7%	0.343	20.0%	0.358	20.6%	0.377	20.9%	0.365	22.0%
	6 Bali (9)	0.097	0.7%	0.097	0.7%	0.097	0.7%	0.097	0.7%	0.097	0.7%	0.090	0.7%
Kalimantan (29)		0.066	1.8%	0.065	1.7%	0.069	1.8%	0.070	1.9%	0.069	1.8%	0.076	2.3%
	1 West Kalimantan (7)	0.110	0.8%	0.109	0.7%	0.107	0.7%	0.105	0.7%	0.105	0.7%	0.103	0.8%
	2 Central Kalimantan (6)	0.033	0.1%	0.033	0.1%	0.036	0.1%	0.038	0.2%	0.039	0.2%	0.039	0.2%
	3 South Kalimantan (10)	0.066	0.4%	0.064	0.4%	0.060	0.4%	0.054	0.3%	0.058	0.3%	0.069	0.4%
	4 East Kalimantan (6)	0.025	0.3%	0.022	0.2%	0.021	0.2%	0.026	0.3%	0.024	0.2%	0.027	0.3%
Sulawesi (38)		0.002	0.0%	0.003	0.1%	0.004	0.1%	0.006	0.1%	0.006	0.1%	0.008	0.2%
	1 North Sulawesi (7)	0.038	0.1%	0.038	0.1%	0.037	0.1%	0.038	0.1%	0.041	0.1%	0.046	0.2%
	2 Central Sulawesi (4)	0.002	0.0%	0.001	0.0%	0.001	0.0%	0.001	0.0%	0.001	0.0%	0.002	0.0%
	3 South Sulawesi (23)	0.068	0.7%	0.071	0.7%	0.071	0.7%	0.072	0.7%	0.077	0.7%	0.070	0.7%
	4 Southeast Sulawesi (4)	0.011	0.0%	0.010	0.0%	0.015	0.0%	0.011	0.0%	0.013	0.0%	0.017	0.0%
Others (47)		0.059	0.8%	0.055	0.7%	0.052	0.7%	0.049	0.6%	0.059	0.7%	0.056	0.8%
	1 West Nusa Tenggara (7)	0.022	0.1%	0.023	0.1%	0.023	0.1%	0.023	0.1%	0.024	0.1%	0.025	0.1%
	2 East Nusa Tenggara (12)	0.047	0.1%	0.050	0.1%	0.058	0.2%	0.063	0.2%	0.060	0.2%	0.056	0.2%
	3 East Timor (13)	0.079	0.1%	0.081	0.1%	0.081	0.1%	0.077	0.1%	0.083	0.1%	0.073	0.1%
	4 Maluku (5)	0.041	0.1%	0.046	0.1%	0.051	0.2%	0.055	0.2%	0.063	0.2%	0.062	0.2%
	5 Irian Jaya (10)	0.112	0.4%	0.111	0.4%	0.109	0.3%	0.106	0.3%	0.141	0.5%	0.136	0.5%
Within Province		0.119	45.5%	0.125	46.5%	0.131	47.4%	0.136	48.4%	0.143	49.7%	0.141	52.8%
Between Province		0.125	47.7%	0.125	46.6%	0.125	45.4%	0.124	44.2%	0.124	43.1%	0.108	40.6%
Between Region		0.018	6.9%	0.019	7.0%	0.020	7.2%	0.021	7.4%	0.021	7.2%	0.018	6.6%
Total		0.262	100.0%	0.269	100.0%	0.276	100.0%	0.281	100.0%	0.287	100.0%	0.266	100.0%

(Notes) (a) 'Contrib' is the contribution to total regional inequality.

(b) Numbers in the parentheses are the number of Kabupatens and Kotamadyas.

Table 14. Per Capita GDP, after excluding the Oil and Gas Sectors

in thousand rupiah

		Per Capita GDP			Growth Rate	
Region	Province	1993	1997	1998	93-97	97-98
Sumatra		1,342.1	1,717.5	1,583.8	6.4%	-7.8%
	1 DI Aceh	1,308.3	1,644.3	1,521.6	5.9%	-7.5%
	2 North Sumatra	1,648.5	2,186.6	1,981.1	7.3%	-9.4%
	3 West Sumatra	1,448.7	1,815.5	1,678.7	5.8%	-7.5%
	4 Riau	1,635.1	2,162.9	2,119.1	7.2%	-2.0%
	5 Jambi	1,077.9	1,296.7	1,180.1	4.7%	-9.0%
	6 South Sumatra	1,245.9	1,573.3	1,442.4	6.0%	-8.3%
	7 Bengkulu	1,100.1	1,225.7	1,171.2	2.7%	-4.4%
	8 Lampung	853.4	1,059.8	959.1	5.6%	-9.5%
Java-Bali		1,661.6	2,173.8	1,852.5	6.9%	-14.8%
	1 DKI Jakarta	5,801.7	7,424.2	5,979.2	6.4%	-19.5%
	2 West Java	1,377.3	1,882.3	1,546.5	8.1%	-17.8%
	3 Central Java	1,069.8	1,338.9	1,211.1	5.8%	-9.5%
	4 D I Yogyakarta	1,390.5	1,760.1	1,562.5	6.1%	-11.2%
	5 East Java	1,405.4	1,827.8	1,632.1	6.8%	-10.7%
	6 Bali	2,009.6	2,579.3	2,447.2	6.4%	-5.1%
Kalimantan		2,043.5	2,681.6	2,585.0	7.0%	-3.6%
	1 West Kalimantan	1,506.3	1,963.1	1,888.8	6.8%	-3.8%
	2 Central Kalimantan	1,968.4	2,538.5	2,372.9	6.6%	-6.5%
	3 South Kalimantan	1,624.0	2,092.3	1,965.0	6.5%	-6.1%
	4 East Kalimantan	3,516.0	4,619.3	4,558.8	7.1%	-1.3%
Sulawesi		1,007.5	1,264.1	1,200.8	5.8%	-5.0%
	1 North Sulawesi	1,091.3	1,465.4	1,443.4	7.6%	-1.5%
	2 Central Sulawesi	948.5	1,138.3	1,070.4	4.7%	-6.0%
	3 South Sulawesi	1,022.9	1,283.7	1,211.1	5.8%	-5.7%
	4 Southeast Sulawesi	860.8	995.1	917.1	3.7%	-7.8%
Others		872.6	1,096.2	1,030.1	5.9%	-6.0%
	1 West Nusa Tenggara	719.0	897.3	859.1	5.7%	-4.3%
	2 East Nusa Tenggara	610.1	771.4	718.3	6.0%	-6.9%
	3 East Timor	623.6	825.6	813.4	7.3%	-1.5%
	4 Maluku	1,219.8	1,441.5	1,342.6	4.3%	-6.9%
	5 Irian Jaya	1,398.2	1,828.8	1,694.3	6.9%	-7.4%
Total		1,520.9	1,973.8	1,738.1	6.7%	-11.9%

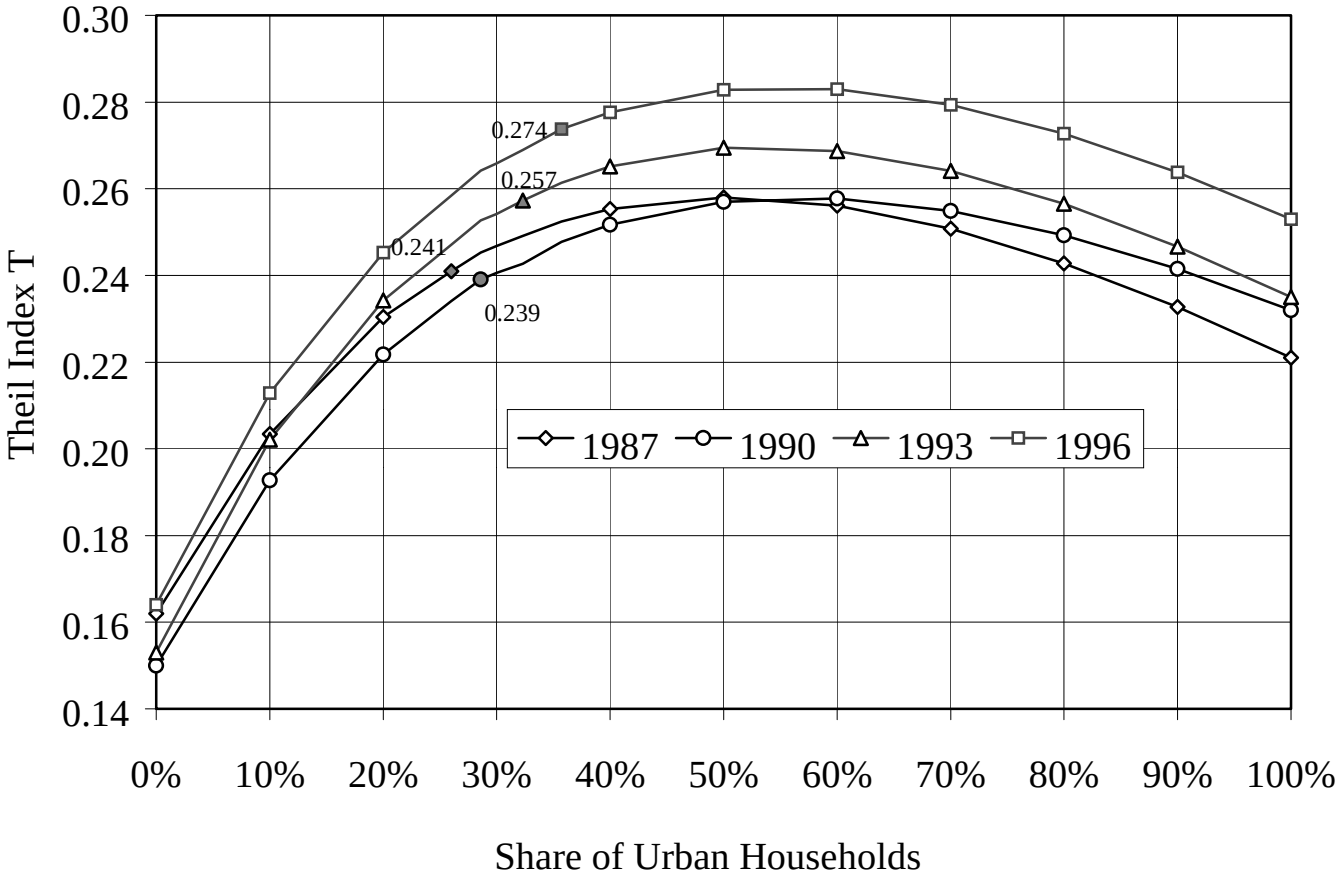
Table 15. Shift and Share Analysis for Provinces, 1997-98
Based on GDP Excluding Oil and Gas Sectors

in billion rupiah

	Province	Total Growth (A)	Regional Share (B)	Total Shift (C) = (A) - (B) = (D) + (E)	Industry Mix Shift (D)	Competitive Shift (E)	Growth Rate
1	Aceh	-380	-824	444	169	275	-5.8%
2	North Sumatra	-2,733	-3,139	406	368	38	-11.0%
3	West Sumatra	-520	-1,010	490	203	287	-6.5%
4	Riau	-155	-1,080	925	-57	982	-1.8%
5	Jambi	-282	-398	116	56	60	-8.9%
6	South Sumatra	-1,082	-1,551	470	127	342	-8.8%
7	Bengkulu	-109	-220	110	64	46	-6.3%
8	Lampung	-500	-909	409	91	317	-6.9%
9	DKI Jakarta	-12,163	-8,776	-3,387	-2,742	-645	-17.5%
10	West Java	-12,744	-8,583	-4,161	-567	-3,595	-18.7%
11	Central Java	-5,750	-5,201	-549	170	-719	-14.0%
12	Yogyakarta	-596	-667	71	31	40	-11.3%
13	East Java	-10,424	-8,108	-2,316	-49	-2,267	-16.2%
14	Bali	-306	-954	648	173	475	-4.0%
15	West Kalimantan	-340	-911	571	94	476	-4.7%
16	Central Kalimantan	-297	-541	244	161	83	-6.9%
17	South Kalimantan	-404	-781	377	135	242	-6.5%
18	East Kalimantan	-317	-1,440	1,122	256	866	-2.8%
19	North Sulawesi	-89	-475	386	88	299	-2.4%
20	Central Sulawesi	-92	-292	201	83	118	-4.0%
21	South Sulawesi	-570	-1,248	678	302	377	-5.8%
22	Southeast Sulawesi	-95	-207	112	36	77	-5.8%
23	West Nusa Tenggara	-125	-424	300	122	178	-3.7%
24	East Nusa Tenggara	-77	-358	281	119	162	-2.7%
26	Maluku	-183	-388	205	49	156	-6.0%
27	Irian Jaya	931	-916	1,847	518	1,329	12.8%
	Total	-49,402	-49,402	0	0	0	-12.6%

Figure 1

Kuznets Curve based on Theil Index T
1987 - 1996



Endnotes

[1] This section is an updated and revised version of Akita, Lukman, and Yamada (1999).
[2] See, for example, Ahluwaria (1976a, 1976b), Robinson (1976), Braulke (1983), Saith (1983), Mizoguchi (1985), Papanek and Kyn (1986), Campano and Salvatore (1988), Ram (1988), Oshima (1992), Anand and Kanbur (1993), Ram (1995), Jha (1996).
[3] See, for example, Esmara (1975), Sundrum (1979), Dapice (1980), Booth and Sundrum (1981), Hughes and Islam (1981), Sigit (1985), Yoneda (1985), Islam and Khan (1986), Rietveld (1986), Uppal and Budiono Sri Handoko (1986), Kameo and Rietveld (1987), Akita (1988), Ravallion (1988), Asra (1989), Azis (1990), Thorbecke (1991), Booth (1992), Ravallion and Huppi (1991), Akita and Lukman (1995), Hill (1996), Akita and Lukman (1999), Akita and Szeto (2000).
[4] With regard to the reliability of the *Susenas* data, see, for example, Booth (1992) and Hill (1996).
[5] Surbakti (1995) gave a detailed account of the National Socio-Economic Survey since 1963.
[6] There are now three *Susenas* modules around the core questionnaire in order to gather more detailed household information: the first module collects data on household consumption expenditures and incomes; the second module collects data on welfare, socio-cultural variables, criminality, and tourism; and the third module collects data on health, nutrition, education, and living conditions. Since 1984, the consumption expenditure module of *Susenas* has been conducted every three years together with the core questionnaire.
[7] The sample size for the 1969, 1976, and 1980 *Susenas* was 19,000, 17,000, and 58,000 households, respectively. The 1978 value of the weighted coefficient of variation based on per capita GDP excluding mining (at current prices) was, in fact, the smallest between 1975 and 1983.
[8] Anand (1983) presented an overview of decomposable inequality indices. Recent inequality decomposition studies include Mookherjee and Shorrocks (1982), Ikemoto (1985), Glewwe (1986), Ikemoto (1991), Ching (1991), Tsakloglou (1993), Tsui (1993), Jenkins (1995), and Estudillo (1997), Akita and Lukman (1999), Akita and Szeto (2000).
[9] It should be reminded that Hughes and Islam (1981) used per-capita expenditure data, rather than household expenditure data, on which our study are based. Therefore, care should be taken when we compare our results with theirs.
[10] Since there are high correlations between the three indices (Theil T, Theil L, Gini) in intra-provincial inequalities (about 0.99), we will use the Theil index T exclusively hereafter.
[11] 'Average' here refers to the simple average of provincial expenditure inequalities.
[12] To simplify the discussion, we will use, hereafter, 'households with a certain level of education' instead of 'households whose heads completed a certain level of education'.
[13] Large income transfers sometimes take place between regions.
[14] This subsection is an updated and revised version of Akita and Lukman (1995).
[15] The provincial GDP statistics employ a 37-sector classification. We classify these 37 sectors into primary, mining, secondary, and tertiary sectors, where the primary sector consists of agriculture, livestock, forestry, and fishery, the mining sector of oil/gas and non-oil/gas mining, quarrying, oil refining, and LNG, the secondary sector of manufacturing (excluding oil refinery and LNG) and construction, and the tertiary sector of the remaining sectors.
[16] The between-province inequality component is an average of between-province inequalities weighted by GDP shares.
[17] It should be noted that, for an unknown reason, West Java's GDP in *Gross Regional Domestic Product of Regencies/Municipalities in Indonesia* is much larger than its GDP in *Gross Regional Domestic Product of Provinces in Indonesia.* For example, West Java's GDP minus the oil and gas sector in 1997 was Rp76,150 billion in the regencies/municipalities' statistics; in contrast, it was Rp68,010 billion in the provincial statistics. In other provinces, the discrepancy is significantly smaller over the 1993-97 period (all are within 3% of each other).
[18] The within-province inequality component is an average of within-province inequalities weighted by GDP shares.
[19] According to the provincial GDP data, per capita GDP declined by 13.9% in 1998.
[20] It should be noted that we use only 1998 data, and thus care should be taken to interpret the results. Since 1999 district-level GDP data is not yet available, we do not know whether the within-province inequality component decreased or increased in 1999; but, according to *Gross Regional Domestic Product of Provinces in Indonesia by Industrial Origin, 1996-1999*, regional income inequality, as measured based on provincial GDP data, reduced further in 1999 due mainly to the fall in the between-province inequality component.
[21] The following should be noted: in 1997 East Java's GDP in *Gross Regional Domestic Product of Regencies/Municipalities in Indonesia* was smaller than its GDP in *Gross Regional Domestic Product of Provinces in Indonesia* (Rp62,815 vs. 64,259 billion), in 1998 the former became larger than the latter (Rp56,606 vs. 53,825 billion). Therefore, the rate of decrease in GDP was much smaller when the statistics of regencies/municipalities

are used rather than provincial statistics (-10% vs. –16%).

[22] For the detailed account of the shift and share analysis, please see, for example, Armstrong and Taylor (1985).

[23] This is true even though the agricultural sectors in West Java and East Java contracted by 7.6% and 5.0%, respectively, both of which were higher than the 2.6% negative growth rate in the agricultural sector of the whole country.

[24] Household expenditure data from the National Socio-Economic Surveys (*Susenas*) also indicated an increase in inequality, as measured by Theil indices and the Gini coefficient, between 1993 and 1996 (Akita and Szeto, 2000).

[25] For example, Green (1969), Jensen (1969), Esmara (1975), Gilbert and Goodman (1976), Mathur (1983), Uppal and Budiono (1986), Akita (1988), Tabuchi (1988), Mutlu (1991) and Hill (1992).

[26] There is no regional distributed income data in Indonesia.