The Economic Crisis and Regional Income Inequality in Indonesia

Takahiro Akita
and
Armida S. Alisjahbana

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Takahiro Akita is a Professor of International Development, Graduate School of International Relations, International University of Japan.
Armida S. Alisjahbana is Faculty of Economics, Department of Economics and Development Studies, Padjadjaran University.

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Abstract

This paper estimates regional income inequality in Indonesia during 1993-1998 using a Theil index based upon district-level GDP and population data. The 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%. 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. In 1997, the within-province inequality component accounted for about a half of overall regional income inequality. In terms of per capita GDP, the economic crisis caused the Indonesian economy to revert to the 1995 level. The impact was, however, very uneven across provinces and districts. The overall regional income inequality declined to 0.266 in 1998, which corresponded to the level prevailing in 1993-94. Contrary to the 1993-1997 period, about three-quarters of the decline was due to the decrease in the between-province inequality component, in which the Java-Bali region played a prominent role through a significant decrease in its between-province inequality. The economic crisis appears to have been a crisis afflicting urban Java and urban Sumatra.

Key Words: Indonesia, regional income inequalities, two-stage inequality decomposition, economic crisis

1. Introduction

Prior to the economic crisis, Indonesia achieved an annual average growth rate of more than 7% in the late 1980s and the 1990s, comparable to the rapid growth period of the 1970s. However, this rapid growth was achieved without the benefit of large oil revenue windfalls. In the decade prior to the economic crisis in 1997, Indonesia underwent remarkable structural changes in production and trade. These changes included a significant decline in the agricultural and mining sectors' share of value added and trade in contrast to the increasing share of manufacturing. According to Akita and Hermawan (2000), the manufacturing sector's share of GDP rose from 12% to 21% between 1985 and 1995, while agriculture and mining's combined share decreased from 46% to 26%. The change was most conspicuous in exports, in which the manufacturing sector's share increased from 17% to 53%, while the agriculture and mining sectors' combined share decreased from 73% to 22%. The economic crisis that started in 1997, however, suddenly brought the dynamism of the Indonesian economy to a standstill, and in 1998, Indonesia experienced significant negative growth (-12%). The economic crisis cast a shadow not only on the financial sector but also the real sector of the economy. The construction and non-oil manufacturing sectors were hardest hit by the crisis and contracted in real GDP terms by 33% and 18%, respectively.

The rapid economic growth prior to the crisis was accompanied by a remarkably stable level of regional income inequality, as measured in terms of provincial GDP after excluding the oil and gas sectors. According to Akita and Lukman (1995) and this study's calculation, the weighted coefficient of variation in provincial GDP, after excluding the oil and gas sectors, was virtually constant over the 1985-1997 period: during 1985-1993, it was in the

range of 0.54-0.55 as measured at 1983 constant prices; during 1993-1997, it was in the range of 0.66-0.67 as measured at 1993 constant prices.[1] The weighted coefficient of variation in provincial GDP, including the oil and gas sectors, was much larger due to these two sectors' very uneven geographical distribution, but even this has gradually decreased as the contribution of the oil and gas sectors to total GDP has fallen (Akita and Lukman, 1995). These achievements are remarkable if we consider the fact that in this period the Indonesian economy also experienced substantial structural changes in production and trade.

Despite these achievements, regional income inequality still receives 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 sectors. 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 sectors. In terms of per capita GDP after excluding the oil and gas sectors, 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. With respect to other socio-economic indicators, 1) in Jakarta, the proportion of people below the poverty line was 2.5% in 1996, while it was 20.6% and 22.0% in East Nusa Tenggara and West Kalimantan, respectively, 2) the number of hospital beds per thousand people in 1997 was 1.6 in Jakarta, while it was less than 0.3 in Lampung and West Nusa Tenggara, and 3) the number of students attending senior high school (either general or vocational) per thousand people in 1997 was 45 in Jakarta and Yogyakarta, while it was only 15 in South Kalimantan and West Nusa Tenggara.

The main purposes of this paper are to estimate regional income inequality in Indonesia during 1993-1998 using a Theil index based upon district-level GDP and population data (as compiled by the Central Bureau of Statistics) and to analyze the factors of regional income inequality. The study period includes 1998 when Indonesia experienced a significant decline in living standards in the midst of the economic crisis; thus this study analyzes the effects of the economic crisis on regional income inequality. Most previous studies employed provincial GDP and population data to measure regional income inequality in Indonesia and were unable to measure inequality within provinces.[2] This study uses district-level data, rather than provincial data, to measure regional income inequality, thus providing a means to analyze not only between-province but also within-province inequalities. This study explores the factors of regional income inequality in Indonesia by using the two-stage nested inequality decomposition method, which was developed by Akita (2000). 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. 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.

2. Method and the Data

Method: Two-Stage Nested Inequality Decomposition Method

This study estimates regional income inequality using a Theil index based upon district-level GDP and population data; it also conducts a two-stage nested inequality

decomposition analysis to explore the factors of regional income inequality. Theil indices are additively decomposable and satisfy several desirable properties as a measure of regional income inequality, i.e., mean independence, population-size independence, and the Pigou-Dalton principle of transfers (Bourguignon, 1979; Shorrocks, 1980).[3]

This section presents the two-stage nested inequality decomposition method as an extension of the one-stage inequality decomposition method.[4] There are numerous studies that used the one-stage inequality decomposition method to analyze the factors of income inequality. But most studies applied the method to analyze inter-personal or inter-household income inequality.[5]

We consider the following hierarchical structure of a country: region-province-district as shown in Figure 1. Using a district as the underlying regional unit, overall regional income inequality can be measured by the following Theil index (Theil index T).

$$T_d = \sum_i \sum_j \sum_k \left(\frac{y_{ijk}}{Y} \right) \log \left(\frac{y_{ijk}/Y}{n_{ijk}/N} \right), \qquad (1)$$

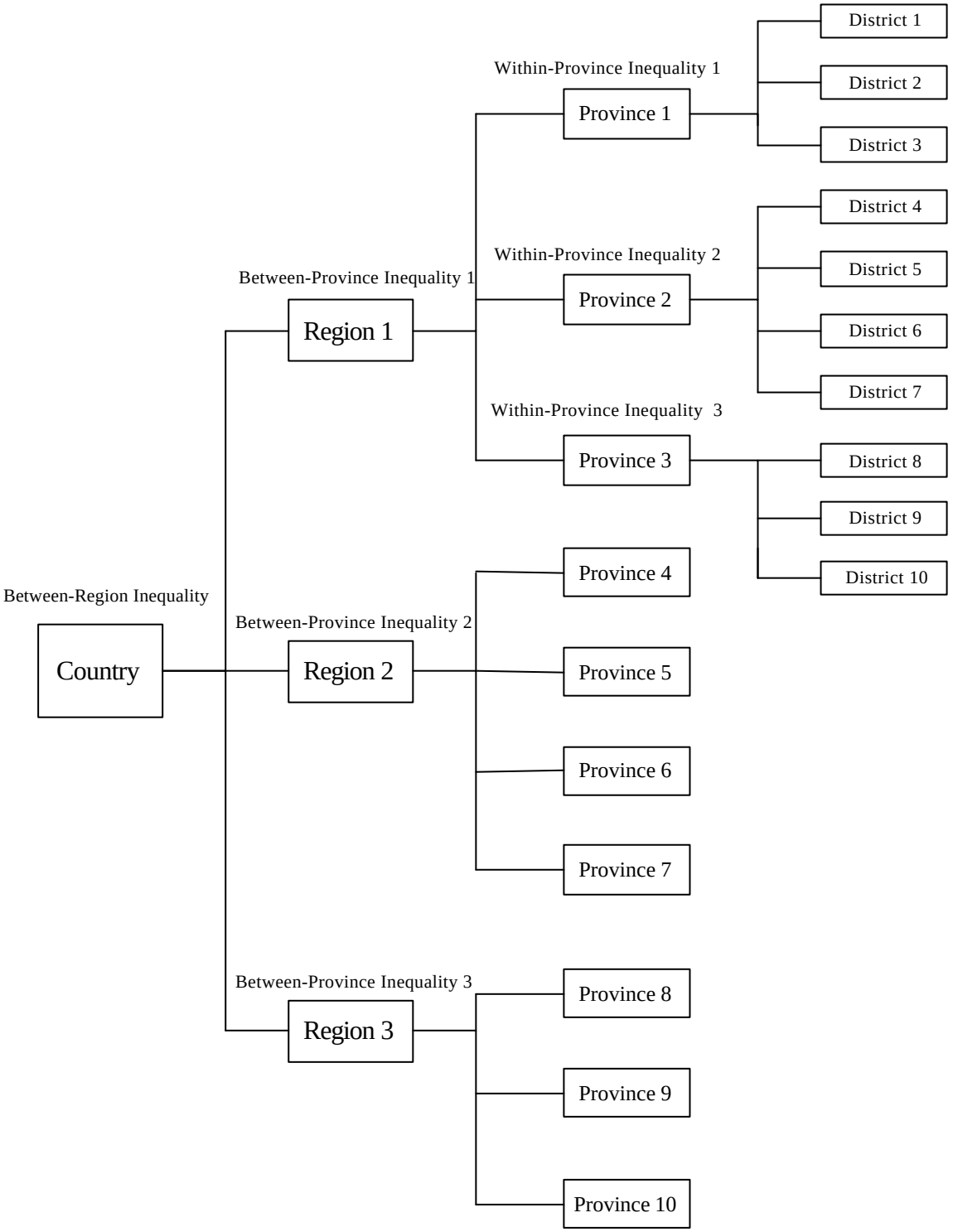
where y_{ijk} is the income of district k in province j in region i,

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

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

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

Figure 1. Three-Level Hierarchical Structure
Region-Province-District



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

$$T_{di} = \sum_j \sum_k \left(\frac{y_{ijk}}{Y_i} \right) \log \left(\frac{y_{ijk} / Y_i}{n_{ijk} / N_i} \right), \tag{2}$$

then T_d in equation (1) will be decomposed into

$$\begin{aligned} T_d &= \sum_i \left(\frac{Y_i}{Y} \right) T_{di} + \sum_i \left(\frac{Y_i}{Y} \right) \log \left(\frac{Y_i / Y}{N_i / N} \right) \\ &= \sum_i \left(\frac{Y_i}{Y} \right) T_{di} + T_{BR} \end{aligned} \tag{3}$$

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

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

$T_{BR} = \sum_i \left(\frac{Y_i}{Y} \right) \log \left(\frac{Y_i / Y}{N_i / N} \right)$ 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 (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,

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

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

$$T_{di} = \sum_j \left(\frac{Y_{ij}}{Y_i} \right) T_{ij} + \sum_j \left(\frac{Y_{ij}}{Y_i} \right) \log \left(\frac{Y_{ij} / Y_i}{N_{ij} / N_i} \right) \qquad (4)$$

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

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

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

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

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

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

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

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

Equation (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}).

The Data

The two-stage nested inequality decomposition analysis uses district-level GDP and population data from *Gross Regional Domestic Product of Regencies/Municipalities in Indonesia* (BPS, 1997b, 1998a, 2000a), where GDP figures are reported in constant 1993 prices, after excluding the oil and gas sectors.[6]

In this study, Indonesia is divided into five regions: Sumatra, Java-Bali, Kalimantan, Sulawesi, and Others. Sumatra includes DI Aceh, North Sumatra, West Sumatra, Riau, Jambi, South Sumatra, Bengkulu, and Lampung. Java-Bali includes DKI Jakarta, West Java, Central Java, DI Yogyakarta, East Java, and Bali. Kalimantan includes West, Central, South, and East Kalimantan. Sulawesi includes North, Central, South, and Southeast Sulawesi. Finally, Others include West and East Nusa Tenggara, East Timor, Maluku, and Irian Jaya.

3. Regional Income Inequality prior to the Economic Crisis

Table 1 presents the result of the two-stage nested inequality decomposition analysis (see also Figure 2). 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 (from 0.119 to 0.143); 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 at around 0.125; thus, its contribution fell from 47.7% to 43.1%.

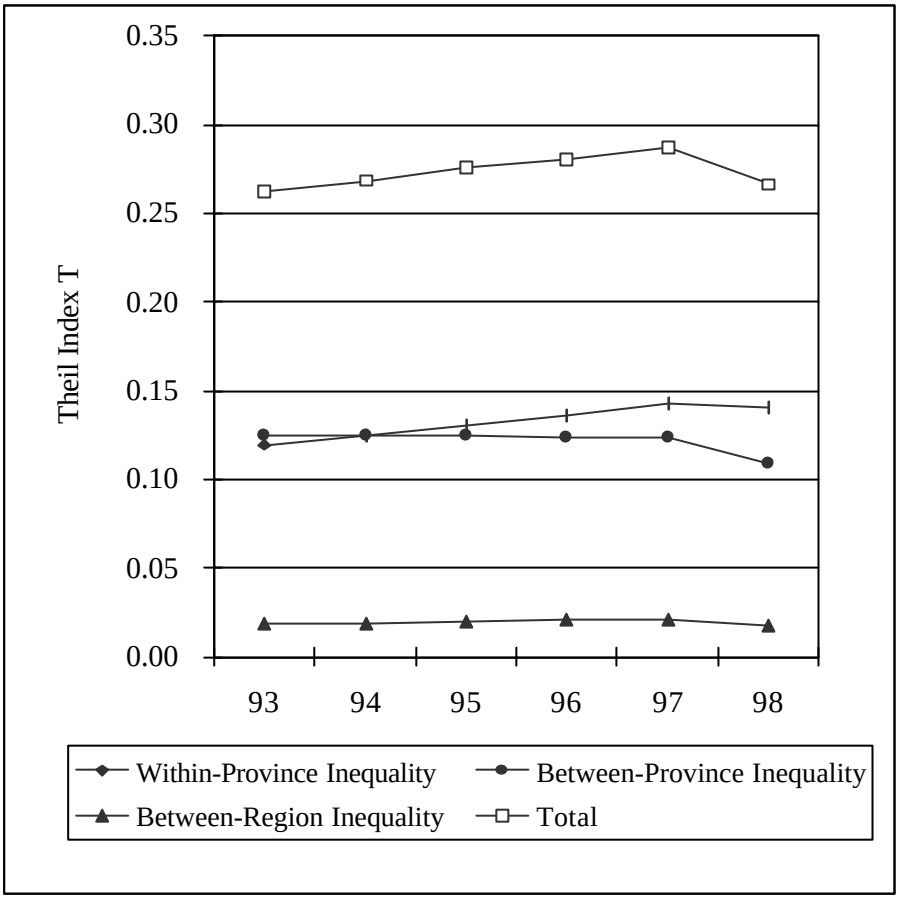
Table 1. Two-Stage Nested Inequality Decomposition, 1993-1998 (excluding the Oil and Gas Sector)

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.

Source: BPS (various issues), *Gross Regional Domestic Product of Regencies/Municip*

Figure 2. Two-Stage Nested Inequality Decomposition, 1993-1998
Excluding the Oil and Gas Sector



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 2 and Figure 3). 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: while the per capita GDP growth rates of Java-Bali, Kalimantan, and Sumatra were much higher than 6%, the growth rates of Sulawasi and Others were less than 6%.

Table 2. Per Capita GDP, after excluding the Oil and Gas Sectors

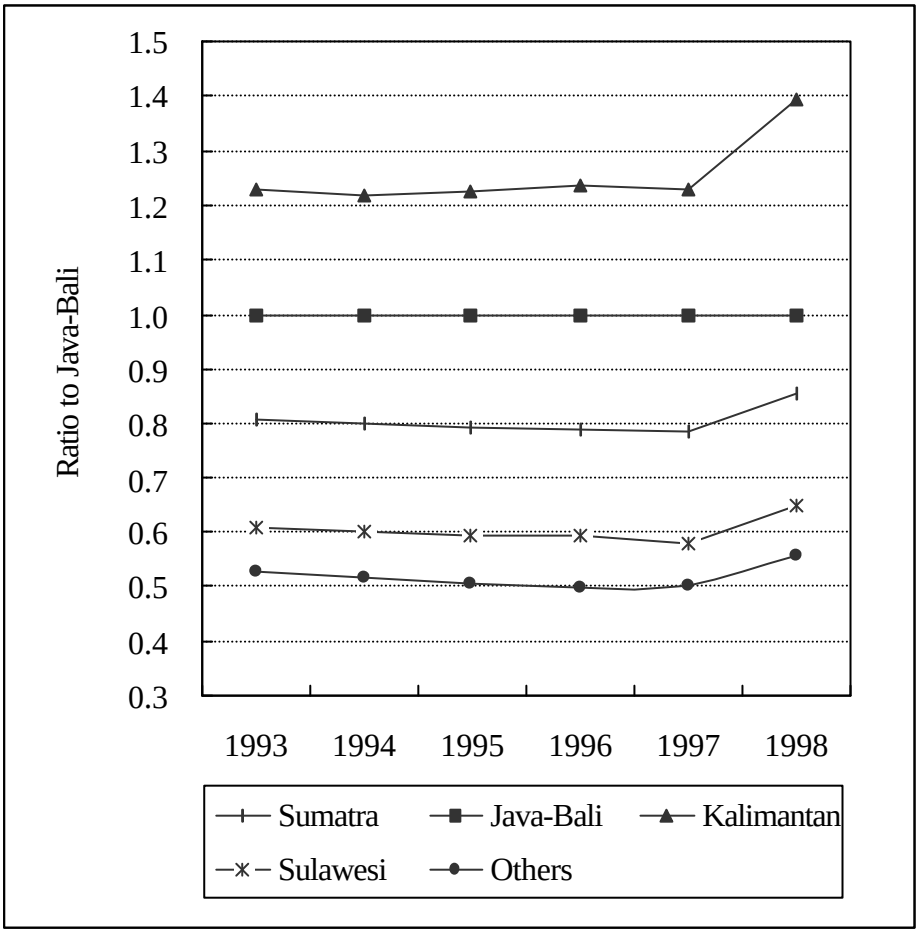
in thousand rupiah

		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%

Source: BPS (various issues), *Gross Regional Domestic Product of Regencies/Municipalities in Indonesia*.

Figure 3. Per Capita GDP by Region, 1993-1998

Java-Bali = 1.0

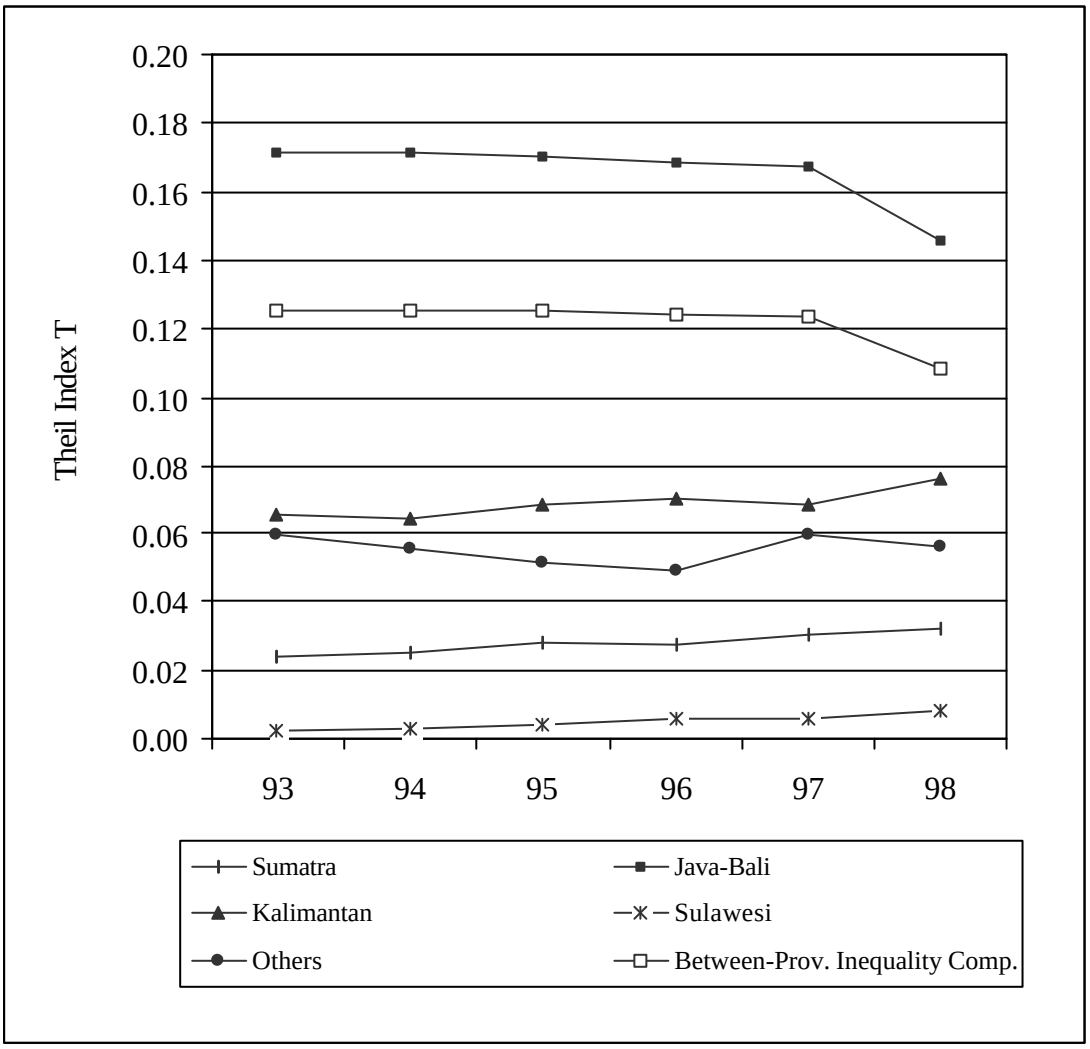


Between-Province Inequalities

Though the between-province inequality component remained relatively constant over the 1993-97 period, each region recorded a distinct movement in between-province inequality (Figure 4).[7] Due largely to the existence of Jakarta, Java-Bali's between-province inequality was the highest (over 0.16), though 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: West Java recorded an annual average per capita GDP growth rate of 8.1% over the 1993-97 period, while the other provinces recorded

less than 7%. 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.[8]

Figure 4. Between Province Inequality by Region, 1993-1998



Note: The between-province inequality component is an average of between-province inequalities weighted by GDP shares.

According to the data on provincial GDP from *Gross Regional Domestic Product of Provinces in Indonesia by Industrial Origin* (BPS, 1996, 1998b, 2000b), 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 sectors in 1997; the comparable figure in Indonesia as a whole is 24.5%. These observations suggest that before the economic crisis, West Java, perhaps in the Kabupatens and Kotamadyas adjacent to Jakarta, had absorbed massive inflows of domestic as well as foreign capital in its non-oil and gas manufacturing sector.

East Java had a similar growth pattern to West Java, though its per capita GDP growth rate was lower at 6.8%. 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. Liberalization of private foreign borrowing beginning in the late 1980s appears to have resulted in a construction boom in the greater Jakarta metropolitan region (Jabotabek), where high-rise buildings and real estate complexes have mushroomed in the early 1990s. According to the data on provincial GDP from *Gross Regional Domestic Product of Provinces in Indonesia by Expenditure* (BPS, 1997a, 1999), Jakarta's gross fixed capital formation grew at an average annual rate of 9.1% during 1993-97.

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 (Table 1 and Figure 4). Kalimantan had the second highest between-province inequality next to Java-Bali and experienced a very slight increase (from 0.066 to 0.069). 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 equitably distributed among its provinces and population than in Kalimantan, but Sumatra's between-province inequality increased from 0.024 to 0.031 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 even more equitably 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 from 0.002 to 0.006 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 (Table 1 and Figure 2).[9] 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 (from 0.225 to 0.299), Jakarta (from 0.074 to 0.090), West Java (from 0.083 to 0.115), and East Java (from 0.311 to 0.377). 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 at 0.299, which was followed by West Sumatra (0.088) and Lampung (0.065). 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 12.8 million rupiah was much larger than other districts' per capita GDP after excluding the oil and gas sectors. 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 at 0.377, 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 22.3 million rupiah, which was significantly larger than Central Jakarta's per capita GDP at 16.8 million rupiah. While much lower than Kediri's, Surabaya and Gresik had per capita GDP of 5.7 and 3.8 million rupiah, 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 at 0.187 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 (5.0 and 4.2 million rupiah, respectively). West Java had the third highest level of inequality at 0.115 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 (5.3 million rupiah), which was followed by Bekasi (3.4 million rupiah) and Serang (3.4 million rupiah). In other districts, per capita GDP ranged from 1.0 to 3.3 million rupiah.

Among Kalimantan provinces, West Kalimantan registered the highest level of within-province inequality in 1997 at 0.105. This is driven in part by urban Pontianak, which had the highest level of per capita GDP (4.2 million rupiah). In other districts, per capita GDP ranged from 1.0 to 2.4 million rupiah. It is interesting to observe that while East Kalimantan had a very large per capita GDP (4.6 million rupiah after excluding the oil and gas sectors), its level of within-province inequality is one of the lowest in Indonesia (0.024, after excluding the oil and gas sectors).

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 at 0.077 due in large part to Ujung Pandang's per capita GDP of 2.5 million rupiah. Sulawesi, however, had a very equitable 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 at 0.141; this is driven mainly by Manokwari, which had the highest per capita GDP (4.0 million rupiah).

4. The Impact of the Economic Crisis on Regional Income Inequality

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 sectors fell by 11.9% in 1998 (Table 2); thus, per capita GDP in 1998 had retreated to the 1995 level.[10] 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 1 and Figure 2). The two-stage inequality decomposition analysis reveals, however, that about three quarters of the decline was due to the decrease in the between-province inequality component (from 0.124 to 0.108); its contribution to the overall regional inequality decreased to 40.6% (from 43.1% in 1997). 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 (from 0.021 to 0.018).

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 (Table 2). Sumatra also experienced a large decrease in per capita GDP (-7.8%), 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; their per capita GDP declined by 3.6% and 5.0%, respectively, in 1998. As a result, the between-region inequality fell to 0.018 in 1998 (from 0.021 in 1997).

Between-Province Inequalities

Java-Bali's between-province inequality played a major role in the reduction of the between-province inequality component; it decreased significantly from 0.167 in 1997 to 0.146 in 1998. This is translated into a fall in its contribution to the overall regional inequality from 38.6% to 35.1% (Table 1 and Figure 4). 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.

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 (Table 2). The economies of West Java and East Java also contracted substantially, though the rates of decrease were not as large as in Jakarta (-16% and –10%, respectively); the per capita GDP of West Java and East Java declined by 17.8% and 10.7%, respectively.[11] The primary reason why Java-Bali recorded a significant decrease in between-province inequality appears to have been Jakarta's large decrease in per capita GDP relative to 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 GDP data from *Gross Regional Domestic Product of Provinces in Indonesia by Industrial Origin* (2000b) (See the Appendix for the detailed account of the shift and share analysis). 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 3. 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 in Table 3). 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 3. 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%

Source: BPS (2000b), *Gross Regional Domestic Product of Provinces by Industrial Origiin in Indonesia*.

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 12.6% contraction 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.[12]

In contrast to Java-Bali, Kalimantan and Sulawesi both recorded an increase in between-province inequality in 1998 (from 0.069 to 0.076 for Kalimantan and from 0.006 to 0.008 for Sulawesi) (Table 1 and Figure 4). 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 (Table 2). 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 (Table 3). 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 with a growth rate of -2%. In 1998, Riau became

the richest province in Sumatra in terms of per capita GDP (Table 2). 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 (Table 3).

Within-Province Inequalities

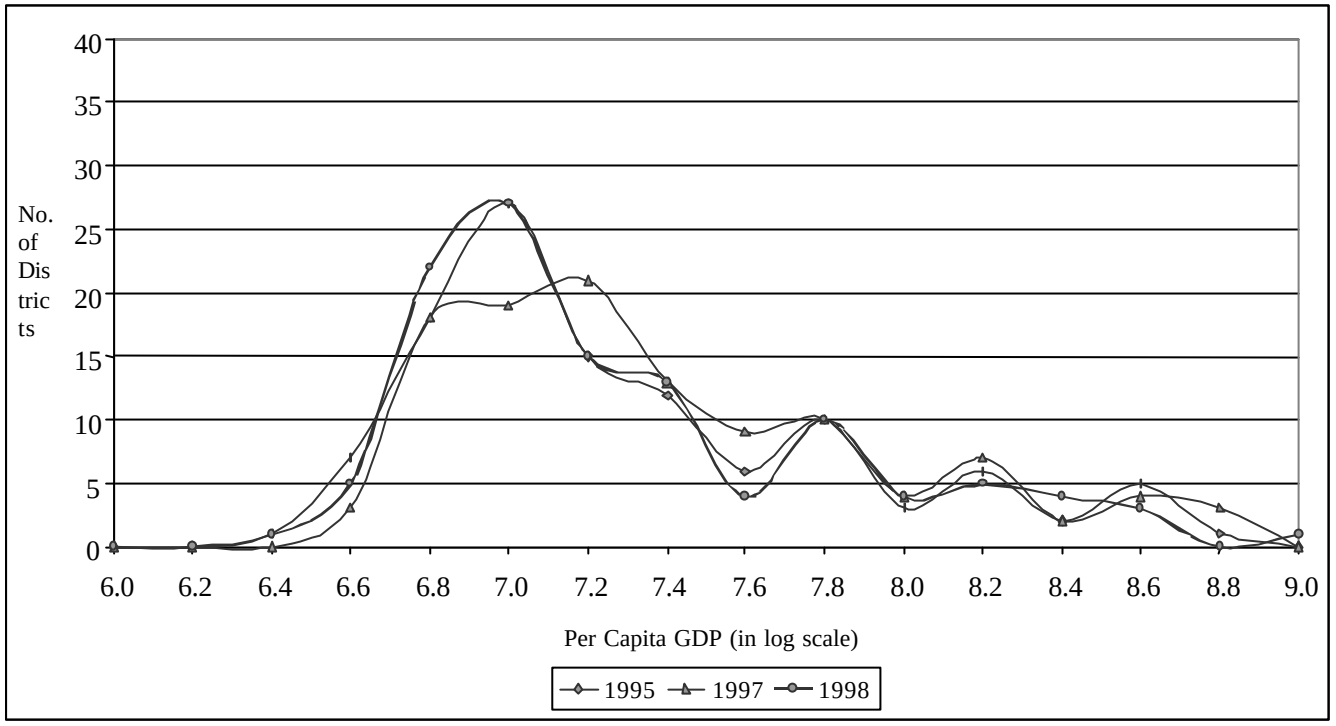
In Java-Bali, all but Jakarta experienced a fall in within-province inequality (Table 1). Jakarta's within-province inequality rose in 1998, but this is a continuation of the trend that existed in the pre-crisis period. The reason why Jakarta experienced increasing within-province inequality over the 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 sectors 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 (from 0.377 to 0.365), 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 (from 0.187 to 0.166); 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.

Figure 5 depicts the frequency distribution of the per capita GDP (using the natural log scale) of Java-Bali's districts in 1995, 1997, and 1998. First, the mode of the distribution shifted from the 7.0 to 7.2 range in 1997 (corresponding to a per capita GDP range of 1.10 to 1.34 million rupiah) to the 6.8 to 7.0 range in 1998 (corresponding to a per capita GDP range of 0.90 to 1.10 million rupiah). Secondly, the number of districts with per capita GDP (using the natural log scale) less than or equal to 7.0 (corresponding to a per capita GDP of less than or equal to 1.1 million rupiah) increased from 40 to 55 in 1998 (out of 116 districts), which was slightly larger than in 1995 (53 districts). Third, the number of districts with per capita GDP (using the natural log scale) greater than or equal to 7.6 (corresponding to a per capita GDP of greater than or equal to 2 million rupiah) fell from 42 to 33 in 1998, which was smaller than in 1995 (36 districts). In sum, the economic crisis seems to have shifted Java-Bali's distribution to a level before 1995.

Figure 5. Frequency Distribution of the Per Capita GDP of Java-Bali Districts (Natural Log Scale)



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 (from 0.065 to 0.048); this is due mainly to a substantial reduction in the per capita GDP of Bandar Lampung,e 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 (from 0.058 to 0.069). This is due to the fact that Kota Baru, the richest district in South Kalimantan, experienced positive growth in its per capita GDP (3%),

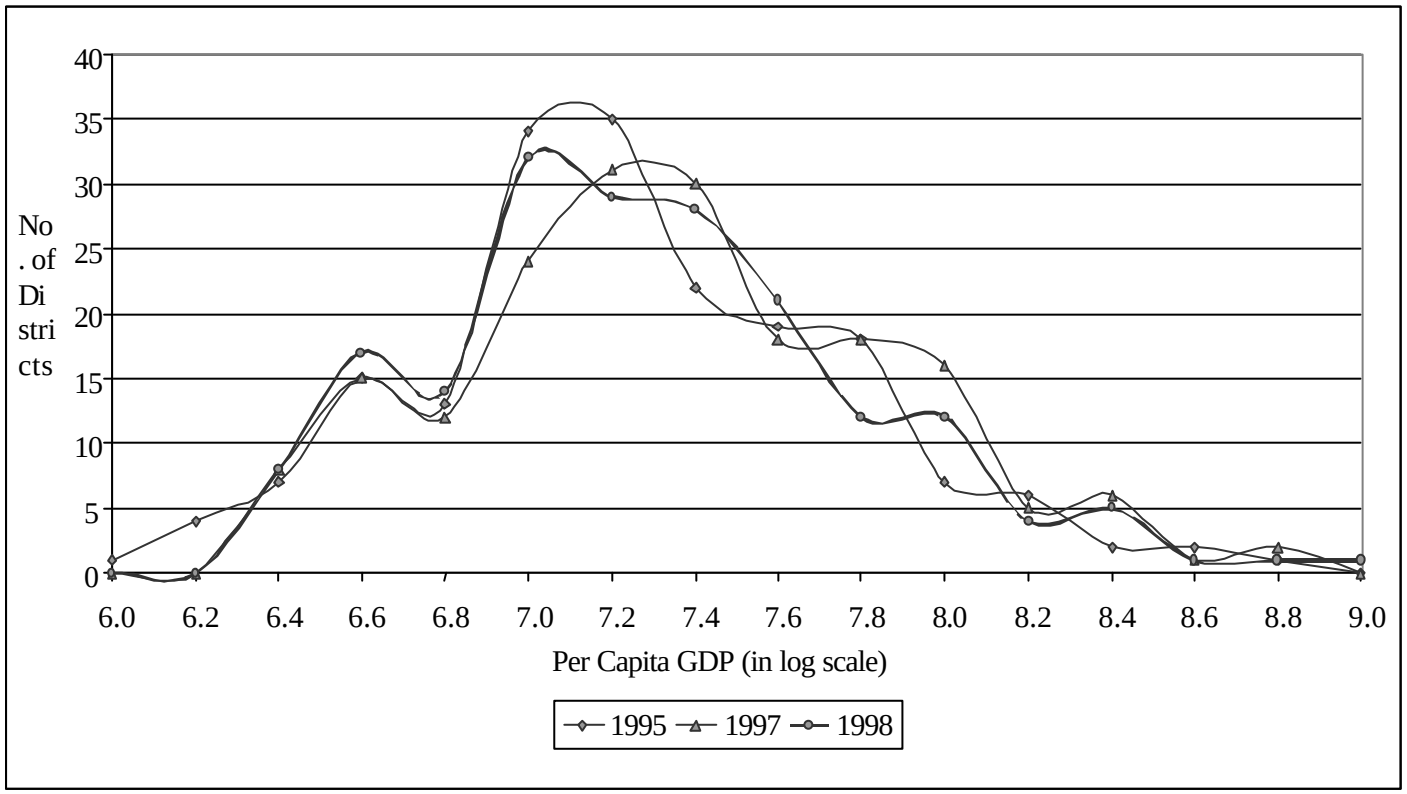
while the second and third richest districts (Barito Kuala and Banjarmasin) recorded substantial decreases in their per capita GDP (-9% and -14%, respectively). It should be noted that among Kotamadyas in Kalimantan (i.e., Pontianak, Palangka Raya, Banjarmasin, Balikpapan, and Samarinda), only Banjarmasin 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 (from 0.077 to 0.070) 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.

Figure 6 presents the frequency distribution of the per capita GDP (using the natural log scale) of Outer Island districts in 1995, 1997, and 1998. First, the distribution shifted to the left in 1998 and backtracked to approximately the 1995 distribution, but the number of districts in the 6.8 to 7.2 range (corresponding to a per capita GDP range of 0.90 to 1.34 million rupiah) was much smaller in 1998 than in 1995 (61 vs. 69 districts). Second, the number of districts falling in the 6.2 to 6.8 range (corresponding to a per capita GDP range of 0.49-0.90 million rupiah) in 1997 was the same as in 1995 at 35, but in 1998, it had increased to 39. Third, the number of districts with per capita GDP (using the natural log scale) greater than or equal to 7.6 (corresponding to a per capita GDP range of greater than or equal to 2 million rupiah) fell from 49 to 38 in 1998, which was only slightly greater than in 1995 (37 districts). In sum, the economic crisis shifted the Outer islands' distribution to the left, but the effects were not as large as in Java-Bali. It is interesting to note that, unlike Java-Bali, there

was a larger number of districts in the 6.4 to 6.6 range (corresponding to a per capita GDP range of 0.60 to 0.74 million rupiah) than in the 6.6 to 6.8 (corresponding to a per capita GDP range of 0.74 to 0.90 million rupiah) in the Outer islands. This is due to the fact that the Outer islands include the very poor provinces of West and East Nusa Tenggara and East Timor.

Figure 6. Frequency Distribution of the Per Capita GDP of Outer Islands Districts (Natural Log Scale)



Conclusion

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.[13] 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. This result suggests that it would be very misleading to judge whether regional inequality is increasing or decreasing based only upon provincial data, especially when the economy is growing very rapidly and undergoing significant structural changes.

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.

Appendix

Shift and share analysis is a technique that has been widely used to examine the factors of regional growth (see, for example, Armstrong and Taylor, 2000). Shift and share analysis divides a region's growth into three components. The first component is the region's share of national growth (RS). If a region grows at the national average, it will maintain its share of national output. The formula for calculating RS for a particular sector can be expressed in the following way:

$$RS_i = e_i\left(\frac{\Delta E_N}{E_N}\right),$$

where

e_i = regional output in sector i at the beginning of the period,

E_N = total national output at the beginning of the period, and

ΔE_N = the change in total national output.

The second component, the industry-mix component (IMS), is based on the premise that a region that has a relatively larger share of output in fast-growing industries should grow faster than the nation as a whole. IMS for a single sector can be defined as:

$$IMS_i = e_i\left(\frac{\Delta E_i}{E_i} - \frac{\Delta E_N}{E_N}\right),$$

where

E_i = national output in sector i at the beginning of the period, and

ΔE_i = the change in national output in sector i.

The third component is called the competitive component (CS). A region may have a competitive advantage in some industries compared to other regions because its environment is conducive to the growth of these industries. Growth brought by this effect is called CS. CS

for a single sector can be defined as:

$$CS_i = e_i\left(\frac{\Delta e_i}{e_i} - \frac{\Delta E_i}{E_i}\right),$$

where

Δe_i = the change in regional output in sector i.

In the shift and share analysis, the region's share of national growth (RS) is sometimes called the SHARE component, while the sum of the industry-mix component (IMS) and the competitive component (CS) is called the SHIFT component.

The output growth of a particular sector (sector i) of a region, Δe_i, is now given as the sum of these three components in the following way:

$$\Delta e_i = RS_i + IMS_i + CS_i = e_i\left(\frac{\Delta E_N}{E_N}\right) + e_i\left(\frac{\Delta E_i}{E_i} - \frac{\Delta E_N}{E_N}\right) + e_i\left(\frac{\Delta e_i}{e_i} - \frac{\Delta E_i}{E_i}\right),$$

while the total output growth of a region is given by

$$\sum_{i=1}^{n} \Delta e_i = \sum_{i=1}^{n} (RS_i + IMS_i + CS_i) = \sum_{i=1}^{n} e_i\left(\frac{\Delta E_N}{E_N}\right) + \sum_{i=1}^{n} e_i\left(\frac{\Delta E_i}{E_i} - \frac{\Delta E_N}{E_N}\right) + \sum_{i=1}^{n} e_i\left(\frac{\Delta e_i}{e_i} - \frac{\Delta E_i}{E_i}\right),$$

where n = the number of industries.

Endnotes

[1] Williamson (1965) introduced the weighted coefficient of variation as a measure of regional income inequality, which is the coefficient of variation weighted by population. It should be noted that the large increase in the coefficient between the 1985-1993 period and the 1993-1997 period is due solely to the change in constant prices between these periods.

[2] See, for example, Akita and Lukman (1995), Esmara (1975), Garcia and Soelistianingsih (1998), Uppal and Budiono Sri Handoko (1986).

[3] An inequality index is said to be additively decomposable if total inequality can be written as the sum of between-group and within-group inequalities. Mean independence implies that the index remains unchanged if every region's income is changed by the same proportion, while population-size independence indicates that the index remains unchanged if the number of people in each region is changed by the same proportion, i.e., the index depends only on the relative population frequencies at each region and not the absolute population frequencies. Finally, the Pigou-Dalton principle of transfers implies that anyincome transfer from a richer to a poorer region that does not reverse their relative ranks in income reduces the value of the index.

[4] For the one-stage inequality decomposition method, see Anand (1983)

[5] See, for example, Akita, Lukman, and Yamada (1999), Akita and Szeto (2000), Anand (1983), Ching (1991), Estudillo (1997), Glewwe (1986), Ikemoto (1985), Jenkins (1995), Mookherjee and Shorrocks (1982), Tsakloglou (1993), and Tsui (1993).

[6] For Irian Jaya's Fak-Fak, non-oil and gas mining is also excluded.

[7] The between-province inequality component is an average of between-province inequalities weighted by GDP shares.

[8] 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 sectors in 1997 was 76,150 billion rupiah in the regencies/municipalities' statistics (BPS, 2000a); in contrast, it was 68,010 billion rupiah in the provincial statistics (BPS, 2000b). In other provinces, the discrepancy is not significantly smaller over the 1993-97 period (all are within 3% of each other).

[9] The within-province inequality component is an average of within-province inequalities weighted by GDP shares.

[10] According to the provincial GDP data, per capita GDP declined by 13.9% in 1998 (BPS, 2000b).

[11] 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* (62,815 vs. 64,259 billion rupiah), in 1998 the former became larger than the latter (56,606 vs. 53,825 billion rupiah) (BPS, 2000a, 2000b). 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%).

[12] 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.

[13] 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).

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