WPS0529

The Sectoral Structure of Poverty During An Adjustment Period

Evidence for Indonesia in the Mid-1980s

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Favorable initial conditions, a timely adjustment program, and associated gains to the rural sector allowed Indonesia to maintain the momentum of its progress in poverty alleviation during the difficult 1980s.

This paper — a product of the Agricultural Policies Division, Agriculture and Rural Development Department — is part of a larger PRE research effort: "Policy Analysis and Poverty: Applicable Methods and Case Studies." Copies are available free from the World Bank, 1818 H Street NW, Washington DC 20433. Please contact Cicely Spooner, room N8-039, extension 30464 (47 pages, with tables).

Huppi and Ravallion examine the structure of poverty in Indonesia by sector of employment — and how it changed during the adjustment period, 1984 to 1987.

They find that, while aggregate poverty decreased during the period, the gains to the poor were quite uneven across regions and sectors. Gains to the rural sector in key regions were quantitatively important to Indonesia's success in alleviating poverty, they found. Most poverty exists — and most gains in alleviating poverty were made — in the rural farming sector. These gains were associated with crop diversification and continued growth in off-farm employment.

The aggregate distribution of consumption changed little around its growing mean, but substantial shifts in distribution occurred within sectors — so there was virtually no correlation between sectoral growth rates and rates of poverty alleviation. This has impor.ant implications for applied general equilibriun models of the effects of adjustment on poverty

Two features of the government's adjustment program favored rural areas and were crucial to Indonesia's evident success at maintaining momentum in alleviating poverty:

• Devaluations increased agricultural exports (largely nonfood crops). The poor shared in sizable gains in cash crop incomes.

• The government and others argue that a serious attempt was made to protect fiscal allocations to programs that directly benefited the poor. The real cuts in public spending were on development spending — especially in more capital-intensive industrial and mining projects. Programs that directly benefited the poor — including labor-intensive rural infrastructure projects — were sheltered in an attempt to expand rural employment opportunities during the adjustment.

The adjustment package undoubtedly helped, conclude Huppi and Ravallion, but one should not underrate the favorable conditions in Indonesia when adjustment started. A period of sustained, fairly equitable growth for several years before adjustment created the circumstances in which, by the mid-1980s, the momentum of poverty alleviation could be maintained at lower growth rates.

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1.   Introduction

Indonesia's economy experienced various external shocks during the mid-1980s, chiefly due to declining prices of the country's main export good, oil. Public revenues had been heavily dependent on oil exports and so were severely affected. The government's rapid and voluntary adjustment program in response to these shocks included aggregate budgetary contraction (with planned outlays cut by about one fifth), rapid and sizable currency devaluations, continuing monetary restraint, and trade, finance, and regulatory reforms (World Bank, 1989). GDP per capita growth rates fell sharply over the period, though remaining (barely) positive. The aggregate sectoral structure of output and employment remained fairly static, slowing the historical decline in agriculture's share.

In an earlier paper we looked at the evolution of aggregate poverty in Indonesia between 1984 and 1987 and found that it declined significantly despite the macroeconomic shocks and ensuing adjustments which Indonesia faced during the period (Ravallion and Huppi, 1990). Our results proved to be very robust with respect to alternative welfare measures, poverty lines, and poverty measures.

In this paper we examine how the sectoral structure of poverty in Indonesia changed during the adjustment period. There are two possible approaches to such an investigation. One is to use a general equilibrium model to simulate the effects on a base period distribution of explicit external and policy changes. The other is to look at the actual changes in distribution over a period encompassing the changes in external and policy variables. Both have their advantages and disadvantages; for example, while the former approach gives a clearer resolution of "what caused what", it does

the response of incomes of the poor to the changes in relative prices during the mid-1980s. The nominal devaluations shifted farmers' terms of trade in favor of tradable goods (Ahmed and Chhibber, 1989). To what extent did the poor share in the growth in agricultural export earnings, stimulated by the devaluations? This could happen either directly, through growth in returns to "cash crops", or indirectly through growth in wage earnings. Related to the latter possibility, there have been reports of a decline in real agricultural wage rates in Java during this period, though there is conflicting evidence.[2] Even so, the impact on poverty is unclear, since it is real wage earnings that we are more concerned about in poverty assessments. All these questions call for a quite detailed analysis of income sources of the poor over the period.

The paper's third aim is primarily methodological, and concerns the empirical validity of assumptions which underlie the first approach mentioned above for studying the effects on the poor of sector specific economic changes and policy interventions, such as adjustment programs. In "mapping" the final effects of initially sector specific changes, such as in applied general equilibrium modelling, it is natural (and common) to assume that intra-sectoral distributions are static.[3] Effects on poverty can be simulated by applying predicted sector specific growth rates to a sector profile of poverty for a base date, assuming distributional neutrality within sectors. Inter-sectoral changes then propel aggregate distributions and, hence, poverty.

This is a convenient assumption for modelling purposes. Also, and in contrast to our more descriptive approach in this paper, it has the attraction of allowing a deeper understanding of the causal connections between specific adjustment policies and distributional outcomes. However, neutrality within sectors may be a questionable assumption in certain circumstances. For

example, with relatively flexible labor markets (as is believed to be the case in Indonesia), the mobility of the poor between sectors can result in significant intra-sectoral distributional changes, which should not be ignored when considering the impact of sector specific changes on aggregate poverty. While there is often no practical modelling option to the within-sector neutrality assumption, it is important to know if the assumption is reasonable, and what magnitude of error in simulating aggregate distributional outcomes arises when it fails to hold.

After a discussion of our methodology and data in the following section, the paper examines the question of who were the main beneficiaries of Indonesia's poverty reduction between 1984 and 1987. Sections 3 and 4 look at average consumption and incomes, and various measures of poverty in different urban and rural sectors of employment. Section 4 also quantifies the contribution of these different sectors to the reduction of aggregate poveri Section 5 investigates how the sectoral pattern of economic growth affected poverty, and the relevance of intra-sectoral distributional changes. Section 6 takes a closer look at the evolution of the principal income sources of rural farm households. Some conclusions are offered in Section 7. An Appendix looks at the sensitivity of our main results to some key assumptions made in measuring poverty.

2.   Data and Methodology

Any cardinal assessment of poverty depends on three things: the measure used to determine an individual's living standard, the cutoff point below which an individual is considered to be poor, and the functional form of the poverty measure. The most commonly used indicators of an individual's living

standard are income and consumption expenditure within a certain time frame.
It has generally been accepted that consumption expenditure is a better
welfare indicator than income. In the past, assessment of poverty in
Indonesia has been based on consumption expenditure per capita derived from
the Central Bureau of Statistic's national household survey, the SUSENAS. We
will follow this practice and base our analysis on the data gathered during
the two SUSENAS surveys carried out in February 1984 and January 1987. We
consider the robustness of our results to an alternative welfare indicator
based on the share of consumption going to food in the Appendix.

The SUSENAS is a consumption based survey. It accounts for market
expenditure as well as consumption from own production and transfers.[4] The
1984 and 1987 surveys covered about 50,000 randomly sampled households each
and appear to be fully compatible in terms of the methodology used and
questions asked, and were carried out in comparable agricultural years.

All income and expenditure data have been adjusted to February 1984
urban prices, using the Consumer Price Index (CPI). For the purpose of our
analysis, the CPI has the shortcoming that it is only constructed for urban
areas and doesn't adequately reflect the consumption pattern of the poor. We
have recalculated the index, adjusting for urban rural price differentials and
giving a higher weight to food expenditures, reflecting the typical
expenditure pattern of poor households. Specifically, we have increased the
food share from 45% to 68%, reflecting the consumption behavior of the bottom
30% of households in 1984, and we have assumed a 10% urban rural price
differential.[5] There is no satisfactory regional price index for Indonesia,
though differences in regional inflation rates are incorporated in our

analysis. We consider the sensitivity of our results to alternative assumptions on regional price differentials in the Appendix.

The choice of a particular poverty line, and hence the cardinal measurement of poverty, is always debatable. Although we have considered a range of poverty lines for this study, we will for brevity's sake only present results with regard to a monthly per capita expenditure poverty line of Rp. 11,000 (1984 urban prices, Rp. 10,000 in rural prices). In real terms, this closely approximates the poverty line which has been used in past World Bank studies (Rao, 1984, 1986). It is also in close accord with the poverty line one would expect for a country at Indonesia's mean consumption level, given the empirical relationship between poverty lines and mean consumptions across a number of developing and industrialized countries found by Ravallion et al., (1990). To test the robustness of some of our findings, we make use of dominance conditions for ordering distributions with respect to a broad class of poverty measures and wide range of poverty lines (Atkinson, 1987; Foster and Shorrocks, 1988). Results are discussed in the Appendix.

Various measures of poverty will be considered, aiming to embrace the range of possible value judgments on this issue. We shall consider three members of the Foster, Greer and Thorbecke (FGT) (1984) class of additively decomposable poverty measures P_α, each member of which is identified by a non-negative parameter α. The three FGT measures used here are:[6]

(i) The <u>headcount index</u> of poverty given by the percentage of the population living in households with average consumptions below the poverty line; this is the FGT measure for $\alpha = 0$. This measure allows us to easily assess variation in the <u>incidence</u> of poverty across sectors. While it is a simple measure to interpret, the headcount index has the disadvantage that it

is entirely insensitive to changes <u>below</u> the poverty line; for example, a poor person may become poorer, but measured poverty will not change. Thus the index implicitly treats all of the poor identically; no distinction is made amongst the 30-40 million poor in Indonesia in terms of the <u>depth</u> or <u>severity</u> of their poverty. And it is plain from at least casual observation that the poor are not all equally poor.

(ii) The <u>poverty gap index</u>, defined as the aggregate consumption deficit of the poor as a proportion of the poverty line and normalized by the population size; this is the FGT measure for $\alpha = 1$. Letting $g=(z-y)/z$ denote the proportionate poverty deficit of a person with income or consumption y below the poverty line z, and setting $g=0$ for the non-poor, P_1 is simply the arithmetic mean of g over the whole population. P_1 allows an assessment of the <u>depth</u> of poverty within sectors.

(iii) The <u>distributionally sensitive</u> FGT measure, P_2, whereby, instead of weighting the various poverty deficits of the poor equally (as in the previous measure) they are weighted by the deficits themselves. The resulting measure is then simply the mean of the <u>squared</u> proportionate poverty deficits g^2. This measure satisfies the main axioms for a desirable poverty measure found in the theoretical literature (for a recent survey see Foster, 1984), including Sen's (1976) Transfer Axiom which requires that when income is transferred from a poor person to someone who is poorer measured poverty decreases. Neither measures (i) nor (ii) satisfy this condition. In view of the desirable properties of P_2 we shall take it to be the preferred measure. It can be interpreted as an indicator of the <u>severity</u> of poverty within sectors.

The FGT measures have the advantage over a number of alternative measures that they are _additively separable_, such that the aggregate measure is the population weighted mean of the measures for all sub-groups of a population. Aside from the obvicus computational advantages of that property for constructing decompositions of poverty ("poverty profiles"), it implies that when any subgroup cf the population becomes poorer, aggregate poverty will also increase, ceteris paribus (Foster and Shorrocks, 1987).

When analyzing the sources of observed reductions in aggregate poverty, we will also make use of a simple _decomposition_ formula which we proposed in Ravallion and Huppi (1990), exploiting the additivity property of the FGT class of measures. Let P_{it} denote the FGT poverty measure (or any other additive, population weighted measure) for sector i with population share n_i at date t, where there are m such sectors, and t=1984,1987. Then it is readily verified that:

$$P_{87} - P_{84} = \Sigma(P_{i87} - P_{i84})n_{i84} \quad \text{(Intra-sectoral effects)}$$

$$+ \Sigma(n_{i87} \quad n_{i84})P_{i84} \quad \text{(Population shift effects)}$$

$$+ \Sigma(P_{i87} - P_{i84})(n_{i87} - n_{i84}) \quad \text{(Interaction effects)} \quad (1)$$

where all summations are over i=1,..,m. The "intra-sectoral effects" tell us the contribution of poverty changes within sectors, controlling for their base period population shares, while the "population shift effects" tell us how much poverty in the 1984 was reduced by the various changes in population shares of sectors between then and 1987. The interaction effects arise from the possible correlation between sectoral gains and population shifts.

3.   Consumption and Income by Sector of Employment

The SUSENAS data set provides information on the individual household's principal source of income. This is self-reported, with respondents being asked to identify their principal income source from a list of ten employment sectors, each of which is divided into subgroups of self-employed or hired workers.[7] For the purpose of our analysis we will further distinguish between urban and rural areas. Sectors with less than 100 sampled observations have been dropped as results were considered unreliable. This gives 28 sector categories in all. Note that these refer to principal income sources; many households will derive income from more than one sector. In principle, one could further sub-divide according to secondary income sources, though one rapidly runs out of degrees of freedom for many sectors. Later we will examine in detail the diversity of income sources for the largest sector, self-employed farmers, for selected regions.

Table 1 provides information about the relative importance of the various sectors in terms of their population shares. It also gives an indication of the relative standard of living within each sector in terms of mean consumption and income in 1984 and 1987. Rural self-employed farmers are the largest group, followed by rural farm laborers, and then rural traders and urban and rural services. Although the share of people employed by these sectors slightly shifted between 1984 and 1987, their order of importance remained unchanged over these three years. Rural farming (laborers and self-employed) provided the main income for over half of Indonesia's population in 1984 and for slightly less than half in 1987.

In terms of average per capita consumption, urban financial employees fared best in 1984, followed by employed urban miners, urban employees of the

service sector and self-employed urban construction workers. This ranking remained unchanged three years later. Average consumption of all rural employment sectors was significantly below the level of the top three urban sectors in both years. In rural areas, the highest average consumption in 1984 was registered among employees of the service sector, followed by people engaged in transportation (self-employed) and employed mine workers. While employees of the service sector continued to rank highest in rural areas in 1987, the second highest average consumption was registered among rural self-employed construction workers, who had ranked much lower in 1984. Rural farm laborers averaged the lowest per capita consumption in both years, followed by self-employed rural miners and self-employed rural farmers.

A look at the change in mean consumption of the various employment sectors reveals that average consumption of agricultural workers living in urban areas was the only one to decrease between 1984 and 1987, though this is a small group and the decline is barely significant statistically. Average consumption of rural agricultural workers, on the other hand, increased quite significantly during this time period, as did the consumption of rural and urban self-employed farmers. The highest rate of increase in mean consumption occurred among employees of the urban financial sector. Although their average income also increased, it did so to a much lesser extent. Rural self-employed construction workers experienced the second highest proportionate increase in average consumption, though, surprisingly, this is not reflected in their mean incomes. In contrast to the relatively large increase in average consumption of rural self-employed construction workers, one finds a comparatively small growth rate of consumption among urban self-employed construction workers. Average consumption and income of rural self-

employed miners also grew at impressive rates. The share of people engaged in self-employed rural mining, however, decreased quite significantly, so that the increase in this sector's average consumption may at least partially be due to out-migration of the poorest households. Further noteworthy is the relatively low growth rate of income and consumption in the urban manufacturing sector.

Although information on average consumption and expenditure can shed some light on differences in typical living standards between various sectors of employment, it does not provide us with any information about the distribution within each sector as relevant to poverty assessments. We turn to this issue in the next section.

4.   **Poverty by Sector of Employment**

The Poverty Profiles

Table 2 contains information about the extent of poverty in the various employment sectors and their relative participation in the alleviation of aggregate poverty between 1984 and 1987.

The data in this table clearly illustrate the disparities in poverty incidence, depth, and severity between sectors. In both years, disparities between various urban employment sectors were more pronounced than between rural sectors. And in all cases but one, the poverty measures are higher in rural than in urban areas within a given sector of employment. The highest disparities within one occupational sector were found in mining, where urban mine workers figured among the least poor, and experienced one of the highest relative declines in poverty between 1984 and 1987, while both self-employed

and hired rural miners figured among the poorest groups, although poverty among the latter dropped significantly over the three year period.

By all measures, and in both years, the highest concentration of poverty was found among farmers, who at the same time make up the largest population proportion. It must, however, be noted that poverty decreased at impressive rates over the period in all farming sectors. In the agricultural sector the highest relative drop in poverty was found among urban self-employed farmers and rural farm laborers, although the latter retained the highest proportion of poor (53% in 1984 and 38% in 1987). The preferred poverty measure for rural farm laborers, however, shows that the severity of poverty in this group dropped from first to third place over the three year period. The extent of poverty in this sector was less pronounced than among self-employed rural miners or urban agricultural laborers in 1987. Also noteworthy is that poverty among urban farm laborers dropped, despite a rather significant decrease in the mean value of their consumption.

In 1984, the headcount index of all farming groups (i.e. self-employed and laborers, urban and rural), of self-employed rural miners and of hired rural traders was above the national average. Except for rural traders, the preferred poverty measure of all these groups was also above the national average. With the exception of self-employed rural farmers and rural traders, both poverty measures for the above groups remained above the national average in 1987. In addition, the headcount index for self-employed rural industrial workers also rose above the national average in 1987. Among the sectors with the lowest incidence of poverty in both years were urban finance, urban services, urban mining, and in 1987, urban transportation. The ranking of these sectors slightly varies by year and poverty measure. In rural areas,

services, transportation and industry were amongst those with the lowest incidence of poverty.

Sectoral poverty as measured by all three poverty measures under consideration dropped significantly in all but one of the sectors of employment between 1984 and 1987. The exception were the urban employees of the financial sector, where all measures showed an increase in poverty, although only the increase in the headcount index was statistically significant. Notwithstanding this poverty increase, the financial sector remained the one with the lowest incidence and extent of poverty.

Sectoral Participation in Aggregate Poverty Reduction

Table 2 also provides information on each sector's relative contribution to aggregate poverty alleviation. These are the "intra-sectoral effects" in equation 1, expressed as a percentage of the reduction in aggregate poverty.

The drop in poverty among self-employed rural farmers clearly had the largest influence on aggregate poverty reduction. Over 48% of the reduction in the national headcount index was due to gains in this sector, while it accounted for 55% of the gain in the preferred poverty measure. The second most important contribution came from rural agricultural workers, whose reduction in poverty as measured by the headcount index contributed almost 11% to the reduction in the aggregate index, while the decline in this sector's preferred poverty measure contributed to almost 16% of the aggregate decline. These two groups jointly accounted for 59% of the reduction of the aggregate headcount index and for over 71% of the reduction of the aggregate value of the preferred poverty measure. Note that the rural farm sector's impressive participation in the reduction of aggregate poverty is due to both significant

declines in their poverty measures, and the large share of national poverty accounted for by this sector.

Also noteworthy is the relatively important part of aggregate poverty reduction due to population shifts. Over 13% of the decline in the national headcount index was due to population shifts between various sectors of employment, and over 9% of the decline in the preferred measure can be traced back to these shifts. As was seen in Table 1, the sectors which gained in population share were almost all urban, and had initially lower poverty measures. This is the main factor underlying the contribution of population shifts to poverty alleviation.

5.   Testing Intra-Sectoral Neutrality: Economic Growth and Poverty by Sector

Both aggregate economic growth and reductions in overall inequalities of consumption contributed to aggregate poverty alleviation in Indonesia during the mid-1980s (Ravallion and Huppi, 1990). Here we look more closely at how the sectoral pattern of Indonesia's growth affected poverty.

Comparing Tables 1 and 2, there is clearly a strong negative correlation between the poverty indices across sectors and the mean consumptions and incomes of sectors. The simple correlation coefficients between mean consumption and the poverty measures across sectors in 1984 are -.90 for the headcount index, -.83 for the poverty gap index, and -.76 for the preferred measure. For 1987, the correlation coefficients are -.80, -.73, and -.68 respectively.[8] Similar correlations exist between the poverty measures and mean incomes, though the correlations are not quite as strong (for 1984 they are -.81, -.75, -.71 for the three measures respectively, while for 1987 they are -.76, -.70, and -.65). Figure 1 plots the headcount index in 1984 against

the mean income by sector, indicating a sharply decreasing convex

relationship. The figure also gives an estimated line of best fit[9]; the

implied elasticity of the headcount index to mean income is -2.7 at the mean

points. It is evident then that the intra-sectoral distributions of

consumption do not vary so much across sectors to mitigate the correlation

between mean living standards and poverty. The static picture is clear.

What is more surprising is that there is little sign of a correlation

between the rates of change in the means across sectors and the rates of

poverty alleviation. Indeed, the correlations are positive, though small;

the simple correlation coefficient between the proportionate change in mean

consumption over the period and the proportionate change in poverty is .39 for

the headcount index, .37 for the poverty gap index, and .40 for the preferred

measure. There is negligible correlation for the changes in mean income; the

coefficients are .13, .14, and .15 respectively. Figure 2 plots the

proportionate changes in the headcount index against the income growth rates

(over three years). The sectors which experienced the more rapid rates of

poverty alleviation were clearly not (as a rule) the sectors which had the

highest rates of income growth; nor were the poorly performing sectors in

terms of growth the ones which fared worst in terms of their progress in

alleviating poverty.

This is not to say that growth did not alleviate poverty over the

period. From our aggregate analysis it is clear that growth accounted for the

majority of the observed change in poverty; for example, if one assumed that

growth was distributionally neutral across the whole economy over the period

then one would underestimate the change in the headcount index by only 14%,

though this rises to 33% for the preferred poverty measure, reflecting the

fact that it is distributionally sensitive (Ravallion and Huppi, 1990).
Distributional effects were of secondary importance in the aggregate picture.

What these new calculations are telling is that distributional effects
within sectors were much more important to the sectoral pattern of poverty
alleviation. There were significant shifts in the distributions of
consumption within sectors over the period, mitigating the effects of growth.

This can be seen more clearly from our estimates of the contribution of
distributionally neutral growth to poverty alleviation across sectors in Table
3. To estimate these, we have first estimated the change in poverty that
would have been observed over the period if all incomes within a given sector
in 1984 had grown at the same rate.[10] We then express this as a percentage of
the actual change that occurred. A figure of 100 thus indicates that the
actual growth which occurred was distributionally neutral. A figure less than
100 indicates that distributional changes helped alleviate poverty, while they
made it worse when the figure exceeds 100.

It can be seen from Table 3 that distributional changes helped alleviate
poverty in 22 of the 28 sectors. In two sectors, urban farm laborers, and
urban mine workers, poverty would have increased if the (negative) growth had
been distributionally neutral, while it actually decreased. In these cases,
over 100 percent of the actual change in poverty is attributable to improved
distribution. But these sectors are unusual, and for the vast majority of
sectors both growth and distributional changes helped alleviate poverty. What
is striking, however, is the wide variation across sectors in the relative
importance of these two factors. This is borne out clearly in Figure 3, which
plots the 1987 Gini index against that for 1984 by sector.[11] It can be seen
that the Gini index fell in almost all sectors, but that the rates of

improvement vary considerably across sectors. It is this variability across
sectors in the importance of shifts in distribution which accounts for the
absence of a correlation between growth performance alone and the rate of
poverty alleviation.

Given that intra-sector changes in distribution generally alleviated
poverty, one would expect the assumption of neutrality within sectors to lead
to an underestimation of the aggregate reduction in poverty associated with
the pattern of growth. It is also of interest to inquire into the magnitude
of that underestimation for our data. The last row of Table 3 gives the
estimated proportions of national poverty alleviation accountable to the
sector growth rates in mean consumption assuming intra-sector neutrality.
Here we assume that both the actual growth rates in mean consumption and the
changes in sector population shares are known; in practice, errors in
assessing these will add to the imprecision in predicting the impact on
aggregate poverty. Here we focus solely on the error due to incorrectly
assuming neutrality within sectors. Since nearly 90% of the change in the
headcount index is captured, the within-sector neutrality assumption may be
considered to provide a fair approximation to the aggregate change in the
proportion who are poor with known rates of change in means and population
shares.[12] The error is a good deal larger for the preferred poverty measure,
for which the neutrality assumption only picks up about two-thirds of the
actual change in poverty. This reflects the measure's responsiveness to
intra-sector distributional shifts below the poverty line.

6.   A Closer Look at Poverty in the Farming Sector

Regional Dimensions

The importance of the rural farming sector in national poverty alleviation as evident in Table 2, warrants further investigation. Tables 4 and 5 provide information about the __regional__ distribution of self-employed farm households and the evolution of poverty among them. Regional disparities in average consumption, income and poverty levels of self-employed rural farmers are quite substantial, as are some of the changes in poverty between 1984 and 1987. Average consumption by self-employed farmers decreased in eight out of twenty-seven regions during the three year period. Consumption decreases among self-employed farm households occurred solely in the Outer Islands.

Although average consumption of self-employed rural farmers fell in nearly a third of the regions, poverty in this employment sector increased with statistical significance in three regions only, namely Aceh, East Timor and Irian Jaya. Desirable __intra__-regional distributional effects were clearly important in mitigating the effects of aggregate economic decline in the remaining regions where average consumption decreased. Note, however, that increases in the poverty measures among farmers in East Timor and Irian Jaya are probably due to changes in the SUSENAS sampling frame in these two regions between 1984 and 1987, rendering the comparison doubtful.[13] The 1987 figures for these provinces are likely to be more accurate.

The spatial disparities in poverty incidence are marked. While poverty among self-employed rural farmers in Aceh, Riau, Jambi and Bengkulu lay below 10% in 1984, over 50% of this employment group in Lampung, Central and East Java, East and West Nusa Tenggara and Central and South Sulawesi fell below

the poverty line. Strong regional disparities were still prevalent three years later, though somewhat less pronounced.

Significant reductions in poverty were experienced among self-employed farmers in West Sumatra, Lampung, Central and East Java, Yogyakarta, East Nusa Tenggara, East Kalimantan and South Sulawesi. 81% of the reduction in the headcount index for all self-employed rural farmers was due to gains in three key regions, namely Central Java (35.2%), East Java (22.5%) and Lampung (13.3%). 68% of the reduction in the preferred poverty measure for this sector were due to declines in these regions. The participation of these three regions in the sector's aggregate poverty reduction is due to both the impressive reductions in poverty (in regions with initially high poverty levels) and high population shares. Further noteworthy is the significant reduction in the severity of poverty (i.e. the preferred measure) in East Nusa Tenggara and South Sulawesi. Together these two regions accounted for another 19% of the reduction in the sector's preferred measure, though their contribution to the decline in the headcount index was much less pronounced. On the other hand, some of the regions with the lowest incidence and extent of poverty among self-employed farmers (e.g. Riau, Jambi, Bengkulu) showed little improvement over the three years.

Income Sources of Self-Employed Farmers in Selected Regions

The significant regional disparities in poverty levels and in the rate of progress in poverty alleviation among self-employed farmers call for further explanations. We have looked at the relative share and intertemporal variation of the various income sources for self-employed farmers in selected regions. Given East and Central Java's important participation in the

alleviation of poverty among self-employed farmers, further analysis of this employment group in these two regions is warranted. We have further included East Nusa Tenggara and West Kalimantan in our analysis. Besides being represented by large sample sizes, these regions are interesting examples for two reasons: Despite a relatively large drop in poverty between 1984 and 1987, East Nusa Tenggara remained one of the regions with the highest incidence of poverty among self-employed farmers in 1987 (53%). In West Kalimantan, on the other hand, poverty among self-employed farmers in rural areas was quite significantly below this employment group's national average in 1984, and the data suggest a slight increase (albeit not statistically significant) between 1984 and 1987.

Tables 6 through 9 provide information about the relative importance of rural self-employed farmers' various income sources in the four regions under consider, ion. Self-employed farmers in each region are separated into poor and non-poor groups. For purposes of comparison, two poor groups are distinguished in 1987: the "1987 poor" as determined by the headcount index in this year and the "1984 poor" consisting of the share of the population determined as poor by the headcount index in 1984. A comparison of this latter group with the same proportion of the population in 1984 gives a better indication of changes in income sources. (A comparison of the 1984 poor with the 1987 poor may be biased by differences amongst the poor in the composition of incomes; for example, the share of wages amongst the rural poor may increase solely because the "least poor" who crossed the poverty line were not wage laborers). Note, however, that the relative importance of different income sources varies only slightly between these two groups of poor farmers, but the growth rates of different incomes differ quite markedly.

In Central and East Java, poor self-employed farmers derived about 55-60 percent of their income from farming (Tables 6 and 7). The proportion is only slightly different for the non-poor, and it is generally higher. The share of farm income changed little over the period. Income sources of poor self-employed farmers in Java appear to be somewhat more diversified than earnings of the same groups in the two provinces in the outer islands, where there was also a tendency for decreasing diversification over the period. In West Kalimantan, poor self-employed farmers earned almost three quarters of their income from farming in 1987, and this share had increased by nearly 10 percentage points over the period. In East Nusa Tenggara they derived over two thirds of their income from this source; the share increased over the period, though less markedly than in West Kalimantan.

Wage earnings of self-employed farmers in East and Central Java were substantially more important than in West Kalimantan (where the contribution of this source declined) and East Nusa Tenggara (where wage earnings were a negligible source of income for the poor). The relative importance of wages among the "1984 poor" in East and Central Java rose to over 16% and almost 20% respectively in 1987. They rose to 3% only in East Nusa Tenggara and dropped to 7% in West Kalimantan. In both Javanese provinces average wage earnings of poor self-employed farmers grew at a significantly higher rate than earnings from any other source and contributed markedly to the increase in total income. Average wage earnings of the "1984 poor" farmers in Central Java almost doubled over the three year period, thus contributing substantially to poverty alleviation among farmers in this region. In West Kalimantan, where poverty among self-employed farmers barely changed over the three years, wage earnings of the poor dropped significantly, as did their relative importance.

On the other hand, wage earnings of the non-poor in this province increased dramatically, though largely through a displacement of other sources.

As real wage rates appear to have changed little in either agriculture or the unskilled manufacturing sector (World Bank, 1990a), this increase in real wage earnings in Java is likely to have been largely from employment growth. Most of this employment growth probably came from a booming rural non-farm sector (Collier et al., 1988).

There is a good deal of diversity across the four provinces in the sources of growth in farm incomes. The main food crops (grains, beans and tubers, fruit and vegetables) were quantitatively important to the growth of farm incomes in all four provinces. Only in West Kalimantan was income growth from "cash crops" more important. In Central Java, average cash crop income of the poor actually declined, though it increased markedly in neighboring East Java (with a growth rate well above that of total farm income). This income source also grew rapidly in East Nusa Tenggara. In all except the latter province, the growth in cash crop incomes was more important to the non-poor, though the poor may have gained indirectly through wage income growth, particularly in Java.

To summarize: Growth in wage earnings was very important to poor farmers in Java. A substantial increase in real wage earnings and a (more modest) increase in farming income were the most important contributors to higher incomes of the "1984 poor" self-employed farmers in Central Java. Wages were also an important source of income gains to the poor in East Java, though growth in non-grain farm incomes was more important there. In marked contrast to Java, wages mattered little to farmers in East Nusa Tenggara - gains to poor farmers in that province arose from growth in a wide range of

crop and livestock incomes. And wage earnings were of decreasing importance
in West Kalimantan, where the modest income growth for the poor arose mainly
from the "cash crops". This was also an important source of gains to the poor
in East Java and East Nusa Tenggara, though not Central Java, except possibly
through employment growth in that sub-sector.

7.   Conclusions

Our main goal has been to describe the sectoral structure of poverty in
Indonesia, and how this evolved during the difficult period of macroeconomic
shocks and rapid adjustments in the mid-1980s.

We have found that gains within the rural sector were quantitatively
important to the country's success at alleviating poverty during this period.
In Indonesia, the highest concentrations of poverty (both in terms of
incidence and absolute numbers of poor) are found in the rural farming sector,
and this sector accounted for 70% of the reduction in our preferred measure of
the severity of poverty between 1984 and 1987. Gains to other sectors
accounted for a further 25%, while 10% was due to population shifts, generally
from rural to urban areas (the offsetting interaction effect between
population shifts and sectoral gains was -5%).

The gains to the rural poor were largely due to growth in the sector's
mean income and consumption; at most 30% of the changes in the sector's
poverty measures was attributable to improved distribution within the sector.
Over half of the gain to the rural farming poor is accountable to gains to the
poor in two key provinces, Central and East Java. For them, gains to both
farm incomes and wage earnings contributed to poverty alleviation, with the
latter being particularly important in Central Java. The picture is much more

varied amongst the Outer Islands, with increases in poverty amongst farmers in a few provinces, though rarely significant. In the two Outer Island provinces studied here in greater depth, East Nusa Tenggara and West Kalimantan, there is less sign of income diversification amongst farmers than in Java, and wage earnings were of little importance in poverty alleviation.

These results suggest that features of the government's adjustment program which favored rural areas, particularly on Java, were crucial to the evident success in maintaining the country's momentum in alleviating aggregate poverty. Two such features have been suggested in recent discussions.

i) There is evidence that the devaluations led to higher agricultural exports as well as (though less elastically than) manufacturing exports (Ahmed and Chhibber, 1989). Agriculture accounted for over half of the rise in non-oil exports during the adjustment period. It is not obvious a priori what effect a real devaluation would have had on poverty, since some of the poor may be net consumers of tradeables, though it should be noted that Indonesia's growth in agricultural exports was largely non-food crops. Thorbecke et al., (1990) report general equilibrium simulations which suggest that Indonesia's devaluations would have had favorable distributional effects. Our results indicate that where there were sizable gains in cash crop incomes, such as in parts of Java and some of the Outer Islands, the poor participated in those gains.

ii) While it is not something our study can throw much further light on, it has been argued by the government and others that a serious attempt was made to protect fiscal allocations to programs which directly benefited the poor, including the rural poor. There is supportive evidence in the sectoral composition of public outlays over the period (Ahmed and Peters, 1990; World

Bank, 1990; Thorbecke et al., 1990). Current consumption was sheltered; indeed the real cut in public spending of about three percent per year over the period was due entirely to cuts in development expenditures. Amongst both routine and development expenditures, certain programs with probable benefits to the poor were sheltered, such as current transfers to the provinces and the more labor intensive rural infrastructure projects, with the latter being encouraged in the attempt to expand rural employment opportunities during the adjustment period. The severest cuts in development expenditures tended to be in the more capital intensive industrial and mining projects. The various counter-factual simulations reported in Thorbecke et al., (1990) confirm that the government's selective budget retrenchment sheltered household incomes - including those of the poor - in the short-run, as compared to uniform proportional cuts. However, their results also suggest that over the medium term the rural poor would have been better off under less severe cuts in public investment relative to consumption.

While the adjustment package undoubtedly helped, one should not underrate the role of Indonesia's relatively favorable initial cond'tions for the adjustment period. The period of sustained and fairly equitable growth for a number of years prior to the adjustment period had created circumstances such that, by the mid-1980s, poverty would be quite responsive to further growth (Ravallion and Huppi, 1990). Conversely, the momentum of poverty alleviation could be maintained at lower growth rates. It can also be argued that much of the stimulus to rural infrastructure development from the late 1970s would have begun to yield substantial returns to the sector by the mid-1980s (Ahmed and Peters, 1990).

Under these conditions, the most important key to Indonesia's success in poverty alleviation during this period may simply be that positive growth in mean private consumption was maintained; the "investment pause" did the bulk of the work, while both initial conditions and some ingredients of the adjustment package helped assure that the poor continued to share at least proportionately in consumption growth. Without these fortuitus initial conditions the adjustment period would certainly not have yielded the same gains to the rural poor.

Although we find a strong negative correlation between levels of poverty and mean incomes across sectors at each date, there is no sign of this between growth rates and rates of poverty alleviation across sectors. The sectors which grew faster were generally not those where poverty was alleviated more rapidly. There were substantial shifts in the intra-sectoral distributions over the period clouding the relationship between sector growth and poverty alleviation. While distributional changes generally helped alleviate poverty, their relative importance varied enormously across sectors, possibly associated with distributionally non-neutral workforce shifts.

Thus, although distributionally neutral growth in average consumption was clearly a strong driving force in the alleviation of aggregate poverty (generally swamping the favorable effects of improved equity), its importance varied greatly across sectors of the economy. For future research, these results suggest that one should be wary of assuming that distributions are static within sectors when analyzing the likely impact of the sectoral pattern of growth on poverty.

Appendix: Robustness of Results

The Choice of Poverty Line

At a poverty line of Rp. 11,000 monthly per capita consumption in urban 1984 prices, the headcount index of poverty dropped significantly in all employment sectors, but one, between 1984 and 1987. We now ask how sensitive these results are to the exact choice of the poverty line and poverty measure.

In testing the robustness of our results to alternative poverty lines and poverty measures, we shall draw on the recent theoretical literature applying stochastic dominance arguments to the comparison of income distributions in terms of poverty measures (Atkinson, 1987; Foster and Shorrocks, 1988). We shall use two results from this literature. The first-order dominance condition, which states that if the cumulative distribution of consumption in 1987 lies nowhere above (and at least somewhere below) that for 1984 at all points up to the maximum conceivable poverty line, then all well-behaved poverty measures will indicate a reduction in poverty between 1984 and 1987. If this condition does not hold, then some poverty measures and poverty lines will rank the two distributions differently to others. To resolve this ambiguity, it may help to consider plausible restrictions on the range of admissible poverty lines. It can also help to consider a restricted class of poverty measures. Sen's Transfer Axiom provides one such restriction. In particular, if we restrict attention to distributionally sensitive poverty measures, then the second-order dominance condition may prove useful. This states that if the area under the 1987 cumulative distribution function is nowhere greater (and somewhere less) than that under the 1984 distribution at all points up to the maximum poverty line, then poverty will have deceased

according to any distributionally sensitive measure satisfying certain mild
conditions.

The first order dominance condition does not hold for twelve of the
twenty-eight sectors under consideration. Testing for second order dominance
in these sectors, we found that dominance only failed to hold in three
instances, namely for employees of the urban and rural manufacturing sector
and for urban construction workers. All distributionally sensitive poverty
measures and all poverty lines will thus indicate a decrease in poverty for
twenty five of the twenty eight sectors no matter where the poverty line is
drawn.

The Choice of Welfare Indicator

We are also concerned about robustness to the choice of welfare
indicator. Two alternative indicators will be considered: a real consumption
measure incorporating an estimate of the inter-province differences in cost-
of-living, and a measure based on the non-food consumption share.

As we have noted, there is no ideal regional price deflator for
Indonesia. Here we consider one possible contender, which we term the
"spatial CPI". The usual CPI is indexed to 100 at a common base date by
dividing an estimated expenditure at each date by that for the base period.
From the same data one can instead construct an index which uses a given date
and place (such as February 1984 in Jakarta) as the base. If the expenditure
data were for the same bundle of goods across all provinces then this would be
a valid Laspeyres price index for making simultaneous spatial and temporal
comparisons. The problem is that the former condition does not hold, in that
no attempt has been made to guarantee that one is costing the same bundle of

goods. Nor is there any obviously sound basis for arguing that the

adjustments to that bundle simply reflect local market conditions, such that

there is a common underlying reference utility level. Nonetheless, our

alternative spatial CPI does at least incorporate information on spatial price

differentials.

Table 10 gives the headcount index for each sector based on the "spatial

CPI". It can be seen that deflation by the CPI for the poor and by the

"spatial" CPI give quite similar results on the sectoral profiles of poverty

for both dates. Clearly, the sectoral profiles average out a good deal of the

spatial price variability.

A rather different welfare indicator is the non-food consumption share,

which is generally found to be a strictly increasing function of real income,

and thus can be considered to be a valid welfare indicator. The main problem

with this measure is that the function relating non-food share to real income

will vary according to other factors such as relative prices, demographic

factors and tastes. This makes non-food share a noisy welfare indicator.

Nonetheless, it is of interest to test the sensitivity of the sectoral

profiles to a switch from the consumption based measure to non-food shares.

We shall assume that a person is poor if their non-food share does not

exceed 25%. This is in the range of commonly assumed cut-off points, and also

gives an aggregate headcount index close to our poverty line. Table 10

compares the headcount index based on non-food shares with the headcount index

based on total consumption. Again the correlation coefficient across sectors

between the two measures is quite high (0.895 in 1984 and 0.804 in 1987).

However, the two indicators give quite different results on the movements over

time and, indeed, the two do not always display a move in the same direction.

While poverty appears to have dropped in all sectors but one according to the expenditure based poverty measures (though with ambiguities at very low expenditure ranges in three sectors, as discussed above), the food-share based headcount index indicates an increase in poverty in nine sectors. In certain sectors, the two measures also show rather large disparities between the levels of poverty.

We can summarize our results as follows: The conclusion that poverty fell in almost all sectors is robust to the choice of a poverty line. It is more sensitive to the choice of welfare indicator, with significant increases in poverty indicated in a few sectors using the non-food share as the welfare indicator. The sectoral profiles at a given date are affected little by the choice of welfare indicator.

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Notes

1.   For example, it has been argued that it has been the large farmers who have gained proportionately more `:om the growth of non-farm activities; see,for example, Thorbecke et al., (1990), who also reference other work on this question.

2.   Papanek (1989) estimates that real agricultural wage rates declined at about 1.7 percent per year in Central and East Java between 1982 and 1987. The apparent inclusion of the last half of 1987 as the end date of Papanek's series may tend to exaggerate the downward trend, as it coincided with a severe drought and unusually high rice prices.   Concern has also been expressed about the particular price index used by Papanek, which is believed to have substantially over-estimated the rate of inflation (notably in certain vegetable prices); see Ahmed and Peters (1990).   Collier et al., (1988) do not find evidence of declining real wages in their study of 13 villages in the same provinces over a similar period, using a different deflator.

3.   See, for example, the interesting counter-factual experiments using various general equilibrium models reported in the Thorbecke et al., (1990) study of the distributional effects of Indonesia's adjustment program.

4.   Concern has been raised that the SUSENAS data may tend to underreport consumption. This is suggested by comparisons with the national accounts, though doubts have also been raised about accuracy of the latter. It can be argued that any underestimation using the SUSENAS is more likely to be for the rich than the poor.   Indeed, there is evidence of a tendency for food consumption recall to over-estimate consumption by the poor (Ravallion, 1990).

5.   An urban rural price differential of about 10% seems quite plausible for the poor, see for example, Rao (1984), and Ravallion and van de Walle (1990). It should be noted, however, that some past studies have assumed a higher differential between the urban and rural poverty lines.   We interpret this as embodying relativist poverty considerations, such that a higher real poverty line is used in urban areas.   For further discussion see Ravallion and Huppi (1990).

6.   We can write the FGT class of poverty measures as follows:

$$P_\alpha = \sum_{y_i < z} [(z-y_i)/z]^\alpha$$

where α is a non-negative parameter.

7.   Having listed the 10 sectors and a residual category, the respondent is asked: "Of the above, the major source of income is.." ("Dari sur.Jer penghasilan di atas yang utama adelah").   Note that the interpretation of "major" is subjective. This need not coincide with the largest income share in that year, though on inspecting the data the two generally coincide. Exceptions may reflect

an unusual year, or sluggishness in recognizing significant changes in income sources.

8   The correlations are somewhat higher if one applies appropriate transformations to the poverty measures and means noting that the poverty measures are likely to be a decreasing convex function of the mean, and are also bounded above and below (as is clear from Figure 1 below); for example, the correlation between the logit transform of the headcount index for 1987 and the log of mean consumption is -.94.

9.   The fitted values are given by

$$\log[H/(1-H)] = -155.8 + 33.74\log y - 1.83(\log y)^2 \quad R^2=.85$$
$$\qquad\qquad\quad (2.21) \quad (2.43) \qquad (-2.69)$$

where H denotes the headcount index and y is the sector's mean income.

10.   This is based on a constant elasticity approximation; the point elasticities with respect to distributionally neutral growth of each poverty measure have been calculated for each sector in 1984, and these have been used to estimate the level of poverty that would have been observed in 1987 using the growth rates in Table 1. A more accurate method is to estimate the 1984 Lorenz curve for each sector, and use this to simulate the level of poverty that would have held in 1987 at the mean consumption or income for that year. Ravallion and Huppi (1990) use this method in similar calculations for the changes in aggregate poverty. However, it is computationally far more expensive than assuming constant elasticities, and this will probably give a good enough approximation for our purposes.

11.   A change in the Gini index is not sufficient for identifying whether distributional changes have benefited the poor, which also depends on the precise way in which the Lorenz curve shifts. The decomposition results in Table 3 are a better indicator. However, the popularity and ease of interpretation of the index make it attractive for this illustrative purposes.

12.   If we had also assumed that populaion shares by sector had not changed over the period, the estimated proportions of the observed change in poverty accountable to the pattern of growth, assuming neutrality within sectors, are 89.06%, 68.46% and 68.00% for the headcount index, poverty gap index, and preferred measure respectively. It should also be recalled that we are assuming constant elasticities within sectors for these calculations. We do not know how much any deviations from that assumption are adding to the discrepancies between simulated and actual changes in poverty in Table 3, though we would be surprised if it is not tolerably small in the aggregate.

13.   The SUSENAS sample in these two regions was greatly expanded in 1987. The 1984 sampling rate had been artificially low in rural areas of both provinces due to factors beyond BPS control.

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Table 1: Summary Data on Sectors of Employment

Income source			No.of sampled households 1984	No.of sampled households 1987	Population shares % 1984	Population shares % 1987	Mean consumption per capita Rp./month 1984	Mean consumption per capita Rp./month 1987	t test	Growth rate (3 yr) (%)	Mean income per capita Rp./month 1984	Mean income per capita Rp./month 1987	t test	Growth rate (3 yr) (%)
1. Farming	L	U	396	34°	0.65	0.71	18505	15791	-1.88	-14.67	20858	19233	-0.80	-7.79
		R	2999	3045	8.38	7.92	11699	13606	12.37	16.30	13587	15547	8.18	14.43
	SE	U	976	751	1.30	1.27	15415	18619	4.85	20.78	19290	23467	1.97	21.65
		R	20788	21400	43.73	39.78	13444	15090	18.86	12.24	16034	17662	11.23	10.15
2. Mining	L	U	263	181	0.29	0.23	32623	32288	-0.15	-1.03	42026	39692	-0.74	-5.55
		R	191	153	0.44	0.35	18387	20424	1.45	11.08	23581	22932	-0.31	-2.75
	SE	R	232	109	0.51	0.20	12108	14985	3.03	23.76	17058	19461	0.90	14.09
3. Industry	L	U	1074	1004	2.06	2.38	23768	25655	2.84	7.94	27520	28726	1.32	4.38
		R	671	700	1.94	1.88	16096	18841	5.15	17.05	21142	21762	0.30	2.93
	SE	U	323	307	0.54	0.65	25455	27324	0.99	7.34	35791	34423	-0.37	-3.82
		R	667	674	1.39	1.52	15059	16740	3.36	11.16	21331	21853	0.39	2.45
. Construction	L	U	876	856	1.40	1.45	19905	22225	2.73	11.66	23138	26227	1.97	13.35
		R	795	864	2.13	2.35	14637	16355	4.20	11.58	17827	20300	2.24	13.87
	SE	U	169	154	0.22	0.23	28225	29987	0.57	6.24	33763	39321	1.11	16.46
		R	131	126	0.31	0.26	17048	21514	2.87	26.20	26466	25994	-0.08	-1.78
. Trade	L	U	567	549	0.86	0.99	27352	31661	3.78	15.75	30053	35308	3.64	17.49
		R	151	151	0.32	0.35	17182	19063	1.26	10.95	21853	21245	-0.28	-2.78
	SE	U	2943	2927	4.50	5.31	24698	27937	6.66	13.11	32199	34533	2.13	7.25
		R	2379	2771	6.29	7.28	17205	19325	6.28	12.32	22831	23842	0.95	4.43
6. Transport	L	U	701	588	1.15	1.08	24058	27004	2.63	12.25	26592	30650	2.68	15.26
		R	357	310	0.89	0.85	18205	20729	3.02	13.86	21886	23841	1.76	8.93
	SE	U	460	555	0.75	1.04	21116	22700	1.28	7.50	24230	26629	1.27	9.90
		R	365	411	1.00	1.13	19657	19976	0.21	1.62	24790	24541	-0.12	-1.00
7. Finance	L	U	298	294	0.43	0.53	38193	49307	5.09	29.10	54311	61701	1.13	13.61
8. Services	L	U	3894	4282	5.51	6.52	28690	31846	6.86	11.00	32420	36134	5.97	11.46
		R	2297	2918	4.66	6.09	21720	24134	5.45	11.11	26312	29975	5.41	13.92
	SE	U	608	635	0.95	1.12	23691	25922	2.39	9.42	27444	33082	2.08	20.54
		R	484	498	1.10	1.18	17373	18718	1.84	7.74	20623	22545	1.34	9.32

Notes: February 1984 urban prices

L: Laborer/Employee; SE: Self-employed

Sector Definitions:
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1 = farming, husbandry, hunting and fishery
2 = mining and excavating
3 = industrial processing
4 = construction
5 = wholesale, retail, restaurant and hotel
6 = transportation, warehousing and communication
7 = finance, insurance, office rental, real estate and office services
8 = community services, social services and personal services

Table 2: Changes in Poverty by Sector of Employment

Income source			Headcount index 1984	1987	t test	Reduction due to sectoral gains	Poverty gap index 1984	1987	t test	Reduction due to sectoral gains	Preferred measure 1984	1987	t test	Reduction due to sectoral gains
			%	%		%				%				%
National			33.02	21.65	-40.86	100.00	8.52	4.22	-51.63	100.00	3.17	1.24	-49.38	100.00
Farming	L	U	41.51	34.50	-1.98	0.40	12.26	8.24	-3.30	0.60	5.08	2.69	-3.83	0.80
		R	53.01	38.42	-11.51	10.75	16.85	7.56	-17.58	14.20	5.79	2.17	-17.72	15.71
	SE	U	35.37	20.26	-7.15	1.72	9.94	3.95	-8.90	1.81	4.06	1.20	-8.52	1.92
		R	43.91	31.42	-26.67	48.04	11.69	6.50	-34.93	52.78	4.44	1.99	-34.09	55.5
Mining	L	U	5.94	2.59	-1.78	0.09	1.44	0.10	-3.05	0.09	0.52	0.00	-2.64	0.08
		R	26.29	16.92	-2.13	0.37	7.17	3.28	-2.83	0.40	3.04	0.96	-3.05	0.48
	SE	R	48.29	37.91	-1.82	0.47	13.57	7.64	-3.24	0.71	5.17	2.67	-2.80	0.66
Industry	L	U	9.94	7.01	-2.40	0.53	1.43	0.97	-2.01	0.22	0.36	0.23	-1.64	0.14
		R	23.82	16.24	-3.51	1.30	5.42	2.21	-5.93	1.45	1.72	0.60	-4.98	1.13
	SE	U	16.80	11.84	-1.78	0.24	3.49	2.31	-1.60	0.15	1.24	0.65	-1.85	0.17
		R	35.57	23.38	-4.94	1.49	8.96	3.97	-7.27	1.62	3.16	0.95	-7.35	1.59
Construction	L	U	18.15	13.70	-2.54	0.55	3.45	2.09	-3.45	0.44	0.97	0.54	-2.90	0.31
		R	32.69	21.46	-5.17	2.10	7.26	3.70	-5.97	1.76	2.51	1.05	-5.25	1.61
	SE	U	9.98	4.70	-1.84	0.10	1.65	0.96	-1.15	0.04	0.40	0.24	-0.81	0.02
		R	28.64	12.42	-3.29	0.44	7.09	2.22	-3.87	0.35	2.07	0.54	-3.74	0.24
Trade	L	U	8.54	3.81	-3.31	0.36	1.66	0.60	-3.14	0.21	0.53	0.14	-2.81	0.17
		R	33.79	17.02	-3.41	0.47	9.01	4.04	-3.33	0.37	3.12	1.22	-3.03	0.32
	SE	U	9.97	5.25	-6.84	1.87	2.10	0.73	-8.38	1.43	0.68	0.17	-7.46	1.19
		R	26.75	14.63	-10.74	6.70	5.91	2.34	-12.23	5.22	1.92	0.58	-10.99	4.37
Transport	L	U	11.30	2.72	-6.26	0.87	2.04	0.39	-5.66	0.44	0.55	0.07	-4.62	0.29
		R	20.45	13.63	-2.36	0.53	4.58	2.01	-3.62	0.53	1.51	0.47	-3.59	0.48
	SE	U	26.27	11.70	-5.91	0.96	5.10	2.01	-5.15	0.54	1.54	0.50	-4.15	0.40
		R	28.97	15.14	-4.67	1.22	6.72	1.81	-6.42	1.14	2.29	0.36	-5.79	1.00
Finance	L	U	0.38	2.37	2.08	-0.08	0.09	0.32	1.22	-0.02	0.02	0.09	0.98	-0.02
Services	L	U	5.09	3.62	-3.25	0.71	1.00	0.56	-4.44	0.56	0.29	0.13	-4.50	0.46
		R	15.93	9.78	-6.54	2.52	3.37	1.61	-7.38	1.91	1.08	0.46	-6.04	1.50
	SE	U	11.80	7.85	-2.34	0.33	2.83	0.87	-4.62	0.43	1.02	0.17	-4.53	0.42
		R	24.77	20.75	-1.50	0.39	4.85	3.03	-2.96	0.47	1.51	0.67	-3.56	0.48
Population shifts						13.22				10.44				9.40
Interaction effects						-2.56				-4.26				-4.50

Notes: Components do not add up to total exactly because of missing data for some households, and the fact that a number of sectors are omitted because of small sample sizes, as well as rounding errors.
Significance tests on the differences between poverty measures are based on Kakwani's (1989) formulae for the standard errors of P_α.

Table 3: Sectoral Growth and Poverty Alleviation

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==============================================================
                               % Poverty alleviation due to
                                   distributionally neutral
                                          growth
        Income
        Source                   Headcount  Poverty gap  Preferred
                                   index       index      measure
==============================================================
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Income Source			Headcount index	Poverty gap index	Preferred measure
Farming	L	U	-140.04	-106.71	-88.12
		R	88.38	85.33	81.59
	SE	U	78.45	88.24	85.47
		R	118.83	76.01	72.46
Mining	L	U	-6.52	-3.45	-3.63
		R	54.69	54.45	43.99
	SE	R	218.39	139.12	159.67
Industry	L	U	111.79	146.88	130.69
		R	137.75	97.75	112.68
	SE	U	71.41	82.82	56.00
		R	65.66	59.53	58.59
Construction	L	U	146.22	125.98	134.44
		R	85.36	82.75	75.38
	SE	U	53.30	75.36	97.54
		R	82.26	115.92	171.90
Trade	L	U	106.24	102.25	91.29
		R	43.41	54.58	6?.87
	SE	U	100.84	75.34	73.03
		R	64.17	71.93	73.38
Transport	L	U	66.93	68.72	76.02
		R	86.38	85.61	81.85
	SE	U	33.05	51.39	51.36
		R	8.74	7.35	7.45
Finance	L	U	261.31	93.77	203.70
Services	L	U	56.00	44.99	53.86
		R	32.46	41.42	47.13
	SE	U	28.13	29.85	33.42
		R	21.37	31.80	34.25
National			86.75	68.02	67.81

Table 4: Summary Data of Income and Expenditure of Self-Employed Rural Farm Households by Province

Province	No.of sampled households		% of self-employed farm population		Mean consumption per capita Rp./month		t test	Growth rate (3 yr) (%)	Mean income per capita Rp./month		t test	Growth rate (3 yr) (%)
	1984	1987	1984	1987	1984	1987			1984	1987		
Aceh	921	785	2.75	2.55	20398	18039	-5.82	-11.56	23444	19702	-5.07	-15.96
N.Sumatra	931	942	5.81	6.30	14174	16399	7.54	15.70	15670	17964	5.93	14.64
W.Sumatra	672	577	2.33	2.09	16869	21290	9.70	26.21	18454	22155	5.80	20.06
Riau	610	608	1.69	1.90	18634	18659	0.06	0.13	21793	20657	-1.87	-5.21
Jambi	429	498	1.38	1.73	17665	18762	2.21	5.21	20051	20120	0.07	0.34
S.Sumatra	857	904	3.51	3.92	15963	18753	7.50	17.48	17219	20929	7.00	21.5
Bengkulu	261	257	0.71	0.85	18751	16952	-2.88	-9.59	21736	19837	-2.04	-8.74
Lampung	1169	959	5.57	5.48	10983	13958	11.38	27.09	14176	17428	2.94	22.94
W.Jawa	1306	1115	12.37	11.15	15886	16796	2.56	5.74	18246	18365	0.20	0.65
C.Jawa	2011	1753	18.07	16.31	10763	13497	13.34	25.40	13391	15407	4.42	15.0
Yogykarta	654	508	1.72	1.45	12992	15126	5.16	16.43	15684	17681	2.85	12.73
E.Java	2126	1940	18.67	18.40	12354	14296	4.53	15.72	15099	16840	4.09	11.53
Bali	847	606	1.84	1.81	12556	13840	3.24	10.23	16348	19236	2.39	17.6
W.Nusa Tenggara	873	647	2.20	2.18	11066	12841	5.02	16.04	13710	15214	2.55	10.97
E.Nusa Tenggara	1210	3536	3.72	3.80	10420	12092	8.12	16.05	14073	16315	4.12	15.93
E.Timor *	129	292	0.03	0.94	15991	12933	-4.04	-19.12	19338	18697	-0.65	-3.3
W.Kalimantan	810	1026	2.48	2.63	16230	14742	-4.32	-9.17	17312	17385	0.12	0.42
C.Kalimantan	360	330	1.05	1.07	16809	16537	-0.46	-1.62	19730	18524	-1.40	-6.11
S.Kalimantan	730	561	1.64	1.46	16820	15827	-2.78	-5.90	18872	18076	-0.90	-4.22
E.Kalimantan	314	355	0.62	0.83	15281	21098	8.21	38.07	16892	24979	8.14	47.87
N.Sulawesi	594	489	1.77	1.60	13523	15937	4.37	17.85	16171	21881	4.62	35.31
C.Sulawesi	378	342	1.71	1.55	11262	15451	9.06	37.20	14048	21766	5.51	54.94
S.Sulawesi	1077	1127	5.51	6.07	12496	13006	1.78	4.08	15567	16564	1.96	6.40
SE.Sulawesi	973	340	0.97	1.20	12632	11339	-3.64	-10.24	15929	15310	-1.04	-3.89
Maluku	294	272	1.79	1.49	16013	15469	-0.81	-3.40	19536	18093	-1.48	-7.39
Irian Jaya *	252	631	0.10	1.25	18084	13861	-6.86	-23.35	21118	17402	-4.51	-17.50

Note: * 1984 and 1987 not comparable due to change in sampling frame.

able 5: Changes in Poverty of Rural Self-Employed Farm Households by Province

Province	Headcount index				Poverty gap index				Preferred measure			
	1984	1987	t test	Reduction due to sectoral gains	1984	1987	t test	Reduction due to sectoral gains	1984	1987	t test	Reduction due to sectoral gains
	%	%		%				%				%
Aceh	6.52	12.50	4.17	-1.32	0.72	1.56	3.93	-0.45	0.12	0.29	3.31	-0.19
N.Sumatra	27.28	22.32	-2.49	2.31	4.83	4.96	0.26	-0.15	1.25	1.55	1.58	-0.71
W.Sumatra	17.92	6.98	-6.01	2.04	4.20	0.55	-7.47	1.64	1.70	0.08	-6.33	1.54
Riau	6.39	7.85	0.99	-0.20	0.58	1.03	1.99	-0.15	0.11	0.21	1.45	-0.07
Jambi	6.73	6.48	-0.16	0.03	0.89	0.71	-0.73	0.05	0.17	0.12	-1.03	0.03
S.Sumatra	22.13	15.02	-3.84	2.00	3.74	3.16	-1.24	0.39	1.02	1.11	0.47	-0.13
Bengkulu	10.88	8.77	-0.81	0.12	1.50	0.78	-2.00	0.10	0.26	0.10	-2.36	0.05
Lampung	64.31	34.41	-14.39	13.33	18.46	6.09	-18.72	13.28	7.05	1.57	-16.93	12.46
W.Jawa	26.77	22.97	-2.16	3.76	4.16	3.51	-1.79	1.55	1.03	0.86	-1.34	0.86
C.Jawa	65.27	40.95	-15.36	35.19	19.07	9.07	-18.22	34.82	7.34	2.87	-16.58	32.97
Yogykarta	45.71	25.19	-7.49	2.83	10.26	4.37	-7.87	1.95	3.40	1.22	-6.61	1.53
E.Java	53.86	38.83	-9.72	22.47	14.76	8.71	-11.61	21.76	5.73	2.78	-11.15	22.48
Bali	44.14	39.99	-1.58	0.61	11.23	8.78	-3.02	0.87	3.93	2.85	-2.93	0.81
W.Nusa Tenggara	63.24	47.05	-6.34	2.85	18.86	11.30	-8.33	3.20	7.36	3.78	-8.16	3.21
E.Nusa Tenggara	65.27	53.00	-7.65	3.65	21.80	12.05	-14.33	6.99	9.56	3.77	-14.98	8.79
E.Timor *	26.46	45.27	3.88	-0.05	6.64	10.42	2.76	-0.02	1.93	3.18	2.52	-0.02
W.Kalimantan	26.10	27.64	0.74	-0.31	4.66	4.73	0.16	-0.03	1.29	1.18	-0.61	0.11
C.Kalimantan	25.61	17.65	-2.56	0.67	3.36	2.13	-2.48	0.25	0.68	0.33	-2.85	0.15
S.Kalimantan	16.82	15.37	-0.71	0.19	2.32	2.03	-0.79	0.09	0.54	0.41	-1.14	0.09
E.Kalimantan	30.04	8.17	-7.37	1.05	6.02	1.17	-6.65	0.58	1.80	0.28	-5.19	0.38
N.Sulawesi	40.71	27.72	-4.54	1.84	14.90	6.13	-8.16	2.99	7.08	2.01	-8.54	3.66
C.Sulawesi	58.25	29.77	-8.04	3.90	16.02	5.91	-8.73	3.33	6.16	1.68	-7.95	3.13
S.Sulawesi	51.53	42.01	-4.50	4.20	16.64	8.88	-10.09	8.24	7.25	2.76	-10.69	10.10
SE.Sulawesi	46.23	55.81	3.06	-0.74	13.86	15.36	1.30	-0.28	5.68	5.55	-0.73	0.05
Maluku	31.21	24.95	-1.66	0.90	7.92	3.68	-4.12	1.46	3.01	0.80	-4.63	1.61
Irian Jaya *	16.35	40.96	8.09	-0.20	3.72	10.51	7.20	-0.13	1.31	3.77	5.88	-0.10
Population shifts				7.29				4.95				4.09
Interaction effects				-8.16				-6.41				-5.49

Note: * 1984 and 1987 not comparable due to change in sampling frame.

Table 6: Income Sources of Rural Self-Employed Farmers in Central Java

Year	Group	% of pop.	Farm income	Grains	Beans & tubers	Vege-tables & fruits	"Cash crops"	Animal husbandry & dairy	Fishery	Forestry & hunting	Non-farm	Wages	Capital	Gifts	Mean income
1984	1984 poor	65.3	5149	2310	700	299	997	581	74	188	690	1050	1379	361	8629
	1984 non poor	34.7	10081	4428	1102	657	2139	1318	256	181	1703	1743	3506	1757	18790
1987	1984 poor	65.3	5815	2734	928	552	936	501	58	105	1080	2028	1274	124	10321
	1984 non poor	34.7	12318	5525	1137	668	2661	1047	1214	67	2720	2417	2789	668	20912
% contribution to increase in total income	1984 poor		39.36	25.04	13.50	14.97	-3.60	-4.72	-0.93	-4.90	23.05	57.80	-6.22	-14.00	100.00
	1984 non poor		105.45	51.69	1.65	0.52	24.58	-12.76	45.15	-5.39	47.92	31.75	-33.78	-51.33	100.00
1987	1987 poor	41.0	4956	2326	865	482	812	342	44	85	792	1960	1074	153	8934
	1987 non poor	59.0	10238	4660	1095	669	2037	932	748	97	2245	2304	2305	424	17515
% contribution to increase in total income	1987 poor		-63.33	5.23	53.86	60.00	-60.43	-78.22	-9.95	-33.83	33.34	297.87	-99.82	-68.06	100.00
	1987 non poor		12.29	18.17	-0.52	0.92	-8.00	-30.27	38.61	-6.62	42.49	3.98	-94.22	-104.53	-100.00

Notes: All figures are in 1984 rural prices

Non-farm income includes handicraft, cottage industry, trading, transportation, services, construction, etc.

Capital income includes interests, house, hall and equipment rentals, dividends, pensions, scholarships, grant, life insurance and others.

Gifts refers to the balance of gifts received and gifts made.

"Cash crops" includes estate and plantation crops (coffee,clove,nutmeg,pepper,tobacco, rubber,coconut,sugar cane and others)

Animal husbandry and dairy includes cattle, poultry, miscellaneous domestic animals, milk and eggs.

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Table 7: Income Sources of Rural Self-Employed Farmers in East Java

| Year | Group | % of pop. | farm income | of which | | | | | | | Non-farm | Wages | Capital | Gifts | Mean income |
				Grains	Beans & tubers	Vege-tables & fruits	"Cash crops"	Animal husbandry & dairy	Fishery	Forestry & hunting					
1984	1984 poor	53.8	4815	2511	449	206	491	895	202	61	560	1304	2120	213	9012
	1984 non poor	46.2	10789	5148	1298	873	1514	1242	664	50	1644	1840	4353	618	19244
1987	1984 poor	53.8	5583	2413	959	343	812	849	72	136	556	1644	2260	140	10183
	1984 non poor	46.2	12413	5944	1574	812	2270	1399	359	55	1556	2570	3971	782	21291
% contribution to increase in total income	1984 poor		65.61	-8.35	43.51	11.69	27.40	-3.95	-11.08	6.39	-0.35	29.02	11.98	-6.26	100.00
	1984 non poor		79.32	38.87	13.49	-2.99	36.91	7.68	-14.89	0.24	-4.32	35.66	-18.68	8.02	100.00
1987	1987 poor	38.8	5093	2203	890	317	795	697	64	126	455	1645	1985	121	9299.
	1987 non poor	61.2	11048	5213	1469	713	1921	1359	294	81	1374	2341	3725	636	19123
% contribution to increase in total income	1987 poor		96.94	-107.10	153.61	38.71	105.88	-68.79	-48.07	22.70	-36.51	118.67	-47.12	-31.98	100.00
	1987 non poor		214.89	53.75	141.68	-132.93	337.10	96.75	-306.96	25.50	-223.86	414.85	-520.84	14.95	-100.00

Table 8: Income Sources of Rural Self-Employed Farmers in East Nusa Tenggara

Year	Group	% of pop. :	Farm Income :				of which				:	Non-farm	Wages	Capital	Gifts :	Mean income
		:	:	Grains	Beans & tubers	Vege-tables & fruits	"Cash crops"	Animal husbandry & dairy	Fishery	Forestry & hunting :				:	
1984	1984 poor	65.3 :	5332 :	1749	650	214	754	1786	155	24 :	481	164	1879	784 :	8640
	1984 non poor	34.7 :	12236 :	3988	1086	562	2269	3869	426	36 :	812	374	4713	2468 :	20603
1987	1984 poor	65.3 :	7592 :	2245	1114	680	1201	2173	97	83 :	659	328	1867	889 :	11335
	1984 non poor	34.7 :	13861 :	3549	1383	1024	2076	5390	296	142 :	1595	751	3709	1462 :	21377
% contribution to increase in total income	1984 poor	:	83.88 :	18.39	17.21	17.30	16.58	14.35	-2.15	2.19 :	6.59	6.07	-0.44	3.90 :	100.00
	1984 non poor	:	209.83 :	-56.69	38.39	59.70	-24.98	196.50	-16.76	13.68 :	101.13	48.65	-129.67	-129.94 :	100.00
1987	1987 poor	53.0 :	7050 :	2068	1068	645	1133	1955	96	85 :	613	272	1826	814 :	10576
	1987 non poor	47.0 :	12834 :	3407	1364	974	1923	4796	245	124 :	1401	702	3274	1397 :	19608
% contribution to increase in total income	1987 poor	:	88.74 :	16.49	21.57	22.26	19.58	8.71	-3.02	3.15 :	6.82	5.59	-2.72	1.56 :	100.00
	1987 non poor	:	60.08 :	-58.45	27.91	41.47	-34.81	93.25	-18.17	8.87 :	59.24	33.00	-144.66	-107.67 :	-100.00

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Table 9: Income Sources of Rural Self-Employed Farmers in West Kalimantan

| Year | Group | % of pop. | Farm income | of which | | | | | | | Non-farm | Wages | Capital | Gifts | Mean income |
				Grains	Beans & tubers	Vege-tables & fruits	"Cash crops"	Animal husbandry & dairy	Fishery	Forestry & hunting					
1984	1984 poor	26.1	5704	3298	120	106	1831	130	183	36	215	1043	1725	61	8748
	1984 non poor	73.9	9981	5434	235	214	3008	259	586	245	1482	1470	5179	95	18207
1987	1984 poor	26.1	6947	3536	132	269	2630	31	247	103	442	659	1275	50	9374
	1984 non poor	73.9	10559	4612	195	652	3911	198	595	397	887	2710	3452	469	18077
% contribution to increase in total income	1984 poor		198.57	37.97	1.86	25.97	127.58	-15.81	10.30	10.71	36.24	-61.26	-71.83	-1.72	100.00
	1984 non poor		444.02	-631.33	-31.09	336.54	693.80	-46.91	6.54	116.46	-457.05	951.86	-1326.20	287.37	-100.00
1987	1987 poor	27.6	6929	3534	129	267	2596	31	249	123	462	663	1292	58	9405
	1987 non poor	72.4	10642	4635	197	661	3952	201	601	395	888	2751	3492	475	18248
% contribution to increase in total income	1987 poor		186.53	35.97	1.32	24.57	116.50	-15.12	10.06	13.23	37.68	-57.81	-65.96	-0.44	100.00
	1987 non poor		1602.39	-1937.35	-92.73	1083.66	2288.90	-140.86	36.57	364.21	-1439.68	3107.37	-4091.34	921.25	100.00

Table 10: Alternative Headcount Indices

Income source			1984			1987		
			CPI	CPIS	Non-food share	CPI	CPIS	Non-food share
Farming	L	U	41.51	42.62	26.60	34.50	36.65	24.40
		R	53.01	54.93	38.39	38.42	40.31	38.89
	SE	U	35.37	37.10	26.67	20.26	21.34	21.27
		R	43.91	46.08	45.68	31.42	34.33	41.96
Mining	L	U	5.94	9.90	10.14	2.59	3.72	18.38
		R	26.29	30.46	32.60	16.92	25.89	31.23
	SE	R	48.29	54.80	38.74	37.91	34.12	50.46
Industry	L	U	9.94	10.69	9.84	7.01	7.29	9.03
		R	23.82	26.75	24.52	16.24	17.37	22.00
	SE	U	16.80	13.82	16.65	11.84	10.26	7.24
		R	35.57	34.24	33.97	23.38	21.04	29.76
Construction	L	U	18.15	19.79	10.39	13.70	12.58	13.39
		R	32.69	34.28	33.15	21.46	23.51	28.69
	SE	U	9.98	8.23	9.99	4.70	6.91	3.26
		R	28.64	35.69	26.12	12.42	14.97	32.22
Trade	L	U	8.54	9.23	9.61	3.81	5.64	4.78
		R	33.79	39.46	27.06	17.02	17.77	28.70
	SE	U	9.97	10.19	8.85	5.25	5.7ª	7.05
		R	26.75	27.72	26.49	14.63	16.23	26.11
Transport	L	U	11.30	12.11	13.29	2.72	3.48	13.78
		R	20.45	23.06	30.19	13.63	13.38	37.26
	SE	U	26.27	26.54	17.83	11.70	14.69	13.42
		R	28.97	24.71	30.13	15.14	14.02	26.74
Finance	L	U	0.38	1.53	4.22	2.37	3.30	4.26
Services	L	U	5.09	5.56	5.98	3.62	4.19	5.44
		R	15.93	16.55	21.15	9.78	11.42	21.51
	SE	U	11.80	12.57	13.69	7.85	6.13	7.78
		R	24.77	28.06	33.86	20.75	20.85	26.46

Notes: CPI Headcount Index: per capita consumption deflated by CPI for the poor
CPIS Headcount Index: per capita consumption deflated by CPI
taking into account spatial expenditure variations
Non-food share headcount index: Non-food share poverty line: 25% of
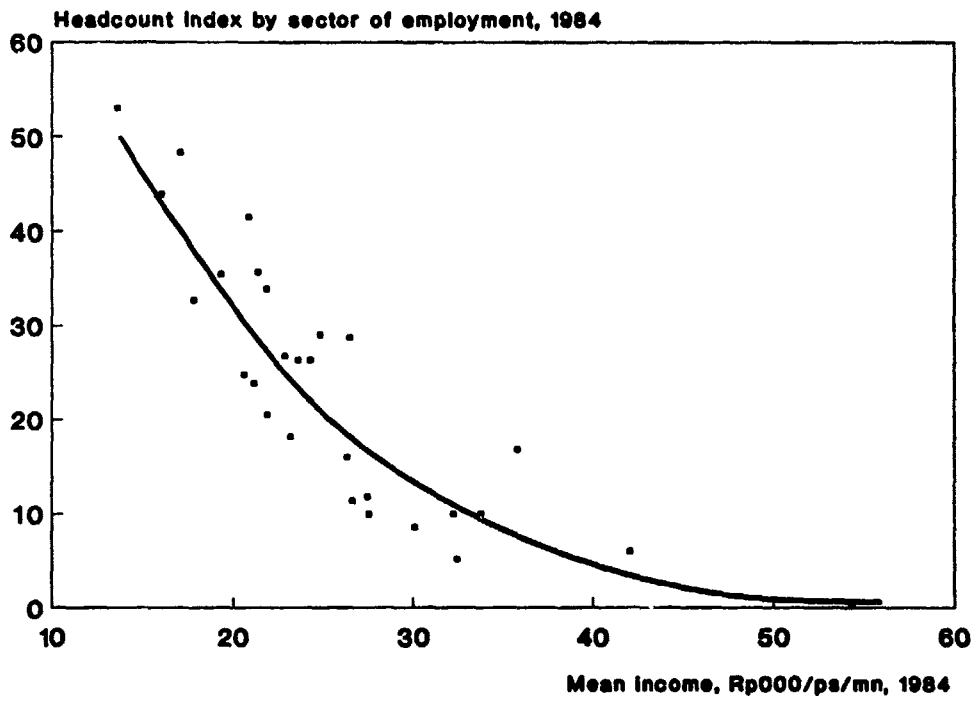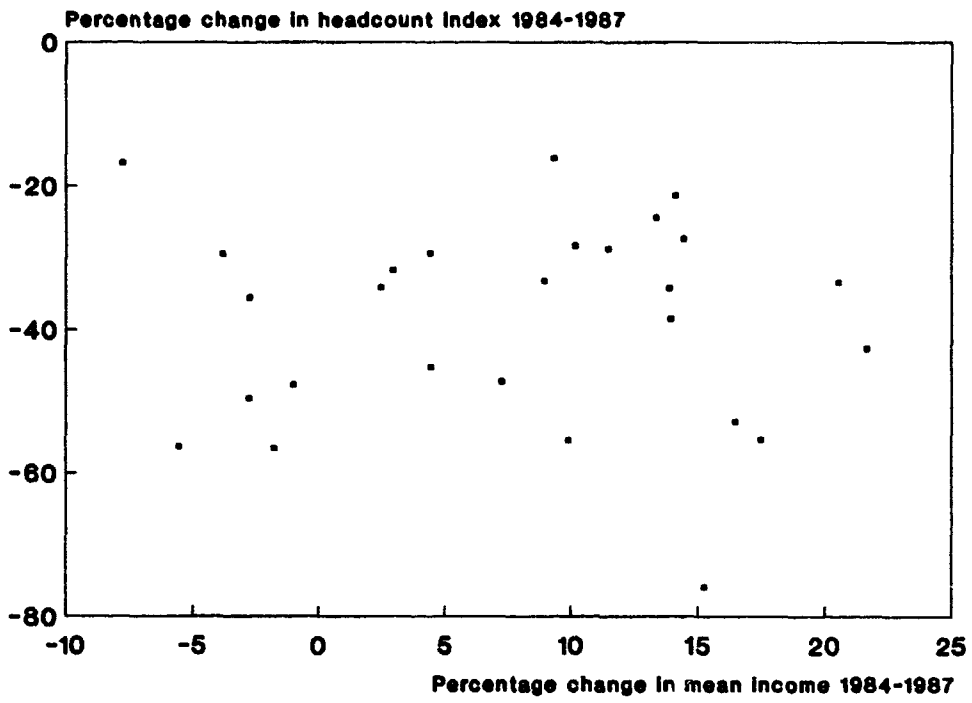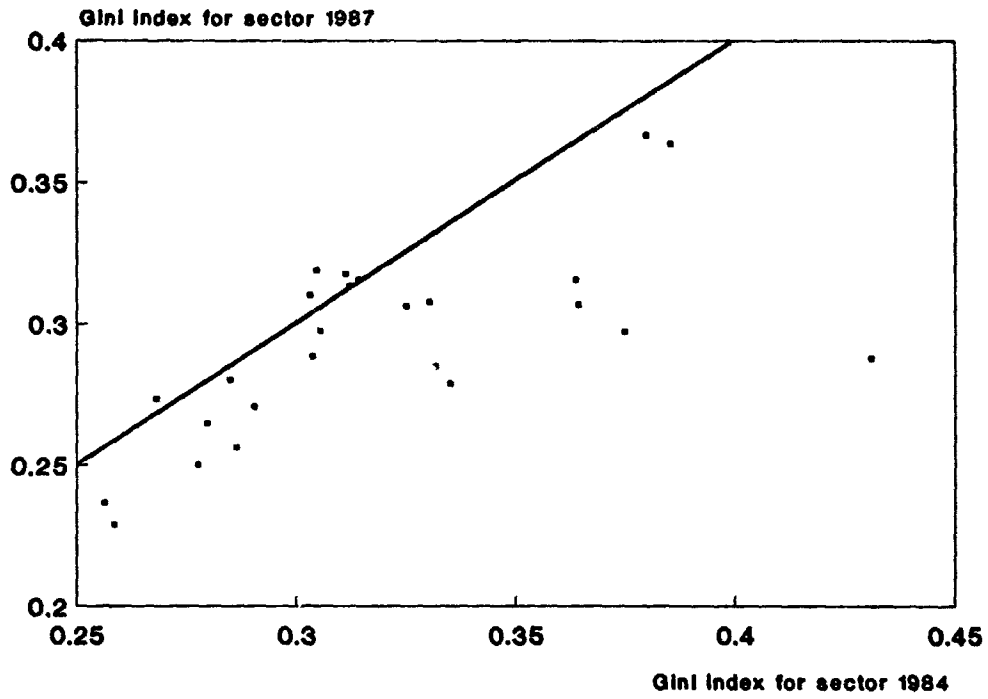total expenditure

Figure 1

Headcount Index by sector of employment, 1984

Mean Income, Rp000/ps/mn, 1984

Figure 2

Percentage change in headcount index 1984-1987

Percentage change in mean income 1984-1987

Figure 3

Gini Index for sector 1987

Gini Index for sector 1984

	Title	Author	Date	Contact for paper
WPS510	Public Expenditure Reviews for Education: The Bank's Experience	Antoine Schwartz Gail Stevenson	October 1990	C. Cristobal 33640
WPS511	The Macroeconomic Underpinnings of Adjustment Lending	Fred Jaspersen Karim Shariff	October 1990	A. Oropesa 39075
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