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Poverty and inequality in Java: examining the impact of the changing age, educational and industrial structure

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Abstract

This paper uses the method of DiNardo et al. [DiNardo, J., Fortin, N.M., Lemieux, T., 1996. Labor Market Institutions and the Distribution of Wages, 1973–1992: A Semiparametric Approach, Econometrica, 64 (5), Sept, 1001–1044.] to examine the distribution of the benefits of growth in Java. DiNardo et al.'s method presents the decompositions visually rather than in the form of opaque summary statistics. In this paper, it was modified so that changes in the cumulative distribution functions, Lorenz curves and generalized Lorenz curves are decomposed. The change in the distribution of per capita income between 1984 and 1990 is related to the aging of the population, decreased reliance on agriculture, increased educational attainment and changes in incomes within industry and age/education categories. © 2000 Elsevier Science B.V. All rights reserved.

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1. Introduction

The Indonesian economy has undergone a significant transformation over the last two decades. It has progressed from a predominantly agricultural society to

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one in which the industrial and service sectors play an important role. It has experienced rapid growth and decreasing levels of poverty. Education levels have increased and a successful family planning program has played a role in lowering fertility rates and slowing the rate of population growth. [1] While these changes would be considered by many to indicate a successful process of economic development, the Indonesian government describes its development goals as encompassing the three broader objectives of Growth, Equity and Stability. It is the effect of development on equity that is a pressing policy concern today. Indonesia has traditionally experienced relatively low levels of inequality for a developing country. However, the showy lifestyles of the growing Jakarta middle class have brought attention to the sharp contrast between rich and poor and have stimulated public discussion of the equity issue. Even the government has conceded that the distribution of the benefits from growth is a matter for concern, yet due to a lack of confirmation in the most oft-used data sets, few articles have sought to empirically explain why inequality might be rising.

This study uses the Survei Sosial Ekonomi Nasional (*Susenas*) household level data tapes to analyze the changes in the income distribution in Java between the years 1984 and 1990. Java constitutes only 6.89% of the land area of Indonesia but holds approximately 60% of the Indonesian population and has been the heart of the government's industrial development program. The Susenas income data show that inequality is increasing, both within Java and in Indonesia as a whole.[2]

The aim of this study is twofold. First, it aims to provide an understanding of the relationship between poverty, inequality and development by decomposing the distributional changes into components related to:

1. the changes in the composition of the Javanese economy
    (a) the aging population

[1] Agriculture's share of GDP dropped from 45% in 1970 to 19% in 1992. GDP grew at an average rate of 4% per annum between 1980 and 1992. See Ravallion and Huppi (1991) for a discussion of the decline in poverty levels. Today 45% of secondary school age children are enrolled in school, compared to only 16% in 1970. The proportion of the Indonesian population over the age of 60 increased from 4.1% in 1971 to 6.4% in 1990 (World Bank, 1994). The proportion under the age of 25 decreased from 61.6% to 56.6% over the same period (Nam et al., 1991).

[2] Most previous papers have used per capita expenditure to study inequality and have found either that there has been very little change in the level of inequality or that there has been decreasing inequality over time. For example, Hill (1996) reports a downward trend in Indonesian expenditure inequality between 1964 and 1993 (and also over the sub-period 1984 to 1990). Contrasting trends in inequality in the expenditure and income data do not necessarily cast doubt on the quality of the data. Various theoretical models can explain the difference. For example, if the relative variability of transitory income shocks increases as an economy develops then a permanent income model predicts lesser increases in inequality in the expenditure distribution than in the income distribution because people consume predominantly out of permanent income. Another possible explanation is that as the economy develops asset income becomes a greater share of household income for wealthy households and the marginal propensity to consume out of asset income is lower than that out of earned income.

   (b) higher educational attainment
   (c) movement out of agriculture
2. changes in average income levels
   (a) within industries
   (b) within age/education categories

This information will be valuable as a base from which to analyze the distributional impacts of alternative development strategies. Second, it makes a methodological contribution. A variation on the semi-parametric approach of DiNardo et al. (1996) is presented. The advance of DiNardo et al.'s (1996) method is that it presents decompositions in terms of probability density functions and thus allows a more transparent analysis of distributional changes than the traditional method of decomposing opaque summary statistics such as the Gini coefficient. A variant of their method is presented in this paper. Here the decompositions are primarily presented in the form of cumulative distribution functions, Lorenz curves and generalized Lorenz curves (The probability density functions are presented in the Appendix). Via these curves we can explicitly focus on how the various facets of the Indonesian growth experience have impacted on poverty, inequality and social welfare.[3]

The paper is set out as follows. Section 2 surveys the literature on decompositions of inequality and poverty. Section 3 describes the data. Section 4 conducts preliminary comparisons of the 1984 and 1990 distributions. The decomposition notation is introduced in Section 5 and Section 6 details the decomposition methodology and results. Section 7 examines the residual differences in the distributions and conclusions are drawn in Section 8.

2. Previous literature

2.1. Inequality decompositions

Shorrocks (1982) and (1984) are the seminal papers in the modern inequality decomposition literature. Shorrocks (1984) examines the decomposition of inequality by population subgroup. He shows that a broad class of inequality

[3] The probability density functions are less informative in a high growth scenario such as Java over the years of study than in the more slowly growing US economy studied by DiNardo et al. Under conditions of high growth changes in the distribution around the mean are swamped by increases in the mean.

measures (monotonic transformations of additively decomposable indices) can be decomposed into components reflecting only the size, mean and inequality value of each population subgroup. Shorrocks (1982) examined decomposing inequality by income source. Shorrocks decomposition rules have since been widely used (For example, Cowell and Jenkins (1995) and Jenkins (1995) decompose income inequality by population subgroup and income source in the US and UK, respectively). However, Shorrocks (1982) also revealed the problems that can result from the use of specific inequality indices. Following Atkinson's (1970) axiomatic approach, he set down six desirable properties of inequality decompositions[4] and examined the constraints these properties impose on the decomposition assignments. The results show that in principle there are an infinite number of possible decomposition rules. However, Shorrocks advocates the use of the ''natural decomposition'' which allocates interaction effects equally across variables. Unfortunately, even the use of the natural decomposition is capable of generating quite different results when used with different inequality indices. This highlights the primary advantage of the method used in this paper, that is, its lack of reliance on specific inequality indices and hence the avoidance of this indeterminacy.

Fields (1998) and Morduch and Sicular (1998) have more recently proposed regression based methods of decomposition. These methods involve estimating standard income generating equations. The equations are then manipulated to be written in terms of covariances. The contribution of the explanatory variables to the distributional changes is a function of the magnitude of the coefficients in the income equation and the size of the change in the variable. In the case of Lorenz dominance, comparisons of these coefficients and changes can give one a non-parametric indication of the magnitude of each variable's effect on income inequality. However, in the case of Lorenz-crossing and in order to quantify the effect, one again has to choose an inequality measure. Fields states that ''It is an empirical question whether the choice of inequality measure makes a large difference or a small one in any particular case.''

Bourguignon et al. (1998) have developed a further decomposition method. They examine the changes in the Taiwanese distribution of individual and household earnings between 1979 and 1994. Their method is similar to the method

[4] Shorrocks' desirable properties are that (1) the inequality index is continous and symmetric, (2) the assigned proportional contribution of each source must be continuous in the income from that source, (3) the contribution of a given factor is independent of the level of aggregation of the other factors, (4) the contributions of the factors should sum exactly to the overall index, (5) individuals are treated symmetrically and that the factor contribution is zero if all individuals receive the same income from that source, and (6) two income components are assigned the same contribution to inequality if the distribution of both sources are identical and together they make up total income.

presented here in that they impose characteristics estimated from the terminal year on the initial year.[5] However, their estimation techniques differ in a number of ways which reflect their emphasis on labor market participation and occupational choice decisions which are not examined here. The main thrust of their results is presented in terms of Gini coefficients and so their method also potentially suffers from the drawbacks of a parametric approach, although they supplement their results with plots of the effect of some of the changes at each percentile of the distribution.

2.2. Poverty decompositions

Poverty decomposition has been a less frequent past time for economic researchers. Datt and Ravallion (1992), however, develop a method that allows changes in poverty measures to be decomposed into growth and redistributive components and Ravallion and Huppi (1991) decompose changes in poverty by population subgroup in ways similar to the inequality decompositions of Shorrocks (1984). The poverty measures used are the head count index, the poverty gap index and the Foster, Greer and Thorbecke index.[6] The use of summary poverty measures involves the same difficulties as their use in inequality decompositions. Different measures can give different results. Ravallion and Huppi (1991) allow for this by comparing the decomposition results across their three chosen poverty indicators.

3. Data

The Susenas data cover approximately 50,000 households across the Indonesian archipelago of which approximately 20,000 are on the island of Java. Indonesia is a very geographically and economically diverse nation and so only Java is examined to avoid the risk of confusing differing distributional processes on islands which have had quite different experiences of the development process.[7] The Susenas is primarily a consumption survey although it also provides demographic information on householders and in every third year a supplementary

[5] These methods are closely related to the earlier method of shift-share analysis (see Semple, 1975 and Dinwiddy and Reed, 1977). A shift-share analysis of the effect of a changing age distribution on the distribution of income between periods t_1 and t_2 involves constructing a distribution at t_2 with t_1's age structure. The resultant distribution is compared with the t_1 distribution.

[6] See Atkinson (1987) and Foster et al. (1984).

[7] Using this method to examine changes in interregional inequality is an interesting area for further research.

income section is conducted. The income survey provides information on the sectors of the economy from which the household derives its income as well as calculating a monthly household income figure (the sum of wages received, entrepreneurial income, income from other sources such as rent, and net transfers received by the household). Details of the income questionnaire are provided in the Appendix.[8]

The focus of this study is *individual* income because it is individuals that are the repository of utility and gaining an understanding of the effect of changing economic circumstances on well-being is our ultimate aim. Household income must thus be converted to an individual basis and is divided by the number of household members. Using per capita income assumes that income is distributed equally across household members[9] and does not take into account the fact that different members in a household may have different needs. For example, that young children do not require as much food as adults. Some studies attempt to account for this problem by establishing ‘‘equivalence scales’’ that scale an individual’s needs subject to characteristics such as age and gender. There is, however, no consensus as to the most appropriate way to deal with the problem and so no adjustment is made in this paper. For a discussion of the pros and cons of using equivalence scales, see Deaton (1994).

To allow for comparability across the years, the 1990 figures were also deflated to 1984 Rupiahs using the Consumer Price Index for the capital city of each province.[10] In addition, all calculations below use individual level sample weights that reflect the individual’s urban/rural status and province of residence to adjust for over or underestimation of sections of the population.[11]

In a comparison of only 2 years of data one may be concerned that any differences between the years may be a product of an unusual occurrence such as a drought in one of the years. There is no publicly available series of *income* distribution measures based on the Susenas so it is not possible to compare the 1984 and 1990 figures with those over a longer period. However, neither 1984 nor 1990 is an unusual year in terms of agricultural yield or any other obvious economic indicator.

[8] The survey has been generally successful, but questions have been raised about the reliability of the income section. The criticisms have most often related to the inability of the survey to capture households at the upper end of the distribution and also the ability to accurately measure income in an economy with a large informal sector. The following results should therefore be interpreted keeping in mind the possible limitations of the data.

[9] Thus inequality is underestimated if this is not the case, Haddad and Kanbur (1990).

[10] Source: The Statistical Year Book of the Republic of Indonesia. The Central Bureau of Statistics (Biro Pusat Statistik, BPS) unfortunately does not produce a series of urban/rural price indices. Previous studies have, however, found urban/rural price differentials to be modest, Ravallion and Bidani (1994) and World Bank (1990) and no attempt is made to correct for them in this paper.

[11] Java is divided into five provinces: Jakarta, D.I. Yogyakarta, East Java, Central Java and West Java.

4. Preliminary comparisons of 1984 and 1990

This section introduces the indicators that will be used to explore the changes in the distribution and compares the 1984 and 1990 distributions. The cumulative distribution function is used to elicit the effect of the distributional changes on

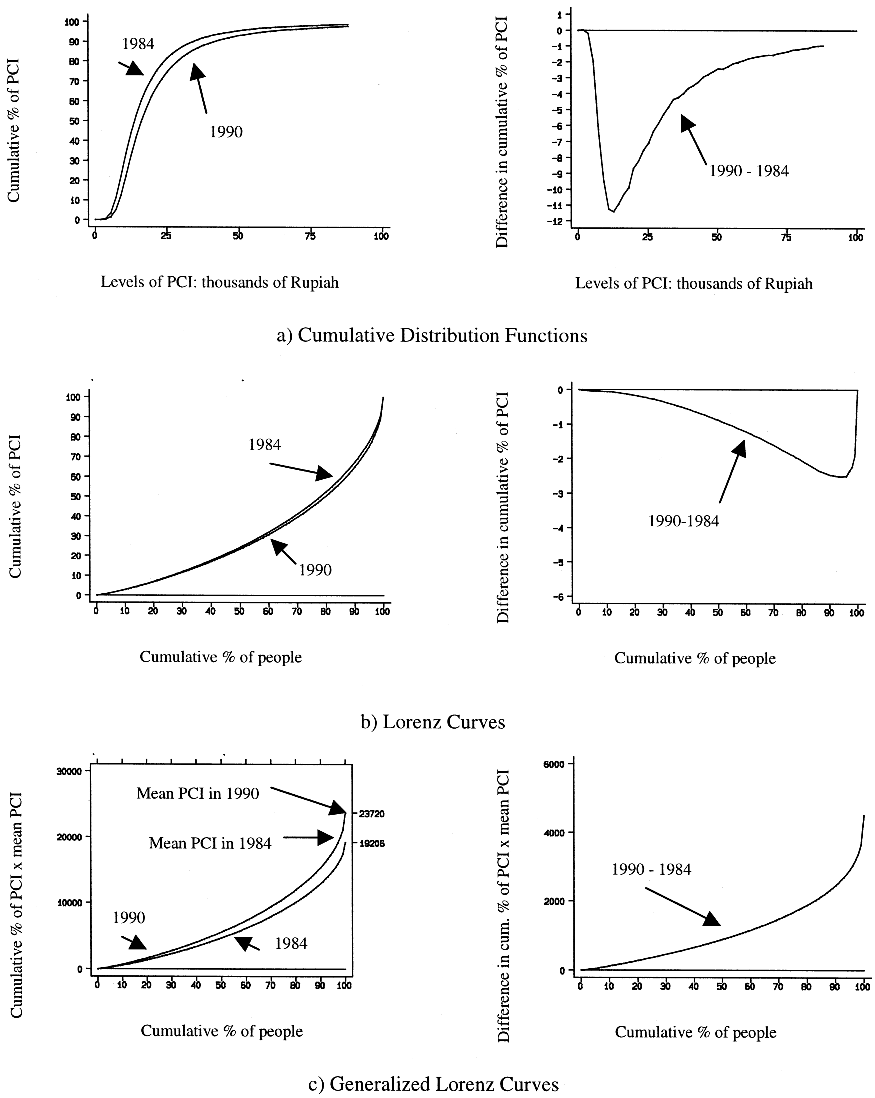

Fig. 1. Comparison of the 1984 and 1990 distributions.

growth and poverty. Lorenz curves are used to analyze changes in inequality and generalized Lorenz curves illustrate the effect on social welfare.

4.1. Poverty and growth

The left hand panel of Fig. 1a shows the cumulative distribution functions of per capita income for 1984 and 1990. The overwhelming feature of the figure is the growth of per capita income. Mean per capita income in Java grew by 23.5% over the period, from Rp19,206 to Rp23,720 (US$1 = Rp1026 in 1984[12]). The 1990 cumulative distribution function first order stochastically dominates the 1984 distribution. This guarantees that an additively separable poverty measure will rank the 1990 distribution as having less poverty than the 1984 distribution. This broad class of measures includes the head count index, the poverty deficit measure and the Foster–Greer–Thorbecke measure. Hence no matter what poverty line one chooses, the percentage of the population under the poverty line is always less in 1990 than in 1984. The right hand panel of Fig. 1a plots the difference between the cumulative distribution functions. Similar differences will be reported in the decomposition below.

4.2. Inequality

The Lorenz curves for 1984 and 1990 are shown in Fig. 1b. If one Lorenz curve lies everywhere above another it is possible to unequivocally rank two distributions. The higher Lorenz curve is said to Lorenz dominate the lower curve and all summary measures that respect the principle of transfers will show inequality to be lower in the higher curve.[13]

It is clear from Fig. 1b that the 1984 distribution Lorenz dominates the 1990 distribution. Movements of Lorenz curves are typically not very large so it is often useful to plot the difference between the curves on a larger scale, as shown in the right panel of Fig. 1b. For the rest of the paper only the differences between Lorenz curves will be shown.

In addition to the Lorenz curves, the standard summary measures used in the literature will be reported: the Gini coefficient, the variance of logs and the 90–10th percentile ratio.[14] These are presented in Table 1. Each summary

[12] Source: World Bank (1990).

[13] The principle of transfers states that a small transfer of income from one individual to a poorer (richer) individual should always decrease (increase) the value of the inequality index.

[14] As discussed above, different inequality summary measures are capable of giving different results. For example, the Gini coefficient puts more weight on changes around the mode of the distribution than changes elsewhere in the distribution, whereas the variance of logs is more affected by changes in the lower tail of the distribution, Kakwani (1980). Some measures also violate the principal of transfers. The 90–10th percentile ratio violates the principle as does the variance of logs for some transfers at the upper end of the distribution.

Table 1
Summary measures of inequality

	Gini coefficient	Variance of log per capita income	90–10th percentile ratio
1984	0.3978	0.4239	4.914
1990	0.4186	0.4488	4.931
Adjusting for: (% of total change shown in brackets)			
Age composition	0.3990 (5.8)	0.4263 (9.6)	4.927 (77)
Educational composition	0.4095 (50.5)	0.4554 (116.9)	5.272 (2030)
Industrial composition	0.4134 (18.8)	0.4604 (20.1)	5.325 (312)
Returns within industries	0.4165 (14.9)	0.4646 (16.9)	5.351 (153)
Returns to age/education	0.4102 (−30.3)	0.4494 (−61.0)	5.164 (−1100)
Total	(59.7)	(102.5)	(1471)

measure shows that inequality increased between 1984 and 1990. The Gini coefficient increased from 0.398 to 0.419.

4.3. Social welfare

Generalized Lorenz curves scale the vertical axis of standard Lorenz curves up by multiplying the cumulative share of per capita income by *mean per capita income*. In a comparison of two distributions where one generalized Lorenz curve lies everywhere above another, any equity respecting social welfare function will prefer the distribution with the higher curve.[15] The generalized Lorenz curve is the integral of the inverse of the cumulative distribution function. If one cumulative distribution function first order stochastically dominates another,[16] the generalized Lorenz curve will also lie everywhere above the other's generalized Lorenz curve. Hence the 1990 generalized Lorenz curve must everywhere lie above the curve for 1984 as shown in Fig. 1c. The growth over the period has thus more than compensated for the increase in inequality and social welfare is unambiguously greater in 1990.

5. Notation

The notation used to facilitate the following decomposition is that of DiNardo et al. (1996). Each observation is viewed as a vector (y,z,t) of per capita income y, household attributes z, and a date t. The joint distribution of these variables is denoted $F(y,z,t)$. The density of per capita income at one point in time, $f_t(y)$, is the integral of the density of per capita income conditional on a set of individual

[15] This is the case because every percentile of this distribution has access to more resources.
[16] Or second-order stochastically dominates the other distribution.

attributes and a date t_y, $f(y|z,t_y)$, over the distribution of attributes $F(z|t_z)$ at date t_z:

$$f_t = \int_{z \in \Omega_z} f\big(y|z,t_y = t;d_t\big)\mathrm{d}F\big(z|t_z = t\big) = f\big(y;t_y = t, t_z = t, d_t\big) \tag{1}$$

where Ω_z is the domain of individual attributes and d_t denotes distributional characteristics that will be discussed below.

The last expression in Eq. 1 introduces the notation that will allow us to follow the dating of the different attributes of the distribution during the decomposition. For example, $f(y;t_y = 84,\ t_z = 84,\ d_{84})$ is the density of income in 1984 and $f(y;t_y = 84,\ t_z = 90,\ d_{84})$ represents the density that would have prevailed in 1984 if the distribution of household attributes was the same as in 1990.

We now define z to consist of three attributes, $z = (a,e,m)$, where a is the age of the household head, e is the education of the household head and m is the main source of household income. Hence, $f(y;t_y = 84,\ t_a = 90,\ t_e = 84,\ t_m = 84,\ d_{84} = 84)$ is the density that would prevail in 1984 if the age composition of the population was the same as in 1990.

The distributional characteristics, d_t, that will be varied during the decomposition are the mean of per capita income in industry categories, i_t, and the mean of per capita income in age/education categories, s_t.

The differences between the 1984 and 1990 distributions of income per capita will be decomposed into the following six components:

$$\begin{aligned}
f_{84}(y) - f_{90}(y) = {} & \big[f\big(y;t_y = 84, t_a = 84, t_e = 84, t_m = 84, d_{84}\big) \\
& \quad - f\big(y;t_y = 84, t_a = 90, t_e = 84, t_m = 84, d_{84}\big)\big] && \text{(i)} \\
& + \big[f\big(y;t_y = 84, t_a = 90, t_e = 84, t_m = 84, d_{84}\big) \\
& \quad - f\big(y;t_y = 84, t_a = 90, t_e = 90, t_m = 84, d_{84}\big)\big] && \text{(ii)} \\
& + \big[f\big(y;t_y = 84, t_a = 90, t_e = 90, t_m = 84, d_{84}\big) \\
& \quad - f\big(y;t_y = 84, t_a = 90, t_e = 90, t_m = 90, d_{84}\big)\big] && \text{(iii)} \\
& + \big[f\big(y;t_y = 84, t_a = 90, t_e = 90, t_m = 90, d_{84}\big) \\
& \quad - f\big(y;t_y = 84, t_a = 90, t_e = 90, t_m = 90, i_{90}, s_{84}\big] && \text{(iv)} \\
& + \big[f\big(y;t_y = 84, t_a = 90, t_e = 90, t_m = 90, i_{90}, s_{84}\big) \\
& \quad - f\big(y;t_y = 84, t_a = 90, t_e = 90, t_m = 90, i_{90}, s_{90}\big] && \text{(v)} \\
& + \big[f\big(y;t_y = 84, t_a = 90, t_e = 90, t_m = 90, i_{90}, s_{90}\big) \\
& \quad - f\big(y;t_y = 90, t_a = 90, t_e = 90, t_m = 90, i_{90}, s_{90}\big] && \text{(vi)}
\end{aligned} \tag{2}$$

The first five components in Eq. 2 correspond to the decompositions listed in Section 1. The sixth component is the residual distributional change.

6. The decomposition

6.1. Changes in the composition of the population

6.1.1. Methodology

The first decomposition in Eq. 2 involves moving from the 1984 distribution to the distribution that would have prevailed if the age composition was the same as in 1990. The density of per capita income in 1984 can be written:

$$f(y;t_y=84,\, t_z=84,\, d_{84}) = \int\int f(y|a,e,m,t_y=84;\, d_{84})\mathrm{d}F(e,m|a,t_e=84,\, t_m=84)\mathrm{d}F(a|t_a=84) \tag{3}$$

The hypothetical density that would have prevailed if the age composition was the same as in 1990 is:

$$f(y;t_y=84,\, t_a=90,\, t_e=84,\, t_m=84,\, d_{84}) = \int\int f(y|a,e,m,t_y=84;\, d_{84})\mathrm{d}F(e,m|a,t_e=84,\, t_m=84)\mathrm{d}F(a|t_a=90) \tag{4}$$

This can be rewritten as:

$$f(y;t_y=84,\, t_a=90,\, t_e=84,\, t_m=84,\, d_{84}) = \int\int f(y|a,e,m,t_y=84;\, d_{84})\mathrm{d}F(e,m|a,t_e=84,\, t_m=84) \times \Psi_a \mathrm{d}F(a|t_a=84) \tag{5}$$

where:

$$\Psi_a = \frac{\mathrm{d}F(a|t_a=90)}{\mathrm{d}F(a|t_a=84)} \tag{6}$$

Eq. 5 is merely a reweighted version of the 1984 density. Integrating to obtain the corresponding cumulative distribution function gives:

$$F\left(y;t_y=84,\,t_a=90,\,t_e=84,\,d_{84}\right)$$
$$=\int\int\int f(x|a,e,m,t_x=84;\,d_{84})\mathrm{d}F\left(e,m|a,t_e=84\right)$$
$$\times\,\Psi_a\mathrm{d}F\left(a|t_a=84\right)\mathrm{d}F(x) \tag{7}$$

Thus, we can plot the cumulative distribution function of the hypothetical distribution by reweigthing the 1984 observations using an estimate of Ψ_a. Ψ_a is the probability of a person randomly drawn from the 1990 population being of age a, divided by the same probability in 1984. The estimate of Ψ_a used below is the population share of each age group in 1990 divided by the 1984 population share.

This same procedure is then repeated for the other compositional changes. To plot the distribution that would have prevailed in 1984 if the age and education compositions were as in 1990, the weighting term is $\Psi_{a/e}$ and is calculated as the ratio of the population shares in the age/education cells in 1990 to those in 1984.

Age/education/industry cells are used when reweighting the 1984 distribution so it mimics the 1990 age, educational and industrial structure. The age, education and industry categories used in the analysis are defined below.

Note that the variables that form the basis of the decomposition are not independent of one another. For example, age and educational attainment will be negatively correlated because older Indonesians on average have lower levels of education than the younger generations. A consequence of this lack of independence is that the sequential nature of the decomposition implicitly assigns any interaction between variables to the earliest decomposition. For example, reweighting the 1984 distribution so that it reflects the 1990 age distribution which has a higher percentage of the population in the older age categories will implicitly weight the distribution away from more highly educated individuals. Similarly, it will put greater weight on the agricultural sector because older Indonesian are more likely to be working in agriculture. More explicitly, the probability of being in any age/education/industry category given the 1984 education/industry composition and the 1990 age composition is:

$$\mathrm{d}F\left(e,m|a,t_e=84,\,t_m=84\right)\mathrm{d}F\left(a|t_a=90\right) \tag{8}$$

Hence, changing the probability of being in any age category so it is the same as in 1990 also changes the probability of being in any education or industry category through the term $\mathrm{d}F(e,m|a,t_e=84,\ t_m=84)$. Only in the case where the probability of being in an education category is independent of the age category, so that $\mathrm{d}F(a,e,m|t_a=90,\ t_e=84,\ t_m=84)=\mathrm{d}F(e,m|t_e=84,\ t_m=84)\mathrm{d}F(a|t_a=90)$, are there no interaction effects.

To assess the effect of interaction terms, the decompositions below were conducted in different sequences. The qualitative conclusions were not affected by the reassignments of the interaction effects and the quantitative differences were not large. To give the reader a feel for the magnitude of the interaction effects, Table A1 in the Appendix presents the percentage of the total change in the Gini coefficient that is attributed to each stage of the decomposition for different sequences of decomposition.

6.1.2. Changes in the age distribution

Table 2 shows the changes in the age composition of the population over the period. It shows a pattern consistent with an aging population. In 1990 there are 3.16% less households with a head under the age of 31 and 3.56% more with a head over the age of 50 than in 1984. The permanent income hypothesis and the

Table 2
Summary statistics by age, education and industry categories
US$1 = Rp1026 in 1984.

	Percentage of households		1984 income per capita (Rp)		
	1984	1990	Mean	Std dev.	Coefficient of variation
Age category					
< 31 years	19.98	15.82	21,991	23,527	1.07
31–40 years	25.61	26.72	20,507	37,394	1.82
41–50 years	24.35	22.84	19,076	20,905	1.10
51–60 years	18.85	19.18	20,392	22,517	1.10
> 61 years	12.21	15.44	21,847	29,037	1.33
Education category					
No schooling	28.82	22.81	16,034	19,086	1.19
< Primary	33.93	26.67	16,457	15,363	0.93
Primary	24.23	32.00	21,059	22,725	1.08
> Primary	13.02	18.52	40,519	55,119	1.36
Industry category					
Agricultural laborers	15.34	11.94	15,237	39,806	2.61
Agricultural entrepreneur	37.48	32.82	15,285	14,901	0.98
Industrial worker	5.32	6.21	25,034	22,928	1.64
Industrial entrepreneur	2.52	2.96	25,758	41,008	1.59
Commercial worker	1.33	1.82	29,915	26,954	0.90
Commercial entrepreneur	12.10	13.73	24,929	28,241	1.13
Finance	0.51	0.99	52,869	82,250	1.56
Service employee	11.39	13.12	29,473	26,019	0.88
Service entrepreneur	4.05	5.48	24,238	28,748	1.19
Mining and building laborers	4.37	5.08	20,000	15,917	0.80
Remittees	5.61	5.84	29,286	35,606	1.22

life-cycle theory of saving predict that within cohort inequality increases with age.[17] The pattern of income inequality across age groups at one point in time will of course reflect within cohort changes and cohort effects. However, in the absence of large cohort effects, one would expect inequality to increase with age. Apart from a much higher coefficient of variation for households with a head aged between 31 and 40, Table 2 shows that the variability of earnings increases monotonically with age. The greater inequality in the 31–40 age group most probably reflects the pattern of household formation because households are categorized by the age of the household head. The age cells in Table 2 are used to calculate the weights, Ψ_a.[18] The decompositions are presented in terms of movements in cumulative distribution functions in Fig. 2, Lorenz curves in Fig. 3 and generalized Lorenz curves in Fig. 4. Decompositions in terms of probability density functions are included in Fig. 5 in the Appendix.

Reapportioning individuals across age categories so that the age structure is the same as in 1990 does not have large distributional consequences. The cumulative distribution functions show a small increase in the percentage of the population in the lowest percentiles. The change in the age composition moves people into age categories with higher within category variances and accordingly, the difference between the Lorenz curves shows that inequality unambiguously (although only very slightly) increases. The increase in inequality is also reflected in all of the inequality measures in Table 1. The Gini increases from 0.3978 to 0.3990, which explains 5.8% of the change in the Gini coefficient between 1984 and 1990.

The difference between the generalized Lorenz curves shows that we cannot unambiguously rank the social welfare associated with the two distributions. The lower tail of the ‘‘aged’’ distribution, however, has less resources than the lower tail of the original distribution.

6.1.3. Changes in the educational structure

Table 2 also shows the changes in the education levels of household heads and the education-earnings profile. There are large decreases in the proportion of household heads with no education (a 6.0% decrease) and those who started but

[17] The life-cycle theory of saving also predicts non-decreasing between cohort inequality (inequality across groups of people of different ages), and hence that an aging population results in increasing income inequality, Deaton and Paxson (1995). This relationship was confirmed by Deaton and Paxson (1994) using US, British and Taiwanese data.

[18] The ‘‘age’’ of the household is the age of the household head. If household composition is relatively stable over time (as it is in the data), reweighting the 1984 distribution to reflect the age composition of household heads in 1990 will be roughly equivalent to reweighting the sample so the age composition of the entire population is the same in 1984 as in 1990. The household head is defined to be the oldest male in the household.

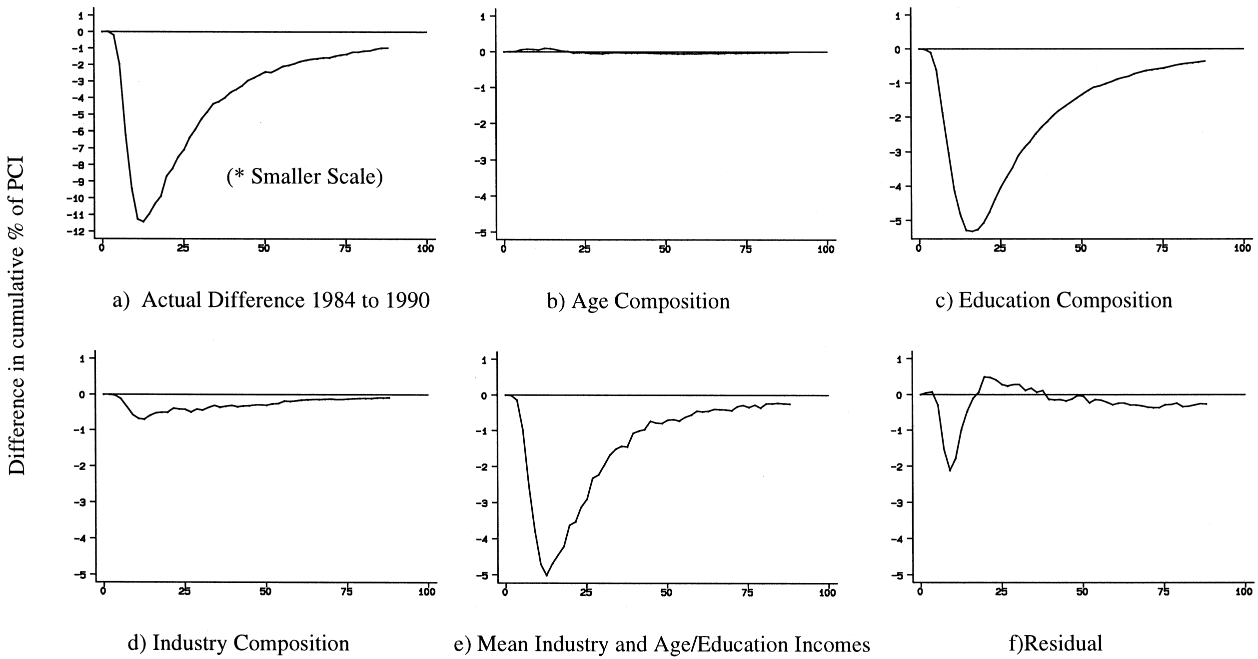

Fig. 2. Differences between the cumulative distribution functions of income per capita adjusted for the indicated factors.

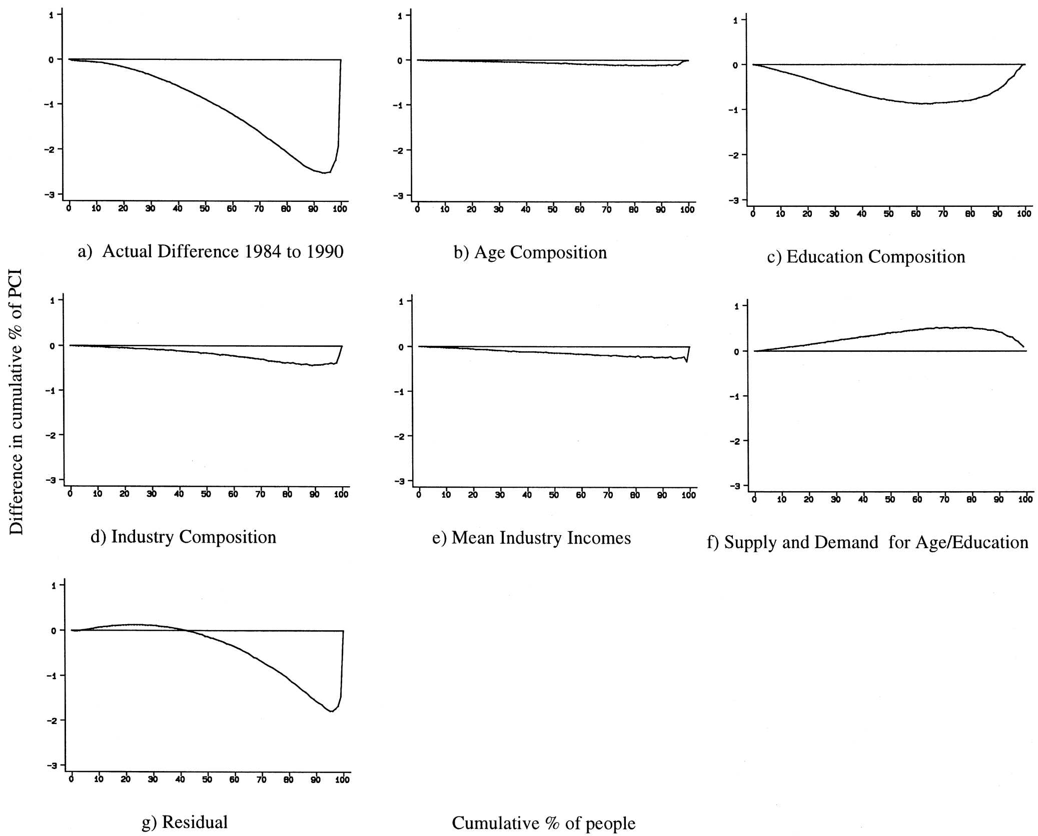

Fig. 3. Differences between Lorenz curves of income per capita adjusted for the indicated factors.

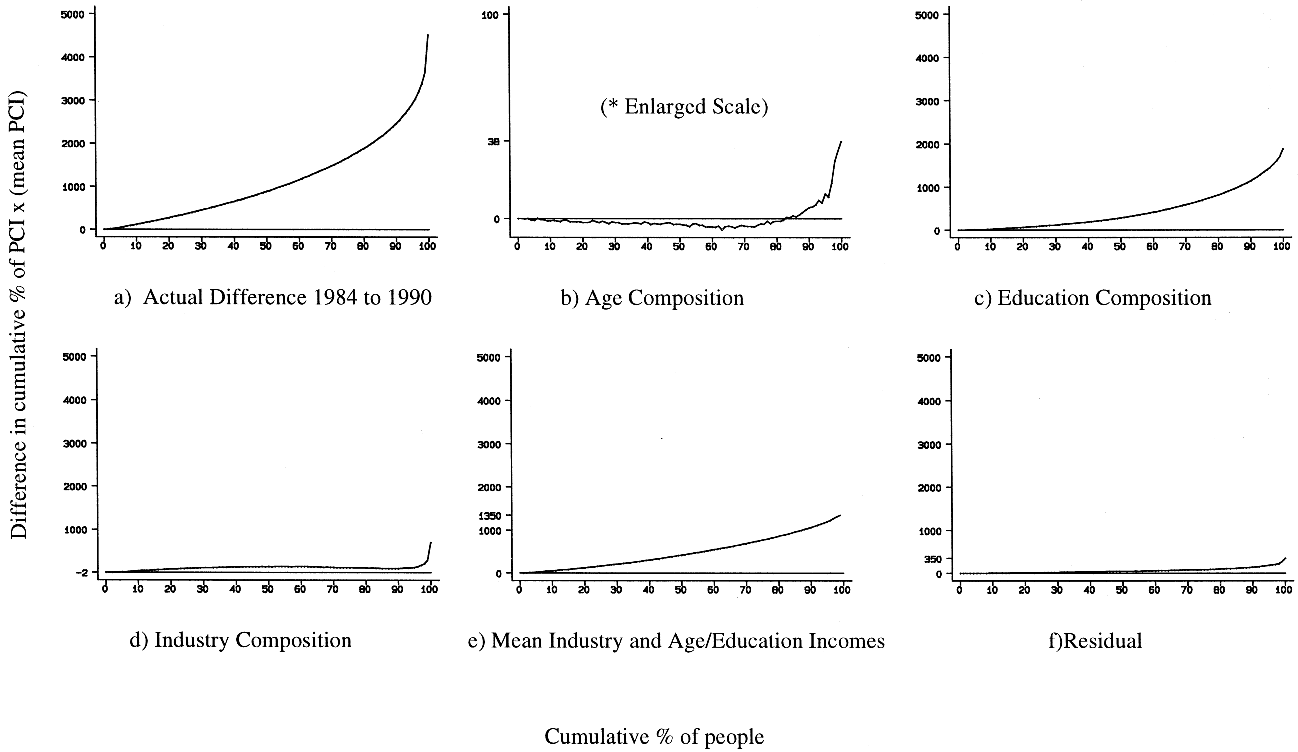

Fig. 4. Differences between generalized Lorenz curves of income per capita adjusted for the indicated factors.

did not finish primary school (7.3%) and an increase in the proportion in all higher education categories, especially in the number of heads with a primary school education which increases by 7.8%.[19]

Mean income increases monotonically with education. Reweighting the 1984 distribution towards the higher education categories, holding the distribution of earnings within education categories constant, therefore shifts the cumulative distribution function out. Fig. 2c shows that the cumulative distribution function for the post-adjustment distribution lies everywhere below the pre-adjustment distribution. Thus, increasing levels of education (returns held constant) result in a decrease in the percentage of the population in poverty as measured below any poverty line. First-order stochastic dominance ensures that social welfare also unequivocally increased as shown by the generalized Lorenz curves. Of course, if the supply and demand of more highly educated workers do not move in unison, then we would expect the returns to education to change. Adjusting for changes in returns to education, as will be explored below, may offset or further this effect. For instance, there has been much written about the excess supply of university graduates in Indonesia and the resulting difficulty graduates have finding well-paid jobs, Keyfitz (1989).

The difference between the Lorenz curves shows that increased educational attainment caused income inequality to increase unequivocally and by a magnitude much larger than that induced by the change in the age distribution. The Gini coefficient increased from 0.3990 to 0.4095, accounting for an additional 50.5% of the change between 1984 and 1990, beyond what was explained by adjusting for the age composition. Together the first two adjustments account for 56.3% of the total change in the Gini coefficient.

6.1.4. Changes in the main source of income

All industry information is also provided at the household level. The household head is asked to indicate those industries from which the household derives income and that which is the main source of household income. Households are classified into industries on the basis of their main source of income: as ‘‘agricultural workers’’, ‘‘agricultural entrepreneurs’’, ‘‘transport entrepreneurs’’ and so forth.

Table 2 shows the industrial classifications used to reweight the 1984 data in order to reflect the 1990 industry composition.[20]

[19] These are surprisingly large changes for a 6-year period. However, if we age the individuals interviewed in 1984 6 years and then choose household heads according to the 1990 pattern of headship across age categories, similar figures are obtained.

[20] Approximately 6% of all households in each year state their main source of income as being remittances from family members. This group is treated the same as the other income source groups except that they are omitted from the demand and supply analysis in Section 6.2.

The ‘‘industry’’ categories are defined to be a mix of industrial sector and the worker status as self-employed or an employee. This is because Java has a large informal sector that consists primarily of self-employed individuals who operate very small businesses, for example, food hawkers and becak drivers. In contrast, in the formal sector, a large proportion of workers are employees of government or larger corporations. Employees and entrepreneurs are therefore often working in substantially different types of markets which can be captured by differentiating by employment type. These differences become especially apparent when we look at changes in the mean incomes in these groups in Section 6.2. Only the finance sector is not divided by employment type. This is because it represents such a small proportion of the population and the difference between employees and entrepreneurs in this sector is less distinct.

The number of households reporting agriculture as their main source of income decreased by 8.6% between 1984 and 1990. The service and commercial sectors experienced the highest growth in the number of workers over the period.

The result of adjusting the 1984 distribution so it reflects the 1990 industry structure as well as the age/education structure is shown in Figs. 2d–4d. The returns within industries are held constant. The cumulative distribution function moved out to the right and social welfare unambiguously increased. Agriculture is a low paying sector and so a population with a lower percentage of agricultural households experiences less poverty. There is a small but unequivocal (larger than the effect of the change in the age distribution but smaller than that caused by the increase in educational attainment) increase in inequality as shown by the difference between the Lorenz curves. The Gini coefficient increased from 0.4095 to 0.4134 which accounts for 18.8% of the total change. When added to the effect of the other adjustments, we have now accounted for 75.1% of the total change.[21]

6.2. Changes in mean incomes within industry and age / education categories

6.2.1. Adjusting for changes in mean industry incomes

The first step in adjusting for changes in mean industry incomes is to estimate the mean income for each of the 2 years. This is done by estimating the following equation:

$$\log(y) = \alpha + \eta \cdot \mathrm{IND} + \gamma \cdot \mathrm{AGE/EDUC} + \beta \tilde{z} + \epsilon \qquad (9)$$

where IND is a vector of 10 dummy variables that reflect the main source of household income (as defined in Table 2 and omitting the agricultural laborer

[21] The most significant interaction effects in this study arise from the interaction of industrial composition and educational composition. As can be seen in Table A1, adjusting for the industry structure before the educational structure does not alter the observation that both changes served to increase inequality and changes in educational composition had the larger effect, however, a larger share of the increase in inequality is attributed to the changing industrial structure when it is adjusted first.

Table 3
Changes in mean incomes within industries
t-Statistics corresponding to H_0: change in mean industry income = 0 are shown in parentheses.

Main source of income	Fraction of households			Percentage change in mean income/capita relative to agricultural laborers
	1984	1990	Change	
	(i)	(ii)	(iii)	(iv)
Agricultural laborers	0.153	0.119	−0.034	0.00
Agricultural entrepreneurs	0.328	0.328	−0.047	4.70 (2.58)
Industrial workers	0.062	0.062	0.009	5.66 (1.99)
Industrial entrepreneurs	0.030	0.030	0.005	−0.80 (0.22)
Commercial employees	0.018	0.018	0.005	7.53 (1.65)
Commercial entrepreneurs	0.121	0.137	0.016	1.48 (0.67)
Financial sector	0.005	0.010	0.005	17.8 (2.78)
Service employees	0.114	0.131	0.017	7.50 (3.17)
Service entrepreneurs	0.041	0.055	0.014	3.21 (1.08)
Mining/building employees	0.044	0.051	0.011	7.43 (2.49)
Remittees	0.056	0.058	0.002	1.22 (0.42)

dummy), AGE/EDUC is a vector of 19 dummy variables that reflect the age/education categories (as defined in Table 2 and omitting the dummy for households with a head under the age of 31 and with no education) and the vector $\tilde{z}$ contains other household attributes: gender of the household head, the rural/urban status of the household and regional dummy variables.

The differences in the coefficients on the industry dummies across years ($\eta_{90} - \eta_{84}$) capture the changes in mean industry incomes relative to the omitted industry group, agricultural laborers. It is not possible to separate the change experienced by agricultural laborers from that experienced by the omitted age/education group (less than 31 years of age with no education). However, the changes in mean industry incomes relative to agricultural laborers are sufficient to allow an assessment of the changes in inequality because inequality is a scale-invariant concept. An analysis of the changes in the cumulative distribution functions and the generalized Lorenz curves will, however, have to be postponed until we have also assessed the changes in returns to education.

Table 3 presents the estimates of growth in mean industry income relative to the growth experienced by agricultural laborer households.[22] If workers are not fully mobile across industries, increased demand in booming sectors will lead to

[22] The results of the estimation of Eq. 9 which are presented in Table A2 in the Appendix. For example, mean household income for agricultural entrepreneurs relative to agricultural laborers increased by 4.7% ((0.128 − 0.081) × 100) over the period.

higher income growth in those sectors. In addition, the simple Lewis model of a developing economy predicts higher income growth in the modern sectors than in the agricultural sector until all surplus labor is extracted from the agricultural sector and agricultural marginal products begin to rise.

Every group except for industrial entrepreneurs had higher earnings growth than agricultural laborers. The industry group that experienced the highest increase in mean per capita income (controlling for returns to age and education) is the finance sector (17.8% more than the increase experienced by agricultural laborers). The period 1984 to 1990 was one of great financial deregulation and also one in which rules regulating foreign companies were relaxed creating a boom period for the financial sector. Entrepreneurs generally fared worse than employees. The entrepreneurial class in Java consists predominantly of small, unskilled operations which may not have the same growth opportunities.

These changes in industry earnings are then applied to the Lorenz curves as shown in Fig. 3e (still using the 1990 age/education/industry composition weights). Inequality increased unambiguously because the least well-off groups, such as agricultural laborers, received the smallest increases. The increase is similar in magnitude to that caused by the compositional shift out of agriculture. The Gini coefficient increased from 0.4134 to 0.4165, which explains 14.9% of the change between 1984 and 1990. When added to the effect of the previous adjustments, 90.0% of the change in the Gini coefficient has been accounted for. Put together, the move out of agriculture and the change in industry incomes to the detriment of agriculture resulted in quite a large increase in inequality (33.7% of the total increase in the Gini coefficient).

6.2.2. Adjusting for changes in mean incomes within age / education categories which are attributable to changes in supply and demand

We could now repeat the above exercise, using the coefficients on the age/education dummies. However, it is more informative to relate the change in mean incomes within age/education categories to changes in supply and demand for these groups of workers. Then, only that portion of the change which can be attributed to changes in supply and demand will be applied to the 1984 figures.

Adjusting the distribution so it reflects the change in mean incomes within age/education categories that can be attributed to supply and demand involves the following three steps.

Step 1: For each of the 20 age/education categories we calculate the predicted change in the mean log per capita income purged of changes in household attributes and changes in industry premiums (except for the change experienced by the omitted group, agricultural laborers) in each year as follows:

$$\log(y_{90})_j - \log(y_{84})_j = (\hat{\alpha}_{90} - \hat{\alpha}_{84}) + (\hat{\gamma}_{90j} - \hat{\gamma}_{84j}) + (\hat{\beta}_{90}\bar{z}_{84j} - \hat{\beta}_{84}\bar{z}_{84j}) \quad (10)$$

where $\bar{z}_{84j}$ is a vector of the mean of the variables within age/education category j in 1984.

Step 2: The predicted changes in mean log income in each age/education category, $\log(y_{90})_j - \log(y_{84})_j = \Delta Y_j$, are then regressed on a measure of the change in supply, $\Delta \ln N_j$, and a measure of the change in demand, $\Delta \ln D_j$, as shown in Eq. 11 (The change in log mean income experienced by the omitted industry group will be captured in the constant term).

$$\Delta Y_j = \xi_0 + \xi_1 \Delta \ln D_j + \xi_2 \Delta \ln N_j + \epsilon_j \tag{11}$$

The methodology of Bound and Johnson (1992) is used to calculate the measures of supply and demand that will be used in the above regression. The measure of the change in supply, $\Delta \ln N_j$, is the change in the log of the number of households in each of the 20 age/education categories across the years.[23] The demand measure used, $\Delta \ln D_j$, is Bound and Johnson's ''derived demand index'' which reflects shifts in relative labor demand between sectors. The measure is derived from the specification of a constant elasticity of substitution production function.[24] Table 4 shows the changes in the supply and demand measures for each of the 20 age/education groups.

The largest decreases in supply were amongst younger, less-educated workers while the supply of older, higher-educated workers increased the most. The derived demand measures show increased demand for every category of worker (a feature of a rapidly expanding economy) but greater increases for better educated workers and younger workers. For example, those under the age of 31 with an education at primary school level or above experienced approximately a 30% increase in demand. The results of the regression shown in Eq. 11 (*t*-statistics shown in parentheses) are:

$$\begin{aligned}\Delta(\ln Y_j) = {} & 0.0632(3.823) - 0.109(0.932)(\Delta \ln D_j) \\ & - 0.0826(-3.386)(\Delta \ln N_j)\end{aligned} \tag{12}$$

The coefficient on the change in supply is negative and statistically significant at the 1% level. The coefficient on the demand term is negative but insignificantly different from zero.

[23] We rely on the assumption that changes in the number of households in each of the age/education categories are representative of changes in these categories at the individual level and so reflect the changes experienced in the market.

[24] An alternative measure of changes in demand is the ''fixed-coefficient manpower requirements index'', Freeman (1980) and Katz and Murphy (1992). An advantage of Bound and Johnson's method is that it nets out changes in supply and so does not confound demand changes with supply changes. A disadvantage though is that the demand measure is identified via strong assumptions about the structure of the production function.

Table 4
Changes in supply and demand and predicted changes in returns to age/education

Age	Education	$d(\ln N_i)$ (supply)	$d(\ln D_i)$ (demand)	Predicted changes in returns
< 31	none	−0.527	0.215	0.083
	< primary	−0.442	0.152	0.083
	primary	0.220	0.305	0.012
	> primary	0.221	0.295	0.013
31–40	none	−0.216	0.050	0.076
	< primary	−0.158	0.334	0.073
	primary	0.411	0.034	0.026
	> primary	0.503	0.042	0.017
41–50	none	−0.366	0.024	0.091
	< primary	−0.141	0.034	0.071
	primary	0.470	0.139	0.009
	> primary	0.537	0.172	0.000
51–60	none	−0.054	0.031	0.064
	< primary	0.049	0.014	−0.058
	primary	0.514	0.152	0.004
	> primary	0.855	0.167	−0.026
61+	none	0.236	0.059	0.037
	< primary	0.317	0.074	0.029
	primary	0.953	0.046	−0.020
	> primary	0.592	0.043	0.010

The predicted values from Eq. 12 are the changes in mean incomes within each age/education category that are determined by changes in supply and demand. Table 4 shows the predicted changes.[25]

The largest predicted increases in income are for those with less than primary school education and within this group, the predicted increases decrease with age. Those households with a head less than 31 years of age and with no formal education had predicted increases of 4.6% (8.3 − 3.7) more than that of households with the same education but with a head over the age of 61 years, and 7.1% more than households with a head less than 31 but with a full primary school education. These results are driven by the changes in supply within the age/education categories.

[25] Note that these figures differ from the pure age/education effects by a constant, unidentified amount which reflects the growth experienced by agricultural laborer households (because the constant term, ξ_0, is used when making the predictions). However, the differences in these predicted values across the categories are pure age/education effects.

Table 5
Summary of decomposition results
+ = increase; − = decrease; ~ = no unambiguous effect.

Allowing for:	Poverty	Inequality	Welfare
1. Aging population	~	small +	~
2. Increased education	−	+	+
3. Shift away from agriculture	−	+	+
4. Changes in incomes within industries		+	
5. Changes in returns to education and experience		−	
(4. and 5.)	−		+
Residual change	~	~	+

Step 3: The predicted percentage changes in per capita income in each of the age/education categories, are applied to the 1984 income figures which have already been adjusted for changes in industry incomes and which use the 1990 age/education/industry weights. Inequality unambiguously decreased and by a relatively large amount as shown by the differences in the Lorenz curves in Fig. 3f. The Gini coefficient decreased from 0.4165 to 0.4102. The sequence of decompositions now only accounts for 59.7% of the change in the Gini coefficient between 1984 and 1990. Note that this decrease in inequality is smaller than the initial increase in inequality caused by higher educational attainment, Hence, increased educational attainment coupled with decreasing returns to education resulted in a moderate increase in inequality.

The changes within all industry categories and the changes within all age/education categories that can be explained by the forces of supply and demand have now been applied to the distribution and it is now valid to plot the cumulative distribution function and generalized Lorenz curves. The joint effect of the changes in industry and age/education mean incomes causes the cumulative distribution function to move unambiguously to the right and the generalized Lorenz curve to move up.

Table 5 provides a synopsis of the distributional changes uncovered by the decompositions shown in Figs. 2–4.

7. The residual shift in the distribution

The remaining comparison to be made is between the actual 1990 distribution and the 1984 distribution which has been adjusted to reflect the 1990 age/education/industry composition and changes in mean returns. This is a comparison of the distribution we would expect in 1990 given the 1984 distribution and the

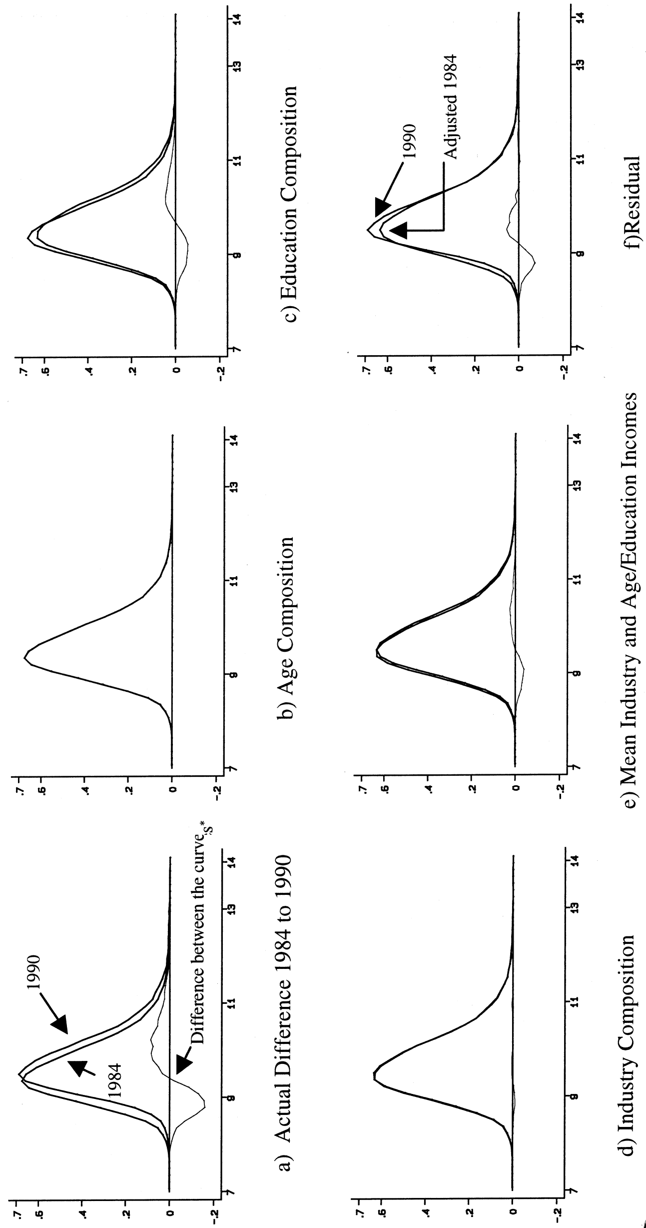

Fig. 5. Changes in the density functions due to the indicated factors.

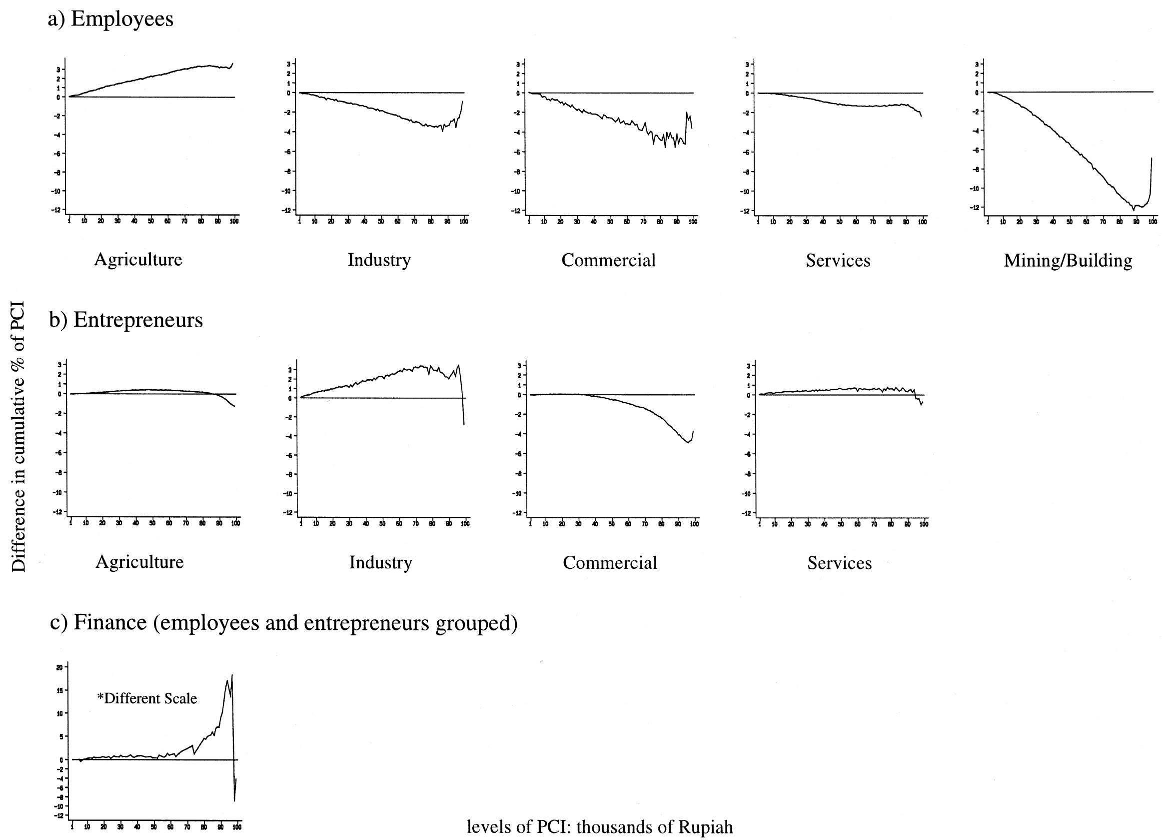

Fig. 6. Residual changes in Lorenz curves by industry (1990–fully-adjusted 1984).

changes in the economy between the 2 years, and the actual 1990 distribution. The residual difference can best be examined by looking at the estimates of the probability density function in Panel (f) of Fig. 5. The 1990 distribution has less people in the lower tail of the distribution and more people around the middle of the distribution than was predicted by the adjusted 1984 distribution. There is no unequivocal ranking in terms of inequality or poverty. The Lorenz curves in Fig. 3g cross at around 47% of the population. The generalized Lorenz curves indicate that the 1990 distribution has unambiguously higher social welfare than the fully adjusted 1984 distribution.

To further explore the residual differences, Fig. 6 presents them by industrial category. The most striking feature is that in the true 1990 distribution there is significantly less inequality within the agricultural sector, amongst both agricultural workers and agricultural entrepreneurs (although not unambiguously for agricultural entrepreneurs). In fact, agricultural laborers are the only employee group to experience a decrease in inequality. This decrease in inequality in the agricultural sector may be explained by the increasing diversification into non-agricultural activities by farm families (as documented by Collier et al., 1993). Non-agricultural income of farm households was found to moderate income differences in Rietveld (1986). This group is also shrinking as a proportion of the work force and has not experienced as much income growth as the other sectors. The distributional change could therefore reflect people in the tails of the distribution moving out of the sector.

Another noticeable difference across the groups is that all employee groups have higher inequality in 1990 than that which is predicted by adjusting the 1984 distribution. In contrast, all entrepreneurial groups (except for commercial entrepreneurs) show lower inequality in 1990 than that predicted by adjusting the 1984 distribution.[26] Investigating reasons for the different patterns of distributional change across the industry groups is an interesting area for further research.

8. Conclusions

The data used in this study support the view that the welfare cost in terms of increasing income inequality between 1984 and 1990 was more than offset by the social welfare gains that accrued from higher incomes. Nevertheless, poverty reduction with non-increasing inequality is viewed by many as the ultimate

[26] Inequality did not decrease unambiguously in all groups but if the Lorenz curves cross, they cross in the very high percentiles of the distribution.

development goal. If we compare the main determinants of increased inequality and poverty reduction in Java we see, however, that this is likely to be a difficult target. Many of the factors that resulted in decreased poverty were found to also exacerbate inequality. Poverty reduction was largely associated with increased educational attainment, increases in the incomes of lesser educated workers and income gains to workers outside agriculture. However, two of these three factors — increases in non-agricultural incomes and increased educational attainment — also increased inequality. Increased educational attainment was the single largest determinant of the inequality increase, although its effects were tempered somewhat by the associated decrease in returns to education. The movement of workers out of agriculture was a further factor contributing to the higher level of inequality in 1990.

Hence, we expect poverty to continue to decrease and inequality to increase as Indonesians gain more education and as productivity (and hence incomes) outside agriculture increases. The results do, however, suggest one possible route for development policy that may moderate inequality increases while not hindering growth. That is, policies that boost agricultural household's incomes relative to other households. It is of course unlikely that, mid-development, the agricultural sector will boom but programs that encourage agricultural households to supplement their income with non-agriculture earnings have the same desired effect. The findings of this study hence support the expansion of the current programs of rural industrialization on distributional grounds.

Acknowledgements

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Appendix A. The income calculation

Entrepreneurial income is calculated as the difference between revenue and costs. Revenue is calculated as the sum of the market value of produce that is sold, consumed by the household or given to others and any residual produce. Monthly entrepreneurial income from the agricultural sector is calculated as a 12th of the past year's income in an attempt to net out seasonal effects. Entrepreneurial income from the non-agricultural sectors is calculated as a third of the past 3 months' income and the monthly wages are wages received in the past month. The income surveys for 1984 and 1990 were conducted in the same season of the agricultural year.

Table A1
Sensitivity analysis of the order of decomposition. Percentage of the total change in the Gini coefficient attributable to each variable
Blanks indicate that the result is the same as for the original decomposition. Differences in the total are due to rounding errors.

Order of decomposition:	Original order	Education, Age, Industry, Industry $\bar{Y}$, *Age / Educ* $\bar{Y}$	Age, Industry, Education, Industry $\bar{Y}$, *Age / Educ* $\bar{Y}$	Industry, Age, Education, Industry $\bar{Y}$, *Age / Educ* $\bar{Y}$	Age, Education, Industry, Age/Educ $\bar{Y}$, Industry $\bar{Y}$	Industry $\bar{Y}$ Age/Educ $\bar{Y}$, Age, Educ, Industry
Compositional changes:						
Age	5.8	8.7		11.5		5.8
Education	50.5	47.6	38.5	38.5		52.9
Industry	18.8		30.8	25.0		23.1
Changes in mean incomes:						
Industry	14.9				14.9	11.5
Age/Education	−30.3				−30.3	−33.7
Total	59.7	59.7	59.7	59.6	59.7	59.6

Table A2
Dependent variable: log of per capita income (1984 Rupiahs)
Note: *t*-statistics are shown in parentheses.
The omitted dummy variables are: no schooling, agricultural labourers, urban area, Jakarta, male.

Constant	Education	9.795 (275.9)	9.980 (236.8)
Age		1984	1990
< 31	< primary	0.112 (3.24)	0.021 (0.52)
	primary	0.230 (6.60)	0.126 (3.15)
	> primary	0.715 (19.42)	0.537 (12.45)
31–40	none	−0.050 (−1.34)	−0.129 (−2.94)
	< primary	0.001 (0.016)	−0.063 (−1.57)
	primary	0.137 (4.01)	0.0384 (0.98)
	> primary	0.589 (16.53)	0.487 (11.91)
41–50	none	0.004 (0.128)	−0.057 (−1.40)
	< primary	0.010 (0.281)	−0.022 (−0.55)
	primary	0.168 (4.726)	0.068 (1.72)
	> primary	0.601 (16.06)	0.535 (12.62)
51–60	none	0.058 (1.70)	−0.003 (−0.07)
	< primary	0.160 (4.56)	0.057 (1.41)
	primary	0.364 (9.63)	0.181 (4.35)
	> primary	0.794 (17.89)	0.692 (14.95)
> 60	none	0.078 (2.25)	0.052 (1.31)
	< primary	0.272 (7.11)	0.161 (3.83)
	primary	0.431 (9.90)	0.294 (6.77)
	> primary	0.943 (16.56)	0.729 (13.03)
Industry:			
Agricultural entrepreneur		0.081 (6.20)	0.128 (10.08)
Industrial worker		0.160 (7.91)	0.217 (10.87)
Industrial entrepreneur		0.229 (8.73)	0.222 (9.13)
Commercial employee		0.199 (6.11)	0.274 (8.59)
Commercial entrepreneur		0.284 (17.82)	0.299 (19.6)
Finance		0.418 (8.70)	0.597 (14.10)
Service-sector employee		0.236 (14.0)	0.311 (18.8)
Service sector entrepreneur		0.181 (8.25)	0.214 (10.64)
Mining and building labourers		0.147 (6.76)	0.221 (10.82)
Remittees		0.284 (13.91)	0.297 (14.29)
Other:			
Rural area		−0.227 (−20.65)	−0.162 (−15.56)
West Java		−0.189 (−11.94)	−0.330 (−18.47)
Central Java		−0.465 (−29.12)	−0.520 (−28.74)
D.I. Yogyakarta		−0.330 (−17.56)	−0.467 (−21.77)
East Java		−0.321 (−20.28)	−0.440 (−24.75)
Female household head		0.1537 (12.99)	0.165 (13.66)

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