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Income Distributions, Inequality, and Poverty in Asia, 1992–2010

Duangkamon Chotikapanich, William E. Griffiths,
D. S. Prasada Rao, and Wasana Karunarathne

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Duangkamon Chotikapanich is Professor at the Department of Econometrics and Business Statistics, Monash University, Melbourne, Australia. William E. Griffiths is Professor at the Department of Economics, University of Melbourne. D. S. Prasada Rao is Professor at the School of Economics, University of Queensland, Brisbane, Australia. Wasana Karunarathne is Tutor Coordinator at the Department of Economics, University of Melbourne.

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Please contact the authors for information about this paper.
Email: duangkamon.chotikapanich@monash.edu, b.griffiths@unimelb.edu.au, p.rao@economics.uq.edu.au, lakminik@unimelb.edu.au

Asian Development Bank Institute
Kasumigaseki Building 8F
3-2-5 Kasumigaseki, Chiyoda-ku
Tokyo 100-6008, Japan

Tel: +81-3-3593-5500
Fax: +81-3-3593-5571
URL: www.adbi.org
E-mail: info@adbi.org

Abstract

Income distributions for developing countries in Asia are modeled using beta-2 distributions, which are estimated by a method of moments procedure applied to grouped data. Estimated parameters of these distributions are used to calculate measures of inequality, poverty, and pro-poor growth in four time periods over 1992–2010. Changes in these measures are examined for 11 countries, with a major focus on the People's Republic of China (PRC), India, and Indonesia, which are separated into rural and urban regions. We find that the PRC has grown rapidly with increasing inequality accompanying this growth. India has been relatively stagnant. Indonesia has grown rapidly after suffering an initial set back from the Asian financial crisis in 1997.

JEL Classification: C13, C16, D31

Contents

1. INTRODUCTION

As the most populous region in the world, Asia is home to 4,282 million people. The People's Republic of China (PRC), India, and Indonesia are the three largest countries in Asia with populations of 1,357 million, 1,257 million, and 248 million, respectively, accounting for more than 60% of the population in the region. The Asian region is also the economic power house of the world with some of its fastest growing economies. The PRC has been the fastest growing economy over the last two decades; over the period 1989–2013 it posted an annual average growth rate of 9.8% per annum. India has also been growing at a fast rate with an annual average rate of 9% over the period 2003–2007; since then, its growth rate has slowed to around 5%. Indonesia has also performed well with an average growth rate of 6% since 2006. Both the PRC and India are among the 10 largest economies in the world as measured by gross domestic product (GDP).

The incidence of poverty in the Asian region is quite high despite the spectacular growth performance of the PRC, India and other economies in the region. According to the 2013 *World Development Indicators,* 12.5% of the population in East Asia and 31% of the population in South Asia are below the $1.25/day poverty line used by the World Bank.[1] A staggering 66.7% of the population in South Asia and 21.7% of the population in East Asia is under the $2/day poverty line. Poverty incidence under the $1.25/day poverty line is 32.67%, 18.06%, and 11.80%, respectively, in India, Indonesia and the PRC. The picture is equally disturbing when national poverty lines are used. The incidence of poverty in rural India and rural PRC is quite high compared to their urban counterparts, indicating an unequal distribution of growth across rural and urban regions of these countries.

According to the Asian Development Bank (2012), over the last 20 years, inequality in the distribution of income has worsened in the three most populous countries. In the PRC, the Gini measure of inequality has increased from 0.32 to 0.43; in India from 0.33 to 0.37 and in Indonesia from 0.29 to 0.37. This means that inequality in the region has generally been on the rise while GDP has been growing at impressive rates.

In this paper we examine levels and trends of inequality and poverty in Asia during the period 1992–2010. Also, based on the data on GDP growth, inequality in the income distribution, and poverty incidence in various countries in the Asian region, it is important to examine the benefits accrued to the poor from GDP growth in these economies. Has the growth in the Asian region been pro-poor? How have the gains from GDP growth been distributed to households at different levels of income? Has the pro-poor growth been absolute or relative? With an absolute approach, growth is considered to be pro-poor if it reduces absolute poverty. In contrast, growth is defined as pro-poor under a relative approach if the growth benefits the poor proportionately more than the non-poor.

A number of methods for examining pro-poorness of growth have been developed over the last decade. Ravallion and Chen (2003) advocate the use of growth incidence curves and provide an index of pro-poorness of growth using the Watts index. Kakwani and Pernia (2000) provide a number of measures of pro-poorness of growth and also offer useful decompositions of the pro-poorness measures of growth. Duclos and Verdier-Couchane (2010) and Klasen et al. (2004) provide useful applications of these methods to the analysis of pro-poor growth in South Africa, Mauritius, and Bolivia.

[1] http://www.scribd.com/doc/135966817/World-Development-Indicators-2013

Typically, analyses of pro-poorness of growth require unit record data on incomes or expenditures at two different points of time. Data on households are then used to examine growth in income at different quantiles, which in turn provides information to compute pro-poorness measures. Thus, data requirements are demanding when it comes to conducting analysis of pro-poor growth. If the analysis is to cover a large number of countries and if it is to be applied to examine trends over a long period of time, the requirement of having access to household expenditure surveys is a major limitation. Globally available income distribution databases like the WIDER income distribution data set often provide limited income distribution data in the form of decile or quintile shares.

In this paper, we examine inequality, poverty, and pro-poor growth performance in the rural and urban regions of selected Asian economies, including the PRC, India, and Indonesia, using aggregate income distribution data. In the first stage, we make use of the recent contributions of Chotikapanich et al. (2007) and Chotikapanich et al. (2012) and the methodology proposed in these papers to model flexible income distributions using limited data. At the second stage, we make use of the income distributions fitted to aggregate data to analyze inequality, poverty, and pro-poor growth.

Income distributions for countries in Asia are estimated for the years 1992, 2000, 2005, and 2010 using the assumption that these distributions follow beta-2 distributions. The beta-2 distribution that we have chosen for our analysis is a member of the generalized beta-2 class of distributions (see McDonald and Xu [1995]). It is a flexible distribution that has been shown to provide a good fit to a variety of empirical income distributions. See for example McDonald (1984) and McDonald and Ransom (1979). The technique that we use to estimate each beta-2 distribution from summary data comprising population shares and income shares is the method of moments estimator suggested by Chotikapanich et al. (2007). Once country-level distributions are estimated we derive regional income distributions by combining the beta-2 distributions for each country. The same procedure is applied to combine area-level (urban or rural) income distributions to derive country income distributions. Finally, income distributions derived for country and regional levels are used to study the levels and trends in income inequality and poverty. Our focus is on estimating and measuring inequality and poverty and their changes over time; we do not discuss poverty-reducing interventions or pro-poor policies. Also, our measures of well-being are restricted to the use of expenditure or income; we do not discuss multidimensional inequality or poverty.

There are a number of large-scale studies on poverty in Asia involving many countries. Examples are Gaiha et al. (2009), Zhuang (2010), and Ravallion (2012). Most of them rely on poverty estimates obtained from the World Bank to do their analysis. The work by Wan and Sebastian (2011) is slightly different. Their paper is closely related to what we aim to do in this paper. They update poverty estimates for 25 countries in the Asia and Pacific region for 2005 and 2008 and project their estimates further to 2009 and 2010. Using poverty lines of $1.25 and $2 a day, they find an impressive reduction in poverty in the PRC and a significant decline in the number of poor in Asia as a whole between 2005 and 2008. When the country survey data are available, the headcount ratios are obtained by counting the number of people below the poverty lines. When the available data are in grouped form, they estimate the country distributions using the method suggested by Shorrocks and Wan (2009). This approach is performed to obtain estimates for India for 2010 and for the PRC for 2008, 2009, and 2010. For countries where there are no data available, they use the World Bank's estimates from PovcalNet or rely on the estimates obtained by applying the poverty elasticity of growth to country per capita GDP.

In Section 2 we make reference to where details of our methodology for estimating and combining the beta-2 distributions and for calculating inequality and poverty measures can be found. We also describe the pro-poor measures used in the study. Details of the data used are given in Section 3. The empirical results are presented in Section 4. Section 5 contains a summary of the contribution of the paper.

2. METHODOLOGY FOR ESTIMATING INCOME DISTRIBUTIONS AND CALCULATING POVERTY

The main sources of data for poverty measurement originate from household surveys conducted in most countries, at varying intervals. If accessibility of unit record data from these household surveys is not a problem, nonparametric poverty estimates can be computed from the unit record data using discrete versions of the various poverty measures that appear in the literature. However, when carrying out large-scale projects involving many countries and different time periods, accessing and compiling the unit record data can be difficult, time consuming, and labor intensive. A less resource intensive alternative is to use grouped data that have been constructed from the unit record data and which have been made readily available to researchers by the World Bank. These grouped data are in the form of population and income shares and include summary statistics such as mean income.

When grouped data are the primary source of information, the usefulness of nonparametric techniques is limited. Discrete versions of poverty measures need to assume incomes are uniformly distributed within each group, or use some other arbitrary method of interpolation. The alternative is to make some kind of parametric assumption. Two possible ways in which a parametric assumption can be made are (1) to specify and estimate a functional form for a Lorenz curve, and (2) to assume a particular density for the income distribution and estimate it. Once a Lorenz curve or an income distribution has been estimated, estimates of poverty measures can be computed from either the Lorenz curve parameters or the income distribution parameters. The first approach, estimation of a Lorenz curve, has been championed by the World Bank and is used almost exclusively in applications. Poverty measures computed on their PovcalNet website are based on the better fitting Lorenz curve, chosen from the general quadratic (Villasenor and Arnold 1989) or the beta Lorenz curve (Kakwani 1980). The second approach, estimation of an income distribution, has received less attention, possibly because techniques for estimating income distributions from grouped data have not been widely disseminated. However, recent papers by Chotikapanich et al. (2007) and Hajargasht et al. (2012), showing how to compute generalized method of moments estimates of income distributions from grouped data, have filled that gap.

There are several reasons for considering income distributions as an alternative to Lorenz curves for estimating poverty measures. Once an income distribution has been estimated it can be used to compute a variety of characteristics of that distribution, including the Lorenz curve. The converse is not true, however. It is not always possible to retrieve an underlying income distribution and its characteristics from a Lorenz curve. There are two problems that the World Bank encounters when estimating general quadratic and beta Lorenz curves. The first is that the parameter estimates may not yield an admissible Lorenz curve that is monotonically increasing and convex. In this case estimation breaks down. In contrast, Lorenz curves derived indirectly from an estimated income distribution will automatically satisfy the required properties. The second problem is that there is a range of incomes for which an estimated Lorenz

curve has no corresponding valid income distribution. The World Bank reports a range of "valid income values" associated with each of its Lorenz curve estimates. If a poverty line falls below the minimum value of this range, as can happen for relatively wealthy countries, the range of incomes over which a poverty measure is calculated is "invalid", and the validity of poverty estimates is in doubt. Even when a poverty line falls within the valid income range, there will be a range of "invalid incomes" that contribute to poverty measure calculation.

The distribution that we use for modeling incomes is the beta-2 distribution. It is chosen because of its simplicity, flexibility and its superior fit over log-normal and other distributions. These properties are discussed in Chotikapanich et al. (2007) and also in Hajargasht et al. (2012).[2] The probability density function (pdf) for the three-parameter beta-2 distribution used to model the country income distributions is defined as

$$f(y) = \frac{y^{p-1}}{b^p B(p,q)\left(1+\frac{y}{b}\right)^{p+q}} \qquad y > 0 \tag{1}$$

where y denotes income, $b > 0$, $p > 0$, and $q > 0$ are parameters; $B(p,q)$ is the beta function. The cumulative distribution function (cdf) for income is given by

$$F(y) = \frac{1}{B(p,q)} \int_0^{[y/(b+y)]} t^{p-1}(1-t)^{q-1}dt = B_{y/(b+y)}(p,q) \tag{2}$$

where the function $B_t(p,q)$ is the cdf for the normalized beta distribution defined on the (0,1) interval. This representation is convenient because $B_t(p,q)$ is readily computed by most statistical software. Chotikapanich et al. (2007) provide expressions for mean income, the Gini coefficient, the Theil index and the headcount ratio in terms of the parameters of the beta-2 distribution. For other poverty measures such as the Foster–Greer–Thorbecke (FGT) measure, the Atkinson and the Watt measures, Chotikapanich et al. (2013) provide expressions for these measures in terms of the parameters of the generalized beta distribution of which the beta-2 distribution is a special case. They also give details of the technique used for estimating the parameters and suggest a way to combine country income distributions to create regional income distributions. The same approach can be used to combine rural and urban income distributions to obtain a country income distribution.

2.1 Measures of Pro-Poor Growth

In addition to examining changes in poverty incidence over time using measures such as the headcount ratio or refinements of it that take into account the severity of the poverty, it is useful to examine whether growth has favored the poor relative to others placed at more favorable points in the income distribution. Following Duclos and Verdier-Chouchane (2010), we consider three such pro-poor measures, namely, measures attributable to Ravallion and Chen (2003), Kakwani and Pernia (2000), and a poverty equivalent growth rate (PEGR) suggested by Kakwani et al. (2003).

[2] Hajargasht et al. (2012) provide a specification test, and results reported therein suggest the beta-2 distribution fits well and performs better than other distributions. Further estimates of economic quantities of interest like the Gini and Theil indices and poverty incidence from the beta-2 distribution are close in magnitude to those derived using more complex distributions like the generalized beta distribution. For a more detailed discussion of these properties the reader is referred to Chotikapanich et al. (2007) and Hajargasht et al. (2012).

The first step toward the Ravallion–Chen measure is the construction of a growth incidence curve (*GIC*) which describes the growth rate of income at each percentile *u* of the distribution. Specifically, if $F_A(y)$ is the income distribution function at time *A*, and $F_B(y)$ is the distribution function for the new income distribution at a later point *B*, then

$$GIC(u) = \frac{F_B^{-1}(u) - F_A^{-1}(u)}{F_A^{-1}(u)}$$

For computing values of $GIC(u)$ from the beta-2 distribution, note that

$$F^{-1}(u) = \frac{bB_u^{-1}(p,q)}{1 - B_u^{-1}(p,q)}$$

where $B_u^{-1}(p,q)$ is the quantile function of the standardized beta distribution evaluated at *u*. When we have a regional distribution or a country distribution which is a mixture of rural and urban beta-2 distributions, it is no longer straightforward to compute $F^{-1}(u)$. One needs either to solve the resulting nonlinear equation numerically or estimate $F^{-1}(u)$ using an empirical distribution function obtained by generating observations from the relevant beta-2 distributions in the mixture. We followed the latter approach in our applications.

The *GIC* can be used in a number of ways. If $GIC(u) > 0$ for all *u*, then the distribution at time *B* first-order stochastically dominates the distribution at time *A*. If $GIC(u) > 0$ for all *u* up to the initial headcount ratio H_A, then growth has been *absolutely* pro-poor. If $GIC(u) > (\mu_B - \mu_A)/\mu_A$ for all *u* up to the initial headcount ratio H_A, that is, the growth rate of income of the poor is greater than the growth rate of mean income (μ), then growth has been *relatively* pro-poor.

For a single measure of pro-poor growth Ravallion and Chen suggest using the average growth rate of the income of the poor. It can be expressed as

$$RC = \frac{1}{H_A}\int_0^{H_A} GIC(u)du$$

For a beta-2 distribution (not a mixture), this integral can be evaluated numerically. Alternatively, we can generate observations from a beta-2 distribution or a mixture and compute

$$RC = \frac{1}{N_1}\sum_{i=1}^{N_1} GIC(i/N)$$

where *N* is the total number of observations generated, and $N_1 = H_A N$.

The Kakwani–Pernia measure compares the change in a poverty index such as the change in the headcount ratio, $H_A - H_B$, with the change that would have occurred with the same growth rate, but with distribution neutrality, $H_A - H_{\tilde{B}}$. Here, $\tilde{B}$ denotes an income distribution that would be obtained if all incomes changed in the same proportion as the change in mean income that occurred when moving from distribution *A* to distribution *B*. To obtain $\tilde{B}$ in the context of using beta-2 distributions, we can simply change the scale parameter *b* and leave the parameters *p* and *q* unchanged.

The Lorenz curve and inequality measures obtained from a beta-2 distribution depend on *p* and *q*, but do not depend on *b*. Thus, we have

$$p_{\tilde{B}} = p_A \qquad q_{\tilde{B}} = q_A \qquad b_{\tilde{B}} = \left(\frac{\mu_B}{\mu_A}\right) b_A$$

Finding $\tilde{B}$ for a mixture of beta-2 distributions—a situation that occurs when we combine rural and urban distributions to find a country distribution—is less straightforward. Using the superscripts *r* and *u* to denote rural and urban, respectively, and $\left(\lambda_A^r, \lambda_A^u\right)$ to denote the respective population proportions at time *A*, we obtain the distribution function for $\tilde{B}$ as follows:

$$p_{\tilde{B}}^j = p_A^j \qquad q_{\tilde{B}}^j = q_A^j \qquad b_{\tilde{B}}^j = \left(\frac{\mu_B^j}{\mu_A^j}\right) b_A^j \qquad j = u, r$$

$$F_{\tilde{B}}(y) = \lambda_A^r F_{\tilde{B}}^r(y) + \lambda_A^u F_{\tilde{B}}^u(y)$$

Thus, to obtain $\tilde{B}$ we assume that all incomes in the rural and urban sectors increase in the same proportion as their respective mean incomes, and the distributions of income and the population proportions in each of the sectors remain the same.

The Kakwani–Pernia measure is

$$KP = \frac{H_A - H_B}{H_A - H_{\tilde{B}}}$$

Assuming the growth in mean income has been positive, a value $KP > 0$ implies the change in the distribution has been absolutely pro-poor, and a value $KP > 1$ implies the change in distribution has been relatively pro-poor.

The third measure of pro-poor growth is the poverty equivalent growth rate (PEGR) suggested by Kakwani et al. (2003). In the context of our description of the Kakwani–Pernia measure, it is the growth rate used to construct the distribution $\tilde{B}$ such that $H_B = H_{\tilde{B}}$. In other words, it is the growth rate necessary to achieve the observed change in the headcount ratio when distribution neutrality is maintained. In terms of the beta-2 distribution, it is the value g^* that solves the following equation:

$$H_B = B_{\left[z/(b_B+z)\right]}(p_B, q_B) = B_{u^*}(p_A, q_A) \ , \qquad \text{where} \qquad u^* = \frac{z}{\left(g^*+1\right)b_A + z}$$

Thus, we have,

$$u^* = B_{H_B}^{-1}(p_A, q_A) \qquad \text{and} \qquad g^* = \frac{z\left(1-u^*\right)}{b_A u^*} - 1$$

For a mixture of beta-2 distributions this calculation is less straightforward. An alternative with similar properties, and the approach we followed, is to use $g^{**} = g \times KP$ where $g = \mu_B/\mu_A - 1$ is the actual growth rate of average income. When growth has not been relatively more favorable to the poor or non-poor, then $g = g^* = g^{**}$. If $g - g^*$ (or $g - g^{**}$) is negative, growth among the poor is lower than the average growth rate. On the other hand, if $g - g^*$ (or $g - g^{**}$) is positive, growth among the poor is higher than the average growth rate.

As noted by Duclos and Verdier-Chouchane (2010), consideration of the distribution $\tilde{B}$, which has the same income shares and inequality as the distribution *A*, but the same average income as distribution *B*, motivates a decomposition of a poverty change into "growth" and "redistribution" components. Specifically, we can write the change in the headcount ratio as

$$H_A - H_B = \underbrace{H_A - H_{\tilde{B}}}_{\text{growth effect}} + \underbrace{H_{\tilde{B}} - H_B}_{\text{redistribution effect}}$$

If we carried out the same analysis with a counterfactual distribution $\tilde{A}$ with the same income shares and inequality as distribution *B*, but the same average income as distribution *A*, we would not necessarily obtain the same result. In this case the decomposition would be

$$H_A - H_B = \underbrace{H_A - H_{\tilde{A}}}_{\text{redistribution effect}} + \underbrace{H_{\tilde{A}} - H_B}_{\text{growth effect}}$$

To accommodate this difference in results, Duclos and Verdier-Chouchane (2010) suggest averaging the two alternatives.

All the required quantities—the means of the distributions, the density and distribution functions, the Gini coefficients, the poverty measures, and the pro-poor growth measures—depend on the unknown parameters of the beta-2 distributions *b*, *p* and *q*. A method-of-moments procedure for estimating these parameters is discussed by Chotikapanich et al. (2007).

3. DATA AND COUNTRY COVERAGE

A major source of data for cross-country study of income distributions, inequality, and poverty is from the World Bank PovcalNet web site.[3] We used the data on all countries in South and Southeast Asia reported on the site for which there are data for the years as close as possible to 1992, 2000, 2005, and 2010. This has led to 11 countries being included in the study, with the data separated into rural and urban areas for the People's Republic of China (PRC), India, and Indonesia. The list of the countries considered is in Table 2. The data available are in grouped form comprising population shares and corresponding income or expenditure shares for a number of classes, together with mean monthly expenditure or income that has been reported from surveys, and then converted to purchasing power parity (PPP) using the World Bank's 2005 PPP exchange rates for the consumption aggregate from national accounts. Also available are the data on population size. Given a choice between income and expenditure shares, we prefer expenditure, in line with established practice at the World Bank. Expenditure was used for all the selected countries except Malaysia where only income was available. Throughout the paper we use the generic term *income distributions*, although almost all of our example distributions are for expenditure. The coverage percentages relative to the whole of Asia for each year are 85.4%, 86.6%, 70.5%, and 78.4% for 1992, 2000, 2005, and 2010, respectively.[4]

[3] The latest version of the data was downloaded on 15 October 2013 at http://research.worldbank.org/PovcalNet/index.html

[4] Consideration of regional shares is necessary when comparisons over time are made at the regional level.

4. EMPIRICAL RESULTS

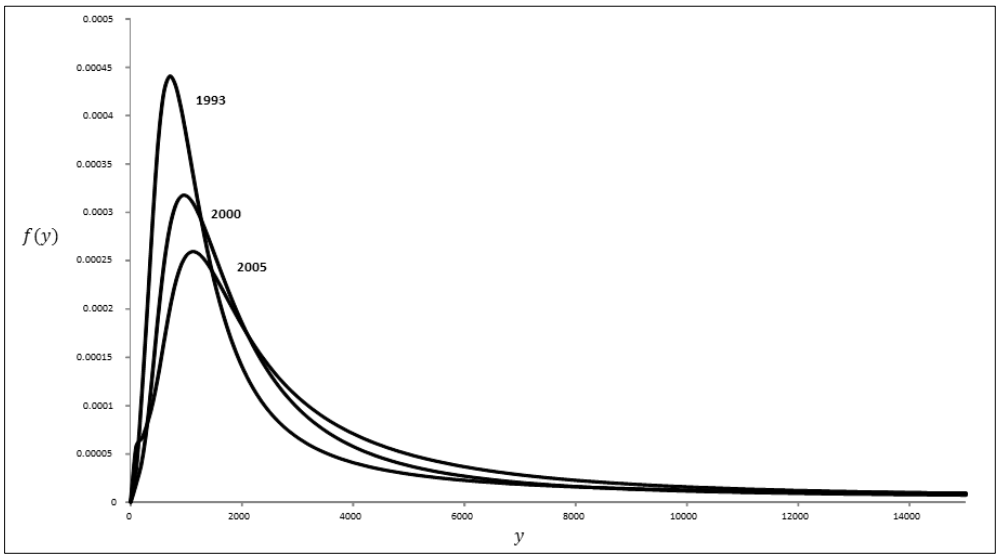
We start this section by looking at the changes in the global income distributions between 1992 and 2005, how Asia fits into the changes, and what contribution Asia has made towards global inequality in the distribution of income. We would expect the change in Asia to play an important role in explaining the change in the global income distribution since during this period Asia made up about 60% of the world population. Then we focus the analysis on inequality and poverty in Asia and extend the results to include 2010. Poverty in the PRC, India, and Indonesia is analyzed in detail.

4.1 Global Income Distributions: Levels and Trends

We first present the results for the global income distribution and inequality taken from Warner et al. (2013). In that study the data used for country per capita income were the GDP per capita in PPP terms, obtained from World Bank's 2005 International Comparison Program (ICP). The analysis covers 94, 92, and 93 countries for the world for 1993, 2000, and 2005, respectively. This coverage is approximately 90%, 88%, and 85% of the total population in the world. For Asia, the study covers 19, 18, and 14 countries, of both developed and developing countries, for 1993, 2000, and 2005, respectively. In the next section we focus on our results calculated in this paper for poverty in Asia for the periods 1992, 2000, 2005, and 2010. Our analysis considers only the developing countries in Asia. One difference between the poverty analysis in this paper and that of the previous study in Warner et al. (2013) is that we use the country survey monthly mean income reported by the World Bank on the PovcalNet site as country per capita income.

Figure 1 shows plots for the global income density functions over 1993, 2000, and 2005. These density functions are the population weighted averages of the density functions of each individual country considered. The distributions have consistently moved to the right reflecting the increase in world mean income over time. However, the peaks of the distributions (which reflect modal incomes) are still less than the annual income of $1,500, indicating that there is a significant proportion of the world's population that receives an income much less than $4.10 a day.

Figure 1: Global Density Function Over Time



Source: Warner et al. (2013).

Table 1 provides overall estimates for global income inequality for 1993, 2000, and 2005 obtained from Warner et al. (2013). Over the period 1993–2005, both the Gini and Theil coefficients indicate a continual decline in global income inequality. The Gini coefficient declined from 0.7000 in 1993 to 0.6904 in 2000 and then further to 0.6702 in 2005. The decline in the Theil index appears even more significant, given the greater sensitivity of this measure to changes in income with inequality, falling from 1.0532 in 1993 to 0.9864 in 2000 and then to 0.8772 in 2005.

Table 1: Global Inequality

	1993	2000	2005
Global			
Gini	0.7000	0.6904	0.6733
Theil's L	1.0532	0.9864	0.9061
Within	0.2873 (27.28%)	0.3006 (30.47%)	0.3074 (33.93%)
Between	0.7659 (72.72%)	0.6858 (69.53%)	0.5987 (66.07%)
Asia			
Gini	0.5665	0.5293	0.4609
Thiel's L	0.5501	0.4847	0.3681
Within	0.2550 (46.36%)	0.2492 (51.41%)	0.2891 (78.54%)
Between	0.2951 (53.64%)	0.2355 (48.59%)	0.0790 (21.46%)

Notes:
1. The results for the global section are taken from Warner et al. (2013).
2. The results for the Asia section are the authors' calculations.

A decomposition of inequality into contributions from the differences in incomes within and between countries is useful in understanding the factors driving the overall downward trend in global inequality. This decomposition indicates that the driving force behind the decline in overall global inequality has been the decline in inequality between countries, both in absolute and relative terms. In 1993, between country inequality measured 0.7659, contributing 73% of total global inequality; while in 2005 this had reduced to 0.5987, comprising 66% of total inequality. This is an indication of convergence in incomes across countries. The decline in between-country inequality has been coupled with a slight increase in within-country inequality both in absolute and relative terms, rising slightly from 0.2873 (27%) in 1993 to 0.3074 (35%) in 2005.

The second part of Table 1 presents the trend in inequality in Asia calculated in this paper. There is a decrease in inequality between 1993 and 2005 as can be shown by the decrease in the Gini coefficients from 0.5665 for 1993 to 0.4609 for 2005. The Theil indices also show a decrease in inequality: from 0.5501 in 1993 to 0.3681 in 2005. As will be investigated further in this section, the trend in inequality in Asia is likely to be attributed to the strong growth performance of the PRC and India. Both these populous countries have seen growth in mean income which is likely to be driving down between-country inequality as is evident from the decrease in between-country inequality in Asia presented in Table 1; and have experienced an increasing disparity of income within their borders between 1993 and 2005.

4.2 Poverty in Developing Countries in Asia

In Table 2 we report the results for the headcount ratio, the poverty gap and the FGT for developing countries considered in this paper for the years 1992–2010, using a poverty line of $1.25/day ($38/month), a value proposed by the World Bank to measure

extreme poverty.[5] We use the inequality aversion $\alpha = 2$ for the FGT measure. From this table we can compare the degree of poverty in different countries, observe how poverty incidence has changed over time, and examine whether relative poverty assessments are robust to choice of poverty index. Although the magnitudes of the three poverty indices vary considerably, reflecting their different definitions, poverty comparisons over time and countries are generally not sensitive to choice of index. The following observations can be made from any one of them:

- During the period 1992–2010, Bangladesh was the poorest country. In 1992, 70% of the total population of the country was in extreme poverty. The poverty decreased over time; but 43% of the total population was still in extreme poverty in 2010.
- In 2010, poverty was greatest in Bangladesh, rural India, and urban India; it was lowest in urban PRC, Thailand, and Malaysia. Nearly 20 years earlier, in 1992, Bangladesh, Pakistan, Viet Nam, and rural PRC were the poorest countries. Malaysia, Thailand, and urban PRC had the least poverty.
- Countries which have made the greatest progress towards eliminating poverty, and the periods in which the major poverty reductions took place are rural PRC (1992–2005), rural and urban Indonesia (2000–2010), Viet Nam (1992–2005), urban PRC (1992–2010), and Pakistan (1992–2005). India (rural and urban) and Bangladesh have made some progress, but the incidence of poverty still remains extremely high.
- The PRC, India, and Indonesia are large countries, together accounting for more than 80% of the total population of the Asian countries considered in this study. These countries, with the PRC in particular, grew at a fast rate. Thus, movements in these countries have had a strong impact on movements in Asia as a whole. Looking more closely at what has happened in these countries, in Figure 2 we present the number of poor in the whole of Asia and the contributions from the PRC, India, and Indonesia for 1992, 2000, 2005, and 2010. It can be seen that these three countries contribute to more than three-quarters of the total poor in Asia. In the next section we investigate the level and trends of poverty in each of these three countries and assess the pro-poorness of the distributive changes over this period of time.

[5] See Ravallion et al. (2009) and Ravallion (2010) for a detailed explanation of how the $1.25 poverty line was set and for discussion about alternative poverty lines for different countries.

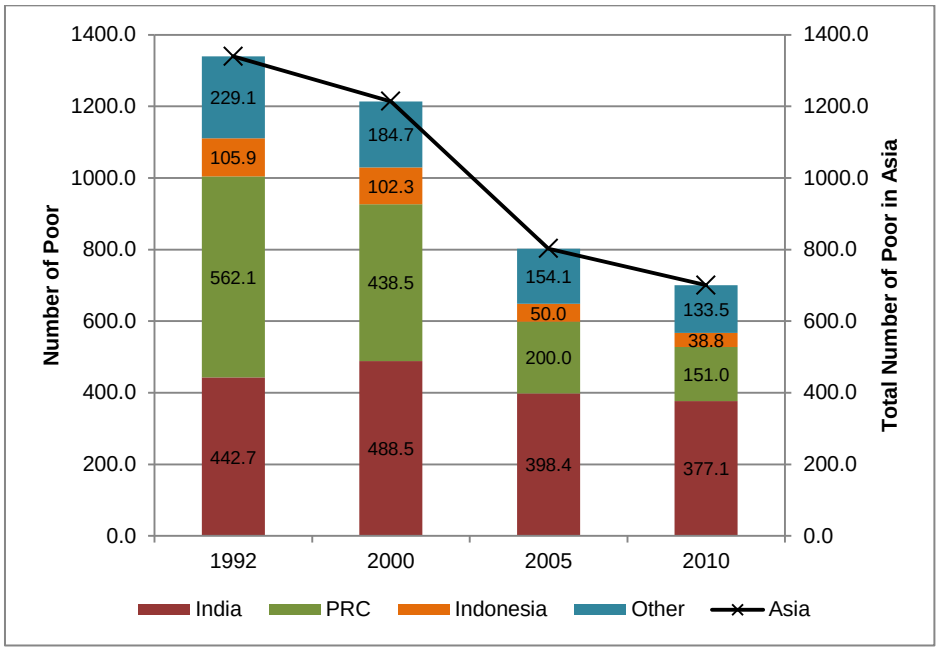
Table 2: Poverty in Asia

Year	Country	Head Count Ratio	Poverty Gap Ratio	FGT (α=2)	Population (millions)	No. of Poor (millions)
2010	**Asia**	**0.210**	**0.050**	**0.017**	**3328.856**	**700.427**
	Bangladesh	0.427	0.115	0.043	148.690	63.501
	Cambodia	0.184	0.038	0.012	14.140	2.600
	PRC Rural	0.198	0.047	0.016	753.729	149.538
	PRC Urban	0.003	0.000	0.000	570.926	1.503
	India Rural	0.349	0.081	0.027	810.820	282.770
	India Urban	0.287	0.073	0.026	329.110	94.298
	Indonesia Rural	0.160	0.030	0.009	111.060	17.749
	Indonesia Urban	0.164	0.037	0.013	128.811	21.076
	Malaysia	0.008	0.002	0.001	27.950	0.219
	Pakistan	0.221	0.043	0.013	167.440	36.950
	Philippines	0.163	0.041	0.015	91.700	14.980
	Sri Lanka	0.046	0.007	0.002	20.650	0.947
	Thailand	0.006	0.001	0.000	68.710	0.445
	Viet Nam	0.163	0.037	0.013	85.120	13.850
2005	**Asia**	**0.258**	**0.066**	**0.024**	**3115.199**	**802.445**
	Bangladesh	0.482	0.140	0.055	153.280	73.921
	Cambodia	0.311	0.086	0.034	13.750	4.269
	PRC Rural	0.252	0.062	0.022	759.740	191.379
	PRC Urban	0.016	0.003	0.001	544.760	8.607
	India Rural	0.431	0.112	0.040	664.060	286.343
	India Urban	0.364	0.100	0.038	307.700	112.047
	Indonesia Rural	0.248	0.051	0.015	116.753	28.945
	Indonesia Urban	0.186	0.041	0.013	113.166	21.019
	Malaysia	0.014	0.003	0.001	25.590	0.357
	Pakistan	0.244	0.052	0.016	158.650	38.762
	Philippines	0.200	0.056	0.022	87.120	17.398
	Sri Lanka	0.073	0.013	0.003	20.040	1.461
	Thailand	0.016	0.003	0.001	67.280	1.089
	Viet Nam	0.202	0.051	0.019	83.310	16.848
2000	**Asia**	**0.382**	**0.110**	**0.044**	**3179.931**	**1213.984**
	Bangladesh	0.567	0.184	0.078	131.050	74.349
	Cambodia	0.370	0.108	0.043	13.020	4.816
	PRC Rural	0.499	0.164	0.072	815.900	406.889
	PRC Urban	0.072	0.014	0.004	437.800	31.609
	India Rural	0.457	0.118	0.042	724.500	330.947
	India Urban	0.361	0.101	0.040	436.100	157.527
	Indonesia Rural	0.545	0.144	0.051	124.850	68.037
	Indonesia Urban	0.400	0.110	0.042	85.761	34.302
	Malaysia	0.016	0.004	0.001	21.780	0.344
	Pakistan	0.365	0.088	0.030	150.410	54.898
	Philippines	0.203	0.055	0.021	77.310	15.714
	Sri Lanka	0.145	0.030	0.009	18.750	2.723
	Thailand	0.045	0.009	0.003	63.160	2.857
	Viet Nam	0.364	0.096	0.036	79.540	28.970
1992	**Asia**	**0.490**	**0.164**	**0.075**	**2735.556**	**1339.748**
	Bangladesh	0.700	0.242	0.107	111.990	78.430
	Cambodia	0.437	0.437	0.437	10.540	4.608
	PRC Rural	0.623	0.245	0.126	827.260	515.173
	PRC Urban	0.134	0.024	0.007	351.180	46.883
	India Rural	0.522	0.147	0.056	664.060	346.573
	India Urban	0.409	0.114	0.044	235.260	96.174
	Indonesia Rural	0.584	0.166	0.063	128.501	75.048
	Indonesia Urban	0.474	0.143	0.058	65.025	30.834
	Malaysia	0.029	0.007	0.003	19.200	0.558
	Pakistan	0.650	0.237	0.111	114.970	74.776
	Philippines	0.289	0.084	0.034	63.150	18.269
	Sri Lanka	0.167	0.032	0.009	17.740	2.956
	Thailand	0.102	0.024	0.009	58.230	5.925
	Viet Nam	0.636	0.235	0.110	68.450	43.541

PRC = People's Republic of China, FGT = Foster–Greer–Thorbecke measure.

Source: Authors' calculations.

Figure 2: Number of Poor in Asia, People's Republic of China, India, and Indonesia



PRC = People's Republic of China.

Source: Authors' calculations.

4.3 Inequality and Poverty in the People's Republic of China

The PRC is the world's most populous country. It had an estimated population of 1.3 billion in 2005. It is also among the five largest economies in the world with an estimated GDP (in PPP constant 2005 international dollars) of 9.1 trillion dollars for 2010. The annual GDP growth rate in the PRC for the period 2005–2010 was between 9.2% and 11.3%.[6] After liberalization reforms and the Cultural Revolution in the late 1970s, the PRC made quick economic progress. Due to cheap labor, the PRC attracts massive external investment. Through massive internal investment on modern infrastructure and urban facilities, and moving from primary to manufacturing activities, the PRC has been growing at a rapid rate.

Table 3 presents the overall mean, inequality, and poverty in the PRC and the corresponding values for urban and rural areas separately, over the period 1992–2010. Table 4 reports the growth rates, the indices for measuring pro-poor growth, and the growth redistribution figures for the whole of the PRC between these periods.[7] The results confirm the PRC's very rapid growth, as indicated by the impressive increases in mean incomes (Table 3) from around $46 a month in 1992 to $146 a month in 2010, with the growth rate (Table 4) of the PRC as a whole as high as 44.76% between 1992 and 2000, followed by a sharp increase to 63.81% for the period 2000–2005, before slowing down to 33.89% between 2005 and 2010. The impressive growth rates between 1992 and 2005 are also apparent in both the urban and rural areas.

[6] http://databank.worldbank.org/data/views/variableselection/selectvariables.aspx?source=world-development-indicators

[7] Growth rates are calculated between the two year periods where the data are available. The growth rate between 1992 and 2000 covers an eight-year period while those for 2000-2005 and 2005-2010 cover five-year periods.

Table 3: Inequality and Poverty in the People's Republic of China

People's Republic of China		1992	2000	2005	2010
Mean		45.996	66.584	109.074	146.043
	Urban	67.753	100.126	161.920	196.870
	Rural	26.827	48.605	71.176	83.304
Gini		0.335	0.390	0.419	0.448
	Urban	0.2462	0.3171	0.3504	0.3535
	Rural	0.3248	0.3551	0.3553	0.3948
Head Count Ratio		0.4769	0.3498	0.1533	0.1123
	Urban	0.1335	0.0722	0.0158	0.0046
	Rural	0.8049	0.4985	0.2520	0.2172
Population (millions)		1178.33	1253.7	1304.5	1331.38
	Urban %	29.80	34.92	41.76	44.00
	Rural %	70.20	65.08	58.24	56.00
Number of Poor (millions)		562	439	200	149
	Urban	167	153	84	66
	Rural	394	285	116	84

Source: Authors' calculations.

In terms of inequality, there are notable disparities in the mean incomes between urban and rural areas, with mean incomes in the urban areas consistently more than twice those in the rural areas for all years considered. The disparities are also indicated by the increasing values of the Gini coefficients for the whole of the PRC; the values increase at a relatively constant rate from 0.335 in 1992 to 0.448 in 2010. The increases in inequality are also observed within both the rural and urban areas.

In terms of poverty, the initial level for the headcount ratio for 1992 was as high as 47.69% for the whole of the PRC. It decreased over time and in 2010 the headcount ratio was at 11.23%. But since the PRC is a big country with a massive population of approximately 1178.33 million and 1331.38 million in 1992 and 2010, respectively, the actual number of extremely poor living on less than $1.25 a day is still very high even though it reduced from 562 million in 1992 to 149 million in 2010.

Turning to Table 4, we see that the PRC has grown at an impressive rate since 1992, but the peak period was between 2000 and 2005 when the growth rate was 63.81%. During this period, both rural and urban areas also grew at very high rates of 46.44% and 61.72%, respectively. Table 4 also shows that from 1992 to 2000, the rural areas grew at a very high rate of 81.18%. The rate of growth slowed down between 2005 and 2010 for the whole of the PRC in both urban and rural areas. To examine how the strong growth was distributed among the population, the last section of Table 4 reports the impact of growth on poverty. The changes in the headcount ratios are decomposed into the effects from growth itself and from how the income distributions have changed. Between 1992 and 2000, the actual headcount ratio decreased by 12.72 percentage points. If there had been no change in the income distribution between the two years, growth would have reduced poverty by as much as 16.61 percentage points. The impact of the change in income distribution is an increase in incidence of poverty by 3.89 percentage points. The effect of growth net of distributional effects is a reduction in poverty of 12.72%. Moving on to the period of high growth between 2000 and 2005, the impact of strong growth resulted in a reduction of the headcount ratio by 19.65 percentage points. Both growth and the redistribution of income contributed to this reduction. This result suggests that during this period, the PRC's policy of redistribution

of growth to the poorest of the population was successful. The period between 2005 and 2010 saw a small reduction in the headcount ratio of 4.11 percentage points. If there had been no change in the income distributions between these two years, the impact of growth would have resulted in a reduction of the headcount ratio by 7.84 percentage points. The adverse effect of the redistribution of growth, which increased poverty incidence by 3.74% during the period, offsets this reduction resulting in a net reduction in poverty of 7.84%.

Table 4: Growth and Pro-Poor Growth in the People's Republic of China

People's Republic of China	1992–2000	2000–2005	2005–2010
Growth Rate	0.4476	0.6381	0.3389
Urban	0.4778	0.6172	0.2158
Rural	0.8118	0.4644	0.1704
Ravallion and Chen (2003) Index	0.3129	0.5260	0.1141
Kakwani and Pernia (2000) Index	0.7833	1.0783	0.5345
PEGR Index	0.3506	0.6881	0.1812
Growth Redistribution			
Change in poverty (head count ratio)	0.1272	0.1965	0.0411
Average growth effect	0.1661	0.1815	0.0784
Average redistribution effect	-0.0389	0.0150	-0.0374

PEGR = poverty equivalent growth rate.

Source: Authors' calculations.

The redistribution effects on poverty shown in Table 4 can be examined further by contrasting the shares of income accruing to the poorest 20% of the population with the income shares of the top 5% of the population. From Table 5, the share of the bottom 20% dropped from 6.64% in 1992 to 4.86% in 2010, a 26.8% drop in the share of the poorest 20%. In contrast, the share of the top 5% of the population increased from 14.07% to 21.57%, representing a 53.3% increase in their share of the total income. These figures are consistent with the significant increase in the Gini measure of inequality from 0.335 in 1992 to 0.448 in 2010 and the negative contribution made by the distributional change to poverty incidence in the PRC.

Table 5: Income Shares for Selected Population Groups in the People's Republic of China

People's Republic of China		Income Shares			
		1992	2000	2005	2010
Bottom	1%	0.12%	0.15%	0.14%	0.12%
	5%	0.97%	1.04%	0.97%	0.81%
	10%	2.50%	2.49%	2.30%	1.92%
	20%	6.64%	6.20%	5.70%	4.86%
Top	20%	40.05%	45.49%	47.97%	50.13%
	10%	24.04%	29.01%	31.41%	33.29%
	5%	14.07%	18.05%	20.02%	21.57%

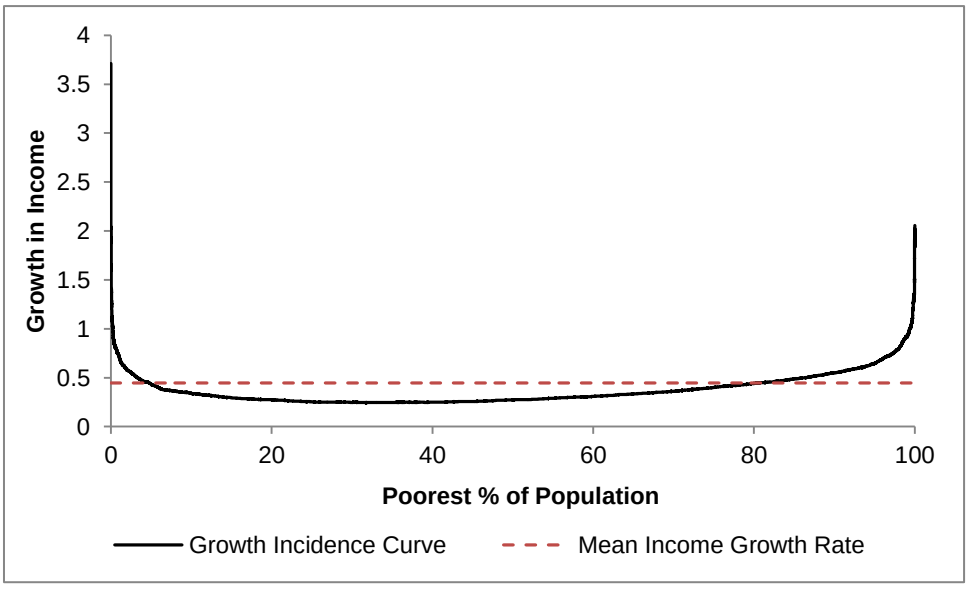
Source: Authors' calculations.

Apart from investigating whether growth helps reduce poverty or not, it is also useful to examine whether the development policy in the PRC resulted in pro-poor growth. The

middle section of Table 4 reports the RC, KP, and $PEGR$ indices. Positive values of these indices indicate that growth has been absolutely pro-poor. To consider whether growth has been relatively pro-poor, we can compare RC and $PEGR$ with the growth rate, g, and KP with 1. If the differences $RC-g$, $PEGR-g$, and $KP-1$ are positive, then growth is relatively pro-poor. It can be seen that all the indices, RC, KP and $PEGR$ take positive values for all periods, suggesting that growth in 1992–2010 was absolutely pro-poor. Investigating whether growth is also relatively pro-poor during these periods we find that in the periods 1992–2000 and 2005–2010, all three differences are not positive, suggesting that growth was not relatively pro-poor. Income of the poor did not grow sufficiently to follow the overall growth rate. For the period 2000–2005, the results are inconclusive. The values for $RC-g$, $KP-1$, and $PEGR-g$ are –0.1121, 0.0783, and 0.05, respectively. As a result, $RC-g$ does not suggest relatively pro-poor growth while $KP-1$ and $PEGR-g$ indicate that growth has been pro-poor in the relative sense.

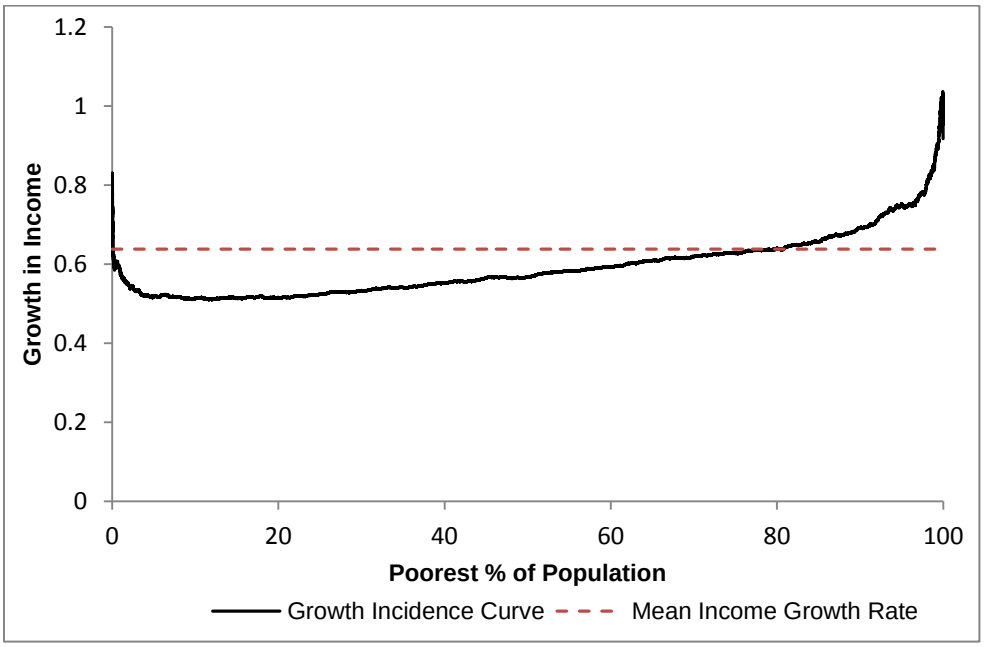
The pro-poor indices considered above are summary indices. It may be more informative to look more closely at the impact of growth on the entire distribution. Figures 3–5 show the growth incidence curves (*GIC*) for the periods 1992–2000, 2000–2005, and 2005–2010, respectively. The horizontal lines in these figures represent the mean income growth rate, g, between these periods For all figures, the *GIC* is above the zero line, confirming that growth for all periods is absolutely pro-poor regardless of where we might put the poverty line. In terms of the relative impact of growth, we can see in Figure 3 that between 1992 and 2000, the *GIC* starts higher than the growth line until around 5% of the poorest population; from there the curve moves below the growth line until around 80% of the population, before increasing above the growth line. This suggests that during this period, growth was relatively pro-poor for the population who were extremely poor, at the lowest 5%. However, growth was not relatively pro-poor for poor people who were above the lowest 5%. For the periods 2000–2005 and 2005–2010, the *GIC* curves are below the growth line for the poorest 80% of the population. Growth in these periods was not relatively pro-poor for any region in the lower tails of the distributions.

Figure 3: Growth Incidence Curve, People's Republic of China, 1992–2000



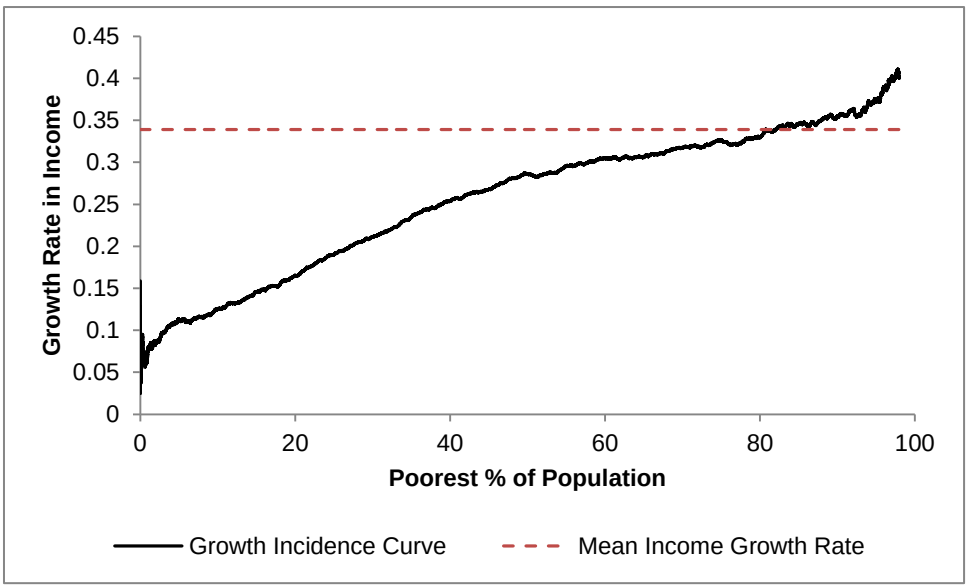
Source: Authors' calculations.

Figure 4: Growth Incidence Curve, People's Republic of China, 2000–2005



Source: Authors' calculations.

Figure 5: Growth Incidence Curve, People's Republic of China, 2005–2010



Source: Authors' calculations.

Overall, during 1992–2010 the PRC was able to achieve strong growth, and also redistribute it in such a way that it was successful in reducing poverty. However, the PRC also faced increasing inequality over this period of time.

4.4 Inequality and Poverty in India

India is the second most populated country in the world, with a population of 1.08 billion in 2005. It is also among the largest economies in the world with an estimated GDP (in PPP constant 2005 international dollars) of $3.77 trillion in 2010. The annual GDP growth rate for India for the period 2005–2010 was as high as 10.5% in 2010 and as

low as 3.9% in 2008.[8] In terms of development, India underwent fundamental reforms in 1991, followed by a renewal of these reforms in the 2000s. Since 2000, economic development has been driven by expansion of the service sector, which has grown faster than other sectors. Nevertheless, the agricultural sector plays an important role in overall development and remains the main, largest economic sector. In addition, the country has gone through an agricultural revolution that has transformed the nation from having a dependence on grain imports to being a global exporter of food.

Table 6 presents results on inequality and poverty in India for 1992, 2000, 2005, and 2010, as well as the growth rates and the impact of growth on poverty reduction in the periods 1992–2000, 2000–2005, and 2005–2010. The initial mean income for 1992 is approximately the same as the mean income of the PRC for the same year. While the mean income increases over the years, growth rates are low for all periods (Table 7), especially for 2000–2005. The low growth rates are reflected in both the urban and rural areas.

Table 6: Inequality and Poverty in India

India		1992	2000	2005	2010
Mean		46.773	52.643	53.906	59.929
	Urban	54.934	59.050	62.390	73.060
	Rural	43.881	48.787	49.853	54.600
Gini		0.3098	0.3103	0.3337	0.3284
	Urban	0.3433	0.3488	0.3762	0.3926
	Rural	0.2863	0.2812	0.2999	0.2937
Head Count Ratio		0.4920	0.4037	0.4096	0.3312
	Urban	0.4088	0.3610	0.3641	0.2861
	Rural	0.5215	0.4295	0.4312	0.3496
Population (millions)		899.400	1160.600	951.800	1139.900
	Urban %	29.80	34.92	41.76	44.00
	Rural %	70.20	65.08	58.24	56.00
Number of Poor (millions)		442.541	468.572	389.810	377.565
	Urban	96.192	157.435	112.047	94.148
	Rural	346.349	311.137	277.764	283.416

Source: Authors' calculations.

The national Gini coefficients for India are relatively stable, indicating a slight increase in inequality from 0.31 to 0.33 over the period 1992–2010, a level of inequality that is about average. The Gini coefficients for rural and urban areas are also reported in Table 6. Initial inequality in 1992 was at 0.3433 in urban areas, compared to a relatively low level of 0.2863 for rural areas. Inequality worsened in urban areas to 0.3926 in 2010. However, inequality in rural areas was relatively stable with a level of 0.2937 in 2010.

Table 6 also reports how the headcount ratios change over time. The initial level for India in 1992 was very high with 49.2% of the total population living in extreme poverty. Conditions improved over time with the headcount ratio decreasing to 33.12% in 2010. Similar trends can be found in both rural and urban areas with a decrease in poverty of

[8] http://databank.worldbank.org/data/views/variableselection/selectvariables.aspx?source=world-development-indicators#

approximately 12–17 percentage points over the period 1992–2010. The development policies appear to be successful in reducing poverty in both areas. In terms of the number of people living in extreme poverty, we find that the initial figure was 442.541 million people. By 2010 there were still 377.565 million in extreme poverty in India, with the majority of the poor living in rural areas.

Turning to growth and the redistribution of growth, Table 7 reports the growth rates, the changes in poverty as measured by the headcount ratios, and the decomposition of the changes into effects of growth and of changes in inequality. For 1992–2000, there is a reduction in the headcount ratio, which can be explained in large part by a growth effect. Of the 8.83 percentage point reduction in the headcount, 7.65 percentage points can be explained by the effect of growth. The change in the distribution of income within this period resulted in a slight reduction of 1.18 percentage points of the headcount ratio. Between 2000 and 2005, poverty increased slightly with the headcount ratio increasing by 0.58 percentage points. This slight worsening in poverty can be explained purely by the worsening in the redistribution of growth. If the distribution of income remained as it was in 2000, growth should have decreased poverty by 2.44 percentage points. Between 2005 and 2010, there was a fall in poverty by 7.83 percentage points. This fall would have been 8.17 percentage points if inequality had remained the same as it was in 2005.

Table 7: Growth and Pro-Poor Growth in India

India	1992–2000	2000–2005	2005–2010
Growth Rate	0.1255	0.0240	0.1117
Urban	0.0749	0.0566	0.1710
Rural	0.1118	0.0219	0.0952
Ravallion and Chen (2003) Index	0.1014	-0.0138	0.1153
Kakwani and Pernia (2000) Index	1.1194	-0.2322	0.9550
PEGR Index	0.1405	-0.0056	0.1067
Growth Redistribution			
Change in poverty (head count ratio)	0.0883	-0.0058	0.0783
Average growth effect	0.0765	0.0244	0.0817
Average redistribution effect	0.0118	-0.0302	-0.0034

PEGR = poverty equivalent growth rate.

Source: Authors' calculations.

Table 8 shows the changes in income shares accruing to the poorest and richest in the Indian population. The share of the bottom 20% reduced from 8.90% in 1992 to 8.46% in 2010 though there was a modest increase from 8.35% in 2005 to 8.46% in 2010. During this period, the share of the richest 5% of the population increased from 15.79% in 1992 to 17.38% in 2010, which represents a 10% increase in their share. In comparison to the shifts in the shares of the poor and rich in the PRC, changes observed in India appear to be modest. However, the adverse distributional changes in the PRC have been offset by spectacular growth rates in real income.

Table 8: Income Shares for Selected Population Groups in India

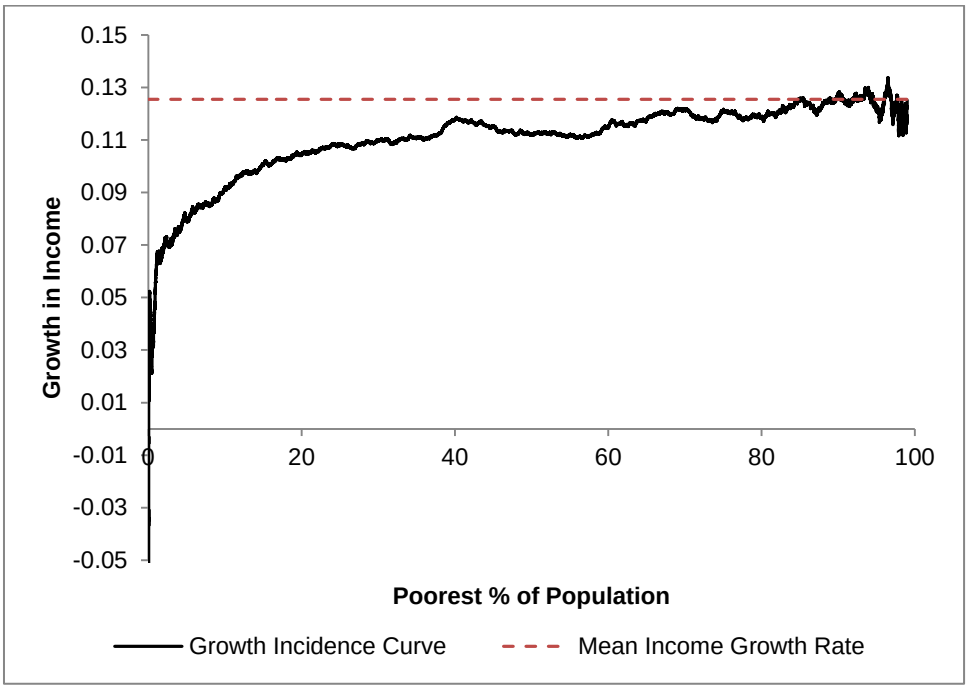
India		Income Shares			
		1992	2000	2005	2010
Bottom	1%	0.27%	0.25%	0.25%	0.26%
	5%	1.70%	1.63%	1.58%	1.61%
	10%	3.84%	3.71%	3.58%	3.63%
	20%	8.90%	8.70%	8.35%	8.46%
Top	20%	40.00%	40.18%	42.11%	41.91%
	10%	25.32%	25.39%	27.33%	27.16%
	1%	15.79%	15.77%	17.60%	17.38%

Source: Authors' calculations.

Table 7 also reports the three pro-poor indices, RC, KP, and $PEGR$. We find that during 1992–2000, all these indices are positive suggesting growth was absolutely pro-poor. In the relative sense, the estimates for $KP-1$ and $PEGR-g$ are positive suggesting there was relatively pro-poor growth. This conclusion is not reached, however, by using the index $RC-g$, where the estimate is negative. For 2000–2005, RC, KP, and $PEGR$ are all negative suggesting that the distributive change of growth has increased absolute poverty and therefore growth was absolutely anti-poor. Moving to the last period, 2005–2010, we find RC, KP, and $PEGR$ to be positive, indicating that growth was absolutely pro-poor. A contradiction occurs when we consider the relative perspective, where $RC-g$ suggests that growth was pro-poor while $KP-1$ and $PEGR-g$ suggest that growth was not pro-poor.

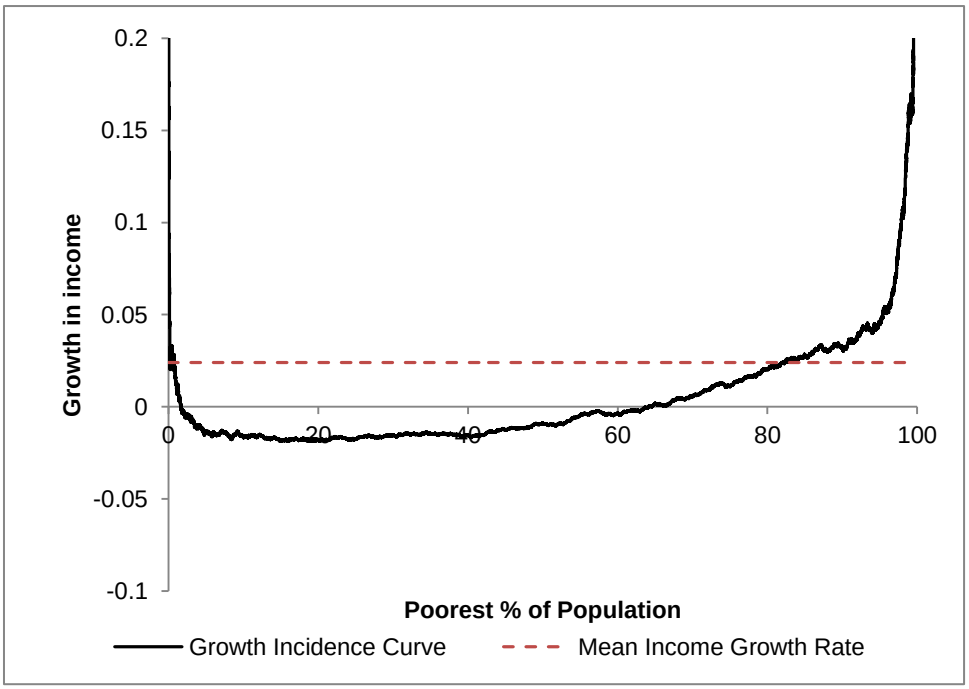
Figures 6–8 present the *GIC* curves for India for the three periods considered. The curve for the period 1992–2000 is positive for the whole population suggesting there was absolutely pro-poor growth during this period. However, the curve is below the growth line for the most part suggesting that the poor did not benefit from growth as much as the non-poor. For 2000–2005, the *GIC* is negative from approximately 1.66%–65% of the poorest population. It is also below the growth line for most of the population. In this period, growth is absolutely pro-poor for the extremely poor population below 1.66% of the population, but for most of the poor population growth was neither absolutely nor relatively pro-poor. For 2005–2010, the *GIC* is entirely above zero and mostly above the growth line up to about 20% of the poorest population. From then, it fluctuates around the growth line up to about 40% before dipping down below the growth line. Since the headcount ratios are 0.4096 and 0.3312 for 2005 and 2010, respectively, we can conclude that growth during this period is both absolutely and relatively pro-poor.

Figure 6: Growth Incidence Curve, India, 1992–2000



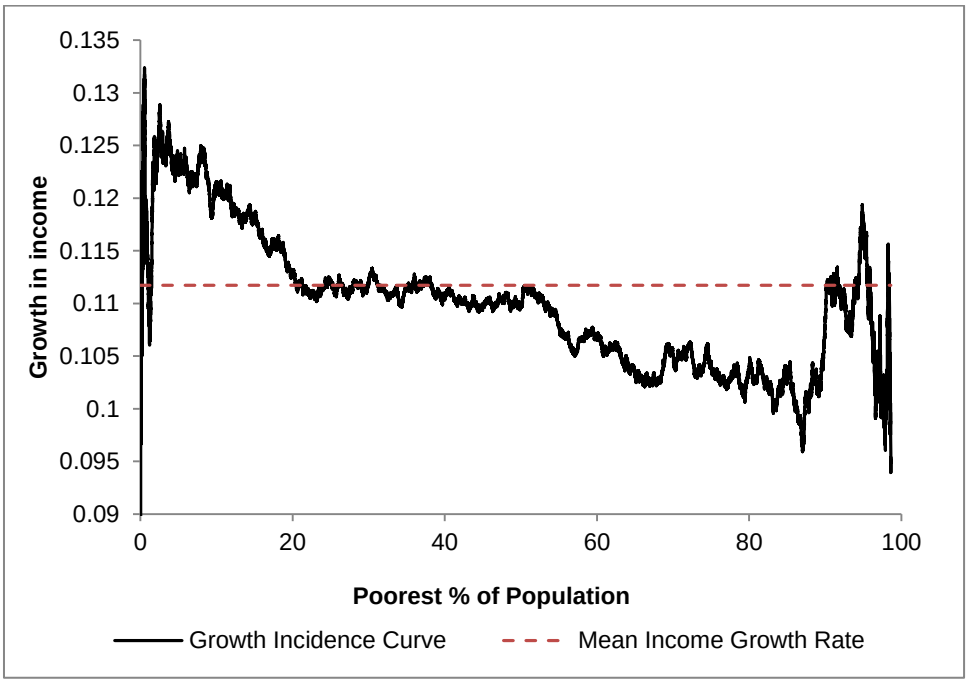
Source: Authors' calculations.

Figure 7: Growth Incidence Curve, India, 2000–2005



Source: Authors' calculations.

Figure 8: Growth Incidence Curve, India, 2005–2010



Source: Authors' calculations.

Overall, we cannot conclude that development policy in India during 1992–2010 was successful in reducing inequality and poverty. India was growing relatively slowly in the period 2000–2005. In terms of inequality, there is a slight increase over the entire period. Although the development process resulted in growth that reduced poverty, there were still over 377 million people in extreme poverty in 2010.

4.5 Inequality and Poverty in Indonesia

Indonesia is among the world's most populous countries, with a population of over 230 million in 2005. It is the largest economy in Southeast Asia with an estimated GDP (in PPP constant 2005 international dollars) of $0.932 trillion in 2010. The annual GDP growth rate was 5.7% in 2005 and 6.2% in 2010.[9] Indonesia is a country with rich natural resources that include crude oil, natural gas and mineral ores, relying to a large extent on oil exports. People in rural areas mostly engage in agriculture. During 1992–2010, Indonesia went through phases of political and economic turmoil. Indonesia was badly affected by the Asian financial crisis in 1997 which resulted in low economic growth, high unemployment, and increased poverty rates. The economy started to recover with positive growth rates after 2000, and after 2004 various economic reforms were introduced.

Table 9 presents inequality and poverty in Indonesia, and Table 10 reports Indonesian growth rates and the impact of growth on poverty reduction. The initial monthly mean income for Indonesia for 1992 is $43.58. This level is comparable with the PRC and India for the same year. It increases over the period to $83.31 in 2010. This level is higher than India but much lower than the PRC. Indonesia started with a low growth rate (Table 10) of 8.49% over the 8-year period between 1992 and 2000. This period was characterized by the region's financial crisis in 1997 and the country's economic

[9] http://databank.worldbank.org/data/views/variableselection/selectvariables.aspx?source=world-development-indicators#

and institutional reforms. For the following period, 2000–2005, the economy recovered from the crisis with a high growth rate of 59.15% before slowing down to 10.70% between 2005 and 2010.

Table 9: Inequality and Poverty in Indonesia

Indonesia		1992	2000	2005	2010
Mean		43.58	47.29	75.25	83.31
	Urban	51.09	56.19	88.80	90.20
	Rural	39.79	41.17	62.70	75.32
Gini		0.2979	0.3020	0.3576	0.3529
	Urban	0.3535	0.3489	0.3987	0.3805
	Rural	0.2605	0.2488	0.2963	0.3138
Head Count Ratio		0.5469	0.4864	0.2180	0.1619
	Urban	0.4737	0.4010	0.186	0.1636
	Rural	0.5839	0.5450	0.248	0.1598
Population (millions)		193.52	210.61	227.30	239.87
	Urban %	33.60	40.72	49.22	53.70
	Rural %	66.40	59.28	50.78	46.30
Number of Poor (millions)		106	102	50	39
	Urban	36	42	24	21
	Rural	70	61	25	18

Source: Authors' calculations.

Table 10: Growth and Pro-poor Growth in Indonesia

Indonesia		1992–2000	2000–2005	2005–2010
Growth rate		0.0849	0.5915	0.1070
	Urban	0.0999	0.2681	0.2658
	Rural	0.0347	0.3356	0.3698
Ravallion and Chen (2003) Index		0.0782	0.4037	0.0755
Kakwani and Pernia (2000) Index		1.4337	0.8051	0.8935
PEGR Index		0.1217	0.4762	0.0956
Growth Redistribution				
	Change in poverty (head count ratio)	0.0605	0.2684	0.0562
	Average growth effect	0.0441	0.3189	0.0598
	Average redistribution effect	0.0164	-0.0505	-0.0036

PEGR = poverty equivalent growth rate.

Source: Authors' calculations.

Initial inequality in 1992 was relatively low with a Gini coefficient of 0.2979. It then deteriorated over the years such that, in 2010, the Gini was 0.3529. Table 9 also reports urban and rural inequalities. For all years considered, inequality in urban areas was higher than in for rural areas. Between 1992 and 2000 inequality decreased slightly for both areas before increasing in 2005 and 2010. In general, there were upwards trends for both rural and urban inequalities between 1992 and 2010.

The national level of poverty started from a high level in 1992 with 54.69% of the population living in extreme poverty. By 2000, the level had decreased to 48.64%. From 2000, poverty decreased sharply to 21.80% and 16.19% in 2005 and 2010, respectively. These levels and trends in poverty also held for both rural and urban areas. Translating the headcount ratio into the number of poor, there were approximately a total of 106 million people in poverty in 1992, 102 million people in 2000, 50 million people in 2005, and 39 million people in 2010.

The last section of Table 10 presents the changes in the headcount ratios and the decompositions into the effects of growth and of redistributions on the changes. The change in poverty, as measured by the headcount ratio, can be explained largely by a growth effect. For the period 1992–2000, 4.41 percentage points of the change is explained by growth. The remaining 1.64 percentage points are explained by a redistribution that was in favor of the poor. During 2000–2005 and 2005–2010 the development process resulted in growth that was not redistributed in favor of the poor. With distribution neutrality, but the same growth rate, poverty should have decreased by 31.89 and 5.98 percentage points in 2000–2005 and 2005–2010, respectively. The effect of the redistribution offset the effect of growth during these periods.

Table 11 shows the relative shares of the poor and rich in Indonesia. There is a significant reduction in the share of the poorest 20% of the Indonesian population from 9.24% in 1992 to 7.65% in 2010, a drop of 17.2%. During the same period, the share of the top 5% increased from 15.64% in 1992 to 18.24% in 2010, an increase of 16.64%. Of particular note is the significant reduction in the share of the poorest 20% over the period 2000–2005, which is accompanied by a corresponding increase in the share of the top 5% during the same period. Changes in these shares are reflected in the increase in poverty of 5.05% due to redistributional effects reported in Table 10.

Table 11: Income Shares for Selected Population Groups in Indonesia

Indonesia		**Income Shares**			
		1992	2000	2005	2010
Bottom	1%	0.29%	0.29%	0.23%	0.21%
	5%	1.79%	1.78%	1.48%	1.38%
	10%	4.02%	3.99%	3.36%	3.21%
	20%	9.24%	9.19%	7.86%	7.65%
Top	20%	39.48%	39.87%	44.29%	43.53%
	10%	24.97%	25.43%	29.39%	28.38%
	5%	15.64%	16.03%	19.27%	18.24%

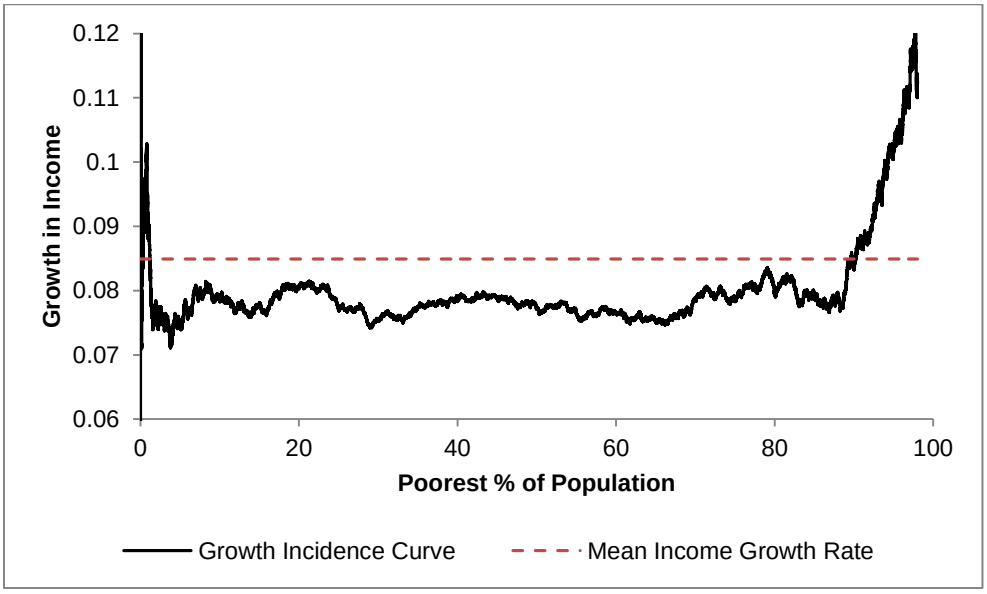
Source: Authors' calculations.

In terms of the impact of growth on poverty, Table 10 presents the three pro-poor indices: the RC, KP, and $PEGR$. It is found that all indices are positive for all periods considered, suggesting that growth was absolutely pro-poor during 1992–2010. In terms of the relative perspective, the $RC - g$ measure is negative for the three periods suggesting that growth was not relatively pro-poor. This conclusion also holds for $KP - 1$ and $PEGR - g$ for the periods 2000–2005 and 2005–2010. However, for 1992–2000, $KP - 1$ and $PEGR - g$ suggest that growth was relatively pro-poor.

Figures 9–11 present the growth incidence curves for the three periods considered. The curves for 1992–2000 and 2000–2005 are entirely positive for all the population but they are not above the growth lines until we reach 80%–90% of the population. This suggests that growth during 1992–2000 and 2000–2005 was pro-poor in the absolute

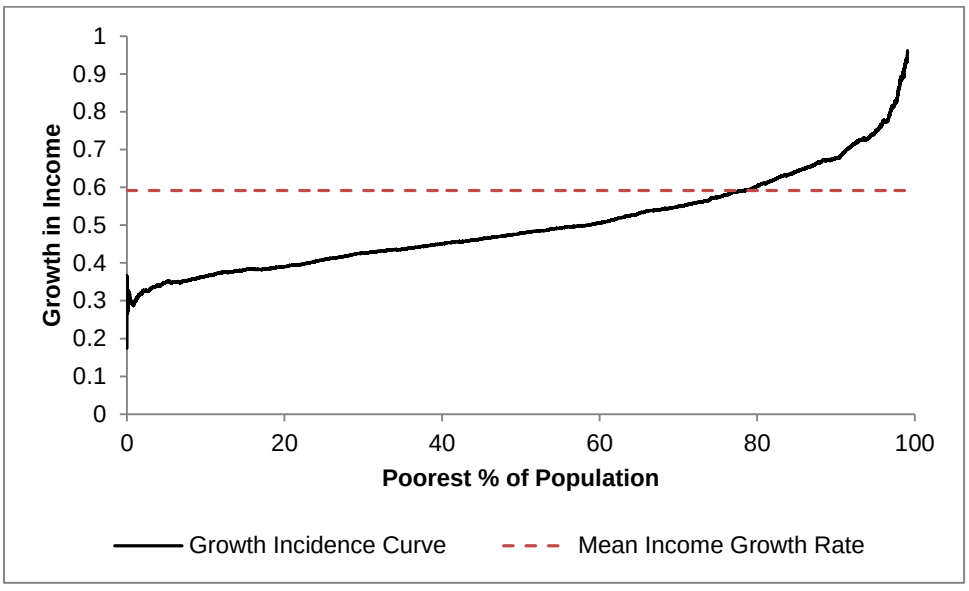
but not relative perspective. Between 2005 and 2010, where the headcount ratios are 0.218 and 0.1619, most of the curve is positive, but it is below the growth line up to approximately 20% of the poorest population. Growth during this period was pro-poor in the absolute sense for the poor population above approximately 0.566%. The extreme poor below 0.566% did not benefit at all from growth.

Figure 9: Growth Incidence Curve, Indonesia, 1992–2000



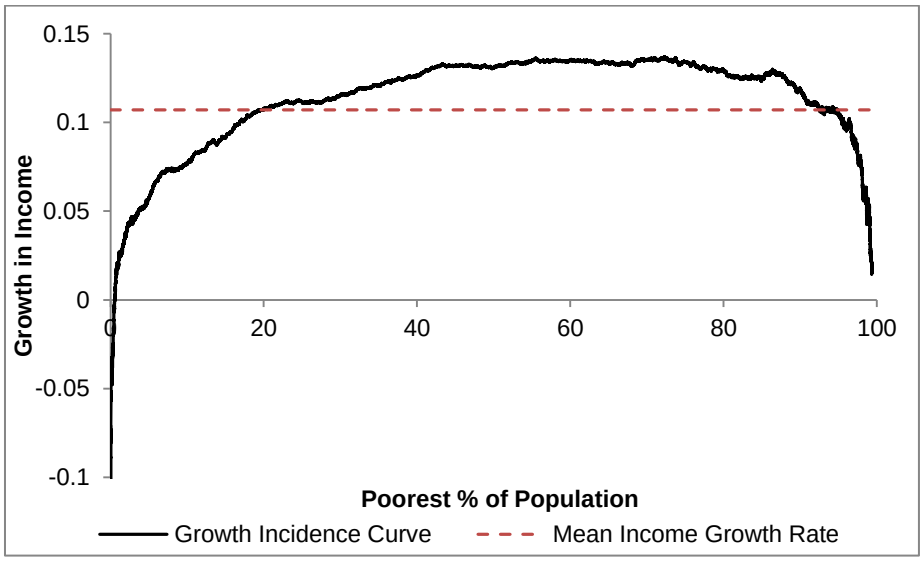
Source: Authors' calculations.

Figure 10: Growth Incidence Curve, Indonesia, 2000–2005



Source: Authors' calculations.

Figure 11: Growth Incidence Curve, Indonesia, 2005–2010



Source: Authors' calculations.

Overall, for the period 1992–2000, which includes the Asian financial crisis, the Indonesian economy grew at a very low rate with a high poverty level. By 2005 the economy had recovered; the period between 2000 and 2005 saw a high growth rate and a large reduction in poverty. The international oil price rise in 2005 had a big impact on the Indonesian economy. This slowed the growth rate in 2005–2010, however there was a very small impact on inequality during this period.

5. CONCLUSIONS

Using available data in the form of population and income shares we estimated beta-2 income distributions for most of the countries in Asia. These country distributions are combined into regional income distributions from which we can compute inequality in Asia for 1992, 2000, and 2005. It was found that inequality decreased over time—a result of the decreasing inequality between countries in Asia. We extended the analysis to include 2010, and examined further the levels and trends of poverty in Asia as a whole and for each of the developing countries. We found that there was some reduction in poverty over time in relative and absolute terms for the whole of Asia and for most of the developing countries. Finally, we focused on poverty analysis for the three big countries in Asia: the PRC, India, and Indonesia. Summary findings for each country are as follows.

The PRC, with a fast growing economy, has been managing well to direct growth to alleviate poverty. There was pro-poor growth from an absolute perspective but not in a relative sense. The income of the rich seems to grow faster than that of the poor. This has resulted in increasing levels of inequality over time.

From 1992 to 2010, average income in India did not grow strongly enough to bring many of the poor out of poverty. There was some reduction in poverty, but by 2010 33.12% of the population was still in extreme poverty. During 2000–2010, the positive effect of growth on poverty reduction was offset by a negative effect of redistribution. This suggests that growth did not trickle down far enough and, as a result, there was an increase in inequality. It is worth noting that growth during the period 2000–2005 was not pro-poor in the absolute or relative sense.

For Indonesia, average income grew very rapidly during 2000–2005. This high growth rate lifted many people out of poverty, with approximately a 27 percentage point reduction by 2005. The successful development policy during this time did not continue to the next period, 2005–2010, where the growth rate and the reduction in extreme poverty were relatively low. Despite the reduction in poverty, from 2000 onwards growth has not been pro-poor in a relative sense. The increase in inequality between 2000 and 2005 confirms this result.

The main focus of the paper has been on the measurement of growth and the redistribution effects on poverty and on the results for the PRC, India, and Indonesia which are the three largest and most populous countries in the Asian region. The analysis conducted within the limited timeframe has necessarily focused on poverty at the national level. From a policy perspective it is important to examine poverty incidence at the regional or provincial level as the growth performance tends to be uneven across different regions. Distribution patterns and changes in income shares of different population subgroups can be significantly different across different provinces. Similarly, rates of urbanization at the national and regional level may have a significant influence on income levels and on the distributional characteristics which in turn may manifest in different levels of poverty incidence and pro-poor growth patterns. The paper demonstrates the feasibility of utilizing aggregated income distribution data in modeling and distilling information necessary to assess pro-poorness of growth observed in different countries. The modeling tools described in the paper will hopefully encourage empirical modeling and analysis of income distributions at the national and regional levels and over a long period time which can provide useful input into policy formulation to alleviate poverty in the Asian economies.

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