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Growth, Poverty, and Inequality

A Regional Panel for Bangladesh

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Empirical work in Bangladesh shows that growth reduces poverty in both urban and rural areas — and is associated with rising inequality only in urban areas. It appears that promoting growth in rural areas rather than urban areas would reduce poverty more.

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Summary findings

Most empirical work on how growth affects poverty and inequality has been based on international panel data sets. Panels can also be used within a country, if the analysis is carried out at the regional level.

Wodon does this for Bangladesh, where regional panel estimates indicate that growth reduces poverty in both urban and rural areas. Growth is associated with rising inequality only in urban areas.

Simulations based on these estimates indicate how much poverty reduction could increase in the next 10 years if growth were promoted in rural areas rather than urban areas.

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Growth, Poverty, and Inequality: A Regional Panel for Bangladesh

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I Introduction

The relationships between growth, inequality, and poverty in developing countries have been discussed at some length. The standard view is that broad-based economic growth is poverty reducing[2]. Yet, growth may also be associated with rising inequality, which then tends to offset part of the gains from growth for the poor. This point was first made by Kuznets (1955) who suggested that rural to urban migration would result in an inverted-U relationship between growth and inequality since urban areas have not only higher standards of living, but also higher inequality. Kuznets' views or extensions thereof remain present in the literature today (Anand and Kanbur, 1993; Watkins, 1995; Ram, 1995), even though they have been challenged or at least qualified recently (Papanek and Kyn, 1986; Bourguignon and Morisson, 1990; World Bank, 1990; Fields, 1989; Chen and Ravallion, 1997; Bruno et al., 1996)[3].

While the theoretical arguments for explaining the links between growth, inequality, and poverty have been refined over time, most of the empirical work is still based on international panel data with growth, poverty, and inequality measures for a large number of countries at a few points in time. Empirical studies focusing on a single country have relied on somewhat less satisfying methodologies. First, researchers using single surveys have estimated the point elasticity of poverty to growth and inequality using formulae provided by Kakwani (1993) and Kanbur (1987). Although useful for short term comparative statics, these elasticities say nothing about the longer term relationships between growth, poverty, and inequality. Second, researchers have decomposed changes in poverty measures

[2] The World Bank's (1990) World Development Report on poverty recommends growth as a privileged path for poverty alleviation, provided it is accompanied by policies to promote access to education, health and social services, and also by the provision of safety nets, especially during adjustment periods.

[3] For example, as noted by Bourguignon and Morisson (1990) and Papanek and Kyn (1986), many factors other than growth per se may affect inequality. These factors include the education of the labor force (a progressively better educated labor force tends to raise inequality), the structure of exports (which may or may not be associated with rents - mineral exports is a case in point), and the presence of trade distortion (which tend to increase inequality while free trade favors the abundant factor which is labor in developing countries). When these factors are omitted, the link between growth and inequality may be spurious.

over time into changes due to growth and inequality (Datt and Ravallion, 1992; Ravallion and Sen, 1996; Wodon, 1995; Essama-Nssah, 1997). This is potentially more interesting, but it does rarely provide sufficient evidence for generalization since only a few observations are typically available using these decompositions (N-1 observations at the country level for N surveys).

Two of the rare countries for which time series data have been available for analyzing the relationships between growth, inequality, and poverty over time are the United States and India. Yet, panel data techniques could be used for many other countries with only a few surveys provided one is willing to carry the analysis at the regional rather than national level. This is shown in this paper using five cross-sectional surveys from Bangladesh spanning the years 1983 to 1996. By constructing a regional panel of consumption, poverty and inequality measures for fourteen areas and the five survey years, we are able to analyze not only the impact of growth and inequality on poverty, but also the impact of growth on inequality. The results differ strikingly between urban and rural areas, and they can be used by policy makers to promote faster poverty reduction. Section 2 of the paper describes our method for estimating poverty lines and obtaining measures of consumption, poverty, and inequality in real rather than nominal terms. Section 3 shows the insights and limits of standard methods of analysis used for empirical work on single countries. Section 4 analyzes the relationships between growth, inequality, and poverty using a regional panel. By combining the panel estimates of section 4 with the output of a consistent macro-economic model, section 5 gives simulations of the reduction in poverty which could be achieved under alternative sectoral growth patterns over the next ten years. A conclusion follows.

II Poverty lines and welfare measures

II.1 Regional poverty lines

To analyze the relationship between growth, inequality, and poverty one needs first to obtain good measures of these variables. Poverty lines must be estimated for obtaining poverty measures. In a country like Bangladesh where half the population is poor, poverty lines also represent valid price indices faced by the population. Hence, they can also be used to estimate real rather than nominal consumption and inequality. Consumption will be the preferred indicator of well-being because it incorporates the life cycle hypothesis, and because it is measured more precisely. Therefore, all measures of poverty, growth and inequality in this paper will be based on consumption rather than income, and they are all computed using successive rounds of the nationally representative Household Expenditure Surveys (HES)

Regional poverty lines were estimated according to the cost of basic needs method. Details on the implementation of the method can be found in Wodon (1997), hence the exposition will be brief here. Three steps were followed for the estimation of the poverty lines. First, the country was divided into fourteen geographical areas. The list of areas and their sample size for the various years is given in Table A1 in appendix. A food bundle representative of actual consumption patterns in the country and providing 2,122 kcal per day and per person was chosen. The bundle is given in Table A3, and the same bundle applies to all areas. In each area, the price of each item in the food bundle was estimated, using regressions to control for the impact of household characteristics on the quality of the food consumed. The resulting prices for 1995-96 by area are given in Table A3. Given the estimates of the food prices by area, the cost of the food bundle (the food poverty line denoted by Z_F in Table A4) was computed in each area. The second step consisted in computing a cost of basic non-food needs. The non-food expenditures of households whose food or total consumption is equal to their area food poverty line were estimated as, respectively, lower and upper bounds for the cost of non-food needs. Third, lower and upper poverty lines were obtained by summing up the food poverty line with respectively the lower and upper allowance for non-food consumption. The resulting poverty lines by area[4], denoted by Z_L and Z_U, are given in Table A4.

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[4] There are minor differences in the poverty lines appearing in Table A3 and those computed for the years 1983-84 to 1991-92 by Wodon (1997). This is because the composition of the food bundle was changed slightly as well as

II.2 Measures of poverty, consumption, and inequality

Three poverty measures of the FGT (Foster, Greer, and Thorbecke, 1984) class are used, and each of them is computed for both the lower and upper regional poverty lines. The incidence of poverty, which is simply the percentage of the population living in households with a per capita consumption below the poverty line, is measured by the headcount index (denoted by HL for the lower poverty line and HU for the upper poverty lines). The depth of poverty is measured by the poverty gap index (denoted by PGL or PGU), which estimates the average distance separating the poor from the poverty line as a proportion of that line (the mean is taken over the whole sample with a zero distance allocated to the households who are not poor.) The severity of poverty is measured by the squared poverty gap index (denoted by SPGL or SPGU), which takes into account not only the distance separating the poor from the poverty line, but also the inequality among the poor. Denoting by C_i the nominal per capita consumption for household i, by N the population size, by w_i the weight for household i (equal to the household size times the regional expansion factor, the sum of the weights being N), and by Z the set of regional poverty lines, the three poverty measures are obtained for values of θ equal to 0, 1, and 2 in:

$$P_\theta = \Sigma_{Ci \leq Z} (w_i/N) [(Z - C_i)/Z]^\theta \qquad (1)$$

Two additional measures of well-being are used: the welfare ratios (denoted by WL or WU) and the Gini indices (denoted by GL or GU). Welfare ratios are simply mean consumption levels normalized by the poverty lines so that differences in costs of living between areas are taken into account:

$$W = \Sigma_i (w_i /N) (C_i /Z) \qquad (2)$$

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the transformation table giving caloric intake from food consumption. The differences in poverty lines result in fairly small differences in poverty measures which are not statistically significant.

If the mean welfare ratio is equal to one, it indicates that on average households have consumption at the level of the poverty line. Growth is then measured by changes in the welfare ratios over time. Finally, Gini indices are also computed using normalized consumption levels, such that:

$$G = 2 \text{ cov } (C_i / Z, F_i) / W \qquad (3)$$

where F_i is the normalized rank (taking a value between zero and one) of household i in the distribution of consumption, and the covariance is computed using the household weights. Note that at the area level, the Gini index computed with the lower poverty line (GL) is equal to the Gini with the upper poverty line (GU) since using one or the other regional poverty line just scales up all consumption measures without affecting inequality. However, at the national, urban, and rural levels, the Gini indices do depend on the poverty lines used since the poverty lines and the consumption distributions are not equal between areas.

II.3 Results

Table 1 gives poverty measures at the national, urban, and rural levels (measures for the fourteen geographical areas are given in appendix). We find decreasing poverty in the early 1980's, increasing poverty in the late 1980's and early 1990's, and again decreasing poverty thereafter (the results are similar with both sets of poverty lines). Broadly speaking, these results are consistent with previous research[5].

Table 2 provides welfare ratios and Gini indices of inequality. The trends for welfare ratios are similar to those observed for poverty, which is not surprising since welfare ratios represent mean levels of consumption. Nationally, the welfare ratios increased from 1983-84 to 1985-96, then decreased from

[5] According to Rahman and Haque (1988), poverty decreased from the mid 1970's to the mid 1980's. For the later period, estimates based on group data for the Household Expenditure Surveys published by the Bangladesh Bureau of Statistics indicate that in both rural and urban areas, poverty increased in the late 1980's and early 1990's (Khundker, Mahmud, Sen, and Ahmed, 1994; Hossain and Sen, 1992). This was confirmed using the unit level data of the surveys up to 1991-92 (Wodon, 1995, 1997). Additional work based on a smaller survey conducted by the Bangladesh Institute of Development Studies within rural areas also show an increase in poverty in the late 1980s, followed by a decrease between 1990 and 1994 (Rahman and Hossain, 1995; Rahman, Hossein, and Sen, 1996).

1985-86 to 1991-92, but increased sharply in 1995-96. The trend in inequality is somewhat different. Apart from a slight decrease in 1991-92, inequality has been on the rise throughout the period. Note that inequality is much higher in urban than in rural areas, especially in 1995-96. Another interesting result is that the performance of various geographical areas has been uneven over time. For example, as can be seen in the appendix, the headcount index of poverty with the lower poverty line decreased in 10 areas from 1983-84 to 1995-96 and increased in four areas. Some of the changes are very large while others are small. We will not attempt to explain the sources of geographical differences in poverty reduction, but we will use these differences for estimating the relationships between growth, poverty, and inequality.

III Standard methods of analysis

III.1 Theoretical derivation of the elasticities of poverty to growth and inequality

Kakwani (1993; see also Kanbur, 1987) has derived formulae to assess the impact of growth and inequality on poverty using a single cross-section of data. Denoting by f(Z) the probability density of consumption at the poverty line, and by θ the order of the poverty measure of the FGT class, the point elasticity of poverty to growth holding inequality constant, which is denoted by η_θ, can be estimated as:

$$\eta_\theta = - Z\, f(Z)/P_0 \qquad \text{for } \theta = 0$$

$$= \theta\, (1 - P_{\theta-1} / P_\theta) \quad \text{for } \theta \geq 0 \qquad (4)$$

These elasticities are always negative since P_θ is monotonically decreasing in θ. To compute the elasticity η_0 for the headcount, an estimate of f(Z) is needed. This estimate can be obtained by computing $f(Z) = 1/[\mu L''(s)]$ where L"(s) is the second derivative of the Lorenz curve with respect to the share of total consumption enjoyed by the poorest share of the population s, and μ is mean consumption. L"(s) can itself be obtained by fitting the curve $L(s) = s - as^\alpha(1-s)^\beta$ where a, α, and β are estimated. This can be done by regressing log [s - L(s)] on a constant, log s, and log (1-s). This was done for all poverty measures at the national, urban, rural, and regional level. Note that there is a sign typo in the value of L"(s) in terms of a, α, and β as given in Kakwani (1993). The correct value of L"(s) is given as follows:

$$L''(s) = as^{\alpha}(1-s)^{\beta}\left[\frac{\alpha(1-\alpha)}{s^2}+\frac{2\alpha\beta}{s(1-s)}+\frac{\beta(1-\beta)}{(1-s)^2}\right] \qquad (5)$$

What about the impact of changes in inequality on poverty? Assuming that the Lorenz curve shifts in such a way that $L^*(s) = L(s) - \lambda[s - L(s)]$, with a value of $\lambda = 0.01$ corresponding to a one percent increase in the Gini index, the elasticity of P_θ with respect to a change in inequality, denoted by χ_θ, is:

$$\chi_\theta = \eta_0 (Z-\mu)/Z \qquad \text{for } \theta = 0$$

$$= \eta_\theta + (\theta\mu P_{\theta-1})/(ZP_\theta) \qquad \text{for } \theta \geq 0 \qquad (6)$$

Given (4) and (5), a measure of the trade-off for poverty reduction between higher growth and higher inequality can be obtained by asking what should be the percentage increase in mean consumption to compensate for an increase in the Gini index of one percent. The resulting marginal proportional rate of substitution (MPRS) is given by:

$$\text{MPRS} = - \chi_\theta / \eta_\theta \qquad (7)$$

III.2 Empirical decomposition of changes in poverty measures over time

Kakwani's results are elegant, but they rely on assumptions which may not be valid for the data at hand (such as the parametrization of the Lorenz curve and the nature of its shift). They are also valid for marginal changes only in growth and inequality. To account for the contribution of growth and changes in inequality to actual discrete changes in poverty over time, a decomposition proposed by Datt and Ravallion (1992) can be used instead. Write poverty P^t at time t as a function of mean income μ^t and the Lorenz curve π^t at time t, such that $P^t = P(\mu^t, \pi^t)$. The change in poverty between two dates due to the change in mean consumption holding the Lorenz curve constant is the growth impact. The impact of inequality or redistribution results from a change in the Lorenz curve, holding mean consumption constant. There is typically a residual R in this decomposition, which is therefore written as:

$$P(\mu^{t2}, \pi^{t2})\text{-}P(\mu^{t1}, \pi^{t1}) = [P(\mu^{t2}, \pi^{t1})\text{-}P(\mu^{t1}, \pi^{t1})] + [P(\mu^{t1}, \pi^{t2})\text{-}P(\mu^{t1}, \pi^{t1})] + R \quad (8)$$

Thus the first two terms in (8) are the growth and inequality components. Below, we will present results in a slightly different way by giving the values of, respectively, $P(\mu^{t+1}, \pi^{t})$ and $P(\mu^{t}, \pi^{t+1})$.

III.3 Results

The national, rural, and urban point elasticities of poverty to growth and inequality obtained using Kakwani's formulae in (4) and (6) and the MPRS trade-off in (7) are given for the survey year 1995-96 in Table 3 (see the appendix for estimates of these elasticities at the regional level). Table 4 gives the results of the decomposition (8) at the national, urban, and rural levels. The key findings are as follows:

- Elasticity of poverty to growth: In general, elasticities are lower with the upper than the lower poverty lines, but the impact of growth on poverty tends to be similar because the poverty measures are higher with the upper poverty lines. For example, at the national level, a growth in the mean welfare ratio of one percent would generate a reduction in the headcount index of respectively 2.14 and 1.47 percent with the lower and upper poverty lines. This would correspond to a drop in the share of the population below the poverty line of 0.76 point (2.14 percent of the headcount of 35.55) with the lower poverty line, and 0.78 point with the upper poverty line (1.47 percent of 53.08). Note also that the elasticities are larger in urban areas than in rural areas with the lower poverty lines, but they are similar with the upper poverty lines. At the area level, elasticities differ substantially by area (see appendix), especially with the lower poverty lines where they range for the headcount index from -1.81 in area 14 (rural Bogra, Rangpur, and Dinajpur) to -5.66 in area 5 (SMA of Chittagong).

- Elasticity of poverty to inequality and MPRS: In most cases, Gini elasticities are lower than growth elasticities. At the national level, a one percent increase in the Gini generates respectively 0.98 and 0.24 percent increases in poverty with the lower and upper poverty lines. Contrary to what was observed with growth, the Gini elasticities tend to be lower in urban than in rural areas. Finally, the variance in Gini elasticities by area is even larger than what was observed with growth elasticities[6]. The marginal proportionate rates of substitution given in the last six columns of Table 3 indicate that in urban areas, a relatively modest level of growth (0.29 percent for the headcount index with the lower poverty line) suffices to compensate for a one percent increase in the Gini. The required level of growth in rural areas is much higher (1.32 percent). In both urban and rural areas, the levels of growth required to compensate for more inequality are larger for higher order poverty measures.
- Decompositions of changes in poverty: Table 4 is based on the results of the decomposition (8). The Table gives the poverty measures which would have been obtained with growth without changes in inequality, or with changes in inequality without growth from 1983-84 onwards. In other words, four cumulative decompositions were estimated (from 1983-84 to, respectively, 1985-86, 1988-89, 1991-92, and 1995-96), and the growth and inequality components of these decompositions were added to the poverty measures for 1983-84 to obtain the results in the Table. Nationally (Figure 1), without changes in inequality, the headcount indices with the lower and upper poverty lines would have dropped below the 30 and 50 percent levels in 1995-96. In rural and urban areas, using the lower poverty lines for example, poverty would have been respectively four and seven percentage points

[6] Note that with the upper poverty lines, a few Gini elasticities are negative at the area level for the headcount index, which is obtained in equation (6) when the mean level of consumption is below the poverty line (given that growth elasticities are positive). This counter-intuitive result is due in part to the special assumptions made as to the changes in the Lorenz curve used to compute these elasticities.

lower at the end of the period without the increase in inequality. Alternatively, without growth, the headcount would have been eight and twenty points higher in respectively rural and urban areas. Had there been no growth in urban areas, and no increase in inequality in rural areas, the headcounts would have converged in the two sectors to 35 (rural) and 37 (urban) percentage points using the lower poverty lines. The same applies with the upper lines, but with headcounts twenty points higher.

What can be concluded from the above results? As can be seen from Table 4 (and Figure 1), the growth only and inequality only scenarios move in opposite directions. This indicates that positive (negative) growth tends to be associated with rising (decreasing) inequality. But at this stage, this remains an impressionistic result without a firm analytical grasp as to the elasticity of inequality to growth. Moreover, a cursory look at Table 4 would indicate that the relationship between growth and inequality is similar in urban and rural areas. If this were indeed the case, combining this finding with the results based on Kakwani's formulaes would suggest that poverty is likely to be reduced more through urban than through rural growth (compare the two MPRS). In fact, it is exactly the reverse which is true: rural growth appears to be more poverty reducing than urban growth. This is because of the correlation between growth and inequality is much lower in the rural than in the urban sector, as we shall now see.

IV Regional panel estimates

IV.1 The relationship between growth and inequality

The techniques illustrated in the previous sections do not provide us with a clear picture of the long term relationships between growth, poverty, and inequality. The key missing piece is an estimate of the correlation between growth and inequality which cannot be readily estimated with Kakwani's formulae. But it can be found using our regional panel by estimating the following regression:

$$\text{Log } G_{kt} = \alpha + \beta \text{ Log } W_{kt} + \alpha_k + \varepsilon_{kt} \quad (9)$$

where G_{kt} is the Gini index for area k in period t, W_{kt} is the mean level of consumption (welfare ratio) for that area at that time, α_k are area fixed or random effects, and ε_{kt} are error terms. Given the log-log specification, the parameter β directly provides the elasticity of inequality to growth (this regression does not pretend to indicate causality; it simply measures a correlation observed thanks to the panel model).

The results for the national (70 observations), rural (40 observations) and urban (30 observations) samples with either the lower or upper poverty lines[7] are given in Table 5 and they are illustrated in Figure 3, 5, and 7 for the headcount with the lower poverty lines. Nationally, there is a positive correlation between growth and inequality. A one percentage point increase in the mean levels of consumption in an area increases the Gini of that area by 0.27 (upper poverty lines) to 0.38 (lower poverty lines) percentage points. These coefficients are significantly different from zero. A Hausman specification test does not reject (at the 5 percent level) the null hypothesis that the coefficients of the fixed and random effects models are the same (the test gives the same result for the urban and rural samples taken separately). Yet, in our panel, the correlation between growth and inequality is entirely due to urban areas. When splitting the sample, the estimated parameters for rural areas are not statistically different from zero (flat slope on Figure 5), while the estimated parameters for urban areas are larger than the national estimates. In Bangladesh over the period 1983-1996, there has been no systematic link between growth and inequality in rural areas, while there has been such a (positive) link in urban areas.

IV.2 Gross and net impact of growth on poverty

The elasticity β of inequality to growth is a key component of the difference between the gross (holding inequality constant) and net (accounting for changing inequality) impacts of growth on poverty.

[7] Although the Ginis computed with the lower and upper poverty lines are the same within each area, they can be regressed on the welfare ratios computed with either the lower or the upper poverty lines, which differ by area. Therefore, two regressions must be estimated at the national level, and for urban and rural areas as well.

Denoting by γ and λ the gross and net elasticities of poverty to growth, by β the elasticity of inequality to growth, and by δ the elasticity of poverty to inequality (controlling for growth), one has:

$$\lambda = \gamma + \beta\delta \qquad (10)$$

To find the gross elasticity of poverty to growth and the elasticity of poverty to inequality controlling for growth, we use:

$$\text{Log } P_{kt} = \varpi + \gamma \text{ Log } W_{kt} + \delta \text{ Log } G_{kt} + \varpi_k + \nu_{kt} \qquad (11)$$

where P_{kt} is poverty for area k in period t, W_{kt} and G_{kt} are defined as before, and ϖ_k are fixed or random effects. Equation (11) was also estimated first for all areas, and next for rural and urban areas separately. In a very large majority of cases, Hausman specification tests could not reject the null hypothesis of the equality of the parameter estimates with the fixed and random effects models.

Nationally, Table 6 indicates that holding inequality constant, a one percent growth in mean per capita consumption results in a 2.42 percent (fixed effects model) to 2.61 percent (random effects model) drop in the headcount index of poverty when using the lower poverty line, or in a smaller 1.43 to 1.63 percent drop when using the upper poverty line. The impact of growth on higher order poverty measures is larger. This indicates that growth does not simply enable those who are close to the poverty line to emerge from poverty: growth does create benefits for the poorest of the poor. On the other hand, rising inequality increases poverty (as expected). A one point increase in the Gini increases the headcount by 1.28 to 1.41 percentage points with the lower poverty lines (0.52 to 0.53 percentage points with the upper poverty lines). Again, the impact of a change in the Gini is larger on higher order poverty measures, indicating that when inequality rises, the poorest of the poor are affected, and not only those close to the poverty line. When splitting the urban and rural samples, one finds slightly higher elasticities of poverty to growth (in absolute values) and much larger elasticities of poverty to inequality in urban than in rural areas. While the first result does not differ from that obtained using Kakwani's formulae, the second does, so that marginal proportional rates of substitution obtained using (11) would differ from Kakwani's.

What is the net impact of growth on poverty? It can be found by using (10) or by estimating:

$$\text{Log } P_{kt} = \varphi + \lambda \text{ Log } W_{kt} + \varphi_k + \eta_{kt} \quad (12)$$

The results are still given in Table 6 and they are illustrated in Figure 2, 4, and 6 for the headcount with the lower poverty lines. Nationally, when factoring in the impact of growth on inequality, a one percentage point increase in growth reduces the headcount index by 1.98 to 2.03 percentage points with the lower poverty lines, and 1.29 to 1.37 points with the upper poverty lines. The impact of growth on higher order poverty measures is similarly reduced as compared to what was obtained holding inequality constant. About one fourth of the potential gains from growth for poverty is lost due to higher inequality.

While the results for the headcount index are similar in urban and rural areas, they differ for higher order poverty measures which are more sensitive to inequality. Consider the squared poverty gap with the upper poverty lines. The net elasticity of poverty to growth obtained with the fixed and random effects models in urban areas are -2.51 and -2.53, much below the gross elasticities at -3.53 and -3.52. In rural areas the net elasticities, at -3.50 and -3.59, are virtually equal to the gross elasticities, at -3.62 with the two models. This confirms that rural growth reduces inequality-sensitive poverty measures more than urban growth simply because growth is more associated with inequality in urban than in rural areas.

IV.3 Possibilities for further work

The regressions used above remain descriptive in that we did not attempt to investigate the potentially complex relationships between past, current, and future growth, inequality, and poverty. Completing such an investigation would be beyond the scope of this paper, but a few potential topics can be highlighted in order to show the rich possibilities provided by analyses using regional panel data.

For example, one could try to estimate the impact of past inequality (at time t-1) on how the poor may benefit from growth (at time t)? As noted by Ravallion (1997), one of the reasons why inequality may reduce the prospects of the poor of escaping poverty through growth is that the higher the initial inequality, the lower the share of the poor in the benefits of growth. Imagine that a single person has all the resources in an area. Then, whatever the growth, poverty will never be reduced through growth. More generally, the higher the inequality, the less elastic poverty will be to economic growth for a large class of poverty measures (but in a recession, the poor will be less affected if the level of inequality is higher). To test this argument, Ravallion proposed the restricted form $r = \beta\,(1\text{-}IG)g$ where r is the rate of poverty reduction for the area from t-1 to t, IG is the initial Gini index at time t-1, g is the rate of growth between t-1 and t, and β is a parameter to be estimated. Using a panel for 23 countries with 41 spells, Ravallion tested this specification against an ad hoc encompassing model, and accepted the restricted form. We replicated this estimation with our regional panel. The results proved highly sensitive to the specification of the encompassing model, and in most cases, we had to reject the Ravallion's hypothesis that what matters for poverty reduction is the rate of growth corrected for the extent of initial inequality.

Another reason why initial inequality (or poverty) may matter for future poverty reduction is known as the induced-growth argument, according to which higher initial inequality (or poverty) may result in lower subsequent growth, and thereby in a smaller rate of poverty reduction. The negative impact of inequality (or poverty) on growth may result from various factors (Persson and Tabellini, 1994; Alesina and Rodrik, 1994, Clarke, 1995, Deininger and Squire, 1996). Economic distortions hampering growth may result from the redistributive policies implemented to reduce inequality (or poverty) for political economy considerations. Or access to credit may be concentrated in the hands of privileged categories, thereby preventing the poor to invest. To test for these hypotheses, one would use growth as the dependent variable, and include past levels of inequality (and poverty) as right-hand side variables. As for the impact of growth on inequality however, one would have to be careful in that many factors other than poverty and inequality may affect growth (these factors may include, for example, positive externalities of education and infrastructure, or a negative impact from trade distortions).

V Sectoral Growth Patterns and Future Poverty Reduction

V.1 Framework for the simulations

The findings of the previous sections can be used to inform policy. By combining the regional panel estimates of the net elasticity of poverty to growth with a consistent macroeconomic model for Bangladesh, we can simulate future trends in poverty. Denote GDP by Y, the average propensity to consume by c, population by N, and the net elasticity of poverty to growth in average consumption by λ (as before). Then, the impact of GDP value added growth on poverty in any of the two sectors (urban or rural) depends on four parameters: the rate of sectoral GDP growth, the rate of sectoral population growth, the change over time in the share of sectoral GDP used for consumption by households in the sector, and the sectoral elasticity of poverty to sectoral consumption growth. For each sector:

$$\frac{d\log P}{P} = \lambda\left[\frac{d\ln Y}{Y} + \frac{d\ln c}{c} - \frac{d\ln N}{N}\right] \qquad (13)$$

The term within brackets in (13) is the growth in per capita consumption, that is the sum of the growth in the share of income which is consumed and the growth of income per capita. The percentage change in poverty is obtained by multiplying the percentage change in per capita consumption by the elasticity of poverty to consumption growth. Using changing sectoral population shares over time to reflect the differentiated growth patterns by sector, we can then simulate changes in national poverty following changes in sectoral growth, consumption, and population. This is done below with three simulations: a base case scenario, a higher growth scenario through additional growth in urban areas, and a higher growth scenario with more growth in rural areas. The simulations are not intended to be precise forecasts since our framework is much too basic for that. The objective is rather to illustrate trade-off and policy choices. Given the differentiated impact of growth on inequality in rural and urban areas, yielding higher elasticities of poverty to growth in rural areas, rural growth should reduce poverty more than urban growth, at least for the poverty gap and even more so for the distribution sensitive squared poverty gap. The question is: just how much difference do sectoral growth patterns make for poverty reduction?

To promote GDP growth, various policies are needed, including steps to increase investments. Investments may be financed nationally or internationally. If financing come from national resources, the share of GDP allocated to consumption must decrease, so that the short term impact of growth on poverty will be reduced. Nationals would essentially give up current consumption (and poverty reduction) for future benefits. By contrast, if investments are financed internationally, national consumption as a share of GDP need not decrease, and the immediate impact of GDP growth on poverty will be larger (but debts will have to be repaid at a latter stage). Since at least part of the investments necessary for higher national growth will need to be financed through private national savings, the analysis must include a lower propensity to consume in the two higher growth scenarios, so that part of the benefits of growth for poverty reduction will be lost in the short run. At the extreme, higher growth may not imply any gain in poverty reduction over the planning horizon (but of course, in the long run, all benefits would be reaped). For the three scenarios, the World Bank's RMSM-X consistency macroeconomic model for Bangladesh was used to estimate how much investment will be needed to achieve various levels of growth, and to allocate the necessary investment levels to private nationals, the government, and the rest of the world. The RMSM-X model will not be not discussed in details here: only basic assumptions will be outlined[8].

[8] Using a Leontief-type production function in which labor is abundant and capital is rationed, RMSM-X assumes a relatively stable relationship between current investments and future GDP growth. The model also includes detailed monetary, budgetary, trade, pricing, and debt information. The assumptions and economic reasoning behind the RMSM-X model are outlined in Easterly (1989) and Khan, Montiel, and Haque (1990).

V.2 Base case scenario

The base case scenario represents a likely macroeconomic outcome for Bangladesh in the years ahead according to the most recent Country Assistance Strategy prepared by the World Bank (1988a) for the country. The national rate of GDP growth is expected to increase progressively, reaching 7.3 percent in 2008. The average GDP growth rate for the whole planning horizon is 6.6 percent, above the 4.4 percent average observed over the last six years, but below the 7.3 percent average growth projected by the Government of Bangladesh (1997) in its draft Fifth Five Year Plan for 1997-2002. The reasons for expecting gains in national GDP growth include the commitment of the Government to maintain macroeconomic stability, a modest improvement in infrastructure thanks to private sector involvement, particularly by foreign investors, and some progress in the implementation of structural reforms in the financial sector, civil administration, legal/judicial systems and privatization. Bangladesh also faces the prospect of higher foreign direct investments thanks to the discovery of natural gas fields. On the other hand, political stability is expected to remain fragile due to the non-cooperative strategies adopted by major political players, leading to uncertainty in economic policy. The national rate of GDP growth in the base case is expected to come from export oriented manufacturing and services rather than from agriculture. Hence, rural growth is expected to be lower (flat 4 percent GDP growth rate assumed here throughout the planning horizon) than urban growth (increasing from 9.9 to 15.1 percent over time)[9].

To translate the rural and urban GDP growth rates into changes in per capita income, we assume that the share of the national population living in rural areas decreases by half a percentage point per year,

[9] The discussion in this section si similar to that in the poverty assessment prepared by the author and colleagues for the World Bank (1998b). In the RMSM-X model and in the simulations given in World bank (1998b), three sectors are distinguished: agriculture, industry, and services. The base case scenario assumes a flat 2 percent growth rate in value added for agriculture each year. This corresponds to normal climatic conditions (there may be natural disasters in some years and higher growth in other years, but this cannot be predicted). For industry, growth increases progressively from 3.6 percent in 1997 to 8.5 percent after 2004. The growth rate for services increases from 6.2 to 7.5 percent. We translated these growth rates into urban and rural growth rates for this paper in order to use the elasticities estimated in the previous section. None of the qualitative results and policy implications are affected by considering here two rather than three sectors.

with a corresponding increase in the share of the urban population (this is the trend observed over the last five years). Using the fact that the overall population for Bangladesh is expected to grow by 1.5 percent per year over the next four years, and by 1.2 percent thereafter, we compute accordingly the growth in per capita GDP over time in the two sectors. What is still missing is an estimate of the change in the average propensity to consume, for which we need to use the World Bank's RMSM-X model.

From the RMSM-X model, given the limited availability of foreign financing, we find that private consumption as a share of GDP is expected to decline nationally by four percentage points to help finance investments (in the model, aggregate savings are measured residually as the difference between aggregate gross investments and the current account deficit). For simplicity, we assume that this drop in average propensity to consume affects all households in a similar way, in both urban and rural areas. Using the elasticities of poverty to growth computed with household data in the previous section, one finds the poverty forecasts given in Table 7 by sector and nationally using sectoral population shares (Table 7 uses the upper poverty lines; the trends obtained with the lower poverty lines are similar).

According to Table 7, poverty will decrease in both urban and rural areas, but more so in urban areas due to higher growth there (which more than compensates for higher urban population growth and rising inequality). Nationally, the headcount index with the upper poverty lines would be in 2008 at 29.05 percent, versus 53.08 percent in 1995-96. The reductions in the poverty gap and squared poverty gaps are even larger (proportionately to their 1995-96 level), indicating that growth would not leave the worst off behind even though inequality may be expected to rise over time (at least in urban areas).

The assumptions outlined above, as well as many others which have not been mentioned[10], could be challenged. For example, to the extent that the necessary increase in aggregate saving to finance

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[10] The are many such assumptions scattered throughout the RMSM-X model. Here are a few. Inflation is assumed to remain stable between 3.5 and 5.5 percent, reflecting the Government's efforts to control monetary growth in order to avoid pressure on prices and the balance of payments. The budget deficit is also projected to be remain stable within the 5 to 6 percent range. While the Government is not likely to raise the revenue-GDP ratio by 0.5

higher investments and growth would not involve reduced consumption of the poor, the poverty impact could be larger. On the other hand, the base case reduction in poverty may appear to be be too optimistic when compared with the experience of the last 15 years in Bangladesh. Still, the point made in favor of pro-rural growth would remain valid under alternative assumptions. Rather than focusing on the impact of any single assumption of the base case scenario on the future value of the headcount index of poverty, it is more interesting for informing policy to look at the impact on poverty of different scenarios.

V.3 Two alternative high growth scenarios

The first alternative high growth scenario keeps the rural growth rate flat at 4 percent, but it assumes higher growth in urban areas, yielding a national growth rate closer to the 7.3 percent average projected by the Government in the draft Fifth Five Year Plan. Achieving this higher level of growth would require economic reforms, but higher life expectancy, lower fertility, and micro-credit NGO programs could help provide better incentives for saving. Since higher foreign savings would pay for part only of the investments necessary for higher growth, private national savings would have to increase, thereby reducing the consumption share of GDP. The saving rate implied by higher growth (as given by the RMSM-X model) is in fact such that poverty would be virtually unchanged by 2008 as compared to the base case scenario. Of course, were the savings rates to progressively return to their 1996 level beyond the planning horizon, poverty would end up being lower since consumption would be higher, but then future years investments and growth would slip back to their previous 1996 level as well.

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point by year as recommended by the IMF, it is expected to keep a hold on expenditures. New concessional foreign aid may decline in real terms in the next ten years, but disbursements should remain stable due to past commitments. The country should not face difficulties in servicing its debt. Private savings are projected only slightly above past levels toward the end of the planning horizon in order to reflect the absence of a well organized capital market (and the limited increase in the growth rate). The Government is expected to continue its exchange rate, attempting to keep the real effective exchange rate constant. Maintaining a liberal trade policy and encouraging foreign investment should help protect the reserve level. Export and import growth rates are set at 7 to 9 percent, below the high levels of recent years. Growth in remittances is higher. Foreign direct investments are expected to pick up.

The second alternative scenario is based on similar higher national rates of growth, but this time thanks to faster rural development. This could be achieved by using foreign concessional loans to boost investments and productivity in agriculture, and by strengthening the links between the farm and non-farm sectors. The rationale for promoting rural development comes of course from the fact that the elasticity of poverty to growth is higher in rural than in urban areas. This scenario assumes an annual rural GDP growth rate of 5 percent per year. The level of savings needed is the same than in the previous higher growth scenario. In 2008, the national headcount would be 3 points lower than in the base case scenario, which is not a very large gain. The proportionate gain (as compared to the base case scenario) is much larger for the poverty gap and the squared poverty gap, the later reaching 0.82 in year 2008, which should not be surprising since these measures better take into account inequality which increases less with rural growth than with urban growth. Note finally that an additional reason why there would be lower inequality in 2008 under the pro-rural scenario is because the between group component of inequality (with groups corresponding to households living in urban and rural areas) would be lower.

VI Conclusion

Apart from a few exceptions (India and the United States), panel data techniques have not been used to analyze the relationships between growth, inequality, and poverty within single countries, apparently because two few observations are available to researchers. Yet, this constraint can be removed provided researchers are willing to conduct their analysis at the regional level. This was shown in this paper using data from Bangladesh. A regional panel was constructed for fourteen geographical areas, with data for five points in time between 1983 and 1996. This panel enabled us to estimate the impact of growth and inequality on poverty, as well as the impact of growth on inequality. Some of these results could not be obtained with standard methods of analysis relying on point estimates of the elasticity of poverty to growth and inequality, or on decompositions of changes in poverty over time due to growth and redistribution. In fact, it was shown that standard method of analysis could well be misleading.

From a substantive point of view, the paper has provided a new set of poverty and inequality measures for Bangladesh. Poverty decreased significantly over the last few years, especially in urban areas, but inequality increased as well, so that the gains from growth for the poor have not been as large as they would have been with a stable distribution. The correlation between growth and inequality is much higher in urban than in rural areas, a result which was used for policy simulations. These simulations were not intended to be precise forecasts. Rather, they were completed to illustrate policy choices in terms of sectoral growth patterns. What is to be concluded from these simulations ? First, if growth does pick up in Bangladesh, the simulations show that we can expect significant gains in poverty reduction in the future. Second, the simulations demonstrate that higher growth does not reduce poverty much more than baseline growth as long as high savings rate are needed for achieving higher growth. Only in the long run does higher growth generate large gains in poverty reduction (once consumption as a share of GDP rises again). Third, channeling investments toward rural growth has the potential to bring additional gains in poverty reduction. A pro-rural development strategy would also reduce inequality.

Appendix: Comparability issues, poverty lines, and regional panel

The various rounds of the HES from 1983 to 1996 provide comparable data, at least much more so than many surveys available in other countries. Yet, the 1995-96 survey differs in some respects from previous surveys. Hence there are a few comparability issues, mainly in terms of the sampling frame and the expansion factors, the diary for food consumption, and the standard errors of poverty measures.

The first comparability issue relates to the expansion factors. The sampling frame for the 1995-96 HES consists of 14 strata corresponding to the Standard Metropolitan Areas (SMAs), other urban areas, and rural areas of the five administrative divisions of Bangladesh, as described in Table A2. Accordingly, 14 expansion factors were computed by the BBS for the 1995-96 survey (last column of Table A2). In previous years, there were strata for the SMAs, urban municipalities, other urban areas, and rural areas for each of four divisions. While a corresponding number of expansion factors should have been provided, the BBS used only two expansion factors for these years, one urban and one rural.

Because welfare measures and probabilities of being selected vary between geographical areas, using two expansion factors only generatesd bias in the estimates of poverty for previous years. The problem is not too serious for rural areas. As can be seen from Table A2, the probability that a household will be selected in the various rural strata are similar. In 1995-96, four out of five rural expansion factors belong to the interval [3702, 3916]. But this is not true for urban areas. Highly populated urban areas such as the Dhaka and Chittagong SMAs, which are under-represented in the sample, have higher standards of living. Hence using aggregate urban expansion factors would increase urban (and national) poverty measures since the population share of dense and well-off areas would be under-estimated.

To provide a consistent set of expansion factors matching the HES sampling frame for the survey years prior to 1995-96, estimates of the number of households in each of the strata for each of the survey years would be required. This detailed information is not easily available for all strata because the structure of the sampling frame changed in 1995-96 versus previous years. For example, all non-SMA urban households were regrouped in one stratum per division. Yet it is feasible to retrieve approximate expansion factors by stratum for previous years using information on the number of household living in the various areas in the 1981 and 1991 censii, and using geometric projections for computing rates of growth in the number of households between these two years. We conducted this exercise, which yielded the expansion factors in Table A2 for the survey years 1983-84 to 1991-92. Note also that the definition of urban areas in the HES does not match that of the 1991 census (this was taken into account in computing the expansion factors in Table A2). In 1991-92 for example, the HES counts as rural 12 of 107 municipalities reported by the 1991 census as urban, as well as all 415 thana headquarters and non-municipal towns also reported as urban by the census. Therefore, the urban population share in the HES is lower than that in the Census (in 1991-92, the urban share was 16.5 percent according to the HES, versus about 20 percent according to the 1991 census). We used HES shares for the macro simulations.

A second comparability issue between the 1995-96 HES and previous surveys relates to the collection method for the food diaries recording consumption expenditures. In 1995-96, the households kept their food diary for 7 days (for a few households, the number of days is lower, but this information is available in the data, so that adjustments can be made). Accordingly, the total monthly food expenditure was computed as the total expenditure recorded in the diary times 30.42/7 (with 30.42 days also being used to estimate the monthly food poverty lines in the cost of basic needs method). In previous years however, the households kept their diary for 15 days. The issue relates to the quality of the recall. It could be conjectured that households keep better track of their food expenditures over a 7 days than over a 15 days period. Then the monthly food expenditure totals for previous years would be under-estimated as compared to the totals computed for 1995-96. As discussed, poverty decreased sharply in 1995-96. It could well be that part of this decrease is due to the difference in collection method for the food diaries.

A third comparability issue has to do with standard errors. For the 1995-96 HES, we have information on both stratification and clustering, so that appropriate standard errors can be computed.

This is not the case for previous years, where we do not know to which PSU households belong, although we do know to which stratum they belong. As shown by Howes and Lanjouw (1995), stratification reduces standard errors, and clustering increases them. Rather than taking into account stratification alone, which would result in too low standard errors, formulae for the errors of poverty measures under simple random sampling could be used. Yet estimates of standard errors that take into account both stratification and clustering are typically larger than those based random sampling. Therefore, we choose not to report standard errors of poverty measures. The standard errors of all poverty measures in this paper for the year 1995-96 (and using random sampling for previous years) are available upon request.

References

Alesina, Alberto and Dani Rodrik, 1994, Distributive Politics and Economic Growth, Quarterly Journal of Economics, 108: 465-90.

Anand, Sudhir and Ravi Kanbur, 1993, The Kuznets Process and the Inequality-Development Relationship, Journal of Development Economics, 40: 25-52.

Bangladesh Bureau of Statistics, 1995, Report of Household Expenditure Survey 1991-92, Bangladesh Bureau of Statistics, Dhaka.

Bangladesh Bureau of Statistics, 1996, Report of the Poverty Monitoring Survey 1995, Bangladesh Bureau of Statistics, Dhaka.

Bourguignon, Francois and C. Morisson, 1990, Income Distribution, Development and Foreign Trade: A Cross-Sectional Analysis, European Economic Review, 34: 1113-1132.'

Bruno, Michael, Martin Ravallion, and Lyn Squire, 1996, Equity and Growth in Developing Countries, Policy Research Working Paper 1563, World Bank, Washington, DC.

Chen, Shaohua and Martin Ravallion, 1997, What Can New Survey Data Tell Us about Recent Changes in Distribution and Poverty?, World Bank Economic Review, 11: 357-82.

Clarke, George R. G., 1995, More Evidence on Income Distribution and Growth, Journal of Development Economics, 47: 403-28.

Datt, Gaurav and Martin Ravallion, 1992, Growth and Redistribution Components of Changes in Poverty Measures: A Decomposition with Applications to Brazil and India in the 1980s, Journal of Development Economics 38: 275-295.

Datt, Gaurav and Martin Ravallion, 1997, Why have some Indian States Done Better than Others at Reducing Rural Poverty?, Economica, forthcoming.

Deininger, Klaus and Lyn Squire, 1996, New Ways of Looking at Old Issues: Inequality and Growth, mimeo, The World Bank, Washington, DC.

Easterly, W., 1989, A Consistency Framework for Macroeconomic Analysis, Policy, Planning, and Research Working Paper 234, World Bank, Washington, DC.

Essama-Nssah, B., 1997, Impact of growth and distribution on poverty in Madagascar, Review of Income and Wealth, 43: 239-52.

Fields, Gary, 1989, Changes in Poverty and Inequality in Developing Countries, World Bank Research Observer, 4: 167-186.

Foster, James, J. Greer, and Erik Thorbecke, 1984, A Class of Decomposable Poverty Measures, Econometrica 52: 761-66.

Government of the People's Republic of Bangladesh, Planning Commission, 1997, The Fifth Five Year Plan 1997-2002 (draft), Dhaka.

Hossain, Mahabub and Binayak Sen, 1992, Rural Poverty in Bangladesh: Trends and Determinants, Asian Development Review 10: 1-34.

Howes, Stephen and Jean Olson Lanjouw, 1995, Making Poverty Comparisons Taking Into Account Survey Design: How and Why, The World Bank: Washington, DC, Mimeograph.

Kakwani, Nanak, 1993, Poverty and Economic Growth with Application to Cote d'Ivoire, Review of Income and Wealth, 39: 121-139.

Kanbur, Ravi, 1987, Structural Adjustment, Macroeconomic Adjustment and Poverty: A Methodology for Analysis, World Development, 15: 1515-1526.

Khan, S.M., P. Montiel, and N. U. Haque, 1990, Adjustment with Growth: Relating the Analytical Approaches of the IMF and the World Bank, Journal of Development Studies, 32: 155-179.

Khundker, Nasreen, Wahiddudin Mahmud, Binayak Sen, and Monawar Uddin Ahmad, 1994, Urban Poverty in Bangladesh: Trends, Determinants, and Policy Issues, Asian Development Review 12: 1-31.

Kuznets, Simon, 1955, Economic Growth and Income Inequality, American Economic Review, 45: 1-28.

Papanek, Gustav and Oldrich Kyn, 1986, The effect on income distribution of development, the growth rate and economic strategy, Journal of Development Economics, 23: 55-65.

Persson, Torsten, and Guido Tabellini, 1994, Is Inequality Harmful for Growth?, American Economic Review, 84: 600-621.

Rahman, Atiq and Trina Haque, 1988, Poverty and Inequality in Bangladesh in the Eighties: An Analysis of Some Recent Evidence, Research Report No. 91, BIDS, Dhaka.

Rahman, Hossain Zillur, and Mahabub Hossain (eds), 1995, Rethinking Rural Poverty: Bangladesh as a Case Study, Sage Publications: New York.

Ram, Rati, 1995, Economic Development and Inequality: An Overlooked Regression Constraint, Economic Development and Cultural Change, 3: 425-434.

Ravallion, Martin, 1997, Can High-Inequality Developing Countries Escape Absolute Poverty?, Policy Research Working Paper 1775, World Bank, Washington, DC.

Ravallion, Martin and Binayak Sen, 1996, When Method Matters; Toward A Resolution of the Debate about Bangladesh's Poverty Measures, Economic Development and Cultural Change, 44: 761-792.

Watkins, Kevin, 1995, The OXFAM Poverty Report, OXFAM, Oxford.

World Bank, 1990, World Development Report, Oxford University Press, New York.

Wodon, Quentin, 1995, Poverty in Bangladesh: Extent and Evolution, Bangladesh Development Studies, 23, 3-4: 81-110.

Wodon, Quentin, 1997, Food Energy Intake and Cost of Basic Needs: Measuring Poverty in Bangladesh, Journal of Development Studies, 34: 66-101.

World Bank, 1998a, Memorandum of the President of the International Development Association and the International Finance Corporation to the Executive Directors on a Country Assistance Strategy of the World Bank Group for the People's Republic of Bangladesh, Washington, DC.

World Bank, 1998b, Bangladesh: From Counting the Poor to Making the Poor Count, Washington, DC.

Table 1: Poverty measures with lower and upper poverty lines (Bangladesh, 1983-84 to 1995-96)

	83-84			85-86			88-89			91-92			95-96		
	HL	PGL	SPGL	HL	PGL	SPGL	HL	PGL	SPGL	HL	PGL	SPGL	HL	PGL	SPGL
Nation	40,91	10,42	3,69	33,77	6,85	2,14	41,32	9,89	3,43	42,69	10,74	3,86	35,55	7,89	2,59
Rural	42,62	10,51	3,88	36,01	7,36	2,31	44,30	10,76	3,78	45,95	11,73	4,25	39,76	8,90	2,95
Urban	28,03	6,53	2,29	19,90	3,70	1,04	21,99	4,20	1,21	23,29	4,89	1,53	14,32	2,75	0,80
	HU	PGU	SPGU	HU	PGU	SPGU	HU	PGU	SPGU	HU	PGU	SPGU	HU	PGU	SPGU
Nation	58,50	16,52	6,61	51,73	12,27	4,20	57,13	15,35	5,77	58,84	17,19	6,76	53,08	14,37	5,36
Rural	59,61	16,83	6,72	53,14	12,50	4,27	59,18	16,01	6,07	61,19	18,06	7,15	56,65	15,40	5,74
Urban	50,15	14,26	5,78	42,92	10,85	3,81	43,88	11,06	3,83	44,87	12,00	4,43	35,04	9,19	3,44

Source: Author's estimation. H, PG, and SPG are the headcount, poverty gap, and squared poverty gap with the lower (L) or upper (U) upper poverty lines.

Table 2: Welfare ratios and Gini indices with lower and upper poverty lines (Bangladesh, 1983-84 to 1995-96)

	83-84				85-86				88-89				91-92				95-96			
	WL	WU	GL	GU	WL	WU	GL	GU	WL	WU	GL	GU	WL	WU	GL	GU	WL	WU	GL	GU
Nation	123,5	103,1	25,53	25,17	135	113	25,66	24,52	129	109	27,94	26,50	125	102	27,15	25,70	146	116	31,01	29,01
Urban	158	119	29,46	29,12	181	132	29,87	29,16	180	136	31,78	31,15	173	130	31,09	30,57	232	160	36,03	34,97
Rural	119	101	24,33	24,51	128	110	23,80	23,54	121	105	25,96	25,24	117	98	25,06	24,18	129	108	26,43	26,38

Source: Author's estimation. H, PG, and SPG are the headcount, poverty gap, and squared poverty gap with the lower (L) or upper (U) upper poverty lines.

Table 3: Elasticity of poverty to growth and inequality using the Kakwani formulae (Bangladesh, 1995-96)

	Growth elasticies						Gini elasticities						MPRS (Trade-off)					
	HL	PGL	SPGL	HU	PGU	SPGU	HL	PGL	SPGL	HU	PGU	SPGU	HL	PGL	SPGL	HU	PGU	SPGU
Nation	-2,14	-3,51	-4,09	-1,47	-2,69	-3,36	0,98	3,06	4,78	0,24	1,60	2,88	0,46	0,87	1,17	0,16	0,60	0,86
Rural	-2,20	-3,47	-4,03	-1,51	-2,68	-3,37	2,90	6,89	9,95	0,90	3,20	5,21	1,32	1,99	2,47	0,60	1,19	1,55
Urban	-3,22	-4,21	-4,88	-1,66	-2,81	-3,34	0,92	2,49	3,96	0,13	1,30	2,41	0,29	0,59	0,81	0,08	0,46	0,72

Source: Author's estimation. H, PG, and SPG are the headcount, poverty gap, and squared poverty gap with the lower (L) or upper (U) upper poverty lines.

Table 4: Cumulative change in headcount index due to growth and inequality (decomposition)

			1983-4	1985-6	1988-9	1991-92	1995-96
National	**HL**	Actual	40,91	33,77	41,32	42,69	35,55
		Growth only	-	32,01	36,65	39,79	25,90
		Inequality only	-	43,99	45,18	43,70	50,51
	HU	Actual	58,50	51,73	57,13	58,84	53,08
		Growth only	-	49,03	52,62	59,24	46,34
		Inequality only	-	60,32	62,32	58,14	64,00
Rural	**HL**	Actual	42,62	36,01	44,30	45,95	39,76
		Growth only	-	29,37	41,18	44,44	35,05
		Inequality only	-	44,36	45,88	44,30	47,53
	HU	Actual	59,61	53,14	59,18	61,19	56,65
		Growth only	-	48,51	56,03	62,94	53,06
		Inequality only	-	60,91	62,78	58,41	62,79
Urban	**HL**	Actual	28,03	19,90	21,99	23,29	14,32
		Growth only	-	22,32	18,97	21,44	7,96
		Inequality only	-	29,07	32,30	29,70	37,84
	HU	Actual	50,15	42,92	43,88	44,87	35,04
		Growth only	-	41,35	37,46	41,25	26,42
		Inequality only	-	50,94	53,65	51,50	55,90

Source: Author's estimation. H is the headcount with the lower (L) or upper (U) upper poverty lines.

Table 5: Impact of growth on inequality (regional panel estimates of β)

	National (all areas)		Rural areas		Urban areas	
	Fixed effects	Random eff.	Fixed effects	Random eff.	Fixed effects	Random eff.
G on WL	0.35	0.38	0.18	0.09	0.43	0.39
	(3.50)	(5.22)	(0.95)	(0.66)	(3.94)	(3.87)
G on WU	0.27	0.35	0.07	0.01	0.37	0.35
	(2.54)	(3.79)	(0.38)	(0.05)	(3.05)	(3.05)

Source: Author's estimation. These are the results of the regressions of the Gini index G on mean consumption measures W with the lower (L) or upper (U) upper poverty lines. A Haussman test of equality of the parameter estimates from the fixed and random effects models could not reject the null of equality at the 5% level in the 3 equations. See the appendix for more details on the data used at the area level for this regional panel model.

Table 6: Impact of growth and inequality on poverty (regional panel estimates)

	Net impact of growth λ		Gross impact of growth γ		Impact of inequality δ	
	Fixed effects	Random eff.	Fixed effects	Random eff.	Fixed effects	Random eff.
All areas						
HL	-1.98	-2.03	-2.42	-2.61	1.28	1.41
	(-11.47)	(-15.12)	(-18.59)	(-27.76)	(7.99)	(10.15)
HU	-1.29	-1.37	-1.43	-1.63	0.52	0.53
	(-10.96)	(-15.30)	(-12.94)	(-20.15)	(3.94)	(5.36)
PGL	-2.67	-2.71	-3.47	-3.71	2.30	2.55
	(-9.49)	(-11.77)	(18.79)	(-25.67)	(10.12)	(12.22)
PGU	-2.17	-2.09	-2.57	-2.64	1.49	1.55
	(-11.91)	(-13.36)	(1.47)	(-35.48)	(12.7)	(17.06)
SPGL	-3.30	-3.34	-4.39	-4.79	3.12	3.62
	(-7.67)	(-9.73)	(-13.09)	(-20.31)	(7.56)	(10.24)
SPGU	-2.85	-2.69	-3.44	-3.48	2.18	2.32
	(-10.56)	(-11.44)	(-22.98)	(-29.33)	(12.10)	(16.11)
Rural areas						
HL	-2.04	-2.26	-2.20	-2.29	0.88	0.87
	(-9.51	(-14.44)	(-15.48)	(-19.61)	(6.56)	(6.83)
HU	-1.21	-1.33	-1.23	-1.32	0.29	0.31
	(-11.86)	(-14.29)	(-13.96)	(-16.21)	(3.42)	(3.61)
PGL	-3.08	-3.29	-3.41	-3.45	1.81	1.82
	(-8.40)	(-12.47)	(-23.85)	(-34.44)	(13.44)	(15.20)
PGU	-2.55	-2.67	-2.63	-2.66	1.15	1.15
	(-11.17)	(-14.84)	(-30.79)	(-36.98)	(13.86)	(14.96)
SPGL	-3.85	-4.06	-4.31	-4.31	2.53	2.58
	(-7.13)	(-10.15)	(-16.06)	(-32.35)	(9.98)	(11.53)
SPGU	-3.50	-3.59	-3.62	-3.62	1.78	1.79
	(-9.72)	(-12.41)	(-24.57)	(-29.29)	(12.46)	(13.61)
Urban areas						
HL	-1.95	-2.05	-2.84	-2.98	2.10	2.31
	(-7.11)	(-8.03)	(-13.92)	(-26.22)	(6.89)	(12.96)
HU	-1.33	-1.41	-1.70	-1.76	0.92	0.99
	(-6.42)	(-7.80)	(-8.35)	(-13.22)	(3.38)	(5.29)
PGL	-2.47	-2.59	-3.85	-4.23	3.21	4.12
	(-5.72)	(-6.30)	(-16.07)	(-20.22)	(6.18)	(12.36)
PGU	-1.96	-2.00	-2.71	-2.71	1.99	2.10
	(-6.99)	(-7.70)	(-16.55)	(-26.75)	(8.53)	(14.75)
SPGL	-3.05	-3.21	-4.84	-5.38	4.22	5.64
	(-4.50)	(-5.07)	(-7.30)	(-14.00)	(4.26)	(9.20)
SPGU	-2.51	-2.55	-3.53	-3.52	2.72	3.08
	(-6.27)	(-6.80)	(-13.44)	(-20.21)	(7.26)	(12.56)

Source: Author's estimation. H, PG, and SPG are the headcount, poverty gap, and squared poverty gap with the lower (L) or upper (U) upper poverty lines. A Haussman test of equality of the parameter estimates from the fixed and random effects models could not reject the null of equality at the 5% level in 30 of the 36 regressions. See the appendix for more details on the data used at the area level for this regional panel model.

Table 7: Poverty Simulations under Alternative Growth Scenarios (using upper poverty lines)

	Poverty in 1996	Poverty in 2008		
		Base case scenario	Higher growth via urban	Higher growth via rural
National				
Headcount	53.08	29.05	28.73	25.46
Poverty gap	14.38	4.78	4.79	3.57
Squared poverty gap	5.36	1.24	1.26	0.82
Rural				
Headcount	56.65	35.59	36.01	30.50
Poverty gap	15.40	5.94	6.09	4.29
Squared poverty gap	9.19	1.57	1.62	1.00
Urban				
Headcount	35.04	6.52	3.64	8.12
Poverty gap	9.19	0.78	0.31	1.07
Squared poverty gap	3.44	0.13	0.04	0.20

Source: Author's estimation. See text for details on the simulations.

Table A1: Geographical areas and sample sizes (Bangladesh, 1983-84 to 1995-96)

Area	Division	Description	*1983/84*	*1985/86*	*1988/89*	*1991/92*	*1995/96*
1	Dhaka	Standard Metropolitan Area	652	620	653	688	680
2		Other urban areas	160	144	190	188	200
3		Rural Dhaka, Mymensingh	352	320	588	592	620
4		Rural Faridpur, Tangail, Jamalpur	255	224	456	462	760
5	Chittagong	Standard Metropolitan Area	255	224	254	256	320
6		Other urban areas	113	111	156	159	200
7		Rural Sylhet, Comilla	319	303	576	591	740
8		Rural Noakhali, Chittagong	224	208	367	365	460
9	Khulna	All urban areas	304	303	340	352	580
10		Rural Barisal, Patuakhali	175	145	299	301	520
11		Rural Khulna, Jessore, Kushtia	256	240	459	462	580
12	Rajshahi	All urban areas	240	239	269	265	400
13		Rural Rajshahi, Pabna	239	224	507	510	520
14		Rural Bogra, Rangpur, Dinajpur	288	272	538	544	840
-	Total		3832	3577	5652	5735	7420

Source: Author's computations.

Table A2: Expansion Factors (Bangladesh, 1983-84 to 1995-96)

Area	Division	Stratum	83/84	85/86	88/89	91/92	95/96
9	Barisal	Non-SMA urban	1068	1193	1259	1424	440.555
10		Rural	6849	7044	4320	4575	2742.767
5	Chittagong	SMA	1068	1193	1259	1424	1537.488
6		Non-SMA urban	1068	1193	1259	1424	1077.005
7/8		Rural	6849	7044	4320	4575	3815.811
1	Dhaka	SMA	1068	1193	1259	1424	2370.931
2		Non-SMA urban	1068	1193	1259	1424	1395.135
3/4		Rural	6849	7044	4320	4575	3702.77
9	Khulna	SMA	1068	1193	1259	1424	975.964
9		Non-SMA urban	1068	1193	1259	1424	1005.875
10/11		Rural	6849	7044	4320	4575	3915.416
12	Rajshahi	SMA	1068	1193	1259	1424	926.05
12		Non-SMA urban	1068	1193	1259	1424	1741.142
13/14		Rural	6849	7044	4320	4575	3756.915

Source: BBS for 1995-96 and author's computations using HES data and census data for previous years (see text).

Table A3: Food prices and monthly food poverty lines by geographical area (Bangladesh, 1995-96)

	rice	wheat	pulses	meat	potato	milk	oil	banana	sugar	fish	veget.	ZF
Gm/day	391,06	39,40	39,40	11,82	26,60	57,13	19,70	19,70	19,70	47,28	147,76	819,56
Areas												
1	14,25	12,59	39,80	60,60	7,92	19,61	55,33	19,70	35,32	50,06	7,37	465,86
2	12,75	10,92	39,03	61,79	8,55	15,16	55,80	20,61	37,15	46,39	6,15	429,51
3	12,91	10,92	40,00	60,00	8,00	14,67	60,00	13,33	31,82	40,00	6,00	415,68
4	12,44	10,11	39,41	54,84	7,84	13,31	63,54	19,30	31,80	37,57	6,02	406,32
5	13,52	12,00	39,38	72,89	8,74	16,48	65,79	19,49	35,65	38,24	6,53	441,20
6	13,04	11,27	39,74	66,60	8,98	16,06	67,44	26,32	33,86	38,81	7,58	441,83
7	12,73	11,30	38,53	66,66	8,18	15,01	57,92	22,08	34,27	31,93	7,30	415,06
8	12,82	11,60	39,80	68,73	8,59	14,65	60,35	20,06	35,21	40,41	5,94	425,32
9	13,11	10,96	38,98	58,42	8,68	14,07	56,15	18,88	32,74	40,04	5,69	416,08
10	12,90	11,18	37,33	62,87	8,78	13,15	64,05	17,46	34,75	33,17	6,16	409,18
11	12,05	10,30	32,30	52,69	7,96	11,54	56,70	16,39	29,74	33,13	4,04	367,35
12	12,26	10,32	35,51	47,71	6,97	12,98	57,11	16,87	31,24	32,25	4,54	375,98
13	11,18	9,52	36,68	40,45	7,98	12,45	57,35	21,02	30,43	32,75	4,44	363,29
14	11,15	9,74	32,47	47,58	7,42	10,51	55,59	12,38	29,82	32,62	4,32	349,57

Source: Author's estimation using HES data. Zf is the monthly per capita food poverty line.

Table A4: Food, lower and upper poverty lines by area (Bangladesh, 1983-84 to 1995-96)

	83-84			85-86			88-89			91-92			95-96		
	ZF	ZL	ZU	ZF	ZL	ZU	ZF	ZL	ZU	ZF	ZL	ZU	ZF	ZL	ZU
Areas															
1	198	254	342	248	331	478	305	401	565	365	480	660	466	613	950
2	192	258	314	234	308	381	293	389	437	317	399	482	430	584	931
3	191	241	279	223	291	336	285	358	405	336	425	512	416	523	661
4	180	231	271	218	282	325	281	344	355	350	432	472	406	521	604
5	197	258	375	238	321	404	305	399	507	384	523	722	441	561	749
6	193	238	291	236	317	400	301	384	475	391	517	609	442	564	704
7	188	241	281	223	291	345	285	368	513	352	432	558	415	515	584
8	195	259	297	231	301	366	287	394	436	341	438	541	425	548	638
9	186	245	302	220	286	401	283	364	473	381	482	635	416	541	779
10	183	234	253	220	280	316	281	355	397	322	413	467	409	522	639
11	183	229	270	210	286	339	266	353	405	328	420	497	367	481	563
12	188	248	351	223	296	384	280	357	462	342	446	582	376	499	628
13	184	238	292	208	282	330	261	333	371	353	459	540	363	480	582
14	181	238	302	204	272	303	270	347	386	336	426	487	350	457	570

Source: Author's estimation using HES data. ZL and ZU are the monthly per capita lower and upper poverty line.

Table A5: Poverty measures with lower and upper poverty lines (Bangladesh, 1983-84 to 1995-96)

Areas		83-84			85-86			88-89			91-92			95-96	
	HL	PGL	SPGL	HL	PGL	SPGL	HL	PGL	SPGL	HL	PGL	SPGL	HL	PGL	SPGL
1	21,63	4,48	1,40	9,96	1,74	0,44	16,84	3,09	0,83	13,54	2,10	0,47	7,87	1,16	0,24
2	44,07	11,15	4,10	37,82	9,13	3,06	43,08	9,25	3,02	31,98	6,25	1,92	28,09	6,74	2,34
3	46,47	11,90	4,71	37,22	8,11	2,67	39,19	9,16	3,13	42,05	9,79	3,30	31,64	7,47	2,55
4	51,83	12,98	4,64	48,48	11,04	3,73	60,59	16,02	6,00	63,69	18,36	7,02	49,66	12,56	4,51
5	12,14	1,49	0,29	10,39	0,80	0,09	12,65	1,78	0,41	21,34	3,25	0,78	9,83	1,22	0,26
6	13,66	3,72	1,44	26,98	3,74	0,72	21,74	5,49	1,90	43,17	11,24	4,37	17,02	2,68	0,68
7	27,89	5,42	1,64	21,90	4,14	1,08	30,96	7,92	2,77	24,15	4,45	1,23	37,58	7,10	2,02
8	42,75	8,35	2,56	25,47	4,82	1,53	42,32	9,83	3,43	23,92	4,10	1,06	31,70	6,11	1,77
9	38,74	8,26	2,68	23,29	4,28	1,20	29,55	5,51	1,49	34,10	7,82	2,47	26,37	6,50	2,29
10	33,69	7,15	2,23	35,98	5,46	1,27	52,22	12,08	3,94	53,89	12,51	4,05	44,77	10,38	3,41
11	44,92	11,88	4,76	40,88	9,24	3,26	43,94	9,48	2,98	44,88	9,98	3,21	33,20	6,53	1,92
12	46,43	13,75	5,62	35,68	7,50	2,26	25,77	4,86	1,44	28,98	8,16	2,95	19,24	3,74	1,00
13	48,47	13,68	5,39	32,33	6,19	1,85	47,46	12,57	4,82	67,42	22,21	9,31	40,78	8,77	2,84
14	45,37	12,25	4,69	46,35	9,15	2,75	46,86	10,94	3,73	58,68	15,74	6,06	46,75	11,70	4,25
	HU	PGU	SPGU	HU	PGU	SPGU	HU	PGU	SPGU	HU	PGU	SPGU	HU	PGU	SPGU
1	42,39	11,51	4,37	36,42	8,24	2,71	42,22	10,73	3,79	36,15	8,33	2,65	28,93	6,78	2,35
2	64,94	19,00	7,67	56,21	16,73	6,48	53,97	13,60	4,76	53,13	12,43	4,23	61,10	21,60	9,70
3	58,90	17,51	7,23	51,86	13,06	4,67	53,26	13,40	4,90	59,83	16,86	6,42	53,39	15,02	5,81
4	64,42	19,69	7,89	63,64	16,81	6,27	63,38	17,46	6,67	73,16	22,61	9,23	63,54	18,83	7,40
5	47,48	9,41	2,83	25,66	4,36	0,96	36,34	7,08	1,89	46,11	12,07	4,12	27,20	5,35	1,53
6	22,03	6,27	2,62	43,15	10,25	3,10	35,58	10,23	3,97	50,99	16,69	7,11	33,60	7,08	2,14
7	45,84	9,96	3,23	41,29	8,48	2,56	66,19	19,63	8,10	47,12	11,57	3,90	48,37	11,42	3,64
8	57,81	13,84	4,59	45,40	10,29	3,47	50,53	13,31	4,90	45,46	9,90	3,08	45,34	10,75	3,54
9	58,40	15,51	5,81	47,63	13,19	4,90	50,27	13,71	4,83	52,96	16,52	6,66	52,19	16,65	7,15
10	48,87	9,68	3,11	56,10	9,90	2,63	62,09	16,83	6,03	62,90	17,70	6,43	60,64	18,11	7,06
11	60,80	18,04	7,65	57,38	15,55	5,93	61,29	15,08	5,21	58,66	16,60	6,14	51,45	11,75	3,86
12	69,40	26,37	13,09	60,36	16,65	6,25	47,34	12,17	4,28	53,26	15,70	6,63	33,92	8,49	2,88
13	69,41	22,21	9,64	50,83	11,45	3,69	60,05	16,79	6,75	77,25	29,77	14,01	62,78	16,52	5,98
14	69,79	21,98	9,42	61,26	13,84	4,47	55,86	14,96	5,48	70,62	21,85	9,05	67,68	20,82	8,59

Note: H, PG, and SPG are the headcount, poverty gap, and squared poverty gap with the lower (L) or upper (U) poverty line.

Table A6: Welfare ratios and Gini indices with lower and upper poverty lines (Bangladesh, 1983-84 to 1995-96)

Area	83-84			85-86			88-89			91-92			95-96		
	WL	WU	GL/U	WL	WU	GL/U	WL	WU	GL/U	WL	WU	GL/U	WL	WU	GL/U
1	180	134	29,76	212	147	29,75	201	143	33,01	208	151	32,43	288	186	36,78
2	118	97	25,55	141	114	29,30	136	121	29,62	149	124	29,35	163	102	30,99
3	114	99	23,97	127	110	24,38	126	112	25,90	128	106	27,58	143	113	28,70
4	112	95	24,40	112	97	22,11	104	101	25,95	93	85	21,40	113	98	25,42
5	171	118	23,48	179	142	22,59	183	144	28,21	161	117	24,97	193	144	25,23
6	179	146	27,27	174	138	30,90	197	159	33,97	140	118	31,50	175	140	26,88
7	139	119	25,07	147	124	24,35	136	97	26,58	140	109	21,44	132	116	25,28
8	118	103	21,36	142	117	23,49	121	109	23,82	135	110	19,44	140	120	25,80
9	135	110	27,56	174	124	30,14	158	121	29,73	146	111	29,19	181	126	35,33
10	130	120	23,79	122	109	19,84	115	103	25,34	110	98	23,40	126	103	27,00
11	114	97	23,46	125	105	25,30	121	105	24,81	122	103	24,84	131	112	23,21
12	123	87	29,45	138	107	27,09	158	122	28,13	142	109	26,84	204	162	35,66
13	109	89	24,49	132	113	22,62	114	102	25,57	93	79	26,51	126	104	25,94
14	114	90	24,72	115	103	21,94	120	108	26,04	100	88	22,58	122	97	27,95

Source: Author's estimation. WL and WU are the welfare ratios (times 100) with the lower and upper poverty line.
GL and GU are the Gini indices with the lower and upper poverty lines. Note that GL is equal to GU at the area level.

Table A7: Elasticity of poverty to growth and inequality using the Kakwani formulae (Bangladesh, 1995-96)

Area	Growth elasticies						Gini elasticities						MPRS (Trade-off)					
	HL	PGL	SPGL	HU	PGU	SPGU	HL	PGL	SPGL	HU	PGU	SPGU	HL	PGL	SPGL	HU	PGU	SPGU
1	-5,65	-3,83	-4,40	-1,75	-3,27	-3,78	10,61	10,06	14,03	1,50	4,65	6,95	1,88	2,63	3,19	0,86	1,42	1,84
2	-2,00	-2,95	-3,44	-1,01	-1,83	-2,45	1,26	3,50	5,44	0,02	1,07	2,11	0,63	1,19	1,58	0,02	0,58	0,86
3	-2,49	-2,90	-3,06	-1,51	-2,56	-3,17	1,06	2,67	4,16	0,19	1,46	2,66	0,43	0,92	1,36	0,13	0,57	0,84
4	-1,91	-2,99	-3,59	-1,38	-2,37	-3,09	0,25	1,53	2,75	-0,03	0,92	1,88	0,13	0,51	0,76	-0,02	0,39	0,61
5	-5,66	-7,16	-8,15	-2,79	-4,08	-4,98	5,26	8,58	11,43	1,24	3,26	5,10	0,93	1,20	1,40	0,44	0,80	1,02
6	-3,69	-2,67	-3,18	-2,15	-3,74	-4,62	2,78	3,77	5,91	0,87	2,92	4,68	0,75	1,41	1,86	0,40	0,78	1,01
7	-2,49	-4,15	-4,59	-1,97	-3,23	-4,27	0,79	2,64	4,10	0,32	1,69	3,02	0,32	0,64	0,89	0,16	0,52	0,71
8	-2,75	-4,12	-4,53	-2,03	-3,22	-4,08	1,10	3,05	4,61	0,41	1,85	3,22	0,40	0,74	1,02	0,20	0,57	0,79
9	-2,16	-3,69	-4,17	-1,20	-2,13	-2,66	1,75	4,81	7,01	0,31	1,81	3,21	0,81	1,30	1,68	0,26	0,85	1,21
10	-1,80	-3,71	-4,42	-1,30	-2,35	-3,13	0,47	2,22	3,66	0,04	1,10	2,15	0,26	0,60	0,83	0,03	0,47	0,69
11	-2,70	-2,78	-3,00	-1,79	-3,38	-4,08	0,84	2,17	3,55	0,21	1,52	2,73	0,31	0,78	1,19	0,12	0,45	0,67
12	-2,89	-2,38	-2,89	-1,71	-3,00	-3,90	3,02	4,53	7,11	1,07	3,49	5,68	1,04	1,90	2,46	0,62	1,17	1,46
13	-2,21	-2,54	-3,07	-1,27	-2,80	-3,53	0,57	1,91	3,31	0,05	1,14	2,20	0,26	0,75	1,08	0,04	0,41	0,63
14	-1,81	-2,70	-3,22	-1,07	-2,25	-2,85	0,39	1,80	3,13	-0,03	0,91	1,87	0,22	0,67	0,97	-0,03	0,41	0,66

Source: Author's estimation using HES data. Names of variables are as in previous tables.

FIGURE 1: CUMULATIVE NATIONAL CHANGE IN HEADCOUNT INDEX BANGLADESH
Total Change and Growth and Redistribution Components

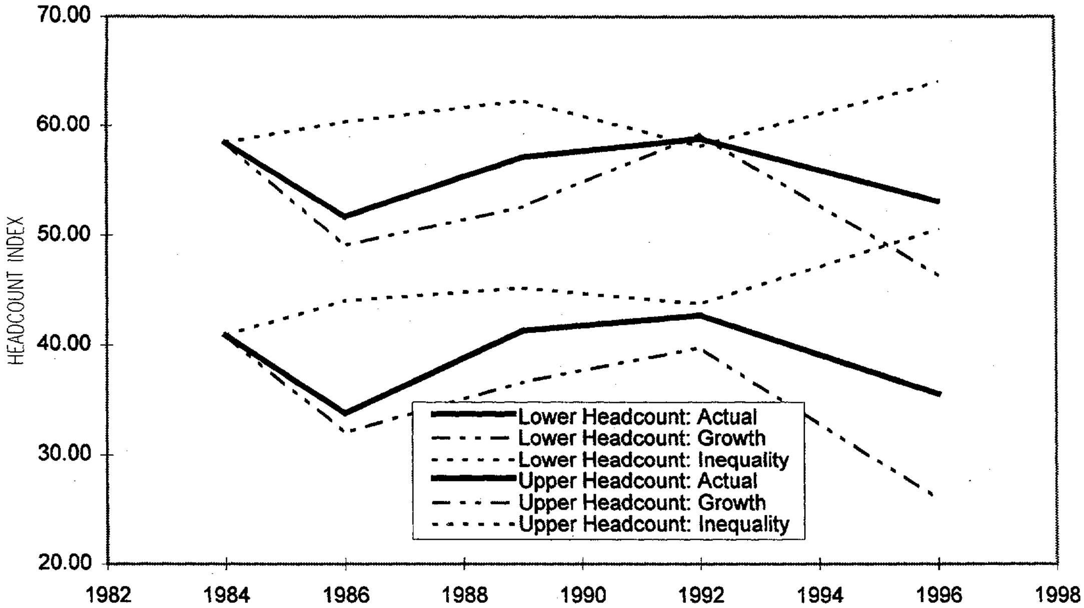


FIGURE 2: IMPACT OF GROWTH ON POVERTY - NATIONAL
[BANGLADESH, REGIONAL PANEL 1983-84 TO 1995-96]

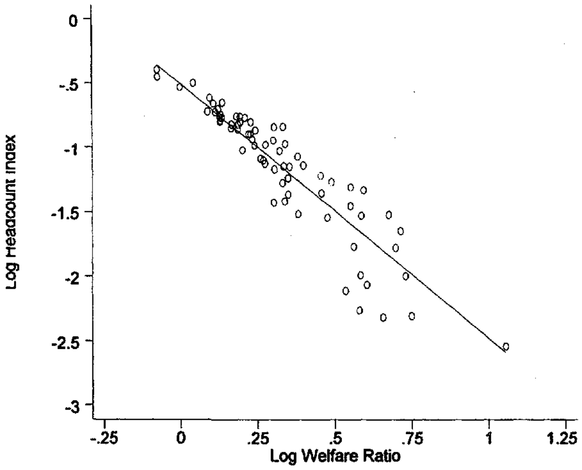


FIGURE 3: IMPACT OF GROWTH ON INEQUALITY - NATIONAL
[BANGLADESH, REGIONAL PANEL 1983-84 TO 1995-96]

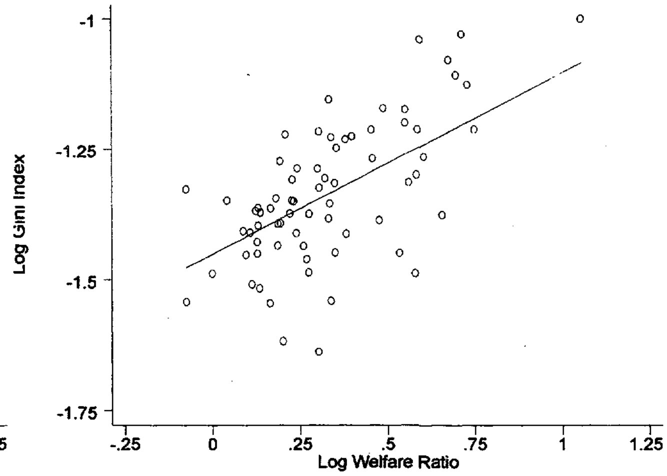


FIGURE 4: IMPACT OF GROWTH ON POVERTY - RURAL AREAS
[BANGLADESH, REGIONAL PANEL 1983-84 TO 1995-96]

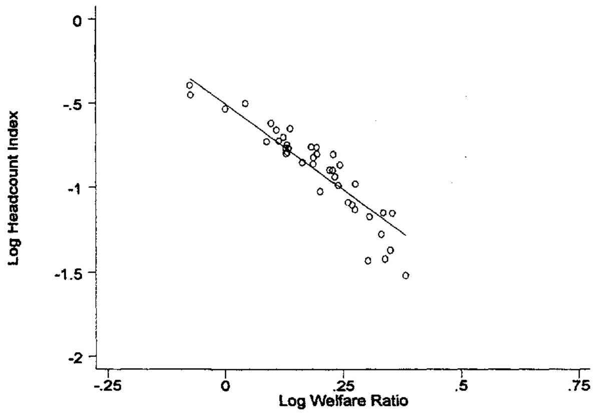


FIGURE 5: IMPACT OF GROWTH ON INEQUALITY - RURAL AREAS
[BANGLADESH, REGIONAL PANEL 1983-84 TO 1995-96]

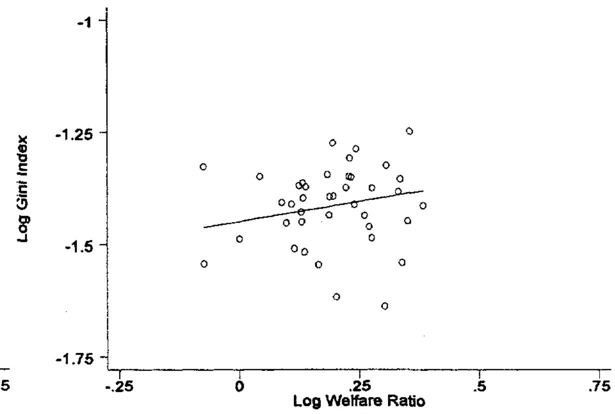


FIGURE 6: IMPACT OF GROWTH ON POVERTY - URBAN AREAS
[BANGLADESH, REGIONAL PANEL 1983-84 TO 1995-96]

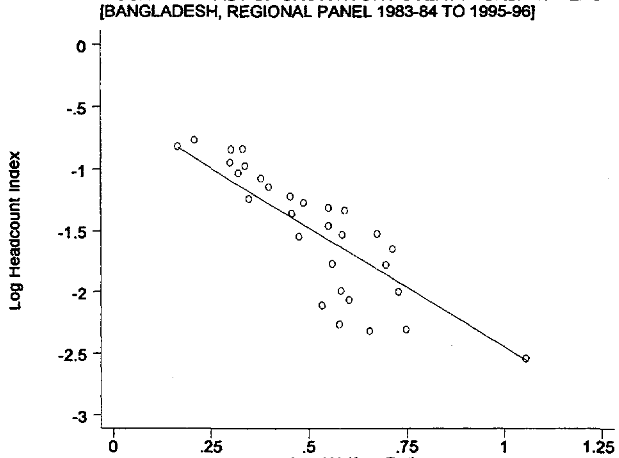
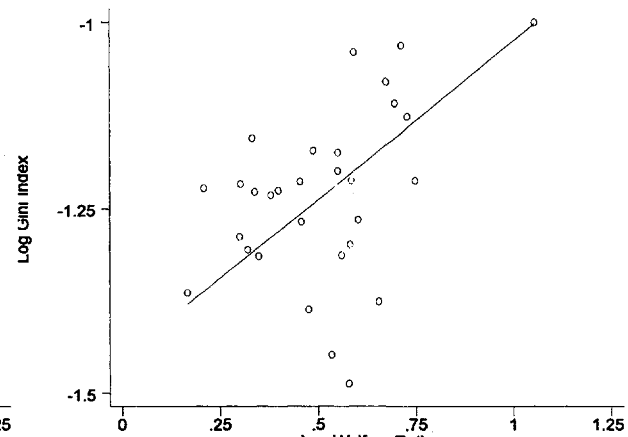


FIGURE 7: IMPACT OF GROWTH ON INEQUALITY - URBAN AREAS
[BANGLADESH, REGIONAL PANEL 1983-84 TO 1995-96]



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