

Spatial Dimensions of Income Inequality and Poverty in Bangladesh: An Analysis of the 2005 and 2010 Household Income and Expenditure Survey Data

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Using 2005 and 2010 Household Income and Expenditure Survey (HIES) data, the paper examines income inequality and poverty in Bangladesh with focus on their spatial dimensions. As disparity among administrative divisions is small, such inequalities, especially in the urban areas, need policy attention. As education appears to play an important role in increasing urban inequality, raising the level of general education is essential. Similarly, wages and salaries contribute to mitigating inequality which points to expanding opportunities for earning formal incomes. Though the effects are likely to be small, transfer programmes may be expanded to raise incomes among the poorest. In addition to raising general educational level, it is necessary to provide primary education throughout the country in order to mitigate poverty. It is imperative to raise agricultural productivity in both rural and urban sectors. Furthermore, non-agricultural activities should be promoted according to the pattern of comparative advantages.

Keywords: Income Inequality, Poverty, Spatial Dimensions, Bangladesh

JEL Classification: I3, O15, O18

I. INTRODUCTION

Bangladesh has achieved relatively high growth over the last two decades, during which its real gross domestic product (GDP) grew at an annual average rate of 5.2 per cent. In 2010, its per capita GDP exceeded 650 US dollars. The Goldman Sachs identified Bangladesh as one of the most promising economies in the 21 century and classified it into the Next 11 countries, together with Indonesia, the Philippines, South Korea, Vietnam, etc., which could follow the four emerging BRIC economies. However, the incidence of poverty in Bangladesh is still very high among Asian countries, even though it has declined

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considerably over the last two decades owing to steady growth. According to the Progress Report on Millennium Development Goals (GoB and UN 2005), almost half of Bangladeshis were living below US\$1 per day and the proportion of people in extreme poverty was 20 per cent in 2005. In line with the Millennium Development Goals, the Bangladesh government is making an effort to achieve the target of reducing extreme poverty to 14 per cent by 2015.

A number of factors have contributed to high incidence of poverty in Bangladesh, especially in rural areas. Adult illiteracy rate is very high at 60 per cent. About 80 per cent of active household members have no education or have attained only primary education. More than 40 per cent of the labour force is in the agricultural sector, and many farmers are landless and engaged in subsistence farming. Only a quarter of paid non-agricultural workers are females, and female wage is less than half of male wage in the non-agricultural sector. Meanwhile, there is a large disparity in infrastructure between the rural and urban sectors. While 80 per cent of urban households have access to electricity, only 30 per cent of rural households have access to electricity. Water supply conditions are even worse in rural areas; virtually no rural households have access to tapped water supply. Merely 9 per cent of rural households live in houses with brick walls, though many of them own houses. Very poor socioeconomic conditions in rural areas seem to have aggravated poverty in Bangladesh.

There have been a number of studies on inequality and poverty in Bangladesh; for example, Rahman and Huda (1992), Wodon (1997, 1999, and 2000), Khan (2001), Khandker (2005, 2009), Klychnikova and Diop (2006), Nath and Namun (2007), Shilpi (2008), Khandker, Bakht and Koolwal (2009), Khandker, Khalily and Samad (2010), and Kotikula, Narayan and Zaman (2010). But only a few studies have analysed inequality and poverty specifically in a spatial context. According to Eastwood and Lipton (2000) and Shorrocks and Wan (2005), the urban sector has much larger mean per capita income/expenditure than the rural sector and the urban-rural disparity accounts for around 10-20 per cent of overall income/expenditure inequality in most Asian countries. The urban sector has also larger income/expenditure inequality than the rural sector. On the other hand, poverty is more a rural than an urban phenomenon in the developing world, as rural poverty headcount ratio is appreciably higher than urban, and about three quarters of poor people live in rural areas using the \$1 a day poverty line (Ravallion, Chen and Sangraula 2007). In many developing countries, the incidence of poverty varies from region to region.

Bangladesh is a large country with the population of 140 million and the land area of 148 thousand square km, extending 820 km north to south and 600 km

east to west. It is bordered mostly by India, and the southern part of Bangladesh faces the Bay of Bengal. In 2010, the country is divided into 7 administrative divisions, and these divisions are further divided into 64 districts. In terms of socioeconomic conditions and physical and human geography, there are large differences between regions and between rural and urban areas. In order to formulate better policies to promote sustainable and equitable development, it is imperative to examine inequality and poverty in a spatial context. The main objective of this paper is to investigate income inequality and poverty in Bangladesh based on the 2005 and 2010 Household Income and Expenditure Surveys (HIES), with particular focus on their spatial dimensions (i.e., rural versus urban sectors and regions). This is achieved by conducting several inequality and poverty decomposition analyses by location and region based on the Theil indices, the Gini coefficient, and the Foster-Greer-Thorbecke indices.

II. THE DATA

2.1 Data

This study uses income data from the Household Income and Expenditure Survey (HIES) in 2005 and 2010 to analyse the distribution of economic well-being in Bangladesh. The HIES has been conducted almost every 5 years since 1973-74 to collect socioeconomic information at the household level. The original 2005 HIES dataset includes 10,080 households (504 primary sampling units times 20 households); but due to missing values, 684 households are eliminated from the dataset in this study, and thus we analyse the economic well-being of 9,396 households in 2005, of which 5,646 are in rural areas and 3,750 are in urban areas (BBS 2007). On the other hand, the 2010 HIES dataset includes 11,084 households, of which 7,051 households are in rural areas and 4,033 are in urban areas. This study measures inequality among these 9,396 households in 2005 and 11,084 households in 2010 in annual per capita household income (in Bangladesh Taka or BDT).

To measure poverty, this study uses individual level data, where we assume that household income is shared equally by the household members, i.e., each member receives its household's per capita income. In this study, we only analyse poverty in 2005, as we could not obtain poverty lines for 2010. Our 2005 dataset includes 48,543 individuals. The poor are those individuals whose per capita household income falls below a poverty line. In Bangladesh, poverty lines have been estimated based on the cost of basic needs, in which the cost of a basket of 11 food items, required to meet 2,122 calories per day, was estimated for urban and rural areas in each administrative division using regional price

data, as recommended by Ravallion and Sen (1996). Lower poverty lines, used in this study, correspond to this cost (i.e., food poverty lines).

In 2005, Bangladesh was divided into 6 administrative divisions: Barishal, Chittagong, Dhaka, Khulna, Rajshahi, and Sylhet. Table I presents the geographical distribution of households in the 2005 and 2010 samples. Dhaka has the largest number of households in the samples, which is followed by Rajshahi and Chittagong. Dhaka is most urbanised with the urbanisation rate of 44 per cent and 42 per cent respectively in 2005 and 2010, which is followed by Chittagong and Khulna. Sylhet has the largest household size, while Rajshahi has the lowest size in both 2005 and 2010.

TABLE I
GEOGRAPHICAL DISTRIBUTION OF HOUSEHOLDS
IN THE 2005 AND 2010 SURVEY SAMPLES

	Rural (%)	Urban (%)	Total (%)	Urbanisation Rate (%)	Household Size
2005					
Barishal	5.4	2.5	8.0	31.9	5.1
Chittagong	10.0	7.4	17.5	42.5	5.5
Dhaka	16.4	12.6	29.0	43.5	4.8
Khulna	8.6	6.3	14.9	42.3	4.7
Rajshahi	16.5	9.4	25.9	36.3	4.6
Sylhet	3.1	1.6	4.7	33.7	5.5
Total	60.1	39.9	100.0	39.9	4.9
2010					
Barishal	5.4	2.4	7.7	30.6	4.8
Chittagong	10.7	6.1	16.9	36.4	5.2
Dhaka	16.5	11.8	28.4	41.7	4.6
Khulna	9.4	5.9	15.4	38.6	4.3
Rajshahi	16.1	8.5	24.6	34.4	4.3
Sylhet	5.4	1.7	7.1	23.5	5.6
Total	63.6	36.4	100.0	36.4	4.7

As this study explores the factors of income inequality in the distribution of households, the active working member of a household having the highest education among the active members is assumed to represent the household, rather than the head of the household, who is the decision-maker of the household and usually the eldest member, where as active working members are considered as those members who are engaged in some sorts of income generating activities. The active working member representing a household may be the household head as well.

Household income is the sum of the earnings of all household members, either in cash or in kind. There are several sources of household income. The HIES dataset provides the 8 sources: (1) *Agro income* is an income generated from all agricultural products including farm, fishery and forestry products; (2) *Formal income* includes wages and salaries earned from various permanent and temporary jobs in farm and non-farm activities; (3) *Business income* includes profits earned in various entrepreneurial activities; (4) *Rental income* is an income generated by renting land, real estate or other establishments excluding agricultural equipment; (5) *Remittance income* encompasses remittance from within the country and abroad; (6) *Retirement income* includes pension, gratuity and other benefits after retirement; (7) *Transfer income* includes all direct and indirect transfers and gifts in cash or in kind, including transfers in social safety net programmes, education benefits, and prize in lottery; and (8) *Miscellaneous income* includes all other incomes such as interest and dividend incomes.

III. METHOD

3.1 Inequality Measures

Suppose that there are n households in a population, which are classified into m mutually exclusive and collectively exhaustive groups according to a certain categorical variable, such as location (e.g., urban and rural sectors, provinces, and regions), gender, age, education, occupation, sector, household size, etc. Let μ , n_i , μ_i , and y_{ij} be the mean per capita income of all households, the number of households in group i , the mean per capita income of households in group i , and the per capita income of household j in group i respectively. Overall inequality in per capita household income is then measured by the Theil indices T and L as follows (Anand 1983, Fields 2001):

$$T = \frac{1}{n} \sum_{i=1}^m \sum_{j=1}^{n_i} \left(\frac{y_{ij}}{\mu} \right) \log \left(\frac{y_{ij}}{\mu} \right) \quad (1)$$

$$L = \frac{1}{n} \sum_{i=1}^m \sum_{j=1}^{n_i} \log \left(\frac{\mu}{y_{ij}} \right) \quad (2)$$

These Theil indices belong to the generalised entropy class of inequality measures and satisfy several desirable properties as a measure of inequality: anonymity; income homogeneity; population homogeneity; and the Pigou-Dalton principle of transfers. Furthermore, they can be additively decomposed into the

within-group inequality component and the between-group inequality component as follows (Shorrocks 1980):

$$T = \sum_{i=1}^m \left(\frac{n_i \mu_i}{n \mu} \right) T_i + \sum_{i=1}^m \left(\frac{n_i \mu_i}{n \mu} \right) \log \left(\frac{\mu_i}{\mu} \right) = T_W + T_B \quad (3)$$

$$L = \sum_{i=1}^m \left(\frac{n_i}{n} \right) L_i + \sum_{i=1}^m \left(\frac{n_i}{n} \right) \log \left(\frac{\mu}{\mu_i} \right) = L_W + L_B \quad (4)$$

where T_i and L_i are respectively the Theil indices T and L for the within-group inequality of group i .

This study also uses the Gini coefficient to estimate inequalities in per capita household income. Suppose that all households are arranged in non-descending order of per capita household income, i.e., $y_1 \leq y_2 \leq \dots \leq y_n$, where y_i is the per capita income of i th household. Then the Gini coefficient for the distribution of per capita household income, $\mathbf{y} = (y_1, y_2, \dots, y_n)$, can be given by:

$$G = \frac{2}{n\mu} \text{cov}(i(\mathbf{y}), \mathbf{y}) \quad (5)$$

where $i(\mathbf{y})$ is the rank of households in the distribution of per capita household income. It should be noted that the Gini coefficient satisfies the above mentioned four desirable properties.

Suppose now that the per capita income of i th household is composed of K income sources as follows:

$$y_i = y_{1i} + y_{2i} + \dots + y_{Ki} \text{ and } \mu = \mu_1 + \mu_2 + \dots + \mu_K \\ i = 1, 2, \dots, n.$$

Then the Gini coefficient can be additively decomposed by income sources as follows (Pyatt, Chen and Fei 1980, Lerman and Yitzhaki 1985):

$$G = \sum_{k=1}^K w_k C_k = \sum_{k=1}^K w_k R_k G_k \quad (6)$$

In this formula, w_k is the share of income from source k and $C_k = \frac{2}{n\mu_k} \text{cov}(i(\mathbf{y}), \mathbf{y}_k)$, $G_k = \frac{2}{n\mu_k} \text{cov}(i(\mathbf{y}_k), \mathbf{y}_k)$, and $R_k = \frac{\text{cov}(i(\mathbf{y}), \mathbf{y}_k)}{\text{cov}(i(\mathbf{y}_k), \mathbf{y}_k)}$ are respectively the concentration ratio, the Gini coefficient, and the rank

correlation ratio for income source k , where $\mathbf{y}_k = (y_{k1}, y_{k2}, \dots, y_{kn})$ is the distribution of per capita household income from source k and $i(\mathbf{y}_k)$ is the rank of households in the distribution of per capita household income from source k .

In equation (6), if we let $g_k = \frac{C_k}{G} = \frac{R_k G_k}{G}$, then we have

$$1 = \sum_{k=1}^K w_k g_k \quad (7)$$

g_k is called the relative concentration ratio of income source k . If $g_k > 1$, then income source k is an inequality-increasing component, while if $g_k < 1$, then income source k is an inequality-decreasing component.

3.2 Poverty Measures

This paper uses the P_α class of poverty measures, which was devised by Foster, Greer and Thorbecke (1984) and thus known as the FGT indices, to measure the level of poverty. Let n , q , z , α , and y_i be the number of people, the number of poor people, the poverty line, the parameter of poverty aversion, which measures the sensitivity to poverty, and the per capita household income of individual i , where we assume that each individual receives its per capita household income. Then, the P_α class of poverty measures is defined by:

$$P_\alpha = \frac{1}{n} \sum_{i=1}^q \left(\frac{z - y_i}{z} \right)^\alpha \quad (8)$$

where $y_i < z$ for $i = 1, 2, \dots, q$. When $\alpha = 0, 1$, and 2 , equation (8) becomes respectively $P_0 = \frac{q}{n}$, $P_1 = \frac{q}{n} \bar{I}$ and $P_2 = \frac{q}{n} (\bar{I}^2 + (1 - \bar{I})^2 C_p^2)$.

$\bar{I} = \frac{z - \bar{y}_p}{z}$ is the average (normalised) income shortfall among the poor, where

$\bar{y}_p = \frac{1}{q} \sum_{i=1}^q y_i$ is the average income of the poor, while

$C_p^2 = \frac{1}{\bar{y}_p^2} \frac{1}{q} \sum_{i=1}^q (y_i - \bar{y}_p)^2$ is the squared coefficient of variation among the poor.

P_0 , P_1 , and P_2 are called respectively the poverty head count ratio, the poverty

gap index, and the poverty severity index. All these indices satisfy the principles of anonymity and population homogeneity. Furthermore, the poverty gap index satisfies the principle of strong monotonicity, while the poverty severity index satisfies the principle of distributional sensitivity in addition to strong monotonicity.

The P_α class of poverty measures is subgroup decomposable. Suppose that the population is divided into m mutually exclusive and collectively exhaustive groups. Let P_α^j and v_j are respectively the poverty of group j , as measured by the P_α indices, and the population share of group j . Then, overall poverty can be expressed as a sum of contributions from these groups as follows:

$$P_\alpha = \sum_{j=1}^m v_j P_\alpha^j \quad \text{or} \quad 1 = \sum_{j=1}^m \frac{v_j P_\alpha^j}{P_\alpha} \quad (9)$$

$\frac{v_j P_\alpha^j}{P_\alpha}$ is the % contribution of group j to overall poverty. When $\alpha = 0$ (i.e., headcount ratio), it is the % share of group j in poor population.

IV. EMPIRICAL RESULTS

4.1 Accounting for Overall Income Inequality

4.1.1 Rural and Urban Dimensions

Table II presents the result of inequality decomposition by location in 2005 (urban vs. rural sectors). Overall inequality in per capita household income is 0.741 as measured by the Theil index T, while according to the Theil L and the Gini coefficient, it is 0.469 and 0.504 respectively. A very large Theil T value, as compared to the values of the Theil L and the Gini coefficient, indicates that there are some exceptionally rich households in the 2005 sample, as, in the case of the Theil T, each household is weighted by its income share.

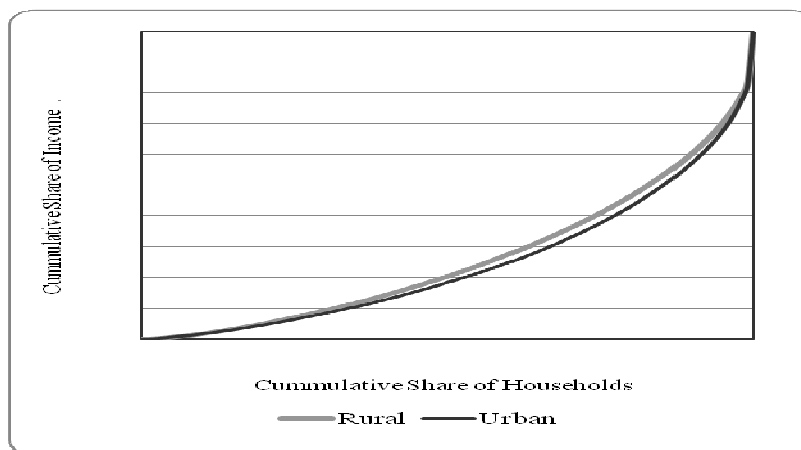
TABLE II
DECOMPOSITION OF OVERALL INEQUALITY BY LOCATION (URBAN VS. RURAL SECTORS) IN 2005

	Theil T	Theil L	Gini	Mean Income	Pop. Share (%)	Income Share (%)
Urban	0.709	0.473	0.513	25,190	39.9	50.4
(% Contribu.)	48.1	40.2				
Rural	0.730	0.430	0.477	16,489	60.1	49.6
(% Contribu.)	48.9	55.1				
Within sector	0.719	0.447				
(% Contribu.)	97.0	95.3				
Between sector	0.022	0.022				
(% Contribu.)	3.0	4.7				

Total	0.741	0.469	0.504	19,961
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When measured by the Theil L and the Gini coefficient, the urban sector has a larger inequality than the rural sector; but when measured by the Theil T, this is reversed. This indicates that the Lorenz curves for the urban and rural sectors cross. Figure 1 depicts the Lorenz curves based on per centile group data. It shows that the rural curve is located mostly above the urban curve. The question is why, according to the Theil T, the urban sector has a smaller inequality than the rural sector.

FIGURE 1: LORENZ CURVES FOR URBAN AND RURAL SECTORS IN 2005



According to the percentile group data in 2005, the two Lorenz curves, in fact, cross somewhere between the 8th and 9th percentile groups, i.e., urban sector's Lorenz curve is located above rural sector's curve up to the 8th percentile group. This, however, should not be the main reason why urban Theil T is smaller than rural Theil T, because the Theil T uses an income share as weight when each household's per capita income is compared to the mean per capita income of all households; very poor households are weighted by income shares that are much smaller than population shares.

It should be noted that the richest 1 per cent households (i.e., 100th percentile group) account for 18 per cent of total per capita household income, suggesting that there is a very large income disparity between the richest 1 per cent households and the other households in 2005. According to the Theil T, the disparity between these two groups is 0.36, accounting for almost 50 per cent of overall inequality (0.741). The within-group inequality of the richest 1 per cent households is also very large at 0.76, contributing 18 per cent to overall

inequality. This indicates that a few exceptionally rich households exist in the richest 1 per cent group.

Using the richest 1 per cent households (22 rural and 71 urban households in the sample), the inequality is decomposed by location in 2005. The result is presented in Table III. Interestingly, among the richest 1 per cent households, the rural sector has a much higher inequality than the urban sector according to all inequality indices (i.e., the Gini coefficient and the Theil indices). Rural sector's very high inequality in the richest 1 per cent group appears to be the main factor that raised its within-sector inequality among all households, which, according to the Theil T, exceeds urban sector's inequality (0.730 vs. 0.709).

TABLE III
DECOMPOSITION OF INEQUALITY AMONG THE RICHEST 1%
HOUSEHOLDS BY LOCATION (URBAN VS. RURAL SECTORS) IN 2005

	Theil T	Theil L	Gini	Mean Income	Pop. Share (%)	Income Share (%)
Urban	0.596	0.383	0.474	305,629	71.0	60.3
(% Contribu.)	47.1	53.8				
Rural	0.952	0.719	0.623	491,699	29.0	39.7
(% Contribu.)	49.5	41.3				
Within sector	0.738	0.481				
(% Contribu.)	96.6	95.1				
Between sector	0.026	0.025				
(% Contribu.)	3.4	4.9				
Total	0.764	0.506	0.540	359,649		

In the richest 1 per cent group, three households, one in urban Rajshahi and two in rural Khulna and rural Rajshahi, have exceptionally large per capita incomes in 2005. Their per capita household incomes are about 200 times as large as the mean per capita income of all households. Even among the richest 1 per cent households, their incomes are more than 10 times as large as the mean. These three very rich households appear to have raised overall inequality radically and would mask the true determinants of income inequalities for the majority of households. Therefore, this study excludes these three households from the 2005 sample. For a similar reason, one exceptionally rich rural household is excluded from the 2010 sample.

After excluding these exceptionally rich households, the result of inequality decomposition by location is given in Table IV. Overall inequality is reduced substantially to 0.484 in 2005 (from 0.741) according to the Theil T. Urban

sector's mean per capita household income is 1.6 times as large as rural sector's mean income. As the urban-to-rural ratio is not large, the between-sector inequality, at 0.027, accounts for only 5.5 per cent of overall inequality in 2005. Without the three rich households, the urban sector has a significantly larger within-sector inequality than the rural sector (0.53 vs. 0.38). Based on the bootstrap standard error for the Theil index T, the 95 per cent confidence interval is 0.32-0.44 for the rural sector and 0.45-0.61 for the urban sector. Urban inequality's contribution to overall inequality amounts to 56.2 per cent, while rural inequality's contribution is 38.3 per cent. In 2005, urbanisation rate was 39.9 per cent. Further urbanisation would make urban inequality more prominent in overall inequality. However, in the study period from 2005 to 2010, urbanisation rate has declined to 36.4 per cent, and the contribution of urban inequality to overall inequality has fallen to 44 per cent by the Theil T. As the urban-to-rural ratio in mean per capita income is merely 1.3, the between-sector inequality accounts for 2-3 per cent of overall inequality in 2010. During the study period, the rural sector seems to have grown more rapidly than the urban sector; but this high income growth appears to have increased inequality among rural households.

TABLE IV
DECOMPOSITION OF OVERALL INEQUALITY BY LOCATION
(URBAN VS. RURAL SECTORS) IN 2005 AND 2010

	Theil T	Theil L	Gini	Mean Income	Pop. Share (%)	Income Share (%)
2005						
Urban	0.530	0.425	0.488	23,981	39.9	51.3
(% Contribu.)	56.2	42.1				
Rural	0.381	0.345	0.430	15,104	60.1	48.7
(% Contribu.)	38.3	51.4				
Within sector	0.458	0.377				
(% Contribu.)	94.5	93.5				
Between sector	0.027	0.026				
(% Contribu.)	5.5	6.5				
Total	0.484	0.403	0.470	18,647		
2010						
Urban	0.482	0.415	0.489	38,144	36.4	43.6
(% Contribu.)	44.4	37.5				
Rural	0.448	0.379	0.467	28,171	63.6	56.4
(% Contribu.)	53.3	59.8				
Within sector	0.463	0.392				
(% Contribu.)	97.7	97.3				
Between sector	0.011	0.011				
(% Contribu.)	2.3	2.7				

Total	0.474	0.403	0.482	32,200
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Note: In the decomposition result in 2005, three very rich households (one in the urban and two in the rural sector) are excluded, while in the decomposition result in 2010, one very rich household (in the rural sector) is excluded.

4.1.2 Regional Dimension

Table V presents the result of inequality decomposition by administrative division (i.e., region). Disparity among administrative divisions is very small. In 2005, the largest mean per capita household income was registered by Sylhet, while the smallest by Rajshahi; the largest-to-smallest ratio was about 1.4. On the other hand, in 2010, the largest mean per capita income was registered by Dhaka, while the smallest by Rajshahi; the largest-to-smallest ratio was about 1.3. According to the Theil T, the between-division inequality accounts for merely 1.5 per cent and 1.0 per cent of overall inequality in 2005 and 2010 respectively. In other words, much of income inequality among households is due to within-region inequalities.

TABLE V
DECOMPOSITION OF OVERALL INEQUALITY BY ADMINISTRATIVE DIVISION
(REGION) IN 2005 AND 2010

	Theil T	Theil L	Gini	Mean	Pop Share (%)	Income Share (%)
2005						
Barishal	0.392	0.368	0.440	16,679	8.0	7.1
(% Contribu.)	5.8	7.3				
Chittagong	0.617	0.448	0.490	20,351	17.5	19.1
(% Contribu.)	24.3	19.4				
Dhaka	0.513	0.459	0.490	20,529	29.0	32.0
(% Contribu.)	33.8	33.1				
Khulna	0.449	0.349	0.455	17,884	14.9	14.3
(% Contribu.)	13.3	12.9				
Rajshahi	0.350	0.320	0.425	15,711	25.9	21.8
(% Contribu.)	15.8	20.5				
Sylhet	0.467	0.426	0.491	22,610	4.7	5.7
(% Contribu.)	5.5	5.0				
Within region	0.477	0.396				
(% Contribu.)	98.5	98.2				
Between region	0.007	0.007				
(% Contribu.)	1.5	1.8				
Total	0.484	0.403	0.470	18,647		
2010						
Barishal	0.445	0.411	0.484	29,047	7.8	7.1
(% Contribu.)	6.6	7.9				
Chittagong	0.443	0.399	0.477	34,555	16.9	18.3
(% Contribu.)	17.1	16.7				
Dhaka	0.497	0.414	0.484	34,826	28.4	31.1
(% Contribu.)	32.6	29.1				
Khulna	0.499	0.398	0.480	32,514	15.3	15.7
(% Contribu.)	16.5	15.2				
Rajshahi	0.432	0.374	0.470	27,863	24.6	21.6
(% Contribu.)	19.7	22.8				

Sylhet	0.492	0.405	0.485	28,270	7.1	6.3
(% Contribu.)	6.5	7.1				
Within region	0.470	0.398				
(% Contribu.)	99.0	98.8				
Between region	0.005	0.005				
(% Contribu.)	1.0	1.2				
Total	0.474	0.403	0.482	31,801		

Though Dhaka has the second highest within-region inequality as measured by the Theil T in both 2005 and 2010, its income share is the largest and thus it offers the largest contribution to overall inequality at 33 per cent. In 2005, Chittagong has the highest within-region inequality by the Theil T and its contribution to overall inequality amounts to 24 per cent, though its population share at 18 per cent is the third largest. While Rajshahi has the second largest population share at around 25 per cent, its mean per capita income is the smallest in both 2005 and 2010, and thus its contribution to overall inequality by the Theil T is much smaller.

Table VI presents inequality decomposition by location for each administrative division (region). The contribution of the between-sector inequality to total within-division inequality varies from division to division. But, except Sylhet in 2005, it is smaller than 10 per cent, signifying that much of within-division inequality is due to within-sector inequalities. Rajshahi has a very small urban-to-rural ratio in mean per capita income at 1.2; thus its between-sector inequality accounts for merely 1.0-1.5 per cent of Rajshahi's total inequality. Its urban mean per capita income is, in fact, the smallest among all administrative divisions. It should be noted that in Rajshahi, 20 per cent of its urban households are still engaged in agriculture as their main income-generating job, which is the biggest among all administrative divisions, and only 20 per cent of its urban households have secondary and higher education, which is the lowest.

Khulna has the second smallest urban-to-rural ratio at 1.4 in 2005, and the between-sector inequality accounts for 3 per cent of Khulna's total inequality, while in 2010, it has the smallest urban-to-rural ratio and its between-sector inequality accounts for less than 1 per cent of Khulna's inequality. Chittagong, Dhaka and Barishal follow next with the urban-to-rural ratio of around 1.7 in 2005 and 1.2-1.5 in 2010. Interestingly, in Barishal, about three quarters of its active working members representing urban households have primary and higher education, while in the other divisions, the proportion is less than 60 per cent. Sylhet is exceptional among 6 divisions, as its urban-to-rural ratio is very large at 2.4 in 2005 and 1.8 in 2010, and thus the between-sector inequality accounts for 20 per cent and 8 per cent of Sylhet's total inequality in 2005 and 2010 respectively. In Sylhet, more than 80 per cent of urban households are engaged in non-agricultural activities as their main income-generating jobs; the proportion

is, in fact, the largest among all divisions. On the other hand, more than 50 per cent of rural households are in the no-education group, and this proportion is the largest among all divisions.

In all administrative divisions, urban inequality is higher than rural inequality in 2005, while 3 out of 6 divisions have their urban inequality higher than rural inequality in 2010. The contribution of urban inequality varies from division to division; it ranges from 46 per cent in Rajshahi to 64 per cent in Chittagong in 2005. In 2010, the contribution fell substantially in most divisions, which ranges from 24 per cent in Sylhet to 50 per cent in Dhaka. On the other hand, rural inequality has increased in the study period and thus raised its contribution to within-division inequality in all administrative divisions. Rural sector's high income growth seems to have promoted income inequality among rural households in all administrative divisions. It is interesting to note that though rural inequality is relatively small in Rajshahi, its contribution exceeds 50 per cent.

TABLE VIA
DECOMPOSITION OF INEQUALITY BY LOCATION (URBAN VS. RURAL SECTORS)
FOR EACH ADMINISTRATIVE DIVISION IN 2005

	Theil T	% Contribution	Gini	Mean Income	Income hare (%)
Barishal					
Urban	0.452	51.4	0.459	23,310	44.6
Rural	0.281	39.7	0.401	13,572	55.4
Within sector	0.357	91.1			
Between sector	0.035	8.9			
Total	0.392	100.0	0.440	16,679	100.0
Chittagong					
Urban	0.711	63.8	0.525	26,524	55.4
Rural	0.426	30.8	0.427	15,786	44.6
Within sector	0.584	94.6			
Between sector	0.034	5.4			
Total	0.617	100.0	0.490	20,351	100.0
Dhaka					
Urban	0.493	54.8	0.482	26,889	57.0
Rural	0.453	38.0	0.460	15,634	43.0
Within sector	0.476	92.9			
Between sector	0.037	7.1			
Total	0.513	100.0	0.490	20,529	100.0
Khulna					
Urban	0.492	55.3	0.474	21,335	50.5
Rural	0.378	41.7	0.422	15,350	49.5
Within sector	0.436	97.0			
Between sector	0.014	3.0			
Total	0.449	100.0	0.455	17,884	100.0
Rajshahi					
Urban	0.391	46.1	0.441	17,871	41.3
Rural	0.313	52.4	0.410	14,479	58.7
Within sector	0.345	98.5			

Between sector	0.005	1.5			
Total	0.350	100.0	0.425	15,711	100.0
Sylhet					
Urban	0.415	48.8	0.471	36,758	54.8
Rural	0.323	31.3	0.422	15,416	45.2
Within sector	0.374	80.0			
Between sector	0.093	20.0			
Total	0.467	100.0	0.491	22,610	100.0

TABLE VIB
DECOMPOSITION OF INEQUALITY BY LOCATION (URBAN VS. RURAL
SECTORS) FOR EACH ADMINISTRATIVE DIVISION IN 2010

	Theil T	% Contribution	Gini	Mean Income	Income Share (%)
Barishal					
Urban	0.342	29.1	0.446	35,875	37.8
Rural	0.488	68.3	0.489	26,035	62.2
Within sector	0.433	97.4			
Between sector	0.012	2.6			
Total	0.445	100.0	0.484	29,047	100.0
Chittagong					
Urban	0.407	37.9	0.469	39,262	41.3
Rural	0.460	60.9	0.476	31,862	58.7
Within sector	0.438	98.8			
Between sector	0.005	1.2			
Total	0.443	100.0	0.477	34,555	100.0
Dhaka					
Urban	0.478	50.6	0.480	44,039	52.7
Rural	0.467	44.4	0.464	28,242	47.3
Within sector	0.473	95.1			
Between sector	0.025	4.9			
Total	0.497	100.0	0.484	34,826	100.0
Khulna					
Urban	0.608	49.7	0.518	34,358	40.8
Rural	0.422	50.1	0.452	31,353	59.2
Within sector	0.498	99.8			
Between sector	0.001	0.2			
Total	0.499	100.0	0.480	32,514	100.0
Rajshahi					
Urban	0.503	45.2	0.497	31,428	38.8
Rural	0.380	53.9	0.451	25,994	61.2
Within sector	0.428	99.0			
Between sector	0.004	1.0			
Total	0.432	100.0	0.470	27,863	100.0
Sylhet					
Urban	0.332	24.2	0.443	43,084	35.9
Rural	0.522	68.0	0.466	23,712	64.1
Within sector	0.454	92.2			
Between sector	0.038	7.8			
Total	0.492	100.0	0.485	28,270	100.0

4.2 Accounting for Rural and Urban Inequalities

4.2.1 Distribution of Households according to Household Attributes

In order to explore the determinants of rural and urban inequalities, it is instructive to analyse the distribution of households by gender, age, household size, education, and agriculture and non-agriculture sectors. Table VII presents these distributions.

TABLE VII
DISTRIBUTION OF HOUSEHOLDS BY GENDER, AGE, HOUSEHOLD SIZE,
EDUCATION AND SECTOR IN 2005 AND 2010 (IN %)

	2005			2010		
	Rural	Urban	Total	Rural	Urban	Total
Gender						
Female	16.7	14.4	15.7	8.2	10.9	9.2
Male	83.3	85.6	84.3	91.8	89.1	90.8
Age						
0-20	9.4	7.9	8.8	2.3	1.7	2.1
21-30	19.8	20.3	20.0	16.6	16.0	16.4
31-40	28.1	31.3	29.4	27.2	29.5	28.0
41-50	22.8	24.4	23.5	25.6	27.9	26.4
51-60	12.0	11.1	11.6	17.0	17.6	17.2
61+	7.9	4.9	6.7	11.4	7.3	9.9
Household Size						
1-3	21.6	23.2	22.2	25.3	27.3	26.0
4	23.0	26.5	24.4	25.1	28.1	26.2
5	21.1	21.5	21.3	22.1	20.5	21.5
6	15.5	14.0	14.9	13.1	12.1	12.7
7-	18.8	14.8	17.2	14.5	12.0	13.6
Education						
No Education	56.8	42.1	50.9	52.6	37.8	47.2
Primary	30.8	32.0	31.3	20.7	19.0	20.1
Secondary & Higher	12.4	26.0	17.8	26.7	43.2	32.7
Sector						
Agriculture	49.6	14.1	35.4	60.5	21.5	46.3
Non-agriculture	50.4	85.9	64.6	39.5	78.5	53.7

First, there is no notable difference in the distribution of households by gender between the rural and urban sectors. Second, about three quarters of households are represented by an active worker aged between 21 and 50 in the urban sector, while in the rural sector, the proportion is 70 per cent. However, the

rural and urban sectors are not very different in terms of the average age of active workers (39.1 and 38.4 respectively in both 2005 and 2010). Third, the rural sector has a larger average household size than the urban sector.

Fourth, there is a conspicuous difference between the rural and urban sectors in the distribution of households by the educational attainment of the active working member representing its household. In 2005, 57 per cent of households are in the no-education group in the rural sector, while in the urban sector, the proportion is much smaller at 42 per cent. On the other hand, 26 per cent of households are in the secondary and higher education group in the urban sector, while in the rural sector, the proportion is 12 per cent. By 2010, the proportion of the no-education group has decreased to 53 per cent in rural areas, while in the urban sector, it has declined to 38 per cent. Meanwhile, the proportion of the secondary and higher education group has risen significantly in both urban and rural sectors; in the urban sector, it is more than 40 per cent in 2010. Fifth, there is also a notable difference in the distribution of households with respect to agriculture versus non-agriculture sector. About half of rural households are in agriculture, but only 14 per cent of urban households are in agriculture in 2005. Interestingly, the proportion of households in agriculture has risen prominently in the rural sector: from 50 per cent to 60 per cent in 2010.

4.2.2 Inequality Decomposition by Population Sub-group

Table VIII provides the results of inequality decomposition by gender, age, education and sector (agriculture/non-agriculture) in the rural and urban sectors. As to gender and age, the between-group inequality is negligible in both 2005 and 2010. In the rural sector, households represented by a male active worker have a higher within-group inequality than female represented households by both the Theil T and the Gini coefficient. But, in the urban sector, the result is mixed depending on the Theil T and the Gini. Interestingly, female represented households have a larger mean per capita income than male represented households in both rural and urban sectors in 2005 and in the urban sector in 2010. Households represented by an active working member aged 51-60 have the highest mean per capita income in both rural and urban sectors. In the urban sector, mean per capita income increases gradually as we move from the 0-20 age group to the 51-60 group in both 2005 and 2010.

The between-group inequality is relatively large in the decomposition by education, accounting for 4.7 per cent and 11.1 per cent respectively of rural and

urban inequalities in 2005, while 6.4 per cent and 10.2 per cent in 2010. In rural areas, households represented by an active working member with secondary and higher education have 1.7 times as large mean per capita income as those with no education, whereas in urban areas, the ratio is larger at 2.3 in 2005 and 1.9 in 2010. In 2005, no-education group's inequality accounts for more than half of rural inequality, while the secondary and higher education group has the largest contribution to urban inequality at 37 per cent. By 2010, the contribution of no-education group's inequality has declined to 38 per cent in the rural sector, while in the urban sector, the contribution of secondary and higher education group's inequality has risen substantially to 49 per cent.

In the decomposition by sector (agriculture/non-agriculture), the between-group inequality is very small in both rural and urban sectors in 2005, though not negligible. In the urban sector, households represented by an active working member engaged in non-agricultural activities have 1.6 times as large mean per capita income as those in agriculture. But the ratio is 1.2 in the rural sector. Very interestingly, in 2010, mean per capita income is larger in the agricultural sector than in the non-agricultural sector in both rural and urban sectors. In particular, in rural areas, the agricultural sector has 1.6 times as large mean per capita income as the non-agricultural sector, and the between-group inequality accounts for 5 per cent of rural inequality. Agriculture seems to have contributed to a relatively high income growth in the rural sector.

TABLE VIII
INEQUALITY DECOMPOSITION BY GENDER, AGE, EDUCATION, AND
AGRICULTURE/NON-AGRICULTURE SECTOR IN THE RURAL AND URBAN
SECTORS IN 2005

	Rural				Urban			
	Theil T	% Contribution	Gini	Mean	Theil T	% Contribution	Gini	Mean
Gender								
Female	0.326	15.8	0.406	16,706	0.502	14.7	0.497	25,846
Male	0.392	83.9	0.434	14,784	0.535	85.3	0.486	23,669
Within-group	0.380	99.7			0.530	99.9		
Between-group	0.001	0.3			0.001	0.1		
Age								
0-20	0.367	9.5	0.414	15,777	0.434	5.6	0.417	20,888
21-30	0.329	18.3	0.407	16,148	0.406	14.4	0.451	22,175
31-40	0.397	27.5	0.437	14,212	0.652	39.0	0.523	24,244
41-50	0.330	18.3	0.421	13,976	0.574	28.7	0.504	26,079
51-60	0.509	18.4	0.459	17,353	0.373	8.5	0.455	26,086
61+	0.358	7.2	0.432	14,707	0.413	3.1	0.454	19,558
Within-group	0.378	99.2			0.527	99.3		
Between-group	0.003	0.8			0.004	0.7		

Education								
No Education	0.386	50.7	0.417	13,281	0.409	22.2	0.433	16,446
Primary	0.345	28.5	0.411	15,425	0.511	29.5	0.467	22,951
Secondary & Higher	0.331	16.2	0.427	22,660	0.487	37.2	0.471	37,463
Within-group	0.363	95.3			0.472	88.9		
Between-group	0.018	4.7			0.059	11.1		
Sector								
Agriculture	0.447	52.1	0.450	13,515	0.520	8.9	0.459	15,425
Non-agriculture	0.318	46.5	0.403	16,670	0.518	88.9	0.485	25,384
Within-group	0.375	98.6			0.519	97.8		
Between-group	0.005	1.4			0.012	2.2		
Total	0.381	100.0	0.430	15,104	0.530	100.0	0.488	23,981

TABLE VIII B
INEQUALITY DECOMPOSITION BY GENDER, AGE, EDUCATION AND
AGRICULTURE/NON-AGRICULTURE SECTOR IN THE RURAL
AND URBAN SECTORS IN 2010

	Rural				Urban			
	Theil T	% Contribution	Gini	Mean	Theil T	% Contribution	Gini	Mean
Gender								
Female	0.389	6.4	0.466	25,281	0.448	11.0	0.506	41,296
Male	0.452	93.5	0.466	28,431	0.487	88.9	0.487	37,758
Within-group	0.448	99.9			0.482	99.9		
Between-group	0.000	0.1			0.000	0.1		
Age								
0-20	0.332	1.4	0.419	23,795	0.329	0.7	0.431	22,114
21-30	0.522	17.5	0.474	25,385	0.448	12.5	0.475	32,216
31-40	0.524	28.3	0.482	25,125	0.525	29.2	0.494	34,730
41-50	0.371	20.5	0.442	27,290	0.451	27.1	0.475	39,613
51-60	0.367	17.1	0.448	34,613	0.465	21.2	0.495	47,711
61+	0.452	13.4	0.459	32,771	0.447	7.1	0.468	39,981
Within-group	0.440	98.1			0.472	97.8		
Between-group	0.008	1.9			0.010	2.2		
Education								
No Education	0.397	37.8	0.447	22,917	0.498	27.9	0.468	27,294
Primary	0.390	17.3	0.444	27,085	0.430	12.6	0.455	28,338
Secondary & Higher	0.462	38.4	0.462	39,347	0.404	49.3	0.456	51,928
Within-group	0.419	93.6			0.433	89.8		
Between-group	0.029	6.4			0.049	10.2		
Sector								
Agriculture	0.432	68.0	0.454	32,853	0.485	23.6	0.476	41,646
Non-agriculture	0.412	27.1	0.452	21,002	0.480	76.2	0.492	37,186
Within-group	0.426	95.1			0.481	99.8		
Between-group	0.022	4.9			0.001	0.2		
Total	0.448	100.0	0.467	28,171	0.482	100.0	0.489	38,144

4.2.3 Inequality Decomposition by Income Sources

Table IX presents inequality decomposition by income sources in the rural and urban sectors. In 2005, 35.7 per cent of total income is generated by agricultural activities in rural areas. Formal income (wages and salaries) and

business income follow next by accounting for, respectively, 25.5 per cent and 16.5 per cent of total income. Among these three income sources, business income serves to have raised inequality in per capita household income among rural households, while the other two sources serve to have lowered inequality, as indicated by relative concentration ratio. Though the share is very small, retirement income is an inequality-increasing source, while transfer income serves to have lowered inequality. Remittance income and rental income are both inequality-increasing sources, thus they contribute 11.3 per cent and 4.7 per cent to rural inequality respectively, which are larger than their income shares.

In the study period, the share of income generated by agricultural activities has increased substantially in the rural sector, from 35.7 per cent to 42.5 per cent. Agricultural income now serves to have raised inequality among rural households. This is in marked contrast to the role of agricultural income in 2005, which serves to have mitigated rural inequality. The contribution of agricultural income is more than 50 per cent of rural inequality in 2010. Like in 2005, remittance income and rental income are inequality-increasing sources, accounting for 12.9 per cent and 4.8 per cent of rural inequality in 2010 respectively, while transfer income is an inequality-reducing source.

In the urban sector, formal income (wages and salaries) accounts for 39.1 per cent of total income in 2005, which is followed by business income with the share of 33.1 per cent. Like in the rural sector, business income serves to have raised urban inequality, while formal income serves to have lowered urban inequality. Therefore, the contribution of business income to urban inequality amounts to 43.7 per cent, which is much larger than its income share. On the other hand, formal income accounts for 29.9 per cent of urban inequality, much smaller than its income share. Among the other income sources, income from agricultural activities and transfer income are inequality-reducing sources, while retirement income and rental income are inequality-increasing sources.

Like in the rural sector, agricultural income has increased its share in the urban sector and became an inequality-increasing source in 2010. Its contribution to urban inequality has risen to 15.8 per cent from 4.8 per cent. In contrast, business income has reduced its contribution conspicuously to 31.6 per cent from 43.7 per cent. Among other income sources, remittance income and rental income are inequality-increasing sources, while formal income and transfer income are inequality-reducing sources in 2010.

Formal income (wages and salaries) from farm and non-farm activities appears to have played an important role in mitigating income inequality in both

rural and urban sectors in the study period. Though the magnitude is very small, transfer incomes, such as transfers in social safety net programmes, also serve to have alleviated rural and urban inequalities. On the other hand, business income, i.e., profits from entrepreneurial activities, serves to have raised inequality in both rural and urban sectors. However, while business income plays a decisive role in urban inequality in 2005, its contribution to urban inequality has declined prominently. Income from agricultural activities has played a relatively more important role, not only in rural inequality but also in urban inequality. In order to reduce income inequality, it is apparent that opportunities for formal income (wages and salaries) from farm and non-farm activities should be expanded in both rural and urban sector. At the same time, transfer programmes, such as social safety net programmes, should be expanded to raise transfer incomes, particularly in lower income classes.

TABLE IX
INEQUALITY DECOMPOSITION BY INCOME SOURCES IN THE RURAL
AND URBAN SECTORS IN 2005 AND 2010

	Income Share (%) wk	Concentration Ratio Ck	Gini Coefficient Gk	Relative Concentration Ratio gk	% Contribution wk*gk
2005					
Rural Sector					
Agriculture	35.7	0.346	0.660	0.805	28.7
Formal	25.6	0.394	0.754	0.917	23.5
Business	16.5	0.546	0.883	1.270	21.0
Retirement	0.8	0.817	0.989	1.901	1.5
Remittance	7.7	0.632	0.924	1.471	11.3
Rental	3.6	0.565	0.913	1.316	4.7
Transfer	1.8	0.163	0.843	0.379	0.7
Miscellaneous	8.4	0.448	0.831	1.044	8.7
Total	100.0	0.430	0.430		100.0
Urban Sector					
Agriculture	8.5	0.276	0.886	0.565	4.8
Formal	39.1	0.374	0.649	0.765	29.9
Business	33.1	0.644	0.859	1.319	43.7
Retirement	1.1	0.745	0.989	1.525	1.7
Remittance	4.2	0.537	0.932	1.100	4.6
Rental	4.9	0.637	0.910	1.305	6.4
Transfer	1.0	0.169	0.901	0.347	0.4
Miscellaneous	8.0	0.520	0.869	1.065	8.5
Total	100.0	0.488	0.488		100.0
2010					
Rural Sector					
Agriculture	42.5	0.564	0.712	1.208	51.4
Formal	28.6	0.200	0.620	0.430	12.3
Business	15.0	0.509	0.880	1.092	16.4
Retirement	0.8	0.891	0.994	1.911	1.5
Remittance	8.3	0.722	0.947	1.548	12.9

Rental	3.6	0.632	0.936	1.355	4.8
Transfer	0.9	0.188	0.904	0.404	0.4
Miscellaneous	0.2	0.635	0.980	1.362	0.3
Total	100.0	0.467	0.467		100.0
Urban Sector					
Agriculture	12.8	0.607	0.921	1.241	15.8
Formal	45.9	0.378	0.631	0.772	35.4
Business	28.5	0.543	0.832	1.109	31.6
Retirement	1.3	0.774	0.991	1.581	2.0
Remittance	4.4	0.629	0.956	1.286	5.6
Rental	5.7	0.657	0.915	1.342	7.7
Transfer	0.5	0.206	0.936	0.422	0.2
Miscellaneous	1.0	0.821	0.992	1.677	1.7
Total	100.0	0.489	0.489		100.0

4.3 Accounting for Overall Poverty

4.3.1 Rural and Urban Dimensions

Table X presents the level of poverty by location (rural and urban sectors), as measured by the FGT indices. The rural sector accounts for 71.5 per cent of poor population, which is larger than its population share of 61.2 per cent, since the rural sector has a much higher incidence of poverty (i.e., higher poverty headcount ratio) than the urban sector: 35.5 per cent of people are under the poverty line in the rural sector, compared to 22.4 per cent in the urban sector. Rural poverty is also deeper than urban poverty, as shown by the average income shortfall (I): average income among the poor is 35.5 per cent smaller than the poverty line in the rural sector, while in the urban sector, it is 31.5 per cent. In other words, it would be more expensive on average to remove poverty in the rural sector than in the urban sector. Furthermore, rural poverty is severer than urban poverty, as inequality among the poor (C^2) is higher in the rural than in the urban sector, indicating that very poor people exist in the rural sector. Due to its larger average income shortfall and inequality among the poor, rural sector's contribution to overall poverty is 75.3 per cent as measured by the poverty severity index (P_2), which is even larger than its share of poor population (71.5 per cent).

TABLE X
POVERTY BY LOCATION (URBAN VS. RURAL SECTORS) IN 2005

	P0	P1	P2	Income Shortfall (I)	Inequality among Poor (C^2)	Population Share (%)
Urban	0.224	0.070	0.034	0.315	0.111	38.8
(% Contribu.)	28.5	26.2	24.7			
Rural	0.355	0.126	0.065	0.355	0.139	61.2
(% Contribu.)	71.5	73.8	75.3			
Total	0.304	0.105	0.053	0.344	0.131	100.0

4.3.2 Regional Dimension

Table XI provides the level of poverty by administrative division (region). Barishal has the highest head count ratio; 37.4 per cent of its people are under the poverty line. Rajshahi, Chittagong and Dhaka follow next, but their head count ratios are much smaller at around 0.30. On the other hand, Sylhet has the lowest head count ratio; 23.6 per cent of its people are under the poverty line. Due to its large population share, Dhaka accounts for 28.4 per cent of the poor in the country; Rajshahi and Chittagong come next with 23.9 per cent and 20.3 per cent respectively. Barishal, despite its high headcount ratio, contributes 10.1 per cent to overall poverty due to its small population share.

Poverty in Barishal and Dhaka is very deep as they have a very large average income shortfall (I); in these two divisions, average income among the poor is about 37 per cent smaller than the poverty line. Furthermore, Dhaka has a very high inequality among the poor, indicating that there are very poor people in this division. Due to its large average income shortfall and inequality among the poor, Dhaka's contribution to overall poverty is 33.4 per cent, as measured by the poverty severity index (P_2), which is much larger than its share of poor population (28.4 per cent). On the other hand, due to its low average income shortfall and inequality among the poor, Khulna's contribution to overall poverty is merely 8.4 per cent as measured by the poverty severity index (P_2), which is much smaller than its share of poor population (13.0 per cent).

TABLE XI
POVERTY BY REGION IN 2005

	P0	P1	P2	Income Shortfall (I)	Inequality among Poor (C^2)	Population Share (%)
Barishal	0.374	0.139	0.073	0.371	0.146	8.2
(% Contribu.)	10.1	10.9	11.3			
Chittagong	0.308	0.109	0.057	0.355	0.145	20.1
(% Contribu.)	20.3	21.0	21.7			
Dhaka	0.302	0.113	0.062	0.374	0.167	28.6
(% Contribu.)	28.4	31.0	33.4			
Khulna	0.282	0.077	0.032	0.275	0.070	14.0
(% Contribu.)	13.0	10.4	8.4			
Rajshahi	0.309	0.099	0.047	0.322	0.107	23.6
(% Contribu.)	23.9	22.4	20.9			
Sylhet	0.236	0.082	0.042	0.350	0.128	5.4
(% Contribu.)	4.2	4.3	4.3			
Total	0.304	0.105	0.053	0.344	0.131	100.0

Table XII shows the level of poverty by administrative division (region) in the rural and urban sectors. In the rural sector, Barishal has the biggest headcount ratio; 43.3 per cent of its rural people are under the poverty line. Rural Dhaka comes next with the headcount ratio of 0.391. Due to its large population share, rural Dhaka accounts for 21.3 per cent of overall poverty, as measured by the headcount ratio, i.e., 21.3 per cent of poor people are located in rural Dhaka. In both rural Barishal and rural Dhaka, average income shortfall and inequality

among the poor are also very high, indicating that poverty is deep and severe in these two rural areas. Rural Chittagong has also a relatively large headcount ratio, average income shortfall and inequality among the poor, though the levels are slightly lower than in rural Barishal and rural Dhaka. In the other administrative divisions (Khulna, Rajshahi and Sylhet), the head count ratio is relatively small in the rural sector; but, about 30-32 per cent of their rural population are still under the poverty line. It should be noted that rural Chittagong, rural Dhaka and rural Rajshahi together account for more than half of poor population, much greater than their combined population share of 42 per cent.

The urban sector exhibits a quite different spatial pattern of poverty incidence. In the urban sector, Rajshahi has the biggest poverty headcount ratio; 28.4 per cent of its urban people are under the poverty line, which is, in fact, slightly smaller than its rural sector's headcount ratio, meaning that in Rajshahi, poverty is not only a rural problem but also an urban problem. Urban Barishal, urban Khulna and urban Chittagong follow with the headcount ratio of 0.252, 0.238 and 0.229 respectively. On the other hand, Dhaka has a relatively small headcount ratio in the urban sector; only 18 per cent of its urban population are under the poverty line, which is in contrast to 39.1 per cent in the rural sector. However, urban Dhaka has a relatively large average income shortfall and inequality among the poor, signifying that poverty is deep and severe in urban Dhaka despite its small incidence of poverty. Like in the rural sector, urban Sylhet registers the smallest headcount ratio; merely 10 per cent of its people are under the poverty line. Urban Sylhet has also the lowest average income shortfall and inequality among the poor; the average income among the poor is 24 per cent smaller than the poverty line, and the incomes are concentrated around this average income in urban Sylhet.

TABLE XII
POVERTY BY ADMINISTRATIVE DIVISION (REGION) IN THE RURAL AND
URBAN SECTORS IN 2005

	Rural				Urban			
	P0	% Contribu.	Income Shortfall (I)	Inequality among Poor (C ²)	P0	% Contribu.	Income Shortfall (I)	Inequality among Poor (C ²)
Barishal	0.433	7.9	0.388	0.161	0.252	2.2	0.310	0.093
Chittagong	0.360	14.3	0.371	0.155	0.229	6.0	0.316	0.118
Dhaka	0.391	21.3	0.386	0.166	0.180	7.1	0.341	0.164
Khulna	0.312	8.5	0.267	0.068	0.238	4.5	0.289	0.075
Rajshahi	0.322	15.9	0.327	0.115	0.284	8.1	0.312	0.091
Sylhet	0.296	3.6	0.367	0.143	0.103	0.6	0.240	0.036
Total	0.355	71.5	0.355	0.139	0.224	28.5	0.315	0.111

4.4 Accounting for Rural and Urban Poverty

In this subsection, we analyse poverty level of individuals in relation to the attribute of the active working members who represent a household they belong to, as each household member has the same per capita income. Table XIII presents the level of poverty by the following attributes in the rural and urban sectors: gender, age, education and sector (agriculture/non-agriculture). In both rural and urban sectors, the male-represented household group has a larger headcount ratio than the female-represented household group. But, the difference is much more pronounced in the rural sector; in the rural sector, 37.9 per cent of male-represented household members are under the poverty line, as compared to 25.8 per cent in the female-represented group. Rural sector's male-represented group accounts for 64.2 per cent of the poor in the country, which is much larger than its population share of 52 per cent. Poverty in the male-represented household group is also deep and severe in the rural sector, as the group has a very large average income shortfall and inequality among the poor; the average income is 36 per cent smaller than the poverty line.

In the rural sector, the group of people whose households are represented by an active working member aged 31-40 has the largest headcount ratio. But, the 41-50 year old group has almost the same level of poverty. In these two groups, more than 40 per cent of the population are under the poverty line; they together account for 42 per cent of the poor in the country, which is much larger than their combined population share of 30 per cent. Poverty in the 41-50 year old group is also very deep and severe in the rural sector, as the group registers a very large average income shortfall and inequality among the poor; the average income among the poor is 38 per cent smaller than the poverty line. Though much smaller than these two groups, the 51-60 year old group and the 61+ group have a relatively high head count ratio in the rural sector, at around 0.32. Like in the rural sector, the 31-40 year old group has the highest headcount ratio in the urban sector, though its poverty level is much smaller than in the rural sector; 25 per cent of its people are under the poverty line.

In both rural and urban sectors, the highest headcount ratio is registered by the no-education group, which is followed by the primary education and secondary and higher education groups. In the rural sector, the no-education group has a very large headcount ratio; 42.5 per cent of its people are under the poverty line. The group also registers a relatively high headcount ratio in the urban sector, which is, in fact, bigger than the headcount ratio of rural sector's primary education group. The no-education group in the rural and urban sectors together accounts for about 64 per cent of the poor in the country, which is

compared to its population share of 50 per cent. It is interesting to note that the depth of poverty is very similar among the three educational groups in both rural and urban sectors; in the rural sector, the average income among the poor is around 35-36 per cent smaller than the poverty line, while in the urban sector, it is 30-31 per cent.

In both rural and urban sectors, the agriculture group has a very large headcount ratio; in the rural sector, 44.1 per cent of its people are under the poverty line, while in the urban sector, the proportion is 41.1 per cent. The agriculture group in the rural and urban sectors together accounts for a half of the poor in the country, which is much larger than its population share of 35 per cent. Poverty in the agriculture group is also very deep and severe, as the group has a very large average income shortfall and inequality among the poor; the average income among the poor is 38-39 per cent smaller than the poverty line and the squared coefficient of variation is around 0.17. It should be noted that 58 per cent of people in the agriculture group do not have any education in the rural sector, as compared to 52 per cent in the non-agriculture group. In the urban sector, the proportions are 50 per cent and 40 per cent respectively in the agriculture and non-agriculture groups.

TABLE XIII
POVERTY BY GENDER, AGE, EDUCATION, AND AGRICULTURE/NON-
AGRICULTURE SECTOR IN THE RURAL AND URBAN SECTORS IN 2005

	Rural				Urban			
	P0	% Contribu.	Income Shortfall (I)	Inequality among Poor (C^2)	P0	% Contribu.	Income Shortfall (I)	Inequality among Poor (C^2)
Gender								
Female	0.258	7.3%	0.305	0.103	0.204	3.3%	0.316	0.103
Male	0.379	64.2%	0.360	0.143	0.229	25.2%	0.309	0.106
Age								
0-20	0.318	6.4%	0.329	0.114	0.188	2.1%	0.224	0.048
21-30	0.277	10.7%	0.318	0.119	0.230	5.6%	0.263	0.073
31-40	0.418	22.8%	0.346	0.117	0.250	9.8%	0.325	0.107
41-50	0.412	19.3%	0.380	0.171	0.227	7.1%	0.326	0.122
51-60	0.326	7.6%	0.365	0.165	0.178	2.6%	0.341	0.128
61+	0.327	4.7%	0.387	0.161	0.224	1.3%	0.390	0.206
Education								
No Education	0.425	46.3%	0.356	0.142	0.334	17.4%	0.319	0.108
Primary	0.320	20.2%	0.347	0.123	0.211	8.7%	0.295	0.100
Second/Higher	0.196	5.0%	0.366	0.181	0.071	2.3%	0.293	0.114
Sector								
Agriculture	0.441	42.7%	0.394	0.170	0.411	7.3%	0.381	0.165
Non-agriculture	0.286	28.9%	0.295	0.093	0.195	21.2%	0.285	0.086

V. CONCLUDING REMARKS

This paper has attempted to analyse income inequality and poverty in Bangladesh based on the 2005 and 2010 Household Income and Expenditure Survey (HIES), with particular focus on their spatial dimensions (i.e., rural versus urban sectors and regions). Major findings are summarised as follows. Disparity between the rural and urban sectors is not large, accounting for around 5-6 per cent and 2-3 per cent of overall income inequality respectively in 2005 and 2010. The urban sector has a significantly larger within-sector inequality than the rural sector; its contribution to overall inequality amounts to 56 per cent in 2005 by the Theil T. Further urbanisation would thus make urban inequality more prominent in overall inequality. However, urbanisation rate has declined from 40 per cent to 36 per cent in the study period from 2005 to 2010, and the contribution of urban inequality to overall inequality has fallen to 44 per cent. The rural sector seems to have grown more rapidly than the urban sector; but this high income growth appears to have increased inequality among rural households. Disparity among administrative divisions (regions) is very small, and thus much of the income inequality among households is due to within-division inequalities. Dhaka, most populous division, has a relatively high within-division inequality in both 2005 and 2010, accounting for around 33 per cent of overall inequality, while Rajshahi, second populous division, has the smallest within-division inequality.

In most administrative divisions, much of within-division inequality is due to within-sector inequalities (i.e., urban and rural inequalities). Sylhet is an exception; its between-sector inequality accounts for 20 per cent and 8 per cent of its within-division inequality in 2005 and 2010 respectively. On the other hand, Rajshahi has a very small urban-to-rural ratio in mean per capita income; thus its between-sector inequality accounts for merely 1.0-1.5 per cent of its within-division inequality. Rajshahi's urban mean per capita income is, in fact, the smallest among all administrative divisions in both 2005 and 2010. In all administrative divisions, urban inequality is larger than rural inequality in 2005, while 3 out of 6 divisions have their urban inequality higher than rural inequality in 2010. Rural inequality has increased in the study period and thus raised its contribution to within-division inequality in all administrative divisions. Rural sector's higher income growth seems to have promoted income inequality among rural households in all administrative divisions.

Gender and age are not key determinants of rural and urban inequalities. Households represented by an active working member engaged in non-agricultural activities have a larger mean per capita income than those in agriculture in both rural and urban sectors in 2005; however, the disparity is not

large. However, in the study period, mean per capita income of the agricultural sector has grown more rapidly and exceeded that of the non-agricultural sector in both rural and urban sectors. In particular, in rural areas, the agricultural sector has 1.6 times as large mean per capita income as the non-agricultural sector in 2010 and the between-group inequality accounts for 5 per cent of rural inequality. Agriculture seems to have contributed to a high income growth in the rural sector in the study period. Interestingly, in the rural sector, households in agriculture have a higher within-group inequality than those in non-agriculture.

Education appears to have played an important role in income inequality, especially in the urban sector, where households represented by an active working member with secondary and higher education have 2.3 and 1.9 times as large mean per capita income as those without any education in 2005 and 2010 respectively. No-education group's inequality accounts for 51 per cent and 38 per cent of rural inequality, while the secondary and higher education group is the largest contributor to urban inequality at 37 per cent and 49 per cent in 2005 and 2010 respectively

According to the decomposition of inequality by income sources, in 2005, business income (profits earned in various entrepreneurial activities) serves to have raised rural inequality, while agricultural income (income from various agricultural activities) and formal income (wages and salaries earned in farm and non-farm activities) serve to have lowered rural inequality. Remittance income and rental income are both inequality-increasing sources in the rural sector, while transfer income serves to have lowered rural inequality. Like in the rural sector, business income is an inequality-increasing source in the urban sector in 2005, while formal income serves to have lowered urban inequality. Business income accounts for 44 per cent of urban inequality, while the contribution of formal income to urban inequality is 30 per cent. Among the other income sources, agricultural income and transfer income are inequality-reducing sources in 2005, while retirement income and rental income serve to have raised urban inequality. But their contributions to urban inequality are not large.

In the study period, the share of agricultural income has increased substantially in the rural sector, and in 2010, agricultural income serves to have raised inequality among rural households, accounting for more than 50 per cent of rural inequality. This is in marked contrast to the role of agricultural income in 2005. However, remittance income and rental income are still inequality-increasing sources in the rural sector, while formal income and transfer income are inequality-reducing sources. Like in rural areas, agricultural income has increased its share in the urban sector and became an inequality-increasing source in 2010. Its contribution to urban inequality has risen to 16 per cent. In

contrast, business income has reduced its contribution conspicuously to 32 per cent. Among other income sources, remittance income and rental income are inequality-increasing sources in the urban sector, while formal income and transfer income are inequality-reducing sources in 2010.

In the rural sector, 36 per cent of its people are under the poverty line, compared to 22 per cent in the urban sector in 2005; thus the rural sector accommodates 72 per cent of the poor in the country, much larger than its population share of 61 per cent. Rural poverty is also deeper and severer than urban poverty, as indicated by average income shortfall and inequality among the poor, signifying that a large number of very poor people exist in the rural sector. Barishal is the poorest division; 37 per cent of its people are under the poverty line. Rural Barishal is especially poor; but it accounts for 8 per cent of the poor in the country, due to its small population share. Rajshahi, Chittagong and Dhaka follow next, where about 30 per cent of their people are under the poverty line. In particular, rural Dhaka and rural Chittagong have high poverty headcount ratios. Poverty in these two rural areas is also deep and severe. In the urban sector, Rajshahi has the largest headcount ratio, indicating that poverty is not only a rural problem but also an urban problem in Rajshahi. On the other hand, urban Dhaka has a relatively small headcount ratio; but poverty in urban Dhaka is deep and severe, as indicated by a relatively large average income shortfall and inequality among the poor. Due partly to its relatively high mean per capita income, Sylhet has the smallest incidence of poverty in both rural and urban sectors. In the rural sector, Khulna follows next, due to its very small average income shortfall and inequality among the poor.

Education seems to be one of the most important factors of the incidence of poverty. In both rural and urban sectors, the no-education group registers the highest poverty headcount ratio, which is followed by the primary education and secondary and higher education groups. In the rural sector, 43 per cent of those in the no-education group are under the poverty line, while in the urban sector, the proportion is 33 per cent. The no-education group accounts for 64 per cent of the poor in the country. Household members represented by active working members who are engaged in agriculture also have a very high incidence of poverty; 44 per cent and 41 per cent of those in the rural and urban sectors are under the poverty line respectively.

Based on these observations, some policy recommendations can be formulated. As disparity among administrative divisions is small, inequalities within each administrative division need to be reduced. In particular, urban inequality should be reduced, because urbanisation would proceed in tandem with globalisation and liberalisation. As education appears to have played an

important role in income inequality, especially urban inequality, raising general educational level and promoting quality education are essential. As wages and salaries from farm and non-farm activities serve to have mitigated income inequality, especially in urban areas, opportunities for formal income should be expanded. Though the effect may be small, transfer programmes, such as social safety net programmes, should be expanded and strengthened in order to raise income among the poorest population.

In addition to raising general educational level and promoting quality education, it is necessary to provide at least primary education throughout the country in order to mitigate poverty. At the same time, it is imperative to raise agricultural productivity in both rural and urban sectors, as the incidence of poverty is very high for those who are represented by active working members engaged in agriculture. Furthermore, non-agricultural activities need to be expanded and promoted in accordance with the country's pattern of comparative advantages, as the non-agriculture group has a much lower incidence of poverty. As the 31-40 and 41-50 year old groups have a very high headcount ratio in the rural sector, another policy option to reduce poverty, in the short run, would be to give effective vocational training programmes to these groups.

REFERENCES

- Anand, Sudhir. 1983. *Inequality and Poverty in Malaysia: Measurement and Decomposition*. World Bank Research Publication, New York: Oxford University Press.
- BBS. 2007. *Household Income and Expenditure Survey (HIES), 2005*. Bangladesh Bureau of Statistics, Planning Division, Ministry of Planning.
- Eastwood, Robert and Michael Lipton. 2000. "Rural-Urban Dimensions of Inequality Change." Working Papers No. 2003. Helsinki: UNU World Institute for Development Economics Research.
- Fields, Gary S. 2001. *Distribution and Development*. Cambridge: The MIT Press.
- Foster, J., J. Greer and E. Thorbecke. 1984. "A Class of Decomposable Poverty Measures." *Econometrica*, 52(3): 761-766.
- GoB, and UN. 2005. *Millennium Development Goals: Bangladesh Progress Report*. Government of Bangladesh.
- Khan, Azizur Rahman. 2001. "Inequality and Its Sources in Bangladesh, 1991/92 to 1995/96: An Analysis based on Household Expenditure Surveys." *The Bangladesh Development Studies*, 27(1): 1-49.
- Khandker, Shahidur R. 2005. "Micro-finance and Poverty: Evidence using Panel Data from Bangladesh." *The World Bank Economic Review*, 19(2): 263-286.

- Khandker, Shahidur R. 2009. "Poverty and Income Seasonality in Bangladesh." Policy Research Working Paper No. WPS 4923. Washington, D.C.: World Bank.
- Khandker, Shahidur R., Zaid Bakht and Gayatri B. Koolwal. 2009. "The Poverty Impact of Rural Roads: Evidence from Bangladesh." *Economic Development and Cultural Change*, 57(4): 685-722.
- Khandker, Shahidur R., M.A. Baqui Khalily and Hussain A. Samad. 2010. "Seasonal and Extreme Poverty in Bangladesh: Evaluating an Ultra-poor Microfinance Project." Policy Research Working Paper No. 5331. Washington, D.C.: World Bank.
- Klytchnikova, Irina and Ndiame Diop. 2006. "Trade Reforms, Farm Productivity, and Poverty in Bangladesh." Policy Research Working Paper No. 3980. Washington, D.C.: World Bank.
- Kotikula, Aphichoke, Ambar Narayan and Hassan Zaman. 2010. "To What Extent are Bangladesh's Recent Gains in Poverty Reduction Different from the Past." Policy Research Working Paper No. 5199. Washington, D.C.: World Bank.
- Kuznets, Simon Smith. 1955. "Economic Growth and Income Inequality." *American Economic Review*, 45(1): 1-28.
- Lerman, Robert I. and Shlomo Yitzhaki. 1985. "Income Inequality Effects by Income Sources: A New Approach and Applications to the United States." *The Review of Economics and Statistics* 67(1): 151-156.
- Nath, Hiranya K., and Khawaja A. Namun. 2007. "Trade, Growth and Wage Inequality in Bangladesh." *Journal of International Trade and Economic Development*, 16(4): 505-528.
- Pyatt, Graham, Chau-man Chen and John Fei. 1980. "The Distribution of Income by Factor Components." *The Quarterly Journal of Economics*, 95(3): 451-473.
- Rahman Pk. Md. Motiur and S. Huda. 1992. "Decomposition of Income Inequality in Rural Bangladesh." *Modern Asian Studies*, 26(1): 83-93.
- Ravallion, Martin, Shaohua Chen and Prem Sangraula. 2007. "New Evidence on the Urbanization of Global Poverty." *Population and Development Review*, 33(4): 667-701.
- Ravallion, Martin, and Binayak Sen. 1996. "When Method Matters: Towards Resolution of the Debate about Bangladesh's Poverty Measures." *Economic Development and Cultural Change*, 44(4): 761-792.
- Shilpi, Forhad. 2008. "Migration, Sorting and Regional Inequality: Evidence from Bangladesh." Policy Research Working Paper No. 4616. Washington, D.C.: World Bank.
- Shorrocks, Anthony. 1980. "The Class of Additively Decomposable Inequality Measures." *Econometrica*, 48(3): 613-25.

- Shorrocks, Anthony, and Guanghua Wan. 2005. "Spatial Decomposition of Inequality." *Journal of Economic Geography*, 5(1): 59-81.
- Wodon, Quentin T. 1997. "Food Energy Intake and Cost of Basic Needs: Measuring Poverty in Bangladesh." *Journal of Development Studies*, 34(2): 66-101
- 1999. "Growth, Poverty, and Inequality: A Regional Panel for Bangladesh." Policy Research Working Paper No. 2072. Washington, D.C.: World Bank.
- 2000. "Microdeterminants of Consumption, Poverty, Growth, and Inequality in Bangladesh." *Applied Economics*, 32(10): 1337-52.