

DRAFT

**Explaining poverty reduction in the 2000s: an analysis of the
Bangladesh Household Income and Expenditure Survey**

Andy Kotikula
Ambar Narayan
Hassan Zaman

A background paper for Bangladesh Poverty Assessment (2007)

South Asia Region

World Bank

1. Since the beginning of the 1990s, Bangladesh has witnessed robust economic growth averaging around five percent and has seen impressive gains in human development outcomes. The Household Income and Expenditure Surveys of 2005 and 2000 (HIES 2005, 2000) provide an opportunity to assess the extent that living standards have improved, the factors that are associated with household consumption and poverty, and how changes in these may have influenced poverty reduction over time. This paper builds on recent work on measuring poverty and inequality trends (Narayan et al, 2007) that shows that poverty declined at almost twice the rate since 2000 than it did between 1990 and 2000. These trends also reveal sharp differences across geographical regions with poverty declining far more rapidly in the Eastern part of the country.

2. In this paper we attempt to understand the correlates or determinants of poverty, including the household specific attributes and geographic or location characteristics. An analysis of these factors using data from two different points in time (2000 and 2005) will also help understand the reasons behind this decline – by assessing whether household and geographic characteristics, or the returns to these characteristics, have changed significantly during this period. We apply a model specification that uses as a starting point the work done on determinants of poverty reduction between 1988 and 1992 (Ravallion and Wodon 1999) in order to assess the reasons behind these changes. We also discuss a range of poverty correlates and how they have evolved between 2000 and 2005.

3. The paper is structured as follows. The data sources are described in Section I. Poverty profiles, including a descriptive analysis of the correlation between consumption poverty, household characteristics and geographical location, are presented in Section II. Section III uses a multivariate regression framework to identify the relationships between household and location/geographic characteristics and poverty. This framework is also used to examine the trends in the correlates of poverty over time, to identify how changes in these factors may have contributed to poverty reduction. Section IV concludes the paper, summarizing the main findings and identifying future areas for further analysis.

I. Data sources

4. The main data source for this study is the Household Income and Expenditure Survey (HIES), a household survey conducted by the Bangladesh Bureau of Statistics (BBS). The paper relies primarily on the 2005 round of HIES for poverty profile and determinant analyses; the 2000 HIES is used to make comparisons over time. The 2005 survey was conducted from January to December. The sampling was based on 16 strata, created by dividing each of the 6 divisions into rural, urban and metropolitan areas (for larger divisions). Altogether, 504 primary sampling units (PSU) were drawn from the sampling frame; for each PSU, 20 households were randomly selected to be interviewed. The HIES sample consists of 10,080 households in 2005 and 440 in 2000. Apart from data on income and expenditure, HIES also includes several other modules on topics such as education, housing characteristics, employment, health and assets.

5. This paper also uses the community survey of the HIES to examine geographic characteristics, namely *mouza*-level characteristics such as access to market and services, infrastructure, etc. The 2001 *Population Census* is also used to obtain sub-district level variables measuring access to infrastructure. Finally, data on microfinance coverage at sub-district (*thana*) level was obtained from the *Palli Karma Sahayak Foundation (PKSF)*, the apex body for microfinance in Bangladesh.

II. Trends in standard of living measures and a profile of the poor

6. HIES data shows sizeable poverty reduction in Bangladesh over the last 15 years (between 1991-92 and 2005) and more recently, between 2000 and 2005. Estimates based on the Cost of Basic Needs (CBN) method show that in the year 2000, 49 percent of Bangladesh's population was poor (per capita consumption below the *upper poverty line*) as compared to 40 percent in 2005.¹ 34 percent of the population was extremely poor (per capita consumption below the *lower poverty line*) in 2000 as compared to 25 percent in 2005.² The percentage decline in poverty was higher in urban areas (24 percent) than in rural areas (19 percent).³

	Poverty Headcount (%)		Population Distribution (%)	
	2000	2005	2000	2005
<i>Roof materials</i>				
Brick/cement	6.5	5.2	6.9	8.1
C.I. Sheet/wood	47.2	40.1	70.6	82.4
Tile/wood	38.7	62.1	3.8	1.9
Hemp/hay/bamboo	73.3	71.3	18.1	6.8
Other	57.1	70.4	0.6	0.8
<i>Electricity Connection</i>				
Yes	24	20.8	32.6	45.4
No	60.8	55.9	67.5	54.6
<i>Telephone (Landline and/or mobile)</i>				
Yes	1.7	3.7	1.8	14.2
No	49.7	46	98.2	85.8
<i>Latrine</i>				
Unsafe	67	63	46	29
Safe	34	31	54	71
Total	49	40	100	100

Note: safe latrine includes sanitary latrine, pacca latrine (water seal), pacca latrine (pit), and kacha latrine (permanent).

7. Households' welfare can be observed through a range of characteristics that measure standard of living, going beyond consumption levels. One would expect these characteristics to be correlated with poverty reduction; households that have reached a higher *consumption* level are also likely to live in a better house, built with superior materials and equipped with features such as electricity and improved latrine. Therefore, improvements in these indicators would be consistent with reduction in consumption poverty – in other words serve as a consistency check for the consumption poverty trends. Furthermore, improvements in these indicators would also show a positive trend in the general well-being of the population, going beyond the relatively narrow measure of consumption on non-durable goods. Table 1 shows how these characteristics have changed between 2000 and 2005.

¹ Official poverty estimates (see Bangladesh Bureau of Statistics, 2006 and Narayan et al. 2007). The upper CBN poverty line—and upper poverty headcount—is used in much of the analysis in this paper and often refer to as *poverty rate*. There are 16 area-specific poverty lines for both 2000 and 2005.

² Similar 8-9 percentage point declines in national poverty rate are also found employing different methods to calculate poverty lines and price indices, indicating that the measured reduction in poverty is similar across a wide range of methodologies. The robustness with respect to the choice of poverty lines is consistent with changes in the distribution of per capita expenditure between 2000 and 2005.

³ The reduction in poverty headcount from 2000 to 2005 was statistically significant at 95 percent level of confidence for national and rural estimates, and at 90 percent level for urban.

8. Earlier work on poverty in Bangladesh shows that poverty and *quality of housing* is closely correlated. Specifically households who live in houses with straw roofs are typically considered extremely poor (Rahman 1995) – not surprisingly around 71 percent of households who have straw roofs are poor in 2005. More significantly, the number of such households has fallen dramatically, from 18 percent in 2000 to 7 percent in 2005 (Table 1). The data suggests that these households have upgraded to tin roofs as the proportion of households with tin roofs has gone up by 11 percentage points over this period.

9. Turning to *electricity connections* we find that poverty rate in 2005 among households living in homes with access to electricity is roughly one-third of those who do not. Moreover the two poorest divisions—Barisal and Rajshahi—also have the lowest connection rates (Annex, Table A-1). We also find that the number of electricity connections have risen from 33 to 45 percent over these five years (Table 1), although one needs to emphasize that most households suffer from regular power outages as there has been virtually no additional generation capacity during this period (World Bank, 2006).

10. Access to *hygienic toilet facilities* is closely associated with a reduced disease burden, better health outcomes and lower poverty. We find that between 2000 and 2005, the percentage of households with access to safe toilet has increased from 54 percent to 71 percent (Table 1). Table 1 also shows that in 2005 households who do not have access to safe toilet are around twice as likely to be poor than those who do.

11. Another indicator of changes in living standards is *access to a telephone*. We find that there has been a remarkable rise in the percentage of households with access to a phone (landline and/or mobile), driven by a sharp rise in mobile phones (from 2 percent of the population in 2000 to 13 percent in 2005). The dominance of mobile phone is even more evident in rural areas, where access to mobile phone is about 20 times higher than a land line. Access to a phone is also a clear indicator of poverty status – only 4 percent of households with access were poor while almost half the households who did not have access were below the poverty line in 2005 (Table 1).

12. The remaining part of Section II will profile poor households by factors that are likely to be associated with the *likelihood* of a household to be poor. The focus will primarily be on factors that are relatively “exogenous”, which is to say more likely to *determine* consumption levels rather than the other way around. The profiles are drawn in the form of bivariate cross-tabulations, while a multivariate analysis – using regressions to measure the effect of each factor holding others constant – will follow in Section III. In some cases, the levels and patterns of the poverty correlates in 2005 will also be compared with the corresponding figures in 2000, to provide some clues on what factors were associated with the reduction in poverty from 2000 to 2005.

13. **Household demographics** are typically closely associated with poverty. Cross-country evidence suggests that larger households, and households with a large number of children, are more likely to be poor (Lanjouw and Ravallion, 1995). This is also the case for Bangladesh, as the regressions presented in Section II (also see Table A-6, Annex) clearly show.

14. The close association between household size/composition and poverty must however be qualified in the light of the fact that the reference welfare measure used in Bangladesh is consumption *per capita*, which *does not take into account* economies of scale and equivalence

scales in consumption.⁴ Such effects are hard to quantify in a universally acceptable form, and therefore excluded from poverty measures following the practice in many countries. Note that ignoring such scale effects in consumption would most directly affect correlations with variables related to household size and composition. In other words, if scale effects could be incorporated, the association between household size/composition and poverty would likely be different from what is seen here. For example, the welfare level of larger households with more children would turn out to be higher than what their per capita consumption suggests.

15. The reduction in consumption poverty in Bangladesh has been accompanied by a *sharp fall in household size* from 2000 to 2005. A comparison of the 2000 and 2005 HIES shows that household size fell from

5.2 people per household in 2000 to 4.9 in 2005. This reduction occurred in both urban and rural areas. A closer look at the age structure shows that this is in line with the trend in national fertility, which showed a

sharp fall from 6.3 children per woman in 1975 to 3.3 in 1994 and has changed little since (Josh et al, XX). The HIES data shows that the largest reduction took place in the *average number of children* (age 1-14 years) per household, with a smaller reduction in the average number of adults and no reduction in the number of infants. This pattern is roughly consistent with the decline in fertility up to the mid-1990s, followed by a tapering off in recent years. More careful analysis, which is beyond the scope of this paper, will be necessary to draw direct links between fertility trends and household size and composition from HIES surveys.

	2000			2005		
	Rural	Urban	Total	Rural	Urban	Total
Household size	5.19	5.13	5.18	4.89	4.72	4.85
# infants	0.11	0.09	0.11	0.11	0.1	0.11
# children: 1-5 y/o	0.66	0.51	0.63	0.58	0.51	0.56
# children: 6-14 y/o	1.32	1.16	1.29	1.16	0.92	1.10
Number of adults	3.09	3.36	3.15	3.04	3.2	3.08

Note: Infant: family member of age less than 1 year

16. A recent paper using HIES 2000 and 2005 clearly illustrates the importance of **education** on wage rates, household income and poverty (Al-Samarrai, 2007). Not surprisingly, Table 3 shows that poverty rates in both 2000 and 2005 are much lower when household heads attain higher levels of education.

	Poverty Rate		Population Distribution	
	2000	2005	2000	2005
No Education	63.2	54.7	57.3	53.5
Primary	40.3	35.1	15.4	15.5
Secondary	30	21.4	19.9	22.1
Higher Secondary	8.8	8.5	5.9	3.6
Graduate and above	3.1	4.3	1.6	5.3

Source: HIES 2000, 2005

17. The overall trends from 2000 to 2005 suggest two important directions of changes: (i) an improvement in education level in 2005, which would contribute towards lower poverty; and (ii) lower poverty rate in 2005 for the *same* education level (up to secondary level). The population distribution across education levels shows that the proportion of household heads with graduate level education has risen from 1.6 percent in 2000 to 5.3 percent in 2005, while the share of those with no education has declined from 57 to 54 percent. At the same time, households headed by

⁴ Economies of scale in consumption refers to the fact that larger households are likely to obtain the *same* level of welfare per person with a lower expenditure per capita than a small household, due to the fact that certain types of expenditure are lumpy (rent for housing is one example) (see Lanjouw and Ravallion, 1995). Equivalence scale refers to adjustments to allow for the fact that consumption requirements are likely to vary by age, gender, sector (urban/rural) and even occupation or climate.

individuals with *no education* are seen to have experienced a reduction in poverty from 2000 to 2005. This is in line with the finding that the extreme poor (who have a higher proportion of household heads with no education than other groups) experienced a significant improvement in real incomes over this period (Narayan et al, 2007 and Serajuddin et al, 2007).

18. **Occupational status** is believed to be another key correlate of poverty. Earlier work in Bangladesh shows that *agricultural wage laborers* are typically the poorest occupational group (Hossain 1995) and Table 4 finds that this has remained unchanged – the poverty rate when household heads work as agricultural wage labor is 72 percent. Non-agricultural day

	Poverty rate (%)			Population share (%)		
	Rural	Urban	Total	Rural	Urban	Total
Self: agri	33	27	33	29	6	23
Self: non-agri	38	23	33	17	31	20
Salary wage employment	27	17	22	10	31	15
Daily wage: agri	72	72	72	19	5	16
Daily wage: non-agri	60	55	59	12	15	13
None	30	20	28	13	13	13
Total	44	28	40	100	100	100

Source: HIES 2005

laborers, predominately in urban areas, are slightly better off with a poverty rate of 59 percent. The extent of the occupational disparity is shown by the fact that the proportion of daily wage households below the poverty line (averaging between agricultural and non-agricultural), is double that for the second poorest group— when the household heads are self-employed (Table 4).

19. **Land ownership** is the most common targeting variable in anti-poverty programs in Bangladesh given its close relationship with poverty status particularly in rural areas. Table 5 confirms this – poverty rate for the landless was 57 percent in 2005 compared to 24 percent for

<i>Land size</i>	<i>Poverty Rate</i>		<i>Population Distribution</i>	
	2000	2005	2000	2005
Landless <0.05 acre	63.5	56.8	48.0	45.8
Functionally landless 0.05-0.5 acre	59.7	48.8	13.0	15.9
Marginal 0.5-1.5 acres	47.2	35.1	17.5	18.8
Small 1.5-2.5 acres	35.4	23.7	9.2	8.8
Medium/large: 2.5 acres or more	20.7	12.8	12.4	10.7

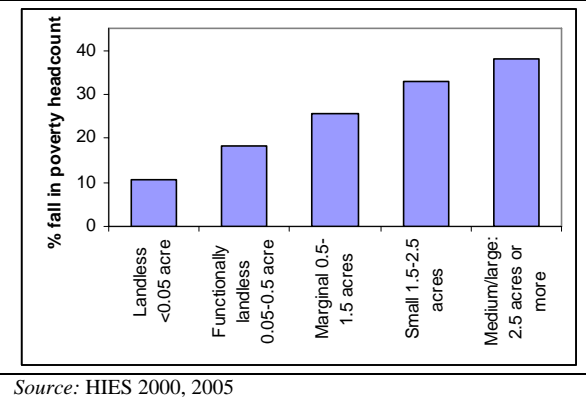
Source: HIES 2000, 2005

small landowners and 13 percent for medium/large landowners. Land ownership is correlated with poverty not only in rural areas, but also in urban areas (Table A-2, Annex).

20. A comparison between 2000 and 2005 suggests: (i) while poverty reduction has occurred among all land ownership groups, the rate of reduction is positively correlated with land size; and (ii) no discernible change in land distribution has occurred in these 5 years in rural areas. Figure 1 shows that the fall in headcount rate was progressively greater for higher land ownership. Poverty fell by 11 percent among landless households, 26 percent among the marginal landowners, 33 percent among small landowners and 38 percent among medium/large landowners. Table 5 also shows the distribution of land holding has been stable; in both 2000 and 2005, around 61 percent of households in rural Bangladesh have less than 0.5 acres of land – the commonly used targeting criteria for NGO programs.

21. **Lack of asset ownership** is widely considered to be an important characteristic of poor households. While land is perhaps the most important asset in rural areas of developing countries, the ownership of other types of property is also likely to be important – in terms of determining a household’s ability to smooth consumption or finance income generating activities including migration, through sale of assets or using them as collateral for credit. Although it is difficult to get a measure of the value of assets owned from household data, information on *sale* of assets/property would be an indirect indicator of how asset ownership is related to poverty status. Looking at property sale just by itself may however be misleading. For the poor, sale of property could be a way to alleviate distress that would improve consumption in the short-run but adversely affect long-term income-earning potential. On the other hand, for the non-poor, asset sales are more likely to be driven by the need to earn higher income in the long-run.

Figure 1: % reduction in poverty headcount (2000-05) by land ownership



22. Most importantly, whether someone *can* sell their property is conditioned on *prior ownership*. Poor households who don’t have any land or property cannot sell any. To adjust for this bias partially, Table 6 shows poverty rate of households by their agricultural land size (as a proxy for asset ownership) and whether they sold any property last year. The figures suggest that households who sold property last year had lower poverty rates overall. However, the correlation depends on the extent of land ownership. Property sale is associated with lower poverty rate for the landless, functionally landless and marginal landowners; but has no correlation with poverty status among small, medium and large landowners. This finding is however further complicated by the fact that categories in Table 6 refer to the land ownership status *after* the property sale has occurred.

Land size (acre)	Poverty rates (%)		
	Sold property last year	Did not sell	Overall poverty rate
Landless <0.05	45	34	45
Functionally Landless 0.05 to 0.5	41	33	41
Marginal 0.5 to 1.5	29	28	29
Small 1.5 to 2.5	18	20	18
Medium and Large 2.5 or more	9	8	9
Total	38	25	37

Source: HIES 2005

23. Given these serious caveats, the correlations between property sale and poverty status must be interpreted cautiously. While more analysis will be required to understand how ownership and sale of property/assets affect consumption-smoothing and income generation, the findings in Table 6 provide some indication that the ability to sell property is likely to affect poverty status, particularly among households who are not asset-rich to start with.

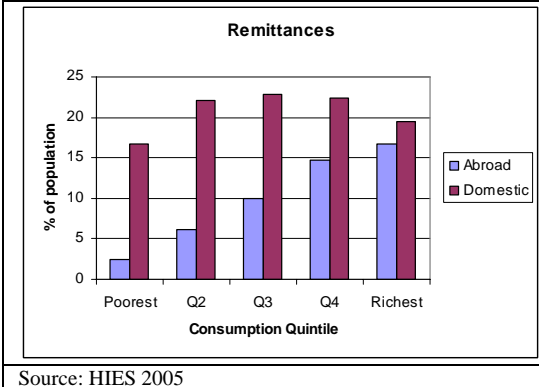
24. **Remittances** have been a key driver of poverty reduction in several countries and their role appears to have grown over the past decade (World Bank 2005).⁵ Central Bank data shows that official remittances have grown from 2 billion dollars in 2002 to around 5 billion in 2006. According to HIES 2005 data, international remittances account for 8.3 percent of household’s

⁵ See World Bank et al (2006) for an analysis of the role of remittances in reducing poverty in Nepal.

total consumption, while domestic remittances account for 3.1 percent. The 2005 data shows that poverty among households receiving remittances from abroad is only 17 percent, compared to 42 percent among those who do not receive foreign remittances.

25. HIES 2005 shows that while domestic remittances are received by the rich and the poor alike, foreign remittances go mostly to households in higher consumption quintiles. Figure 2 illustrates the narrowing gap between domestic and international remittances as households move up the consumption quintiles.

Figure 2 Percentage of population receiving remittance by quintile, 2005



26. The geographical pattern of remittances is important, particularly in the light of sharp variations in poverty rates and the pace of poverty reduction across regions. International remittances are concentrated in Chittagong (24 percent of households receiving remittances in 2005) and Sylhet divisions (16 percent). In contrast only 1 percent of households in Rajshahi, 4 percent in Khulna and 5 percent in Barisal receive remittances from abroad (see Annex, Table A-3). This east-west divide in remittance patterns has not changed much between 2000 and 2005, and roughly mirrors the pattern of poverty in Bangladesh in 2005 that shows the eastern part of the country faring much better on the average than the western part. The distribution of domestic remittances is more even (Annex, Table A-3), with fewer households in Dhaka and Sylhet receiving money from other parts of the country as these are divisions where either workers remit money to their own villages (Dhaka) or receive remittances from abroad (Sylhet).

27. Poverty has clear **gender dimensions** and one would expect this to show up as differences in the poverty rate of female-headed and male-headed households. However the literature shows that it is important to distinguish between de-facto and de-jure female headed households (Buvinic and Gupta, 1997), as for instance female headed households who have migrant male spouses (who is often the de facto household head) remitting income may in fact be less poor than male headed households.

28. The HIES 2005 confirms that this distinction is important for Bangladesh. Without taking into account remittances, female headed households in Bangladesh appear to be better off than male-headed households. But comparing male and female headed households who do *not receive remittances from abroad*, it turns out that there is no significant difference in poverty rate (Table 7). Even this refinement, however, does not fully take into account the difference between de facto and de jure head of the household, and is therefore not the definitive finding on poverty in female-headed households. More importantly, the gender dimension of poverty is closely related to intra-household resource allocation – an issue the HIES data sheds no light on.

Receives Remittances from Abroad	Male headed			Female headed		
	Not Married	Married	Total	Not Married	Married	Total
No	37	43	43	42	31	40
Yes	13	20	19	17	9	11
Total	35	41	41	38	17	29

Note: population weighted
Source: HIES 2005

29. In Bangladesh, the microfinance revolution in recent years is an important phenomenon to consider for any cross-section or time trend analysis of poverty. Unfortunately, lack of adequate information on savings/credit in the HIES does not allow for incorporating microfinance access at the household level into the analysis. Instead, data obtained from PKSf on changes in microfinance coverage at the sub-district (*thana*) level is merged with HIES data to look at broad correlations between these changes and changes in poverty. This results of the analysis hint at an interesting relationship between expansion in microfinance and reduction in poverty.

30. Table 8 shows that **microfinance access** has increased significantly in recent years, with the number of members increasing by 62 percent between 2003 and 2005.⁷ A majority of microfinance clients are served by three major providers: BRAC, ASA, and Grameen Bank, with market share of the major three not having changed much between 2003 and 2005.

	2003	2005
Number of members: BRAC	3,341,325	4,289,969
Number of members: ASA	2,071,486	4,180,157
Number of members: Grameen	2,786,748	4,881,444
<i>Number of members: Total</i>	<i>12,866,585</i>	<i>21,731,043</i>
Share of 3 major MFIs (%)	63.7	61.4
Effective rate of coverage (% of households)	31.1	51.1
<i>Note: 1) Total number of members also includes members of the smaller providers; 2) effective rate of coverage is the estimated number of microfinance households divided by the projected total number of households</i>		
<i>Source: PKSf (2005)⁶</i>		

31. Table 9 shows that on the average, microfinance membership expanded faster in areas that were poor in 2000. But sub-districts with faster growth in microfinance coverage, which were on the average poorer in 2000 than those with lower growth in microfinance, also experienced a higher rate of poverty reduction. For instance, in *thanas* where microfinance membership grew by less than 20 percent, poverty incidence fell by less than 4 percent. However, where micro-credit coverage grew by more than 40 percent, the reduction in poverty rate is as high as 13 percent.

<i>Increase in no. of members</i>	<i>Poverty Rate (%)</i>		
	2000	2005	Change (%)
Less than 20%	46.6	42.7	-3.9
20% to 30%	46.8	40.0	-6.8
30% to 40%	50.9	38.4	-12.6
More than 40%	54.4	41.1	-13.3
Total	49.6	40.3	-9.3
<i>Note: Increase in microfinance activities refers to percentage change in members in Thana between 2000 and 2005.</i>			

32. A few caveats must be noted. *First*, these findings, like all other results in this section, do not necessarily imply a causal link between poverty reduction and microfinance expansion. *Second*, since the membership figures are *thana*/sub-district level aggregates and the poverty incidence is calculated from household level data, the association between microfinance coverage and poverty is a correlation between the geographic patterns of microfinance access and poverty reduction, rather than a household level correlation (unlike the other poverty correlates analyzed so far). *Third*, in the absence of membership figures from 2000, the change in microfinance membership during 2003-05 is used, whereas the poverty trend is from 2000 to 2005. The results above thus

⁶ The effective rate of coverage is the estimated number of micro finance households divided by the total number of households. Due to multiple memberships within households, the number of microfinance households is estimated to be 66 percent of total number of members (see World Bank, 2006). The total number of households is projected from Census 2001, assuming an annual population growth of 1.5 percent.

⁷ Figures for the number of borrowers in 2003 and in 2005 were obtained, as there was no comparable data for 2000.

implicitly assume that the annual rate of client growth in each sub-district during 2003-05 is similar to what would have occurred between 2000 and 2005.

33. Notwithstanding these caveats, these results indicate a likely relationship between microfinance expansion and poverty reduction. More careful analysis, using panel data that has household level information including access to microfinance, would be required to provide more conclusive evidence on the question of what the impact of increased access to microfinance has been on poverty in Bangladesh.

34. **Geographical pockets of poverty**, or ‘lagging regions’, exist in virtually every country. Bangladesh is no different (Ravallion and Wodon, 1999). While poverty reduction has occurred for both rural and urban areas, a disaggregation by geographic regions reveals a mixed picture, with an emerging contrast between the eastern and western parts of the country. Dhaka, Chittagong and Sylhet divisions, all in the eastern part of the country have had the most significant reductions in poverty; in contrast to Barisal, Khulna and Rajshahi divisions, in the Western part of the country. Regional differences were thus quite sharp in 2005 – the poverty headcount ranged from a low of 32 percent in Dhaka and 34 percent in Chittagong and Sylhet to over 50 percent in Barisal and Rajshahi. A decomposition exercise shows that two divisions – Dhaka and Chittagong – contributed to as much as 79 percent of the aggregate reduction in poverty headcount between 2000 and 2005.⁸

35. This section has shown that a number of household level characteristics – notably household size and composition, occupation and education of household head, ownership of land and whether the household receives foreign remittances or not – appear to be strongly associated with its poverty status. In addition, there is also some evidence that poverty reduction is associated with expansion of microfinance at the sub-district level. Geographic location also seems to matter for poverty reduction, with significant differences emerging between the eastern and western parts of the country. The following section will examine these correlations in a multivariate framework, through poverty determinant regression models. While even such a framework will not be sufficient to clearly identify the causal effects, it will quantify the relative importance of each household/location attribute in influencing household consumption, controlling for the effects of other attributes. In addition, by comparing the results from similar models from different points in time, some inferences can be made about the factors responsible for the changes in poverty incidence over time.

III. Determinants of poverty from multivariate regressions

The model

36. The model specification follows Ravallion and Wodon (1999) (henceforth R-W) to a large extent, which involves estimating separate regressions between urban and rural samples, with district dummies in each regression. This implies that the coefficients are constant within each urban and rural sample, but each district may have different intercepts, captured by the district dummies. The econometric model can be written as follows.

$$(1) \quad Y_i = \alpha_U + X_i\beta_U + D_i\delta_U + \varepsilon_{Ui}; \quad (2) \quad Y_i = \alpha_R + X_i\beta_R + D_i\delta_R + \varepsilon_{Ri}$$

⁸ This refers to a sectoral decomposition of changes in poverty headcount between 2000 and 2005, with the sectors defined as the 6 divisions. Total intra-sectoral effect accounted for 99.8 percent of the change in poverty headcount (Dhaka, Chittagong, Rajshahi and Sylhet contributing 52, 27, 15 and 6 percent respectively), with the population shift effect having an (opposite) effect of -0.4 percent, and the interaction between the population-shift and intra-sectoral effects contributing 0.6 percent.

37. Y is natural logarithm of per capita consumption, X represents household attributes, and D denotes dummy variables for each district, following the old classification of districts (old *zillas*). The classification of old districts/*zillas* – as opposed to the “new” districts – is retained for two reasons. *Firstly*, this allows for a direct comparison with R-W results that are based on HES 1991-92 and 1988 – useful to infer indirectly the long-term dynamic changes in the correlates of consumption poverty. *Secondly*, if the current classification (64 new districts/*zillas* instead of 17 old *zillas*) were used, the number of location/district dummies in the regression would become so large as to make interpretation of the results difficult; and the number of households in each location would be too small to yield statistically significant effects of district dummies. Note that the classification of districts is used here just to estimate the effect of location attributes by some criterion of geographic disaggregation. In this context, whether the particular unit of analysis captures current administrative arrangements is less important, as long as this unit remains unchanged over time.

38. Equation (1) and (2) are estimated separately with ordinary least squared (OLS), where standard errors are corrected for cluster effect within district. The equations take a linear form. The Basic Model—model (1) and model (3) in Table A-6, Annex—are the baseline specifications for rural and urban samples respectively. All the independent variables are the same with the exception that the rural sample includes the number of livestock. In models (2) and (4), local area attributes are added – going beyond the specification of R-W – to see the relative importance of specific characteristics of geographic areas as correlates of poverty.

The variables in the regressions

39. *The dependent variable* in these regressions is the natural log of per capita household consumption. This variable is the sum of food and non-food expenditures (excluding durable goods) and is expressed in real terms by adjusting for spatial price differences using the upper poverty lines.

40. *Independent variables.* The full set of regressors can be found in Table A-6, Annex; they include the number of infants, children and adults in a household, gender, marital status, age, religion, education level and occupation of household head, education level of the household head’s spouse and agricultural land owned by the household. The difference between the education of head (or of spouse) and the maximum education in the household is added to capture potential gains from higher education among other members of the family. All the above variables are identical to those used in the specification of R-W, with the *exception of the occupation variables*, where the differences are due to changes in the occupation codes between surveys.⁹ Variables that combine types of employment (self-employed, salaried, daily wage, etc.) with sector of employment (agriculture and non-agriculture) are used instead in our regressions.

41. In addition to the above, 16 dummy variables are included – one for each (old) district, with Dhaka being the omitted or reference district – to capture the location effects on household consumption. This list of location dummies is identical to the R-W specification (see Table A-4, Annex for a full list of location dummies and how the old districts map on to current districts).

42. Other independent variables included here – and not present in the R-W specification – are the number of non-farm enterprises in a household and dummies for households that receive

⁹ The occupation variables used in R-W are (i) agricultural worker with land; (ii) fishery/forestry/livestock worker; (iii) tenant farmer; (iv) owner farmer; (v) servant and day-laborer; (vi) transportation and communication; (vii) salesman, broker, middleman, etc; (viii) factory worker, artisan, petty trader, small businessman, executive official, professors, teacher; and (ix) retired person, student, non-working.

domestic and international remittances. In addition, as mentioned above, the specifications for the rural samples include the number of chicken and cattle owned by the household. These variables are included to take into account the potential effect of a few key household attributes—remittances are often claimed to play an important role in household consumption, the ability to diversify into nonfarm enterprises may be associated with lower poverty, and ownership of livestock may enhance incomes and enable consumption-smoothing at the time of shocks.

43. The *omitted dummies define a reference household*, which is characterized as a married Muslim couple, who are landless, childless, have no education and are living in Dhaka district. Other members of the reference household are also illiterate. The head of the household is engaged in farming (self-employment in agriculture), and the household does not receive any remittances, either domestic or abroad.

44. In models (2) and (4), additional location characteristics are added to the specifications of (1) and (3) – the travel times to Dhaka, *zila* headquarter, and *thana* headquarter (from HIES community survey); percentage of households in *thana* with electricity connection and percentage owning agricultural land (from the Population Census, 2001). These variables attempt to capture broad indicators of availability of infrastructure, access to markets and the size of the nonfarm sector in a particular location. In addition, two location-specific variables related to access to microfinance derived from the PKSf database (see Section II) are also included. These are (i) the coverage of microfinance at the *thana* level (see definition in Table 8 above) and (ii) the increase in microfinance coverage from 2003 to 2005 at the *thana* level (as defined in Table 9 above). The objective is to see what patterns of correlation emerge between these indicators and household consumption/poverty, and how these results can be interpreted given the limitations of a single-shot, cross-section type analysis.

Results from HIES 2005

45. The results from the regressions, particularly on the association between household attributes and poverty, are largely consistent with the findings of the bivariate cross-tabulations in Section II (all regression results are presented in *Table A-6, Annex*). Household demographics (particularly the number of children and infants in the household), occupation and education level of the household head, and land ownership are important correlates of household consumption even in a multivariate framework. The regressions also help clarify the links between the gender of household head and poverty, and between the presence of non-farm enterprises in the household and poverty. As expected, the regressions are particularly useful in measuring the effect of the location of the household on consumption, and that of location-specific factors related to infrastructure and market access.

46. **Household demographics.** In all specifications, larger households are likely to be poor; multivariate regressions show that the *number of infants, children and adults* are correlated negatively with consumption. Furthermore, the relationship between poverty and number of infants or children tends to be stronger than that with the number of adults, with the number of infants having the strongest impact. These results suggest that higher dependency within a household, particularly of those who unambiguously do not contribute to household income, is associated with higher poverty incidence (Table A-6, Annex).

47. Other demographic variables that exhibit significant association with poverty are *religion* and *age of household head*. Everything else being equal, households with non-Muslim heads tend to be poorer. The age of household head is consistently positively correlated with level of consumption, even after controlling for household and location attributes. Furthermore, the coefficient of head's age squared is greater than zero, which indicates a convex profile of

consumption and age, which is at odds with the expected concave wage-age profile. A possible explanation for this is that households tend to derive more incomes from assets and transfers as the head becomes older.

48. **Education.** The coefficients of all educational variables in the multivariate regressions are, as expected, positive and significant. Higher level of education for any member of the household is significantly associated with higher level of wellbeing. The regression results also reveal that higher the difference between head's and maximum education of family members, larger is the effect on consumption. These results suggest that an increment of education to *any member of the household* is associated with higher household consumption.

49. **Agricultural land and livestock ownership.** Agricultural land ownership is positively and significantly correlated with household consumption in rural areas. All categories of land ownership raise the level of consumption (compared to the reference group of landless households), and the coefficients increase with land size (Table A-6, Annex). The regressions of urban households reveal a similar pattern, but with smaller effects that are significant only for land size categories of marginal and above. With regard to livestock ownership, the number of chicken owned by a household is associated with higher consumption for rural households.

50. **Type of occupation/employment.** There are differences between rural and urban areas when we look at the effect of the occupation type of household heads. In rural areas, relative to the reference group of households headed by self-employed farmers, households headed by daily wage workers are worse off while there is no statistically significant difference when the head is employed in other types of occupation. In urban areas, only non-agricultural self-employment of the household head has a positive and significant effect on household consumption, in comparison to the reference group.

51. **Non-farm enterprises.** The presence of non-farm enterprises in households is associated with higher level of consumption, with the magnitude of the coefficient being similar for both rural and urban areas.

52. **Remittances.** Regression results reveal that remittance-receiving households tend to be better off than households that do not in both urban and rural areas. The coefficient on the dummy representing remittances from abroad is significant and about three times larger than that on domestic remittances. As referred to in Section II, there are some geographical patterns in the incidence of remittances, which can partly explain the location effects on consumption in specific cases.¹⁰

53. The coefficients on remittances must be treated with caution, given that the direction of the causality is unclear – a problem that is likely to be much more serious with remittances than household demographics, education or occupation of the household head. This is because foreign remittances in particular is linked to relatively large investment upfront on migration of family members, which the relatively better off households are more likely to be able to afford. In that case, the coefficient of remittances would be capturing this reverse effect, rather than the impact of remittances on household welfare.

¹⁰ For example, the size of the (negative) coefficient of the dummy of a household being located in Noakhali (old) zilla – with respect to the reference households in Dhaka – is reduced when the remittance variables are introduced (regression result not shown here). This suggests that a part of the (negative) location effect of being in Noakhali is attributable to the lack of remittances to households in this area.

54. As mentioned in Section II, controlling for the incidence of remittances along with other household attributes may help clarify the association between the *gender of the household head* and poverty. The regressions in Table A-6, Annex show this to be the case for Bangladesh—controlling for other attributes including the incidence of remittances, urban households headed by a female are likely to have lower consumption than male-headed households, while no significant effect is observed for rural households. For urban households, the coefficient for female headed households changes from insignificant to significantly negative when variables indicating the receipt of remittances are included in the regression.

55. **The effect of location on household welfare.** Most of the district/location dummies in the poverty determinant models are significant (Table A-6, Annex). The coefficients of the dummies representing location in a specific (old) zilla show the difference in log of per capita consumption of a household relative to being located in Dhaka district. Regression results in Table A-6 show that after controlling for household characteristics, location of a household in most of the outlying (old) *zillas* is associated with lower consumption relative to Dhaka district. Sylhet and Kustia are the only exceptions in the rural and urban samples respectively (see columns 1 and 3).

56. The regional disparities suggested by these results are not unique to 2005. The earlier study referenced in this paper (R-W) also found a similar pattern. The long-term trend of location effects can be seen by comparing the coefficients of (old) *zilla* dummies from HIES 2005 (columns 1 and 3 of Table A-6, Annex) with results from R-W using data from earlier rounds of HES. The results are broadly similar, with small differences. For example, in the rural sample for 1988, there was only one district (Chittagong) whose location effect was not significantly different from that of Dhaka, while in 2005, this is true for only Sylhet.

57. **Trends of location effects** can provide clues on whether or not there is a tendency towards convergence in poverty between geographic areas from 2000 to 2005. Table 10 shows location effects – the coefficients of (old) district dummies — from rural sample regressions for 2000 (column 1) and 2005 (column 2)¹¹, as well as the results of Chow tests for changes in location effects between 2000 and 2005 (column 3)¹².

58. Columns (1) and (2) show that most location effects are significant in both years, suggesting that being located in areas outside of Dhaka is associated with lower consumption (relative to being in Dhaka), *net* of the effect of household attributes. The results in column (3) of Table 10 indicate more formally whether the location effects in 2005 are significantly different from those in 2000. Roughly, the coefficient corresponding to each (old) district in column (3) indicates the *reduction in gap* between Dhaka and the respective district from 2000 to 2005.

¹¹ Similar to model (1) in Table A-6, Annex.

¹² These are coefficients of the interaction terms between district dummies and dummy for 2005 in the model where both years are pooled. The regression model can be described as $Y = \alpha + X\beta_1 + \beta_2 D(\text{year} = 2005) + Z_k\beta_3 + D(\text{year} = 2005)Z_k\beta_4 + \varepsilon$, where Y is log of real per capita consumption, X is other control variables, and Z is district dummies. β_4 is presented in column (3) of Table XX.

59. Column (3) suggests that the period 2000-2005 has seen some convergence in the location effect on consumption in a majority of *zillas* in the rural sample. For 8 out of 16 *zillas*, the gap between Dhaka and the respective *zilla* has become significantly narrower. For 4 *zillas*, the gap has remained statistically unchanged; and in case of 4 others (Rajshahi, Bogra, Khulna and Barisal) the gap with Dhaka has significantly increased from 2000 to 2005. A similar pattern occurred in urban areas, where the gap has become wider for 6 *zillas* and narrower in the rest (see Table A-5, Annex).

60. These results are also consistent with the broad geographic patterns alluded to in Section II. All four *zillas* whose gaps with Dhaka district are increasing are in the western/southwestern part of the country, as are two other districts for which there has been no statistical change in the gap (Pabna and Jessore).

Explaining the “location effects” – local infrastructure and access to markets

61. An important question is to what extent the location effects shown above are explained by location-specific attributes, such as availability of infrastructure, basic facilities and connectivity/access to urban markets.¹³ To address this question, the regressions in columns (2) and (4) in Table A-6, Annex include data from community survey of HIES 2005 (for rural communities) and Census (2001) – as described previously.

62. The coefficients of these variables are merely indicative and must be interpreted with caution because of a number of reasons: (i) the likelihood of measurement errors in the indicators from the HIES community survey in particular, (ii) possible multicollinearity between variables, and (iii) the likely biases caused by omitted variables, since there are potentially a number of other important location attributes that cannot be included because they are unavailable or highly inaccurate.

63. On the whole, these variables are significant correlates of household poverty, and reduce the size of (but do not completely eliminate) the location effects measured by district dummies. For rural areas, adding community variables such as travel time to Thana and district headquarters, and percentage of households in the *thana* with electricity connection and owning agricultural

District	(1) 2000	(2) 2005	(3) Chow Test
Mymensingh	-0.305 (43.33)**	-0.108 (12.96)**	0.199 (32.01)**
Faridpur	-0.357 (56.43)**	-0.072 (8.24)**	0.292 (31.96)**
Tangail/Jamalpur	-0.377 (50.11)**	-0.236 (30.45)**	0.126 (24.45)**
Chittagong	-0.041 (5.65)**	-0.045 (3.72)**	-0.008 (0.69)
Comilla	-0.070 (15.39)**	-0.069 (10.77)**	0.015 (4.23)**
Sylhet	-0.022 (3.77)**	0.017 (1.70)	0.046 (8.21)**
Noakhali	-0.190 (19.71)**	-0.274 (6.22)**	-0.040 (1.66)
Khulna	-0.064 (5.94)**	-0.276 (28.98)**	-0.233 (39.78)**
Jessore	-0.275 (33.97)**	-0.281 (24.38)**	-0.008 (1.45)
Barisal/Patuakhali	-0.270 (47.47)**	-0.358 (36.52)**	-0.091 (13.88)**
Kushtia	-0.242 (30.91)**	-0.041 (7.46)**	0.196 (27.37)**
Rajshahi	-0.237 (26.96)**	-0.287 (19.99)**	-0.058 (5.35)**
Rangpur	-0.424 (53.45)**	-0.318 (46.60)**	0.096 (20.73)**
Pabna	-0.265 (39.97)**	-0.242 (13.85)**	0.015 (1.21)
Dinajpur	-0.332 (26.71)**	-0.252 (25.40)**	0.060 (12.97)**
Bogra	-0.219 (25.07)**	-0.248 (26.82)**	-0.047 (6.51)**

Note: 1) basic specification of rural model (Column 1, Table A-6, Annex) is used; **: significant at 1% level
Source: HIES 2000, 2005

¹³ Location/geographic factors, like infrastructure availability and access to markets turn out to be highly important in some other countries – Sri Lanka being one example – in explaining spatial differences in economic growth and poverty (for the Sri Lanka case, see World Bank, 2007).

land (from the Census) reduce the size of the coefficients on location/district dummies, but the coefficients are still significant (column (2) in Table A-6, Annex). Similar results apply to regressions with urban households, when the Census variables are added (column (2) in Table A-6, Annex). Note that since the Census was fielded in 2001, these variables can be interpreted as indicators of the *initial condition* of development in each Thana.

64. To understand *how location characteristics influence poverty*, it is also useful to examine the effect of each variable separately. Moreover, separate regressions for each variable are useful to cross-check with the results in Table A-6, Annex, since multicollinearity between some variables (such as the travel time estimates) may affect the sign and magnitude of coefficients in Table A-6. Table 11 shows the coefficient on each variable when they are added one at a time to the basic model specification (columns (1) and (3), Table A-6).

	Rural	Urban
Travel time to thana HQ ('00 mins)	-0.065 (4.02)**	
Travel time to zila HQ ('00 mins)	-0.008 (3.22)**	
Travel time to Dhaka HQ ('00 mins)	-0.042 (4.44)**	
Percentage of HH with electricity in Thana	0.004 (3.86)**	0.001 (2.14)*
Percentage of HH owning agricultural land	-0.004 (1.99)	-0.001 (0.54)
<i>Note:</i> each variable is added singly to the basic model for --model (1) for rural and model (3) for urban area. **: significant at 1% level; *: significant at 5% level <i>Source:</i> HIES 2005		

65. **Travel time to urban centers**, which can be interpreted as a proxy for access to markets, turns out to be an important correlate of poverty in rural Bangladesh. All three indicators of travel time —to the *thana* head quarter, to the *zila* head quarter and to Dhaka—are significant and negative, whether they are included at the same time (columns (2) and (4), Table A-6, Annex) or one at a time (Table 11). The results suggest large benefits to a household from being located in a rural community that is better connected to urban areas. The relative magnitude of the coefficients both in Table A-6 and Table 11 suggest that travel times to the *thana* headquarter and Dhaka are much more important than that to the district headquarter. While more analysis is necessary to understand these links better, these findings suggest that what matters the most are access to the nearest local market and that to the largest urban market of the country.

66. **Electrification** also appears to be associated with lower poverty, particularly in rural areas. The coefficient on the percentage of households in the *thana* with electricity connections is positive and significant for both rural and urban regressions, when the variable is included singly (Table 11). The effect is larger for rural households than urban households. However, one must again be careful in interpreting this link, since the coefficient may be partly capturing the fact that an area with lower poverty has a higher proportion of households connected to electricity, rather than the effects of electrification on poverty. The association between household poverty and the households in the *thana* owning agricultural land – a proxy for the size of the non-farm sector in the area – is quite weak, irrespective of whether the variable is introduced with other location variables or added singly (Table A-6, Annex and Table 11).

Sub-district level indicators of microfinance access

67. As mentioned above, the regression specifications for Columns (2) and (4) of Table A-6, Annex also include *thana* level indicators for microfinance coverage and increase in coverage between 2003 and 2005. The coefficient for *thana level microfinance coverage* is negative for both rural and urban households (more statistically significant for urban); while that for *thana-level increase in microfinance coverage* (2003-05) is positive for both urban and rural (statistically significant for rural only).

68. These results are however subject to a number of caveats, and therefore need to be interpreted carefully. Firstly, as mentioned in the context of the cross-tabulations in Section II (see paragraph 32), these results just reflect the association between area-specific coverage of microfinance and household poverty; in other words, even a high rate of microfinance coverage in an area does not necessarily imply that a particular household in the HIES sample has access to such services. Secondly, the second microfinance indicator essentially measures a *change* in coverage over time, which makes its correlation with consumption in a cross-section of households hard to interpret.

69. Despite these caveats, the correlations described above suggest important clues. Firstly, the negative correlation between microfinance coverage rate in a *thana* and poverty status in a cross-section of households likely indicates that microfinance coverage is higher in areas with greater poverty, perhaps by design, which is what one would expect intuitively. In other words, this correlation most likely indicates a reverse effect as a result of placement bias, rather than that of microfinance access on poverty.

70. The coefficient of the *increase* in *thana*-level coverage of microfinance, roughly speaking, captures the correlation of household poverty with increase in microfinance activity (2003-05) in the immediate area, controlling for the current (2005) rate of microfinance coverage and a range of other household and location-specific factors. The results therefore suggest that a household located in rural areas with a large *increase* in microfinance activity is less likely to be poor in 2005 than an identical household located in a *thana* with similar characteristics, but smaller increase in microfinance membership. These results are also consistent with the cross-tabulations shown in Table 8 in Section II. The findings hint at a beneficial impact of microfinance on poverty reduction in Bangladesh. However, more careful analysis – which would require panel data that tracks household consumption and microfinance membership over time – is essential to better understand this effect, including the important question of whether a causal relationship exists, or the correlation just captures the effect of the presence of one or more unobserved variables that positively impact both household consumption and microfinance coverage.

Changes in poverty over time: results from a decomposition analysis

71. A comparison of the regression results from HIES datasets of 2000 and 2005 can be useful to start understanding the factors that were largely responsible for the reduction in poverty during this period. The Oaxaca decomposition method provides a useful framework for this exercise. This method involves decomposing the growth in per capita real consumption (2000-05) into two components: growth due to changes in household and location endowments/characteristics and growth due to changes in returns to these endowments.

72. We start by describing the model of log of consumption per capita in 2000 and 2005 as:

$$(3) \quad Y_{00} = X_{00}\beta_{00} + \varepsilon_{00}; \quad (4) \quad Y_{05} = X_{05}\beta_{05} + \varepsilon_{05}$$

Where Y is the log of real per capita consumption (at 2005 rural Dhaka prices),¹⁴ and X is a vector of household characteristics. Since means of error terms are zero, the difference in means can be decomposed as:

¹⁴ For each year, consumption is adjusted for spatial price differences using the ratio of the upper poverty line for each strata to the rural Dhaka upper poverty line. Consumption from 2000 is adjusted to 2005 prices by multiplying by the ratio of rural Dhaka upper poverty lines from 2005 and 2000.

$$(5) \quad \Delta = \bar{Y}_{05} - \bar{Y}_{00} = (\bar{X}_{05} - \bar{X}_{00})\hat{\beta}_{00} + \bar{X}_{00}(\hat{\beta}_{05} - \hat{\beta}_{00}) + (\bar{X}_{05} - \bar{X}_{00})(\hat{\beta}_{05} - \hat{\beta}_{00})$$

Where \bar{X}_{05} and \bar{X}_{00} are the vectors of means of characteristics (including the constants) for the two years. The first term shows differences in endowments, the second differences in coefficients (including the intercept), and the third interaction between coefficients and endowments.

73. The results of the Oaxaca decomposition using the basic model specification similar to models (1) and (3), for rural and urban samples respectively in Table A-6, Annex, are summarized in Table 12. Each row of the table shows the contribution of changes in endowment/characteristic and coefficient/return to growth in per capita real consumption for a specific category of variables – like education, occupation, household demographics, location dummies and so on (more detailed results for each variable can be found in Table A-7, Annex). Significant differences between rural and urban areas are seen for the decomposition results.¹⁵

	Rural			Urban		
	endowments	coefficients	interaction	endowments	coefficients	interaction
Geographic dummies	-0.002	0.032	0.006	-0.033	0.014	0.017
Household size variables	0.032	0.059	-0.003	0.031	0.012	0.000
Other demographic variables	-0.002	0.220	0.002	-0.001	0.157	-0.004
Education variables	0.023	-0.019	-0.005	0.042	-0.089	-0.008
Land variables	0.000	0.025	0.000	0.020	0.001	0.003
Occupation variables	0.006	0.030	-0.008	-0.035	0.059	0.057
Number of non-farm enterprises	-0.004	-0.003	0.000	-0.002	0.008	-0.001
Remittances	0.004	0.009	0.001	-0.001	0.036	0.000
Livestock	0.003	-0.021	-0.002			
Constant	0	-0.275	0	0	-0.255	0

Source: HIES 2000, 2005

74. Looking at characteristics or endowments, in rural and urban areas alike the highest contributions to consumption growth come from changes in household size and education of household members (Table 12). In rural areas, changes in occupation, remittance and livestock characteristics/endowments also contribute positively towards consumption growth to a small degree. In urban areas, changes in land endowments contribute positively towards consumption growth.

75. In terms of changes in coefficients/returns, household size variables and geographic dummies are major contributors to poverty reduction in rural areas, followed by land ownership, and occupation. In urban areas, the highest contributions come from changes in returns to occupation, remittances, geographic dummies and household size. In both cases, changes in returns to “other demographic variables” (that include marital status, age and other characteristics of household head – see Table A-7, Annex) contribute the most to consumption growth. These variables are added to the models mainly as control variables; interpreting the changes in these coefficients is difficult and not useful from a policy perspective, and therefore not attempted here.

¹⁵ These results are similar (but not identical) to those obtained by Serajuddin et al (2007), using the same datasets, but with some differences in specifications. For an example of a similar decomposition exercise from poverty determinant models – using data from Vietnam – see Glewwe et al (2002).

76. It is useful to examine each category of variables in some detail, using the results from the decomposition in Table 12 and Table A-7, Annex, to examine what this analysis tells us about the drivers of poverty reduction between 2000 and 2005.

77. **District/location dummies.** The decomposition results are consistent with the earlier analysis comparing location effects of 2000 and 2005. The combined impact of changes in coefficients is positive, indicating that the overall negative effect of being located in any (old) district other than Dhaka has reduced from 2000 to 2005 – in other words the location effects on the average appear to be converging toward the Dhaka district's effect. A more disaggregated picture however shows that the story is not uniform. Similar to what was shown earlier, the pattern of convergence is largely concentrated among districts neighboring Dhaka, while districts in the west and southwest seem to lag behind (see Table A-7, Annex). Also, the results in Table 12 suggest that the pattern of convergence is much stronger in rural than in urban areas.

78. **Household size.** As documented in Section II, household size in Bangladesh has become significantly smaller over the last 5 years in both urban and rural areas, mostly due to a fall in the average number of children (aged 1 to 14 years old) per household. This change explains the relatively large contribution of endowment changes in Table 12 for rural and urban areas. In both rural and urban areas, the returns to household size have also increased – implying that the negative effect of having larger number of members has also diminished in size from 2000 to 2005.

79. **Education.** The decompositions show relatively large contribution of education endowments in both urban and rural areas, which is consistent with earlier findings in Section II that show improvements in education. Table 3 indicates that 31 percent of household heads in Bangladesh had education of at least secondary level in 2005, compared to 27 percent in 2000; 47 percent had at least primary education in 2005, an increase of 4 percentage points from 2000.

80. While OLS estimates for both years show that more education of household members is associated with higher household consumption, the decomposition results show the contribution of the coefficient component to be negative, indicating falling returns to education. More disaggregated results suggest a nuanced picture. Among rural households, returns to education of the household head have increased, while that of education of the head's spouse and other household members have declined (Table A-7, Annex). These add up to a negative contribution to poverty reduction from the overall education coefficient component. Since a majority of the spouses are female, the results suggest a decline in the returns to women's education from 2000 to 2005.¹⁶ In urban areas on the other hand, there has been an apparent decline in the returns to all level of education, among all types of members including the head of the household.

81. To summarize, it appears that increases in education attainment of household members contributed positively to consumption growth and poverty reduction. While more education continues to be strongly associated with lower poverty, the returns to education declined for all categories of household members (with the sole exception of household head's education in rural households) from 2000 to 2005. This is quite consistent with what was shown in Section II. Poverty reduction was higher for the lower education categories – namely households headed by an individual who has no education, primary education or secondary education (see Table 3).

82. **Occupation and employment.** Table 12 suggests that the contribution of the coefficient/return of occupations to consumption growth in both urban and rural areas is

¹⁶ This finding is consistent with one of the findings from the labor market study by Al-Samarai (2007)

significant, compared to the contribution of occupation characteristics (or endowments). A comparison of the 2000 and 2005 regressions reveals a few key facts (see Table A-7, Annex). (i) While households headed by daily wage workers were significantly worse off than the reference group (self-employed farmers) in 2000 in rural and urban areas alike, this effect is smaller in magnitude in both cases in 2005, and significant only among rural households. (ii) Across rural and urban areas, the returns to almost all occupations have improved from 2000 to 2005 (relative to the reference group of self-employed farmers), with the sole exception of salaried employees in rural areas.

83. These findings suggest that there is a tendency towards improvements in the returns to different types of occupation. This implies that the negative impact of being employed in a relatively undesirable occupation (like daily wage labor) has diminished.

84. Presence of non-farm enterprises in a household. The coefficients on this variable are positive and significant in urban and rural areas alike in both years. The coefficients remained fairly stable from 2000 to 2005, and the contribution of either the endowment or the return to nonfarm enterprises to growth in consumption between 2000 and 2005 is negligible (Table A-7, Annex).

85. Remittances. Receiving remittances, domestic or foreign, is associated with higher household consumption in both years, with the sole exception of domestic remittances for urban households in 2000. From Table 12, changes in the endowments of remittances contribute little to consumption growth in either rural or urban households. Moreover in rural areas, the coefficients/returns to domestic and foreign remittances have increased only slightly from 2000 to 2005 (Table A-7, Annex), which leads to a small contribution of returns to remittances in consumption growth (Table 12). Among urban households on the other hand, the coefficients on both types of remittances have increased sharply from 2000 to 2005, and these contribute significantly to urban consumption growth between the two years (Table A-7, Annex and Table 12).

86. These findings – on the “contribution” of higher returns to remittances to urban consumption growth – must be interpreted with caution, given that the analysis cannot shed any light on the direction of cause and effect. As explained earlier in paragraph 53, this problem is likely to be more serious with remittances than the other variables listed in Table 12.

87. Agricultural land ownership. As noted earlier, the size of agricultural land holding is strongly associated with household consumption levels, particularly in rural areas. In both 2000 and 2005, the coefficients are positive and significant, and increase with land size (in comparison to the reference group of the landless). From 2000 to 2005, the returns to all categories of land ownership in rural areas have increased, and accordingly the decomposition shows that the increase in returns to land ownership contributed to the reduction of poverty in rural areas (Table 12). The decompositions also show that change in endowment of land has had no contribution to poverty reduction in rural areas. These results are quite consistent with the cross-tabulations in Section II, which show that poverty reduction in rural areas has occurred at a higher rate among groups owning more land (see Figure 1), and there has been little change in overall land distribution pattern from 2000 to 2005 (see Table 5).

88. The results on land ownership for urban households are quite different. As a comparison of the coefficients from the regression show, the returns to being functionally landless or a marginal landowner (relative to being landless) has fallen from 2000 to 2005, while that from being a small, medium or large landowner has increased. The net effect of the change in returns on

poverty reduction is close to zero (Table 12). In urban areas, there is also a sizeable positive impact of change in land ownership characteristics on consumption growth, indicating some movement in urban land distribution.

89. **A longer term trend in poverty determinants** can be obtained by comparing the results from HIES 2000 and HIES 2005 with an earlier study, namely R-W. Such comparisons have already been made above in the context of location/district dummy effects. The most notable difference with regard to the effects of household attributes is found in the education of the spouse of the household head. In the regressions using HIES 1988-89, only a single level of education of spouse, “below class 5”, is significant. In both 2000 and 2005, all education levels of spouse are positive and significant. This trend indicates the progress made by Bangladeshi women over the last 15 years, in the form of increased participation in economic activities that has led to higher returns to their education in the form of higher household consumption.

III. Concluding remarks

90. The analysis here has shown that sharp reduction in consumption poverty in Bangladesh during recent years is also mirrored by substantial improvements in living conditions – including housing characteristics, and access to sanitation facilities, electricity and communications. These trends point to a general improvement along multiple dimensions of welfare, and also provide a cross-check against the measured improvements in household consumption. Furthermore, the findings of this paper also suggest that the reduction in poverty has been associated with shifts in household characteristics, and the relationships of these characteristics with household welfare.

91. The poverty profiles drawn here, supplemented by the multivariate analysis of poverty determinants, identify the household and location/geographic attributes most closely associated with poverty. In general, the poor in Bangladesh are more likely to belong to households with larger number of dependents, lower education, and with the household head engaged in daily wage labor. Poor households are also more likely to be landless or functionally landless, and less likely to receive domestic or foreign remittances and own non-farm household enterprises. There are significant differences between urban and rural areas. Land ownership is relatively less important as a determinant of poverty and remittances more strongly correlated with welfare in urban areas. Non-farm self employment is associated with higher household welfare compared with other occupations in urban areas but not in rural areas.

92. *Poverty also has a strong location aspect* – a finding that is similar to what that in a previous study using data from more than 15 years back in Bangladesh. Being located in a district outside Dhaka, with the exception of one or two districts, is found to be disadvantageous for a household, even after controlling for household level attributes. The location effects are partly explained by a few indicators that, however imperfectly, reflect availability of infrastructure and connectivity with local and national markets. Access to the *thana* (sub-district) headquarter and Dhaka – proxied by rough estimates of travel time – turn out to be particularly important determinants of household consumption. Among other location/geographic characteristics, increased penetration of microfinance (as measured by membership) at the *thana* level appears to be associated with lower poverty. Although this correlation is hard to interpret, it hints at beneficial impact of microfinance expansion that merits further investigation using data more appropriate for drawing such links.

93. A comparison of the poverty determinant models over time (between 2000 and 2005) and decomposition measuring the relative impact of changes in returns and endowments/characteristics provide some clues on why poverty incidence fell during this period.

Changes in some household characteristics – in terms of smaller number of dependents in households and improvements in education of household members – contributed to poverty reduction in both urban and rural areas from 2000 to 2005. Increase in returns across different occupations or types of employment also contributed to poverty reduction – a phenomenon that could indicate an impact of broad-based growth across different sectors. More in-depth analysis of sectoral employment and wage patterns over time would be required to understand these changes better. The direction of changes in returns to household characteristics also reveal a trend towards improved returns for certain attributes that place households at a disadvantage – such as larger number of dependents, lower education or when the household head is engaged in daily wage labor. In other words, while these disadvantages are still significantly associated with higher likelihood of poverty in a cross-section of the population, their negative impact on households has diminished from 2000 to 2005.

94. The returns to owning more agricultural land has actually increased, particularly in rural areas, where there is also no discernible improvement in land distribution. The positive association between household welfare and remittances received, especially from foreign countries, has become stronger, implying that households with remittances are more likely to be better-off in 2005 than 2000. Over a longer time horizon of 15 years, an important development in Bangladesh has been an increase in the returns to women's education on household welfare, which indicates increasing participation of women in economic activities.

95. Finally, between 2000 and 2005 there has been some overall decline in the returns to location, i.e. the negative effect of being located outside Dhaka district, although these effects are still strong and significant for most locations. While this suggests an encouraging trend towards convergence, a more disaggregated picture reveals a mixed story. The convergence process has occurred largely in areas neighboring Dhaka district, and in particular appears to have excluded large areas in the west and southwest of the country where almost no poverty reduction has occurred in recent years. Among a number of topics that demand more in-depth analysis, the question of what type of geographic or spatial characteristics explain this dichotomy between different parts of the country is a critical one.

References

- Al-Samarrai, Samer (2007). "Changes in employment in Bangladesh, 2000-2005: the impacts on poverty and gender equity". Background paper for Poverty Assessment of Bangladesh. World Bank. Draft.
- Bangladesh Bureau of Statistics, Government of Bangladesh (2006). *Preliminary Report of the Household Income & Expenditure Survey 2005*. Dhaka.
- Buvinic, M. and G. R. Gupta (1997). "Female-headed households and female-maintained families: are they worth targeting to reduce poverty in developing countries?" *Economic Development and Cultural Change*; 45, pp. 259-80.
- Glewwe, P., M. Gragnolati, H. Zaman (2002). "Who Gained from Vietnam's Boom in the 1990s?" *Economic Development and Cultural Change*; 50 (4).
- Hossain M. (1995) 'Socio-economic characteristics of the poor' in Rahman and Hossain (eds) *Rethinking rural poverty* UPL, Bangladesh
- Lanjouw, P. and M. Ravallion (1995). "Poverty and household size". *Economic Journal*; 105, pp. 1415-34.
- Narayan, A., N. Yoshida and H. Zaman (2007). "Trends and Patterns of Poverty in Bangladesh in Recent Years". Background paper for Poverty Assessment of Bangladesh. World Bank. Draft.
- Ravallion, M. and Q. Wodon (1999). "Poor areas or only poor people". *Journal of Regional Science*; 39(4), pp. 689-711.
- Serajuddin, U., A. Narayan, H. Zaman (2007). "Extreme Poverty in Bangladesh: Trends and Determinants". Background paper for Poverty Assessment of Bangladesh. World Bank. Draft.
- World Bank (2005). *Global Economic Prospects 2006: Economic Implications of Remittances and Migration*. Washington, DC.
- World Bank, Department for International Development and Asian Development Bank (2006). "Resilience Amidst Conflict: An Assessment of Poverty in Nepal, 1995-96 and 2003-04". Report No. 34834-NP. Washington, DC.
- World Bank (2006). "Economics and Governance of Nongovernmental Organizations in Bangladesh". Report No. 35861-BD. Washington, DC.
- World Bank (2007). "Sri Lanka Poverty Assessment. Engendering Growth with Equity: Opportunities and Challenges". Report No. 36568-LK. Washington, DC.

Annex

	Rural	Urban	Total	Poverty rate
Barisal	23	73.1	30.4	52
Chittagong	39.9	82.4	50.7	34
Dhaka	32.8	92.6	55.8	32
Khulna	33.3	74.5	42.1	46
Rajshahi	25.2	57.5	30.1	51
Sylhet	33.4	83.8	40.7	34
Total	31.2	82.6	44.2	40

Source: HIES 2005

Land size (acre)	Poverty rate			Population share		
	Rural	Urban	Total	Rural	Urban	Total
Landless <0.05	57	34	49	46	72	52
Functionally Landless 0.05 to 0.5	49	25	46	16	7	14
Marginal 0.5 to 1.5	35	17	32	19	10	17
Small 1.5 to 2.5	24	9	22	9	4	8
Medium and Large 2.5 or more	13	4	11	11	7	10
Total	44	28	40	100	100	100

	2005		2000	
	Domestic	International	Domestic	International
Barisal	29.5	5.2	37.2	8.2
Chittagong	25.3	24.2	16.1	20.7
Dhaka	13.5	7.8	17.5	8.2
Khulna	24.1	3.9	21.0	1.8
Rajshahi	27.0	1.3	13.6	2.2
Sylhet	10.4	15.7	33.3	17.4
Total	21.1	8.8	18.9	8.6

Note: Household weighted
Source: HIES 2000, 2005

Figure A-1: Comparing old and new zillas



Table A-4: Mapping location dummies (old zillas) to new zillas

Old Zilas	New Zilas					
Mymensingh	Mymensingh	Netrokona	Kishoreganj			
Faridpur	Faridpur	Madaripur	Shariatpur	Rajbari	Gopalganj	
Tangail/Jamalpur	Tangail	Jamalpur	Sherpur			
Chittagong	Chittagong	Khagrachhari	Rangamati	Cox's Bazar	Bandarban	
Comilla	Comilla	Brahmanbaria	Chandpur			
Sylhet	Sylhet	Sunamganj	Habiganj	Moulvibazar		
Noakhali	Noakhali	Feni	Lakshmipur			
Khulna	Khulna	Satkhira	Bagerhat			
Jessore	Jessore	Jhenaidah	Magura	Narail		
Barisal/Patuakhali	Barisal	Pirojpur	Jhalokathi	Bhola	Patuakhali	Barguna
Kushtia	Kushtia	Meherpur	Chuadanga			
Rajshahi	Rajshahi	Natore	Naogaon	Nawabganj		
Rangpur	Rangpur	Nilphamari	Lalmonirhat	Kurigram	Gaibandha	
Pabna	Pabna	Sirajganj				
Dinajpur	Dinajpur	Thakurgaon	Panchagarh			
Bogra	Bogra	Joypurhat				
Dhaka	Dhaka	Narayanganj	Munshiganj	Manikganj	Gazipur	Narsingdi

Table A-5 Trends in location effects in urban areas			
District	2000	2005	Chow Test
Mymensingh	-0.208 (13.75)**	-0.114 (11.83)**	0.101 (12.28)**
Faridpur	-0.323 (26.57)**	-0.062 (7.16)**	0.235 (15.22)**
Tangail/Jamalpur	-0.019 (1.32)	-0.269 (24.03)**	-0.228 (18.60)**
Chittagong	-0.104 (18.02)**	-0.027 (2.93)**	0.087 (14.00)**
Comilla	-0.077 (9.64)**	-0.130 (13.08)**	-0.032 (4.49)**
Sylhet	-0.151 (13.34)**	-0.066 (6.76)**	0.115 (10.57)**
Noakhali	-0.305 (34.11)**	-0.086 (2.54)*	0.261 (16.26)**
Khulna	-0.315 (51.03)**	-0.416 (54.34)**	-0.098 (24.27)**
Jessore	-0.365 (34.77)**	-0.334 (55.95)**	0.082 (8.02)**
Barisal/Patuakhali	-0.141 (17.32)**	-0.226 (27.68)**	-0.066 (10.92)**
Kushtia	-0.378 (27.08)**	0.135 (14.02)**	0.535 (39.60)**
Rajshahi	-0.267 (33.29)**	-0.255 (16.00)**	0.071 (4.49)**
Rangpur	-0.434 (63.20)**	-0.328 (30.57)**	0.119 (18.73)**
Pabna	-0.055 (4.18)**	-0.309 (19.51)**	-0.219 (10.70)**
Dinajpur	-0.523 (36.38)**	-0.321 (35.93)**	0.243 (24.71)**
Bogra	-0.097 (8.61)**	-0.316 (30.85)**	-0.211 (20.00)**

Note: basic specification of urban model is used.

Table A-6: Regressions of log of per capita consumption, 2005

	(1)	(2)	(3)	(4)
	Rural-Basic	Rural-Extended	Urban-Basic	Urban-Extended
Mymensingh	-0.108 (12.96)**	-0.014 (0.49)	-0.114 (11.83)**	-0.065 (1.62)
Faridpur	-0.072 (8.24)**	-0.004 (0.16)	-0.062 (7.16)**	-0.042 (0.89)
Tangail/Jamalpur	-0.236 (30.45)**	-0.152 (6.86)**	-0.269 (24.03)**	-0.180 (4.02)**
Chittagong	-0.045 (3.72)**	0.108 (2.11)	-0.027 (2.93)**	-0.025 (0.84)
Comilla	-0.069 (10.76)**	-0.014 (1.03)	-0.130 (13.08)**	-0.094 (2.64)*
Sylhet	0.017 (1.70)	0.068 (1.78)	-0.066 (6.76)**	-0.109 (2.35)*
Noakhali	-0.274 (6.21)**	-0.212 (5.68)**	-0.086 (2.54)*	-0.056 (1.04)
Khulna	-0.276 (28.96)**	-0.138 (5.08)**	-0.416 (54.34)**	-0.397 (20.98)**
Jessore	-0.281 (24.37)**	-0.149 (4.66)**	-0.334 (55.95)**	-0.267 (5.59)**
Barisal/Patuakhali	-0.358 (36.47)**	-0.140 (2.85)*	-0.226 (27.68)**	-0.153 (4.25)**
Kushtia	-0.041 (7.46)**	0.032 (1.42)	0.135 (14.02)**	0.205 (5.70)**
Rajshahi	-0.287 (19.97)**	-0.169 (5.85)**	-0.255 (16.00)**	-0.199 (5.81)**
Rangpur	-0.318 (46.62)**	-0.226 (8.05)**	-0.328 (30.57)**	-0.264 (5.55)**
Pabna	-0.242 (13.84)**	-0.197 (7.41)**	-0.309 (19.51)**	-0.255 (5.52)**
Dinajpur	-0.252 (25.40)**	-0.109 (3.40)**	-0.321 (35.93)**	-0.199 (4.24)**
Bogra	-0.248 (26.83)**	-0.156 (6.68)**	-0.316 (30.85)**	-0.260 (5.98)**
Number of babies	-0.202 (3.59)**	-0.209 (4.16)**	-0.421 (3.27)**	-0.406 (3.00)**
Number of babies squared	0.034 (0.66)	0.038 (0.84)	0.277 (2.32)*	0.269 (2.13)*
Number of children	-0.178 (14.80)**	-0.177 (14.06)**	-0.180 (13.34)**	-0.178 (13.15)**
Number of children squared	0.014 (6.01)**	0.013 (5.35)**	0.012 (4.79)**	0.011 (4.62)**
number of adult	-0.104 (7.77)**	-0.109 (7.87)**	-0.142 (6.93)**	-0.138 (7.05)**
number of adult squared	0.008 (5.75)**	0.008 (5.56)**	0.012 (5.64)**	0.011 (5.31)**
head female	-0.015 (0.34)	-0.030 (0.62)	-0.148 (3.02)**	-0.149 (3.09)**

Head:married, no spouse present	0.097 (3.15)**	0.100 (2.68)*	0.350 (6.99)**	0.345 (6.78)**
Head:single, no spouse present	0.108 (1.97)	0.090 (1.71)	0.240 (3.62)**	0.186 (4.08)**
Head:divorces, widowed, separated, no spouse present	-0.041 (1.14)	-0.033 (0.84)	0.160 (2.45)*	0.166 (2.60)*
Head age	0.016 (7.05)**	0.015 (5.95)**	0.020 (10.19)**	0.020 (9.47)**
Head age squared	-0.000 (6.77)**	-0.000 (5.45)**	-0.000 (8.39)**	-0.000 (7.34)**
Head non-muslim	-0.093 (2.80)*	-0.065 (3.16)**	-0.107 (3.34)**	-0.093 (2.86)*
Level of Head's edu: Below class 5	0.138 (4.33)**	0.128 (4.69)**	0.155 (4.70)**	0.155 (4.19)**
Level of Head's edu: Class 5	0.131 (8.91)**	0.128 (7.65)**	0.193 (11.19)**	0.192 (10.17)**
Level of Head's edu: Class 6 to 9	0.191 (10.28)**	0.169 (10.44)**	0.313 (10.78)**	0.308 (11.01)**
Level of Head's edu: Higher Level	0.305 (13.66)**	0.273 (14.71)**	0.467 (10.39)**	0.458 (10.41)**
Level of Spouse's edu: Below class 5	0.066 (2.68)*	0.060 (2.51)*	0.143 (4.36)**	0.140 (4.12)**
Level of Spouse's edu: Class 5	0.045 (2.66)*	0.046 (2.32)*	0.114 (5.41)**	0.117 (5.16)**
Level of Spouse's edu: Class 6 to 9	0.112 (4.17)**	0.101 (3.53)**	0.239 (9.86)**	0.239 (9.30)**
Level of Spouse's edu: Higher Level	0.296 (6.65)**	0.284 (6.53)**	0.439 (9.18)**	0.437 (9.52)**
Difference b/w head and max edu: 1 level	0.088 (5.83)**	0.076 (4.76)**	0.111 (4.03)**	0.110 (4.11)**
Difference b/w head and max edu: 2 level	0.102 (5.57)**	0.086 (5.56)**	0.122 (4.75)**	0.119 (4.15)**
Difference b/w head and max edu: 3 level	0.135 (7.04)**	0.120 (6.28)**	0.226 (8.29)**	0.216 (9.89)**
Difference b/w head and max edu: 4 level	0.159 (4.77)**	0.145 (4.74)**	0.341 (6.37)**	0.315 (8.09)**
Functionally Landless:0.05-0.49	0.072 (4.28)**	0.082 (6.01)**	0.008 (0.37)	0.006 (0.22)
Marginal:0.5 to 1.5	0.148 (8.61)**	0.173 (11.12)**	0.082 (3.21)**	0.100 (4.64)**
Small:1.5 to 2.5	0.269 (7.07)**	0.299 (8.12)**	0.190 (4.31)**	0.206 (4.72)**
Medium&Large:2.5 or more	0.419 (11.83)**	0.476 (15.79)**	0.319 (8.78)**	0.327 (9.05)**
Head's major activity: self-employment:non-agriculture	0.035 (1.66)	0.034 (1.52)	0.100 (2.26)*	0.102 (2.27)*
Head's major activity: Daily wage employment	-0.058 (3.60)**	-0.059 (3.88)**	-0.023 (0.80)	-0.021 (0.67)
Head's major activity: Salary wage employment	0.015 (0.62)	0.004 (0.18)	0.038 (1.48)	0.036 (1.29)

Head's major activity: None	0.024 (1.14)	0.018 (1.02)	0.073 (1.73)	0.077 (1.84)
Number of non-farm enterprises	0.071 (3.79)**	0.062 (3.22)**	0.079 (2.83)*	0.076 (2.79)*
HH receives domestic remittances-dummy	0.091 (2.45)*	0.078 (2.94)**	0.107 (3.16)**	0.109 (3.32)**
HH receives remittances from abroad-dummy	0.252 (5.13)**	0.222 (6.10)**	0.310 (4.88)**	0.302 (4.47)**
number of cattle	0.004 (1.79)	0.005 (1.86)		
number of chicken	0.001 (3.10)**	0.001 (3.15)**		
Travel time to thana HQ ('00 mins)		-0.032 (2.33)*		
Travel time to zila HQ ('00 mins)		-0.003 (2.25)*		
Travel time to Dhaka HQ ('00 mins)		-0.036 (3.22)**		
% of HH with electric connection		0.001 (1.30)		0.000 (0.54)
% of HH own agricultural land		-0.003 (1.74)		-0.000 (0.06)
Coverage of micro finance in Thana in 2005		-0.001 (1.10)		-0.002 (2.51)*
Change in microfinance members between 03-05		0.002 (4.07)**		0.001 (1.15)
Constant	6.858 (97.77)**	7.024 (48.49)**	6.668 (94.25)**	6.696 (47.45)**
Observations	6371	5874	3660	3600
R-squared	0.48	0.50	0.56	0.56
Absolute value of t statistics in parentheses				
* significant at 5%; ** significant at 1%				

Table A-7: Results of regression on log of per capita consumption and Oaxaca decomposition							
<i>Rural sample</i>							
	<i>Coefficient-2000</i>		<i>Coefficient-2005</i>		<i>Oaxaca decomposition</i>		
					<i>endowments</i>	<i>coefficients</i>	<i>interaction</i>
Mymensingh	-0.305	***	-0.108	***	0.0034	0.0157	-0.0022
Faridpur	-0.357	***	-0.072	***	-0.0050	0.0147	0.0040
Tangail/Jamalpur	-0.377	***	-0.236	***	-0.0021	0.0067	0.0008
Chittagong	-0.041	***	-0.045	***	-0.0010	-0.0002	-0.0001
Comilla	-0.070	***	-0.069	***	0.0012	0.0001	0.0000
Sylhet	-0.022	***	0.017		0.0002	0.0026	-0.0003
Noakhali	-0.190	***	-0.274	***	-0.0006	-0.0034	-0.0003
Khulna	-0.064	***	-0.276	***	-0.0001	-0.0084	-0.0002
Jessore	-0.275	***	-0.281	***	-0.0026	-0.0003	-0.0001
Barisal/Patuakhali	-0.270	***	-0.358	***	0.0059	-0.0101	0.0019
Kushitia	-0.242	***	-0.042	***	-0.0031	0.0056	0.0026
Rajshahi	-0.237	***	-0.287	***	0.0002	-0.0032	0.0000
Rangpur	-0.424	***	-0.318	***	0.0010	0.0093	-0.0003
Pabna	-0.265	***	-0.242	***	0.0013	0.0009	-0.0001

Dinajpur	-0.332	***	-0.252	***	-0.0012	0.0035	0.0003
Bogra	-0.219	***	-0.248	***	0.0004	-0.0012	0.0001
Number of babies	-0.354	***	-0.202	***	0.0003	0.0169	-0.0001
Number of babies squared	0.187	*	0.034		0.0000	-0.0175	0.0000
Number of children	-0.184	***	-0.178	***	0.0445	0.0109	-0.0013
Number of children squared	0.012	***	0.014	***	-0.0156	0.0066	-0.0013
number of adult	-0.124	***	-0.104	***	0.0072	0.0622	-0.0012
number of adult squared	0.010	***	0.008	***	-0.0044	-0.0199	0.0008
head female	-0.102	**	-0.015		-0.0020	0.0076	0.0017
Head:married, no spouse present	0.168	***	0.097	***	0.0014	-0.0021	-0.0006
Head:single, no spouse present	0.103	***	0.108	*	-0.0008	0.0001	0.0000
Head:divorced, widowed, separated, no spouse present	0.018		-0.041		0.0002	-0.0042	-0.0005
Head age	0.007	**	0.016	***	0.0095	0.3729	0.0109
Head age squared	0.000	**	0.000	***	-0.0086	-0.1511	-0.0085
Head non-muslim	-0.059	**	-0.093	**	-0.0018	-0.0032	-0.0010
Level of Head's edu: Below class 5	0.112	***	0.138	***	0.0001	0.0012	0.0000
Level of Head's edu: Class 5	0.110	***	0.131	***	0.0007	0.0021	0.0001
Level of Head's edu: Class 6 to 9	0.186	***	0.191	***	0.0032	0.0006	0.0001
Level of Head's edu: Higher Level	0.267	***	0.305	***	0.0014	0.0036	0.0002
Level of Spouse's edu: Below class 5	0.119	***	0.066	**	0.0005	-0.0016	-0.0002
Level of Spouse's edu: Class 5	0.105	***	0.045	**	0.0012	-0.0053	-0.0007
Level of Spouse's edu: Class 6 to 9	0.175	***	0.112	***	0.0055	-0.0053	-0.0020
Level of Spouse's edu: Higher Level	0.368	***	0.296	***	0.0041	-0.0016	-0.0008
Difference b/w head and max edu: 1 level	0.106	***	0.088	***	0.0016	-0.0020	-0.0003
Difference b/w head and max edu: 2 level	0.119	***	0.102	***	0.0000	-0.0015	0.0000
Difference b/w head and max edu: 3 level	0.170	***	0.135	***	0.0037	-0.0036	-0.0008
Difference b/w head and max edu: 4 level	0.319	***	0.159	***	0.0013	-0.0056	-0.0006
Functionally Landless:0.05-0.49	0.063	***	0.072	***	0.0017	0.0013	0.0003
Marginal:0.5 to 1.5	0.098	***	0.148	***	0.0011	0.0085	0.0005
Small:1.5 to 2.5	0.184	***	0.269	***	-0.0001	0.0069	0.0000
Medium&Large:2.5 or more	0.325	***	0.419	***	-0.0025	0.0087	-0.0007
Head's major activity: self-employment:non-agriculture	-0.044	*	0.035		0.0052	0.0223	-0.0093
Head's major activity: Daily wage employment	-0.079	***	-0.058	***	0.0017	0.0076	-0.0005
Head's major activity: Salary wage employment	0.076	***	0.015		0.0004	-0.0054	-0.0003
Head's major activity: None	-0.031		0.024		-0.0013	0.0056	0.0024
Number of non-farm enterprises	0.080	***	0.071	***	-0.0035	-0.0027	0.0004
HH receives domestic remittances-dummy	0.069	***	0.091	**	0.0027	0.0042	0.0008
HH receives remittances from abroad-dummy	0.204	***	0.252	***	0.0017	0.0043	0.0004
number of cattle	0.028	***	0.004	*	0.0023	-0.0217	-0.0020
number of chicken	0.000	***	0.001	***	0.0004	0.0011	0.0002
Constant	7.133	***	6.858	***		-0.2749	
Total					0.0608	0.0584	-0.0079
Urban sample							
	<i>Coefficient-2000</i>		<i>Coefficient-2005</i>		<i>Oaxaca decomposition</i>		
					<i>endowments</i>	<i>coefficients</i>	<i>interaction</i>
Mymensingh	-0.2076	***	-0.1145	***	-0.0031	0.0031	0.0014
Faridpur	-0.3227	***	-0.0620	***	-0.0121	0.0044	0.0098
Tangail/Jamalpur	-0.0194		-0.2690	***	-0.0007	-0.0021	-0.0088
Chittagong	-0.1041	***	-0.0267	***	0.0051	0.0109	-0.0038
Comilla	-0.0773	***	-0.1297	***	-0.0008	-0.0017	-0.0006
Sylhet	-0.1506	***	-0.0658	***	-0.0040	0.0014	0.0023
Noakhali	-0.3052	***	-0.0863	**	-0.0039	0.0055	0.0028
Khulna	-0.3155	***	-0.4160	***	0.0154	-0.0109	0.0049
Jessore	-0.3651	***	-0.3340	***	-0.0026	0.0013	0.0002
Barisal/Patuakhali	-0.1406	***	-0.2263	***	-0.0009	-0.0064	-0.0006

Kushtia	-0.3784	***	0.1347	***	-0.0049	0.0129	0.0066
Rajshahi	-0.2668	***	-0.2545	***	0.0034	0.0010	-0.0002
Rangpur	-0.4335	***	-0.3280	***	-0.0147	0.0026	0.0036
Pabna	-0.0545	***	-0.3090	***	-0.0004	-0.0063	-0.0020
Dinajpur	-0.5226	***	-0.3206	***	-0.0084	0.0034	0.0032
Bogra	-0.0966	***	-0.3163	***	-0.0007	-0.0055	-0.0016
Number of babies	-0.3323	***	-0.4213	***	-0.0015	-0.0078	-0.0004
Number of babies squared	0.1695	*	0.2772	**	0.0009	0.0097	0.0006
Number of children	-0.2091	***	-0.1803	***	0.0413	0.0491	-0.0057
Number of children squared	0.0172	***	0.0116	***	-0.0154	-0.0263	0.0050
number of adult	-0.1357	***	-0.1421	***	0.0194	-0.0213	0.0009
number of adult squared	0.0110	***	0.0116	***	-0.0135	0.0087	-0.0008
head female	-0.1130	*	-0.1476	***	-0.0001	-0.0033	0.0000
Head:married, no spouse present	0.2923	***	0.3503	***	0.0003	0.0020	0.0001
Head:single, no spouse present	0.1938	***	0.2397	***	-0.0007	0.0012	-0.0002
Head:divorces, widowed, separated, no spouse present	0.1312		0.1599	**	-0.0007	0.0022	-0.0002
Head age	0.0135	***	0.0201	***	0.0040	0.2899	0.0019
Head age squared	-0.0001	*	-0.0002	***	-0.0033	-0.1267	-0.0020
Head non-muslim	-0.0014		-0.1070	***	-0.0001	-0.0085	-0.0040
Level of Head's edu: Below class 5	0.1727	***	0.1549	***	0.0000	-0.0008	0.0000
Level of Head's edu: Class 5	0.2727	***	0.1933	***	-0.0016	-0.0084	0.0005
Level of Head's edu: Class 6 to 9	0.3724	***	0.3134	***	0.0034	-0.0103	-0.0005
Level of Head's edu: Higher Level	0.5750	***	0.4673	***	0.0135	-0.0291	-0.0025
Level of Spouse's edu: Below class 5	0.1774	***	0.1428	***	-0.0008	-0.0015	0.0002
Level of Spouse's edu: Class 5	0.1514	***	0.1137	***	0.0008	-0.0037	-0.0002
Level of Spouse's edu: Class 6 to 9	0.2840	***	0.2386	***	0.0079	-0.0077	-0.0013
Level of Spouse's edu: Higher Level	0.5417	***	0.4393	***	0.0197	-0.0132	-0.0037
Difference b/w head and max edu: 1 level	0.1160	***	0.1109	***	0.0017	-0.0006	-0.0001
Difference b/w head and max edu: 2 level	0.1989	***	0.1223	***	0.0003	-0.0053	-0.0001
Difference b/w head and max edu: 3 level	0.3220	***	0.2257	***	0.0014	-0.0073	-0.0004
Difference b/w head and max edu: 4 level	0.3851	***	0.3415	***	-0.0039	-0.0013	0.0004
Functionally Landless:0.05-0.49	0.0876	*	0.0084		0.0036	-0.0028	-0.0033
Marginal:0.5 to 1.5	0.0943	**	0.0820	***	0.0056	-0.0005	-0.0007
Small:1.5 to 2.5	0.1318	*	0.1902	***	0.0035	0.0010	0.0015
Medium&Large:2.5 or more	0.1760	*	0.3188	***	0.0073	0.0036	0.0059
Head's major activity: self-employment: non-agriculture	-0.1465	*	0.1001	**	-0.0356	0.0128	0.0599
Head's major activity: Daily wage employment	-0.0943	**	-0.0232		-0.0021	0.0158	0.0016
Head's major activity: Salary wage employment	-0.0533		0.0384		0.0025	0.0282	-0.0042
Head's major activity: None	0.0545		0.0728		0.0004	0.0022	0.0001
Number of non-farm enterprises	0.0592	*	0.0788	**	-0.0021	0.0082	-0.0007
HH receives domestic remittances-dummy	-0.0149		0.1073	***	-0.0001	0.0232	0.0008
HH receives remittances from abroad-dummy	0.1511	***	0.3099	***	-0.0005	0.0127	-0.0005
Constant	6.9227	***	6.6677	***		-0.2551	
Total					0.0221	-0.0576	0.0652
Note: * Significant at the 10% level; ** Significant at the 5% level; *** Significant at the 1%level							