Are Bangladesh's Recent Gains in Poverty Reduction Different from the Past?

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The poor in Bangladesh are more likely to belong to households with a larger number of dependents, lower education, engaged in daily wage labor, own little land and less likely to receive remittances. This poverty profile for 2005 is similar to those in the mid-1980s apparently indicating that little has changed over time. A closer look at the survey data, however, suggests a much more nuanced story. The paper uses two rounds of the Bangladesh Household Income and Expenditure Survey (HIES) to decompose the micro-determinants of poverty reduction between 2000 and 2005 closely following similar analysis using earlier rounds of the HIES from the 1980s and 1990s. The comparison of results shows that the spatial distribution of poverty has changed over the three decades, the drivers of poverty reduction are different in several respects, and that policies to spur further reduction in poverty need to be adjusted in the light of these shifts over time.

Key words: Antipoverty, Development, Household analysis

JEL Classification: I3, O2, R2

I. INTRODUCTION

In the 1970s, three out of four Bangladeshis lived in poverty and the country was considered a test case for development. Rapid population growth, frequent natural disasters, and low economic growth throughout the 1980s suggested that a large number of households would remain trapped in chronic poverty, and the outlook for the extreme poor appeared exceedingly bleak. Defying this outlook, Bangladesh began experiencing more sustained economic growth in the 1990s and this growth was accompanied by impressive reductions in poverty levels. In 1991-92, about 60 per cent of the population was below the poverty line and around 50 per cent of the population was below the extreme poverty line. By 2000, about half the population was still poor, while the extreme poverty rate had dropped to 34 per cent.

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In the five years that followed, both moderate poverty and extreme poverty declined at an even quicker pace. In 2005, 40 per cent of the population was in poverty and 25 per cent of the population was in extreme poverty, which implied an annual decline of around two percentage points in the incidence of poverty and extreme poverty between 2000 and 2005. The fall in poverty headcount rate was significantly higher than population growth, which led to a decline in the number of poor people by nearly 6 million. The levels and distribution of consumption among the poor improved as well, as evident from reductions in poverty gap and squared poverty gap measures by 30 per cent and 37 per cent respectively (World Bank 2008). The decline in extreme poverty is particularly impressive as it suggests that many households have been able to escape what was widely considered to be vicious poverty traps (Sen and Hulme 2005).

The Bangladesh economy began experiencing structural changes in the 1980s following trade liberalisation and domestic market reforms (Mujeri 2002). In urban areas, private sector growth and employment was spurred by rapid growth in garments exports and growth in manufacturing activities. Rural areas benefited from the deregulation of agriculture markets in the 1990s, which is believed to have led to a sharp rise in agricultural production (Klytchnikova and Diop 2006). At the same time, relatively higher paying rural non-farm opportunities increased and the labour force slowly began to shift away from agriculture (Sen 2003). Declining population growth rates, improved human capital (Sen, Mujeri and Shahabuddin 2007), increased access to microfinance loans (Khandker 2005), improved infrastructure mainly in the form of more extensive road communications networks (Choudhury and Torrero 2006) and increased foreign remittance earnings (Sharma and Zaman 2009) have been put forth as factors explaining Bangladesh's enhanced growth and declining poverty.

The contribution of this paper to the literature lies in its comparisons of poverty determinants from the 1980s with more recent years, thereby allowing us to infer how the micro-determinants of growth and poverty reduction have changed over the last three decades. The long term drivers of poverty reduction in a country like Bangladesh have global policy relevance. If a country which has recurring natural disasters, with poor governance indicators can reduce poverty significantly, then there is hope for many other countries facing challenging circumstances. We first analyse the determinants of poverty using nationally representative household data from two different points in time (2000 and 2005), examining the extent to which poverty reduction is explained by changes in attributes of households (including household and geographic factors) and changes in the returns to these attributes. We attempt to replicate the same decomposition methodology, and econometric specification, as Wodon (2000),

who used earlier rounds of the same dataset to assess the factors explaining poverty reduction in Bangladesh between 1983/84 and 1995/96, in order to assess changes in the micro-determinants of growth and poverty reduction over the three decades.

A specific question in this context relates to the role of geographic location in determining the economic status of households. Wodon (2000) and Ravallion and Wodon (1999), using survey data from 1988 and 1992, had found a significant and sizable geographic effect on poverty in Bangladesh, with the most significant (and positive) impact arising from the location of a household in the greater Dhaka region. In other words, even after controlling for mobile characteristics of households, location of a household in the region surrounding the capital city of Dhaka had a positive and significant effect on household consumption, relative to being located outside this region. This is despite the fact that Bangladesh is a small country in terms of land area and there are no administrative restrictions to migration, which would tend to equalise earnings across space. In the light of these findings, an important question our paper examines is whether the effect of geographic location on household welfare has changed in the 15 or so years since the early-1990s, and if so, in which direction.

The paper is structured as follows. Section II presents the data and methodology. Section III uses a multivariate regression framework with the latest round of the HIES data (2005) to identify the relationships between household and geographic characteristics and poverty. Section IV examines the trends in the correlates of poverty over time, to analyse how changes in characteristics and the returns to these characteristics may have contributed to poverty reduction during the 2000-05 period, comparing with results from the 1980s and 1990s. Section V concludes the paper, summarising the main findings and deriving a few implications for policy.

II. DATA AND METHODOLOGY

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). In addition to being nationally representative, HIES 2000 and 2005 are also representative for urban and rural areas and divisions within the country. 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 community survey of the HIES is also used to examine location-specific characteristics, such as access to market and services, infrastructure, and so forth. The 2001 *Population Census* is 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.

The consumption poverty estimates referred to in this paper are based on the poverty measurement methodology officially adopted by Bangladesh Bureau of Statistics (BBS). Consumption poverty in Bangladesh is measured with reference to poverty lines (defined in terms of per capita household consumption) estimated using HIES 2005 data, employing the commonly used Cost of Basic Needs (CBN) approach (see Narayan, Yoshida and Zaman 2009 for a description).[1] Intuitively, CBN poverty lines represent the level of per capita expenditure at which a household can be expected to meet their basic needs. This is measured by first estimating a food poverty line as the cost of a fixed food bundle that meets a minimum calorie requirement and then adding to that an "allowance" for non-food consumption. Two poverty lines are estimated based on different calculations of the non-food allowance-–a lower line that is the threshold for extreme poverty and an upper one for overall poverty.[2] As prices and consumption patterns vary between different geographical areas, poverty lines are estimated for each of 16 separate geographical areas. To obtain poverty estimates for earlier years, the 2005 poverty lines are deflated by price indices to represent identical purchasing power for all years.[3]

A multivariate analysis of determinants of poverty is useful in identifying the factors associated with the likelihood of a household to be poor. In this analysis, 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. A number of characteristics are considered likely candidates as determinants of household consumption, including household size and composition, occupation and education of household head, ownership of land, whether the household receives foreign remittances or not, and location of the household in terms of region and rural/urban. A multivariate OLS regression can

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[1] A household is deemed to be poor if its monthly per capita consumption is lower than the poverty line defined for the geographical area the household is located in. The approach of estimating the CBN poverty line is similar to what had been used for the earlier poverty lines developed using the 1991-92 round of HIES (see World Bank 2002).
[2] For the lower poverty line, the non-food allowance is the average non-food expenditure of households whose total consumption is equal to the food poverty line; whereas for the upper poverty line, the non-food allowance is the average non-food expenditure of households whose food consumption was equal to the food poverty line.
[3] All poverty estimates – national, rural/urban and for divisions–for 2000 and 2005–are available in the HIES Report by BBS (2007) and World Bank (2008).

quantify the relative importance of each household/location attribute in influencing household consumption.

Regressions of (log of) per capita expenditures on a set of household and location-specific attributes are run separately for urban and rural samples of HIES 2005 data. The regression specification is:

$log(y_i) = \beta X_i + u_i$

Where y_i is real consumption per capita and X_i is a vector of independent variables that influence consumption. The independent variables include household and location-specific variables.

Four different specifications of the model are run: "basic" and "extended" models for rural and urban households separately (for a complete list of variables, see regression results in Table I). The independent variables in the basic model can be grouped into following categories: (i) household composition (number of infants, children and adults, and squared terms); (ii) gender, marital status, age and religion of household head; (iii) education levels of household head and his/her spouse, and (maximum) education of other members; (iv) ownership of agricultural land; (v) occupation/employment status of head and whether the household owns an enterprise; (vi) whether a household receives domestic and international remittances; (vii) ownership of livestock (rural households only); and (ix) location of household, represented by fixed effects corresponding to 16 regions.[4]

The list of independent variables includes a few whose exogenous nature (with respect to household consumption) is questionable. Whether a household receives remittances or not, in particular, can be influenced by a household's economic status since migration of household members often requires upfront costs that can be considerable. These variables are still included in the regression because of the important role remittances have been shown to play in household consumption in Bangladesh in recent literature.[5] Because of such endogeneity issues, the regression coefficients of these variables should be interpreted with caution, and as correlations as opposed to causal relationships.[6]

The extended specifications of the regressions (see columns 2 and 4 of Table I) include spatial variables capturing a few characteristics of the area the

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[4]Dhaka region is the reference region where "region" here refers to the old definition of districts, and not the current definition of 64 much smaller districts.

[5]For recent evidence on the impact of remittances, see Sharma and Zaman (2009) and World Bank (2008).

[6]Endogeneity may be present, or at least cannot be ruled out for some of the other variables in the regressions as well, like the presence of a household enterprise.

household is located in, for which data are available and which are expected to influence a household's economic condition. The inclusion of these variables can shed some light on the factors that can contribute to a location advantage (or disadvantage) of a household, as indicated by the coefficients of the regional dummies in the basic regressions.

The spatial variables included in the extended regressions can be grouped as: (i) the extent of electrification (percentage of households with electricity connection) and importance of agriculture (percentage of households owning agricultural land) for the sub-district (*thana*), from Census 2001; (ii) connectivity of the village to markets, measured as travel time to *thana* and district headquarters and Dhaka city (rural households only), from the community survey of HIES 2005; and (iii) coverage and expansion of microfinance in the *thana*, from PKSF data of 2003 and 2005.

The variables related to microfinance coverage merit some discussion. Access to microfinance in Bangladesh had increased significantly in recent years, with membership increasing by 62 per cent between 2003 and 2005, which underscores the importance of including it in any analysis of poverty determinants. But the lack of adequate information on savings/credit in HIES does not allow for incorporating a household's microfinance access into the analysis. Instead, information obtained from Bangladesh's micro-finance apex body (PKSF) on changes in microfinance coverage at the *thana* level is merged with HIES and incorporated in the extended specifications of the model. Two variables are used: coverage of microfinance in 2005 at the *thana* a household belongs to (measured by the per centage of population who are microfinance members), which indicates the extent of microfinance access in the area; and change in the number of microfinance members in the *thana* between 2003 and 2005, which proxies the extent of *expansion* in microfinance in the area.

The most important caveat to the microfinance variables relates to the fact that since the membership figures are sub-district level aggregates, the coefficients reflect the spatial effect of microfinance coverage and expansion in the sub-district on household consumption, rather than that of microfinance membership of a household on its consumption. Given that the variables are imperfect proxies of the effects of microfinance on household consumption, the coefficients of these variables must be interpreted with caution and are at best indicative (also see Section III).

The specifications for the basic models for rural and urban households (columns 1 and 3 of Table I) include identical explanatory variable groupings as used by Wodon (2000). These are variables related to household demographics, education, occupation, land, religion and location. In order to make the

specifications as similar as possible to those estimated for earlier years, we created an identical set of location variables by grouping households into the same seventeen districts which Wodon had done. Within these groups there are a few This allows us to make rough comparisons between the results from different time periods to get some understanding of how attributes that influence a household's consumption level have evolved in Bangladesh from the 1980s and 1990s to 2005.

III. DETERMINANTS OF POVERTY IN 2005

Results from the regressions we estimate suggest that household demographics (particularly the number of children and infants in the household), occupation and education level of the household head, land ownership and the receipt of remittances are important correlates of household consumption in all specifications (Table I). The regressions indicate a nuanced link between the gender of household head and poverty and show important rural-urban differences in the determinants of poverty, particularly for attributes related to occupation of household head and land ownership. The regional location of a household also has strong effect on its consumption level; and at least some of the location effects seem to be explained by differences in access to infrastructure and markets. We compare our results below with similar cross-sectional regressions estimated by Wodon (2000) for the 1983-84, 1985-86, 1988-89, 1991-92 and 1995-96 HIES rounds.

As with earlier years we find that larger households are likely to be poor—the number of infants, children and adults are all correlated negatively with consumption. The relationship between poverty and number of infants or children tends to be stronger than that with the number of adults, indicating that higher dependency within a household is associated with higher poverty incidence. Religion and age of household head also influence a household's economic status. Everything else being equal, households with non-Muslim heads tend to be poorer in 2005. This contrasts with results from the earlier rounds where religion of the household head was not a significant determinant of household welfare. Household consumption improves with age of the household head, but at a diminishing rate.

The gender dimension of poverty is important to examine in a little more detail. Table I shows that controlling for other factors, female-headed urban households in 2005 are likely to have lower consumption than male-headed urban households, while no significant effect is observed for rural households. In contrast, female-headed rural households were at a clear disadvantage in earlier

survey years, while in only one of the five surveys which Wodon (2000) examines were urban female headed households significantly worse off compared with male-headed households. When interpreting this shift it is important to distinguish between *de facto* and *de jure* female headed households (see Buvinic and Gupta 1997). The economic condition of a female-headed household where male earning members have migrated (and send remittances) can be quite different from one where the female head is the de facto main earner. Disaggregating female-headed households by marital status of the head captures this phenomenon partially. In 2005, the poverty rate was just 16 per cent among households headed by married women, compared to 37-48 per cent among households headed by women who are widowed/divorced/separated. Thus female headed households appear to face considerable hardships in the absence of adult male earners; conversely, households headed by women where the men are migrants are better off on the average than other households, whether male or female headed.

Education levels of all household members have positive and significant association with per capita consumption, with the household head's education having the highest effect. The education "premium" increases with the level of education among household heads. The premiums for education of fifth grade or higher are larger for urban than rural households, reflecting greater opportunities for educated workers in urban areas—a result consistent with Wodon's (2000) analysis of earlier survey years. Spouse's (of the household head) education and the maximum education level among other adult members of the household have positive but smaller effects on per capita expenditures. These indicate positive externalities of education among household members, in line with evidence from an earlier study (Basu, Narayan and Ravallion 2001).

Agricultural land ownership is positively and significantly correlated with household consumption in rural areas controlling for other factors. 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. For urban households, land ownership has smaller effects and are significant only for land size of 0.5 acre and above, while Wodon's urban regressions from earlier years show that *all* land ownership thresholds are associated with higher consumption levels compared with the base category of not owning land. The results suggest that while land ownership remains an important determinant of a household's economic condition in 2005, the link has become weaker compared to the 1980s and 1990s for urban households.

Occupation type and the presence of non-farm enterprises matter for household welfare. In rural areas, households headed by daily wage workers are significantly worse off than other types of households. In urban areas, non-agricultural self-employment of the household head has a positive and significant effect on household consumption, in comparison to other occupations. The presence of non-farm enterprises in households is associated with higher level of consumption, with the coefficient being similar for both rural and urban areas; these results are similar to Wodon's findings from earlier survey rounds.

Households receiving *remittances* (foreign or domestic) tend to be better off than households that do not in both urban and rural areas, with the correlation being about three times stronger for foreign remittances than domestic remittances. The 2005 HIES shows that there is substantial regional disparity in the incidence of external remittances, with around 16 per cent and 24 per cent of households in Sylhet and Chittagong, respectively, receiving remittances compared to less than 5 per cent of households in Barisal, Khulna and Rajshahi (World Bank 2008). The regressions suggest that remittances have a significant correlation with household consumption even *after* controlling for the location of the household. These coefficients must, however, be treated with caution, given that the direction of the causality is unclear. Foreign migration in particular can require relatively large investment upfront that the relatively better off households are more likely to afford in the first place.

After controlling for household characteristics, *location* of a household in most of the regions—fifteen out of 16 regions for the rural sample and all regions for the urban sample—is associated with lower consumption relative to Dhaka region in the basic specifications of the regression (columns 1 and 3, Table I). Ravallion and Wodon (1999) and Wodon (2000) had found broadly similar results using data from earlier rounds of HES. For example, in the rural sample for 1988, location in all but one region (Chittagong) had a negative and significant effect on household consumption relative to location in the Dhaka region.

In the light of these results, an important question is: are the regional fixed effects capturing variations in community characteristics below the level of regions, such as availability of infrastructure in the community, connectivity/access to urban markets and size of the non-farm sector? To address this question, a few community or spatial variables of this type are included in the extended specifications including *thana* level indicators for *microfinance*

coverage and *increase in coverage* between 2003 and 2005 (see discussion in Section II).[7] The coefficients of these variables must be interpreted with caution because some of them are imperfect proxies of the indicators they are trying to measure, and because of the bias from the omission of other potentially important location attributes for which no data is available.

Taken together, the spatial/community variables reduce the size of the regional fixed effects compared to the basic specifications (see Table I). For rural areas, adding travel time from the community to *thana* and district headquarters and Dhaka city, indicators of microfinance coverage at the *thana* level and per centage of households in the *thana* with electricity connection or owning agricultural land reduce the size of the regional fixed effects. Fifteen of the 16 regional dummies had significant (at 5 per cent level or below) and negative effect on consumption in the basic specification (column 1, Table I); with the spatial variables added in, only 10 of these are significant and all the coefficients become smaller in absolute value (column 3). Similar results are observed for urban households when spatial variables related to microfinance, electrification and the importance of agriculture in the area are added as independent variables in the regression (comparing columns 2 and 4 in Table I). However, since the number of spatial variables available for urban areas is smaller than for rural areas, the reduction in the regional effect is smaller in the case of urban households. The results suggest that differences in community or sub-district (thana) characteristics explain some of the location effects on household consumption.

Given that some of the location-specific variables are highly correlated with each other, it is useful to look at their coefficients when they are introduced into the regressions one at a time (see Table II). Travel times to urban centres*,* which proxy access to markets, are important determinants of household welfare in rural Bangladesh. Travel times to the nearest local market (*thana* headquarter) and the largest urban market of the country (Dhaka) have the largest positive effects on rural household consumption. The extent of electrification in the *thana* is associated with higher consumption, more strongly for rural areas than for urban areas (Table II).

For rural households, the coefficient for *thana* level microfinance coverage is insignificant, while that for *thana*-level increase in microfinance coverage (2003-

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[7] 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.

2005) is positive and significant.[8] This is consistent with what is shown by the cross-tabulations in Table III: since 2000 microfinance expanded more in areas that were poorer to start with; and the reduction in poverty was much more among households living in thanas where microfinance membership increased more rapidly. The regressions suggest that controlling for the extent of microfinance coverage in a thana, faster *expansion* in microfinance membership in the area is associated with higher consumption in a cross-section of households in 2005.

Given the caveats on the microfinance variables used here (see Section II), these results should just be seen as showing a correlation between microfinance expansion in an area and household consumption, which does not constitute evidence on the *impact* of microfinance on consumption. Although the lack of data from a nationally representative survey like HIES limits the scope for national level analysis of the impact of microfinance in Bangladesh, some earlier studies using smaller data sets have found a significant positive impact of microfinance on various dimensions of household welfare.[9] While there are differing views among studies about whether microfinance has significant impact on poverty of member households (see Morduch 1999), there is consensus that microcredit improves welfare by reducing the variability of consumption of borrowers and cushioning the impact of income shocks on households.[10]

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[8] The coefficient for *thana* level microfinance coverage is negative and significant for urban households. This is likely to be a spurious correlation–given the extremely limited coverage of MFIs in urban areas, it is hard to see how consumption of urban households would be impacted by microfinance expansion. The negative coefficient probably reflects a deliberate attempt by MFIs to expand coverage in areas that were poorer to start with (see Table III).

[9] To cite one example, using a specialised survey, Khandker (2005) finds that both poverty and extreme poverty rates dropped faster among microcredit borrowers than among non-borrowers, with nearly half of the borrowers' poverty reduction attributable to microcredit alone.

[10] See Morduch (1999), Pitt and Khandker (1998), Zaman (1999) and Khandker (2005).

TABLE I

REGRESSIONS OF LOG OF PER CAPITA HOUSEHOLD CONSUMPTION, 2005

	(1) *Rural-Basic*	(2) *Rural-Extended*	(3) *Urban-Basic*	(4) *Urban-Extended*
Mymensingh	-0.108**	-0.014	-0.114**	-0.065
Faridpur	-0.072**	-0.004	-0.062**	-0.042
Tangail/Jamalpur	-0.236**	-0.152**	-0.269**	-0.180**
Chittagong	-0.045**	0.108	-0.027**	-0.025
Comilla	-0.069**	-0.014	-0.130**	-0.094*
Sylhet	0.017	0.068	-0.066**	-0.109*
Noakhali	-0.274**	-0.212**	-0.086*	-0.056
Khulna	-0.276**	-0.138**	-0.416**	-0.397**
Jessore	-0.281**	-0.149**	-0.334**	-0.267**
Barisal/Patuakhali	-0.358**	-0.140*	-0.226**	-0.153**
Kushtia	-0.041**	0.032	0.135**	0.205**
Rajshahi	-0.287**	-0.169**	-0.255**	-0.199**
Rangpur	-0.318**	-0.226**	-0.328**	-0.264**
Pabna	-0.242**	-0.197**	-0.309**	-0.255**
Dinajpur	-0.252**	-0.109**	-0.321**	-0.199**
Bogra	-0.248**	-0.156**	-0.316**	-0.260**
Number of infants	-0.202**	-0.209**	-0.421**	-0.406**
Number of infants squared	0.034	0.038	0.277*	0.269*
Number of children	-0.178**	-0.177**	-0.180**	-0.178**
Number of children squared	0.014**	0.013**	0.012**	0.011**
Number of adult	-0.104**	-0.109**	-0.142**	-0.138**
Number of adult squared	0.008**	0.008**	0.012**	0.011**
Head female	-0.015	-0.030	-0.148**	-0.149**
Head:married, no spouse present	0.097**	0.100*	0.350**	0.345**
Head:single, no spouse present	0.108	0.090	0.240**	0.186**
Head:divorced, widowed, separated, no spouse present	-0.041	-0.033	0.160*	0.166*
Head age	0.016**	0.015**	0.020**	0.020**
Head age squared	-0.000**	-0.000**	-0.000**	-0.000**
Head non-muslim	-0.093*	-0.065**	-0.107**	-0.093*

(Cont. Table I)

	(1) *Rural-Basic*	(2) *Rural-Extended*	(3) *Urban-Basic*	(4) *Urban-Extended*
Level of Head's edu: Below class 5	0.138**	0.128**	0.155**	0.155**
Level of Head's edu: Class 5	0.131**	0.128**	0.193**	0.192**
Level of Head's edu: Class 6 to 9	0.191**	0.169**	0.313**	0.308**
Level of Head's edu: Higher Level	0.305**	0.273**	0.467**	0.458**
Level of Spouse's edu: Below class 5	0.066*	0.060*	0.143**	0.140**
Level of Spouse's edu: Class 5	0.045*	0.046*	0.114**	0.117**
Level of Spouse's edu: Class 6 to 9	0.112**	0.101**	0.239**	0.239**
Level of Spouse's edu: Higher Level	0.296**	0.284**	0.439**	0.437**
Difference b/w head and max edu: 1 level	0.088**	0.076**	0.111**	0.110**
Difference b/w head and max edu: 2 level	0.102**	0.086**	0.122**	0.119**
Difference b/w head and max edu: 3 level	0.135**	0.120**	0.226**	0.216**
Difference b/w head and max edu: 4 level	0.159**	0.145**	0.341**	0.315**
Functionally Landless:0.05-0.49	0.072**	0.082**	0.008	0.006
Marginal:0.5 to 1.5	0.148**	0.173**	0.082**	0.100**
Small:1.5 to 2.5	0.269**	0.299**	0.190**	0.206**
Medium&Large:2.5 or more	0.419**	0.476**	0.319**	0.327**
Head's major activity: self-employment: non-agriculture	0.035	0.034	0.100*	0.102*
Head's major activity: Daily wage employment	-0.058**	-0.059**	-0.023	-0.021
Head's major activity: Salary wage employment	0.015	0.004	0.038	0.036
Head's major activity: None	0.024	0.018	0.073	0.077
Number of non-farm enterprises	0.071**	0.062**	0.079	0.076*

(Cont. Table I)

	(1) *Rural-Basic*	(2) *Rural-Extended*	(3) *Urban-Basic*	(4) *Urban-Extended*
HH receives domestic remittances-dummy	0.091*	0.078**	0.107	0.109**
HH receives remittances from abroad-dummy	0.252**	0.222**	0.310	0.302**
number of cattle	0.004	0.005		
number of chicken	0.001**	0.001**		
Travel time to thana HQ ('00 mins)		-0.032*		
Travel time to zila HQ ('00 mins)		-0.003*		
Travel time to Dhaka HQ ('00 mins)		-0.036**		
% of HH with electric connection		0.001		0.000
% of HH own agricultural land		-0.003		-0.000
Coverage of micro finance in Thana in 2005		-0.001		-0.002*
Change in microfinance members between 2003 and 2005		0.002**		0.001
Constant	6.858**	7.024	6.668	6.696**
Observations	6,371	5,874	3,660	3,600
R-squared	0.48	0.50	0.56	0.56

Source: HIES 2005.
Note: * significant at 5%; ** significant at 1%.

TABLE II
COEFFICIENTS OF LOCATION VARIABLES, 2005

	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)**	
Per centage of HH with electricity in Thana	0.004 (3.86)**	0.001 (2.14)*
Per centage of HH owning agricultural land	-0.004 (1.99)	-0.001 (0.54)

Source: HIES 2005.
Note: 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.

TABLE III
**INCREASE IN NUMBER OF MICROFINANCE
MEMBERS AND POVERTY REDUCTION**

Increase in no. of members	Poverty Headcount Rate (%)		
	2000	2005	% Change in Poverty rate
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

Note: Increase in microfinance activities refers to per centage change in members in Thana between 2000 (imputed) and 2005. To calculate the membership in 2000, the assumption used is that the annual rate of client growth in each sub-district during 2003-2005 is similar to what would have occurred between 2000 and 2005.

IV. CHANGES IN POVERTY OVER TIME: RESULTS FROM A DECOMPOSITION ANALYSIS

A comparison of the regression results from HIES datasets of 2000 and 2005 can help identify the factors responsible for the rapid reduction in poverty between these years. We apply a similar method as Wodon (2000) so that the results are comparable with earlier years. Prior to that discussion, however, it is useful to consider whether the improvement in consumption poverty was also mirrored by improvements in non-consumption dimensions of household welfare. This is important in order to assess whether the rise in consumption was also associated with a more broad-based rise in well-being.

A number of non-consumption indicators of welfare show significant improvements between 2000 and 2005, for the general population and the poor alike (see Table A-1, Annex). Earlier work on poverty in Bangladesh shows that poverty and quality of housing are closely correlated (see, for example, Hossain 1995). It is therefore significant that housing conditions have improved dramatically between 2000 and 2005, with a larger percentage of households with walls and roofs of corrugated iron sheets and cement that are more resilient to adverse weather conditions. Similarly, between 2000 and 2005, the percentage of households with access to a safe toilet has increased from 52 per cent to 69 per cent. Also significant is the increase in the share of households with electricity connections, from 31 per cent to 44 per cent during 2000-2005. There has also been a sharp rise in the percentage of households with access to a phone (landline

and/or mobile)–-from 2 per cent of the population in 2000 to 13 per cent in 2005–mainly due to expansion of the mobile phone network.

To identify the factors responsible for the reduction in consumption poverty between 2000 and 2005, we decompose the growth in mean per capita real consumption, applying the Oaxaca-Blinder method (see Oaxaca 1973) on the regressions (with per capita consumption as the dependent variable) for the two years. Growth in per capita household consumption is decomposed into changes in (i) household and location *endowments* and (ii) *returns* to these endowments.[11] We specify the linear regression equation (the basic specification, separately for rural and urban households-–as described in section II above) for two different time periods, t and t+1 (where t corresponds to year 2000 and t+1 to year 2005) and then subtract the latter from the former to obtain:

$$log(y_i^{t+1}) - log(y_i^t) = (\beta^{+1} - \beta)X_i^t + \beta^{+1}(X_i^{t+1} - X_I^t) + (u_{t+1} - u_t) \qquad (1)$$

or

$$log(y_i^{t+1}) - log(y_i^t) = (\beta^{+1} - \beta)X_i^{t+1} + \beta(X_i^{t+1} - X_I^t) + (u_{t+1} - u_t) \qquad (2)$$

In most cases these two ways to decompose $log(y_i^{t+1})$ - $log(y_i^t)$ will give similar decomposition results, and this is borne out by the empirical results.[12] In each version, the first term on the right hand side represents the effect of changing returns over time (holding characteristics constant) and the second term represents the effect of changing household characteristics (holding returns constant).

The decompositions suggest somewhat different stories for the rural and urban samples (summary results in Table IV).[13]   Among rural households, increasing *returns* over time had as strong an impact on the observed consumption growth as did changes in household and location characteristics. Among urban households, changes in *characteristics* played a larger role than that in returns or coefficients on the aggregate.[14] Changes in returns to household size, other demographic variables, land ownership and geographic location contributed more to the consumption growth of rural than urban households. The

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[11] See Glewwe, Gragnolati and Zaman (2002) for a similar decomposition exercise, with household survey data from Vietnam.

[12] The standard index number problem, where two possible "weights" (coefficients in this case) can be used for decomposition purposes, is the reason for the two equations presented in this paper.

[13] More detailed results, including decomposition results for each variable, are available in an Addendum to this paper, which can be provided upon request.

[14] These results are similar (but not identical) to those obtained by Serajuddin, Narayan and Zaman (2007), using the same datasets, but with some differences in specifications.

fact that a rise in returns to endowments played a significant role in rural poverty reduction suggests an improvement in the economic environment in rural areas.

TABLE IV
OAXACA DECOMPOSITION OF INCREASE IN PER CAPITA REAL CONSUMPTION BETWEEN 2000 AND 2005: SUMMARY RESULTS

	Rural			Urban		
	endowments	coefficients	interaction	endowments	coefficients	Interaction
Geographic dummies (reference region: Dhaka)	-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
Total*	0.061	0.058	-0.008	0.022	-0.058	0.065

Source: HIES 2000, 2005.

*The total for each column may not exactly match the sum of rows due to rounding off.

   Among household endowments, changes in household size and education of household members contributed the most to consumption growth. The role played by reduction in household size is consistent with the finding in World Bank (2008)–-that if household size had not changed between 2000 and 2005, poverty reduction would have been almost half of what it actually was. This is similar to Wodon's finding for the 1983-1996 period that "*changes in the returns to demographic variables account for the lion's share of the change in per capita consumption over time*" (page 13).

   There was a sizeable reduction in household size between 2000 and 2005: the average household size fell from 5.2 to 4.9 and the dependency ratio fell from 0.77 to 0.69 (see Table A-2, Annex). The downward trend in household size is associated with a fall in the number of children in a household rather than a

change in the number of adults, indicating a fundamental demographic change rather than household splitting or migration. Aggregate evidence also supports this theory-–the decline in household size is consistent with reductions in annual population growth rate (from 2.9 per cent in the 1970s to 1.5 per cent currently) and total fertility rate (from 7 in 1975 to 2.7 in 2007).

The effect of an increase in education endowments among household heads is particularly strong for urban households but the effect of change in returns to education is negative for both rural and urban areas. In other words, while a shift to higher levels of education among heads of households is associated with improving welfare, the overall returns to education at each grade level appear to have declined. Cross-tabulations show education attainment among household heads improving between 2000 and 2005, along with reduction in poverty for all levels of education (see Table A-3, Annex). This is in contrast to Wodon's findings from earlier survey rounds where he concludes that the returns to education of the household head in urban areas rose over time while they fell in rural areas.

Unlike what is seen for household demographics and education, the effects of changes in *returns* to occupations dominate that of changes in occupational *characteristics* for both rural and urban households. For rural households, the increases in returns to agricultural labour and farming are substantial and consistent with poverty reduction seen among households headed by an agricultural day labourer or farmer (Table A-3, Annex). This is consistent with Wodon's results from 1991-1996 showing that returns to agricultural occupations rose following a decline in the 1980s. For urban households, returns to non-agricultural daily labour and self-employment improved significantly, suggesting that rising labour incomes and increased earnings from non-farm self-employment in urban areas contributed to reducing poverty.

Among urban households, the coefficients on remittances (domestic and foreign) increased sharply from 2000 to 2005, suggesting that a rise in "returns" to remittances contributed significantly to urban consumption growth. Among rural households, both increase in remittances and returns to remittances had small contributions to consumption growth. These impacts are consistent with the findings of a recent study on the effect of remittances on household welfare in Bangladesh (Sharma and Zaman 2009).

Given the role played by location effects in explaining household consumption (see Section III), time trends of these effects help us understand whether and how the pattern of regional disparities has changed over the years, and how these changes may have contributed to reduction in national poverty. The results illustrate how spatial dynamics have shifted in Bangladesh. First, it is

clear that there has been some reduction in the "disadvantage" of being located in any region other than Dhaka, compared to the period of the late-1980s and early-1990s. This difference is seen when comparing our results with those from Wodon (2000) which shows increasing gaps between 1983 and 1991 and little change in the 1990s. Between 2000 and 2005, the decompositions show a reduction in the size of the average (negative) effect of being located in any region other than Dhaka (Table V).

TABLE V
EFFECT OF LOCATION (IN A REGION/DISTRICT)
ON HOUSEHOLD CONSUMPTION
(REFERENCE REGION: DHAKA)

"Old" districts	*Divisions*	Rural			Urban		
		(1) *2000*	(2) *2005*	(3) *Chow Test*	(4) *2000*	(5) *2005*	(6) *Chow Test*
Mymensingh		-0.305**	-0.108**	0.199**	-0.208**	-0.114**	0.101**
Faridpur	Dhaka	-0.357**	-0.072**	0.292**	-0.323**	-0.062**	0.235**
Tangail/Jamalpur		-0.377**	-0.236**	0.126**	-0.019	-0.269**	-0.228**
Comilla		-0.070**	-0.069**	0.015**	-0.077**	-0.130**	-0.032**
Chittagong	Chittagong	-0.041**	-0.045**	-0.008	-0.104**	-0.027**	0.087**
Noakhali		-0.190**	-0.274**	-0.040	-0.305**	-0.086*	0.261**
Sylhet	Sylhet	-0.022**	0.017**	0.046**	-0.151**	-0.066**	0.115**
Khulna		-0.064**	-0.276**	-0.233**	-0.315**	-0.416**	-0.098**
Jessore	Khulna	-0.275**	-0.281**	-0.008	-0.365**	-0.334**	0.082**
Kushtia		-0.242**	-0.041**	0.196**	-0.378**	0.135**	0.535**
Barisal/Patuakhali	Barisal	-0.270**	-0.358**	-0.091**	-0.141**	-0.226**	-0.066**
Rajshahi		-0.237**	-0.287**	-0.058**	-0.267**	-0.255**	0.071**
Rangpur		-0.424**	-0.318**	0.096**	-0.434**	-0.328**	0.119**
Pabna	Rajshahi	-0.265**	-0.242**	0.015	-0.055**	-0.309**	-0.219**
Dinajpur		-0.332**	-0.252**	0.060**	-0.523**	-0.321**	0.243**
Bogra		-0.219**	-0.248**	-0.047**	-0.097**	-0.316**	-0.211**

Source: HIES 2000, 2005.

Notes: 1) basic specification of rural model (Column 1, Table 1) is used for both 2000 and 2005 regressions

2) basic specification of urban model (Column 3, Table 1) is used for both 2000 and 2005 regressions.

3) Chow test results (for changes in location effects between 2000 and 2005) represent coefficients of the interaction terms between district dummies and dummy for 2005 in the model where both years are pooled. A positive (negative) coefficient in column 3 indicates the reduction (increase) in gap between the rural samples of Dhaka and the respective district from 2000 to 2005, and similarly for column 6 with regard to urban samples.

4) Dhaka, Chittagong and Sylhet divisions constitute the "East", while the "West" is comprised of Khulna, Barisal and Rajshahi. Regions refer to "old" definition of districts.

5) **: significant at 1% level.

6) Shaded cells refer to districts for which the gap with Dhaka district has *increased* significantly.

Second, a more disaggregated analysis reveals a nuanced story suggesting that the earlier divide between Dhaka and the rest of Bangladesh is being replaced by an "East-West" divide. We run the following regression specification:

$$Y = \alpha + X\beta_1 + \beta_2 D(year = 2005) + Z_k\beta_3 + D(year = 2005)Z_k\beta_4 + \varepsilon$$

Here Y is the vector of log of real per capita consumption, X represents other control variables and Z the district/regional dummies. Chow test results (for changes in location effects between 2000 and 2005) represent coefficients of the interaction terms between district dummies and dummy for 2005 in the model where both years are pooled.

The results in Table V show that the narrowing of the gaps with Dhaka region occurred mostly for the eastern regions, while the gap with Dhaka region has widened for most of the regions to the west and southwest. Table V shows the urban and rural location effects and Chow test results for 16 regions (with Dhaka as the reference region against which the location effects are measured). Of these, 7 regions are in the east (the divisions of Dhaka, Sylhet and Chittagong) and 9 are in the west (the divisions of Barisal, Khulna and Rajshahi). The Chow test results indicate whether the location effects in 2005 are significantly different from those in 2000. For the rural sample, of the nine western regions, the gap with Dhaka region has increased for four and remained unchanged for two. In contrast, the gap with Dhaka region has not increased for *any* of the eastern regions, and shrunk for five out of the seven. For the urban sample, the gap with Dhaka region has increased for five western regions and just one eastern region. Thus while poverty has reduced and consumption improved on the average in the eastern part of the country from 2000 to 2005, the western regions have fallen further behind.

That regional inequality in Bangladesh is taking the form of a growing East-West gap is also consistent with other evidence. The aggregate poverty headcount rate declined much faster in the divisions to the east (between 9 and 15 percentage points) than in the west (between 0 and 6 percentage points) (see Table A-3, Annex). Shilpi (2008) finds systematic differences in returns to endowments between the the "integrated region" of the country (the East), where all the urban growth centres are located, and the less integrated region (the West) which are cut off from major economic centres by major rivers, with these differences growing between 2000 and 2005.[15]

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[15] The findings of Shilpi (2008) and an earlier version of this paper on the growing East-West gap are also discussed at length in World Bank (2008), chapters 3 and 4.

V. CONCLUSION AND POLICY IMPLICATIONS

The poor in Bangladesh are more likely to belong to households with a larger number of dependents, lower education among household members, and with the household head engaged in daily wage labour. Poor households are also more likely to be landless or functionally landless and less likely to receive domestic or foreign remittances. Where a household is located geographically has a strong influence on its economic status. This broad-brush poverty profile for 2005 is similar to the mid-1980s and hence at first glance it would appear that little has changed for the poor in Bangladesh.

A closer look at national household survey data suggests a more nuanced story. For a start the proportion of people below the poverty line has fallen sharply from close to 60 per cent in 1990 to 40 per cent in 2005 with a faster rate of decline since 2000. We show that the reduction in consumption poverty in Bangladesh during 2000-2005 was also mirrored by substantial improvements in living conditions–including housing characteristics, and access to sanitation facilities, electricity, and communications.

We find that the drivers of poverty reduction between 2000 and 2005 were to an extent similar to earlier decades, but in other key features they were not. Important factors contributing to poverty reduction, which are consistent across the past decades, were changes in some household characteristics most prominently, a smaller number of dependents and improvements in education – and an increase in returns to some characteristics, such as occupations and land ownership. The rise in returns to attributes suggest that households were able to get more out of their existing endowments and occupations, which indirectly points to an economic transformation created by sustained economic growth during this period.

So what is different in the new millennium compared with the past? Most significantly, we find that on average there has been some reduction in the economic gap between the Dhaka region and the rest of the country between 2000 and 2005—this phenomenon of a large divide between the region which included the capital city and the rest of the country was a key feature of the 1980s. More interestingly, once we unpack this "average gap" result, we find that since 2000 while most regions in the eastern part of Bangladesh have reduced their gaps with the Dhaka region, much of the west and southwest have stagnated or fallen behind, resulting in an emerging East-West economic divide within Bangladesh. The results also point to more localised, community level factors that explain in part why location of a household matters, and why the location effects on household economic status vary widely even within the East and the West. The location effects are partly explained by a few indicators that reflect the

availability of infrastructure and connectivity with local and national markets. In particular, lower travel times to the *thana* (sub-district) headquarter and Dhaka are strongly associated with higher household welfare (consumption).

Another recent development appears to be the declining rates of return on education in both rural and urban areas since 2000. This contrasts with increasing rates in urban areas and declining rates in rural areas between 1983 and 1996. This likely due to higher numbers going to school leading to a declining "wage premium" in the labour market. Improving the quality of education is likely to reverse this trend.

A third area where the 2000-05 poverty reduction pattern is different from the 1980s relates to labour markets returns. Specifically the increasing rates of return to agricultural labour since 2000 is in marked contrast to Wodon's findings for the 1980s. This is likely due to migration from agriculture to other sectors as well as the use of more modern farming methods. Sasin (2008) estimates that this "inter-sectoral flow" accounts for about half of the total productivity growth which took place in Bangladesh between 2000 and 2005.

There are two other factors which are different in the 2000s compared to earlier decades though the relative importance of their impact cannot be as easily compared with the past. Remittances rose sharply since 2000 as did microfinance access. Both are clearly associated with reducing poverty, although the distribution of remittances was skewed between regions within the country.

Looking ahead, what do the findings of this paper imply for policies to sustain and improve the pace of poverty reduction? Further improving labour productivity in agriculture would be critical to raise earnings of agricultural wage workers who have a high incidence of poverty. While some productivity gains are possible within the sector, achieving higher agricultural labour productivity would require accelerated growth in the non-agricultural sectors to absorb workers from agricultural wage employment. The relatively high returns to non-agricultural self employment underscore the importance of this sector for poverty reduction. The rise in returns from and growth of household-based non-farm enterprises may be linked to the rapid spread of microfinance. Further improving the access to finance for small enterprises, particularly in urban areas where microfinance is less prevalent, is likely to spur their growth.

A fall in dependency ratios within households played a key role in reducing poverty between 2000 and 2005, indicating that sustaining Bangladesh's past successes in reducing fertility is crucial for poverty reduction. Raising education attainments will also have high dividends in terms of higher earnings and reduced poverty. This paper shows the clear link between household welfare and

education of *all* household members, and not just that of the household head. As women's participation in the labour force increases, there are increasing economic benefits of women's education to the household to complement the social and intra-household benefits associated with women's education.

Narrowing the economic gap between the growing and lagging regions of the country would require interventions to improve endowments and returns to the endowments in the lagging parts of the country. To raise returns to endowments, improving the investment climate for non-farm enterprises in lagging regions would be crucial. This would require improving infrastructure including roads and electricity, improving links to markets, and more broadly, improving the links between the isolated parts of the country (primarily in the west and south-west) to the urban growth centres that are mainly in the east.

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ANNEX

TABLE A1
TRENDS IN BASIC ASSETS AND AMENITIES

	All households		Bottom 5 deciles		Bottom 3 deciles	
	2000	2005	2000	2005	2000	2005
Wall of dwelling (% with cement / CI sheet)	37.7	55.2	21.4	39.5	17.4	33.9
Roof of dwelling (% with cement / CI sheet)	76.4	89.9	68.1	84.2	64.5	81.6
Safe latrine use (%)	52.0	69.3	35.2	55.6	29.4	50.0
Electricity connection (%)	31.2	44.2	14.6	25.4	10.0	20.2
TV ownership (%)	15.8	26.5	3.6	10.1	1.8	6.7
Phone ownership (%)	1.5	12.2	0.1	1.5	0.0	0.9

Source: HIES 2000, 2005.

TABLE A2
DEMOGRAPHIC CHARACTERISTICS OF HOUSEHOLDS

Demographics	All households		Poor households		Non-poor households	
	2000	2005	2000	2005	2000	2005
Household Size	5.18	4.85	5.4	5.2	5.0	4.6
Dependency Ratio	0.77	0.69	0.99	0.91	0.60	0.57
Number of children	2.1	1.8	2.5	2.3	1.6	1.5
Number of Male Adults	1.6	1.5	1.4	1.4	1.7	1.6
Number of Female Adults	1.5	1.5	1.5	1.5	1.6	1.6

Source: HIES 2000, 2005.

TABLE A3
POVERTY PROFILES BY DIFFERENT CHARACTERISTICS

	Poverty Rate (%)		Population Distribution (%)	
	2000	2005	2000	2005
Division				
Sylhet	42.4	33.8	6.4	6.3
Chittagong	45.7	34.0	20.1	19.3
Dhaka	46.7	32.0	31.4	32.2
Khulna	45.1	45.7	11.7	11.7
Rajshahi	56.7	51.2	23.4	24.1

(Cont. Table A3)

	Poverty Rate (%)		Population Distribution (%)	
	2000	2005	2000	2005
Barisal	53.1	52.0	7.1	6.4
Highest Level of Education				
No Education	63.2	54.7	57.3	53.5
Primary	40.3	35.1	15.4	15.5
Secondary	30.0	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
Receiving domestic remittances	42.5	37.5	18.5	21.6
Receiving remittances from abroad	26.2	17.1	9.7	10.4
Activity of Household Head				
Self: agri	40.2	32.9	20.7	22.9
Self: non-agri	41.7	32.7	25.7	20.4
Salary wage employment	28.9	22.0	13.3	14.9
Daily wage: agri	76.5	72.4	18.4	15.7
Daily wage: non-ag	66.9	58.5	11.7	13.0
None	39.6	27.7	10.3	13.2