# Access to Growth Poles and Regional Inequality in Bangladesh[1]

**Forhad Shilpi**
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[1] The views expressed are those of the author and should not be attributed to the World Bank or its affiliates. This is a background paper for the Poverty Assessment

## Introduction

Development economists and practitioners have always expressed keen interests in the evolution of regional inequality in living standards. The standard neoclassical theory predicts convergence of regional growth and consequently of living standards in the presence of free factor mobility, and thus traces existence of regional inequality either to artificial barriers to factor movements (e.g. due to restrictions on migration or capital movement) or to a situation where economy is in transition to steady state equilibrium. One of the powerful explanations for the presence of regional convergence or divergence comes from the New Economic Geography literature (Fujita, Krugman and Venables, 1999; Fujita and Thisse, 2002). According to this literature, the agglomeration forces combined with dispersion forces arising from costly transportation and congestion determine the location of activities across regions. The agglomeration forces result from the proximity- productivity relationship, causing economic agents and activities to cluster in regions often endowed with better natural resources, market potentials and infrastructure. Thus, depending on the initial conditions, regions may emerge as leading or lagging regions and living standards in them may converge or diverge at different stages of their growth cycle (Overman, Rice and Venables, 2007).

A large body of empirical literature has documented both regional convergence and/divergence in growth using cross-country and within country data (see Durlauf, Johnson and Temple, 2005 for a survey). Similar evidence is also available on regional clustering of economic activities (Venables, 2006). However, evidence on how households with different factor endowments and at different point of the income distribution fare in the course of regional convergence or divergence remains sparse. The issue has however become increasingly important as a number of developing countries including the widely discussed cases of China and India face a situation where a large section of population are precluded from the benefits of increasing economic growth resulting in social and political instability. In this paper, we examine the evolution of regional differences for the entire distribution of

living standards utilizing household level data from the Household Expenditure Surveys (HES) of 2000 and 2005 from Bangladesh.

The conceptual framework underlying the empirical analysis is derived from the theoretical and empirical insights from different strands of literature on the persistence of welfare gaps at the household and individual levels. One of the widely utilized framework to study spatial differences in living standards come from the locational sorting model a la Roy (1951). According to the locational sorting models, with free and costless mobility, household will choose a region/sector that maximizes returns to factors that it possesses. The factor returns will equate across regions/sectors at the equilibrium. Thus any differences in welfare observed across regions/sectors will be due to differences in household's characteristics as well as in spatial characteristics of the region (Roback, 1982).

As opposed to the prediction of the Roy (1951) model, empirical studies however noted substantial differences in returns to factors across regions even in countries with no apparent migration restrictions. For instance, in the context of USA- a country with very high rate of internal migration - Dahl(2002) found that return to college education varies from 22 percent in Wyoming to 47 percent in Texas. Such differences in the rates of return can be sustained at the equilibrium if migration is costly. In developing countries, migration is an especially costly and risky venture for a number of reasons. First, migration involves large risk both at the origin and at the destination. Households may face shortage of labor due to migration of its member(s) and there is uncertainty of securing a job and accommodation at the destination. A migrant often needs a relatively large amount of saving to finance his/her trip and to sustain him/her during the job search period. Migration also involves high opportunity costs resulting from phase of unemployment and from disposal of household assets under distress. Existing literature thus suggests that the underlying costs and risks of migration vary across individuals and households. The presence of individual and household specific costs and risk of migration implies that the returns to factors will vary across households with different characteristics.

The regional variation in the rates of return may result from variation in the regional characteristics. A region with poor infrastructure and poor access to markets may lower the returns to household's physical and human capitals, and through cumulative causation can lead to persistent under-performance of the region itself. The empirical growth literature provided ample evidence on the importance of initial condition in generating subsequent growth. Ravallion and Jalan(2002) have also shown that a Chinese household living in a poor area – defined in terms of endowment of physical and human capital – fell behind in terms of consumption growth relative to an identical household living in better off region. Recent migration literature highlights the importance of migration network in mitigating risk associated with migration and thus determining the magnitude of migration flows (Carrington et. al. 1996; Munshi, 2003). As social network often forms on the basis of proximity (Fafchamps and Gubert, 2007), spatial isolation can hinder formation of migration network and thus restrict migration flows across regions causing different returns to same household characteristics to persist across regions. Selection in migration along with migration network effect can also lead to similar differences in returns to persist (Kanbur and Rapoport.2005).

The spatial gaps in welfare thus can be results of three factors. First, households with characteristics that foster poverty may concentrate in certain regions/sectors due to locational sorting. For instance, lower educational attainment in rural areas could account fully for a higher incidence of poverty in rural areas. Second, in the presence of migration costs and regional differences in infrastructure and market access, returns to household characteristics may also vary between sectors and regions. For instance, returns to higher education are likely to be higher in urban areas and in regions with better infrastructure and better job market opportunities. Finally, when migration costs vary across individuals and households, returns to household's factor endowments may vary depending on household's position in the distribution of welfare. For instance, households with immobile assets such agricultural land may face a higher opportunity costs of moving, and the differences in the returns to factors could be higher for households at the upper tail of the welfare distribution.

In this paper, we examine the relative roles of these three factors in explaining the spatial gaps in welfare using household level data from two rounds of the Household Expenditure Survey (HES) (2000 and 2005) in Bangladesh. Bangladesh provides an excellent case to study the roles of different factors in explaining urban-rural and spatial differences in welfare for several reasons. First, there are no administrative restrictions on migration in Bangladesh. As much of the Bangladesh's population share the same ethnicity, religion and language, there exists no serious ethnic or cultural barriers to internal migration. This means much of the migration costs are likely to be due to individual and household specific factors (e.g. opportunity cost or credit constraints).

Second, the geography along with the pattern of growth in Bangladesh facilitates identification of regions with better infrastructure and market access. The capital city Dhaka and main port city Chittagong have emerged as two growth poles in the country, dominating both urbanization process and economic growth. The country is sliced into three pieces by two major Asian rivers, the Ganges and the Brahmaputra. The natural border defined by these two rivers allows us to define two regions in terms of their access to Dhaka and Chittagong without relying on potentially endogenous factors such as travel time to these centers. Specifically, we define integrated (IR) as regions which are geographically contiguous to either Dhaka or Chittagong metropolitan area that lies to the North of the Ganges and East of Brahmaputra rivers.[2] The less integrated regions (LIR ) on the other hand accounts for the territory that lies to the West of Brahmaputra (Rajshahi Division) and South of Ganges (Barisal and Khulna divisions).

Finally, Bangladesh has experienced substantial reduction in the incidence of poverty since early 1990s, with 2000-2005 being the period of fastest reduction. The decline in overall incidence of poverty between 2000 and 2005 has been associated with a reduction in urban-rural gap. The gap between IR and LIR, though smaller in magnitude compared with urban-rural gap, has widened during the same period. As many developing countries, especially

[2] The integrated region thus includes the administrative divisions of Dhaka, Chittagong and Sylhet.

those in South Asia region, face similar trend in welfare gaps, an understanding of these gaps in the case of Bangladesh should be able to shed light on possible factors responsible for such gaps in other countries as well.

As the observed spatial gaps in welfare may vary depending on a household's position in welfare distribution, we utilize the quantile regression technique to examine the relative roles of sorting effect and return effect. Nguyen et al.(2007) applied this technique to separate out the contribution of covariates and that of returns to urban-rural inequality in Vietnam. In our empirical analysis, the regional gaps in welfare are measured by the difference in the distribution of the real per capita consumption expenditure between regions. By utilizing the Machado and Mata (2005) decomposition technique, we decompose each of the welfare gaps into the part that is explained by the difference in the distribution of observed household characteristics between the regions (sorting effect) and the part that is explained by the difference in the distributions of returns to these characteristics (returns effect).

The spatial differences in living standards in Bangladesh have been noted in a study by Ravallion and Wodon(1999), which used data from HES 1988-89 and 1990-91. Ravallion and Wodon(1999) carried out the decomposition analysis using mean regressions. A major finding of Ravallion and Wodon(1999) is that poor areas are poor not only because people with attributes that foster poverty live there but also because rates of returns on those attributes are lower in those locations. Our analysis however advances the understanding of the spatial and urban rural differences in living standards in several ways. First, we examine spatial and urban-rural gaps in log of per capita consumption expenditure for the entire distribution. This is important because as we show in later sections, overall gaps vary across different expenditure quantiles. For instance, the overall urban-rural and IR-LIR gaps are much larger at the higher end of the distribution. Second, the quantile regression approach is more suitable when migration costs are household specific as it allows covariates to have different marginal effects depending on a household's position in the distribution. Third, instead of capturing spatial effects using district dummies, we define regions in terms of

infrastructural differences and natural borders.[3] We then allow marginal effects of covariates to vary across regions as well as rural and urban areas. This approach helps to highlight the differences in rates of returns between regions and between urban and rural areas.

The empirical analyses identify a number of interesting patterns. The urban-rural gap is mainly due to covariate effects and a substantial downward shift in these effects for all quantiles is responsible for the narrowing of the urban-rural gap. There is virtually no difference in the returns effects between urban and rural areas for all households up to 60$^{th}$ percentile. For the topmost two quintiles, both covariate and returns effects are larger in urban areas relative to rural areas. These households thus have superior characteristics and enjoy better returns to those characteristics. In contrast with urban-rural gap, the returns effects predominate in the IR-LIR gap in both survey years. Both covariate and returns effects shifted upward in 2005, thus widening the IR-LIR gap. The shift in returns effects has been larger for households at the lower end of the distribution. These households have become worse off not only in terms of their characteristics but also in terms of the returns to those characteristics. Detailed analysis of gaps within each regions suggest that migration and relative ease of accessing low skilled jobs have caused returns to equalize for lower 3 quantiles across rural and urban areas. The differences in returns effects for higher quantiles are due to limited availability of skilled jobs, higher opportunity costs of migration and possible agglomeration effects in the case of high paid economic activities. The substantial difference in returns effects between IR and LIR suggests that the physical barriers created by lack of bridges and transportation links across major rivers not only restricted access to larger markets but also hindered development of migration network across regions. The results thus highlight the critical role of infrastructure in sustaining the welfare gaps between regions.

Rest of the paper is organized as the following. Section 2 provides some basic information on Bangladesh and discusses the regional gaps in living standards between 2000 and 2005. Section 3 describes the data used in the analysis. Section 4 is organized in a couple

[3] Ravallion and Wodon(1999) allows marginal effects of covariates to vary between rural and urban areas, but within each area, spatial differences are captured by district dummies.

of sub-sections and presents the quantile regression results. Section 5 presents the results from quantile decomposition analysis. Section 6 concludes the paper.

## 2. Background

With per capita income of $415 at constant 2000 price, Bangladesh is classified as a Low Income country (LIC). This per capita income however represents more than a four-fold improvement over the level of per capita income in 1971 when the country gained its Independence. Bangladesh has overcome odds of the dire initial conditions immediately following its Independence and entered into a phase of sustained economic growth and poverty reduction since early 1990s. This has been achieved despite beset by chronic political instability, frequent natural calamities and poor governance. On the positive side, the country enjoyed pro-longed macroeconomic stability, a proliferation of microfinance institutions, and other non-governmental service providers. Although public investment in infrastructure has been low by South Asia region's standards, the country has followed a fairly liberalized economic policy since the mid 1980s.

Bangladesh has experienced substantial reduction in poverty starting from the early 1990s. The pace of poverty reduction has been especially rapid between 2000 and 2005. The incidence of poverty measured by head count ratio has declined from 49 percent in 2000 to 40 percent in 2005. During the same period, urban (rural) poverty declined from 35 (52) to 28 (44) percent narrowing the gap between urban and rural poverty. Figure 1 illustrates the urban-rural gap for 2000 and 2005 for the entire distribution of log of real per capita consumption using data from the HES. The urban rural gap in real consumption increases with an increase in consumption quantiles for both 2000 and 2005. For instance, the urban-rural gap in log of real consumption has been about 20 percent at $40^{th}$ percentile and about 40% at $80^{th}$ percentile in 2000. This implies that in 2000, the urban rich has been disproportionately better off than their rural counterpart to the extent to which urban poor has been better off than rural poor. More importantly, the curve showing urban-rural gap in 2005 has shifted downward compared with that in 2000 for all consumption quantiles. For

instance, the urban-rural gap is about 12% at 40th percentile and 35% at 80th percentile. The urban-rural gap has become statistically insignificant for the lowest consumption decile. The downward vertical shift in the urban-rural gap implies that between 2000 and 2005, rural per capita real consumption (RPCE) has grown at a faster rate than the corresponding urban figure at every quantile.

The successive poverty assessments for Bangladesh reported regional variations in the incidence of poverty. The cross tabulations indicate substantial differences in living standards across locations (mostly by administrative divisions, and to some extent at district level). Because administrative divisions were created more for the ease of bureaucratic needs, the gaps in poverty across these locations are often difficult to explain.[4] As regional characteristics such as infrastructure and access to markets can influence both sorting of households and returns to factors they possess, a more relevant issue from policy perspective is to see how the pattern of poverty reduction across regions relate to the characteristics of the regions. As emphasized in the economic geography, an especially relevant issue relates to the extent to which access to growth poles affects the evolution of regional differences in living standards.

In the context of Bangladesh, two main metropolitan cities have emerged as the main growth poles.[5] The urbanization process as well as economic growth in Bangladesh has been dominated by two metropolitan cities - Dhaka, the capital city with a population of 10 million and Chittagong, the main port city with a population of 3.4 million. Together these two cities account for 88 percent of population in metropolitan areas and 41 percent of total urban population. Estimates based in HES 2000 and 2005 indicate that average real per capita income in these cities is about 40 percent higher than that of other metropolitan areas. As a result of higher living standards, Dhaka and Chittagong cities have acted as magnates for

[4] There are 6 administrative divisions in Bangladesh.

[5] Perhaps because of its smaller geographical size, Bangladesh does not have a clearly marked "lagging" region, though the North-West region has been historically known as a region with higher incidence of poverty. However, with the spread of irrigated agriculture, such distinction has become blurred in recent years (Diop, 2005).

migrants, with experiencing more than 5 percent growth in population.[6] These two cities act as the main domestic and international trading hubs and are the dominant seat of major administrative and economic functions.

Access to these urban centers can be used to define an integrated (IR) and a less integrated region (LIR). One can use some access measures such as travel time to these cities to define these regions. However, such measures are arguably endogenous because of endogenous placement of road infrastructure. Instead we utilize the natural border created by two mighty Asian rivers Ganges and Brahmaputra which sliced the country into three pieces (Figure 2). We define IR as regions which are geographically contiguous to either Dhaka or Chittagong metropolitan area.[7] The LIR on the other hand accounts for the territory that lies to the West of Brahmaputra (Rajshahi Division) and South of Ganges (Barisal and Khulna divisions). The appendix Table A.1 shows that the rural areas in the IR and LIR do not differ substantially in terms of some key infrastructure indicator (e.g. electricity coverage) except for the presence of different types of banks and distance to the capital city Dhaka.[8]

The incidence of poverty differs substantially between IR and LIR (Table A.1) and the gap between IR and LIR has increased between 2000 and 2005. At the mean of the welfare distribution, the gap between IR and LIR was about 9 percent in 2000 which has increased to 17 percent in 2005. In contrast, the urban-rural gap has been about 27 percent in 2000 declining to 19 percent in 2005. While the IR-LIR gap has been smaller than urban-rural gap in 2000, the two have converged in 2005. Figure 3 displays the IR-LIR gap by consumption quantiles (from 1 to 99). Similar to the urban-rural gap, the IR-LIR gap is much larger at the upper end of the distribution. In 2000, the difference between IR and LIR was not statistically significant for up to 15$^{th}$ percentile. For the 80$^{th}$ percentile, the difference was about 15 percent. This implies that the rich living in IR enjoys disproportionately higher RPCE than their counterparts in LIR but the difference is much smaller at 20$^{th}$ percentile (about 7

[6] The overall rate of population growth is about 1.5 percent according to the Population Census, 2000.
[7] The integrated region thus includes the administrative divisions of Dhaka, Chittagong and Sylhet.
[8] The Table A.1 is generated using the community surveys of HES 2000 and 2001. Since these surveys are conducted only in rural areas, the summary statistics in the table relate only to rural areas.

percent). More strikingly, between 2000 and 2005, the IR-LIR gap has shifted upward for all quantiles. The shift is less significant at the upper quantiles (more than 90th percentile), and very large for the lowest quantiles. This implies that RPCE in IR has grown at a faster rate than that in LIR for all quantiles and the growth has been especially higher at the lower part of the distribution. As a result, the gap between IR-LIR has become significant for all quantiles but across quantile differences has narrowed. The increasing gap between IR-LIR stands in sharp contrast with substantial decline in overall poverty and in the urban-rural gap.

A detailed analysis of the urban-rural gaps within each region (IR and LIR) and IR-LIR gaps within each areas (urban and rural) reveals interesting trends (Figure 4). From 2000 to 2005, the urban-rural gap has declined in both integrated and less integrated areas and for all quantiles. However, the decline was much more pronounced in integrated region. This suggests that rural areas in integrated areas are catching up with its urban counterparts. In LIR, the urban-rural differences are not significant upto 25th percentile and except for the upper quantiles (above 80th percentile), are much lower than that in IR. This means that within LIR, poor are similar regardless of their location (urban vs. rural) whereas rich in urban areas enjoy higher RPCE than their counterparts in rural areas.

In 2000, the IR-LIR gap in rural areas increased monotonically implying that rich in IR has RPCE substantially higher than their counterpart in LIR. The difference was less pronounced at the lower end of the distribution. The IR-LIR gaps shifted vertically upward in 2005, the largest shift happened at the lower end of the distribution. This implies that the rural households in IR experienced faster growth in RPCE -the fastest growth occurring for the lowest consumption quantiles – compared with their counterparts in LIR. The IR-LIR gap in urban areas in 2000 does not display a monotonic relationship, the gap is larger for middle quantiles compared with two tails of the distribution. The gap has also increased in 2005 except for the uppermost quintile. Despite the increase in the IR-LIR gaps in both rural and urban areas, the increase in the gap in rural areas dominates that in urban areas for almost all quantiles. The trends in Figure 4 indicate that both urban and rural areas in LIR are

falling behind, but it is mainly the slower growth in RPCE in rural areas in LIR that has caused the IR-LIR gap to widen between 2000 and 2005.

## 3. Data

The main data source for our empirical analysis is the Household Expenditure Survey (HES) 2000 and 2005 of Bangladesh which were carried out by the Bangladesh Bureau of Statistics with assistance from the World Bank. The surveys utilized nearly identical three-stage stratified sampling strategy to select a nationally representative sample of the households. The questionnaires for the two rounds are also nearly identical. The HES 2000 covers 7440 households in 442 primary sampling units (psus). The sample size for the HES 2005 is 10,080 households in 504 psus. The standard errors of the estimates are computed using bootstrapping technique (with 500 replications) which corrects for the bias induced by clustering and stratification used in the sample design.

Each of the surveys collected a wealth of information on many aspects of living standards including detailed household level expenditure, demographics, employment, education, health and remittances. In addition, the detailed community level information on infrastructure and access to facilities are collected for the rural psus. We utilize these data to construct both the dependent and explanatory variables. The dependent variable of our empirical analysis is the log of real per capita expenditure (RPCE) at the households level measured in 2005 prices. For the purpose of poverty assessment, two separate price indices are defined. They relate to the "upper" and "lower" poverty lines.[9] As the incidence of poverty is estimated using the upper poverty line, we used price index for the upper poverty line for deflating real per capita expenditure.[10]

As explanatory variables, we include a number of household specific factors. The demographic effects are controlled in the regression by including household size, percentage

[9] The upper and lower poverty lines differ in terms of allowances for non-food expenditure. For detail on the construction of poverty lines, please see Narayan and Yoshida (2007) and BBS(2007).
[10] The lower poverty line is used to define the incidence of extreme poverty. It should be noted that for each year, 16 area specific poverty lines are constructed.

of children (less than 13 years) among household members, the age of the household head and its squared, the gender of the head (female=1). The human capital of the household is measured by four different categories of education of the member of household with highest level of education. In addition, we included the number of household male and female members with education above primary level as separate explanatory variables. These additional education variables introduced to capture the role of educated members of the households other than the head. The regressions also control for households non-liquid assets. This asset variable includes all household assets such as house, land, business assets and other durable goods. We also include dummies to indicate household head's main sector (agriculture, manufacturing, services) and type (government, private wage employment, self-employment) of employment. We included similar variables for household head's spouse but they turn out to be statistically insignificant and are dropped from the regression.

The HES 2000 and 2005 collected community level information for the rural psus. As Table A.1 already suggest, the differences between rural areas located in IR and LIR are not significant for a large number of community level facilities and services variables (e.g. electricity). The differences are significant only in the case of bank coverage and distance to Dhaka city. There is, however, no information on the characteristics of the urban psus, barring us to use these variables as controls. Instead, we include dummies (urban=1 or IR=1) to capture any mean differences in the overall infrastructure across regions.

Table 1 displays the definition of variables used in regression. Table 2 and Table 3 report summary statistics for the dependent and explanatory variables for different consumption quintiles for IR and LIR areas and for rural and urban areas respectively. A number of variables exhibit interesting patterns. For instance, percentage of household receiving remittances from abroad increase with an increase in per capita real consumption in all four different regions. Households in all quantiles own larger amount of assets in IR relative to LIR and in urban areas relative to rural areas. Similarly agricultural employment is relatively less important in IR and urban areas. The percentage of household head with education above secondary level increases with an increase in RPCE. The relationship

between RPCE and education above secondary level is however similar in both IR and LIR. In contrast, percentage of household head with education above secondary level is higher in urban areas. In the case of employment, self employment is more common in LIR and RUR. Private sector wage employment is also more prevalent in LIR. Employment in manufacturing and services sectors are more common in urban areas but no significant differences can be observed between IR and LIR. These patterns are present in the data for both rounds of the survey. Overall, the differences between household characteristics are observed to be more common in the case of urban and rural areas compared with IR and LIR. This suggests that urban households are more unlike rural households and thus a larger part of the urban-rural gap can be explained by sorting of households between these sectors. In the following section we examine in detail the differences in living standards between rural and urban areas and between IR and LIR using the quantile regression framework.

## 4. The Urban-Rural and IR-LIR Gaps across Quantiles

Our objective is to find out the relative contribution of observed household characteristics and returns to those characteristics in the urban-rural and IR-LIR gaps over the entire distribution of log of RPCE. To this end, we estimate the following equation for a number of quantiles:

$$Q^q(y|X,I\,R,\,URB)=\beta_0^q+X\,\beta_1^q+IR\,\gamma_0^q+IR^*X\,\gamma_1^q+URB\,\lambda_0^q+URB^*X\,\lambda_1^q+\varepsilon^q \qquad (1)$$

where y is log of RPCE, $Q^q(y|X,\,R)$ is the qth conditional quantile of y. IR is a dummy for the integrated region and URB is the dummy for urban areas. X is the matrix of all covariates other than the regional dummies, and IR*X is the matrix of interaction of all covariates with integrated region dummy and URB*X is the matrix of interaction of all covariates with urban dummy. $\varepsilon^q$ is the regression resitdual term. The coefficient $\beta_0^q$ is the intercept term and $\beta_1^q$ is the vector of slope coefficients for the $q$th quantile for our base region which is rural areas in LIR region. The $\gamma_0^q$, $\lambda_0^q$, $\gamma_1^q$ and $\lambda_1^q$ give the qth quantile intercept and slope differentials associated with IR and urban areas respectively.

### 4.1 Empirical Results

We take a sequential approach to present our empirical results. We begin with the simplest specification of equation (1) which ignores all the covariates in matrix X, and thus regress log of RPCE on an intercept term and dummies for the urban areas and integrated regions. Table 4 reports the results for the OLS regression as well as quantile regressions for a selected number of quantiles. The coefficient labeled 'base' corresponds to the qth percentile of log(RPCE) for households located in rural areas in the less integrated region. The coefficient of integrated (urban) dummy represents the difference in log(RPCE) between the qth percentile of integrated (urban) distribution and that of less integrated (rural) distribution.

The OLS estimates show that the mean difference between urban and rural log(RPCE) in less integrated region in 2000 is about 0.26. This implies that urban residents in less integrated areas on average enjoy income which is 30 percent higher than their counterparts in rural areas in the same region. The income of rural residents in integrated areas is about 11 percent higher than those in less integrated areas. Urban residents in integrated areas enjoy even higher income premium by about 43 percent over rural residents in less integrated areas. The estimates of income differences are also highly statistically significant. The estimates for 2005 indicate significant differences in income across the four regions. However, the difference in urban income relative to rural income in less integrated regions has declined from 0.26 (30%) in 2000 to 0.18 (19%) in 2005. The difference between rural incomes in integrated and less integrated regions has widened from 0.10 (11%) in 2000 to 0.16 (18%) in 2005.

The quantile regressions indicate that the urban-rural and IR-LIR gaps are different at percentiles of log (RPCE) distribution. In 2000, both urban-rural and IR-LIR gaps have been larger at higher quantiles. The urban-rural difference is statistically highly significant for all quantiles. In the case of IR-LIR difference, the difference is numerically small (0.045) and statistically insignificant at 10 percent level. For higher percentiles, the difference becomes

numerically larger and statistically highly significant. The estimates for 2005 however suggest a dramatic reversal in the regional gaps. The IR-LIR difference has now become large and statistically significant for all quantiles. The largest increase IR-LIR gap occurred at 5$^{th}$ percentile, from 0.045 in 2000 to 0.154 in 2005. The shift in IR-LIR gap occurred in a manner that the gap became similar in magnitude for all income quantiles (ranging from 0.14 to 0.16). The urban-rural gap on the other hand has become numerically small and statistically insignificant for 5$^{th}$ percentile. Although the urban-rural gap is still much larger at higher quantiles, it has become substantially smaller relative to its magnitude in 2000 for all quantiles.

The simple regressions in Table 4 however do not control for the household characteristics that may be able to account for the regional differences if sorting of households a la locational sorting model were the primary source of regional inequality. Neither do they account for possible differences in the returns to the covariates that may arise due to individual specific and asymmetric migration costs. In the following section, we estimate the full regression model presented in equation (1).

### 4.2 Quantile Regression Results

Equation (1) is estimated using the quantile regression technique for quantiles 5.0, 7.5,…, 95, and 97.5. The regression specification includes all household specific covariates as discussed in the data section, their interaction with urban and IR dummies. Table 5 and 6 report the detailed regression results for quantiles 5, 25, 50, 75 and 95 for 2000 and 2005 respectively.

The regression results in Tables 5 and 6 suggest that household characteristics included in the regression accounts for nearly all of the gaps between integrated and less integrated areas in both of the survey years; the coefficient of integrated area dummy is statistically insignificant for all quantiles. In contrast, the coefficient of urban dummy is statistically significant for quantiles 30 to 52.5 for the survey year 2000. This means that some of the urban-rural gaps

for these quantiles remain unexplained by the covariates included in the regressions. However, the coefficient of urban dummy becomes statistically insignificant for all quantiles for the survey year 2005. Thus the apparent advantages of urban and integrated areas in 2005 are almost fully explained by the covariates of the regressions.

As the covariates can explain much of the IR-LIR and urban-rural gaps, changes in the distribution of the covariates and that in their respective returns should be able to explain the apparent narrowing of urban-rural gap and widening of IR-LIR gap. Some of the explanatory variables display interesting patterns across quantiles and across survey years. Apart from education which we discuss below, household assets and whether household receives remittances from abroad have statistically significant positive influence on its expenditure level in both survey years. The coefficient of the dummy indicating household receiving foreign remittances is much larger in magnitude in 2005 compared with 2000. In both survey years, log RPCE is associated significantly negatively with household size and percentage of household member below 15 years of age. For the survey year 2005, several employment variables and dummy for domestic remittances have statistically significant coefficients, with expected sign.

### 4.3 Education

The education level of the household member with highest level of education is represented in the regression by four categorical variables: dummies indicating if household member has education up to primary level, if more than primary but up to secondary level, more than secondary but up to higher secondary degree, and finally above higher secondary level. For the survey year 2000, the coefficients of the dummies indicating up to higher secondary education are positive and statistically significant for all quantiles in the our base case (rural- LIR), except for the 95$^{th}$ percentile. In this later case, above higher secondary level of education is statistically significant. The coefficient of dummy for primary education is significant only in a number of quantiles. For the survey year 2005, coefficient of primary education dummy is not statistically significant, and some of the coefficients have negative signs. Except for some of the lower quantiles, the coefficients of all other education dummies

were positive and statistically significant. In both survey years, the magnitudes of the coefficients increased across quantiles and across education level. For instance, for the 75th percentile in 2005, the coefficient of secondary education is 0.10, whereas it is 0.36 for upto higher secondary and 0.46 for above higher secondary education. The coefficients of interaction of education level with regional dummies indicate large premium for above higher secondary education in urban areas in both survey years.

In order to examine the pattern of returns to education in different regions, we plot the returns against the expenditure quantiles. The upper panel of Figure 5 displays the returns to secondary education in 2000 and 2005 in four of our regions. The returns were much higher in integrated and urban areas in 2000. For the survey year 2000, the regions can be clearly ranked in terms of returns to secondary education. The returns are highest at all but the topmost quantile in integrated urban areas, followed by urban areas in LIR and then by rural areas in IR. The returns are slightly higher at the lower quantiles compared with quantiles above median. For the survey year 2005, the difference in returns to secondary level education has narrowed considerably across regions. The returns in urban areas in both integrated and less integrated regions have declined, with no such downward shift in rural areas. As a result, the urban-rural difference in returns has become insignificant in LIR, and the gap narrowed considerably in IR too. The difference in returns between IR and LIR is still substantial both for rural and urban areas except for the upper quantiles (above 70th percentile). The returns to secondary level education increases across quantiles in rural LIR which stands in contrast with 2000 when no such trend is observed.

The difference in the returns to education across region is even more striking in the case of higher secondary education in survey year 2000 (Figure 6). The returns in urban IR are much larger than that in any other regions for all quantiles except for the lowest on (5th percentile) and the difference is much larger at upper expenditure quantiles. The returns in urban LIR are also larger than that of rural areas for all but the upper three quantiles. In contrast, there is practically no difference in returns between rural areas in IR and LIR for all quantiles below 75th percentile. The returns in 2005 show considerable shifts. For the middle

quantiles, there is little difference in the returns across regions. For the percentiles below median, the difference between urban and rural returns has become insignificant while there is still considerable IR-LIR difference. For the upper quantiles (above median), the urban-rural difference is present only in integrated region. Compared with 2000, the curves displaying returns have become steeper in all regions in 2005 implying that returns are higher at higher quantiles.

In the case of more than higher secondary education, returns are substantially higher in urban areas compared with rural areas in both survey years. However, the returns curves have become much steeper in 2005 compared with those in 2000. And the curves for LIR have become steeper than those for IR. The consistently higher returns to more than secondary level of education in urban areas is perhaps due to the fact that urban areas specialize in activities which offer better return to higher education.

To summarize, the estimates of returns to different levels of education show that the differences between urban and rural returns have been substantial in 2000, but the gap narrowed considerably during 2005 for all levels of education except for more than secondary level. The differences between IR and LIR returns, however, still substantial in both urban and rural areas. The returns to more than secondary level of education are substantially higher in urban areas compared with rural areas in both survey years. Finally, the return curves for secondary and more than secondary education level have become steeper in 2005 implying higher returns at the higher end of the expenditure distribution.

The trends of returns to education, especially up to secondary education are consistent with overall trends in urban-rural and IR-LIR gaps. The summary statistics in Tables 2 also show that there are changes in covariates consistent with the trends in urban-rural and IR-LIR gaps. In the following, we utilize the Machado and Mata (2005) decomposition technique to ascertain the relative roles of the changes in covariates and that of their returns in explaining those two regional gaps.

## 5. The Urban-Rural and IR-LIR Gaps: Decomposition Analysis

The empirical analyses presented in the previous section indicate that there are systematic variations in the household characteristics across conditional quantiles of the distribution of log RPCE (LRPCE). These characteristics also vary across regions consistent with the prediction of the locational sorting models. The quantile regression analysis further shows that returns to household level covariates vary across quantiles and across regions. In this section, we decompose each of the regional gaps at each quantile into two components: one component due regional differences in the distribution of the covariates (covariate effect), and another due to differences in returns to those covariates (return effect). We follow the Machado and Mata (2005) decomposition technique as applied by Nguyen et al. (2007) in the case of Vietnam. We illustrate the basic technique for two arbitrary regions, $R_i$ and $R_j$. We decomposition of the gap between the distribution of LRPCE in $R_i$ and $R_j$ following stepwise estimation suggested by Machado and Mata (2005):

First, for each quantile q, we estimate the vector of quantile regression coefficients (returns), $b^i(q)$, using the data from $R_i$. Second, using covariates from $R_j$ and vector of coefficients estimated for $R_i$, we estimate the predicted consumption expenditure as $y^p(q)=X^j b^i(q)$ where $X^j$ is the matrix of covariates in $R_j$. For each quantile q, this generates $N^j$ fitted values where N is the size of sample for $R_j$. Third, we select randomly 100 elements of $y^p(q)$ for each q and stack them into a vector $y^{p^*}$. This $y^{p^*}$ is then used to construct the counterfactual distribution. Now the gap between the qth quantile of LPRCE of the $R_i$ and $R_j$ can be decomposed as:

$$y^j(q) - y^i(q) = [\, y^j(q) - y^{p^*}(q)] + [\, y^{p^*}(q) - y^i(q)] \qquad (2)$$

Since the counterfactual distribution $F(y^{p^*})$ provides the distribution of LRPCE that would have prevailed if returns to covariates in $R_i$ had been the same as in $R_i$, the first term on the right hand side measures the contribution of the difference in returns to the $R_i$-$R_j$ gap at the qth quantile. This is known as the return effect. The second term on the right hand

side, the covariate effect, thus measures the contribution of the different values of covariates to $R_i$-$R_j$ gap at the qth quantile. We generated the confidence intervals of these effects by randomly re-sampling of the $R_i$ data at the first step of the estimation. We estimated the return and covariate effects associated with urban-rural and IR-LIR gaps using the above methodology.

Figures 8 and 9 display the returns effects and covariate effects for urban-rural and IR-LIR gaps for both survey years for quantiles 5 to 97.5. In the case of IR-LIR gap, the return effects predominate in both survey years. In 2000, the covariate effects were small implying the households residing in IR and LIR were not very different in terms of their characteristics. Moreover, the return effects were larger at higher expenditure quantiles. Thus households belonging to higher quantiles earned higher returns to their endowments relative to those in lower expenditure quantiles. Both covariate effects and return effects shifted upward in 2005. The shift has been much larger at the lower end of the distribution of LRPCE, especially with respect to return effects.

In the case of urban-rural gap (Figure 9), the covariate effects are much larger than returns effects for all quantiles during 2000, and this is true for all quantiles below 80$^{th}$ percentile in 2005 also. According to Figure 6b, much of the urban-rural gap up to 60$^{th}$ percentile is due to covariate effects in both survey years. This means that for the poor households in urban and rural areas, the differences in household characteristics matter more than differences in returns to those characteristics. This is consistent with the prediction of locational sorting models when there are no substantial migration costs. Given the relative proximity of the rural and urban areas, and no substantial opportunity costs of migration for poorer households, the results suggest that rates of returns to household characteristics do converge for these households across rural and urban areas. This may also be due to the fact that poorer households are employed in low skill jobs and there is little or no barrier to entry into those jobs. This however does not hold for households at the upper end of the distribution. The return effects increase across quantiles for households above 60$^{th}$ percentile of LRPCE distribution. The covariate and returns effects show that relatively well off

households have better characteristics and they earn higher returns to those characteristics too. The comparison of 2000 and 2005 indicates that the covariate effects shifted downward for all quantiles whereas returns effect stayed about the same for all quantiles up to 80$^{th}$ quantile and then became slightly steeper. The downward shift in the covariate effects was larger in magnitude for the households at the upper end of the distribution. The results thus suggest that the decline in urban-rural gap is mainly due to downward shift in the covariate effects. This implies that rural households, particularly those at the upper end of the distribution, are catching up with their urban counterparts in terms of their characteristics.

Figures 10 and 11 further decompose the IR-LIR and urban-rural gaps within each region. Two features stand out. First, the widening of the IR-LIR gap in 2005 relative to that in 2000 seems to be due to a large increase in returns effect in rural areas in the integrated region. The covariate effects also shifted upward implying that rural residents in IR have better characteristics that their counterparts in LIR. Second, while urban-rural gap became smaller in both integrated and less integrated regions, the narrowing of overall urban-rural gap is mainly due to a large downward shift in covariate effects in integrated region. The rural residents in integrated region have not only enjoyed higher returns relative to their counterparts in less integrated region, they are also catching up with their urban counterparts in integrated region. The trend in regional living standards suggests a pattern where improvement in living standard is spreading from urban growth poles toward adjacent rural areas. The regions which are cut off from the growth poles by the formidable barriers erected by the rivers are falling behind both in terms of their endowments and returns to those endowments.

## 6. Conclusions

The poverty assessments carried out for a large number of developing countries during the last couple of decades identify two robust empirical patterns. First, in almost all countries, there exist significant variations in the incidence of poverty across regions: every country has a region where incidence of poverty is unusually high by national standards. Second, there is a substantial difference in the incidence of poverty across rural and urban

areas: rural areas home many more poor people than urban areas in relative terms. The evolution of these twin gaps in poverty especially in relation to economic growth has far-reaching implications for overall economic policy as well as anti-poverty programs.

In this paper, we examine the regional gaps in living standard for the entire distribution of log of real per capita consumption expenditure using data from the Household Expenditure Surveys of 2000 and 2005 from Bangladesh. In addition to urban-rural gap, we analyze the gap between integrated and less integrated regions within the country. The integrated region is defined as the region which is geographically contiguous to two main urban growth poles: Dhaka, the capital city, and Chittagong, the port city. The less integrated region consists of the part of the country which is cut-off from the growth poles by two mighty Asian rivers: the Ganges and Brahmaputra. Utilizing the quantile decomposition technique, we decompose the urban-rural and integrated-less integrated gaps into two components: one due to differences in household characteristics, and other due to differences in the returns to those characteristics.

The analysis based on the distribution of log RPCE shows that the urban-rural gap, though substantial in survey year 2000, narrowed considerably in 2005. In contrast the IR-LIR gap has widened substantially in 2005. The empirical analysis based on quantile regressions and Machado-Mata (2005) decomposition yields a number of results with respect to urban-rural and IR-LIR gaps.

The detailed analysis of the urban-rural gap indicates that in both survey years, the observed urban-rural gaps in the distribution of RPCE are mainly due to covariate effects: households in urban areas have superior characteristics (e.g. better education) relative to those in rural areas. In both survey years, the magnitude of return effect is very small (approximately zero) for all households at or below $60^{th}$ quantile of the RPCE distribution and is positive and increasing across upper quantiles (above $60^{th}$ percentile). Thus households at the upper quantiles have both better household characteristics and enjoy better returns to those characteristics. More importantly, the narrowing of the urban-rural gap between 2000 and 2005 has been caused by a dramatic decline in the magnitude of covariate effects across

the entire distribution of log of RPCE. The decline was larger in magnitude for the households at the upper end of the distribution. This implies that rural households, particularly at the upper end of the distribution are catching up with their urban counterparts in terms of their characteristics.

In the case of IR-LIR gap, the return effects predominate in both survey years. While the covariate effects were smaller during 2000, both covariate and return effects shifted upward in 2005 causing IR-LIR gap to widen. The shift in the returns effect was larger for the households at the lower end of the distribution, with no substantial shift at the middle and upper ends of the distribution. The covariate effects on the other hand shifted upward for all quantiles implying that households in IR have better characteristics than those in LIR in 2005. The results also suggest that households at the lower end of the distribution in LIR are worse of not only in terms of their characteristics but also in terms of returns to those characteristics.

A more detailed analysis of these gaps shows that the narrowing of urban-rural gap is mainly due to convergence of covariate effects in integrated region. The rural residents in LIR have fallen well behind the rural residents in IR both in terms of their endowments/characteristics and of returns to those characteristics, causing the IR-LIR gap to widen. The results from the empirical analysis suggest that improvement in living standards is spreading from the urban growth poles to the regions (IR) adjacent to those growth poles. The LIR is on other hand less urbanized and also lacks easy access to urban growth poles due to lack of bridges and other transportation links. The residents in LIR have fallen behind those of IR not only because of its weaker access to growth poles but also because of migration of its better endowed households to IR.

Among households characteristics, secondary and above education is associated with higher log RPCE in both survey years. The differences in returns to secondary and higher secondary education have narrowed across regions between 2000 and 2005. The difference remains large and significant in the case of education above secondary level. This implies that there is still considerable inflexibility in accessing highly skilled jobs.

Within each region, migration and relative ease of accessing lower skilled jobs causes returns to equalize between urban and rural areas especially for lower 3 quintiles of expenditure distribution. For the upper two quintiles, the differences in returns are significant perhaps due to limited availability of skilled jobs which are often difficult to access and due to higher opportunity costs of migration. The substantial difference in returns effects between IR-LIR suggests that physical barriers created by the rivers not only limit access to larger markets but also raise migration costs perhaps due to its impact on formation of migration network and on risk of migration.

The empirical results have a number of policy implications. Since within each region there is virtually no difference in the rates of returns between urban and rural areas for lower three quintiles of the distribution, investing in human capital (e.g. education), creating employment opportunities through target programs (e,g, micro finance) and enhancing assets of the poorer and rural population can have large impact on the living standard of these households and reducing the urban-rural gap. On the other hand, because of substantial returns effect, reduction of the IR-LIR gap would require policy interventions that affect the rates of returns. Such policy interventions would include investment in infrastructure especially in road transport and bridges which will improve connectivity between IR and LIR. This will not only ensure better access for LIR residents to growth poles but also facilitate better movement of people across regions. Moreover, as covariate effects are also considerable, narrowing of the IR-LIR gap would require investment in human capital and enhancement of employment opportunities in LIR. The urban areas in LIR are behind those in IR both in terms of household characteristics and returns to those characteristics. Investment in urban infrastructure and services in LIR may enhance returns to household characteristics, create an engine of growth within LIR and attract migrant from rural areas. Combination of these forces could contribute to narrowing the IR-LIR gap.

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Table 1 :Definition of Variables

| Acronym | Definition |
|---|---|
| RPC | Per capita consumption expenditure deflated by regional price index |
| LRPC | Log per capita consumption expenditure deflated by regional price index |
| I | Dummy for integrated region |
| U | Dummy for urban area |
| drs | Dummy =1 if Household Received domestic remittances |
| frs | Dummy =1 if Household Received Remittances from abroad |
| lasset | Log(Total Asset deflated by regional price index) |
| hsize | Household size |
| hhage | Household head's age |
| hhages | Household head's age squared |
| hhfem | Household head Female |
| hhmar | Household head Married |
| hedu2 | HH Head has primary education |
| hedu3 | HH Head has Secondary education |
| hedu4 | HH Head has higher Secondary education |
| hedu5 | HH Head has more than higher Secondary education |
| pchi | Percentage of children |
| agri | agri=1 if HH head employed in agriculture |
| manu | manu=1 if HH head employed in manfacutring |
| serv | serv=1 if HH head employed in services |
| self | self=1 if HH head is self employed |
| gov | gov=1 if HH headem ployed in government job |
| priv | priv=1 if HH head employed in private sector wage employment |
| pmedu | Number of adult male with Education equal to or more than primary |
| pfedu | Number of adult female with Education equal to or more than primary |

Table 2: Quintile means of key variables, across integrated and less integrated regions

| | Consumption Quantiles | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Less Integrated Region | | | | | Integrated Region | | | | |
| | Lowest | Second | Middle | Fourth | Highest | Lowest | Second | Middle | Fourth | Highest |
| Household Expenditure Survey 2001 | | | | | | | | | | |
| RPC (Taka) | 377.42 | 522.77 | 656.09 | 852.72 | 1593.53 | 397.38 | 563.80 | 730.01 | 995.91 | 1986.90 |
| LRPC | 5.92 | 6.26 | 6.48 | 6.74 | 7.31 | 5.97 | 6.33 | 6.59 | 6.90 | 7.49 |
| drs | 0.18 | 0.21 | 0.21 | 0.21 | 0.25 | 0.12 | 0.16 | 0.20 | 0.24 | 0.20 |
| frs | 0.01 | 0.02 | 0.03 | 0.05 | 0.08 | 0.05 | 0.09 | 0.12 | 0.18 | 0.20 |
| Lasset | 3.36 | 3.94 | 4.29 | 4.84 | 5.81 | 3.60 | 4.16 | 4.45 | 4.93 | 5.99 |
| hsize | 1.62 | 1.55 | 1.48 | 1.49 | 1.45 | 1.72 | 1.65 | 1.56 | 1.52 | 1.46 |
| hhage | 42.19 | 42.96 | 43.37 | 46.14 | 46.76 | 43.11 | 44.01 | 43.97 | 45.16 | 46.89 |
| hhfem | 0.09 | 0.07 | 0.05 | 0.07 | 0.08 | 0.10 | 0.10 | 0.11 | 0.11 | 0.12 |
| hhmar | 0.90 | 0.92 | 0.92 | 0.89 | 0.88 | 0.90 | 0.91 | 0.90 | 0.89 | 0.89 |
| hedu2 | 0.14 | 0.17 | 0.15 | 0.11 | 0.05 | 0.13 | 0.15 | 0.15 | 0.13 | 0.05 |
| hedu3 | 0.17 | 0.24 | 0.29 | 0.36 | 0.22 | 0.17 | 0.25 | 0.28 | 0.32 | 0.24 |
| hedu4 | 0.03 | 0.07 | 0.08 | 0.16 | 0.15 | 0.02 | 0.07 | 0.09 | 0.14 | 0.16 |
| hedu5 | 0.02 | 0.03 | 0.08 | 0.16 | 0.48 | 0.01 | 0.05 | 0.07 | 0.18 | 0.46 |
| pchi | 0.47 | 0.41 | 0.35 | 0.29 | 0.24 | 0.49 | 0.42 | 0.37 | 0.32 | 0.25 |
| agri | 0.53 | 0.52 | 0.46 | 0.48 | 0.34 | 0.47 | 0.42 | 0.40 | 0.32 | 0.20 |
| manu | 0.15 | 0.14 | 0.14 | 0.15 | 0.15 | 0.11 | 0.14 | 0.17 | 0.15 | 0.13 |
| serv | 0.23 | 0.27 | 0.32 | 0.29 | 0.40 | 0.31 | 0.33 | 0.30 | 0.39 | 0.47 |
| self | 0.31 | 0.46 | 0.51 | 0.58 | 0.59 | 0.34 | 0.42 | 0.44 | 0.50 | 0.44 |
| priv | 0.65 | 0.52 | 0.47 | 0.36 | 0.32 | 0.57 | 0.49 | 0.46 | 0.37 | 0.36 |
| pmedu | 0.82 | 0.88 | 0.98 | 1.30 | 1.74 | 0.95 | 1.04 | 1.00 | 1.30 | 1.70 |
| pfedu | 0.76 | 0.74 | 0.75 | 0.92 | 1.34 | 0.83 | 0.82 | 0.82 | 1.03 | 1.34 |
| Household Expenditure Survey 2005 | | | | | | | | | | |
| RPC (Taka) | 523.34 | 720.69 | 903.33 | 1186.51 | 2335.76 | 612.01 | 843.68 | 1063.65 | 1430.99 | 2823.28 |
| LRPC | 6.24 | 6.58 | 6.80 | 7.07 | 7.67 | 6.40 | 6.74 | 6.97 | 7.26 | 7.86 |
| drs | 0.17 | 0.27 | 0.26 | 0.28 | 0.28 | 0.14 | 0.22 | 0.19 | 0.21 | 0.18 |
| frs | 0.01 | 0.01 | 0.03 | 0.05 | 0.11 | 0.06 | 0.12 | 0.15 | 0.19 | 0.21 |
| Lasset | 2.02 | 2.65 | 3.08 | 3.60 | 4.41 | 2.27 | 2.66 | 3.13 | 3.69 | 4.60 |
| hsize | 1.57 | 1.51 | 1.44 | 1.41 | 1.40 | 1.68 | 1.54 | 1.50 | 1.46 | 1.39 |
| hhage | 42.71 | 43.55 | 45.00 | 46.67 | 47.32 | 43.09 | 45.20 | 46.23 | 46.74 | 47.82 |
| hhfem | 0.10 | 0.06 | 0.08 | 0.08 | 0.09 | 0.09 | 0.10 | 0.13 | 0.16 | 0.16 |
| hhmar | 0.88 | 0.92 | 0.89 | 0.90 | 0.89 | 0.93 | 0.91 | 0.90 | 0.90 | 0.88 |
| hedu2 | 0.34 | 0.30 | 0.23 | 0.17 | 0.09 | 0.25 | 0.25 | 0.20 | 0.12 | 0.06 |
| hedu3 | 0.28 | 0.39 | 0.47 | 0.50 | 0.41 | 0.28 | 0.37 | 0.49 | 0.53 | 0.41 |
| hedu4 | 0.01 | 0.02 | 0.03 | 0.08 | 0.16 | 0.01 | 0.02 | 0.06 | 0.10 | 0.15 |
| hedu5 | 0.01 | 0.02 | 0.04 | 0.10 | 0.28 | 0.02 | 0.03 | 0.04 | 0.11 | 0.32 |
| pchi | 0.44 | 0.38 | 0.32 | 0.28 | 0.24 | 0.48 | 0.40 | 0.34 | 0.30 | 0.26 |
| agri | 0.39 | 0.42 | 0.39 | 0.35 | 0.24 | 0.41 | 0.38 | 0.31 | 0.24 | 0.15 |
| manu | 0.14 | 0.14 | 0.15 | 0.11 | 0.10 | 0.13 | 0.16 | 0.14 | 0.14 | 0.11 |
| serv | 0.34 | 0.34 | 0.34 | 0.39 | 0.48 | 0.29 | 0.30 | 0.35 | 0.41 | 0.49 |
| self | 0.26 | 0.37 | 0.43 | 0.50 | 0.49 | 0.32 | 0.37 | 0.42 | 0.43 | 0.42 |
| priv | 0.64 | 0.56 | 0.45 | 0.37 | 0.31 | 0.56 | 0.49 | 0.38 | 0.31 | 0.27 |
| pmedu | 0.12 | 0.16 | 0.22 | 0.28 | 0.37 | 0.10 | 0.16 | 0.23 | 0.30 | 0.37 |
| pfedu | 0.11 | 0.15 | 0.19 | 0.23 | 0.34 | 0.11 | 0.15 | 0.21 | 0.28 | 0.38 |

Table 3: Quintile means of key variables for Rural and Urban Areas

| | Consumption Quantiles | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Rural | | | | | Urban | | | | |
| | Lowest | Second | Middle | Fourth | Highest | Lowest | Second | Middle | Fourth | Highest |
| Household Expenditure Survey 2001 | | | | | | | | | | |
| RPC (Taka) | 378.35 | 521.15 | 648.95 | 833.58 | 1440.15 | 413.57 | 613.69 | 832.31 | 1206.92 | 2433.91 |
| LRPC | 5.92 | 6.25 | 6.47 | 6.72 | 7.21 | 6.00 | 6.42 | 6.72 | 7.09 | 7.70 |
| drs | 0.15 | 0.18 | 0.19 | 0.22 | 0.26 | 0.16 | 0.20 | 0.19 | 0.24 | 0.16 |
| frs | 0.03 | 0.05 | 0.07 | 0.10 | 0.19 | 0.03 | 0.06 | 0.08 | 0.11 | 0.12 |
| Lasset | 3.44 | 3.94 | 4.34 | 4.70 | 5.39 | 3.65 | 4.23 | 4.73 | 5.47 | 6.55 |
| hsize | 1.66 | 1.60 | 1.55 | 1.51 | 1.45 | 1.68 | 1.57 | 1.52 | 1.53 | 1.45 |
| hhage | 42.82 | 43.54 | 43.83 | 45.93 | 47.46 | 42.31 | 42.79 | 43.40 | 44.85 | 46.39 |
| hhfem | 0.09 | 0.08 | 0.06 | 0.09 | 0.11 | 0.12 | 0.09 | 0.08 | 0.08 | 0.11 |
| hhmar | 0.91 | 0.91 | 0.92 | 0.89 | 0.87 | 0.90 | 0.90 | 0.89 | 0.92 | 0.89 |
| hedu2 | 0.14 | 0.16 | 0.15 | 0.13 | 0.09 | 0.14 | 0.17 | 0.12 | 0.05 | 0.02 |
| hedu3 | 0.17 | 0.23 | 0.26 | 0.32 | 0.30 | 0.19 | 0.33 | 0.34 | 0.27 | 0.14 |
| hedu4 | 0.02 | 0.06 | 0.06 | 0.13 | 0.14 | 0.05 | 0.09 | 0.16 | 0.20 | 0.14 |
| hedu5 | 0.01 | 0.03 | 0.07 | 0.11 | 0.28 | 0.02 | 0.07 | 0.14 | 0.40 | 0.68 |
| pchi | 0.49 | 0.43 | 0.37 | 0.32 | 0.27 | 0.46 | 0.38 | 0.33 | 0.28 | 0.23 |
| agri | 0.62 | 0.60 | 0.53 | 0.54 | 0.47 | 0.13 | 0.14 | 0.14 | 0.10 | 0.06 |
| manu | 0.10 | 0.08 | 0.12 | 0.11 | 0.09 | 0.25 | 0.25 | 0.25 | 0.23 | 0.15 |
| serv | 0.19 | 0.23 | 0.25 | 0.24 | 0.30 | 0.50 | 0.51 | 0.49 | 0.50 | 0.60 |
| self | 0.33 | 0.46 | 0.50 | 0.59 | 0.63 | 0.31 | 0.35 | 0.39 | 0.36 | 0.38 |
| priv | 0.62 | 0.49 | 0.45 | 0.35 | 0.27 | 0.60 | 0.57 | 0.48 | 0.46 | 0.39 |
| pmedu | 0.91 | 0.90 | 1.00 | 1.13 | 1.43 | 0.89 | 1.00 | 1.30 | 1.79 | 1.91 |
| pfedu | 0.79 | 0.76 | 0.75 | 0.84 | 1.07 | 0.79 | 0.88 | 1.02 | 1.38 | 1.58 |
| Household Expenditure Survey 2005 | | | | | | | | | | |
| RPC (Taka) | 551.64 | 751.80 | 927.64 | 1191.28 | 2168.45 | 570.78 | 826.78 | 1091.48 | 1563.13 | 3176.14 |
| LRPC | 6.30 | 6.62 | 6.83 | 7.08 | 7.60 | 6.33 | 6.71 | 6.99 | 7.35 | 7.98 |
| drs | 0.17 | 0.24 | 0.24 | 0.26 | 0.26 | 0.16 | 0.21 | 0.21 | 0.21 | 0.19 |
| frs | 0.02 | 0.06 | 0.09 | 0.14 | 0.19 | 0.02 | 0.05 | 0.07 | 0.09 | 0.15 |
| Lasset | 2.22 | 2.83 | 3.10 | 3.49 | 4.18 | 1.85 | 2.52 | 3.13 | 4.01 | 4.88 |
| hsize | 1.62 | 1.56 | 1.47 | 1.44 | 1.39 | 1.58 | 1.49 | 1.44 | 1.47 | 1.42 |
| hhage | 43.19 | 44.41 | 46.16 | 47.48 | 49.00 | 42.22 | 43.40 | 44.51 | 44.94 | 46.42 |
| hhfem | 0.09 | 0.06 | 0.10 | 0.12 | 0.15 | 0.10 | 0.08 | 0.10 | 0.10 | 0.11 |
| hhmar | 0.90 | 0.92 | 0.90 | 0.89 | 0.87 | 0.90 | 0.91 | 0.90 | 0.91 | 0.90 |
| hedu2 | 0.32 | 0.26 | 0.24 | 0.18 | 0.11 | 0.31 | 0.25 | 0.17 | 0.07 | 0.03 |
| hedu3 | 0.26 | 0.36 | 0.43 | 0.48 | 0.53 | 0.33 | 0.45 | 0.53 | 0.49 | 0.27 |
| hedu4 | 0.01 | 0.02 | 0.02 | 0.06 | 0.12 | 0.02 | 0.04 | 0.09 | 0.15 | 0.19 |
| hedu5 | 0.01 | 0.01 | 0.03 | 0.06 | 0.13 | 0.02 | 0.04 | 0.09 | 0.25 | 0.49 |
| pchi | 0.46 | 0.40 | 0.36 | 0.31 | 0.26 | 0.44 | 0.35 | 0.29 | 0.28 | 0.25 |
| agri | 0.50 | 0.51 | 0.47 | 0.43 | 0.35 | 0.19 | 0.16 | 0.12 | 0.07 | 0.04 |
| manu | 0.10 | 0.10 | 0.11 | 0.09 | 0.08 | 0.22 | 0.23 | 0.19 | 0.19 | 0.11 |
| serv | 0.26 | 0.26 | 0.27 | 0.29 | 0.32 | 0.45 | 0.47 | 0.53 | 0.60 | 0.64 |
| self | 0.29 | 0.39 | 0.44 | 0.50 | 0.51 | 0.29 | 0.36 | 0.39 | 0.39 | 0.39 |
| priv | 0.62 | 0.52 | 0.42 | 0.32 | 0.22 | 0.61 | 0.52 | 0.43 | 0.41 | 0.34 |
| pmedu | 0.10 | 0.14 | 0.18 | 0.24 | 0.32 | 0.14 | 0.22 | 0.31 | 0.38 | 0.41 |
| pfedu | 0.10 | 0.13 | 0.17 | 0.21 | 0.29 | 0.12 | 0.20 | 0.26 | 0.36 | 0.43 |

Table 4: Estimates of Regional Gaps at the mean and at different quantiles

| Year | Coefficient | Mean | Quantiles | | | | |
|---|---|---|---|---|---|---|---|
| 2001 | | | 5th | 25th | 50th | 75th | 90th |
| | Base | 6.47 | 5.799 | 6.167 | 6.426 | 6.737 | 7.289 |
| | t-value | 675.4 | 219.0 | 329.4 | 326.6 | 263.1 | 165.5 |
| | Urban | 0.26 | 0.091 | 0.143 | 0.236 | 0.381 | 0.506 |
| | t-value | 20.2 | 2.580 | 4.550 | 6.709 | 8.881 | 7.188 |
| | Integrated | 0.1 | 0.045 | 0.063 | 0.093 | 0.099 | 0.121 |
| | t-value | 7.93 | 1.339 | 2.313 | 3.314 | 2.678 | 2.034 |
| 2005 | | | | | | | |
| | Base | 6.81 | 6.155 | 6.501 | 6.758 | 7.078 | 7.647 |
| | t-value | 833.8 | 361.7 | 417.0 | 469.8 | 365.8 | 261.6 |
| | Urban | 0.178 | 0.008 | 0.071 | 0.144 | 0.273 | 0.434 |
| | t-value | 16.55 | 0.395 | 3.300 | 5.374 | 7.857 | 7.892 |
| | Integrated | 0.163 | 0.154 | 0.154 | 0.152 | 0.164 | 0.179 |
| | t-value | 15.72 | 7.715 | 7.614 | 6.830 | 5.779 | 4.143 |

Table 5: Quantile Regression Results :2001

| Variables | Percentiles 5th | | 25th | | 50th | | 75th | | 95th | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Coef | Z | Coef | Z | Coef | Z | Coef | Z | Coef | Z |
| l | -0.15 | -0.67 | 0.01 | 0.06 | 0.09 | 0.62 | 0.19 | 1.20 | -0.08 | -0.24 |
| u | -0.02 | -0.07 | 0.21 | 0.92 | 0.39 | 2.27 | 0.02 | 0.09 | -0.22 | -0.68 |
| drs | -0.02 | -0.72 | 0.02 | 0.93 | 0.01 | 0.35 | -0.01 | -0.45 | -0.03 | -0.63 |
| frs | 0.06 | 0.52 | **0.14** | **3.36** | **0.12** | **3.44** | **0.15** | **2.83** | 0.15 | 1.55 |
| Lasset | **0.21** | **11.94** | **0.23** | **21.66** | **0.24** | **24.82** | **0.25** | **23.12** | **0.27** | **17.65** |
| hsize | **-0.33** | **-7.69** | **-0.39** | **-12.37** | **-0.46** | **-18.00** | **-0.48** | **-14.88** | **-0.50** | **-9.69** |
| hhage | -0.07 | -1.83 | -0.04 | -1.33 | -0.05 | -1.57 | -0.04 | -1.64 | **-0.13** | **-1.88** |
| hhfem | 0.00 | 0.05 | 0.02 | 0.52 | -0.02 | -0.47 | -0.02 | -0.60 | 0.08 | 0.76 |
| hhmar | 0.03 | 0.53 | 0.04 | 1.55 | 0.04 | 1.21 | 0.06 | 1.79 | 0.06 | 0.72 |
| hedu2 | **0.07** | **2.36** | **0.02** | **0.96** | **0.05** | **2.37** | **0.03** | **1.56** | **0.02** | **0.52** |
| hedu3 | **0.12** | **3.42** | **0.07** | **3.11** | **0.08** | **3.98** | **0.07** | **3.10** | **0.03** | **0.70** |
| hedu4 | **0.24** | **3.80** | **0.19** | **6.28** | **0.12** | **4.35** | **0.11** | **3.42** | **0.03** | **0.51** |
| hedu5 | **0.25** | **4.11** | **0.22** | **6.85** | **0.26** | **6.84** | **0.24** | **6.37** | **0.23** | **2.70** |
| pchi | **-0.22** | **-2.92** | **-0.28** | **-6.24** | **-0.24** | **-5.36** | **-0.26** | **-5.93** | **-0.37** | **-4.49** |
| agri | 0.08 | 1.04 | 0.05 | 0.93 | 0.04 | 1.00 | 0.04 | 0.79 | -0.05 | -0.72 |
| manu | 0.09 | 1.03 | 0.05 | 1.05 | 0.07 | 1.77 | 0.07 | 1.50 | 0.02 | 0.19 |
| serv | 0.12 | 1.41 | **0.10** | **1.93** | **0.09** | **2.30** | **0.12** | **2.54** | 0.04 | 0.53 |
| self | 0.02 | 0.30 | 0.02 | 0.54 | -0.02 | -0.73 | -0.05 | -1.06 | 0.01 | 0.11 |
| priv | 0.04 | 0.48 | 0.05 | 1.09 | 0.01 | 0.28 | -0.02 | -0.46 | -0.02 | -0.33 |
| pmedu | -0.04 | -1.84 | -0.01 | -0.69 | 0.01 | 1.09 | 0.01 | 0.91 | 0.03 | 1.63 |
| pfedu | -0.01 | -0.55 | -0.01 | -0.98 | 0.01 | 0.59 | 0.01 | 0.62 | 0.02 | 0.88 |
| l*drs | **0.10** | **2.37** | **0.10** | **3.46** | **0.11** | **3.89** | **0.10** | **3.18** | **0.09** | **1.76** |
| l*frs | 0.03 | 0.23 | 0.05 | 0.96 | 0.08 | 1.91 | 0.06 | 1.03 | 0.08 | 0.80 |
| l*Lasset | 0.00 | 0.22 | -0.03 | -1.85 | -0.03 | -2.14 | -0.02 | -1.56 | -0.01 | -0.28 |
| l*hsize | 0.00 | -0.06 | 0.00 | 0.01 | 0.01 | 0.26 | 0.00 | -0.01 | 0.00 | -0.03 |
| l*hhage | 0.01 | 0.19 | 0.03 | 0.68 | 0.02 | 0.52 | -0.01 | -0.14 | 0.06 | 0.72 |
| l*hhfem | 0.05 | 0.51 | 0.00 | -0.06 | 0.04 | 0.69 | 0.04 | 0.67 | -0.09 | -0.87 |
| l*hhmar | **0.14** | **2.01** | 0.02 | 0.35 | 0.04 | 0.81 | 0.01 | 0.13 | -0.01 | -0.10 |
| l*hedu2 | 0.01 | 0.17 | **0.07** | **2.19** | 0.03 | 1.14 | 0.04 | 1.11 | -0.03 | -0.54 |
| l*hedu3 | -0.02 | -0.53 | 0.05 | 1.54 | 0.03 | 1.07 | 0.05 | 1.58 | 0.00 | 0.01 |
| l*hedu4 | -0.06 | -0.88 | 0.01 | 0.13 | 0.02 | 0.53 | 0.03 | 0.62 | 0.07 | 0.79 |
| l*hedu5 | 0.05 | 0.73 | **0.09** | **1.80** | 0.04 | 0.87 | **0.10** | **1.87** | 0.00 | -0.05 |
| l*pchi | -0.11 | -1.13 | -0.04 | -0.68 | -0.05 | -0.87 | -0.01 | -0.10 | -0.01 | -0.05 |
| l*agri | 0.01 | 0.13 | -0.03 | -0.50 | -0.02 | -0.38 | -0.03 | -0.50 | 0.02 | 0.26 |
| l*manu | 0.10 | 0.96 | 0.03 | 0.47 | 0.03 | 0.61 | 0.01 | 0.10 | 0.04 | 0.45 |
| l*serv | 0.02 | 0.15 | -0.02 | -0.40 | 0.00 | -0.06 | -0.04 | -0.74 | 0.02 | 0.24 |
| l*self | -0.05 | -0.56 | 0.02 | 0.30 | 0.00 | 0.04 | 0.01 | 0.18 | -0.04 | -0.57 |
| l*priv | -0.02 | -0.19 | 0.03 | 0.62 | -0.01 | -0.16 | 0.00 | 0.00 | 0.02 | 0.29 |
| l*pmedu | 0.02 | 0.82 | 0.00 | -0.01 | 0.00 | -0.28 | 0.00 | -0.06 | -0.01 | -0.48 |
| l*pfedu | 0.02 | 0.99 | 0.01 | 1.31 | 0.00 | 0.19 | 0.00 | -0.14 | 0.04 | 1.52 |
| u*drs | 0.01 | 0.28 | **-0.09** | **-3.10** | **-0.09** | **-3.35** | -0.04 | -1.32 | -0.02 | -0.45 |
| u*frs | 0.05 | 0.55 | -0.02 | -0.47 | -0.05 | -1.22 | -0.09 | -1.95 | -0.10 | -1.18 |
| u*Lasset | **-0.05** | **-2.08** | **-0.04** | **-2.74** | **-0.03** | **-1.86** | -0.01 | -0.86 | -0.02 | -1.09 |
| u*hsize | -0.09 | -1.69 | **-0.15** | **-3.48** | **-0.07** | **-1.81** | -0.05 | -1.11 | **-0.15** | **-2.06** |
| u*hhage | 0.09 | 1.31 | 0.04 | 0.76 | -0.03 | -0.75 | 0.03 | 0.61 | 0.15 | 1.91 |
| u*hhfem | -0.17 | -1.47 | 0.01 | 0.17 | 0.02 | 0.37 | 0.04 | 0.72 | -0.08 | -0.86 |
| u*hhmar | -0.02 | -0.17 | 0.07 | 1.17 | 0.01 | 0.19 | 0.01 | 0.25 | -0.02 | -0.21 |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| u*hedu2 | 0.01 | 0.12 | 0.06 | 1.39 | 0.06 | 1.52 | 0.03 | 0.80 | 0.00 | -0.01 |
| u*hedu3 | **0.15** | **3.34** | **0.15** | **4.32** | **0.09** | **2.61** | **0.08** | **2.06** | **0.14** | **2.14** |
| u*hedu4 | 0.06 | 0.75 | **0.15** | **2.80** | **0.17** | **3.03** | **0.15** | **3.29** | 0.13 | 1.39 |
| u*hedu5 | **0.24** | **3.54** | **0.32** | **5.38** | **0.23** | **3.70** | **0.19** | **3.45** | **0.23** | **2.02** |
| u*pchi | -0.03 | -0.31 | 0.08 | 1.16 | 0.00 | 0.06 | 0.02 | 0.32 | 0.25 | 2.03 |
| u*agri | -0.09 | -0.74 | 0.00 | 0.00 | -0.01 | -0.09 | 0.04 | 0.63 | -0.09 | -0.76 |
| u*manu | -0.13 | -1.04 | -0.01 | -0.08 | -0.04 | -0.76 | 0.00 | 0.07 | -0.12 | -1.12 |
| u*serv | -0.10 | -0.86 | -0.04 | -0.67 | -0.05 | -0.80 | 0.01 | 0.18 | -0.10 | -0.95 |
| u*self | 0.05 | 0.50 | -0.08 | -1.38 | -0.04 | -0.70 | -0.06 | -1.13 | 0.00 | 0.05 |
| u*priv | 0.03 | 0.32 | -0.12 | -1.90 | -0.06 | -1.20 | -0.07 | -1.46 | -0.04 | -0.48 |
| u*pmedu | 0.00 | -0.16 | 0.01 | 0.93 | 0.00 | 0.23 | 0.00 | 0.08 | 0.01 | 0.49 |
| u*pfedu | 0.04 | 1.85 | 0.01 | 1.07 | 0.02 | 1.29 | 0.01 | 1.01 | 0.00 | -0.13 |
| Intercept | 5.79 | 33.35 | 5.93 | 44.66 | 6.21 | 53.36 | 6.38 | 59.62 | 7.05 | 24.34 |

Table 6: Quantile Regression Results :2005

| Variables | Percentiles 5th | | 25th | | 50th | | 75th | | 95th | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Coef | Z | Coef | Z | Coef | Z | Coef | Z | Coef | Z |
| l | 0.06 | 0.24 | 0.09 | 0.62 | 0.10 | 0.65 | 0.15 | 0.93 | 0.43 | 1.25 |
| u | -0.18 | -0.66 | -0.02 | -0.14 | -0.20 | -1.21 | -0.19 | -1.07 | -0.34 | -0.99 |
| drs | **0.11** | **3.51** | **0.07** | **3.95** | **0.06** | **2.97** | **0.07** | **2.70** | 0.03 | 0.74 |
| frs | **0.25** | **3.60** | **0.27** | **8.10** | **0.33** | **5.99** | **0.35** | **5.79** | **0.67** | **4.52** |
| Lasset | **0.12** | **8.78** | **0.09** | **13.78** | **0.08** | **11.87** | **0.09** | **11.94** | **0.10** | **7.18** |
| hsize | **-0.33** | **-7.52** | **-0.34** | **-15.24** | **-0.31** | **-11.98** | **-0.35** | **-13.52** | **-0.50** | **-10.83** |
| hhage | 0.03 | 0.50 | **0.10** | **3.62** | **0.07** | **2.32** | **0.12** | **3.91** | **0.18** | **2.45** |
| hhfem | -0.04 | -0.43 | -0.02 | -0.56 | -0.08 | -1.85 | -0.06 | -1.21 | -0.07 | -0.69 |
| hhmar | 0.08 | 1.33 | 0.06 | 1.98 | 0.02 | 0.44 | 0.03 | 1.02 | -0.03 | -0.36 |
| hedu2 | -0.03 | -0.84 | -0.01 | -0.42 | 0.03 | 1.51 | **0.05** | **2.61** | 0.07 | 1.72 |
| hedu3 | 0.04 | 1.21 | **0.05** | **2.34** | **0.06** | **2.75** | **0.10** | **4.40** | **0.13** | **2.45** |
| hedu4 | 0.09 | 1.49 | **0.22** | **5.09** | **0.33** | **6.74** | **0.36** | **6.56** | **0.45** | **3.62** |
| hedu5 | **0.16** | **2.26** | **0.24** | **4.74** | **0.33** | **7.15** | **0.46** | **5.92** | **0.56** | **5.35** |
| pchi | **-0.30** | **-3.81** | **-0.29** | **-8.09** | **-0.32** | **-7.55** | **-0.29** | **-6.38** | **-0.18** | **-2.00** |
| agri | 0.01 | 0.14 | 0.02 | 0.61 | 0.00 | 0.08 | -0.01 | -0.27 | **0.15** | **2.85** |
| manu | -0.04 | -0.44 | 0.05 | 1.05 | 0.04 | 1.05 | 0.05 | 1.13 | **0.22** | **4.05** |
| serv | 0.04 | 0.58 | 0.06 | 1.58 | 0.05 | 1.61 | 0.06 | 1.50 | **0.23** | **4.24** |
| self | 0.03 | 0.37 | -0.01 | -0.36 | 0.00 | 0.04 | 0.01 | 0.16 | **-0.16** | **-1.75** |
| priv | -0.03 | -0.45 | -0.06 | -1.45 | **-0.10** | **-2.38** | **-0.12** | **-2.29** | **-0.32** | **-3.56** |
| pmedu | 0.07 | 1.23 | **0.12** | **2.97** | **0.16** | **4.11** | **0.17** | **3.97** | **0.30** | **3.64** |
| pfedu | -0.06 | -0.84 | **0.09** | **2.31** | **0.16** | **3.68** | **0.22** | **4.84** | **0.26** | **3.55** |
| l*drs | -0.04 | -1.03 | **-0.05** | **-1.91** | -0.04 | -1.36 | -0.05 | -1.24 | 0.00 | -0.08 |
| l*frs | -0.07 | -1.01 | **-0.15** | **-3.48** | **-0.25** | **-4.07** | **-0.27** | **-3.88** | -0.52 | -3.16 |
| l*Lasset | -0.01 | -0.85 | 0.01 | 0.66 | **0.02** | **1.85** | **0.03** | **2.32** | 0.05 | 3.14 |
| l*hsize | -0.03 | -0.54 | **-0.09** | **-3.22** | **-0.06** | **-1.80** | -0.06 | -1.69 | -0.02 | -0.27 |
| l*hhage | 0.05 | 0.83 | 0.02 | 0.46 | 0.01 | 0.17 | 0.02 | 0.40 | -0.07 | -0.78 |
| l*hhfem | 0.03 | 0.33 | 0.07 | 1.41 | **0.13** | **2.63** | 0.10 | 1.68 | 0.04 | 0.36 |
| l*hhmar | -0.06 | -0.88 | 0.04 | 0.86 | 0.03 | 0.73 | 0.00 | -0.06 | -0.05 | -0.49 |
| l*hedu2 | 0.03 | 0.78 | **0.06** | **2.24** | **0.05** | **1.88** | -0.01 | -0.22 | -0.04 | -0.68 |
| l*hedu3 | 0.04 | 0.92 | **0.08** | **2.55** | 0.04 | 1.25 | 0.00 | 0.10 | -0.07 | -0.94 |
| l*hedu4 | 0.12 | 1.57 | **0.12** | **2.27** | 0.00 | 0.02 | -0.10 | -1.29 | -0.12 | -0.92 |
| l*hedu5 | 0.03 | 0.41 | 0.06 | 1.06 | -0.04 | -0.64 | -0.09 | -1.20 | -0.04 | -0.29 |
| l*pchi | 0.06 | 0.65 | 0.08 | 1.76 | 0.04 | 0.70 | -0.01 | -0.09 | -0.06 | -0.48 |
| l*agri | -0.01 | -0.12 | -0.02 | -0.40 | -0.02 | -0.52 | -0.02 | -0.34 | -0.10 | -1.29 |
| l*manu | 0.05 | 0.61 | 0.04 | 0.70 | 0.00 | -0.07 | -0.04 | -0.64 | -0.14 | -1.55 |
| l*serv | -0.03 | -0.42 | 0.00 | -0.07 | -0.02 | -0.51 | -0.05 | -0.96 | -0.14 | -1.85 |
| l*self | 0.01 | 0.17 | 0.00 | -0.04 | -0.02 | -0.36 | -0.01 | -0.20 | 0.14 | 1.32 |
| l*priv | 0.02 | 0.22 | -0.02 | -0.31 | 0.01 | 0.22 | 0.03 | 0.57 | 0.22 | 2.25 |
| l*pmedu | 0.00 | 0.00 | 0.02 | 0.37 | 0.02 | 0.49 | 0.00 | -0.05 | -0.32 | -2.93 |
| l*pfedu | 0.07 | 0.97 | -0.03 | -0.64 | -0.02 | -0.43 | -0.05 | -0.81 | 0.00 | 0.04 |
| u*drs | 0.02 | 0.50 | 0.02 | 0.73 | -0.01 | -0.17 | 0.02 | 0.43 | 0.03 | 0.47 |
| u*frs | -0.05 | -0.66 | 0.01 | 0.29 | 0.04 | 0.80 | 0.09 | 1.28 | 0.15 | 1.01 |
| u*Lasset | 0.00 | -0.17 | 0.03 | 2.80 | 0.04 | 3.82 | 0.04 | 3.28 | 0.05 | 2.71 |
| u*hsize | -0.06 | -1.09 | -0.04 | -1.28 | -0.11 | -4.01 | -0.10 | -2.85 | -0.06 | -1.00 |
| u*hhage | 0.02 | 0.25 | 0.00 | -0.13 | 0.05 | 1.28 | 0.04 | 0.92 | 0.07 | 0.73 |
| u*hhfem | 0.07 | 0.74 | -0.04 | -0.81 | -0.03 | -0.62 | 0.01 | 0.24 | 0.05 | 0.48 |
| u*hhmar | 0.10 | 1.13 | -0.03 | -0.66 | -0.02 | -0.37 | 0.00 | 0.09 | 0.08 | 0.80 |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| u*hedu2 | 0.07 | 1.09 | 0.03 | 0.88 | -0.01 | -0.34 | 0.01 | 0.15 | -0.10 | -1.39 |
| u*hedu3 | 0.07 | 1.22 | 0.01 | 0.44 | 0.01 | 0.31 | 0.04 | 0.90 | -0.03 | -0.32 |
| u*hedu4 | 0.11 | 1.24 | 0.00 | -0.01 | -0.04 | -0.62 | 0.10 | 1.27 | -0.08 | -0.61 |
| u*hedu5 | **0.20** | **2.39** | **0.21** | **3.71** | **0.20** | **3.36** | **0.17** | **1.82** | -0.08 | -0.62 |
| u*pchi | 0.03 | 0.35 | -0.03 | -0.64 | 0.06 | 1.01 | 0.09 | 1.37 | 0.11 | 0.95 |
| u*agri | -0.01 | -0.16 | -0.08 | -1.39 | -0.09 | -1.60 | **-0.16** | **-2.43** | **-0.28** | **-2.90** |
| u*manu | 0.06 | 0.65 | -0.03 | -0.47 | -0.04 | -0.84 | -0.10 | -1.59 | **-0.25** | **-2.65** |
| u*serv | 0.05 | 0.66 | 0.00 | 0.06 | 0.01 | 0.13 | -0.06 | -1.21 | **-0.18** | **-2.22** |
| u*self | -0.04 | -0.53 | 0.02 | 0.33 | 0.03 | 0.71 | 0.08 | 1.53 | 0.12 | 1.19 |
| u*priv | 0.03 | 0.38 | 0.06 | 1.23 | **0.11** | **2.29** | **0.14** | **2.56** | **0.17** | **1.80** |
| u*pmedu | 0.13 | 1.79 | 0.02 | 0.35 | 0.03 | 0.53 | 0.04 | 0.59 | 0.12 | 1.11 |
| u*pfedu | 0.10 | 1.22 | 0.07 | 1.31 | 0.11 | 2.11 | -0.02 | -0.37 | -0.06 | -0.47 |
| Intercept | 6.28 | 33.13 | 6.37 | 55.28 | 6.72 | 62.43 | 6.73 | 56.68 | 7.04 | 23.81 |

Table A.1: Indicators for Integrated (IR) and Less Integrated Regions (LIR)

| | 2001 | | 2005 | |
|---|---|---|---|---|
| | LIR | IR | LIR | IR |
| Head count Ratio (Upper poverty line) | 53 | 46 | 50 | 33 |
| Real per capita expenditure | 727 | 800 | 1046 | 1207 |
| Electricity in Mouza | 67% | 63% | 80% | 83% |
| BD Krishi Bank in Mouza | 7% | 17% | 27% | 45% |
| Commercial Bank in Mouza | 17% | 17% | 25% | 40% |
| Grameen Bank in Mouza | 13% | 13% | 29% | 40% |
| Market/bazar in Mouza | 53% | 61% | 64% | 77% |
| Distance to thana HQ (km) | 10.7 | 11.1 | 9.7 | 15.5 |
| Travel time to thana HQ ('00mins) | 0.6 | 0.7 | 0.5 | 0.7 |
| Distance to zila HQ (km) | 27.7 | 33.0 | 28.6 | 33.5 |
| Travel time to zila HQ ('00 mins) | 1.1 | 1.2 | 1.0 | 2.0 |
| Distance to Dhaka HQ (km) | 296.2 | 169.7 | 294.4 | 168.7 |
| Travel time to Dhaka HQ ('00 mins) | 4.2 | 3.0 | 4.5 | 3.2 |
| Any banks in Mouza | 25% | 24% | 35% | 46% |

Source: HES 2000 and 2005

Figure 1: Regional gaps in log per capita expenditure

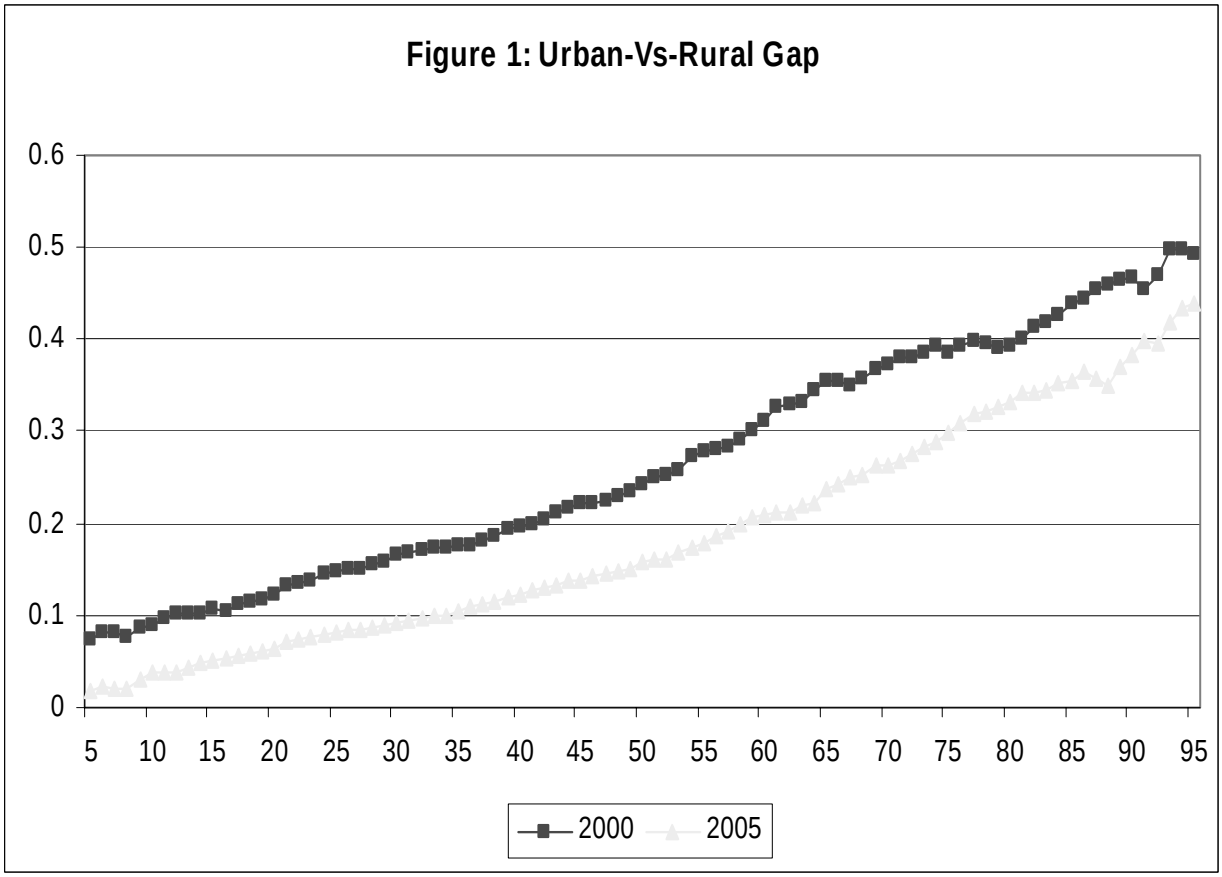


Figure 2: Main network in Bangladesh

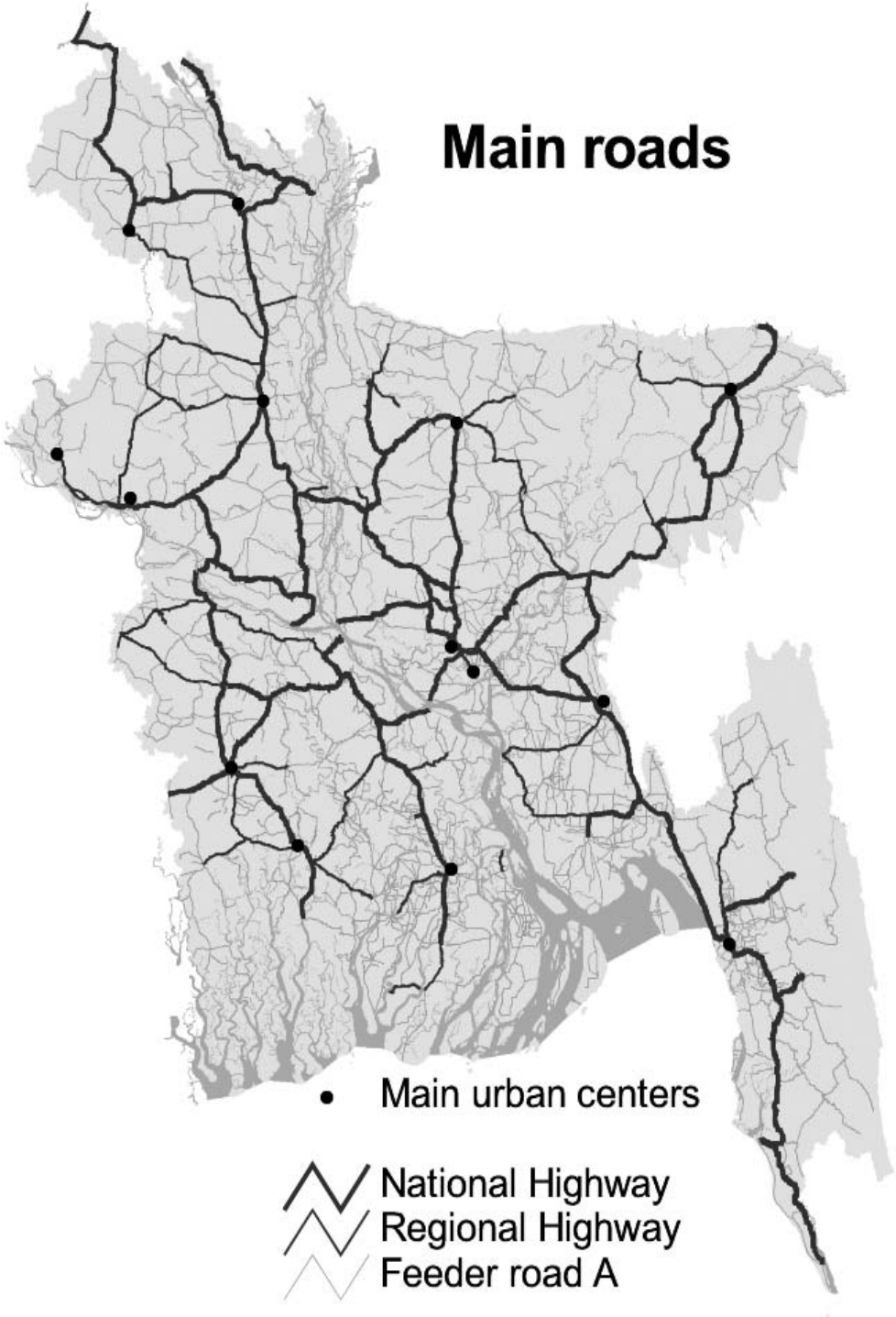
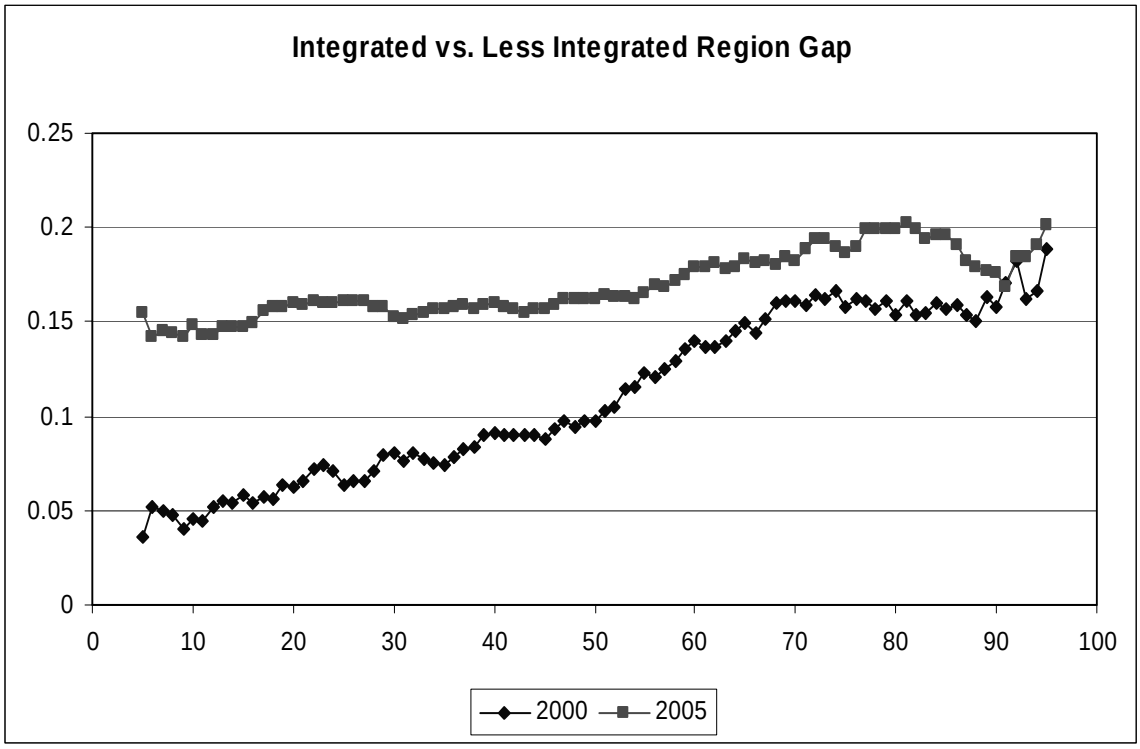


Figure 3: Regional Gap in Living Standard



# Figure 4: Regional Gaps in Living Standards

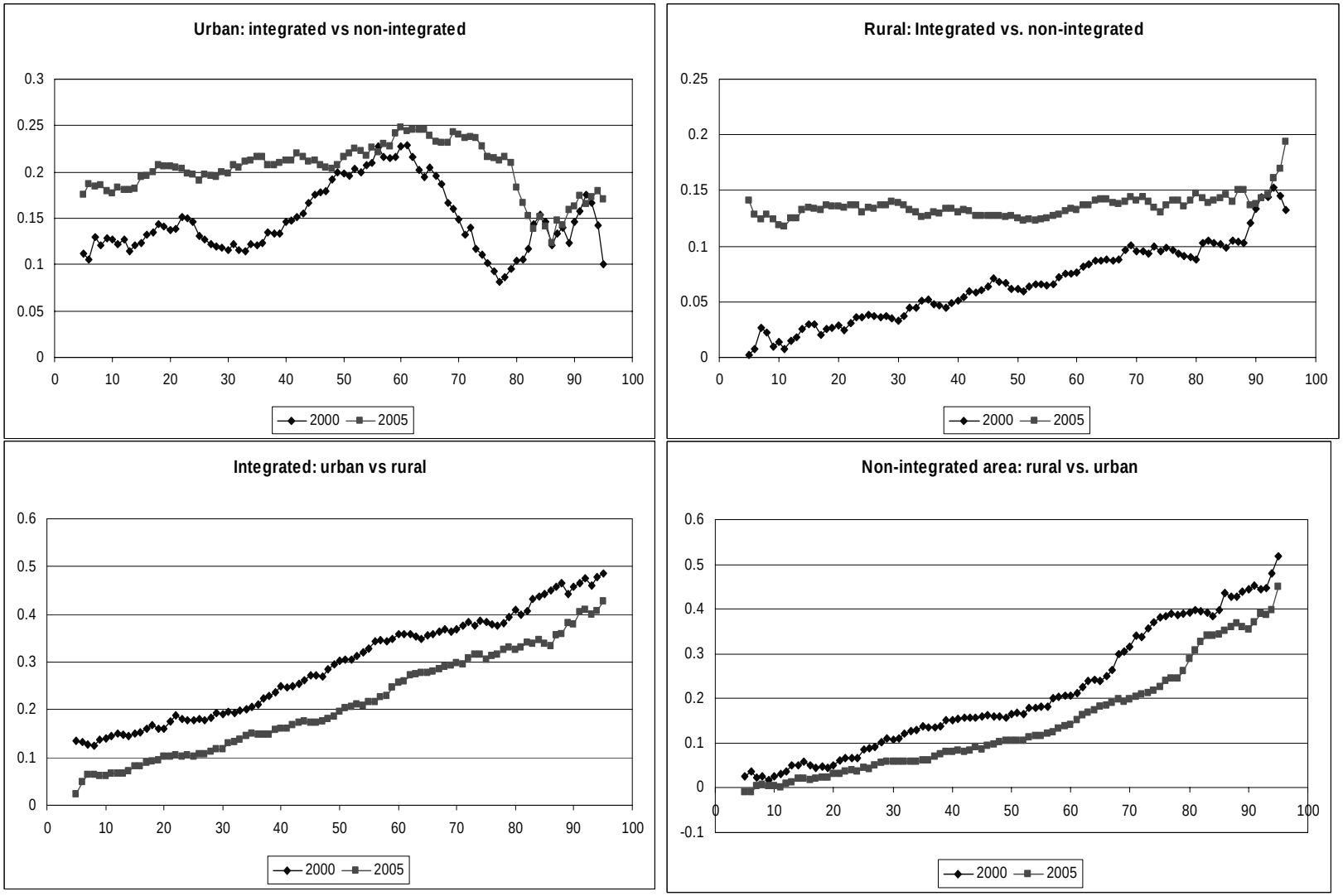
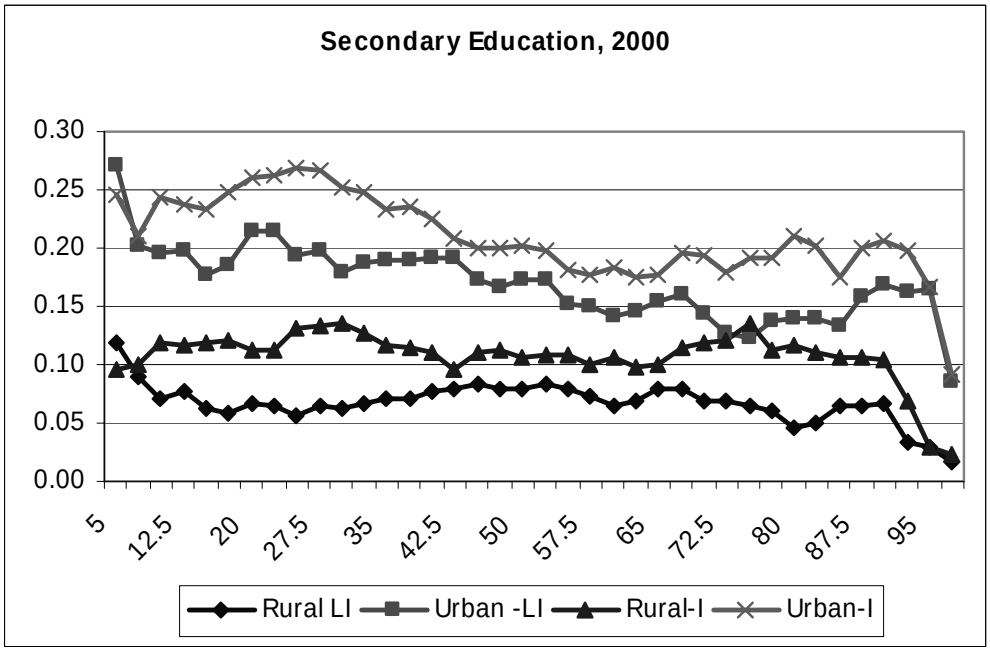


Figure 5: Returns to Secondary Education



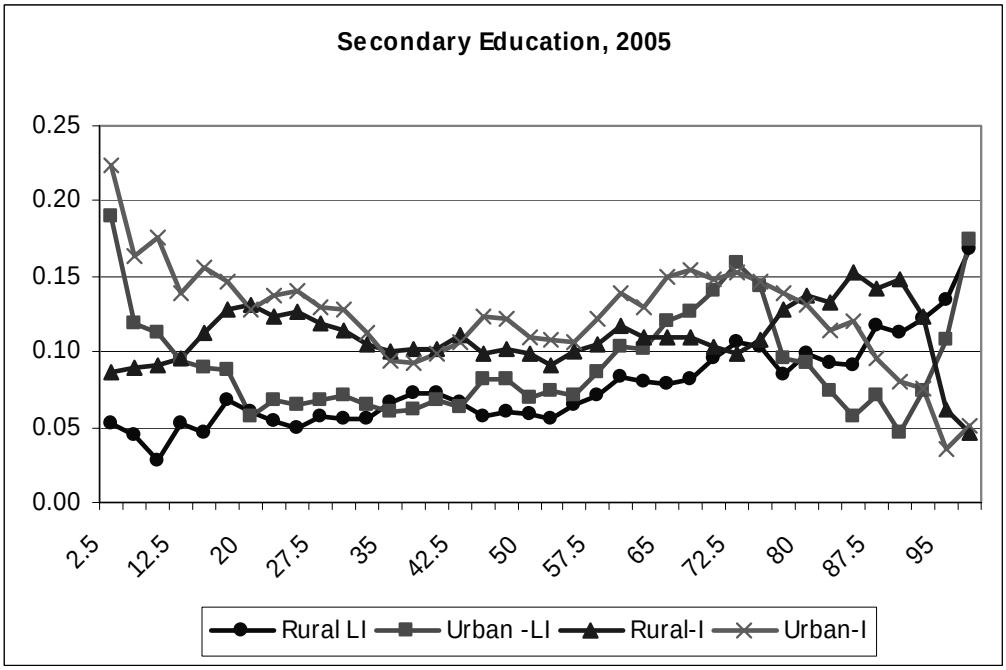
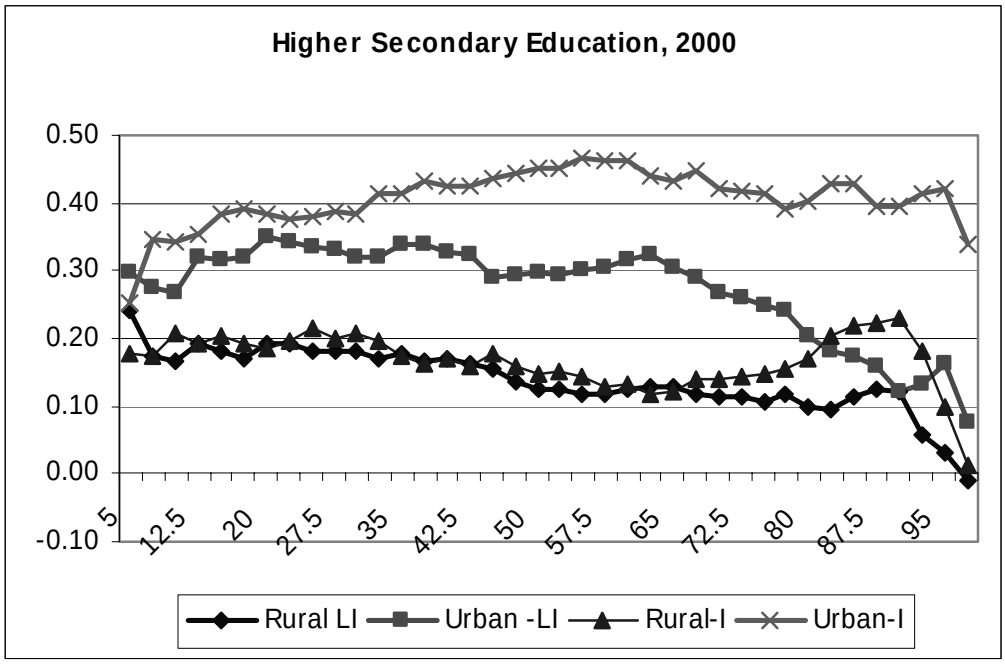



Figure 6: Returns to Higher Secondary Education



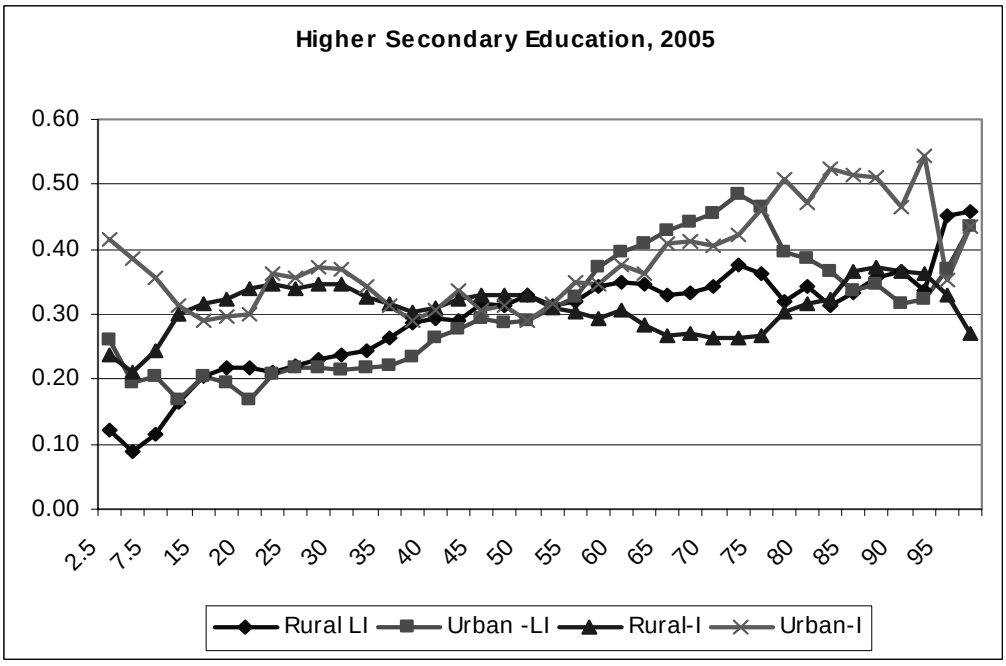
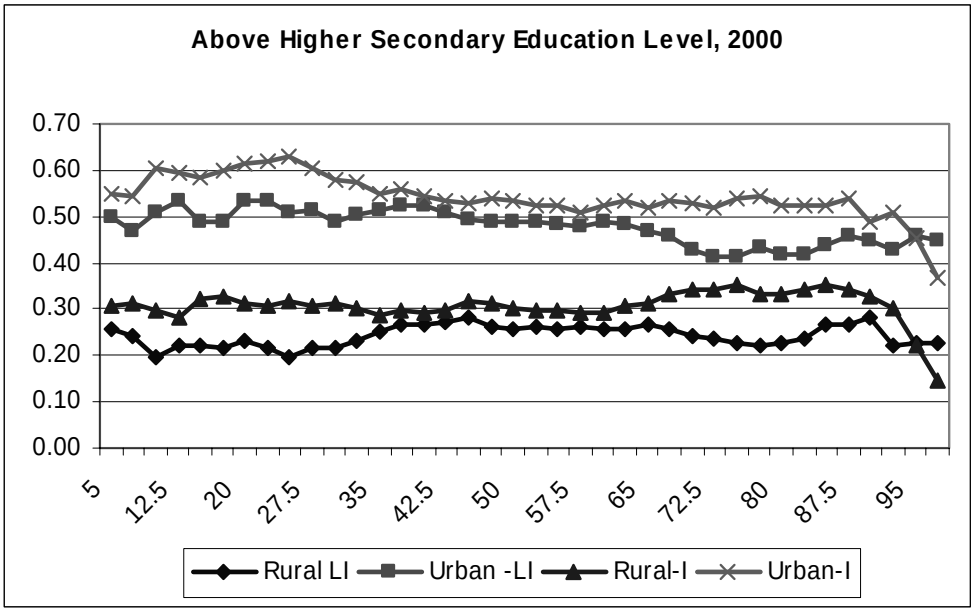



Figure 7: Returns to Education Level Above Higher Secondary



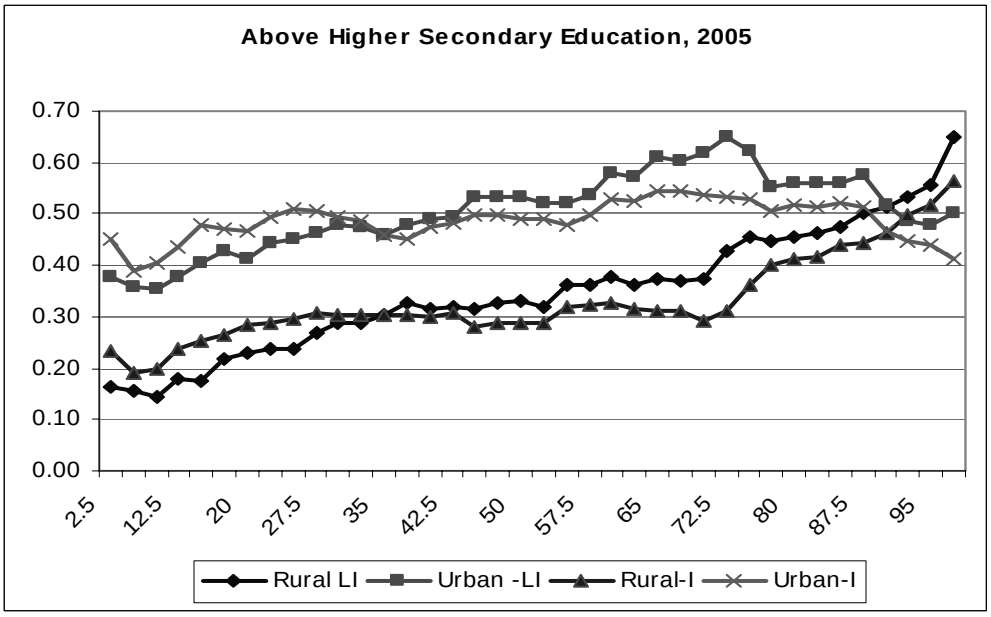
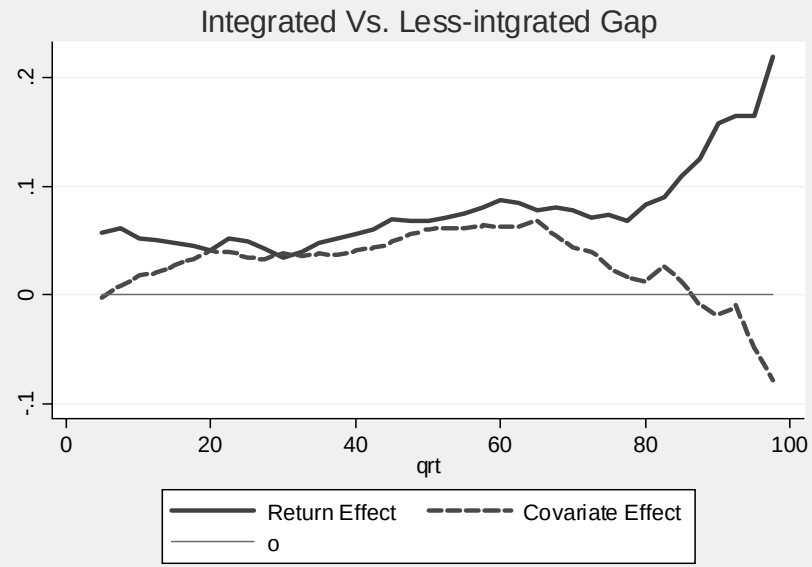



Figure 8: Covariate and Returns Effects for Integrated & Less Integrated Regions

2000




2005

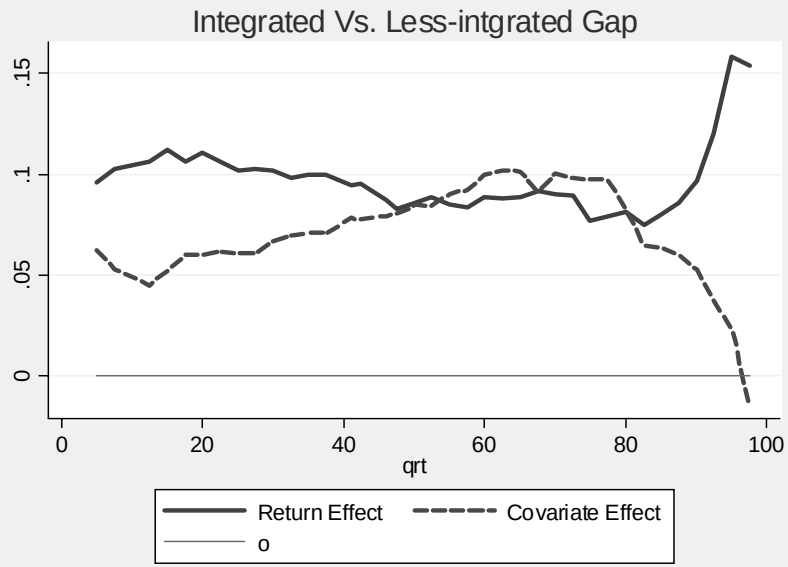
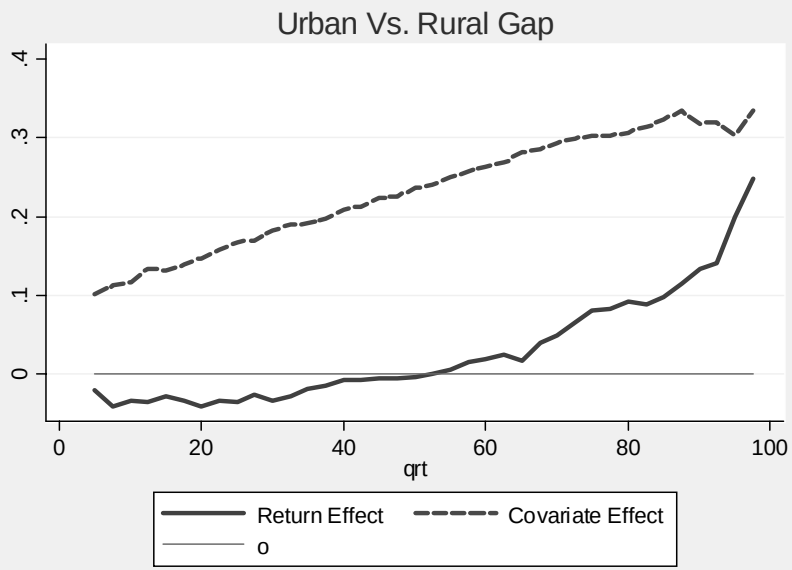


Figure 9: Covariate and Returns Effects for Urban-rural Gaps

2000




2005

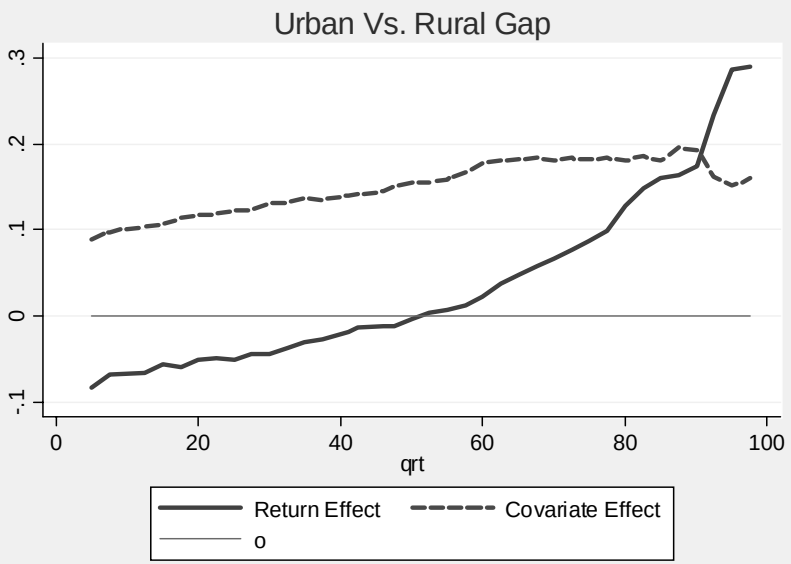


**Figure 10: Covariate and Returns Effects Within Urban and Rural Areas**

2000 2005

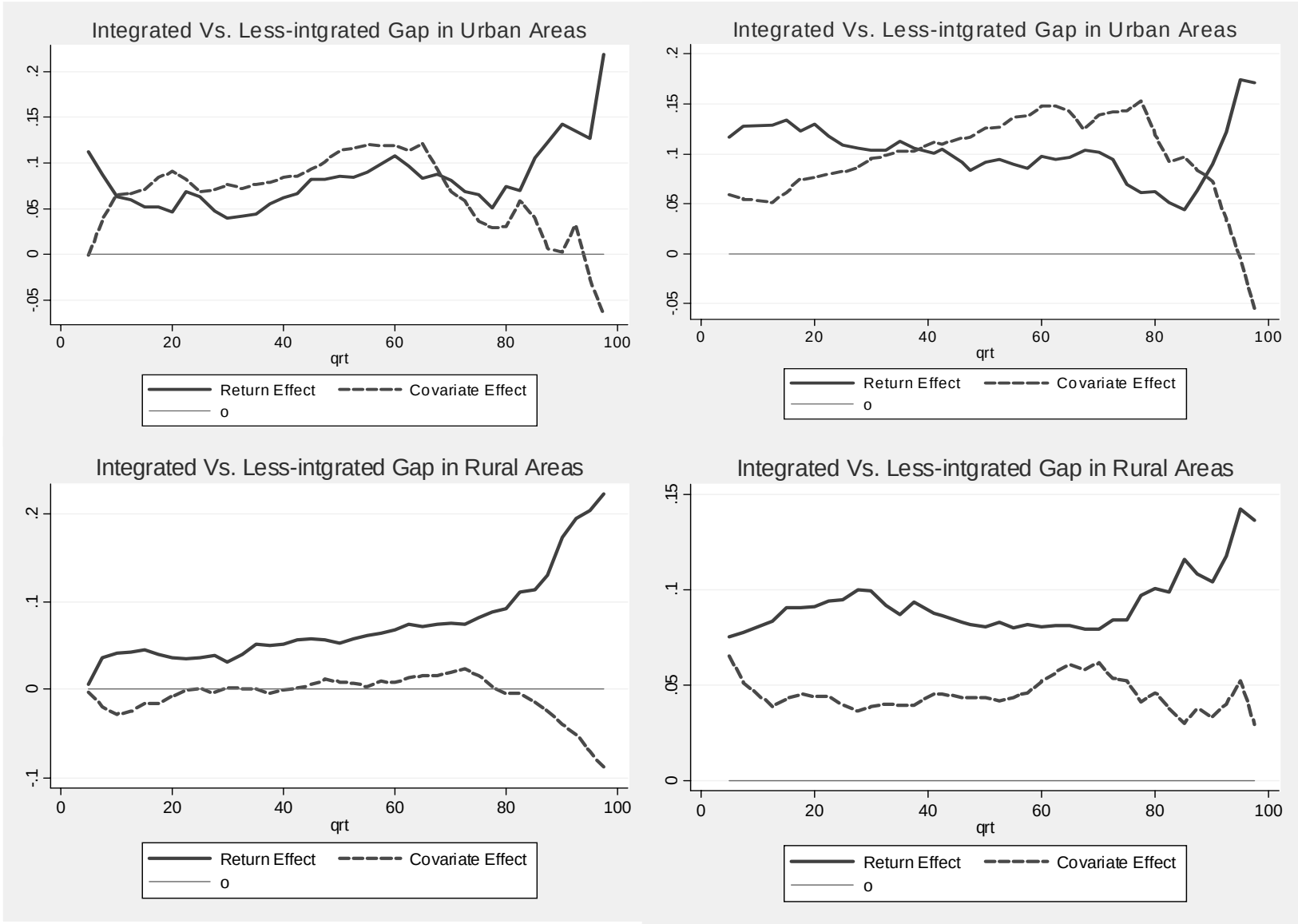
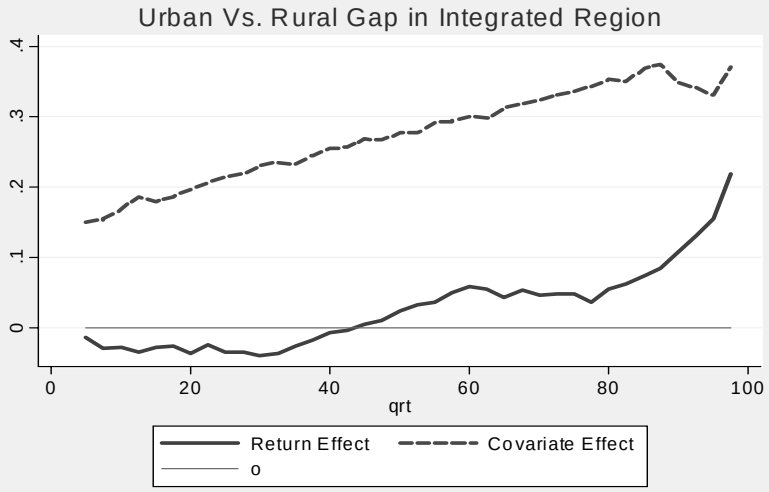
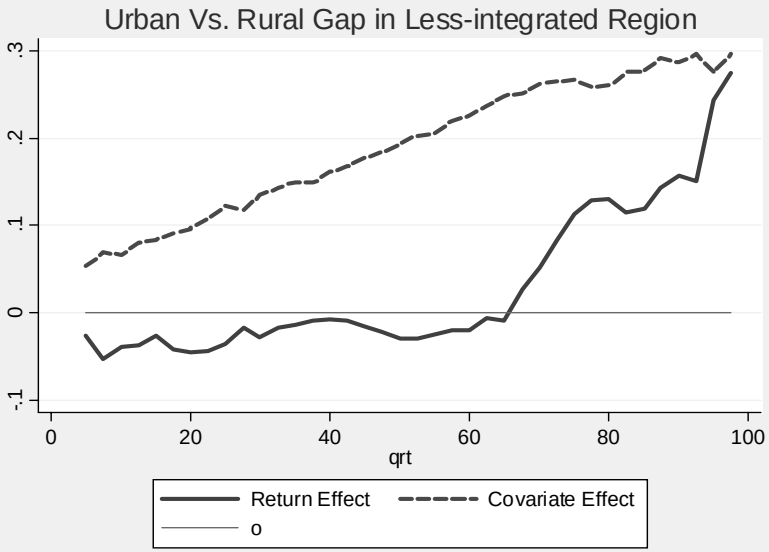


**Figure 11: Covariate and Returns Effects Within Integrated and Less Integrated Areas**

2000




2005