

***Changes in employment in Bangladesh, 2000-2005:
The impacts on poverty and gender equity***

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Abstract

The paper describes changes in the labour market during the first half of the 2000s and identifies the key factors driving the growth in real wages seen over this period. Labour force participation rates have remained relatively stable since 2000 although there has been a continued, but gradual, shift away from what is seen to be low productivity self-employment into more productive wage employment and non-agricultural self-employment. Real incomes for wage employees have also grown steadily between 2000 and 2005 and these increases are likely to explain in part the declines in poverty described in the paper. What emerges most strongly from the paper are the striking and consistent findings showing that women have made rapid gains in the labour force. Women have moved out of low productivity and into higher productivity occupations and their wages have grown considerably faster, leading to a substantial narrowing of the gender wage gap. The paper shows that these improvements have largely come about through increases in levels of education since 2000. However, improvements in education and wages have been concentrated largely amongst richer women and hence the impact on poverty of these trends is likely to be small. Extending good quality secondary education opportunities to poor rural households has the potential of improving labour market outcomes further for both male and female labour force participants.

1. Introduction

This paper explores the impact of changes in employment on poverty in Bangladesh between 2000 and 2005. The paper shows that labour force participation rates have remained relatively steady but shifts in the composition of employment and increases in real wages may have had some impact on poverty. What emerges most strongly from the analysis, are striking and consistent findings showing that women have made rapid gains in formal sector employment and that these gains have resulted largely from improvements in education.

Bangladesh has experienced a rapid decline in poverty since the beginning of the decade. The poverty headcount measure declined by nine percentage points between 2000 and 2005 and even with population growth imply a reduction of approximately 6 million people living in poverty. While these overall declines have been impressive they mask large variations in the progress of different parts of Bangladesh (see Table 1).

Table 1: Poverty Headcount Rates in Bangladesh (%)

	Upper poverty line		
	2000	2005	%'ge point change
National	49	40	-9
Rural	52	44	-8
Urban	35	28	-7
Barisal	53.1	52.0	-1.1
Chittagong	45.7	34.0	-11.7
Dhaka	46.7	32.0	-14.7
Khulna	45.1	45.7	0.6
Rajshahi	56.7	51.2	-5.5
Sylhet	42.4	33.8	-8.6

Source: (BBS 2006)

The purpose of this paper is to contribute to the upcoming poverty assessment in Bangladesh which will analyse trends in poverty, its characteristics and determinants. Firstly, the paper explores trends in the labour market during the first half of the 2000s and the extent to which changes in labour market participation and returns are correlated with the trends and patterns in poverty reported in Table 1. This analysis shows that real wages have increased since 2000 and increases have been much greater for women compared to men. The second objective of the paper attempts to understand what has driven changes in real wage rates over time. The paper focuses on returns to labour engaged in waged employment, and therefore only provides a partial picture of the changes in household income over the period. Separate papers are being planned to analyse changes in income from agriculture and self-employment which will contribute to a more complete assessment of the changes in poverty outlined in Table 1.

The next section of the paper analyses trends in the labour market using information from the Household Income and Expenditure Surveys (HIES) conducted in 2000 and 2005. Section 3 outlines the data and methodology used to estimate earnings equations for wage employees and how wage differentials, over time and between sexes, are broken down to assess the contribution of different characteristics to the overall gap. Section 4 presents the findings. Section 5 offers some conclusions.

2. Trends in the labour market 2000-2005

This section analyses the trends in the labour market by first exploring how the size of the labour force has changed since 2000. It then explores changes in the 'quality' of the labour force in terms of educational attainment and health status. The section concludes by assessing the impact of these changes on wages and income in the wage employment sector.

Labour force size and composition

Table 2 shows that labour force participation rates have remained relatively steady during the 2000s; just under half of the population aged 15 years and older was in the labour force in 2000 and 2005. While participation rates have not changed, the absolute size of the labour force has increased by 16% or approximately 6 million people over the same period.¹ Participation rates differ by gender; only 10% of women compared to over 80% of men were active in the labour force in both years. Female labour force participation rates from the HIES are very different to the rates reported in the last two rounds of the Labour Force Survey (LFS). The female participation rate in this survey was reported as 26% in 2002/03 and 24% in 1999/00 (BBS 2002; BBS 2004). While the trends are similar it is likely that the HIES does not account fully for female unpaid work in crop and non-crop production, cottage industries, small trade and farming. Approximately half of the women counted as in the labour force in the LFS are unpaid family workers.²

Overall unemployment rates are similar in Bangladesh to other low-income countries and countries within the region (World Bank 2006). Unemployment rates are commonly lower than in middle income countries, as most economically active individuals engage in low intensity self-employment activities, while seeking more stable work. Table 2 shows that gender differences in unemployment rates have narrowed since 2000 although they remain large.³ Common with other developing countries, unemployment tends to be concentrated amongst the younger age groups in the labour force; in 2005 unemployment amongst 15 to 29 year olds made up approximately 60% of all unemployment in the labour force even though this group constituted only 35% of the overall labour force. Unemployment rates also tend to be higher among more educated individuals in the labour force. For example, in both 2000 and 2005 the unemployment rate amongst illiterates was 4% compared to 8% for individuals who had completed their secondary school certificate (SSC). These findings imply that a significant proportion of students find it difficult to secure employment directly after completing post-primary education.

The labour force participation rates shown in Table 2 also imply that over half of the population is unemployed and not looking for work. The majority of this group are

women working in the household while individuals who are still in full-time education and training constitute approximately 15% of this group.

Table 2: Labour force participation and status in employment (%)

	2000			2005		
	male	female	total	male	female	total
Labour force	83	10	47	84	10	47
o/w: employed	96	83	95	96	89	95
unemployed	4	17	5	4	11	5
Employment Status						
Day labourer	35	36	35	33	32	33
Salaried wage	18	33	20	21	43	23
Agriculture self-employed	25	21	25	24	8	22
Non-agriculture self employed	21	11	20	23	17	22

Source: HIES (2000 and 2005)

Notes: The BBS definition of the labour force is used which includes the population 15 years and older.

Poverty alleviation and growth in Bangladesh during the nineties was seen to have occurred in part, through a shift in the composition of the labour force away from farm to non-farm employment in rural areas. Declines in poverty were also seen to have resulted from a further shift in non-farm employment away from small scale low productivity self employment to higher productivity, large scale enterprises and non-farm wage employment (Toufique and Turton 2002; Mahmud 2006).

The trends in the composition of employment identified in the 1990s appear to have continued in the 2000s although the shifts have been quite small. Table 2 shows that there has been an increase in the proportion of the labour force engaged in salaried wage employment which is heavily concentrated in the non-farm sector and while self-employment has remained stable over the period there has been a shift away from agriculture (see Table 2).⁴ Non-agricultural self-employment has increased, particularly for women, and this has been mostly a result of increased opportunities in sales and vending a trend which may be associated with an increase in access to micro-credit. In 2005, daily wage workers were equally distributed across the agriculture and non-agriculture sectors but information for 2000 is not available with which to compare. It seems unlikely however that the trends in day labouring would be very different to trends in self-employment.

The most striking changes in employment composition have occurred among women over the five years. In 2005, an additional 10% of employed women were working as salaried wage workers (see Table 2). This increase has been almost entirely concentrated in rural areas; in 2000, 18% (67%) of rural (urban) women were working in salaried wage employment compared to 27% (64%) in 2005. Rural wage employment for women has often been characterised as low productivity daily work for poor wages and often concentrated in public food for work programmes

(Khundker 2001). However, the shift in female employment shown in Table 2 is entirely due to increases in rural women working in salaried employment which is more stable and potentially more productive than daily wage work.⁵

Changes in women's employment have not been particularly pro-poor. The largest increases in salaried wage employment have been concentrated among the richer groups; salaried wage employment increased by 4 percentage points amongst employed women in the poorest 40% of the population compared to 19 percentage points amongst the richest 40% of the population (see Appendix Table 1). These patterns suggest that changes in female employment since 2000 are unlikely to have had a large impact on poverty. This stands in contrast to previous increases in female wage employment opportunities associated with the rise in the garments industry which were generally concentrated towards poorer women (Kabeer and Mahmud 2004).⁶

Are these women salaried workers filling low skill jobs in the wage sector? Table 3 clearly shows that increases in female salaried employment have largely been concentrated in the more skilled occupations. For example, the proportion of women in salaried employment working in professional occupations increased from 25% to 34% between 2000 and 2005. Approximately half of these women are teachers while a further 15-20% are working as nurses or paramedics in the health sector.⁷ Increases in women working in higher level occupations has also resulted in a decline in the share of women working in elementary occupations such as domestic help and farming. The evidence therefore shows that women are not only entering waged employment in greater numbers, they are also working in higher skilled occupations than previously.

The manufacturing sector remains important for female salaried employment. The share of women working in this sector increased from 41% in 2000 to 45% in 2005. This increasing share implies that manufacturing has absorbed a greater proportion of the increase in women salaried workers documented in Table 2. In line with the changes in occupational status shown in Table 3 it is also the case that the share of female salaried employment has increased in the health and education sectors; in 2000 these sectors accounted for 34% of female salaried employment compared to 38% in 2005.

Table 3: Occupations of salaried workers (%)

	2000			2005		
	male	Female	total	male	female	total
professional and technical	24	25	24	22	34	25
Administrative and secretarial	11	4	10	9	3	8
managers and senior officials	13	2	11	11	10	11
skilled trades	22	34	24	22	26	23
personal services	6	0	5	6	1	5
sales and customer services	0	0	0	5	1	4
elementary occupations	24	35	26	24	24	24

Source: HIES (2000 and 2005)

Notes: Categories for occupations are based on UK occupational classifications (National Statistical Office 2000).

During the 1990s, in particular, increases in opportunities for female wage employment have been associated with the expansion of NGO activities in rural areas (Toufique and Turton 2002). However, since 2000 opportunities in the public sector and in autonomous bodies have exhibited the most rapid growth. For example, 24% of female salaried wage employees worked in these sectors in 2000 compared to 35% in 2005. This may be in part due to quotas for women being introduced or enforced in the public sector. For example, the primary education ministry recently recruited an additional 14,000 teachers. Approximately 60% of these new recruits were women although women represent only 40% of the current teaching force (DPE 2006). The share of female wage employees engaged in the NGO sector declined from 9% in 2000 to 6% in 2005. However, the rapid growth in female employment opportunities means that this decline in the share of female wage employees working for NGOs did not represent an absolute decline in employment in this sector.

Table 2 also showed a large increase in women working in non-agriculture self-employment. This growth has been associated with a diversification in the activities self-employed women are engaging in. For example, in 2000 approximately 90% of self-employed women were working in manufacturing and the small business/vending sectors. By 2005, self-employed women working in these sectors accounted for only 72% of the total with women increasingly engaged in the education (e.g. private tuition), construction and health sectors.

The paper has shown that there have only been small increases in labour force participation rates and more specifically in employment since 2000 (see Table 2). Are working individuals working for longer?

Table 4: Hours of work per week and underemployment

	2000			2005		
	male	female	total	male	female	total
Average hours worked per week						
Day labourer	43	34	42	42	34	41
Salaried wage	54	52	54	56	53	55
Agriculture self-employed	36	20	35	36	30	35
Non-agriculture self employed	51	35	50	53	39	52
Total employed	45	37	44	46	43	46
Underemployment: Percentage working less than 20 hours per week						
Day labourer	7	25	9	8	25	10
Salaried wage	3	6	3	2	5	2
Agriculture self-employed	20	64	24	21	48	22
Non-agriculture self employed	6	32	8	6	25	7
Total employed	9	28	11	9	18	10

Source: HIES (2000 and 2005)

Notes: Hours of work per week includes hours spent on main employment activity as well as any additional activities individuals reported. Weekly hours are reported for easy interpretation. However, weekly hours are calculated from yearly totals and therefore take account of different work intensities over the year.

Table 4 shows that the working week has, on average, increased by two hours between 2000 and 2005. Women have experienced the largest changes in their

duration of work increasing by 16% for all employed women over the period. This has largely arisen because of the shifts in the composition of female employment described in Table 2 rather than changes in the number of hours per week individuals are working in each type of employment. However, self-employed females have increased their work intensity greatly over the first half of the 2000s. For example, self-employed women working in the non-agriculture sector worked for 10 hours more per week in 2005 compared to 2000. Despite these increases self-employment in agriculture continues to have the shortest working week and therefore the highest underemployment rates (see Table 4).

Male workers tend to work longer hours and this is particularly true for male day labourers. The smallest gender gap in hours worked per week is for salaried wage workers where the working day is perhaps structured more strictly than in other sectors. Self-employed individuals in agriculture tend to work for far fewer hours and hence underemployment rates tend to be highest in this sector.

Education and health status of the labour force

Access to the education system in Bangladesh continued to grow during the early part of the 2000s. This was particularly true of the secondary education system; between 1999 and 2003 the gross enrolment rate increased from 48% to 54% and implied an increase in enrolment of approximately 1.2 million students (BANBEIS 2006).⁸ Increases in female enrolment at secondary were even more pronounced and were partly driven by the female secondary school stipend programmes that have provided tuition free secondary schooling and a small stipend to all female secondary school students since the mid 1990s (Hossain and Kabeer 2004; White 2005). By 2003, female gross enrolment rates at secondary were 7 percentage points higher than male enrolment rates (BANBEIS 2006). These increases in secondary school enrolment have led to general increases in the level of education in the labour force during the 2000s (see Table 5).

Female education levels have increased at a faster rate than male education. Between 2000 and 2005 the average years of education for a female labour force participant had increased by over a year (see Table 5). By 2005 the education gender gap had narrowed considerably although men still had approximately half a year more education than their female counterparts. Levels of human capital are understood to determine both women's participation in the labour force and also the type of work that they are engaged in (see for example Mahmud 2001). The changes documented in Table 5 suggest that the increased participation of women in wage employment and higher productivity non-farm self-employment has been driven by improvements in female education.

Table 5: Average years of education in the labour force

	2000			2005		
	male	female	total	male	female	total
Labour force	3.9	2.7	3.8	4.6	4.0	4.5
o/w: employed	3.9	2.4	3.7	4.5	3.9	4.4
Unemployed	5.9	3.8	5.2	6.5	4.7	6.1
Employment Status						
Day labourer	1.6	0.5	1.5	1.8	0.7	1.7
Salaried wage	7.4	4.6	6.9	8.4	7.1	8.2
Agriculture self-employed	3.5	1.8	3.5	3.7	0.8	3.6
Non-agriculture self employed	4.6	1.6	4.5	5.2	3.2	5.0

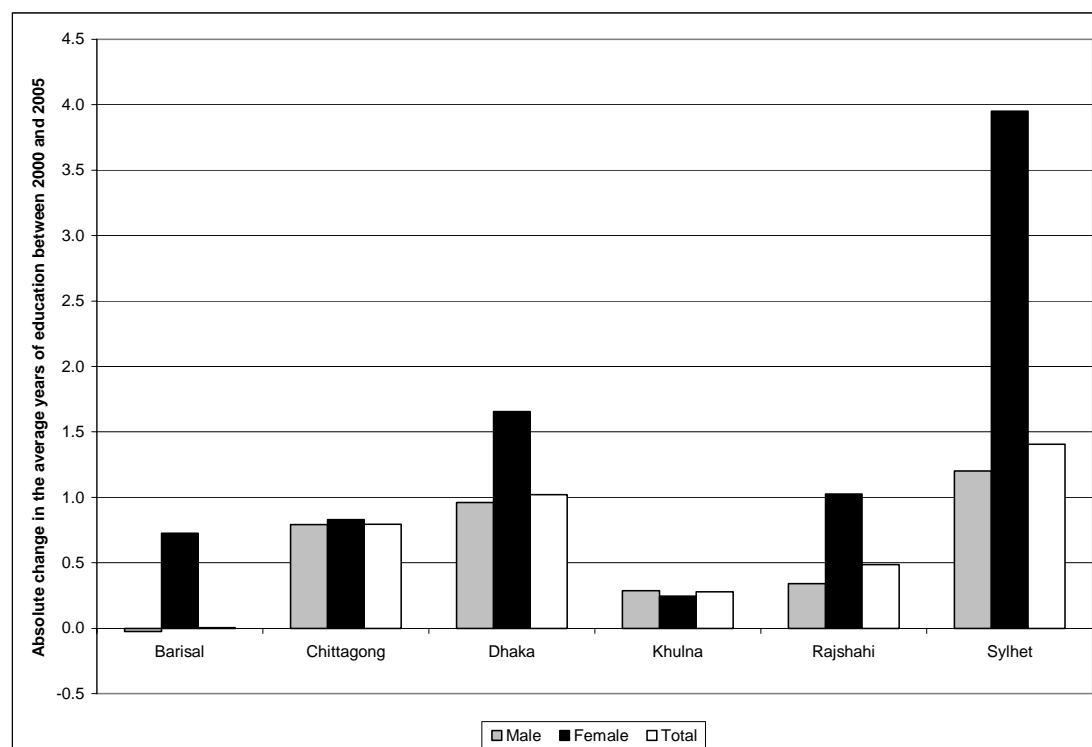
Source: HIES (2000 and 2005)

Notes: There is no information in the HIES on the number of years of education completed for individuals that are not literate. To generate years of education these individuals are assumed to have zero years of education. See Section 3 for a fuller discussion.

As would be expected education levels are higher for individuals engaged in non-agricultural activities and in particular salaried employment. In 2005, the average salaried worker had 3 years of post-primary education compared to only 2 years in 2000. As Table 5 shows the increases in the stock of education in the labour force were almost exclusively concentrated amongst this group. Average years of education for the self-employed in agriculture and day labourers did not change. It is also interesting to note that education levels of unemployed individuals tend to be higher than for employed individuals and have grown by a similar amount in absolute terms between 2000 and 2005.

Table 5 shows impressive gains in education for the labour force but at what level of education have the main increases in education occurred and which groups have been the main beneficiaries? Interestingly, increases in the stock of education have largely been due to increases in the labour force with some secondary education. In 2000, 26% of the labour force had some secondary education compared to 31% in 2005.⁹ While this gain is impressive the increase is largely due to individuals that have started but not completed secondary education. This reflects the very high drop-out rates in secondary school. A survey in 2005 found that only one in five students entering non-government secondary school successfully completed the SSC (CAMPE 2006).

Figure 1: Changes in years of education of the labour force 2000-2005



Source: HIES (2000 and 2005)

Note: The change for Sylhet is calculated based on data for 2000 with only 40 observations and therefore needs to be interpreted cautiously.

Increases in the education level of the labour force have not been spread evenly across the country (see Figure 1). The largest absolute increases have taken place in Chittagong, Dhaka and Sylhet, divisions that have also experienced the largest declines in poverty (see Table 1). Given the overall increases in the education of the labour force it is also surprising to see the relative stagnation, particularly of male education, in Barisal. It is also the case that increases in education have also been concentrated amongst the richer population groups. For example, between 2000 and 2005 the average education level of labour force participants increased by one year for the richest quintile compared to only 0.5 of a year for the poorest quintile (see Appendix Table 2).

Turning to the health of the labour force the HIES asks whether individuals have suffered from any chronic illnesses or disability during the last 12 months and whether they have suffered from illness or injury in the 30 days prior to interview. While these questions may not capture effectively the overall health status of individuals they both show general improvement. For example, in 2000, 19% of

employed individuals reported that they had suffered from illness or injury in the last 30 days compared to only 15% in 2005.

Wages and wage inequality

How have improvements in the health and education of the labour force impacted on the rewards to labour in the wage sector? Table 6 shows that real wages have increased across the period but at a much greater rate for salaried compared to daily wage workers.

Table 6: Real hourly wages in main employment (Tk.)¹⁰

	Daily wage worker			Salaried worker		
	2000	2005	ann. growth (%)	2000	2005	ann. growth (%)
Male	10.7	10.8	0.4	19.9	22.7	2.5
Female	6.1	6.3	0.4	9.5	15.1	9.8
Total	10.2	10.5	0.5	17.9	21.2	3.3
Barisal	10.8	11.4	1.1	20.0	18.4	-1.7
Chittagong	12.1	13.6	2.4	15.2	23.6	9.2
Dhaka	10.5	10.2	-0.6	19.6	21.1	1.5
Khulna	10.8	10.9	0.2	19.0	23.4	4.3
Rajshahi	8.5	8.3	-0.5	17.4	18.7	1.5
Sylhet	11.0	12.3	2.3	13.1	17.5	6.0
Gini coefficient of wage inequality						
male	0.23	0.25		0.41	0.45	
female	0.32	0.31		0.51	0.52	
total	0.25	0.26		0.44	0.47	

Source: HIES (2000 and 2005)

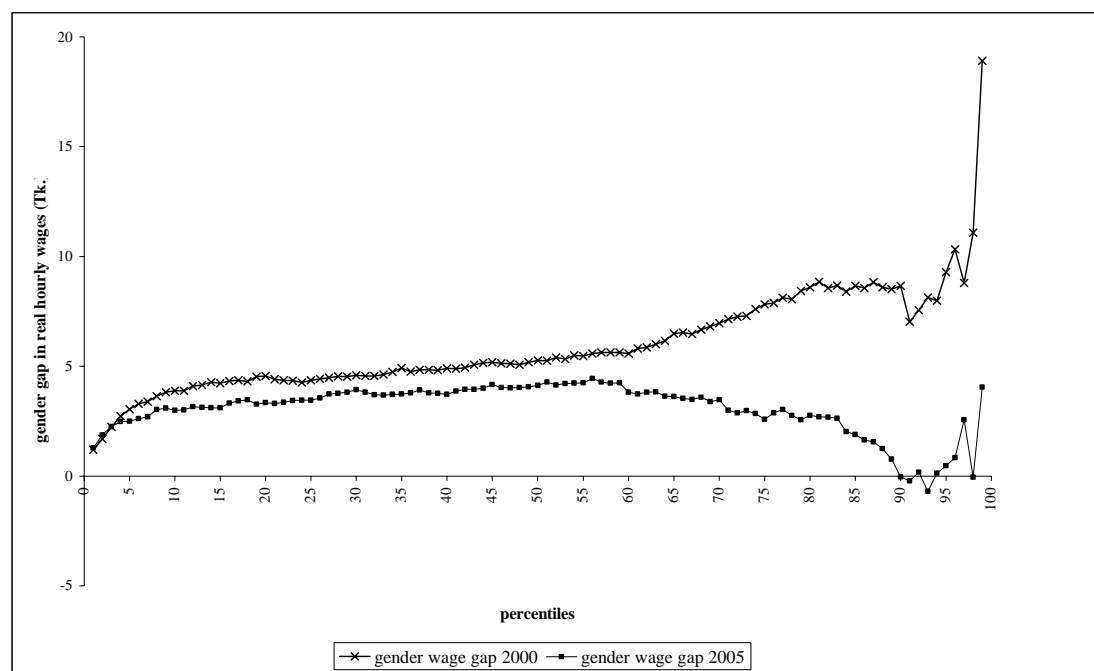
Notes: wages are adjusted for (1) geographical variations in the cost of living using the upper poverty line in 2005 and; (2) inflation between 2000 and 2005. All wages are expressed in rural Dhaka 2005 prices.

There is substantial variation in the growth of real wages across different divisions of Bangladesh; real wages for salaried workers in Chittagong increased by 9% annually since 2000 compared to an annual decline of 2% in Barisal (see Table 6). However, these variations in real wage growth do not appear to be correlated directly with changes in poverty reported in Table 1. Wage inequality appears to have remained relatively stable suggesting that increases in real wages have been relatively evenly spread across the wage distribution. The trends in wage inequality are similar to trends in consumption inequality, which demonstrates the strong link between wage employment and overall levels of household consumption (BBS 2006).

Average male wages are significantly higher than female wages although faster growth in female wages has seen this gap narrow considerably for salaried workers. In 2000, the relative gender wage gap for salaried workers was 52% compared to only 32% in 2005.¹¹ The narrowing of the gap is likely to be due to the upward shift of female salaried workers in the occupation hierarchy (see Table 3). However, the

narrowing of the gender gap has not been even across the wage distribution. Figure 2 shows that for percentiles below the median the gender gap in real hourly wages has declined by about Tk. 1 (a 25% decline). Whereas the decline in the gender gap has been much larger from about the 60th percentile upwards. It is also striking that the overall pattern of the gap has changed over the period. In 2000, the real gender wage gap was highest at the top end of the wage distribution whereas in 2005 the largest gaps occurred at the bottom end. It is also interesting to note that for the bottom 4% of the wage distribution there has been no change in the gender wage gap since 2000. This suggests that the gender gap for the very poorest wage workers has remained constant over the period.

Figure 2: Gender gap in real hourly wages by percentile, 2000 and 2005



Notes: see notes to Table 6.

Before moving on to explore the determinants of the changes in wages described in Table 6 what has happened to the incomes of individuals engaged in the wage sector since 2000? Exploring annual income for all wage employees (both daily wage and salaried workers) incorporates all the main changes in the labour market described in this section and provides a good summary of the aggregate effect of these changes.¹² Table 7 shows that real income from main employment has increased at a gradual rate since 2005. For women, the rise in income from wage employment has increased at a rapid rate; in five years the average income for women has increased by 57% (see Table 7). Recall that this increase in real income is for both day and salaried wage workers and is driven by wage rate growth shown in Table 6, increases in hours of work detailed in Table 4 and changes in the female composition of the wage labour market outlined in Table 2.

Table 7: Annual income from waged employment (Tk.)

	Total wage income		
	2000	2005	ann. growth (%)
Male	34,251	37,489	1.8
Female	17,195	26,920	9.4
Total	31,952	36,126	2.5
Barisal	37,749	31,749	-3.4
Chittagong	32,248	43,638	6.2
Dhaka	38,685	42,078	1.7
Khulna	31,107	32,121	0.6
Rajshahi	23,615	25,862	1.8
Sylhet	24,421	35,148	7.6
Poorest quintile	19,122	21,229	2.1
2	23,563	24,768	1.0
3	25,953	29,201	2.4
4	34,802	39,556	2.6
Richest quintile	63,098	73,688	3.2

Source: HIES (2000 and 2005)

Changes in annual income for those engaged in wage employment are drastically different across divisions. In Barisal, real annual income actually declined between 2000 and 2005 while Khulna division experienced relative stagnation in incomes. While the largest increases in annual incomes seem to have occurred in divisions that also had the largest declines in poverty the correlation is at best weak. It should also be noted that real income gains appear to have been concentrated in the richest 60% of the population with the largest real annual increase occurring in the richest quintile.

3. Methodology and data

What have been the main drivers of the changes in wages seen in Table 6? What explains the large decline in the gender wage gap? Two steps are required in an attempt to answer these questions; estimating earnings equations and decomposing wage gaps into their constituent parts. The first step identifies the key factors that

have determined wages while the second step explores the reasons behind the growth in real wages described in the paper.

Mincerian earnings equations are estimated for 2000 and 2005 in order to identify the main determinants of male and female wages in each year. The measure of wages used in these earnings functions is the natural log of hourly wages. Given the nature of the Bangladesh labour market it is unlikely that individuals working for a wage represent a random drawing from the population as a whole. As a consequence, the estimated coefficients in the earnings equations are potentially biased. In an attempt to correct for this bias the conventional Heckman procedure was employed (Heckman 1979).¹³ A set of instruments is required to identify the parameters of the earnings equation which also include the selection effects. The identifying variables are required to shift the probability of being engaged in wage employment but not the level of earnings. The selection measures are computed from estimates derived from a wage employment participation equation estimated using a probit model. Asset variables are often used as identifying variables and this approach has been followed here. The set of instruments include measures of the land households mortgage in and out and whether the household owns a bicycle or a tubewell with drinkable water.¹⁴ These variables have the desired properties of identifying instruments although it is recognised that the reasons for this are not particularly intuitive.¹⁵

Estimation results using this procedure show that while wage employees appear to have higher earnings than an individual selected randomly from the population these effects are not statistically significant. Previous estimates of earnings functions, using the 2000 HIES data, have also reported statistically insignificant selection effects (see World Bank 2001b; Asadullah 2005). The earnings functions estimated with selection terms included are reported in Appendix Table 5.¹⁶ However, the simple OLS earnings functions are reported and discussed in the text given the lack of statistical significance of the selection terms. It should be noted that coefficient estimates and levels of statistical significance between the selection and OLS models are very similar.

Using the estimated earnings equations the paper breaks down differences in average wages over time, and between the sexes, following a similar methodology to that first proposed by Blinder (1973) and Oaxaca (1973). The average change in wages between 2000 and 2005 can be decomposed into two components:

$$w_{2005} - w_{2000} = X_{2005} \hat{\beta}_{2005} - X_{2000} \hat{\beta}_{2000} + X_{2005} (\hat{\beta}_{2005} - \hat{\beta}_{2000}) \quad [1]$$

where w_t is the average of the log hourly wage, X_t the vector of average characteristics and $\hat{\beta}_t$ the vector of coefficients from the estimated earnings functions for year t ($t=2000, 2005$). The change in wages between 2000 and 2005 will also be calculated using male and female samples separately. However, to ease exposition no male or female subscripts have been included. The first component of the decomposition represents the change in hourly wages due to differences in observable characteristics. For this paper this either represents changes in characteristics between 2000 and 2005 or between male and female wage workers.¹⁷ The second component of the decomposition represents the part of the overall average wage gap attributable

to differences in coefficients over time or between the sexes. In the context of the gender wage gap this is often referred to as labour market discrimination.

Sample weights are used in the regression analysis as the regression analysis is used as a device to summarise the characteristics of the population. Furthermore, the earnings functions estimated are reduced form equations and hence are descriptive rather than structural. Therefore, the justification for using weights is no different to the justification for using weights to calculate means and other summary statistics from representative sample data. Finally, the standard errors reported are robust to the presence of heteroscedasticity, and are based on the White (1980) procedure.¹⁸

An objective for estimating earnings functions in this paper is to assess the impact education has on wages. The empirical approach to estimating this impact is constrained to some extent by a failure to control for innate ability. It is well established that if ability is correlated with both the level of education and labour market earnings, conventional rate of return estimates based on OLS (or an equivalent procedure) exhibit an upward bias. Ability factors are generally difficult to capture empirically and investigators have resorted to innovative approaches to overcome this potential problem.¹⁹ Though there is a consensus about the direction of the bias, there is less on its magnitude. The evidence cited in Card (1999) suggests that the magnitude of the bias may be modest in nature. The data used in this paper has little information that could be used to proxy for ability in a meaningful sense and the estimated rates of return are therefore subject to a caveat in this regard.

Data for the earnings functions are taken from the 2000 and 2005 Household Income and Expenditure surveys. All the variables used in the analysis are drawn from comparable questions in both data sets and many are described in detail in the previous section. One important variable for estimating earnings is the years of education employees have. Unfortunately, the HIES does not ask respondents the number of years spent in full-time education unless they are literate. Therefore, all illiterate respondents are assumed to have no education. This is a strong assumption given the nature of the education system in Bangladesh. In a survey conducted in 2002 it was found that about one third of individuals completing primary education were illiterate (CAMPE 2003). Therefore some illiterate respondents are likely to have spent a significant time in education before entering the labour force and assuming no education will bias downwards the returns, particularly for primary education. Of the 5,868 (7,030) respondents, aged 16 and above, in 2000 (2005) that had information on wages for their main activity 5,206 (6,714) had information on all the variables in the models estimated.²⁰

4. Findings

This section reports the main findings on the determinants of wages and what accounts for the growth in wages and the narrowing in the gender wage gap since 2000. A basic model of earnings determination was estimated from the data and the results are reported in Table 8. The estimated models provide a reasonably good fit to the data and reported R-squareds are comparable with other studies of this kind (see World Bank 2001b; Asadullah 2005). Age is included to proxy for experience in the labour market and the results suggest that experience increases wages; for all

employees an additional year of experience increases hourly wages by approximately 1%.²¹

In 2000, there was no evidence that non-Muslim wage employees had lower wages than the majority Muslim employees. However, by 2005 non-Muslims earned on average 13% less than their Muslim counterparts and this discrimination was only significant for male workers. It is however, unclear what might be driving this result particularly given the heterogeneity of the non-Muslim group and the fact that a greater proportion of wage employees were non-Muslims in 2005 compared to 2000 (see Appendix Table 7).

Table 8: Earnings function estimates for wage employees in Bangladesh

	2000			2005		
	total	male	female	total	male	female
Age	0.042** (0.004)	0.042** (0.004)	0.005 (0.015)	0.043** (0.004)	0.040** (0.004)	0.032** (0.012)
Age squared	-0.0004** (0.00005)	-0.0005** (0.00005)	-0.0001 (0.0002)	-0.0005** (0.00004)	-0.0004** (0.00004)	-0.0004* (0.0001)
Non-Muslim	-0.036 (0.027)	-0.037 (0.030)	0.095 (0.065)	-0.134** (0.021)	-0.119** (0.021)	0.042 (0.065)
Unmarried	-0.037 (0.030)	-0.091** (0.030)	-0.154 (0.105)	-0.036 (0.027)	-0.086** (0.027)	-0.154+ (0.081)
Widowed/ divorced	-0.557** (0.049)	-0.078 (0.079)	-0.077 (0.065)	-0.426** (0.049)	-0.197** (0.070)	0.036 (0.069)
Years of education	0.060** (0.002)	0.046** (0.002)	0.088** (0.007)	0.055** (0.002)	0.049** (0.002)	0.070** (0.006)
Urban	-0.111** (0.021)	-0.014 (0.020)	-0.254** (0.066)	-0.101** (0.018)	-0.074** (0.018)	-0.102+ (0.058)
Other activity	0.019 (0.018)	-0.026 (0.017)	-0.085 (0.109)	-0.001 (0.020)	-0.048* (0.020)	0.079 (0.178)
Daily wage	0.227** (0.026)	0.084** (0.026)	0.453** (0.078)	0.128** (0.024)	0.057* (0.024)	0.136+ (0.075)
Public sector	0.464** (0.034)	0.391** (0.034)	0.792** (0.113)	0.410** (0.031)	0.353** (0.033)	0.674** (0.082)
Divisions						
Chittagong	0.097** (0.033)	0.072* (0.034)	0.208+ (0.115)	0.264** (0.029)	0.275** (0.029)	0.141 (0.125)
Dhaka	0.063* (0.032)	0.052 (0.032)	0.124 (0.106)	0.015 (0.028)	0.033 (0.028)	-0.033 (0.114)
Khulna	0.028 (0.037)	0.031 (0.037)	0.034 (0.117)	0.046 (0.030)	0.080** (0.030)	-0.142 (0.126)
Rajshahi	-0.183** (0.033)	-0.114** (0.033)	-0.254* (0.100)	-0.150** (0.027)	-0.104** (0.027)	-0.347** (0.121)
Sylhet	0.021 (0.043)	0.003 (0.044)	0.089 (0.136)	0.156** (0.036)	0.201** (0.038)	-0.183 (0.127)
Constant	1.122** (0.093)	1.346** (0.097)	1.216** (0.284)	1.156** (0.083)	1.339** (0.084)	1.060** (0.249)
Observations	5206	4440	766	6714	5861	853
R-squared	0.33	0.30	0.42	0.35	0.34	0.44

Notes:

1. The hourly wage measure used are in Taka and are expressed in 2005 Dhaka rural prices. They are gross of all taxes and include the total hourly value of in-kind benefits received.

2. The estimation procedure used was OLS and standard errors, reported in parentheses, are based on the White (1980) adjustment.
3. + statistically significant at 10%; * significant at 5%; ** significant at 1%.

At first glance, results showing the impact on wages of urban residence appear surprising. In other studies, wages are significantly higher in urban compared to rural areas (World Bank 2001b; Asadullah 2005).²² It should be recalled however that the wages here have been adjusted to reflect spatial differences in the costs of living and are all expressed in 2005 rural Dhaka prices.²³

Daily wage workers have higher hourly wages on average than salaried workers when the other variables in the regression equation are controlled for. This is likely to be an additional wage payment or premium for the insecure nature of this work and the lower hours individuals in this type of wage work can secure annually (see Table 4). However, Table 8 shows that this premium has declined quite substantially over the 2000s. For example, the premium associated with daily wage work declined by 10 percentage points between 2000 and 2005 for both male and female wage workers.

Public sector wage workers earn substantial premiums in the labour market compared to private sector workers. Although there is some evidence that these premiums have been declining in recent times they are still large.²⁴ In 2005, the overall public sector premium was 41%. The increase in hourly wages for women working in the public sector is very large; a woman working in the public sector secured hourly wages 67% higher than an equivalent worker in the private sector. Given that there are also other benefits associated with public sector employment, such as a pension, the full premium is probably higher. These findings explain the massive oversubscription for public sector job vacancies. For example, over 135,000 applications were received for 1,800 civil service jobs in the most recent Bangladesh Civil Service recruitment round (Bdnews24.com 2007).

Table 9: Annual returns to education, 2000 and 2005

	2000			2005		
	total	male	female	total	male	female
Education years	6.0** (0.2)	4.6** (0.2)	8.8** (0.7)	5.5** (0.2)	4.9** (0.2)	7.0** (0.6)
Primary	5.6** (0.6)	3.7** (0.6)	8.8** (1.9)	3.6** (0.5)	2.9** (0.5)	3.9** (1.8)
Junior secondary (SSC)	6.2** (0.9)	4.5** (0.9)	13.3** (3.1)	6.2** (0.9)	5.6** (0.9)	9.2** (3.0)
Senior secondary (HSC)	7.0** (2.9)	6.2** (3.0)	4.2 (8.0)	5.9** (2.8)	7.3** (2.7)	4.4 (10.2)
Secondary	6.4** (0.8)	5.0** (0.8)	10.6** (2.5)	6.1** (0.8)	6.1** (0.8)	7.8** (3.1)
Undergraduate	8.7** (2.3)	10.3** (2.4)	-2.1 (5.2)	9.2** (2.0)	8.6** (1.9)	8.4 (6.8)

Notes:

1. Standard errors are reported in parentheses. For reported returns by schooling level standard errors are estimated using the delta method.
2. + statistically significant at 10%; * significant at 5%; ** significant at 1%.

Overall, returns to education in the labour market have remained relatively stable since 2000 (see Table 9). The return to an additional year of education has been approximately 6% in both years. Female rates have declined by almost 2 percentage points and while they remain higher than male returns the gap has narrowed; in 2000 the gender gap in returns to education were 4 compared to only 2 percentage points in 2005. The decline in female returns may in part be due to increases in the supply of educated female labour over the period. As previous tables have shown there have been increases in the number of women working for a wage and also in their average level of education since 2000 (see Table 2 and Table 5).

Are the returns to an additional year of education the same for an additional year of primary or secondary schooling? To attempt to answer this an extended earnings function was estimated that includes controls for different levels of education. Appendix Table 6 reports the full results but Table 9 shows the returns to an additional year of education for each level of the education system. The wage premium associated with an additional year of schooling tends to increase with the level of education. For example, in 2005 the returns to primary education were approximately 4% compared to 9% for higher education. At the primary level, overall returns to education have declined by 2 percentage points with much larger declines for women. The large drop in returns for women is likely to reflect the much greater proportion of women with higher levels of education available in the labour force. For example 22% of women working for a wage had post-primary education in 2000 compared to 39% in 2005 (see Appendix Table 7). Returns to post-primary education have generally remained the same since 2000 although there appear to be substantial gender differences with returns generally increasing for men and declining for women. The declines in female returns to post-primary education are also likely to be in part due to the large increase in the average level of education for women in the labour force over the period (see Table 5). However, rates of return still remain higher for women compared to men.

The rates of return reported in Table 9 for Bangladesh tend to be lower than regional averages. In a recent review of rates of return to education in countries around the world, the average annual returns to education in Asia ranged from a high of 20% for primary education to a low of 16% for secondary education (Psacharopoulos and Patrinos 2002). These are well in excess of the returns reported in Table 9 for Bangladesh. Looking only at the South Asian countries included in the study shows that in general, returns at all levels are higher than in Bangladesh. Only India records a lower return to primary education (3%) although the data used is for 1995 and pre-dates the data for Bangladesh. World wide reviews of returns to education have also generally found that primary schooling has the highest returns and higher education the lowest ((Psacharopoulos 1985; Psacharopoulos 1994; Psacharopoulos and Patrinos 2002).²⁵ This pattern does not generally prevail in South Asia, with India and Pakistan exhibiting a similar pattern to Bangladesh (i.e. higher returns to higher education than to primary schooling).

Declines in the returns to education for women seem to run counter to the increases in real wages experienced since 2000 (see Table 6). However, these declines are only part of the changes that have occurred during this time. Using the methodology outlined in the previous section, Table 10 decomposes changes in wages between 2000 and 2005 into a component explained by changes in the characteristics of wage

employees (e.g. the change in the average level of education) and a component explained by changes in coefficients or the impact characteristics have on wages (e.g. changes in the returns to education). This second component is often referred to as the unexplained component. The overall increase in real wages between 2000 and 2005 is relatively small although the increase is largely due to changes in characteristics rather than changes in coefficients (see Table 10). Appendix Table 8 provides a detailed breakdown of the contribution of each explanatory variable to the explained and unexplained components shown in Table 10. The table shows that increases in the average years of education explain a large component of the change in real wages arising from changes in characteristics.

Table 10: Earnings function decompositions (log of hourly wage)

	Change due to characteristics	Change due to coefficients	Total change
Change in wages between 2000 and 2005			
Male	0.035** (0.007)	-0.005 (0.011)	0.030* (0.013)
Female	0.217** (0.034)	0.095* (0.038)	0.311** (0.045)
Total	0.045** (0.008)	0.026* (0.012)	0.071** (0.013)
Change in wages between male and female wage employees ²⁶			
2000	0.224** (0.046)	0.510** (0.049)	0.734** (0.034)
2005	-0.024** (0.044)	0.476** (0.041)	0.452** (0.032)

Notes:

1. Decompositions based on regressions reported in Table 8 and equation [1].
2. Estimated standard errors are reported in parentheses. For estimation procedure see Jann (2005).
3. + statistically significant at 10%; * significant at 5%; ** significant at 1%.

As Table 6 showed, real wages have increased by a much greater extent for women and Table 10 shows that this has largely come about because of changes in characteristics; 70% of the change in female hourly wages between 2000 and 2005 can be explained by changes in the characteristics of female wage employees. What have been the main changes in characteristics that have given rise to the increase in hourly wages? It will come as no surprise that by far and away the most significant change has been in education. The detailed decomposition results show that over 80% of the change in real wages, brought about from changes in characteristics, originates from increases in women's education (see Appendix Table 8). The results also suggest that increases in the proportion of female wage employees working in public sector jobs has also been partly responsible for the growth in female wages. As the previous section noted there have been substantial gains in public sector employment for women since 2000. The unexplained component accounts for 30% of the change in female wages since 2000 although breaking down this component into its constituent parts does not reveal a great deal about the main factors that account for this change. The results do show that declines in the premiums associated with daily wages and education have acted as a constraint to the growth of female wages (see Appendix Table 8). However, the decline in the rates of return to education has been

outweighed by the increases in the average level of education amongst female wage employees.

Table 10 also breaks down the gender gap in hourly wages for 2000 and 2005. In 2000, 31 per cent of the overall gender gap was explained by differences in the characteristics of male and female wage employees. The remaining two thirds of the gender gap was due to differences in coefficients, which is often referred to in this context as gender discrimination. By 2005, the difference in male and female wages due to characteristics had disappeared and the remaining gender gap was composed almost entirely of the unexplained component. This suggests that improvements in the gender gap have resulted largely from changes in characteristics and the remaining gender gap is largely caused by labour market discrimination.²⁷

5. Conclusions

Labour force participation rates have remained relatively stable since 2000 and while this implies large absolute increases in the size of the labour force it is unlikely that changes in participation rates have had a large impact on the poverty declines experienced in the last five years. However, within the labour force the paper has shown that there has been a continued, but gradual, shift away from what is seen to be low productivity self-employment into more productive wage employment and non-agricultural self-employment. Increases in the proportion of the labour force engaged in wage employment has not resulted in lower wages and more importantly income. The paper shows that real incomes have grown steadily between 2000 and 2005 and this finding is true for both salaried wage and day workers. Shifts in the composition of employment and increased income from wage employment are likely to explain some of the decline in poverty described in the paper. Changes in labour market conditions have been very different across Bangladesh. For example, real incomes from wage employment have grown rapidly in Chittagong compared to slowly declining in Barisal. These differences have in a large part been divided between East and West parts of Bangladesh with labour markets in the East tending to outperform those in the West. Interestingly, similar patterns are seen in the magnitude of poverty declines across these two geographical areas.

A limitation of the work, particularly with regards to poverty is that changes in real wages and income are only reported for those in wage employment. In 2005, this accounts for 56% of employed individuals in the labour force. How income has changed in the remaining 45%, most notably in farm and non-farm self-employment activities is unknown. It will be interesting from further analysis to see how these trends compare with the wage sector.

The gradual changes in the overall characteristics of the labour force are starkly contrasted by changes in female employment over the five year period. In that time female wage employment has increased considerably partly through a decline in agriculture self-employment characterised by high underemployment rates. These shifts have resulted in women working in higher productivity sectors and for longer hours. Womens wages have also increased at a much faster rate than for men and as a result the gender gap in wages and income has narrowed considerably. While a gender gap in wages remains, the rapid reduction in the gender wage gap represents a

substantial improvement in gender equity in the labour market. The paper also shows that there remains a substantial component of the gender wage gap that consists of discrimination rather than gender differences in labour force characteristics. This implies that further declines in the gender wage gap are likely to prove more difficult.

A key factor in the growth of real wages between 2000 and 2005 has been improvements in levels of education. In particular, employees with some secondary education have increased considerably over the period. The impact of education on wages has been particularly high for women and this has again arisen from a rapid narrowing of the gender gap in levels of education of labour force participants. However, increases in education and hence real wages have been concentrated towards richer women. Therefore the impact on poverty of these changes is likely to have been small.

Labour force participants from poor households still lag behind their richer counterparts in terms of education despite the substantial increases in female education described in the paper. The previous round of the HIES in 2000 showed that gross enrolment rates in secondary school (Class 9 and Class 10) for the poor were only 8% compared to 96% for the rich (World Bank 2001a). Given the importance of education in improving labour market outcomes it is important that access to secondary schooling is extended to reach poor rural households.

The paper has shown that returns to education in Bangladesh are low compared to other low income countries and countries in the region. This may reflect differences in education quality across countries and provide evidence that education quality is low in Bangladesh. There is a great deal of evidence to suggest that basic education quality is poor in Bangladesh (see for example, CAMPE 2001; CAMPE 2006). And while stipend programmes have been very successful at increasing education participation their impact on quality has not been so clear (Mahmud 2003). Improving the quality of education in Bangladesh is crucial.

Endnotes

- ¹ To calculate these figures the total population figures for 2000 and 2005 are used with the share of the population 15 years or older in 2000 and 2005 to produce the estimates in the table. Data is taken from BBS (2006)
- ² The HIES only asks whether individual has worked in the last 7 days compared to the labour force survey which asks, 'Did you do any work for at least one hour on any day during the last week for pay or profit, family gain or for own final consumption?'
- ³ Figures for female unemployment rates are much higher from the HIESs than the two labour force surveys conducted in 1999/2000 and 2002/03. It is likely that this is explained by the much higher labour force participation and employment rates reported in the labour force surveys for women. However, the trends and the patterns in unemployment rates, overall and between the sexes are similar.
- ⁴ Table 2 does not report patterns and trends in the composition of employment separately for rural and urban areas. While the composition of the labour force in rural and urban areas is very different (e.g. a much higher proportion of urban employment is salaried wage) the trends have been very similar over the period. The rural/urban breakdown is available on request.
- ⁵ The surveys show that there have been large increases in the number of women engaged in the education and health sectors in rural areas. See Table 3 for a general discussion of changes in female occupations.
- ⁶ Kabeer and Mahmud (2004) show that the garments industry has on the whole generated employment opportunities for poor rural women with two exceptions. Firstly, Export processing zone (EPZ) workers came from richer groups although this section of the garments industry made up only 12% of total employment in the garments sector. Secondly, the garments sector did not provide employment opportunities for the very poorest women.
- ⁷ These figures are based on information contained in the two rounds of the HIES.
- ⁸ These figures are based on Class 6-10 and include both general secondary and madrasah education systems.
- ⁹ The increase for women in this category was much greater; in 2000, 17% of women had some secondary education compared to 23% in 2005.
- ¹⁰ Hourly wages for daily wage workers are gross wages excluding in-kind transfers because these were not quantified in the 2000 HIES. However, only 7 and 4% of daily wage workers reported receiving in-kind transfers in 2000 and 2005 respectively. Hourly wages for salaried workers include the value of any cash or in-kind benefits received.
- ¹¹ It is also interesting to note that the absolute gender wage gap for salaried workers declined from Tk. 9.3 to Tk. 6.4 over the period.
- ¹² Changes in real incomes from day and salaried wage employment have been different and these are detailed in full in Appendix Table 1.
- ¹³ Initially a two-step procedure, developed by Lee (1983) to correct for this bias was attempted which provides a more general approach to the correction of selectivity bias than that proposed by Heckman (1979). By employing a multinomial logit model in the first step it allows activity choice (e.g. wage employment, self-employment, unemployment etc.) to be modelled more accurately. The procedure exploits estimates from a multinomial logit model (MNL) rather than a probit to construct a selection term for the second-step wage equations. While adequate selection terms were identified, the IIA assumption of the MNL was rejected and therefore the results of this estimation are not reported here. However, the results were similar and are available from the author on request.
- ¹⁴ Apart from whether a household owns a bicycle, different instruments were used for the 2000 and 2005 earnings equations because it was not possible to identify variables that had the desired properties for both years.
- ¹⁵ The chi-squared statistic (with 3 degrees of freedom) for the joint significance of the set of identifying variables in the total (male and female) probit wage employment participation equation for 2000 (2005) was 386 (477) suggesting that the null hypothesis of zero coefficients is rejected at the one per cent level in both cases. The corresponding F statistics (with 3 degrees of freedom) were 1.5 and 0.6 for this same set of variables in the 2000 and 2005 total wage equations respectively implying that the null hypothesis of zero coefficients is upheld in both cases. Similar results were also found for the gender disaggregated wage equations.

¹⁶ Given space constraints the first-stage participation model is not reported but is available from the author on request.

¹⁷ Breaking down the wage gap into its component parts is subject to the standard 'index number' problem where the size of the component parts may be sensitive to the weights (or coefficients) used. This is illustrated by the fact that the decomposition of the average wage gap could also be written as:

$$w_{2005} @ w_{2000} = X_{2005} @ X_{2000} \hat{\beta}_{2005} + X_{2000} @ \hat{\beta}_{2005} @ \hat{\beta}_{2000} \quad [2]$$

The decompositions computed using equation 2 are reported in Appendix Table 4.

¹⁸ All estimation was undertaken using the STATA econometric package (STATA 2005).

¹⁹ For example, Bonjour *et al.* (2003) use the wage difference between sets of identical twins to control for innate ability. See also Card (1999) for a survey of the empirical evidence from using twins in this context.

²⁰ Appendix Table 7 provides summary statistics for the variables used in the estimation.

²¹ This is evaluated at aged 35 which is the average age of wage employees in the sample. The impact of experience on wages declines with age but only turns negative outside the age range of labour force participants.

²² Using data from the 2000 LFS Salmon (2001) shows that males in urban areas have lower monthly wages than their rural counterparts. However, women working in urban areas had higher wages.

²³ Estimating the same earnings functions with hourly wages expressed in current prices with no adjustment for spatial differences in the cost of living show the more familiar positive result. These results are available from the author on request.

²⁴ For example, government teachers salaries tend to be much higher than non-government teachers salaries. In a study of primary schools, average government teacher salaries were nearly 3 times higher than salaries of non-government school teachers (FMRP 2006).

²⁵ There has been substantial debate around the quality of data used in these regional aggregates, as well as the time period covered (see for example, Bennell 1995; Bennell 1996).

²⁶ The gender wage gap is broken down using:

$$w_m @ w_f = X_m @ X_f \hat{\beta}_f + X_m @ \hat{\beta}_m @ \hat{\beta}_f$$

²⁷ The gender gap decomposition results using male coefficients to weight the explained component show a much smaller decline in this component. However, the broad conclusion that the remaining gender gap is largely due to discrimination in the labour market is still applicable.

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Appendix Table 1: Employment status by quintile 2000-2005 (%)

quintile	2000				2005			
	Daily wage	Salaried wage	Agriculture self-employed	Non-agriculture self-employed	Day Labourer	Salaried wage	Agriculture self-employed	Non-agriculture self-employed
MALE								
1	59	10	15	16	59	12	14	16
2	48	11	25	17	46	14	21	20
3	38	15	27	20	35	18	27	20
4	24	21	33	22	20	25	30	25
5	10	33	26	31	8	36	24	32
Total	35	18	25	21	33	21	24	23
FEMALE								
1	56	24	8	12	58	22	5	16
2	46	19	22	12	43	30	11	16
3	33	33	24	10	32	37	13	18
4	29	31	30	10	15	52	9	24
5	8	58	26	9	7	76	3	14
Total	36	33	21	11	32	43	8	17
TOTAL								
1	59	12	14	15	59	13	13	16
2	48	12	24	16	45	15	20	19
3	37	17	27	19	35	20	25	20
4	25	22	33	21	19	27	28	25
5	10	36	26	29	8	41	22	30
Total	35	20	25	20	33	23	22	22

Source: HIES (2000 and 2005)

Appendix Table 2: Years of education in the labour force by quintile 2000-2005

quintile	2000			2005		
	male	female	total	male	female	total
1	1.6	0.6	1.4	2.0	1.4	1.9
2	2.2	1.2	2.1	2.7	1.5	2.6
3	3.0	1.7	2.9	3.7	3.1	3.7
4	4.5	3.4	4.4	5.3	4.7	5.3
5	7.7	6.8	7.6	8.6	8.4	8.5
Total	3.9	2.7	3.8	4.6	4.0	4.5

Source: HIES (2000 and 2005)

Appendix Table 3: Annual income from day and salaried wage employment

	Daily wage			Salaried wage		
	2000	2005	ann. growth (%)	2000	2005	ann. growth (%)
Male	23,563	22,777	-0.7	53,713	61,002	2.6
Female	9,898	10,352	0.9	23,390	36,809	9.5
Total	22,200	21,751	-0.4	47,890	56,306	3.3
Barisal	27,136	22,372	-3.8	53,773	46,552	-2.8
Chittagong	24,496	25,770	1.0	40,834	63,642	9.3
Dhaka	24,473	20,835	-3.2	53,738	56,242	0.9
Khulna	23,794	21,992	-1.6	49,071	59,025	3.8
Rajshahi	17,773	19,174	1.5	43,816	50,536	2.9
Sylhet	21,051	26,562	4.8	32,443	46,894	7.6
Poorest quintile	18,273	20,073	1.9	22,965	26,785	3.1
2	22,056	20,949	-1.0	29,524	37,000	4.6
3	22,459	22,154	-0.3	33,150	42,188	4.9
4	25,390	24,380	-0.8	44,587	49,995	2.3
Richest quintile	35,635	29,332	-3.8	69,650	81,847	3.3

Source: HIES (2000 and 2005)

Appendix Table 4: Earnings function decompositions (log of hourly wage)

	Change due to characteristics	Change due to coefficients	Total change
Change in wages between 2000 and 2005			
Male	0.040** (0.008)	-0.010 (0.011)	0.030* (0.013)
Female	0.187** (0.032)	0.124** (0.039)	0.311** (0.045)
Total	0.047** (0.008)	0.024* (0.011)	0.071** (0.013)
Change in wages between male and female wage employees			
2000	0.087** (0.024)	0.647** (0.035)	0.734** (0.034)
2005	0.059* (0.023)	0.394** (0.033)	0.452** (0.032)

Notes:

1. Based on regressions reported in Table 8 and equation [2] in endnote 17
2. Estimated standard errors are reported in parentheses. For estimation procedure see Jann (2005).
3. + significant at 10%; * significant at 5%; ** significant at 1%

Appendix Table 5: Heckman selection model results

	2000			2005		
	total	male	female	total	male	female
Age	0.046** (0.006)	0.042** (0.005)	0.012 (0.022)	0.047** (0.005)	0.039** (0.004)	0.042** (0.013)
Age squared	-0.000** (0.000)	-0.000** (0.000)	-0.000 (0.000)	-0.000** (0.000)	-0.000** (0.000)	-0.001** (0.000)
Non-Muslim	-0.035 (0.027)	-0.037 (0.030)	0.118 (0.081)	-0.132** (0.021)	-0.119** (0.021)	0.105 (0.077)
Unmarried	-0.013 (0.039)	-0.093** (0.034)	-0.115 (0.144)	-0.016 (0.032)	-0.086** (0.028)	-0.111 (0.083)
Widowed/ divorced	-0.572** (0.051)	-0.080 (0.080)	-0.019 (0.142)	-0.436** (0.049)	-0.197** (0.071)	0.202 (0.153)
Years of education	0.059** (0.003)	0.046** (0.003)	0.086** (0.008)	0.054** (0.002)	0.050** (0.003)	0.073** (0.006)
Urban	-0.103** (0.022)	-0.013 (0.020)	-0.219* (0.098)	-0.094** (0.019)	-0.075** (0.019)	-0.026 (0.079)
Other activity	0.017 (0.018)	-0.026 (0.018)	-0.087 (0.109)	-0.004 (0.020)	-0.048* (0.020)	0.094 (0.181)
Daily wage	0.229** (0.026)	0.084** (0.026)	0.455** (0.079)	0.129** (0.024)	0.057* (0.024)	0.143+ (0.074)
Public sector	0.462** (0.034)	0.391** (0.034)	0.788** (0.114)	0.410** (0.031)	0.353** (0.033)	0.670** (0.082)
Divisions						
Chittagong	0.102** (0.034)	0.073* (0.034)	0.203+ (0.115)	0.267** (0.029)	0.275** (0.029)	0.152 (0.126)
Dhaka	0.069* (0.032)	0.053 (0.032)	0.124 (0.106)	0.015 (0.028)	0.033 (0.028)	0.015 (0.121)
Khulna	0.031 (0.037)	0.031 (0.037)	0.032 (0.117)	0.049 (0.030)	0.080** (0.030)	-0.112 (0.129)
Rajshahi	-0.171** (0.036)	-0.113** (0.034)	-0.223+ (0.125)	-0.145** (0.028)	-0.104** (0.027)	-0.289* (0.129)
Sylhet	0.031 (0.045)	0.005 (0.046)	0.093 (0.137)	0.158** (0.037)	0.200** (0.038)	-0.157 (0.130)
Selection term	0.060 (0.060)	0.011 (0.066)	0.081 (0.178)	0.053 (0.048)	-0.005 (0.046)	0.207 (0.142)
Constant	0.951** (0.191)	1.331** (0.125)	0.934 (0.690)	1.011** (0.152)	1.346** (0.104)	0.395 (0.503)
Observations	5206	4440	766	6714	5861	853
R-squared	0.33	0.30	0.42	0.35	0.34	0.44

Notes:

1. Robust standard errors in parentheses
2. + significant at 10%; * significant at 5%; ** significant at 1%

Appendix Table 6: Extended earnings function

	2000			2005		
	total	male	female	total	male	female
Age	0.040** (0.004)	0.040** (0.004)	0.002 (0.015)	0.038** (0.004)	0.034** (0.004)	0.022+ (0.012)
Age squared	-0.0004** (0.00005)	-0.0005** (0.0005)	-0.00006 (0.0002)	-0.0004** (0.00004)	-0.0004** (0.00004)	-0.0003+ (0.0001)
Non-Muslim	-0.035 (0.027)	-0.034 (0.029)	0.091 (0.065)	-0.127** (0.021)	-0.110** (0.021)	0.052 (0.066)
Unmarried	-0.041 (0.030)	-0.094** (0.031)	-0.183+ (0.105)	-0.040 (0.026)	-0.092** (0.027)	-0.164* (0.082)
Widowed/ divorced	-0.568** (0.050)	-0.080 (0.080)	-0.077 (0.066)	-0.442** (0.049)	-0.207** (0.069)	0.032 (0.070)
Incomplete primary	0.156** (0.042)	0.108** (0.038)	0.185 (0.205)	0.093** (0.031)	0.057+ (0.030)	0.110 (0.132)
Primary	0.273** (0.028)	0.181** (0.027)	0.421** (0.087)	0.179** (0.026)	0.142** (0.026)	0.189* (0.089)
Incomplete secondary	0.330** (0.029)	0.202** (0.029)	0.589** (0.092)	0.254** (0.023)	0.214** (0.023)	0.312** (0.081)
Junior secondary (SSC)	0.571** (0.040)	0.400** (0.040)	1.045** (0.124)	0.480** (0.039)	0.413** (0.040)	0.629** (0.122)
Senior secondary (HSC)	0.707** (0.051)	0.521** (0.052)	1.127** (0.145)	0.595** (0.049)	0.555** (0.046)	0.715** (0.193)
Incomplete graduate	0.991** (0.110)	0.626** (0.135)	1.919** (0.087)	0.572** (0.220)	0.528+ (0.283)	0.735* (0.344)
Graduate	0.956** (0.054)	0.814** (0.053)	1.062** (0.149)	0.860** (0.043)	0.803** (0.045)	0.956** (0.110)
Graduate and above	1.188** (0.069)	1.010** (0.072)	1.527** (0.192)	1.173** (0.065)	1.110** (0.076)	1.427** (0.115)
Urban	-0.108** (0.021)	-0.010 (0.020)	-0.236** (0.067)	-0.107** (0.018)	-0.077** (0.018)	-0.123* (0.059)
Other activity	0.019 (0.018)	-0.028 (0.017)	-0.064 (0.111)	-0.013 (0.020)	-0.062** (0.019)	0.089 (0.176)
Daily wage	0.224** (0.026)	0.078** (0.026)	0.462** (0.078)	0.117** (0.024)	0.049* (0.024)	0.094 (0.077)
Public sector	0.454** (0.035)	0.379** (0.034)	0.787** (0.122)	0.403** (0.032)	0.347** (0.034)	0.686** (0.093)
Divisions						
Chittagong	0.096** (0.034)	0.076* (0.034)	0.190 (0.115)	0.265** (0.029)	0.275** (0.029)	0.133 (0.128)
Dhaka	0.055+ (0.032)	0.044 (0.032)	0.075 (0.108)	0.012 (0.028)	0.031 (0.028)	-0.068 (0.120)
Khulna	0.026 (0.037)	0.029 (0.037)	-0.001 (0.118)	0.049+ (0.030)	0.082** (0.030)	-0.155 (0.130)
Rajshahi	-0.189** (0.033)	-0.117** (0.033)	-0.303** (0.102)	-0.155** (0.027)	-0.111** (0.027)	-0.366** (0.125)
Sylhet	0.018 (0.043)	0.002 (0.044)	0.038 (0.139)	0.149** (0.036)	0.194** (0.037)	-0.223+ (0.131)
Constant	1.180** (0.094)	1.421** (0.097)	1.315** (0.283)	1.311** (0.082)	1.501** (0.084)	1.375** (0.260)
Observations	5206	4440	766	6714	5861	853
R-squared	0.34	0.31	0.43	0.37	0.36	0.45

Notes:

1. The hourly wage measure used are in Taka and are expressed in 2005 Dhaka rural prices. They are gross of all taxes and include the total hourly value of in-kind benefits received.
2. The estimation procedure used was Heckman's two step procedure and standard errors, reported in parentheses, are based on the White (1980) adjustment. This does not take account of the predicted values used as regressors.
3. + statistically significant at 10%; * significant at 5%; ** significant at 1%.

Appendix Table 7: Summary statistics

	2000			2005		
	total	male	female	total	male	female
Log of hourly wage	2.289 (0.689)	2.388 (0.601)	1.654 (0.857)	2.360 (0.668)	2.418 (0.618)	1.966 (0.837)
Age	34.521 (12.949)	34.916 (13.176)	31.999 (11.073)	35.312 (13.191)	35.656 (13.301)	32.995 (12.176)
Age squared	1359 (1010)	1393 (1035)	1146 (801)	1421 (1032)	1448 (1045)	1237 (924)
Muslim [†]	0.899 (0.302)	0.904 (0.295)	0.865 (0.342)	0.862 (0.345)	0.871 (0.335)	0.800 (0.400)
Non-Muslim	0.101 (0.302)	0.096 (0.295)	0.135 (0.342)	0.138 (0.345)	0.129 (0.335)	0.200 (0.400)
Married [†]	0.724 (0.447)	0.746 (0.436)	0.583 (0.493)	0.739 (0.439)	0.760 (0.427)	0.593 (0.492)
Unmarried	0.238 (0.426)	0.246 (0.431)	0.184 (0.388)	0.225 (0.417)	0.234 (0.423)	0.163 (0.370)
Widowed/divorced	0.039 (0.192)	0.008 (0.089)	0.233 (0.423)	0.037 (0.188)	0.006 (0.078)	0.244 (0.430)
Years of education	3.692 (4.946)	3.816 (4.957)	2.905 (4.808)	4.522 (5.231)	4.468 (5.153)	4.891 (5.717)
Illiterate [†]	0.570 (0.495)	0.552 (0.497)	0.686 (0.464)	0.483 (0.500)	0.481 (0.500)	0.494 (0.500)
Incomplete primary	0.044 (0.205)	0.046 (0.210)	0.029 (0.167)	0.053 (0.225)	0.055 (0.228)	0.040 (0.196)
Primary	0.097 (0.295)	0.104 (0.305)	0.051 (0.221)	0.103 (0.304)	0.107 (0.310)	0.072 (0.259)
Incomplete secondary	0.125 (0.331)	0.132 (0.338)	0.081 (0.273)	0.162 (0.368)	0.164 (0.370)	0.146 (0.354)
Junior secondary (SSC)	0.060 (0.238)	0.061 (0.239)	0.056 (0.231)	0.068 (0.252)	0.069 (0.253)	0.065 (0.247)
Senior secondary (HSC)	0.043 (0.202)	0.043 (0.203)	0.040 (0.197)	0.045 (0.208)	0.043 (0.203)	0.060 (0.238)
Incomplete graduate	0.002 (0.049)	0.002 (0.043)	0.006 (0.078)	0.001 (0.033)	0.001 (0.027)	0.004 (0.061)
Graduate	0.036 (0.186)	0.036 (0.186)	0.035 (0.183)	0.052 (0.221)	0.050 (0.217)	0.065 (0.247)
Graduate and above	0.023 (0.151)	0.025 (0.155)	0.016 (0.124)	0.033 (0.179)	0.030 (0.171)	0.053 (0.224)
Rural [†]	0.734 (0.442)	0.758 (0.428)	0.581 (0.494)	0.686 (0.464)	0.712 (0.453)	0.512 (0.500)
Urban	0.266 (0.442)	0.242 (0.428)	0.419 (0.494)	0.314 (0.464)	0.288 (0.453)	0.488 (0.500)
No other activity [†]	0.749 (0.433)	0.720 (0.449)	0.935 (0.247)	0.900 (0.300)	0.886 (0.318)	0.993 (0.085)
Other activity	0.251 (0.433)	0.280 (0.449)	0.065 (0.247)	0.100 (0.300)	0.114 (0.318)	0.007 (0.085)
Salaried wage [†]	0.391 (0.488)	0.365 (0.481)	0.560 (0.497)	0.414 (0.493)	0.383 (0.486)	0.628 (0.484)
Daily wage	0.609 (0.488)	0.635 (0.481)	0.440 (0.497)	0.586 (0.493)	0.617 (0.486)	0.372 (0.484)
Private sector [†]	0.920 (0.271)	0.922 (0.269)	0.912 (0.284)	0.917 (0.275)	0.925 (0.264)	0.868 (0.339)
Public sector	0.080 (0.271)	0.078 (0.269)	0.088 (0.284)	0.083 (0.275)	0.075 (0.264)	0.132 (0.339)
Barisal [†]	0.056 (0.229)	0.057 (0.233)	0.044 (0.206)	0.056 (0.230)	0.059 (0.236)	0.035 (0.184)

Appendix Table 7 contd.

	2000			2005		
	total	male	female	total	male	female
Chittagong	0.178 (0.382)	0.184 (0.387)	0.138 (0.345)	0.197 (0.398)	0.205 (0.403)	0.147 (0.355)
Dhaka	0.332 (0.471)	0.332 (0.471)	0.331 (0.471)	0.316 (0.465)	0.299 (0.458)	0.428 (0.495)
Khulna	0.113 (0.317)	0.115 (0.320)	0.098 (0.298)	0.119 (0.324)	0.122 (0.327)	0.099 (0.299)
Rajshahi	0.257 (0.437)	0.243 (0.429)	0.343 (0.475)	0.251 (0.434)	0.255 (0.436)	0.231 (0.422)
Sylhet	0.065 (0.247)	0.068 (0.252)	0.045 (0.207)	0.060 (0.238)	0.060 (0.238)	0.060 (0.237)
Identifying variables						
Land mortgaged out (acres)	0.162 (0.875)	0.156 (0.837)	0.200 (1.088)	n/a	n/a	n/a
Household owns a bicycle	0.156 (0.363)	0.164 (0.371)	0.101 (0.302)	n/a	n/a	n/a
Household owns a tubewell	0.246 (0.431)	0.255 (0.436)	0.186 (0.390)	0.302 (0.459)	0.312 (0.463)	0.240 (0.427)
Land mortgaged in (acres)	n/a n/a	n/a n/a	n/a n/a	0.122 (0.401)	0.132 (0.411)	0.056 (0.324)
Selection term	1.203 (0.232)	0.833 (0.261)	1.671 (0.429)	1.200 (0.226)	0.810 (0.264)	1.718 (0.402)

Notes:

1. Standard deviations are reported in parentheses.
2. † - denotes the reference category not included in the regression analysis.
3. n/a – not applicable in estimation.

Appendix Table 8: Detailed earnings function decompositions

	Decomposing difference in log hourly wages between 2000 and 2005						Decomposing difference in log hourly wages between male and female employees			
	Total		Male		Female		2000		2005	
	explained	unexplained	explained	unexplained	explained	unexplained	explained	unexplained	explained	unexplained
Age	0.033** (0.011)	0.062 (0.201)	0.031** (0.012)	-0.089 (0.203)	0.005 (0.018)	0.874 (0.638)	0.015 (0.046)	1.288* (0.561)	0.084* (0.034)	0.283 (0.434)
Age squared	-0.027** (0.009)	-0.015 (0.096)	-0.026* (0.010)	0.070 (0.098)	-0.007 (0.020)	-0.366 (0.306)	-0.020 (0.049)	-0.541+ (0.284)	-0.080* (0.034)	-0.065 (0.225)
Non-Muslim	-0.001 (0.001)	-0.014** (0.005)	-0.001 (0.001)	-0.011* (0.005)	0.006 (0.005)	-0.011 (0.018)	-0.004 (0.003)	-0.013+ (0.007)	-0.003 (0.005)	-0.021* (0.009)
Unmarried	0.000 (0.001)	0.000 (0.009)	0.001 (0.001)	0.001 (0.009)	0.003 (0.004)	0.000 (0.022)	-0.010 (0.007)	0.016 (0.027)	-0.011+ (0.006)	0.016 (0.020)
Widowed/ divorced	0.001 (0.002)	0.005+ (0.003)	0.000 (0.000)	-0.001 (0.001)	-0.001 (0.002)	0.028 (0.023)	0.017 (0.015)	0.000 (0.001)	-0.009 (0.016)	-0.001* (0.001)
Years of education	0.050** (0.006)	-0.023 (0.015)	0.030** (0.005)	0.014 (0.015)	0.174** (0.027)	-0.084+ (0.046)	0.080** (0.018)	-0.158** (0.029)	-0.030* (0.015)	-0.094** (0.029)
Urban	-0.005** (0.001)	0.003 (0.009)	-0.001 (0.001)	-0.017* (0.008)	-0.017* (0.008)	0.074+ (0.043)	0.045** (0.013)	0.058** (0.017)	0.020+ (0.012)	0.008 (0.018)
Other activity	-0.003 (0.003)	-0.002 (0.003)	0.004 (0.003)	-0.003 (0.003)	0.005 (0.006)	0.001 (0.002)	-0.018 (0.023)	0.017 (0.031)	0.008 (0.019)	-0.014 (0.020)
Daily wage	-0.005* (0.002)	-0.058** (0.021)	-0.002 (0.001)	-0.016 (0.022)	-0.030* (0.012)	-0.118** (0.041)	0.089** (0.018)	-0.234** (0.052)	0.033+ (0.019)	-0.049 (0.049)
Public sector	0.001 (0.002)	-0.005 (0.004)	-0.001 (0.002)	-0.003 (0.004)	0.035** (0.013)	-0.016 (0.019)	-0.008 (0.009)	-0.031** (0.009)	-0.039** (0.009)	-0.024** (0.007)
Chittagong	0.002+ (0.001)	0.033** (0.009)	0.001 (0.001)	0.042** (0.009)	0.002 (0.004)	-0.010 (0.025)	0.010 (0.006)	-0.025 (0.022)	0.008 (0.008)	0.027 (0.026)
Dhaka	-0.001 (0.001)	-0.015 (0.013)	-0.002 (0.001)	-0.006 (0.013)	0.012 (0.011)	-0.067 (0.067)	0.000 (0.003)	-0.024 (0.037)	0.004 (0.015)	0.020 (0.035)
Khulna	0.000 (0.000)	0.002 (0.006)	0.000 (0.000)	0.006 (0.006)	0.000 (0.002)	-0.017 (0.017)	0.001 (0.002)	0.000 (0.014)	-0.003 (0.004)	0.027+ (0.016)
Rajshahi	0.001 (0.002)	0.008 (0.011)	-0.001 (0.001)	0.003 (0.011)	0.029* (0.013)	-0.021 (0.036)	0.025* (0.011)	0.034 (0.026)	-0.008 (0.006)	0.062+ (0.032)
Sylhet	0.000 (0.000)	0.008* (0.003)	0.000 (0.000)	0.012** (0.004)	0.001 (0.003)	-0.016 (0.011)	0.002 (0.003)	-0.006 (0.010)	0.000 (0.002)	0.023** (0.008)
Constant		0.034 (0.125)		-0.007 (0.129)		-0.156 (0.378)		0.130 (0.301)		0.279 (0.263)
TOTAL	0.045** (0.008)	0.026* (0.012)	0.035** (0.007)	-0.005 (0.011)	0.217** (0.034)	0.095* (0.038)	0.224* (0.046)	0.510** (0.049)	-0.024 (0.044)	0.476** (0.041)

Notes:

1. Decompositions based on regressions reported in Table 8 and equation [1].
2. Estimated standard errors are reported in parentheses. For estimation procedure see Jann (2005).
3. + statistically significant at 10%; * significant at 5%; ** significant at 1%.