Earnings Inequality, Returns to Education and Demand for Schooling: Addressing Human Capital for Accelerated Growth in the Seventh Five Year Plan of Bangladesh

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I.   Introduction: Educational Human Capital and Economic Growth

Education has multiple effects—both economic and non-economic. The well-known non-economic effects relate to health, nutrition, and social cohesion. Better educated population has lower child poverty, lower child and maternal under-nutrition, higher female agency and empowerment. The present paper is about economic effects of education. Encouraging upward economic mobility through deliberate accumulation of educational human capital often spanned over inter-generational frame of reference--while ensuring quality education for all--is one sure time-tested way of fighting the "injustice of poverty" (Galor and Zeira 1993; Sobhan 2011).

Different types of education and training—educational human capital, broadly speaking--play different role in different stages of economic growth. It is important to address the human capital requirement consistent with the main sectoral thrust of a particular stage growth (on this, see Behrman 1990). One of the key objectives of the successive five year plans has been to maintain broad coordination between types of required human capital with the nature of growth process.[1] Lack of such coordination creates the risks of supply-demand mismatches in the skilling of labor, resulting in overproduction in certain skills and shortage in others. Mismatch between supply of and demand for skills creates unemployment, especially among youth and female labor force, breeding social discontent and lack of social cohesion that often threatens the growth process itself. Bangladesh is aiming for at least 8% growth rate in the seventh plan. In this backdrop, it is important to conduct growth diagnostics from the perspective of the educational requirements to attain and maintain such a respectable growth rate over the plan period and beyond.

Matching Human Capital with Stages of Economic Growth

The loop that connects economic growth and supply of human capital is mediated by private demand for education. Given the initial level of inequality, private (household) demand for

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[1] On this, see Islam (2014).

education will vary according to the nature of economic growth. If the stage of growth is dominated by agricultural growth—for example, through agricultural modernization—the human capital requirement would be rather modest. A broad-based access to primary education will adequately meet the human capital imperatives of growth. In contrast, if the stage of growth is dominated by export-led labour-intensive manufactures--as with readymade garment sector--a different skill-mix will be necessary. Only emphasis on below-primary or primary education will not be enough in this growth scenario; the focus needs to be given to secondary and technical education commensurate to the demand of the export-led labour-intensive manufacturing growth. Again, if the stage of growth is shaped pre-dominantly by the service sector growth, the emphasis needs to shifted to post-secondary and higher technical education and training. This is most clearly visible in case of distribution of human capital in the advanced countries. Of course, the educational markers of these stages of growth, as outlined above, are only pure types: all economies have a mix of skill requirements responding to different types of education. But, one worry about maintaining the broad correspondence (or lack of correspondence) between the nature of a particular stage of growth (dictating the main source of demand for particular skills) and the main educational driver at that stage of growth (dictating the main source of supply of skills). This dynamic maintenance between demand and supply of skills is not automatically restored in the process of economic growth, however, as one proceeds from lower to higher stage of economic development. Contemporary examples are abound to indicate that there can be protracted periods of mismatches, resulting in shortage of skills in one sector and over-supply of skills in another sectors. Social effects of such mismatches can be observed in case of Sri Lanka in the 1990s and 2000s, and later in the 2000s among the countries of Arab Uprisings where market employment opportunities did not match the supply of educated youth force armed with secondary and higher education.

Three Main Messages of the Paper

In the backdrop of the above, the paper makes three main points. First, past growth of Bangladesh is mainly driven by relatively unskilled labor so much so that labor income inequalities have (however measured) actually declined between 2000 and 2010. This implies that earnings of relatively unskilled labor (of those with no or little education) have increased considerably in the decade of 2000s as against the growth in the skilled labor. The level of labor income (earnings) is still considerably greater in case of secondary and higher education. But, the relative gains to secondary and tertiary education as opposed to "no education" have diminished over the successive labor force surveys (LFS) between 2000 and 2010. This is clearly borne out by the analysis of "educational returns" at successive level of education/ skills.

Second, relatively higher gains for the unskilled labor as opposed to skilled labor have one unintended consequence. It has reduced the demand for secondary and higher education, especially on the part of the poor. According to LFS, The proportion of male workers in total workers with "no formal education" has declined only by 3 percentage points in rural areas and

increased by 5 percentage points in urban areas between 2000 and 2010! This trend has been vindicated by HIES as well for the same period.

This pattern of skill formation while consistent with the stage of growth dominated by the role of relatively unskilled labor has not been conducive to skill formation in the low-income households. In the 2000s, we have seen increasing drop out of the male students from the secondary stream of education partly as a result of the higher income earning opportunities for the relatively unskilled labor.

Finally, the paper argues that Bangladesh could maintain relatively successfully the "matching" of supply of skills with that of demand for skills over the past three decades or so. But, new challenges of drop-out from the system of primary and secondary education, and growing quality divide in education by wealth groups are emerging. By leaving the educational system early, they may have gained in the short-term, but it can retard their subsequent mobility along the income ladder. This demands a few policy measures by way of strengthening quality basic education combined with greater emphasis on technical and vocational education, especially for the low-income households.

Structure of the Paper

Accordingly, the paper is structured in seven sections, as described below. The first introductory section examines the theoretical connections between stages of economic growth and quality of human capital. The second section discusses the trends in labor income and earnings inequality based on LFS data for the last three rounds. The third section briefly sketches out the role of relatively unskilled vs. skilled workers at different stages of growth in Bangladesh. The fourth section examines the key factors underlying earnings inequality with special focus on divergent trends in educational returns disaggregated by educational level and by gender. The latter shows relatively higher increase in educational returns for relatively unskilled labor vis-a-vis the skilled labor. Divergent educational returns are interpreted by economic agents as labor market signals for work force participation as an opposed to continuing education in schools. The fifth section considers the possibility of relatively unskilled labor responding positively to labor market signals and deciding to drop out from the educational system at early (secondary) stage of education, and presents some data on the quality divide in education among various income/ wealth categories. The sixth section provides the concluding observations and draws a few policy implications.

II.   Trends in Earnings Inequality

One of the curious aspects of economic growth in Bangladesh during the 2000s is stable or even declining pattern of overall income inequality, as indicated by successive rounds of household income expenditure surveys (HIES) carried out by the Bangladesh Bureau of Statistics (BBS) in

the 2000s (BBS 2011; BBS 2007; BBS 2002; World Bank 2013). We do not know to what extent this decline is due to statistical artefact or indeed reflect the real changes on the ground. It is possible that upper income groups—especially the "very rich households"—are disproportionately excluded from the HIES sampling frame and this bias may have gone up over time with the growing affluence experienced over the past decade. This especially true in case of judging income inequality in urban areas. Even if the very rich households have been excluded from these surveys, it may be less consequential however for understanding labor income inequality, which is the key focus in this paper. Income of the rich and very rich households comprise not only of labor income, but also much larger share of non-labor incomes compared to the middle class and the poor income groups. From the vantage point of educational human capital, it is more pertinent to consider inequality in labor income which is poorly captured in the HIES.[2] Here the earnings module of the Labor Force Survey (LFS) can shed important new lights.

The distribution of earnings among the workers (male and female considered together) has been quite unequal in 2000. The Gini coefficient of earnings inequality was 0.44. This has declined to 0.36 in 2010. This is evidenced by alternative measures of inequality as well (Table 1). What explains this declining trends in earnings inequality? Apparently, this is puzzling in the sense that one would have expected an increase in earnings inequality in the backdrop of rapid spread of primary and secondary education since 1990. Bangladesh achieved considerable success in human development related MDGs and one would think that inequality of labor earnings across the skill categories—skilled vs. unskilled labor, for instance—would show up in the LFS data.

Table 1: Trends in Labor Income Inequality, 2000-2010

Sl. No.	Inequality Measures	Earning Monthly, 2000	Earning Monthly, 2010
1	Relative mean deprivation	0.31	0.26
2	Coefficient of variation	1.49	1.05
3	Standard deviation of logs	0.89	0.61
4	Gini coefficient	0.45	0.36
5	Mehran measure	0.57	0.47
6	Piesch measure	0.38	0.31
7	Kakwani measure	0.17	0.12
8	Theil index (GE(a), a=1)	0.42	0.27
9	Mean log deviation (GE(a), a=0)	0.38	0.22
10	Entropy index (GE(a), a=-1)	1.79	0.24
11	Half (Coeff. Var. squared) (GE(a), a=2)	1.11	0.55
12	Atkinson inequality measures (eps=1)	0.31	0.20

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[2] For example, LFS 2000 and 2010 contain these information of 12,657 and 39,964 individuals, respectively, as against HIES 2000 and 2010, which contain information on 3,308 and 9,504 individuals. But, most of the HIES adults have missing information on earning and education.

This apparent puzzle can be resolved if we find evidence that not only more jobs have been created for relatively unskilled labor but also the rewards to such jobs have increased proportionately more than that for relatively skilled labor. This is a hypothesis that can be tested only with the worker level information on earnings that is contained in LFS data. One gap in the current LFS that it cannot shed light on the earnings from self-employment, which is still a large share of labor income, especially for the low-income groups. But, we can test this hypothesis as applied to the wage income component of the labor earnings (see, Section 4).

III.   Is Skill a Constraint to Growth Acceleration in Bangladesh?

Whether the "skill factor"—as indirectly captured by education and training--would be a constraint to growth would depend on the stage of growth. A particular stage of growth generates demand for particular skills. Bangladesh was able to respond well---up until recently—to this question by fostering appropriate skill mix commensurate to the particular stage of growth. As may be seen from Annex Table 5, on a range of educational indicators of the labor force (aged 15 and above) Bangladesh lags behind only Sri Lanka, quite at par with India, and better than Pakistan and Nepal. This shows that Bangladesh has done reasonably well in ensuring the supply of skills needed for economic growth acceleration even when the skill level of its work-force is compared to its neighbours.

The main conclusion of this discussion is to point out that supply of skills was adequate to the demand for skills generated by the main 4 drivers of growth—green revolution agriculture, rural non-farm sector, readymade garments led manufactured exports, and international migration.[3] Green revolution generated demand for literacy and below-primary education, rural non-farm sector generated demand for primary education, ready-made garments generated demand for primary and junior secondary education for girls, international migration created demand for secondary and higher secondary education. This is, of course, a schematic presentation, and needs to be understood only as a "central tendency" that decides which type of human capital is going to be more important in a particular stage of development. Demand-side factors are often overlooked in education planning. Structural change in the economy has an important bearing on the demand for skills and human development—an often under-emphasized factor in explaining the pace of human development.

Whether policy responses were endogenous to structural changes in the economy or simply they coincided by a stroke of luck in the form of ad hoc initiatives are matters of on-going debate (see, for example, Heath and Mubarak 2011 on the impact of industrialization on female schooling). But, here we argue that, up until recently, education policies of the country (however they came about) augured well with the nature of the previous stages of growth. For instance, the growth in the 1980s was centred on crop agriculture (green revolution). The phase was also required emphasis on population control because without the latter grow more food strategy is bound to fail to achieve its ultimate objective—food security. Consistent with this

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[3] On the importance of these 4 drivers for the Bangladesh economy, see Osmani et al (2001); Mujeri and Sen (2006); Osmani and Sen (2011); Hossain, Sen and Sawada (2013); Sen and Ali (2015).

objective, the country's successive plan documents emphasized the critical role of primary education, especially for girls (girls' primary education was crucial for the success of family planning) during the period between 1985 and 1995.

Starting with the mid-1990s, main thrust of the development strategy started shifting from crop agriculture to non-crop agriculture and non-agricultural sectors. Demand for female labor was increasing in these activities. As if to match with this growing demand, we see a visible shift towards pro-poor and pro-gender education policy during this period. Although more empirical research needs to be done on the occupational choice of the female labor completing primary and secondary education, the additional years of education have arguably opened up entry of female labor into non-agricultural sectors. The trend of female participation in non-agricultural sectors has become particularly prominent in the 2000s.

Export-led manufactures such as ready-made garment has an important driver of growth and formal sector employment in Bangladesh for the past two decades. Link between education and export-led manufacturing has been crucial to the maintaining the momentum of this growth driver. It is not just the female labor that explained the RMG success in Bangladesh but also the availability of a female work force with some exposure to education and skills was crucially important ingredient of this success. Thus, employment in the RMG sector grew very fast in the decade after the phasing out of MFA, from less than 1.1 million in 2000 to about 4.4 million in 2014, 75% of them are women. This rapid expansion of the RMG sector did not face, however, any skill constraint. To this one could argue that the RMG labor represents the category of "unskilled labor", and hence the skill question does not arise in the first place. This is, however, not a valid proposition. While female participation in RMG factory does not require post-secondary and higher education, it is not predominated by unskilled (in the sense of "uneducated") category either. Thus, the most recent survey data on the RMG sector shows that educational level of the RMG workers has increased remarkably over time (Table 2).[4] In 1990, as many as 38% of the female RMG workers did not have any exposure to formal education. By 1997, the matched share had dropped to 22%; in 2014 survey, it gets reduced further to only 7%. Currently, about 48% of the female workers have at least some level of secondary (post-primary) education. This suggests the possibility that positive human development effects of the demand originate in the modern industrial settings.

Table 2: Education and Export-Oriented RMG Sector

	All	Compliant	Non-Compliant
N	**1600**	**1200**	**400**
Age:			
Below 18	33.0	30.4	40.6
18 − 24	40.6	42.4	35.2

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[4] See, Sen (2014b)

25 – 30	18.8	19.1	18.2
31 – 35	4.3	4.8	2.7
36 +	3.2	3.2	3.2
Marital Status:			
Unmarried	52.1	51.0	55.4
Married	42.1	43.4	38.2
Separated/Divorced	5.8	5.5	6.5
Education (last class passed):			
No Formal education	7.2	7.3	6.7
Below Primary (1-4)	45.0	44.1	47.6
Secondary (5-9)	40.7	40.5	41.2
SSC +	7.1	8.0	4.1
Household Size (Own Family):	3.88	3.83	4.01
Household Size (Parental Family):	5.20	5.19	5.23

Source: Sen (2014b)

International migration (and consequently, the flow of overseas remittances) represents another important driver of growth acceleration, especially in the 2000s and beyond. Analysis of the link between education and international migration also tells the same story (Ahmed and Mahzab 2014). Most of the international migrants come from secondary and above education category. In fact, a bulk of them come from the so-called "middle segment". Impact of education on remittances sent back to home is not significant for primary education; those who have some degree of secondary education (even if "secondary incomplete") record 34% higher remittances compared to illiterate, those who have completed secondary (i.e. SSC passed) report 38% increment over that for the illiterate (Table 3). The matched figures for higher secondary and graduates are much higher, though they are pretty similar in respect of marginal effects (about 61%). This shows that international migration will have positive beneficial effects on acquiring human capital. Note that the share graduates among the migrants is restricted to only one-fifth of the migrants, as also indicated by the sheer dominance of Middle East and South East Asia among the pool of international migrants—countries that mainly demand low skill labor in the construction sector.

Table 3: Education and International Migration

	(1)	(2)	(3)	(4)
Log of Total Remittance in last 12 months	Foreign	Foreign	Domestic	Domestic
Age	-0.012	-0.013	0.052**	0.051**
	(0.018)	(0.018)	(0.023)	(0.024)
Number of Month Migrated	0.003***	0.003***	-0.001	-0.001
	(0.001)	(0.001)	(0.002)	(0.002)
Years of Schooling	0.016**		0.043***	
	(0.007)		(0.013)	

Destination	0.113*	0.114*		
	(0.068)	(0.068)		
Occupation	0.092	0.103	0.056	0.051
	(0.107)	(0.108)	(0.197)	(0.201)
Education				
Primary Complete		-0.021		0.125
		(0.102)		(0.156)
Secondary Incomplete		0.092		0.337**
		(0.094)		(0.166)
Secondary Complete		0.183*		0.384**
		(0.109)		(0.188)
Higher Secondary Complete		0.261**		0.607**
		(0.121)		(0.238)
Graduation and Post-Graduation		0.080		0.603***
		(0.158)		(0.206)
Constant	11.198***	11.251***	8.436***	8.516***
	(0.327)	(0.332)	(0.353)	(0.372)
Adjusted R-squared	0.026	0.028	0.110	0.106
Chi-squared	35.82	44.13	54.65	54.13
Observations	1200	1200	605	605

Note: 1. Bootstrapped Standard Errors are in the parentheses

  2. ***, **, and * imply significant at 1%, 5% and 10% level respectively

  3. Bootstrapped standard errors were computed on 1000 replications and account for the effects of clustering and stratification.

  4. Coefficients of squared age and squared number of months migrated are not reported as both appeared statistically insignificant and coefficients were zero at 3 decimal places.

Source: Estimated by Ahmed and Mahzab (2014)

To sum up, the afore-mentioned 4 key drivers of the macro-economy have been such that they created "good-enough" jobs in the 1990s and 2000s in large numbers (Hossain et al 2013). They were good-enough jobs in the sense that they were poverty reducing, productivity-enhancing (especially by encouraging inter-sectoral mobility), and contributing to social cohesion. The new point we make here is that this process of remunerative job creation in large numbers was sustained by commensurate supply of skills specific to the labor demand generated by each sector/ driver by laying emphasis on a particular component of education policy in each case. Bangladesh did not ignore the labor market signals in designing its education and training policies: it did not rely on unskilled labor with no-formal education, but it did not try to aim to target highly skilled labor with tertiary education either. Consciously or not, in the 1990s, the policy emphasis centred on primary and junior secondary level of education, i.e. on the "lower-middle segment" as distinct from the "middle segment" corresponding to secondary completion and post-secondary education. This strategy paid off, up until recently, before the advent of the new wage regime, especially with the tightening of the agricultural labor market around the late 2000s. This is evidenced in the divergent trends in the educational returns to unskilled, semi-skilled and skilled labor, as discussed below.

IV. What is happening to Returns to Education?

Estimating returns to education is important for educational policy planning, at least for three reasons. First, returns to education show how various categories of workers—unskilled, semi-skilled and skilled workers graded by educational human capital--fare in the labor market. This can show the underlying trends in labour demand and pinpoint the areas which hold out most promise in terms of job search and job creation. Second, estimates of educational returns act like "shadow prices" for human capital for understanding dynamics of other forms of employment outside of the labor market (such as farm and non-farm self-employment). If the returns to unskilled farm labor go up noticeably, this may have implications for the terms of tenancy contract as well. While tenancy is not a part of labor market, it can be seen as a form of labor contract and be influenced by what is happening to returns to unskilled farm wage labor. Similarly, if returns to female labor is in the rise because of spread of female education, then it can reduce the role of the unpaid work or even the share of females in low-paid self-employed work. Such interdependencies are important part of labor market externalities and spill-over effects central to any development strategy. Third, relative returns to education according to different levels of education provide to the planners the implicit labor market signals. It is important to internalize these signals for identifying growth areas where most of the job opportunities are dynamically created and for addressing the skill barriers that may exist in anticipation of these job creations. In short, educational returns are not mere statistical measures: they help better educational policy planning of the country at a particular stage of development. Such a stock taking with the trends mapping for the 2000s is particularly important Bangladesh aiming at a structural transition to become a Middle Income country with "zero extreme poverty".

4.1 Estimating Educational Returns: Methodological Issues

The general idea is that a high level of education gives a high level of earning, but it is difficult to know how much extra earning an individual can achieve by taking one year more of education. The association between education and earning cannot say much about the size of the estimate of the effect of education on earning. Earning gap between two individuals can be due to not only for different levels of education but also for different levels of ability they have. Ability can also affect both education and earning, and thus endogeneity exists in education. Because of the endogeneity problem, the association between education and earning cannot be causal, but ones are interested about the causal effect of education on earning.

The literature, in general, uses instrumental variables (IV) regression in Mincerian earning function to get the causal effect of education on earning. Sometimes, fuzzy Regression Discontinuity Design (RDD) and fixed effect model in panel data are also used to have the causal effect. In the Mincerian education function, earning is the dependent variable, and years of education, job experience and other control variables are independent variables. To know the

reliable size of the return to education parameter (e.g. the causal effect of education on earning) in this function, it is essential to control the endogeneity bias.

There is another bias called sample selection bias, which arises when participation into job market depends on some unobserved factors. In this case, wage variable can be non-random. In developing countries, this problem is in general severe. Because many people are engaged in informal sectors due to self-selection. For some unobserved reasons, some groups (e.g. some women) do not go to job market even they have a high level of education. Selection bias exists here too. To remove this problem, the traditional method is Heckman procedure, which imputes wages for those who did not participate into jobs, based on some characteristics. Most of the cases, imputed wages are not reliable at all, and thus the estimate of return to education is also not reliable. Rather, simple ordinary least square (OLS) is better than Heckman procedure.

Bangladesh has very limited contribution in the vast literature of returns to education. The most rigorous study comes from Niaz Asadullah (see Asadullah, 2007). He used Heckman procedure to control the selection bias. He did not apply IV techniques to control endogeneity bias, because they yield high estimates of return to education. That means that OLS estimates are biased mostly downward. Besides, IV estimates vary a lot with different instruments when OLS gives conservative estimates of the true effect of return to education. He used years of education as education variable and got same coefficients of this variable in OLS and Heckman models. He used Household Income and Expenditure Survey (HIES) 1999–2000, which is not suitable for return to education estimate, because in this data many individuals do not have information on education. Shafiq (2007) also used HIES 1999–2000 to estimate returns to different levels of education for boys. He used weights in data and controlled direct cost and opportunity cost of education in estimating returns to different levels of education.

In this study, we are interested to know the relative magnitudes of the effects of different levels of education on earning. We are also interested to see the relative magnitudes of education parameters among different groups (e.g. male, female, rural and urban) and years, because return to education varies with sex, location and years. As the relative magnitudes of education parameters are our main interest, we do not control endogeneity and selection biases in education parameters. We simply use OLS to estimate returns to different levels of education.

It should be noted that both LFS and HIES are not suitable for estimating return to education using years of education as education variable, because both data do not have information on years of education. Rather, ranges of completed education (e.g. class i-v, class vi-viii etc.) for individuals are available there. From this information, it is not possible to know years of education an individual completed in his/her student life. For example, some individuals within range class i-v may complete class i, some may complete class ii, or some class iii or iv or v. We do not know which individual under the range has completed which level of education. Even age left education, from which years of education can be estimated, is not available in these two survey data. However, studies conducted on Bangladesh estimated years of education using

ranges of highest level of completed education. For estimating years of education, HIES is better than LFS, because HIES does not have range up to class x where LFS has ranges such as class i-v, class vi-viii, class ix-x. HIES has ranges after class x such as higher secondary (years of education 11-12), bachelor (years of education 13-16). Therefore, existing studies used HIES in estimating return to education in Bangladesh. But if one considers sample size, then LFS is better than HIES.

4.2 The Model

We apply a model, which follows the structure of the Mincerian model. Only difference is that we use dummies of different levels of education in place of years of education. We have the following model,

$$W_i = \alpha + \boldsymbol{\rho E_i} + \gamma A_i + \delta A_i^2 + \boldsymbol{\beta X_i} + \varepsilon_i, \hspace{2cm} (1)$$

where W_i is the log of monthly private earning of individual i, α is the constant term, $\boldsymbol{E_i}$ is the vector of education dummies of individual i, $\boldsymbol{\rho}$ is the vector of their coefficients in which we are interested, A_i and A_i^2 are age and age square of individual i respectively, γ and δ are their coefficients, $\boldsymbol{X_i}$ is the vector of other control variables/characteristics of individual i, $\boldsymbol{\beta}$ is the vector of their coefficients and ε_i is the error term. We run OLS regression of this model.

4.3 Data

We use repeated cross-section data from Labour Force Survey (LFS) 2000, 2005-06 and 2010, which were conducted by Bangladesh Bureau of Statistics. They are most suitable data for analyzing return to education in Bangladesh. LFS intensively focused on individual earning and education, but as explained earlier, HIES collected this information poorly.

We include all types of private earnings (e.g. cash and kind) of individuals in the dependent variable — the log of monthly private earning. Any family income such as rent of land is not included in this variable. Daily incomes are converted into monthly incomes by multiplying them by 30, and weekly incomes are converted into monthly incomes by dividing them by 7 and then multiplying by 30. Monetary values of kind incomes are available in data, and we directly use them to generate the dependent variable. We take logarithm of monthly incomes to reduce the variation in incomes. Besides, logarithmic term gives percentage change in income due to increase in education. In general, people are interested to know the percentage change in income, not the absolute change in income. Moreover, it is a regular practice to use logarithmic term of earning variable. In this way, it is easy to compare estimates of returns to education among different studies where earnings are measured in different currencies.

As we need working aged individuals for our analysis, we keep data with 15 to 60 aged individuals who earn money. We use the highest level of completed education to estimate

education dummies. We do not consider current education level because individuals with current education level might not be engaged in the job market. Following the questionnaire, we generate education dummies such as no education (1 if an individual has zero education, 0 otherwise), class i-v (1 if an individual falls within this range, 0 otherwise), class vi-viii (1 if an individual falls within this range, 0 otherwise). Similarly, we generate other education dummies such as class ix-x (1 if an individual falls within this range, 0 otherwise), SSC (1 if an individual passed secondary exam, 0 otherwise), HSC (1 if an individual passed higher secondary exam, 0 otherwise), Bachelor (1 if an individual passed bachelor degree, 0 otherwise), Master (1 if an individual passed master degree, 0 otherwise), and so on. Because of slightly different information, education dummies are slightly different in different survey year. For example, SSC and HSC are together in LFS 2000, but they are separate in LFS 2005-6 and 2010.

We generate other variables, which are used as control variables in regressions. Age, age square, location dummy (Rural=1 if an individual does job in rural area, 0 otherwise), gender dummy (male=1 if an individual is male, 0 if female), marital status dummy (Married=1 if an individual is married, 0 otherwise), religion dummy (Muslim=1 if an individual is Muslim, 0 otherwise), occupation dummies and education institutions' dummies are our control variables. Using loadings (weights) from principal component analysis for household size, pucca house dummy (1 if house is pucca, 0 otherwise), house ownership dummy (1 if owner, 0 otherwise), landholding in decimal, non-agricultural activities dummy (1 if household's main activity is non-agriculture, 0 otherwise), pucca toilet dummy (1 if toilet is pucca, 0 otherwise), we also generate household wealth index as a control variable.

Summary statistics on earnings will give an idea about returns to education levels. Table 4 represents average monthly (private) earnings of working aged individuals from 15 to 60 by location, sex and highest level of completed education categories, using LFS 2000, 2005-06 and 2010. Three main points are noteworthy. First, the level of wage income increases with each successive step in the educational ladder. This is true for all the survey years.

Second, the earnings gap between high educated and low educated individuals has remained stable or decreased gradually from LFS 2000 to LFS 2010, depending on the precise comparator. But, here the first half of the 2000s show different trends in earning gap pattern from that of the first half. For instance, restricting only to the male workers and to comparisons between the category of "no education" and "bachelor" degree holders, it can be seen that the earnings ratio has increased quite sharply from 2.8 in 2000 to 7.2 in 2005/06, but dropped equally sharply to 2.7 in 2010. As a result, considered over the whole decade, the matched gap in earnings for male workers has slightly declined in urban areas (from 2.8 to 2.7) and, more remarkably, in rural areas (from 2.1 to 1.9). This possibly happened because (as explained in the preceding

section), wage income opportunities for the relatively unskilled labor have increased proportionately more than that for the skilled labor, especially in the second half of the 2000s.[5]

Third, the gender gap in earnings has declined over time. Although male workers earned more than female in most of the education categories (in both rural and urban areas). Male-female earning gaps gradually decreased from LFS 2000 to LFS 2010, but such gaps were low among high-skilled workers (e.g. doctors and engineers) in all cases. For instance, in the "no education" category, male-female earnings gap for urban workers was 130% in 2000; it has dropped to 18% in 2005/06, and declined further to 3% in 2010.

Table 4: Average Monthly Earning (in Taka) by Education, Location, and Sex: 2000-2010

(a) *LFS 2000*

	Rural			Urban			Total		
	Male	Female	Total	Male	Female	Total	Male	Female	Total
No Education	3094	1652	2813	3658	1671	3011	3295	1662	2892
Class I-v	3750	1652	3552	4235	1968	3813	3970	1856	3677
Class vi-viii	4561	1849	4397	4929	1835	4477	4777	1838	4446
Class ix-x	4981	2878	4795	5354	2596	4880	5214	2658	4850
SSC/HSC and Equivalent	5537	2553	5215	7018	3468	6483	6584	3266	6124
Diploma	4281		4281	11389	4675	10614	10650	4675	10025
Bachelor	6533	3506	6308	10204	5342	9658	9520	5109	9055
Masters	8323	3592	8045	11643	7660	11117	11298	7475	10820
Agriculture				6025		6025	6025		6025
Engineering/Technical	3079		3079	11176	7761	10913	9348	7761	9252
Medical	5131		5131	20516	17959	19877	19554	17959	19174

(b) *LFS 2005-06*

	Rural			Urban			Total		
	Male	Female	Total	Male	Female	Total	Male	Female	Total
No Education	3253	2507	3146	4621	3913	4431	3609	3118	3520
Class i-v	5034	4307	4977	7342	7038	7297	5818	5710	5807
Class vi-viii	7075	4906	6886	9794	7477	9524	8198	6175	7997
Class ix-x	10371	10417	10375	12863	9618	12543	11434	10021	11312
SSC/Equivalent	15710	12127	15209	20246	19718	20154	17914	16324	17664
HSC/Equivalent	19680	14896	19010	27370	24236	26747	24299	21395	23787
Bachelor/Equivalent	22627	19574	22177	33240	26217	31869	29814	24535	28862
Masters/Equivalent	28755	23429	28176	44255	30658	41615	40869	29762	38904
Medical/Engineering	32388	30000	32089	58399	45000	56062	56065	44063	54022
Technical/Vocational	37714	2229	31800	39612	13779	36383	39325	11469	35659

(c) *LFS 2010*

	Rural			Urban			Total		
	Male	Female	Total	Male	Female	Total	Male	Female	Total
No Education	3654	3899	3679	4144	4006	4115	3732	3931	3756

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[5]This upward trend possibly continued in the first half of the 2010s. Anecdotal impression suggests that wages of low-skilled workers (e.g. agricultural wage workers, rickshaw pullers, maid servants) increased three to five times in the last decade.

Class i-v	4019	4087	4023	4721	4109	4613	4182	4097	4174
Class vi-viii	4591	4449	4576	5651	4105	5404	4904	4306	4833
Class ix-x	4980	4563	4943	6051	4482	5858	5290	4532	5215
SSC/Equivalent	5656	4789	5582	7708	5595	7483	6336	5103	6222
HSC/Equivalent	6035	5182	5938	9051	6494	8733	7280	5758	7101
Bachelor/Equivalent	7103	6097	6977	11021	7518	10528	9089	6862	8792
Masters	8325	6686	8184	13864	8258	12948	11259	7788	10813
Medical/Engineering	9028		9028	21905	12019	20557	18438	12019	17774
Technical/Vocational	6257	9076	6579	10796	11855	10826	8664	9632	8732

4.4 Results

4.4.1.   Returns to Human Capital at Various Levels of Education

Table 5 represents OLS regression results of equation (1) by location and sex, using LFS 2000, 2005-06 and 2010. Here, dependent variable is log of monthly (private) earning of working aged individuals from 15 to 60. No education is the base category here. For a clear and comparable picture, returns to education are also represented in Figure 1. Since male and female workers may respond to different segments of the labor market, we discuss this issues separately by gender status. Several aspects are noteworthy.

First, in rural areas, education for female workers earlier (in 2000) did not matter for earnings until they crossed a threshold level of SSC. The intuitive reason behind this might be that rural females without qualification engaged themselves in low paid agricultural activities where any education without qualification did not make any difference in earnings. Those activities might be highly manual jobs where education cannot make any value addition in productivity. Annex Table 1 supports our intuitive idea. We see that a high number of female workers in rural area were engaged in crop processing and poultry. In these activities, the participation rate of rural female workers was extremely higher than that of rural male workers. In the subsequent years, economic opportunities for rural females with below SSC education have expanded considerably. By 2010, we see that rural females did improve their earnings with the increase in successive education levels. Compared to the category of "no formal education", those with below-primary education had 9% higher labor income, and those with Class VI-VIII had reported matched increase of 18%. However, incremental increase is much less in case of Class IX-X and "SSC or equivalent" education. The relative gains become substantial only after crossing "HSC or equivalent" at which point the matched increase is assessed at 34%. Higher education usually brings higher incremental positive effects—a trend recorded in both 2000 and 2010.

Second, for urban female workers, the education-earnings relationship also tells the same story except for the fact that even a little education (below primary, junior secondary or below SSC) helps the female workers' prospects in the urban context. This can be seen in both 2000 and 2010. This shows that relocation to urban areas opens up greater opportunities for females. However, educational access to primary and secondary education on the part of urban poor females is much less restrictive compared to their rural counterparts—a matter of public policy

choice. This aspect needs to be given greater attention in the context of the Seventh Five Year Plan.

Third, in rural areas, returns to education for both male and female workers with same level of qualification starting with "SSC and above" were almost same in LFS 2000. On the other hand, most of the cases in urban area returns to education were often higher for female workers than for male workers, reflecting the scarcity of supply of female workers in certain categories of occupations. Specially, in the cases of diploma, bachelor, masters and medical practitioners, returns to education for urban females were much higher than for urban males.[6]

However, in LFS 2005-06, returns to education were almost balanced between males and females both in rural and urban areas (see Figure 1). In LFS 2010, returns to education were almost balanced between rural males and females, but returns to education of urban females were moderately lower than that of urban males. Thus, from Figure 1, we can conclude that gaps of returns to education between urban males and urban females increased from 2000 to 2010 (turned from negative to positive especially in high qualifications). This is possibly due to the fact that wages of urban females in low skilled sectors where secondary and higher education is not needed increased substantially from 2000 to 2010. For example, the average wage of maid servants was around 500 Taka in 2000, but it became around 3000 Taka in 2010 according to LFS.
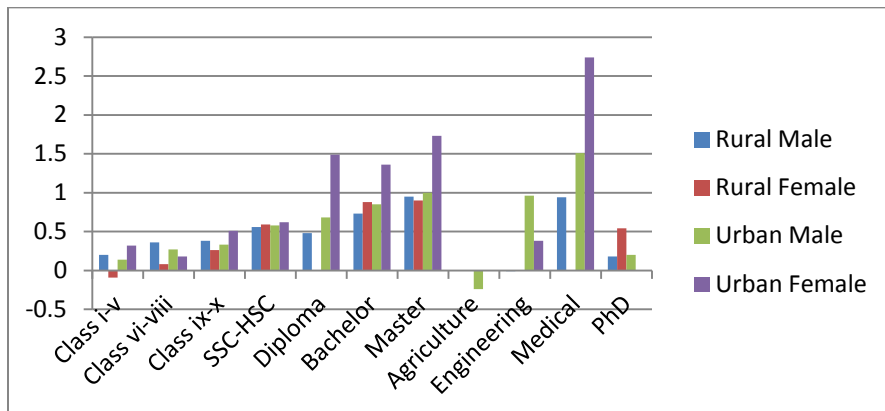
(a) LFS 2000

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[6] It should be mentioned that coefficients of engineering and PhD are biased by few observations (sample sizes for educational categories are not reported here), which might be subject to measurement error. It is highly unlikely to have any qualified engineers and PhDs in rural area. Coefficients of PhD and agriculture in urban area will also be biased because of low observations.
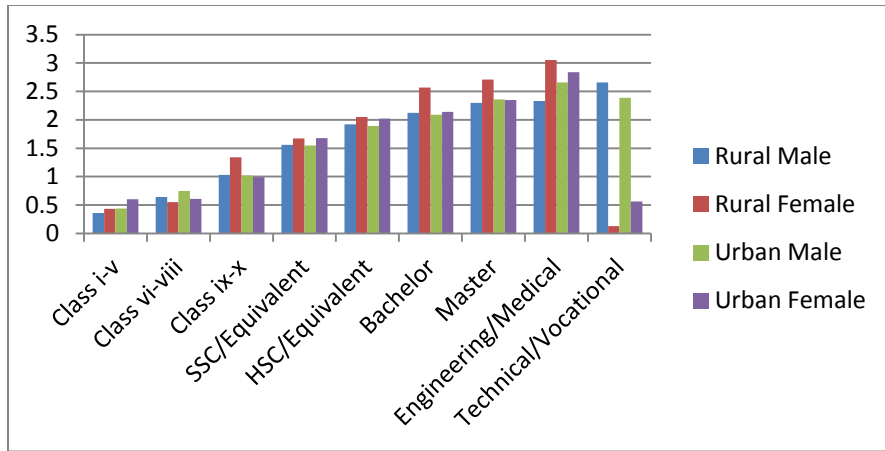
(b) LFS 2005-06
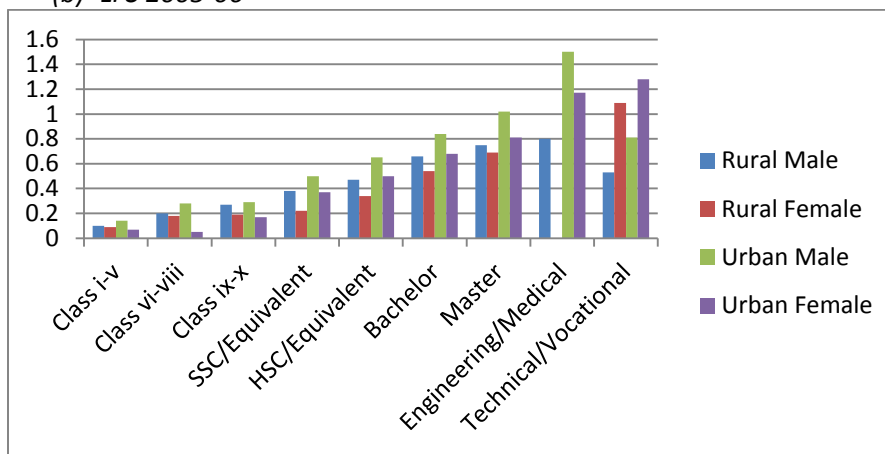
(c) LFS 2010

Figure 1: Returns to education by education levels, sex, location and survey year

Fourth, urbanization seems to have differential effects by gender. Urbanization increases positive effects of educational human capital, at least for the male workers. Thus, in 2000, urban males had higher earnings than rural males only for the category SSC and above. The matched situation has changed dramatically in the subsequent years. By 2010, urban male workers have considerably higher earnings than their male counterparts at all levels of education. Urbanization has progressed at a rapid pace in Bangladesh in the 2000s. Given the positive interaction between urbanization and human capital for the male workers education we surmise that demand-side factors such as urbanization and industrialization have had incentivizing role for the accumulation of human capital. However, notably, positive effects of urbanization on human capital returns are more pronounced (greater) for the higher education categories than that for the lower education categories.

The contrasting trend emerges for females. In general, most of females in both rural and urban areas were engaged in low skilled jobs where wage differences between rural and urban areas were very low. The matched rural-urban earning gap for females remained almost the same in 2000 and 2010.

Fifth, in general, high (low) valued industries/ formal (informal) sectors with high (low) wages are established in urban (rural) area. This contrasting pattern of rural-urban returns augur well with the predictions of rural-urban labor migration based on higher wages/ productivities/ skills associated with urban sector, as originally predicted by Lewis model of modernization and inter-sectoral mobility. This is not a new point and has been maintained earlier (Hossain, Sen and Sawada 2013). The additional moment is that the above validity of Lewis model of structural transformation in the face of rising farm wages since 2007 is further confirmed by the earnings data.

Annex Table 2 represents an extension of Table 5 where some job type and occupation type dummies are added in covariates. Direction the key findings about returns to education remain as same as in Table 5 (though here instability of signs can be seen at times).

4.4.2   Returns to "Other" Control Variables

The coefficients of Age and Age square in panel (a) of Table 5 simply state that in 2000, job experiences of rural females did not have any influence on their earnings, while urban females had little gains in earnings with increase in job experiences. Experienced males gained almost double earnings compared to experienced females, in both rural and urban areas. 10 years down the road, experienced males still gained high returns compared to less experienced or inexperienced males, in both rural and urban. Previously (in LFS 2000), female experiences had no value in rural area; this situation did not change in LFS 2010 either (see panel (c) of Table 5).

Table 5: OLS Regression Results of Returns to Education Model in Equation (1)

(a) *LFS 2000*

	Dep Var: Log of Monthly Earning								
	Rural			Urban			Total		
	Male	Female	Total	Male	Female	Total	Male	Female	Total
Age	0.05***	0.02	0.05***	0.07***	0.04**	0.06***	0.06***	0.03**	0.05***
	[8.78]	[1.02]	[8.62]	[10.76]	[2.26]	[9.61]	[13.51]	[2.42]	[12.87]
Age square	-0.00***	-0.00	-0.00***	-0.00***	-0.00*	-0.00***	-0.00***	-0.00*	-0.00***
	[-6.94]	[-0.80]	[-6.65]	[-8.77]	[-1.75]	[-7.56]	[-10.82]	[-1.87]	[-10.00]
Male			0.87***			0.91***			0.90***
			[22.83]			[30.91]			[38.58]
Rural							-0.16***	-0.05	-0.14***
							[-12.32]	[-1.02]	[-10.57]
Married	0.13***	-0.18**	0.10***	0.16***	-0.19***	0.09***	0.15***	-0.17***	0.10***
	[4.06]	[-2.44]	[3.10]	[4.54]	[-3.10]	[2.85]	[6.25]	[-3.68]	[4.31]
Muslim	0.07**	-0.24***	0.01	0.07**	-0.06	0.02	0.07***	-0.14**	0.02
	[2.26]	[-2.91]	[0.47]	[2.35]	[-0.83]	[0.76]	[3.24]	[-2.53]	[0.89]
Class i-v	0.18***	-0.11	0.15***	0.14***	0.32***	0.18***	0.16***	0.16***	0.16***
	[9.14]	[-0.97]	[6.48]	[5.63]	[4.81]	[7.26]	[10.65]	[2.59]	[9.72]
Class vi-viii	0.34***	0.05	0.31***	0.26***	0.19*	0.25***	0.29***	0.13	0.27***
	[12.13]	[0.32]	[10.62]	[9.68]	[1.81]	[8.54]	[15.37]	[1.47]	[13.02]
Class ix-x	0.34***	0.23	0.32***	0.31***	0.53***	0.35***	0.32***	0.43***	0.33***

	Rural			Urban			Total		
	[7.69]	[0.63]	[6.09]	[7.47]	[3.94]	[8.19]	[10.62]	[3.26]	[10.13]
SSC-HSC	0.46***	0.51***	0.46***	0.56***	0.63***	0.58***	0.53***	0.59***	0.55***
	[13.43]	[3.34]	[13.43]	[20.12]	[6.32]	[20.09]	[24.98]	[7.04]	[24.46]
Diploma	0.42***	0.00	0.40***	0.67***	1.49***	0.79***	0.65***	1.42***	0.75***
	[2.91]	.	[2.79]	[7.02]	[13.67]	[8.63]	[7.49]	[13.00]	[8.83]
Bachelor	0.64***	0.86***	0.65***	0.83***	1.38***	0.91***	0.80***	1.26***	0.86***
	[8.25]	[3.37]	[8.76]	[20.54]	[10.43]	[22.97]	[22.54]	[10.58]	[24.65]
Master	0.80***	0.90***	0.82***	0.96***	1.74***	1.08***	0.95***	1.66***	1.05***
	[5.82]	[8.14]	[6.05]	[15.11]	[9.36]	[17.22]	[16.31]	[9.34]	[18.13]
Agriculture				-0.23		-0.24	-0.23		-0.25
				[-0.21]		[-0.22]	[-0.21]		[-0.23]
Engineering	0.01		-0.00	0.94***	0.38	0.92***	0.73***	0.33	0.72***
	[0.06]		[-0.00]	[5.86]	[0.22]	[4.75]	[4.96]	[0.19]	[4.24]
Medical	0.96***		0.92***	1.48***	2.74***	1.78***	1.46***	2.69***	1.72***
	[35.76]		[34.63]	[6.21]	[11.88]	[8.41]	[6.44]	[11.19]	[8.41]
Wealth Index	0.00***	0.00	0.00***	0.00***	-0.00	0.00***	0.00***	-0.00	0.00***
	[6.55]	[1.01]	[6.66]	[6.73]	[-0.81]	[4.97]	[9.33]	[-0.29]	[9.17]
Constant	6.47***	6.91***	5.76***	6.31***	6.40***	5.68***	6.49***	6.63***	5.79***
	[62.67]	[20.66]	[54.84]	[58.49]	[26.33]	[56.25]	[86.67]	[34.16]	[80.60]
Observations	5194	867	6061	5208	1388	6596	10402	2255	12657
Adjusted R^2	0.229	0.030	0.318	0.286	0.154	0.405	0.288	0.108	0.376

(b) *LFS 2005-06*

	Dep Var: Log of Monthly Earning								
	Rural			Urban			Total		
	Male	Female	Total	Male	Female	Total	Male	Female	Total
Age	0.03***	0.03**	0.04***	0.06***	-0.01	0.05***	0.04***	0.02*	0.04***
	[6.89]	[2.45]	[8.08]	[8.33]	[-0.35]	[7.52]	[9.99]	[1.76]	[10.55]
Age2	-0.00***	-0.00**	-0.00***	-0.00***	0.00	-0.00***	-0.00***	-0.00	-0.00***
	[-6.08]	[-2.32]	[-7.04]	[-6.72]	[0.98]	[-5.56]	[-8.31]	[-1.18]	[-8.50]
Male			0.33***			0.17***			0.26***
			[12.06]			[6.21]			[13.32]
Rural			0.00				-0.31***	-0.46***	-0.33***
			.				[-22.68]	[-12.31]	[-25.62]
Married	0.01	-0.34***	-0.05**	0.10***	-0.00	0.10***	0.05**	-0.18***	0.02
	[0.29]	[-6.10]	[-2.10]	[2.85]	[-0.04]	[3.49]	[2.39]	[-4.59]	[0.83]
Muslim	0.18***	0.23***	0.20***	-0.04	-0.32***	-0.09***	0.09***	-0.00	0.08***
	[8.47]	[4.36]	[9.99]	[-1.22]	[-4.98]	[-3.39]	[5.32]	[-0.04]	[5.12]
Class i-v	0.33***	0.40***	0.33***	0.42***	0.56***	0.45***	0.37***	0.49***	0.38***
	[16.81]	[4.56]	[17.07]	[13.04]	[6.45]	[14.61]	[21.93]	[7.91]	[23.04]
Class vi-viii	0.58***	0.51***	0.57***	0.73***	0.56***	0.71***	0.64***	0.55***	0.63***
	[20.04]	[4.64]	[20.30]	[18.41]	[4.49]	[18.87]	[27.41]	[6.64]	[27.77]
Class ix-x	0.96***	1.23***	0.98***	0.98***	0.94***	0.99***	0.97***	1.11***	0.99***
	[23.16]	[7.36]	[24.18]	[20.08]	[6.43]	[21.17]	[30.73]	[9.75]	[32.14]
SSC/Equivalent	1.45***	1.52***	1.46***	1.49***	1.58***	1.52***	1.48***	1.59***	1.49***
	[39.03]	[13.70]	[41.39]	[38.95]	[15.95]	[42.13]	[56.05]	[21.78]	[59.90]
HSC/Equivalent	1.81***	1.95***	1.82***	1.84***	1.88***	1.86***	1.84***	1.97***	1.86***
	[50.76]	[16.68]	[52.95]	[53.22]	[24.65]	[59.13]	[76.35]	[31.77]	[82.62]
Bachelor	2.01***	2.41***	2.06***	2.02***	1.97***	2.01***	2.03***	2.13***	2.04***
	[57.64]	[26.97]	[63.28]	[58.79]	[24.77]	[63.98]	[84.14]	[34.55]	[91.24]
Master	2.18***	2.55***	2.22***	2.30***	2.21***	2.29***	2.29***	2.29***	2.28***
	[37.66]	[18.81]	[41.08]	[58.64]	[26.93]	[64.63]	[73.46]	[31.73]	[80.55]
Engineering/Medical	2.07***	2.70***	2.15***	2.59***	2.60***	2.60***	2.56***	2.60***	2.56***
	[7.01]	[29.52]	[8.08]	[29.26]	[18.21]	[34.26]	[30.15]	[18.96]	[35.29]
Technical/Vocational	2.59***	0.07	2.19***	2.35***	-0.02	2.11***	2.39***	0.01	2.13***

	[14.24]	[1.33]	[5.58]	[31.32]	[-0.02]	[11.48]	[32.28]	[0.01]	[12.64]
Wealth Index	0.03***	0.04***	0.03***	0.02***	0.05***	0.03***	0.03***	0.04***	0.03***
	[13.66]	[4.93]	[14.27]	[6.67]	[5.96]	[8.66]	[14.83]	[7.31]	[16.53]
Constant	6.80***	6.58***	6.43***	6.65***	7.82***	6.72***	6.99***	7.32***	6.78***
	[85.83]	[26.41]	[80.08]	[54.92]	[28.38]	[59.63]	[102.95]	[39.01]	[102.31]
Observations	11055	1454	12509	6807	1589	8396	17862	3043	20905
Adjusted R^2	0.408	0.388	0.410	0.542	0.495	0.531	0.520	0.490	0.514

(c) *LFS 2010*

	Dep Var: Log of Monthly Earning								
	Rural			Urban			Total		
	Male	Female	Total	Male	Female	Total	Male	Female	Total
Age	0.02***	-0.00	0.02***	0.03***	0.01	0.02***	0.02***	0.00	0.02***
	[9.41]	[-0.33]	[8.24]	[5.98]	[1.12]	[6.14]	[10.75]	[0.62]	[10.58]
Age2	-0.00***	0.00	-0.00***	-0.00***	-0.00	-0.00***	-0.00***	-0.00	-0.00***
	[-8.16]	[0.65]	[-6.95]	[-4.40]	[-0.55]	[-4.21]	[-8.89]	[-0.01]	[-8.46]
Male	0.00	0.00	0.01			0.09***			0.05***
			[0.83]			[5.31]			[4.64]
Rural			0.00			0.00	-0.17***	-0.05**	-0.16***
			.			.	[-23.14]	[-2.46]	[-22.60]
Married	-0.04***	0.04	-0.02**	0.10***	0.01	0.08***	-0.00	0.03	0.00
	[-3.46]	[1.39]	[-2.19]	[4.42]	[0.44]	[4.32]	[-0.23]	[1.42]	[0.21]
Muslim	0.03***	0.04	0.03***	0.05**	0.07	0.06***	0.03***	0.05*	0.03***
	[2.82]	[1.42]	[2.94]	[2.33]	[1.57]	[3.00]	[3.66]	[1.93]	[3.77]
Class i-v	0.10***	0.09***	0.10***	0.13***	0.07*	0.12***	0.10***	0.08***	0.10***
	[11.77]	[2.59]	[11.99]	[7.71]	[1.84]	[7.70]	[13.86]	[3.23]	[13.99]
Class vi-viii	0.19***	0.18***	0.19***	0.27***	0.05	0.23***	0.21***	0.13***	0.20***
	[16.79]	[4.67]	[17.52]	[13.94]	[1.16]	[12.91]	[21.52]	[4.33]	[21.69]
Class ix-x	0.25***	0.19***	0.25***	0.28***	0.18***	0.26***	0.25***	0.19***	0.25***
	[16.58]	[3.59]	[17.02]	[10.40]	[2.86]	[10.44]	[19.30]	[4.65]	[19.88]
SSC/Equivalent	0.36***	0.22***	0.35***	0.48***	0.39***	0.47***	0.40***	0.28***	0.39***
	[20.49]	[3.36]	[20.53]	[17.53]	[5.15]	[18.04]	[26.60]	[5.71]	[27.09]
HSC/Equivalent	0.45***	0.33***	0.44***	0.63***	0.52***	0.61***	0.52***	0.41***	0.51***
	[20.61]	[5.01]	[21.14]	[20.46]	[7.18]	[21.41]	[28.84]	[8.41]	[30.05]
Bachelor	0.63***	0.53***	0.62***	0.82***	0.70***	0.80***	0.72***	0.62***	0.71***
	[25.68]	[8.00]	[26.94]	[25.71]	[11.12]	[27.58]	[36.05]	[13.69]	[38.55]
Master	0.73***	0.68***	0.73***	1.00***	0.83***	0.96***	0.86***	0.78***	0.85***
	[20.90]	[8.63]	[22.34]	[24.28]	[13.55]	[26.85]	[31.42]	[16.23]	[34.41]
Engineering/Medical	0.78***	0.00	0.78***	1.48***	1.20***	1.43***	1.28***	1.18***	1.26***
	[5.43]	.	[5.45]	[14.64]	[7.74]	[15.77]	[14.31]	[7.90]	[15.44]
Technical/Vocational	0.51***	1.07***	0.58***	0.80***	1.30***	0.80***	0.66***	1.13***	0.69***
	[5.28]	[9.08]	[6.26]	[6.85]	[39.44]	[6.94]	[8.20]	[11.27]	[9.05]
Wealth Index	0.00***	0.00	0.00***	0.00***	-0.00	0.00***	0.00***	0.00	0.00***
	[9.59]	[0.81]	[9.42]	[4.48]	[-1.48]	[3.46]	[10.52]	[0.17]	[9.90]
Constant	7.61***	7.99***	7.66***	7.41***	7.81***	7.42***	7.71***	7.93***	7.69***
	[206.26]	[66.34]	[205.62]	[98.89]	[53.38]	[114.09]	[226.51]	[86.90]	[237.33]
Observations	26889	2791	29680	8576	1708	10284	35465	4499	39964
Adjusted R^2	0.092	0.042	0.085	0.244	0.147	0.234	0.165	0.083	0.154

Note: *t* statistics are in brackets. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. No education is the base category dummy for education qualification dummies.

Marriage seems to have a contradictory effects on male vs. female earnings in the context of persistent patriarchy. Married males (females) earned significantly higher (lower) than unmarried males (females) in both rural and urban areas. The intuitive idea is that in

Bangladeshi culture males' responsibilities for their families increase after their marriages. They have to earn more after marriage. On the other hand, after marriage females mostly engage in household activities (e.g. child care), and their economic activities go down. In 2000, married females had lower earnings than unmarried females—the matched differences were statistically significant for both rural and urban areas. In 2010, there is no statistical difference in earnings among married and unmarried females for both rural and urban areas, suggesting a modicum of progress in confronting patriarchy. In contrast, in LFS 2000, both rural and urban males gained earnings after marriage, but in LFS 2010, males did not gain earnings after marriage.

In both rural and urban areas, non-Muslim males had lower earnings than Muslim males. One possible reason is that minority groups had a low participation in high skilled jobs where wage rates are high. On the other hand, Muslim females in rural area possibly faced more traditional restrictions in 2000 to work outside of their homes than their non-Muslim counterparts. Such restrictions even then were not available in urban area. As a result, while in rural area Muslim females earned less than that for non-Muslim females, there were no significant earning gaps among Muslim and non-Muslim females in urban area. This comparative situation has changed dramatically in the subsequent decade. By 2010, such discriminations among females across majority-minority identities vanished in rural areas indicating the weakening grip of traditions over economically transformative processes.

The above patterns remain the same in Annex Table 2 where OLS regression results of returns to education (base model) are extended with occupation dummies.

4.4.3   Returns to Madrasa Education

The information whether an individual studied in Madrasa (govt. affiliated or Kowmi) – is not available in LFS. It is available in HIES (more clearly and intensively in HIES 2010). So, here we use HIES data for seeing the returns to Madrasa education compared to non-Madrasa education. In Table 6, we see that Madrasa education gave substantially low returns for both urban males and females. In rural areas, males had moderate returns to Madrasa education, but female had substantially low returns to Madrasa education compared to non-Madrasa education. However, the important finding is that both in rural and urban areas, not only the earning gaps between males and females who studied in Madrasa are still very high, the absolute level of earnings is the lowest among all categories of education. This is a serious policy concern. In view of the very low return to female Madrasa education, it would be curious to know why females go to Madrasa in the first place. It might be the case that Madrasa education for females is cheaper than in case of secular streams; the other reason may relate to greater personal security in female residential Madrasas compared to non-residential secular educational establishments. But, cost of education is not available for female Madrasa in HIES 2010, and is left for future research.

4.4.4   Returns to Technical and Vocational Education

The category of technical and vocational education (TVE) is not separately available for LFS 2000. The most recent data for 2005/06 and 201 allow us to estimate returns to technical and vocational education for both rural and urban areas by gender. Three aspects are noteworthy.

First, for male workers, return to TVE was already higher than that for "HSC and equivalent" in 2005/06. This continued to hold in 2010 as well. Thus, male workers with TVE had 81% higher earnings than those with no formal education compared to the matched effect of 65% for HSC and equivalent in 2010. In fact, one can discern a comparative edge of TVE over even Bachelor degree in 2005/06 data, which got eroded somewhat in 2010.

Second, for female workers, the contrasting picture emerges. In 2005/06, gaining access to TVE did not matter for females (or mattered little) by way of additional earning prospects compared to those females without education (or even compared to "below primary" level of education). This was true for rural and urban areas. The situation seems to have changed for better in the intervening years. By 2010, the return to TVE for female workers turn significantly higher than those female workers with HSC and Bachelor education. Moreover, the return to TVE is now higher for female workers compared to male workers. This indicated the changing demand pattern in the labor market with increasingly more jobs requiring skill formation through technical and vocational training (Riboud and Tan 2009).

Third, as expected, the return to TVE is higher in urban areas than in rural areas, and this pattern holds for male and female workers. The increasing importance of TVE in urban areas and for female workers merit attention in designing educational policy.

Table 6: Average Monthly Earning per Worker (in Taka) by Educational Institution, Location and Sex in 2010

	Rural			Urban			Total		
	Male	Female	Total	Male	Female	Total	Male	Female	Total
Government	5235	4710	5189	8568	6718	8271	6991	6088	6875
Private (Govt. grants)	5985	4574	5781	7986	6933	7838	7198	5983	7026
Private (Govt. grants)	7957	2100	7399	8690	4121	8358	8491	3447	8093
NGO run institution	4612	1950	4128	5100	1335	2590	4701	1540	3585
Madrasa (Govt. affiliated)	5073	2176	4814	5393	1317	5143	5211	1890	4953
Madrasa (Kowmi)	5566	2000	5411	5338	3333	4836	5517	2889	5262

Source: Estimated from unit-record data of HIES 2010

V. The Quality Divide in Human Capital

One of the unintended consequences of the ascent of the relatively unskilled labor has been the increasing drop-out of boys from the secondary schools. In the backdrop of tightening wage labor market, especially since the second half of the 2000s, male earners from the poor families faced increased choice between attending the secondary schools and participating gainfully in

the labor market which promised immediate returns in the form of higher wages. Over the last decade between 2004 and 2014, in peri-urban areas such as Keraniganj, the agricultural wage rate (per person per day) has increased from 7-8 kg of rice equivalent to 12-13 kg. On the other hand, the real value of primary stipend (per person per month) has declined 7 kg of rice equivalent to about 4 kg during this period. This is not a pattern for peri-urban areas alone: the wage hike was universally reported in rural areas in general during this period (Hossain, Sen and Sawada 2013; Zhang et al. 2013). Even though female wage labor also benefited from this wage hike, the proportionate gains were more pronounced in cased of male agricultural labor. This contrasting wage trends combined with non-offsetting stipend benefits contributed to greater gender equality in primary and secondary enrolments. This has been observed in HIES data, especially between 2005 and 2010. In a sense, this could be predicted from the dynamics of educational returns. Workers with no formal education had equal or even higher growth in earning compared to higher education groups within the band of SSC or below. In certain cases, the relative earnings growth by education was such that the marginal differences between no formal education and the next category of below primary or junior secondary education got blurred. This tendency towards equalization of human capital returns across the lower end of the educational spectrum (up to SSC) has contributed to declining earnings inequality observed in Section II. In short, one of the implications of divergent educational returns (more at the lowest end than in the middle grade) has been girls' enrolment rate being higher than that for boys. The parity success is not to be wholly attributable to supply-side education stipend policy of the government but also strongly got impetus from gender-sensitive labor market signals, particularly for the male labor.

Such a gender specific pattern of human capital formation underpinned by the mobility of the relatively unskilled labor has been reinforced by gradual depreciation of education quality, especially for the lower income groups. This can be judged by two sets of indicators. First, a recent study of the Dhaka middle class reveals that the Rich and the Upper Middle class send their kids mainly to English-medium schools; Lower Middle Class and the Moderate Poor send their sons and daughters to Bengali-medium schools; and the Extreme Poor basically refrain from sending their kids to any kind. The school choice by economic classes already creates quality divide in human capital (Sobhan 2011). Second, test score results indicate considerable student under-achievement on the part of lower wealth categories compared to higher wealth categories (Table 7).[7] Student test scores for all subjects are consistently lower for the bottom two asset quintiles compared to the richer asset categories. Third, we suspect that similar variation may exist in distribution of students with GPA-5 between income poorest and income richest areas. This is partly reflected by the PPRC survey of secondary schools (Rahman 2011). Although the sample size is limited in this study, it revealed a remarkable quality disparity across Metropolitan-rural divide. Thus, proportion of SSC candidates securing GPA 5 was assessed at 72% in Dhaka city schools, 61% in "other city" schools, and only 5% for rural schools.

VI.   Conclusions and Some Policy Considerations

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[7] The authors are grateful to Niaz Asadullah for generating this table from unpublished data.

The main job market story for Bangladesh during the intervening years since 2000 has been the ascent of the relatively unskilled labor both in rural and urban areas. The labor income of the unskilled labor (workers with no or little education) has increased at a higher rate than that for the skilled labor (workers with SSC and above education). This has contributed to declining earnings inequality during the 2000s.

The paper demonstrated one clear pathway for such decline in earnings inequality by analyzing the educational returns at various level of education estimated separately for male and female workers to disentangle gender-specific differences in labour force participation. The paper showed that return gaps on educational human capital between the lowest and subsequent levels of education have narrowed considerably over time. In particular, we find that male workers with no or little education gained as much as the workers with primary and secondary education.

Table 7: Mean Student Score by Wealth Quintiles

FULL sample				
	Maths	English	Islam	general knowledge
Asset_index				
1	33.65	32.17	71.67	36.57
2	34.74	33.73	73.98	39.26
3	35.04	35.15	74.09	39.06
4	35.74	35.40	74.05	39.66
5	37.22	37.06	75.16	40.34
Total	35.03	34.30	73.47	38.58
Sample excluding Aliyah madrasa students				
	Maths	English	Islam	general knowledge
Asset_index				
1	34.60	35.00	67.98	36.54
2	35.97	36.70	70.19	39.61
3	35.55	38.13	70.05	39.14
4	36.15	37.89	71.34	39.35
5	37.22	39.39	72.62	39.98
Total	35.75	37.12	70.17	38.59

Note: Figures in the tables represent mean scores. Computed by Niaz Asadullah. For details, see Asadullah (2014).

It is only after crossing a threshold of SSC or HSC one can see higher marginal benefits of human capital accumulation. This is because male workers with no or little education had adequate income earning opportunities so much so that they faced the hard choice of settling for higher

consumption/ income now (albeit with lower human capital) vis-a-vis lower intergenerational mobility in the future (the latter is generally associated with higher human capital). This is similar to what Wood (2003) characterized as the "Faustian bargain" for the poor caught up with the dilemma of choosing present vs. future welfare. This is theoretically predicted by Galor and Zeira (1993) analyzing the trade-offs between current consumption vs. future consumption using over-lapping inter-generational model of labor mobility.

The calculus of educational return economics is further complicated by unequal access to comparable quality of education. The paper reveals that return to Madrasa education, especially female Madrasa education, is particularly low. An additional moment of the return dynamics is detected in the emergence of female vocational education as a potentially attractive alternative to generalized educational system.

With these findings in view, a brief summary of policy recommendations would be in order in the context of Seventh Five Year Plan. Presently, cost-and-return economics of education for the poor discourages the male members of their families to pursue education beyond primary education, especially set against the continued scenario of labor market tightening for the relative unskilled labour and consequent promise of higher labor earnings. This has the implication of reducing poverty in the short-run by selling wage labor against the prospect of limited long-term mobility requiring continuous accumulation of human capital. The latter is also required to be part of the "networking society" that would connect the poor with capital, technology and power beyond just selling wage labour. This needs to be addressed through a variety of routes, as discussed below.[8]

6.1   Rationalization of Educational Subsidies and Targeting to the Poor

Educational subsidies (stipends) at the secondary level need to be extended to male members of the poor families as well. To make it easily admissible within the prevailing fiscal regime, girls' stipends scheme need to be restricted to female members of the poor families. To this issue one needs to add the growing problem of subsidies involved in spending every year for ensuring delivery of textbooks free of cost to everyone in schools irrespective poverty status. Instead of such universal approach in the distribution of textbooks to everyone, the supports should be broadened and need-based to ensure that we are expanding the scope of support only to those who have the most pressing needs. Moreover, the need of the poor families for quality education is rising and more can be done in this regard. There are still children in schools who suffer due to not having money to buy other materials and in many cases cannot afford the cost of travel to and from school. After all, not everyone's house is adjacent to schools. This includes urban areas as well, where in absence of the system of rapid mass transit, within-city travel has become complex as well as expensive.

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[8] The discussion below is heavily indebted to detailed suggestions provided by Rasheda K. Chowdhury and her colleagues in CAMPE.

The upshot of the above is that rationalization of the educational budget is necessary in the context of the Seventh Plan. Targeting to the poor and poorest in case of educational stipend schemes (including girls' stipend scheme at secondary and higher secondary levels) and in case of the distribution of textbooks would release resources for paying attention to the "other aspects" of education. Resources thus released can be used for improving the "quality of education" as well as reaching out to those families who currently drop out from the sub-systems of primary, secondary and higher secondary education in both rural and urban areas.

6.2   Support "Second Chance" Schooling

For those male workers who are already in the labour market, a "second chance schooling" needs to be actively considered through introducing the "modular approach". The modular approach has been popularized by ILO in the 1970s as applied to technical and vocational education (for early thinking on the modular approach in Bangladesh, see Sen 1976). It is a 'remedial program' for those who have discontinued their education at certain points in life to enter into labor market but can go back to school again to resume their studies. Although initially conceptualized for technical and vocational education, it has wider application in general for other educational streams as well.

In the first place, such remedial programs are very much needed in ensuring "basic literacy" for all workers. Without such basic literacy it is difficult to even train up workforce for any formal sector. The literacy under consideration has to be both in Bangla and English because the instructions, guidelines and many other methods of operations and machineries are in English. A familiar example is provided by the female workers in the ready-made garment sector. While the act of stitching, sewing, cutting and labelling per se belong to the category of "simple technology" the overall participation (and career mobility) requires some exposure literacy and numeracy in English because one has to read the labels and instructions which are typically in English. Someone who is at least literate in Bangla and English would find a much faster career progression and option for increasing his/her earnings than someone who is illiterate or has acquired poor quality education. What is also needed is a 'Life Skills Program' for such group of people. The employers not only need good technical skills but they also appreciate the "soft skills" among employees. Studies have shown that mixing the two types of skills also contributed to productivity. Thus the aspect of developing soft skills through remedial program can also be considered.

6.3   Priority to Technical and Vocational Education

In connection with the above discussion on "second chance schooling", the Seventh Plan must adopt the idea of thrust sector within secondary and post-secondary education in line with the changing demand at the present stage of economic development. Our empirical findings show

that technical and vocational education (TVE) has a higher return than that for those who completed higher secondary certificate for both male and female workers. If TVE access can be expanded in line with the market demand it can re-connect the male drop-outs with the formal educational system. The heightened role of TVE is also important in the context of overseas migration opportunities demanding manual but literate labor with skills in the technical and vocational occupations. This is true of both male and female workers. New migration opportunities are created for female workers in "care giving" sectors, which can be tied with a possible restructuring of TVE responding to the changing demand. One good example is that female TVE has a higher return than that for male TVE, indicating the potentials for increase of TVE for female students at the secondary level. Thus, technical and vocational education merit more attention in the context of the Seventh Plan and annual budgetary priorities need to reflect this.[9]

6.4 Support Income Mobility of the Educated Female Workers

As is known, Bangladesh has made impressive progress in spreading primary and secondary education among girls so much so that not only gender parity has been achieved but the female enrolment and completion rates have become higher than that for the males at both primary and secondary levels! This has positive effects on a range of social indicators such as maternal and child health and nutrition. While this process merits continual support, we need to also think about enhancing synergies between social development through female education and economic development through gainful economic participation of educated female workers. The two aspects of development often do not go hand in hand. While female enrolment rate has accelerated at a faster rate than many developing countries, the female work force participation in the country is still restricted to one-third—way below the matched figure for East and South-East Asian economies. This is where we can do more. Such strategic steps would be beneficial for both growth in per capita GDP (for achieving the Middle Income objective) and gender-sensitive economic structural change (drawing in educated women into the ambit of the modern sector).

In posing such question, we concede that social effects of female education are higher than its immediate economic effects. The moot point is that economic effects of the female education can be magnified through policy support. For devising the educational strategy, the immediate question is to raise the "value for money" spent on girls' education. To what extent female secondary education through female stipend schemes has led to better income/occupational mobility of the stipend beneficiaries remains still an under-researched question. It is possible that human capital effects come through with a lag and what we are not seeing now shall witness in the near future. However, we can accelerate this process of bridging between initial capability development through female educational opportunities and subsequent gainful economic participation of the female workers. This can be done through policies aimed at (a)

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[9] See, Riboud and Tan (2009).

incentivising the creation of remunerative and productive jobs for the female workers mainly through the growing and dynamic private sector of the country; (b) providing gender-friendly work environment; (c) creating gender-friendly Rapid Mass Transit (RMT) within megacities and via improved inter-city connectivity for facilitating easy and secure travel of the female workers; (d) paying attention to the housing policies, especially for the unmarried female workers; and last but not the least (e) fighting pockets of social conservatism by emphasizing the inalienable constitutional rights for the female citizens as well as by show-casing positive stories from the relevant sectors of the economy where female participation has been crucial to national economic success. This would be especially relevant for those geographic areas of the country which still continue to deprecate the value of the female work outside the domain of domesticity. In other words, a more decentralized approach is needed to fighting pockets of social conservatism.

To sum up, for the female workers at large, the main problem seems to be *not* on the side of educational opportunity but on the side of creating economic pathways commensurate to the successive gradations of educational human capital.

6.5   Social Protection for Educational Human Capital in Urban Areas

Social protection has not only protective function against risks of slippages into poverty, but also have important side-effects on the formation of human capital of the poor and their families. Faced with uninsured and unanticipated shocks, children of the poor families are typically withdrawn from schools. With and without shocks, extreme poverty often forces difficult decisions pertaining to labor market participation at a relatively early stage of life-cycle, thus facing poverty trap in the long-run as opposed to reaping welfare gains in the short-run. This effect has been more pronounced in the recent years, especially after 2005, when the labor market has started tightening (Hossain et al. 2013). This adverse human capital effect of positive changes in the labor market are likely to be more pronounced for the urban poor and poorest because urban areas (mega cities in particular) typically exclude many of the existing rural social protection programs.

To the extent urbanization enhances returns to human capital, it is important to extend social policy (social protection, including educational stipends) to the urban poor so as to enable the younger members of the poor households to take better advantage of the urban growth opportunities in the future.

6.6   Not just Poverty Maps, but GPA Maps

Bangladesh has made considerable progress since 2010 in being able to secure higher pass rates in various school certificate examinations, including an increasingly impressive rates of qualifying in these exams with GPA 5. Similar to Poverty Maps, GPA 5 Maps can be prepared to

pinpoint the Upazilas and Unions, which have consistently under-performed compared to the national standard over the 2010s.

This, however, needs to be subjected to one big caveat. Seeing pass-rate as a success indicator in education and introducing a testing system that emphasize on certification without regard to educational system improvements may carry the risk of meeting the quantity targets at the expense of quality of learning outcomes. Besides, it may just create more burden on younger generation.

Serous considerations may be given to the four public examinations from K − 12 period of education. There are obvious positive aspects of having such a certification system, but the consequences of certification without adequate competency assessment might take us to a time when we will have so many school graduates are demanding job with multiple A+ certificates in hand but there skills would not match any sector.

6.7   Testing Learning Outcomes with Internationally Recognized Competency Assessment

Incentivizing education for the younger members of the unskilled labor supplying households cannot be done by targeting quality education for the poor and the poorest. It anticipates efforts at improving quality of education at all levels. Here the action must credibly start at the national level first before it is targeted to the poor. Bangladesh must be part of an internationally acceptable quality testing system, which will enable the national policymakers to assess the quality of its educational system in a quantifiably comparable way with other countries. The Programme for International Student Assessment (PISA) is a triennial international survey which aims to evaluate education systems worldwide by testing the skills and knowledge of 15-year-old students. To date, students representing more than 70 economies have participated in the assessment. The only region of South Asia which already became part of PISA is the Indian states of Tamil Nadu and Himachal Pradesh. Unfortunately, Bangladesh is yet to become a part of PISA and can be a frontrunner among SARC countries.

6.8   Bridging Madrasa and Non-Madrasa Education Streams

Given the persistently low returns for both boys and girls enrolled in Madrasa education compared to non-Madrasa education, it is important to improve the quality of Madrasa education (both for Kowmi and non-Kowmi streams). Even though a single stream education is unlikely to take place in the upcoming five years phase, it is possible to find ways of making Madrasa education more market-friendly. In this backdrop it is worth exploring whether one can construct a bridge between Madrasa education and TVET.

Making TVET more market responsive with better quality is essential, so is ensuring better performance by Madrasas. Here the policy dilemma is to strike a fiscal balance between public funding for upgrading a poorly-performing Madrasa system with that for the mainstream general education system, which is also starved of resources, strictly speaking. Bangladesh is still

spending less than 5% of GDP recommended for quality public education. In recent years, in fact, allocations for the public education has *declined* as a share of public budget. Despite its poor quality, the general stream is much more attuned to demands of the economy. While the political sensitivity cannot be ignored, but a strategy that makes the mainstream general schooling more attractive and easily accessible with better quality and more affordable for poor families (an attraction for Madrasa), would be a way to address the policy dilemma.

Currently, the Kowmi stream of education is treated like the "inferior good" reserved only for the poorest and the most disadvantaged. In general, the Madrasa system of education needs to be modernized infrastructurally, recognizing the "heterogeneity" within this sub-sector. As is known, European Enlightenment was not made on secular reason alone. Immanuel Kant famously said, "I had to recede from reason in order to make room for faith". In this "post-secular age" (to use the term coined by Habermas 2011), both faith and reason must play their due role in the making of Bangladeshi Enlightenment, drawing on the rich traditions of faith-based spiritual inquiries and equally rich traditions of scientific inquiries. This will also be a timely intervention for better prospects for a socially integrated and economically upwardly mobile society.

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Appendix

Annex Table 1: Number of workers (15-60 aged) by economic activities, location and sex (Source: LFS 2000)

	Rural			Urban		
	Male	Female	Total	Male	Female	Total
Crop production (land cultivation, irrigation etc.)	3,653	196	3,849	536	29	565
Crop processing	384	1,570	1,954	62	217	279
Vegetables & species production	55	97	152	17	56	73
Livestock	249	621	870	57	119	176
Poultry	80	1,342	1,422	35	512	547
Forestry	8	3	11	3	2	5
Other agriculture works	18	17	35	22	4	26
Fishing	145	24	169	89	3	92
Natural gas and other minerals	9	20	29	13	2	15
Raw materials for cottage industry	271	86	357	747	320	1,067
Home based cottage work	97	187	284	140	263	403
Electricity, water, gas supply/repair	16	2	18	59	8	67
House, building, road, bridge building/ repair	176	16	192	325	22	347
Retail, small, wholesale business	926	90	1,016	1,715	118	1,833
Hotel, restaurant works	95	5	100	182	18	200
Land, water, air, t&t other transport, colds	359	7	366	893	20	913
Bank, insurance work	18	2	20	113	9	122
Immovable property tax/rent and business	13	2	15	53	9	62
Public administration/management work	72	3	75	334	50	384
Education service	150	30	180	149	121	270
Health service	33	10	43	82	23	105
Voluntary work religion/ social	50	121	171	166	335	501
Other services	151	149	300	399	372	771
Total	7,028	4,600	11,628	6,191	2,632	8,823

Annex Table 2: OLS Regression Results of Returns to Education (Extended) Model

(a) *LFS 2000*

	Rural			Urban			Total		
				Dep Var: Log of Monthly Earning					
	Male	Female	Total	Male	Female	Total	Male	Female	Total
Age	0.05***	0.01	0.04***	0.06***	0.04**	0.06***	0.05***	0.02*	0.05***
	[8.58]	[0.46]	[8.32]	[10.26]	[2.44]	[9.43]	[13.01]	[1.85]	[12.48]
Age2	-0.00***	-0.00	-0.00***	-0.00***	-0.00*	-0.00***	-0.00***	-0.00	-0.00***
	[-6.98]	[-0.25]	[-6.42]	[-8.31]	[-1.82]	[-7.38]	[-10.50]	[-1.23]	[-9.65]
Male			0.79***			0.86***			0.83***
			[25.89]			[31.39]			[40.74]
Rural							-0.16***	-0.02	-0.14***
							[-12.89]	[-0.47]	[-10.69]
Married	0.10***	-0.14**	0.09***	0.15***	-0.12**	0.09***	0.13***	-0.10**	0.10***
	[2.91]	[-2.16]	[3.11]	[4.57]	[-2.03]	[3.12]	[5.50]	[-2.29]	[4.66]
Muslim	0.06**	-0.16**	0.02	0.09***	-0.04	0.03	0.07***	-0.08	0.03
	[2.05]	[-2.30]	[0.58]	[2.92]	[-0.54]	[1.07]	[3.46]	[-1.61]	[1.33]
Class i-v	0.14***	-0.04	0.12***	0.16***	0.35***	0.19***	0.15***	0.21***	0.15***
	[6.91]	[-0.41]	[5.73]	[6.84]	[5.75]	[8.33]	[9.78]	[3.93]	[9.96]
Class vi-viii	0.27***	0.16	0.27***	0.28***	0.32***	0.27***	0.27***	0.23***	0.26***
	[10.02]	[0.96]	[9.54]	[10.38]	[3.82]	[9.73]	[14.30]	[2.98]	[13.08]
Class ix-x	0.25***	0.34	0.27***	0.35***	0.67***	0.39***	0.31***	0.56***	0.34***
	[5.74]	[1.14]	[5.74]	[9.40]	[6.10]	[10.27]	[10.83]	[5.37]	[11.64]
SSC-HSC	0.41***	0.57***	0.45***	0.59***	0.61***	0.59***	0.53***	0.58***	0.54***
	[11.49]	[3.68]	[12.36]	[20.33]	[6.86]	[20.25]	[23.62]	[7.44]	[23.80]
Diploma	0.43**	0.00	0.45**	0.75***	1.45***	0.83***	0.71***	1.44***	0.79***
	[2.40]	.	[2.52]	[7.50]	[12.83]	[8.85]	[7.66]	[13.14]	[9.05]
Bachelor	0.67***	1.01***	0.72***	0.88***	1.31***	0.93***	0.83***	1.25***	0.88***
	[7.92]	[3.83]	[8.90]	[20.98]	[9.83]	[22.74]	[22.44]	[10.45]	[24.52]
Master	0.85***	1.24***	0.90***	1.03***	1.66***	1.12***	1.00***	1.66***	1.09***
	[5.93]	[11.08]	[6.42]	[15.58]	[9.00]	[17.35]	[16.57]	[9.46]	[18.45]
Agriculture				1.22***		1.17***	1.20***		1.18***
				[11.20]		[8.16]	[8.95]		[7.64]
Engineering	0.02		0.03	1.02***	0.33	0.95***	0.78***	0.33	0.75***
	[0.20]		[0.21]	[6.02]	[0.20]	[4.79]	[5.08]	[0.19]	[4.34]
Medical	0.76***		0.77***	1.53***	2.71***	1.80***	1.47***	2.71***	1.74***
	[24.75]		[27.20]	[6.35]	[10.89]	[8.54]	[6.37]	[11.72]	[8.50]
Wealth Index	0.00***	0.00**	0.00***	0.00***	0.00	0.00***	0.00***	0.00	0.00***
	[6.59]	[2.21]	[6.65]	[6.14]	[0.18]	[5.72]	[9.14]	[1.37]	[9.11]
Self-Employment	2.99**	2.12***	2.47***	5.34***	3.15***	3.82***	3.44***	2.36***	2.78***
	[2.40]	[3.08]	[4.11]	[14.23]	[3.44]	[4.79]	[3.34]	[4.16]	[5.55]
Employer	3.91***	1.90***	3.12***	5.84***	3.06***	4.33***	4.01***	2.23***	3.31***
	[3.02]	[2.60]	[4.59]	[14.63]	[3.20]	[5.35]	[3.87]	[3.75]	[6.42]
Salaried Worker	2.73**	1.89***	2.20***	5.13***	3.42***	3.71***	3.22***	2.49***	2.62***
	[2.19]	[2.73]	[3.66]	[13.68]	[3.74]	[4.66]	[3.13]	[4.38]	[5.24]
Daily Labour	2.72**	2.32***	2.27***	5.14***	3.58***	3.71***	3.20***	2.69***	2.62***
	[2.19]	[3.34]	[3.77]	[13.69]	[3.90]	[4.66]	[3.11]	[4.71]	[5.25]
Constant	3.78***	4.88***	3.65***	1.16***	2.95***	2.02**	3.30***	4.17***	3.27***
	[3.03]	[6.32]	[5.98]	[2.99]	[3.23]	[2.53]	[3.21]	[6.97]	[6.48]
Observations	5193	862	6055	5204	1385	6589	10397	2247	12644
Adjusted R^2	0.292	0.168	0.382	0.333	0.259	0.449	0.337	0.214	0.424

	(b) *LFS 2005-06*								
	Dep Var: Log of Monthly Earning								
	Rural			Urban			Total		
	Male	Female	Total	Male	Female	Total	Male	Female	Total
Age	0.03***	0.03**	0.03***	0.05***	-0.00	0.04***	0.03***	0.02*	0.03***
	[7.37]	[2.45]	[8.37]	[8.84]	[-0.11]	[8.53]	[10.60]	[1.92]	[11.50]
Age2	-0.00***	-0.00**	-0.00***	-0.00***	0.00	-0.00***	-0.00***	-0.00	-0.00***
	[-6.80]	[-2.33]	[-7.67]	[-7.35]	[1.04]	[-6.64]	[-9.19]	[-1.10]	[-9.70]
Male			0.55***			0.37***			0.46***
			[21.17]			[15.40]			[26.09]
Rural							-0.08***	-0.22***	-0.10***
							[-7.03]	[-6.20]	[-9.41]
Married	0.07***	-0.30***	0.02	0.11***	-0.03	0.09***	0.10***	-0.17***	0.05***
	[3.26]	[-6.01]	[0.81]	[3.95]	[-0.64]	[3.66]	[5.54]	[-4.92]	[3.22]
Muslim	0.15***	0.16***	0.14***	-0.01	-0.18***	-0.05**	0.08***	-0.00	0.06***
	[8.22]	[3.06]	[7.90]	[-0.25]	[-3.35]	[-2.05]	[5.46]	[-0.13]	[4.37]
Class i-v	0.11***	0.00	0.11***	0.18***	0.24***	0.20***	0.14***	0.12**	0.15***
	[7.36]	[0.02]	[6.75]	[7.01]	[3.35]	[8.42]	[10.65]	[2.17]	[11.07]
Class vi-viii	0.16***	0.13	0.16***	0.26***	0.16*	0.26***	0.20***	0.14**	0.20***
	[7.42]	[1.30]	[7.54]	[8.29]	[1.66]	[8.69]	[11.14]	[2.11]	[11.36]
Class ix-x	0.33***	0.51***	0.36***	0.39***	0.51***	0.42***	0.36***	0.52***	0.38***
	[10.46]	[3.26]	[11.05]	[10.14]	[4.05]	[11.27]	[14.49]	[5.16]	[15.57]
SSC/Equivalent	0.47***	0.57***	0.50***	0.66***	0.87***	0.71***	0.57***	0.74***	0.60***
	[14.47]	[4.84]	[15.35]	[19.06]	[9.70]	[21.30]	[23.93]	[10.33]	[25.94]
HSC/Equivalent	0.66***	0.87***	0.69***	0.91***	1.09***	0.95***	0.81***	1.04***	0.85***
	[17.08]	[6.72]	[18.48]	[25.94]	[14.28]	[29.64]	[31.57]	[15.64]	[35.27]
Bachelor	0.75***	1.26***	0.83***	1.06***	1.18***	1.09***	0.96***	1.19***	1.00***
	[19.07]	[11.68]	[22.12]	[29.89]	[14.82]	[33.14]	[36.41]	[18.20]	[40.78]
Master	0.94***	1.40***	1.00***	1.34***	1.42***	1.35***	1.24***	1.40***	1.27***
	[15.14]	[7.98]	[16.73]	[33.68]	[18.07]	[37.94]	[38.06]	[19.52]	[42.84]
Engineering/Medical	0.61*	1.57***	0.78**	1.60***	1.86***	1.64***	1.51***	1.78***	1.55***
	[1.88]	[14.34]	[2.53]	[18.82]	[15.47]	[22.39]	[17.70]	[15.15]	[21.17]
Technical/Vocational	1.27***	-1.08***	0.91**	1.34***	1.76***	1.36***	1.31***	0.40	1.25***
	[7.18]	[-12.39]	[2.53]	[16.59]	[30.89]	[17.28]	[17.90]	[0.42]	[13.37]
Wealth Index	0.02***	0.04***	0.02***	0.01***	0.02***	0.01***	0.01***	0.03***	0.02***
	[8.92]	[4.45]	[10.17]	[4.87]	[2.63]	[5.81]	[9.90]	[4.98]	[11.49]
Regular Paid Employee	0.98***	0.84***	0.97***	0.68***	0.46*	0.64***	0.86***	0.64***	0.84***
	[11.96]	[3.19]	[12.41]	[6.67]	[1.94]	[6.63]	[13.33]	[3.54]	[13.64]
Employer	0.75***	1.34***	0.82***	0.67***	0.56*	0.67***	0.71***	0.90***	0.76***
	[3.94]	[4.63]	[4.46]	[3.20]	[1.89]	[3.85]	[4.79]	[3.48]	[5.74]
Self Employed	-0.13	0.04	-0.11	-0.30***	-0.38	-0.34***	-0.20***	-0.18	-0.21***
	[-1.52]	[0.14]	[-1.36]	[-2.71]	[-1.24]	[-3.27]	[-2.86]	[-0.81]	[-3.12]
Irregular Paid Worker	0.42***	-0.40	0.29***	-0.02	-0.72***	-0.13	0.24***	-0.58***	0.12*
	[4.74]	[-1.39]	[3.41]	[-0.16]	[-2.65]	[-1.26]	[3.43]	[-2.84]	[1.75]
Day Labourer in Agriculture	-0.56***	-0.48*	-0.55***	-0.84***	-0.91***	-0.88***	-0.65***	-0.74***	-0.66***
	[-6.99]	[-1.81]	[-7.18]	[-8.01]	[-3.60]	[-8.95]	[-10.18]	[-3.99]	[-10.87]
Day Labourer in Non-agriculture	-0.40***	-0.67**	-0.42***	-0.67***	-1.29***	-0.77***	-0.51***	-1.00***	-0.57***
	[-4.95]	[-2.54]	[-5.52]	[-6.47]	[-5.27]	[-7.99]	[-7.86]	[-5.36]	[-9.28]
Servant	0.53***	0.03	0.28***	-0.17	-0.37	-0.13	0.31**	-0.19	0.10
	[3.60]	[0.12]	[2.59]	[-0.76]	[-1.48]	[-1.08]	[2.49]	[-1.00]	[1.31]
Salaried/Non-salaried Apprentice	0.09	-0.04	0.07	-0.41***	-0.60**	-0.48***	-0.15	-0.34	-0.19**
	[0.79]	[-0.12]	[0.62]	[-2.97]	[-1.97]	[-3.78]	[-1.59]	[-1.41]	[-2.18]
Constant	7.34***	7.05***	6.79***	7.26***	8.19***	7.10***	7.41***	7.70***	7.01***
	[75.01]	[20.20]	[69.90]	[52.92]	[26.65]	[55.96]	[91.70]	[32.39]	[89.97]
Observations	10965	1357	12322	6733	1508	8241	17698	2865	20563
Adjusted R^2	0.639	0.537	0.618	0.712	0.667	0.699	0.702	0.641	0.686

	Rural			Urban			Total		
	Dep Var: Log of Monthly Earning								
	Male	Female	Total	Male	Female	Total	Male	Female	Total
Age	0.02***	-0.00	0.02***	0.03***	0.01	0.02***	0.02***	0.00	0.02***
	[8.93]	[-0.62]	[7.84]	[5.69]	[0.74]	[5.82]	[10.78]	[0.46]	[10.51]
Age2	-0.00***	0.00	-0.00***	-0.00***	-0.00	-0.00***	-0.00***	0.00	-0.00***
	[-7.42]	[1.02]	[-6.27]	[-4.16]	[-0.11]	[-3.95]	[-8.60]	[0.27]	[-8.05]
Male			0.10***			0.12***			0.12***
			[7.62]			[7.14]			[11.93]
Rural							-0.11***	0.03	-0.09***
							[-14.52]	[1.32]	[-12.89]
Married	-0.01	0.05**	0.01	0.10***	0.03	0.08***	0.01	0.04*	0.02**
	[-0.88]	[1.98]	[0.55]	[4.36]	[0.80]	[4.37]	[1.33]	[1.86]	[2.13]
Muslim	0.02*	-0.00	0.02*	0.05***	0.06	0.06***	0.03***	0.00	0.03***
	[1.94]	[-0.01]	[1.81]	[2.60]	[1.37]	[3.03]	[3.39]	[0.19]	[3.07]
Class i-v	0.06***	0.03	0.06***	0.10***	0.08*	0.10***	0.07***	0.05*	0.07***
	[8.00]	[0.87]	[7.78]	[5.94]	[1.92]	[6.06]	[9.60]	[1.81]	[9.39]
Class vi-viii	0.07***	0.05	0.07***	0.20***	0.04	0.17***	0.11***	0.05*	0.10***
	[6.71]	[1.49]	[6.76]	[9.86]	[0.86]	[9.11]	[10.98]	[1.80]	[10.88]
Class ix-x	0.13***	0.08*	0.12***	0.21***	0.21***	0.20***	0.15***	0.14***	0.15***
	[8.58]	[1.70]	[8.61]	[7.60]	[3.43]	[8.07]	[11.44]	[3.58]	[12.06]
SSC/Equivalent	0.18***	0.02	0.16***	0.38***	0.40***	0.38***	0.25***	0.18***	0.24***
	[10.20]	[0.31]	[9.60]	[13.32]	[5.27]	[14.20]	[16.21]	[3.56]	[16.57]
HSC/Equivalent	0.22***	0.05	0.20***	0.53***	0.53***	0.52***	0.34***	0.27***	0.33***
	[9.95]	[0.76]	[9.41]	[16.44]	[7.08]	[17.65]	[18.33]	[5.34]	[19.10]
Bachelor	0.32***	0.23***	0.30***	0.70***	0.69***	0.69***	0.49***	0.47***	0.49***
	[12.18]	[3.30]	[12.44]	[20.16]	[10.33]	[22.15]	[22.96]	[9.55]	[24.85]
Master	0.41***	0.39***	0.41***	0.87***	0.81***	0.85***	0.63***	0.65***	0.63***
	[11.39]	[5.26]	[12.07]	[20.15]	[12.57]	[22.74]	[21.90]	[12.71]	[24.35]
Engineering/Medical	0.52***	0.00	0.52***	1.36***	1.15***	1.32***	1.05***	1.10***	1.05***
	[4.10]	.	[4.13]	[13.16]	[6.89]	[14.33]	[11.92]	[8.50]	[13.11]
Technical/Vocational	0.25***	0.74***	0.30***	0.68***	1.28***	0.69***	0.45***	0.93***	0.49***
	[2.86]	[6.24]	[3.62]	[5.55]	[32.93]	[5.72]	[5.92]	[8.67]	[6.71]
Wealth Index	0.00***	0.00	0.00***	0.00***	-0.00	0.00***	0.00***	-0.00	0.00***
	[9.01]	[0.66]	[8.76]	[4.78]	[-1.52]	[3.82]	[10.51]	[-0.01]	[9.88]
Permanent Job	-0.02	-0.06	-0.03	0.06	0.23**	0.10***	-0.01	0.03	0.00
	[-0.85]	[-0.81]	[-1.08]	[1.46]	[2.52]	[2.61]	[-0.29]	[0.50]	[0.02]
Temporary Job	-0.01	-0.11*	-0.02	0.01	0.28***	0.06*	-0.01	0.00	-0.00
	[-0.52]	[-1.65]	[-0.91]	[0.23]	[3.31]	[1.66]	[-0.35]	[0.05]	[-0.09]
Seasonal Job	0.05*	-0.13*	0.03	0.08	0.13	0.10**	0.06**	-0.05	0.05**
	[1.72]	[-1.68]	[1.25]	[1.54]	[1.09]	[2.29]	[2.39]	[-0.78]	[2.39]
Single Time Job	-0.00	0.21	0.02	-0.07	0.00	-0.04	-0.03	0.30	0.01
	[-0.06]	[0.94]	[0.30]	[-0.61]	.	[-0.33]	[-0.44]	[1.28]	[0.13]
Regular Paid Employee	0.29***	0.23	0.28***	0.02	-0.39*	-0.04	0.19***	0.07	0.17***
	[3.75]	[1.59]	[4.11]	[0.11]	[-1.71]	[-0.28]	[2.73]	[0.56]	[2.78]
Employer	0.26**	0.50***	0.35***	0.29	-0.70**	0.17	0.23**	0.40***	0.30***
	[2.52]	[3.08]	[3.99]	[0.98]	[-2.34]	[0.64]	[2.28]	[2.70]	[3.49]
Self Employed in Agriculture	-0.20***	-0.20	-0.21***	-0.22	-0.72***	-0.28	-0.23***	-0.26**	-0.23***
	[-2.64]	[-1.33]	[-2.97]	[-1.39]	[-2.75]	[-1.93]	[-3.26]	[-1.99]	[-3.75]
Self Employed in Non-agriculture	-0.03	-0.10	-0.03	0.07	-0.34	0.02	0.00	-0.08	-0.01
	[-0.33]	[-0.66]	[-0.50]	[0.48]	[-1.48]	[0.14]	[0.01]	[-0.66]	[-0.15]
Irregular Paid Worker	0.03	0.15	0.05	-0.12	-0.63***	-0.19	-0.04	-0.05	-0.03

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	[0.36]	[1.00]	[0.72]	[-0.80]	[-2.70]	[-1.33]	[-0.53]	[-0.35]	[-0.51]
Day Labourer in Agriculture	-0.20***	-0.41***	-0.22***	-0.30**	-0.36	-0.34**	-0.21***	-0.42***	-0.23***
	[-2.64]	[-2.82]	[-3.21]	[-1.99]	[-1.47]	[-2.41]	[-3.09]	[-3.28]	[-3.75]
Day Labourer in Non-agriculture	-0.08	-0.09	-0.08	-0.13	-0.48**	-0.18	-0.10	-0.11	-0.11*
	[-1.02]	[-0.61]	[-1.20]	[-0.89]	[-2.06]	[-1.32]	[-1.52]	[-0.89]	[-1.73]
Servant	-0.16	0.22	0.20***	0.13	-0.31	0.07	-0.10	0.14	0.18***
	[-1.31]	[1.48]	[2.59]	[0.57]	[-1.34]	[0.43]	[-0.92]	[1.08]	[2.61]
Constant	7.73***	8.19***	7.71***	7.49***	8.04***	7.47***	7.75***	8.00***	7.67***
	[88.63]	[42.14]	[96.04]	[44.11]	[31.16]	[48.52]	[98.79]	[50.27]	[107.31]
Observations	26889	2791	29680	8576	1708	10284	35465	4499	39964
Adjusted R^2	0.161	0.164	0.158	0.269	0.164	0.257	0.210	0.145	0.200

Note: Robust t statistics are in brackets. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. No education is the base category dummy for education qualification dummies. Causal job and unpaid family worker are base categories in job type and occupation type dummies respectively.

Annex Table 3: Average yearly education cost by educational institution, location and sex in 2010

	Rural			Urban			Total		
	Male	Female	Total	Male	Female	Total	Male	Female	Total
Government	8002	10389	8625	19412	14714	17567	13707	13188	13534
Private (Govt. grants)	9546	6730	8842	11714	8824	11182	10648	7592	9982
Private (Govt. grants)	8425	na	8425	81000	na	81000	44713	na	44713
NGO run institution	na	na	na	na	na	na	na	na	na
Madrasa (Govt. affiliated)	4281	na	4281	14550	na	14550	5993	na	5993
Madrasa (Kowmi)	12000	na	12000	na	na	na	12000	na	12000

Source: Estimated from the unit-record data of HIES 2010.

Annex Table 4: Distribution of Workers by Education, Location, Sex and Survey Year, 2000-2010

(%)

(a) *LFS 2000*

	Rural			Urban			Total		
	Male	Female	Total	Male	Female	Total	Male	Female	Total
No Education	41.87	59.33	50.41	22.69	37.99	30.21	32.32	48.66	40.33
Class I-v	25.04	22.58	23.83	18.93	20.28	19.59	22.00	21.43	21.72
Class vi-viii	12.66	8.20	10.48	16.03	13.97	15.01	14.34	11.09	12.74
Class ix-x	7.59	4.79	6.22	9.51	8.76	9.14	8.55	6.78	7.68
SSC/HSC and Equivalent	9.75	4.37	7.12	19.71	14.34	17.07	14.71	9.36	12.08
Diploma	0.21	0.03	0.12	1.38	0.36	0.88	0.79	0.19	0.50
Bachelor	2.15	0.53	1.36	8.15	3.15	5.69	5.14	1.84	3.52
Masters	0.42	0.06	0.24	2.62	0.90	1.77	1.51	0.48	1.01
Agriculture	0.00	0.00	0.00	0.06	0.00	0.03	0.03	0.00	0.02
Engineering/Technical	0.12	0.00	0.06	0.54	0.06	0.30	0.33	0.03	0.18
Medical	0.04	0.05	0.05	0.28	0.20	0.24	0.16	0.12	0.14
	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00

(b) *LFS 2005-06*

	Rural			Urban			Total		
	Male	Female	Total	Male	Female	Total	Male	Female	Total
No Education	37.01	48.28	42.59	21.91	31.12	26.46	31.48	42.03	36.70
Class i-v	23.51	23.28	23.39	18.54	19.73	19.12	21.69	21.99	21.84

Class vi-viii	13.53	12.71	13.12	13.02	13.37	13.19	13.34	12.95	13.15
Class ix-x	9.66	8.06	8.87	10.81	10.77	10.79	10.08	9.05	9.57
SSC/Equivalent	9.12	5.31	7.23	13.51	12.88	13.20	10.73	8.07	9.41
HSC/Equivalent	4.35	1.55	2.96	10.17	7.09	8.65	6.48	3.57	5.04
Bachelor/Equivalent	2.02	0.56	1.29	7.68	3.39	5.56	4.09	1.59	2.85
Masters/Equivalent	0.64	0.13	0.39	3.55	1.44	2.51	1.71	0.61	1.16
Medical/Engineering	0.06	0.04	0.05	0.52	0.15	0.34	0.23	0.08	0.15
Technical/Vocational	0.10	0.08	0.09	0.29	0.07	0.18	0.17	0.08	0.12
	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00

(c) *LFS 2010*

	Rural			Urban			Total		
	Male	Female	Total	Male	Female	Total	Male	Female	Total
No Education	38.53	43.77	41.11	27.50	31.49	29.48	36.26	41.20	38.70
Class i-v	30.68	29.97	30.33	27.66	29.12	28.39	30.06	29.79	29.93
Class vi-viii	13.46	13.52	13.49	15.36	15.64	15.50	13.85	13.96	13.90
Class ix-x	7.08	6.98	7.03	8.20	8.95	8.58	7.31	7.39	7.35
SSC/Equivalent	5.00	3.49	4.26	7.18	6.66	6.92	5.45	4.15	4.81
HSC/Equivalent	3.51	1.89	2.71	7.39	6.06	6.73	4.31	2.76	3.55
Bachelor/Equivalent	0.92	0.18	0.55	3.24	0.73	1.99	1.40	0.29	0.85
Masters	0.68	0.16	0.43	2.75	1.18	1.97	1.11	0.38	0.75
Medical/Engineering	0.05	0.01	0.03	0.48	0.14	0.31	0.14	0.04	0.09
Technical/Vocational	0.08	0.04	0.06	0.23	0.03	0.13	0.11	0.04	0.07
	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00

Annex 5: Educational Status of the Bangladeshi Labor Force on a Comparative Scale as per the Barro-Lee data

Indicators (%)	Bangladesh	India	Nepal	Pakistan	Sri Lanka
No Formal Edu.	64.7	61.4	79.7	72.4	19.4
Primary	18.2	19.8	8.7	10.5	34.2
Secondary	15.3	15.8	9.7	14.4	41.2
Tertiary	1.8	2.9	1.7	2.7	5.1

Note: Figures may not total to 100% due to rounding errors.
Source: Barro-Lee global data base on education