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Pay Differences between Teachers and Other Occupations: Some Empirical Evidence from Bangladesh

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Abstract

This paper addresses a popular debate on teacher pay in a developing country context i.e. whether teachers are under-paid or over-paid. Using a recent national level household survey data from Bangladesh, we find that teachers are significantly under-paid in comparison to individuals who possess similar human capital and other characteristics. The estimated wage gap is significantly larger for older (age) cohorts of teachers. These results are robust to sample selection (due to non-random selection into wage work) and, to changes in the sample, and hold true after adjusting for shorter work hours in teaching. The wage gaps are further decomposed to explore whether the observed gap is due to differential human capital endowment or labour market "discrimination". Decomposition analysis also supports our conclusion: Teacher Non-teacher salary difference is driven mostly by differential returns to observed characteristics not by difference in the endowment of productive characteristics. Our results suggest that there is some equity justification for allowing an "across-the-board" increase in teacher pay in Bangladesh.

JEL Classification: J31, I20, J40, H52.
Key Words: Teacher Pay Differentials, Wage-gap decomposition, Bangladesh.

I Introduction

Teachers are the central component in classroom education. Naturally, the most popular school reform has focused on the availability of teachers for students, i.e. teacher-student ratio or TSR. However, evidence of a beneficial impact of smaller class size (i.e. higher TSR) has so far been limited for Bangladesh (Asadullah, 2002)[1]. Partly because a class size effect has been elusive and partly due to the fact that class size reduction is one of the most expensive school reform options, the literature is increasingly focusing on the equally important but potentially less expensive school input i.e. teacher pay (which is also the principal cost component of class size)[2]. Teacher pay has been among the frequently debated school inputs hypothesized to have an important bearing on student learning (Hanushek et al., 1999). Pay policy, it is argued, performs various direct as well as indirect roles which have important implications for teachers as inputs in the educational production process. Higher teacher pay is thought to be a good policy choice for school managers. Such policy affects student achievement by raising incentives for the existing teachers to better teach their students for efficiency wage type reasons. For example, higher teacher pay keeps the opportunity costs of teaching low, thereby allowing schools to *retain* better quality teachers in teaching who would otherwise have superior outside opportunities. In addition, superior pay may improve the overall quality of teachers in school; higher pay attracts a larger pool of potential teachers from which schools can select. As such, the likelihood of adverse selection in teacher choice is reduced, i.e. the quality of new recruits also improves (Lazear, 2001a).

Despite recognition of the importance of teacher incentives, academics, politicians and teachers frequently express their dissatisfaction over existing levels of incentives for school teachers. Dissatisfactions are observed commonly on the issue that teachers are not adequately paid. Not surprisingly, this issue has received a good amount of attention in the economics literature on teacher pay. The recent studies that have looked at the issue of relative pay of teachers are Komenan and Grootaert (1990), Psacharopoulos et al. (1996), Piras and Savedoff (1998), Liang (1999) and Lopez-Acevedo (2001, 2002) [3]. Despite popular beliefs, for some countries, it has been found that teachers are not necessarily paid less in comparison to comparable individuals in the labour market. For example, Komenan and Grootaert (1990) in their study of teacher non-teacher pay gaps for Cote d'Ivoire could not find significant evidence of the problem[4]. Psacharopoulos et al. (1996) look at the issue for Latin America and find no clear pattern of over or under payment across the region. However, their results are difficult to generalize as the analysis does not control for various covariates of earnings. Piras and Savedoff (1998) find that hourly earnings of teachers are comparable or even better than similar workers in other occupations. They argue that such an earnings premium for Bolivia should help recruit, motivate, and retain more qualified individuals in the teaching profession.

In addition to the present international debate on the issue, there has existed popular political demand for salary increase in Bangladesh. The concern that teachers are poorly paid and deserve a pay raise was first expressed almost half a century ago by educationists and policy makers. Arguing that teacher pay is low, the Commission on National Education, 1959, noted:

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[1] The international literature is also inconclusive on the class size question.

[2] Further, the optimal class size is also often conditional on teacher pay (Lazear, 2001).

[3] In recent years, a substantial amount of research examined how teacher pay affects student learning in schools, both for developing and developed countries (Kingdon, 1996; Figlio, 1997; Ballou and Podgursky, 1997; Goldhaber and Brewer, 1997; Khan, 2001). There is a separate literature which looks at the effect of teacher characteristics on student achievement. For example, Behrman et al. (1997), Angrist and Lavy (2001) etc.

[4] This study is also notable as they test for sample selection.

"….A vicious circle is created where-in low (teacher) salary leads to poor work and even low public esteem. It is little wonder that in such condition the best talents are not attracted to the (teaching) profession, that educational standards are lowered and the whole system falls into disfavour."

Similar recognition of the problem is also found in the early five year plans which stressed the need for an increase in teacher salary to raise the quality of primary education in the country. Support for a pay increase both for primary and secondary school teachers was also extended by early local researchers (e.g. Kagoti, 1962; Barman, 1964). More recently teachers have publicly demanded a pay reform citing low salaries in Bangladesh (Daily Star, 2001; 2001a). The nature of reform implicit in the present and past debates is one of "across-the-board" increases. However, we do not know whether teachers are indeed poorly paid. May be teachers are less productive/qualified than individuals in comparable jobs so that the wage differentials are mostly reflecting their low human capital endowment etc. Thus, a natural question that arises in this context is: how does teacher salary compare with the salary of other comparable wage earning groups (e.g. people with similar educational attainment)? Are teachers under-paid or over-paid with respect to similarly qualified and placed workers?

Though this question has been well researched for some developing countries (e.g. Komeanan and Grootaert, 1990; Psacharopoulos et al., 1996; Liang, 1999; Lopez-Acevedo, 2001), it is yet to be studied for (South) Asia: we are not aware of any study which looks at the issue of the relative pay of teachers.[5] In addition, most of the existing studies on relative teacher pay are plagued by the problem of sample selection. A careful examination of this question can shed light on the equity aspect of a policy to raise teacher salaries in developing countries in Asia.

The objective of this paper is to address the issue of relative teacher pay i.e. how well teachers are paid relative to comparable workers, namely people of similar human capital. As such, we further the current debate on teacher pay reform in developing countries and fill an important gap in empirical research on teacher pay in a South Asian context. On the popular perception that teachers are paid significantly less than equally educated and otherwise similar individuals (and hence the presumption that an increase in their pay could be justified at least on the ground of equity), we estimate the labour market earnings of teachers in relation to other comparable individuals in Bangladesh. Our estimates suggest that teachers are less paid than other individuals of similar characteristics in the labour market. The estimates reported control for school quality and work hours, and are robust to sample selection (into wage work). We attempt to provide further insights by decomposing the estimated wage differentials into various components such as the premium arising due to differences in average characteristics of teachers (T) and non-teachers (NT) and the premium due to differences in occupation-specific returns to a given characteristic. The remaining part of the chapter is organized as follows. In section II, we discuss the empirical strategy. Section III discusses data. Section IV reports the main results and section V concludes.

[5] There exist some studies on the determinants of teacher pay based on school sample data (Kingdon, 1996; Khan, 2001) but the results from these studies are not generalizable None of the existing studies have employed large-scale national school survey data to estimate educational production functions.

II Empirical Strategy

We want to see how teacher salary fares vis-à-vis that of other comparable individuals in the labour market i.e. to examine the premium earned by teachers in the labour market. For this purpose, we would like to estimate a monthly earnings function for the entire sample of salaried workers who have at least 10 years of education. All individuals aged 18 years or below are dropped from the analysis. This generates a sample of salaried workers (aged 19 years and above) with a minimum of 10 years of education[6].

The conventional approach to T-NT wage differential modelling includes an occupation (Teaching) dummy intercept in a statistical earnings function controlling for individual characteristics which are supposed to capture the productivity differentials. In such a setting, the dummy reflects the wage differential net of returns to productivity**.** However, such an analysis may be inadequate for at least two reasons. First, if there is some unobserved job characteristic for which teachers are rewarded, then the premium earned in teaching may simply represent a compensating differential. One such well-known characteristic is the flexibility of teaching jobs and the low average working hours in teaching than in other comparable occupations. Also, as individuals with different levels of education choose to work for different hours, estimates of returns to education would differ for hourly wage data and monthly wage data (Schultz, 1968). Hence, to identify whether teachers are under-paid, we adjust the dependent variable for differential work hours across jobs. We thus report estimates of differentials in hourly earnings only[7].

Second, an important methodological issue plagues many of the existing studies on teacher pay in the economics literature. Studies reporting earnings functions assume that the observed sample of wage earners is a random one. However, wages are observed only for waged participants in the labour market; the sample may not be random one because individuals may self-select (or be hierarchically selected) into wage employment. Thus, we also report wage regressions with control for selection into wage work for teachers and non-teachers. Our empirical model can be summarized as follows:

$$Y_i = a_0 + a_1 E_i + a_2 E_i^2 + \sum b_i X_{ij} + \Theta T_i + s l_i + e_i \qquad (1)$$

We observe Yi only if $L_i = 1$ where,

$$L_i = 1 \text{ if } L_i^* > 0$$
$$= 0 \text{ otherwise}$$

and

$$L_i^* = \sum a_{3j} W_{ji} + e_i \qquad (1a)$$

[6] However, taking individuals with more than 10 years of education may give rise to a further sample selection problem: those who complete at least secondary equivalent education may be a select group of individuals in terms of ability etc.

[7] However, we our specification still leaves out other important characteristics of the teaching job such as longer holidays and greater flexibility enjoyed by teachers which is often considered major non-monetary incentives in teaching jobs.

where,

Y_i	=	Log of hourly earnings of the i-th individual in the wage work
T_i	=	1 if i-th individual is teacher; 0 otherwise.
E_i	=	Experience
X_i	=	other characteristics (such as sex, schooling, and school quality etc.) of the i-th individual
L_i	=	unobservable latent variable
W_{ji}	=	individual characteristics that determine participation; it includes identifying variables in addition to the X_i variables used in the earnings functions.
λ_i	=	selection correction term

In the above model, T_m is the key parameter of interest. If we reject the null that $H_o : T_m = 0$, then teachers are either underpaid (when $T_m < 0$) or overpaid (when $T_m > 0$) relative to comparable workers i.e. T_m captures any wage premium earned by teachers in the labour market. In order to correct for sample selection, we use various exclusion restrictions in equation (1a) which models the selection mechanism. Different sources of unearned income are used as exclusion restrictions: (a) money received from sales of assets and lands; (b) income received from other sources such as land leasing, rents, insurance policy, windfall gains such as lottery awards, money received through intra-household transfer, remittances etc.[8] In addition, we also use information on land size[9]. Land ownership is likely to increase productivity of self-employment type activities and hence reduce the probability of participation into wage work. As we will see later, these exclusion restrictions turned out to be jointly significant in most of our regressions.

However, this approach may still be inappropriate for several reasons. First, the above framework ignores the possibility that choice of wage work and teaching could be correlated. For instance, certain groups may participate in the labour market only if they are selected into a particular occupation. An example of such a group could be married females who are often observed in the labour market only when they are in teaching[10]. In such a case, estimates of the probability of selection into teaching must jointly model selection into wage work and teaching. However, this is mostly considered a problem in the context of female workers in the literature (e.g. see Dolton, 1993). Second (and more importantly), T_i is potentially endogenous in the above framework. There may be unobserved (hence omitted) determinants of earnings which could bias the estimated T-NT wage differentials. For example, to the extent that ability (only imperfectly modelled in our specification) is related to occupational affiliation/choice (e.g. low ability people self-selecting into teaching etc.), the coefficient on the occupation status (T dummy) is biased downward, yielding even a larger wage differential. The coefficient on the T dummy may then simply pick any unmeasured ability effect. As a solution, one can adopt an instrumental variable approach. However, the attempt to correct for such endogeneity is often limited by the inability to find identifying variables in the data. Hence, we ignore the potential covariance of occupational choice and selection into wage work and treat the occupation dummy as exogenous.

[8] We exclude income eamed from stipend received by own children (from the government) who are enrolled in secondary schools.

[9] Ideally, we wanted to use inherited landholdings instead of current holding due to potential endogeneity of the former. However, we do not have data on the latter.

[10] Females in the labour market are more likely to be in teaching than males, given the work flexibility available in teaching jobs and given the fact that they have greater family commitments (and hence greater opportunity costs of participation in the labour market).

In addition, a mere examination of average earnings differentials, as has been done in past studies (other than Piras and Savedoff, 1998) is not very informative for policy reasons. Analysis of the sources of differences in mean earnings offers interesting insights which are relevant for policy purposes. The dummy variable approach (discussed above) also imposes a constraint of constant slope coefficients (across T and NT samples), which, if incorrect, would result in loss of efficiency. Thus the literature commonly employs a framework proposed by Alan Blinder (1973) and Ronald Oaxaca (1973) (henceforth OB) to compare and decompose the earnings differentials. Following this approach, one can examine how much of the difference in average earnings between teachers and non-teachers can be explained by differences in productive characteristics and how much can be attributed to the residuals i.e. differences in the amount by which individual characteristics are rewarded (returns to characteristics). If the latter is dominant, then one may argue that there is some real premium, that is, T-NT salary difference is driven not by differential productivity only but rather is unexplained, potentially an outcome of discrimination etc.

The OB decomposition technique involves separation of the sample into teachers and non-teachers and estimating separate wage equations with both intercept and slope coefficients differing. Mean differences in the explanatory variables in the teaching and non-teaching sectors are then weighted by the teacher wage structure to estimate wage differentials. Let $\ln W^t$ and $\ln W^{nt}$ be logs of individual hourly wage, $ß^t$ and $ß^{nt}$ be the vectors of parameters and X^t and X^{nt} being the corresponding vectors of explanatory variables in teaching and non-teaching sectors respectively. Then the T and NT earnings functions can be defined respectively by equation (ii) and (iii):

$$\ln W^t = b^t . X^t + e_t \qquad (2)$$

$$\ln W^{nt} = b^{nt} . X^{nt} + e_{nt} \qquad (3)$$

The difference between estimated equations (ii) and (iii) yields mean T-NT wage differentials. Following the OB (1973) framework, equation (iv) decomposes the earnings gap into differences in productive endowments and returns to those endowments:

$$\ln \overline{W}^t - \ln \overline{W}^{nt} = \sum \hat{b}^t \left(\overline{X^t} - \overline{X^{nt}} \right) + \sum \overline{X}^{nt} \left(\hat{b}^t - \hat{b}^{nt} \right) \qquad (4)$$

In the OB framework, the estimated effects of individuals' endowments on earnings are identical for each group when there is no wage premium by occupation groups. Any observed differences in the coefficients would indicate the presence of a premium. Thus unlike the naïve strategy, differences are not restricted to intercept terms by having an occupational dummy variable specification; variations in the slope coefficients are also exploited.

The above framework was later generalized by Oaxaca and Ransom (1994) (henceforth OR). Within the generalized framework, one can decompose average wage differential as follows:

$$\ln \overline{W}^t - \ln \overline{W}^{nt} = \sum b^* \left(\overline{X^t} - \overline{X^{nt}} \right) + \sum \overline{X}^{nt} \left(b^{nt} - b^* \right) + \sum \overline{X}^t \left(b^* - b^t \right) \qquad \text{(iv)}$$

The first term is an estimate of the part of the pay gap that can be explained by productivity characteristics. The second term in the above equation is an estimate of the NT wage advantage (over T). The last term is a measure of the T wage disadvantage. The * indicates the wage structure observed in a non-discriminatory labour market. Thus the estimated value of the T-NT wage

differentials would depend on whether the ß* is assumed to correspond to the T or NT wage structure or some weighted function of the two.

Lastly, some important caveats on wage gap decomposition. Both the dummy variable approach to modelling earning differentials and the decomposition approach to earning differential are sensitive to omitted variable bias and model misspecification. Differentials may take the forms of non-wage compensations; hence hourly wage differentials are imperfect estimates of the true differentials. In addition, by splitting the sample to fit separate earning function for teachers and non-teachers, we are assuming that there is no significant omitted variable which could lead to (occupational) selection problem[11]. In sum, in the presence of omitted variable and non-normal errors, such decomposition is unlikely to yield unbiased estimates[12].

III Data Description

For the purpose of examining the premium earned in teaching in the labour market, we use data from the Household Income and Expenditure Survey (HIES) 2000 survey conducted by the Bangladesh Bureau of Statistics (BSS). This is a national level household survey which covers some 7400 households and is similar in design to the World Bank Living Standard Measurement Surveys (LSMS) for other developing countries.

To look at the issue of relative teacher pay, we construct a sample of wage earners. The HIES 2000 reports a sample of 12118 people (aged over 18 years) in various economic activities (either in wage employment or self-employed in agricultural or non-agricultural activities). Among these individuals, we focus on the sample of 2021 where everyone has educational attainment at least equivalent to 10 years[13]. Table 1 below shows the distribution of sample observations over various categories. Focusing on this sample allows comparability of earnings of teachers with others in the labour market. In this sample, around 1040 individuals (51 percent) are in salaried/wage work. The rest are self-employed either in agriculture or in non-agricultural activities.

Table 1: Distribution of Sample Observations

	Total		Rural		Urban	
Type of Employment	Sample	%	Sample	%	Sample	%
Wage Employment	1040	51.4	334	35.9	706	64.7
Self Employment (Non-Agriculture)	529	26.1	188	22.2	341	31.26
Self Employment (Agriculture)	452	22.3	408	43.8	44	4.0
Total	2021		930		1091	

Note: All the individuals are aged over 18 years and have at least 10 years of education.

In the full sample of 1040 wage workers with educational attainment equal to or greater than 10 years, a total of 278 individuals (24% of the sample) reported themselves to be in teaching[14]. However, the actual sample used in our regression analysis is slightly larger than that reported in Table 1. This difference arises as occupation variables do not agree with each other in

[11] As argued earlier, the literature also acknowledges such selection only an issue for female samples.

[13] And for whom occupation is known.

[14] 16 teachers reported educational attainment less than 10 years in the original sample of individuals aged 19 years or older.

terms of sample size. For example, while the survey reports 1040 individuals in wage work aged over 18 years and educational attainment greater than 10 years, monthly wage data is reported later for 1126 individuals (who belong to the age and education category). After ignoring 18 individuals for whom earnings data is not reported, we arrive at a final sample of 1108 individuals[15].

Table 2: Means and Standard Deviations

Variable	Definition	Obs	Mean	Std. Dev.
LnEARNtot_hr	Log of Net Hourly Earnings	1108	3.053	1.092
Exp	Age-6-schooling	1108	21.338	10.825
Exp_sq	(Experience Squared)/100	1108	5.724	5.268
Female	Dummy (1=Female)	1108	0.118	0.323
Non_Muslim	Dummy (1=Non Muslim)	1108	0.118	0.323
Rural_WrkP	Dummy (1= Rural workplace)	1108	0.393	0.489
HSC	Dummy (1= if HSC passed)	1108	0.282	0.450
BA	Dummy (1= if BA)	1108	0.238	0.426
MA	Dummy (1= if MA)	1108	0.143	0.350
PRIVaid_sch	Dummy (1= attended private aided school)	1108	0.559	0.497
PRIV_sch	Dummy (1=attended private unaided school	1108	0.100	0.300
RELIG_sch	Dummy (1= attended religious school)	1108	0.036	0.187
SEMI_GOVT	Dummy (1= works in semi-government sector)	1108	0.268	0.443
NON_GOVT	Dummy (1= works in non-government sector)	1108	0.248	0.432
LG_NGO	Dummy (1= works in local government/Non-profit sector)	1108	0.050	0.217
OCC_Tea	Dummy (1= teacher)	1108	0.248	0.432

[15] This sample does not contain any day labourers who exclusion resulted from maintaining the cut-off schooling attainment of 10years.

IV Findings

a. Hourly Earnings Functions with Occupation Dummy

Table 3 reports earnings functions for the sample of all wage workers (aged 19 years or over) with educational attainment equal to or greater than 10 years. Table 2 presents the descriptive statistics of the regression variables along with their definitions. All the regressions include an occupation dummy (Occ_Teaching) for the teaching profession, a significant coefficient on which suggests a wage differential, in log points, relative to the omitted group i.e. non-teachers. Both the OLS and Heckman models are estimated; Heckman estimates are reported in the Appendix Table 2 along with the first stage probits. Mean values of the identifying variables and their definitions are provided in Appendix Table 1.

In Table 3, the coefficient on the teacher dummy is significantly negative when earnings functions are estimated for the full sample. The same result holds for the various sub-samples i.e. females, males, rural, urban, public and private sector individuals. The sub-sample estimates also reveal substantial heterogeneity in the estimated wage gap. For example, female teachers appear to be significantly more underpaid than male teachers[16]. Similarly, urban teachers are less underpaid than teachers in rural sample. However, the relatively higher wage gap experienced by rural teachers is somewhat puzzling given that teaching is one of the most prominent forms of wage work in the rural sector. Similarly, teachers in the public sector sample suffer less (though not significantly so) wage gap than their counterpart in the private sector. Given that the public sector remains one of the chief employer of teachers in the country, the relatively smaller T-NT wage gap in this sample is not puzzling. However, the observed wage gap is still substantial and may perhaps reflect the fact that the majority of public sector teachers are employed in the primary schools where pay is much lower than that in secondary schools. Hence, source of the observed wage gap is perhaps masked by types (primary or secondary) of schools employing these teachers.

A similar problem arises in interpretation of the T-NT wage gap for the private sector sample which masks good deal of heterogeneity. Given the differences in school management types in Bangladesh, the segregation of teachers by private school type (and sample individuals by sub-sectors within the private sector) is important. There are, in general, three types of schools: (i) public, (ii) private, (iii) aided[17]. These three types are observed both among formal schools and religious schools. At the primary level, number of school types is greater due to the fact that Non-government organizations (NGOs) also operate schools to provide non-formal education[18]. Depending on school types, teacher salary varies substantially in Bangladesh even within the private sector (Ahmed, 1997). Hence, the wage gaps experienced by teachers are also likely to vary across sectors. We allow for this possible heterogeneity by splitting the sample into various sectors employing the workers. The HIES 2000 classifies individuals in the labour market in four sub-sectors: (1) government, (2) non-government (i.e. private), (3) semi-government, (4) NGO-Local government[19]. Regressions specific to these sectors are reported in Table 4.

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[16] However, once we relax the assumption of constant slope across T-NT occupations in the OR decomposition analysis (reported later), we find that , male teachers are more underpaid than their female counterparts.

[17] Teachers in the aided schools receive the major share of their salary from the government.

[18] NGOs are non-profit organizations and hence separated from the purely private sector.

[19] Another sector noted in the questionnaire is 'factory'. However, we had only 10 people reported in this category in our final sample (which was limited to individuals aged over 18 years and with a minimum of 10 years of education).

Table 3: Hourly Earnings Functions with Occupation Dummy

	Full Sample	**Female**	**Male**	**Urban**	**Rural**	**Public Sector**	**Private Sector**
Exp	0.044	0.074	0.038	0.047	0.047	0.043	0.04
	(4.11)**	(2.91)**	(3.19)**	(4.38)**	(2.16)*	-1.8	(3.88)**
Exp_sq	-0.041	-0.114	-0.029	-0.052	-0.033	-0.033	-0.039
	-1.77	-1.76	-1.16	(2.25)*	-0.75	-0.68	-1.81
Female	-0.099			-0.073	-0.19	0.056	-0.324
	-1.06			-0.6	-1.07	-0.29	(3.38)**
Non_Muslim	-0.231	0.236	-0.279	-0.033	-0.519	-0.092	-0.288
	(2.33)*	-0.51	(2.90)**	-0.28	(2.72)**	-0.38	(2.75)**
Rural_WrkP	0.397	-0.028	0.46			0.55	0.335
	(4.61)**	-0.15	(4.64)**			(3.31)**	(3.08)**
EDU_HSC	0.271	0.232	0.264	0.207	0.3	0.251	0.209
	(3.72)**	-1.07	(3.24)**	(2.84)**	-1.87	-1.87	(2.32)*
BA	0.515	0.557	0.501	0.488	0.557	0.406	0.569
	(6.50)**	-1.91	(5.80)**	(5.99)**	(3.08)**	(2.52)*	(5.99)**
MA	0.715	0.885	0.701	0.686	0.752	0.598	0.784
	(7.66)**	(3.76)**	(6.79)**	(8.95)**	(3.46)**	(3.83)**	(6.53)**
PRIVaid_sch	-0.232	-0.346	-0.218	-0.101	-0.482	-0.319	-0.127
	(3.25)**	-1.74	(2.74)**	-1.46	(2.73)**	(2.55)*	-1.37
PRIV_sch	-0.202	-0.278	-0.218	-0.064	-0.445	-0.148	-0.164
	-1.81	-0.75	-1.82	-0.55	-1.69	-0.6	-1.37
RELIG_sch	-0.424	0	-0.427	-0.283	-0.62	-0.502	-0.206
	-1.85	(0.00)**	-1.84	-1.65	-1.74	-1.76	-0.86
SEMI_GOVT	-0.085	-0.664	-0.033	-0.139	-0.034		
	-1.14	(3.07)**	-0.4	(2.09)*	-0.21		
NON_GOVT	-0.199	-0.702	-0.155	-0.21	-0.205		
	(2.38)*	(2.39)*	-1.76	(2.71)**	-0.77		
LG_NGO	-0.309	-0.686	-0.211	-0.272	-0.264		
	(2.13)*	(2.57)*	-1.06	-1.79	-1.01		
OCC_Tea1	**-0.665**	**-0.44**	**-0.681**	**-0.305**	**-1.009**	**-0.579**	**-0.603**
	(9.10)**	(2.42)*	(8.19)**	(3.82)**	(8.10)**	(4.59)**	(7.00)**
District Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1108	131	977	673	435	400	708
R-squared	0.31	0.53	0.3	0.35	0.38	0.26	0.35

Notes: Robust t-statistics in parenthesis. All the columns above report OLS estimates unless mentioned otherwise. The omitted category for employment sector dummies is 'government'; omitted education dummy is 'SSC' and school type dummy is 'government school'. "Private" refers to all sectors other than the public (or government) sector.

The estimated wage gap for the Private sector is small and insignificant indicating that (purely) private school teachers are not less paid in comparison to others within the private sector (column 1 of Table 4). However, there may be reporting error in classifying an employment as private or semi-government one. Hence, column 2 of Table 4 also reports estimates regrouping individuals in private and NGO sectors together. However, the reported wage gap of -.41 becomes insignificant and small (-.19 log points) once we control for district dummies (in column 3). This reinforces our finding that within the private sector, teachers are not under-paid. The T-NT wage gap in the semi-government sector (column 4) is significant and large indicating that aided school teachers are paid less in comparison to others within the semi-government sector. Similarly, a large

T-NT wage is reported for the NGO sector and it is significant at the 8% level despite a very small sample size.

Table 4: Hourly Earnings Functions with Occupation Dummy by Sector of Work

	Private Sector (1)	Private Sector (2)	Private Sector (3)	Semi-govt. (4)	Local Govt. & NGO Sector (5)
Exp	0.052	0.051	0.04	0.063	0.252
	(2.79)**	(4.19)**	(3.30)**	(2.52)*	(2.25)*
Exp_sq	-0.068	-0.073	-0.051	-0.067	-0.402
	-1.89	(3.03)**	(2.28)*	-1.22	-1.13
Female	-0.536	-0.375	-0.463	-0.093	0.962
	(2.73)**	(3.57)**	(3.45)**	-0.55	-1.33
Non_Muslim	-0.252	-0.056	-0.252	-0.191	-0.794
	-1.4	-0.36	-1.82	-0.99	-1.18
Rural_WrkP	0.389	0.069	0.313	0.471	2.929
	-1.65	-0.5	-1.77	(3.05)**	(2.87)**
EDU_HSC	0.304	0.2	0.31	-0.099	0.422
	(2.26)*	-1.79	(2.78)**	-0.67	-0.49
BA	0.679	0.596	0.683	0.35	3.023
	(4.27)**	(4.52)**	(5.08)**	(2.23)*	(3.63)**
MA	0.609	0.462	0.574	0.863	1.789
	(3.29)**	(2.41)*	(3.33)**	(5.05)**	-1.85
PRIVaid_sch	0.073	-0.121	-0.088	-0.257	0.648
	-0.45	-0.93	-0.65	-1.71	-1.11
PRIV_sch	-0.168	-0.271	-0.21	-0.07	0.017
	-0.93	-1.88	-1.45	-0.25	-0.02
RELIG_sch	0.057	-0.334	-0.304	-0.085	0
	-0.09	-1.07	-1.03	-0.21	(0.00)**
OCC_Tea1	**-0.029**	**-0.412**	**-0.193**	**-1.055**	**-0.706**
	-0.14	(3.39)**	-1.53	(8.06)**	-1.85
District Dummies	Yes	No	Yes	Yes	Yes
Observations	275	411	411	297	55
R-squared	0.38	0.17	0.37	0.48	0.86

Notes: Robust t-statistics in parenthesis. All the columns above report OLS estimates unless mentioned otherwise. Omitted category for employment sector dummies is 'government'; omitted education dummy is 'SSC' and school type dummy is 'government school'.

Sensitivity Tests

The results reported above already include some form of sensitivity tests. Our results are found robust to sample selection problem. The appendix Table 2 presents the Heckman two-step counterparts of the regression models (for the full sample as well as various sub-samples) as reported in Table 3 along with the 1st stage participation probit. As discussed earlier, we use unearned income (such as income received from rents, leasing of land etc.) and land holdings as identifying variables in the Probit models. Higher unearned income in general is found to significantly decrease labour market participation. Similarly, landholdings perhaps raise returns to self-employment type activities, thereby negatively affecting participation into wage work. The identifying variables in most cases had negative coefficients and were jointly statistically significant. Interestingly, the sample selection correction term 'lambda', was found insignificant for all the sub-samples but female and rural wage workers[20]. There appears to be slight decrease in our estimate of wage premium due to significant sample selection in female and rural sample. The estimates are -.39 (against OLS estimate of -.44) and -.98 (against OLS estimate of -1.009) for female and rural sample respectively.

The regressions also include a large number of district dummies which are jointly highly significant. However, inclusion of these dummies do not affect the size of the estimated T-NT wage gap. We also tested for the sensitivity with respect to model specification. For example, we replaced the age variable by experience calculated as 'age-6-years of education'. The coefficients on age and age squared are found larger than those on experience and experience squared indicating that the returns to experience is somewhat over-estimated in the former specification[21]. Also, we replaced education dummies by a continuous variable that records number of years of education attained in school. However, no changes in the regression results were observed. In addition, the estimated wage gap cannot be attributed to regional differences in consumer prices (hence the purchasing power of hourly earnings); the regressions controlled for the location of the household (i.e. district fixed effects). Throughout the entire analysis, we also treated schooling as exogenous which is not an unrealistic assumption. Using the same dataset, Asadullah (2002a) reports instrumental variable estimates of returns to education using a variety of instruments such as spouse education, parental background and variation in school availability when the individual was aged 6 (i.e. in the year when the individual was supposed to start schooling). However, no significant evidence of endogeneity was found.

[20] For the female sample, we used additional variables such as number of children in the household to serve as an exclusion restriction..

[21] The estimates of the wage differentials appear to be somewhat sensitive to the specification i.e. wage gap increases as experience is proxied by age though not significantly so.

Table 5: Age-cohort Specific Estimates of Hourly Earnings Functions with Occupation Dummy

	Age 19-28	Age 29-38	Age 39-48	Age 49-58
Exp	0.064	0.08	-0.354	0.266
	0.69	0.42	-1.02	0.51
Exp_sq	-0.35	-0.072	0.701	-0.41
	-0.56	-0.12	1.07	-0.56
Female	-0.322	-0.034	0.275	0.451
	(2.46)*	-0.17	1.29	1.01
Non_Muslim	-0.09	-0.007	-0.27	-0.11
	-0.62	-0.03	-1.19	-0.51
Rural_WrkP	0.106	0.323	0.779	0.544
	0.61	1.93	(3.64)**	(2.40)*
EDU_HSC	0.275	0.34	0.194	-0.19
	(2.08)*	(2.62)**	1.3	-0.85
BA	0.409	0.49	0.808	0.236
	(3.09)**	(3.21)**	(4.05)**	1.06
MA	0.426	0.721	0.892	0.664
	(2.11)*	(4.32)**	(3.73)**	(2.40)*
PRIVaid_sch	-0.38	-0.259	-0.218	-0.05
	(2.37)*	-1.95	-1.36	-0.24
PRIV_sch	-0.416	-0.214	-0.482	0.2
	(1.99)*	-1.17	(2.05)*	0.56
RELIG_sch	-0.453	-0.068	-0.999	0.004
	-1.86	-0.17	-1.87	-0.01
SEMI_GOVT	-0.248	-0.064	-0.074	0.088
	-1.74	-0.38	-0.45	0.39
NON_GOVT	-0.258	-0.184	-0.108	-0.74
	(2.03)*	-1.12	-0.56	-1.72
LG_NGO	-0.497	-0.161	-0.073	-0.63
	(2.56)*	-0.45	-0.17	-1.12
OCC_Tea1	**-0.156**	**-0.724**	**-0.842**	**-1.1**
	-1.16	(5.03)**	(5.17)**	(6.14)**
Observations	233	331	327	177
R-squared	0.37	0.34	0.34	0.48

Notes: Robust t-statistics in parenthesis. All the columns above report OLS estimates unless mentioned otherwise. Omitted category for employment sector dummies is 'government'; omitted education dummy is 'SSC' and school type dummy is 'government school'.

Lastly, Table 5 provides additional estimates of wage gap. Results are presented for subpopulations representing different age-cohorts[22]. As such, this set of estimates indicates how wage-differences experienced by younger cohorts of teachers compare with that of older cohorts. Clearly, the gap is increasing across age-cohorts. For the youngest (i.e. age 19-28 years) age-cohort, the estimate of wage gap is insignificant and small. The subsequent estimates are much larger and highly significant. This implies that as a teacher moves across the career ladder, he/she receives less and less wage in comparison to individuals with similar background and age-cohort in

[22] These subpopulations are defined by age an exogenous characteristic (i.e. age) and hence do not suffer from sample selection issue.

the labour market[23]. This also suggests that the experience-earnings profile is likely to be flatter for teachers compared with non-teachers[24]. Indeed this is the case as is depicted in Figure 1. While for non-teachers the usual inverted U-shaped earnings-experience profile is observed, for teachers it is rather a flat straight line. Similar profiles are produced for various sub-samples in Figures 2-5. In all the figures, teacher earnings are lower than that of non-teachers across different years of experience holding other characteristics constant (at their mean values). It is to be noted that in early years, the earning gap is non-existent for full sample, males and urban wage workers.

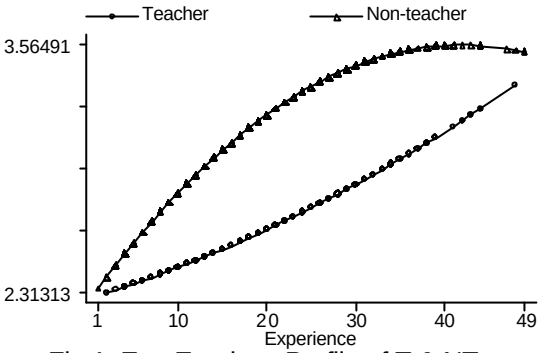

Fig 1: Exp-Earnings Profile of T & NT

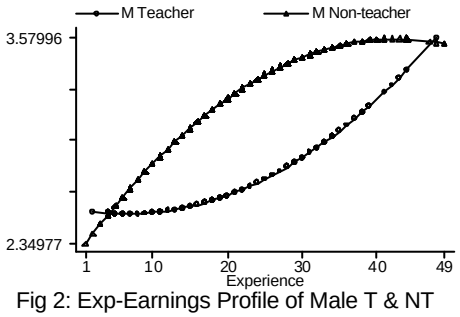

Fig 2: Exp-Earnings Profile of Male T & NT

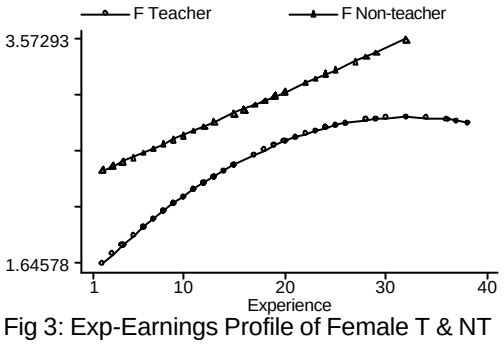

Fig 3: Exp-Earnings Profile of Female T & NT

[23] Another related issue of interest is that of "filtering down" (Knight et al., 1992) i.e. whether successive cohorts of teachers at a particular education level enter less skilled jobs within the teacher sector. For example, one may expect younger cohorts of teachers to be concentrated more in primary instead of secondary schools. However, this may apply to non-teachers as well who, within the non-teaching sector, may opt for lesser skill jobs due to over-expansion of the education system and excess supply of skilled workers. We shall further explore this issue in the next draft.

[24] Earnings profiles are produced using the predicted earnings function evaluated at the mean "X" values for respective samples: $\hat{Y}_i = \hat{a}_0 + \hat{a}_1 E_i + \hat{a}_2 E_i^2 + \sum \hat{b}_j \overline{X}_{ij}$. We don not include a lamda term in that we did not find any evidence of sample selection into wage work for teachers and non-teachers. The Heckman estimates of these earnings functions for different samples are reported in the Appendix Table 3 and 4.

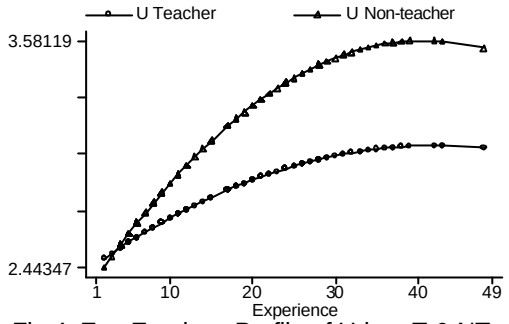

Fig 4: Exp-Earnings Profile of Urban T & NT

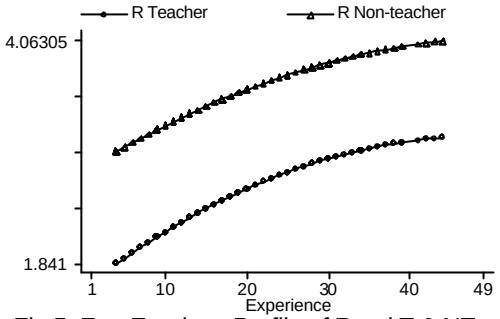

Fig 5: Exp-Earnings Profile of Rural T & NT

But teacher's earning profile diverges rapidly from that of non-teacher with rise in experience. The exceptions are females and wage workers in rural area where there appears to be large earnings differential even in the very early years in the job market. For female sample, this gap appears to reduce somewhat around 20 years of experience. In rural labour market, earnings profile of teachers are also lower than that of non-teachers at all levels of lower than that of non-teachers at all levels of experience. In addition, the profiles (for T & NT) are parallel to each other in rural sample indicating that experience is rewarded at a similar rate (across years of experience) in both sectors. T-NT This finding has serious implication: given the existing salary scheme, school managers may find it more difficult to retain teachers than to attract them initially to the teaching job. However, for rural schools (which employs majority of school teachers in Bangladesh), the challenge may be much greater in that teachers at all levels (of experience) face a lower earning than non-teachers[25].

b. Decomposing the T-NT Wage Gaps

The T-NT wage gap reported in Table 3 for the full sample does not say anything about the channels through which teachers receive less pay than non-teachers of similar background. To this end, we decompose the T-NT earnings gap into the component explained by T and NT characteristics differences and the part unexplained (hence attributed to differences in returns to average characteristics). If the residual (unexplained part) is positive and dominating, then that may be taken as an evidence of under-payment vis-à-vis other occupation. Thus, in addition to the standard dummy variable approach, we predict earnings of an average individual in teaching and non-teaching. We weight the labour market returns to individual characteristics in teaching and non-teaching jobs by average characteristics of an individual in the labour market (obtained from the pooled sample). Teachers could be argued to be under-paid if predicted earning in T is less than that in NT.

Table 6 below presents the results of decomposition. Estimated NT-T wage difference for the full sample is .601 (in natural logs). The part of this gap due to productivity differences in characteristics (weighted by average wage structure) is only .03. Thus, for the full sample, productivity differences account for only 4% of the earnings differentials. The remaining 96 % therefore indeed confirms our earlier finding that teachers are relatively underpaid in comparison to individuals of similar characteristics in NT jobs. The second and third columns of Table 6 further decompose the unexplained (i.e. residual) part of the wage gap into wage advantage of non-teachers and wage disadvantage of teachers. Wage advantage accounts for 23% of the wage gap

[25] However, there may remain good amount of heterogeneity that is currently unobserved in our data. For example, most of the rural teachers are employed in primary schools which offer a much lower salary than secondary schools.

whereas disadvantage experienced by teachers account for a large 71% of the wage gap. Predicted earnings used results from OLS earnings functions (not reported). As it can be seen from Appendix Table 3 and 4 (which reports Heckman estimates of earnings functions for teachers and non-teachers), the lamda term is not significant in any of the cases: we do not find any evidence of selection (into wage work).

Table 6: Decomposing Teacher Non-teacher wage gap

Full-sample	Productivity Difference $[B^*(X_t-X_{nt})]$	NT wage advantage $[X_{nt}(B_{tt}-B^*)]$	T wage disadvantage $[X_t(B^*-B_t)]$	Combined $[b_tX_t-b_{nt}X_{nt}]$
Exp	-0.029	0.043	0.103	0.117
Female	-0.062	0.021	-0.042	-0.084
Non_Muslim	0.000	0.005	-0.002	0.003
Rural_WrkP	0.051	0.097	0.253	0.401
EDU_HSC	-0.001	0.003	0.029	0.031
BA	0.016	0.031	0.063	0.109
MA	0.082	0.026	0.044	0.152
PRIVaid_sch	0.010	0.005	0.005	0.02
PRIV_sch	0.006	-0.002	-0.014	-0.009
RELIG_sch	-0.014	0.000	-0.002	-0.015
SEMI_GOVT	-0.047	0.044	0.007	0.004
NON_GOVT	0.019	-0.005	-0.004	0.011
LG_NGO	0.001	-0.002	0.023	0.022
Constant	0.000	-0.120	-0.030	-0.15
Total	**0.030**	**0.140**	**0.431**	**0.601**
	Productivity Difference $[B^*(X_t-X_{nt})]$	NT wage disadvantage $[X_{nt}(B_{tt}-B^*)]$	T wage disadvantage $[X_t(B^*-B_t)]$	Combined $[b_tX_t-b_{nt}X_{nt}]$
Male Sample	0.143	0.11	0.494	.747
Female Sample	-0.069	0.282	0.2106	.4236

The last two rows of Table 6 report decomposed components of the wage gap for the male and female sub-samples. Productivity difference accounts for only 19% of the estimated wage gap (.747) experienced by male teachers. The remaining .604 (or 81%) of the T-NT wage gap is not explained by teacher and non-teacher's differing characteristics, and may be thought of as under-payment experienced by teachers. Similarly, for females, T-NT wage gap is .4236 of which -.069 (or 14%) is explained by productivity difference. Lastly, the above analysis was carried out assuming that average wage structure is the non-discriminatory wage structure[26]. However, despite such statistical evidence of T-NT wage gaps, we cannot conclusively conclude that teachers are being underpaid or discriminated against since (as argued earlier) we cannot control for differences between teachers and non-teachers in unobserved characteristics (such as work flexibility).

[26] Additional sets of estimates could also be obtained using male and female wage structure separately.

V Conclusion

This paper has looked at the issue of relative teacher pay that is frequently at the centre of existing debates on teacher pay in a developing country like Bangladesh. Recent appeals by teachers to increase pay have been ignored either because teachers already consume most of the recurrent school expenditure and/or statistical evidence supporting under-payment of teachers has been so far absent[27]. In this paper, we have attempted to supply this missing evidence. Our analysis of the wage data on teachers and non-teachers from a recent national household survey showed that teachers are significantly under-paid in comparison to people of similar human capital and other characteristics in Bangladesh. This finding is robust to smaller work hours in teaching, sample selectivity due to non-random participation in the wage work and changes in the sample used for regression analysis as well. Further, the estimated wage gap is significantly larger for older age cohorts of teachers implying that school managers may face significant difficulty in *retaining* individuals in teaching at the current salary level especially in areas of low unemployment among the educated. *Attracting* educated individuals to teaching may be a challenge in case of female and rural populations given our evidence of a large earnings differential even at the entry level for female and rural samples.

However, despite various robustness tests, we are somewhat restricted in our ability to decisively conclude that teachers are being significantly underpaid or discriminated against since (as argued earlier) we could not control for differences between teachers and non-teachers in unobserved characteristics (such as work flexibility). Also, occupation specific selection issues remained unresolved due to lack of valid exclusion restrictions. Keeping these caveats in mind, our findings suggest that there is possibly an equity justification for allowing an increase in teacher pay in Bangladesh. Furthermore, given the earlier finding that the policy of class size reduction is perhaps inefficacious in Bangladesh (Asadullah, 2002), such pay reform (i.e. "across-the-board" increase in teacher salary) may also offer a relatively cheaper policy alternate of boosting student achievement. However, it is not known yet whether increase in teacher pay is an efficient policy option, given the current pay structure in Bangladesh[28]. Furthermore, the policy may not be equally feasible at all levels. For example, most of the primary school teachers are employed in the rural area where "across-the-board" salary increase can create a new type of adverse selection instead: higher salaries may simply attract candidates with strong political or social connections [29]. Hence, policy makers and school managers may have to rethink other non-pecuniary benefits offered to teachers along with the structure of current salary to preserve the efficiency aspect of an across-the-board salary increase.

[27] Or because across-the-board increases in teacher pay are not deemed an efficient way of augmenting student achievement.

[28] That is we do not know whether the present pay structure awards teachers for possession of characteristics that matter most in student achievement in Bangladesh.

[29] Such problem has been documented for India by Dreze and Gardar (1997) in public schools that pay teachers better than private schools. Dreze and Gardar argue that privileged connections of public school teachers with local elites facilitate teacher absenteeism despite a higher pay (where such connections are also partly responsible for obtaining the teaching job in a rural public school).

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Appendix Table 1: Means and Standard Deviations of Trigger Variables used in the Selection Probit

Variable	Definition	Obs	Mean	Std. Dev.
my8b	Income earned from sales of land or other assets	2021	3313.690	18332.370
tmy8a	Income earned from lottery, remittances and renting out land, house or other assets	2021	325.990	2031.630
inc_1	Dummy (1= if tmy8a is below 25th percentile & tmy8a>0)	2021	0.007	0.083
inc_2	Dummy (1= if tmy8a is below 50th percentile & tmy8a>0)	2021	0.011	0.106
inc_3	Dummy (1= if tmy8a is below 75th percentile & tmy8a>0)	2021	0.020	0.141
inc_4	Dummy (1= if tmy8a is above 75th percentile & tmy8a>0)	2021	0.023	0.151
incb_1	Dummy (1= if my8b is in 33th percentile & my8b>0)	2021	0.141	0.348
incb_2	Dummy (1= if my8b is in 66th percentile & my8b>0)	2021	0.211	0.408
incb_3	Dummy (1= if my8b is in 99th percentile & my8b>0)	2021	0.411	0.492
Land_0549	Dummy (1= if land size is between .05-4.9 acres)	2021	0.076	0.265
Land_5149	Dummy (1= if land size is between 5-1.49 acres)	2021	0.138	0.345
Land_15249	Dummy (1= if land size is between 1.5-2.49 acres)	2021	0.089	0.284
Land_25	Dummy (1= if land size is above 2.49 acres)	2021	0.182	0.386
HH_size	Household Size	2021	6.099	2.796
Married	Dummy (1= if currently married)	2021	.8070	.3947
Land_size	Total Landholding (in acres)	2021	1.533	5.582

Appendix Table 2: Heckman Estimates of Hourly Earnings Functions with Occupation Dummy

	Full Sample				Male				Female				Urban				Rural			
	Earnings Fnc.		Participation Eq.		Earnings Fnc.		Participation Eq.		Earnings Fnc.		Participation Eq.		Earnings Fnc.		Participation Eq.		Earnings Fnc.		Participation Eq.	
	coeff.	z	coeff.	z	coeff.	z	coeff.	z	coeff.	z	coeff.	z	coeff.	z	coeff.	z	coeff.	z	coeff.	z
Exp	0.0469	4.33	0.0281	2.93	0.0350	2.87	0.0274	2.78	0.0659	2.66	-1.7170	-1.43	0.0457	4.46	0.0191	1.37	0.0690	2.79	0.0565	3.83
Exp_sq	-0.0465	-2.19	-0.0469	-2.48	-0.0239	-1.02	-0.0453	-2.33	-0.1056	-1.87	7.7529	1.59	-0.0492	-2.37	-0.0325	-1.16	-0.0690	-1.53	-0.0878	-3.13
Female	-0.0141	-0.08	1.3290	8.78									-0.2071	-1.33	1.1597	5.77	0.3658	0.94	1.9127	7.2
Non_Muslim	-0.2379	-2.51	-0.1563	-1.61	-0.2666	-2.52	-0.1817	-1.83	0.2105	0.9	0.8251	0.46	-0.0240	-0.25	-0.0807	-0.56	-0.5257	-2.6	-0.1934	-1.27
Rural_WrkP	0.3555	4.51	-0.2666	-3.65	0.4774	5.1	-0.3006	-4.01	-0.0700	-0.41	-0.0767	-0.07								
EDU_HSC	0.2939	3.33	0.3597	4.76	0.2176	2.17	0.3470	4.49	0.1401	0.66	0.2728	0.2	0.1950	2.69	0.0622	0.58	0.5458	2.5	0.7153	6.14
BA	0.5703	5.04	0.6140	7.09	0.4394	3.28	0.6307	7.08	0.4406	1.91	0.2560	0.21	0.4487	5.44	0.2989	2.62	1.0013	3.31	1.1448	7.6
MA	0.7966	5.29	0.9052	7.82	0.6180	3.48	0.9227	7.82	0.8325	3	-0.7311	-0.39	0.6175	5.52	0.5167	3.36	1.2718	3.6	1.4271	7.18
PRIVaid_sch	-0.2175	-2.97	0.1381	1.81	-0.2321	-2.88	0.1298	1.66	-0.3690	-2.13	-1.0277	-0.45	-0.1071	-1.6	0.0339	0.34	-0.4370	-2.59	0.2137	1.6
PRIV_sch	-0.1851	-1.61	0.1375	1.13	-0.2374	-1.93	0.1406	1.13					-0.0590	-0.55	-0.1004	-0.61	-0.2938	-1.11	0.3382	1.68
RELIG_sch	-0.4752	-2.62	0.4188	2.05	-0.5727	-3.02	0.4061	1.98					-0.2985	-1.23	0.0028	0.01	-0.5433	-1.74	0.6392	2.33
SEMI_GOVT	-0.1072	-1.45			-0.0541	-0.68			-0.6200	-2.96			-0.1365	-1.78			-0.0836	-0.59		
NON_GOVT	-0.2090	-2.63			-0.1619	-1.93			-0.7967	-3.25			-0.1879	-2.64			-0.3379	-1.68		
LG_NGO	-0.3096	-2.2			-0.2142	-1.21			-0.6392	-2.2			-0.2584	-1.76			-0.2756	-1.02		
OCC_Tea1	**-0.6248**	**-8.55**			**-0.6344**	**-7.75**			**-0.3900**	**-2.36**			**-0.2627**	**-3.26**			**-0.9848**	**-7.76**		
incb_1			-0.1684	-1.57			-0.1492	-1.37							-0.2145	-1.36			-0.1898	-1.12
incb_2			-0.0015	-0.02			0.0025	0.03							0.0811	0.58			-0.0176	-0.12
incb_3			-0.1897	-2.3			-0.1639	-1.95							-0.1613	-1.42			-0.1678	-1.24
inc_1			0.3617	1.01			0.3199	0.89							0.3077	0.52			0.3572	0.73
inc_2			-0.0602	-0.2			0.0653	0.21							-0.0326	-0.05			-0.0800	-0.2
inc_3			0.3943	1.73			0.3515	1.5							0.7557	1.97			0.2172	0.66
inc_4			-0.8136	-3.59			-0.8660	-3.6							-0.3586	-1.06			-0.9605	-2.82
Land_0549			-0.0367	-0.29			0.0089	0.07			2.6408	0.89			0.1358	0.62			-0.4296	-2.29
Land_5149			0.0796	0.77			0.1027	0.97			-4.8942	-1.43			0.1420	0.81			-0.2639	-1.7
Land_15249			-0.2796	-2.3			-0.2328	-1.86			-9.2386	-2.08			-0.4886	-2.42			-0.3962	-2.19
Land_25			-0.2605	-2.58			-0.2703	-2.62			13.5933	6.18			-0.1869	-1.04			-0.5539	-3.67
my8b											0.0000	0.25								
tmy8a											-0.0004	-1.64								
HH_size											-0.6210	-1.22								
Married											-5.1759	-1.96								
_cons	2.3985	7.61	-0.3432	-2.28	2.7907	7.64	-0.3518	-2.29	2.7168	7.05	18.7829	1.57	2.6389	10.07	-0.0221	-0.11	2.0526	2.75	-1.1467	-4.28
lamda	0.1786	0.68			-0.1809	-0.6			-0.7202	-1.8			-0.2625	-0.98			0.7278	1.79		
N	1108				977				131				673				435			

Note: Landless individuals form the omitted category for the land dummies.

Appendix Table 3: Estimates of Earnings Function for Teachers with Heckman correction for selection into wage work

	Full sample				Male Sub-sample				Female Sub-sample				Urban Sub-sample				Rural Sub-sample			
	Earnings Eqn		Participation Probit		Earnings Eqn		Participation Probit		Earnings Eqn		Participation Probit		Earnings Eqn		Participation Probit		Earnings Eqn		Participation Probit	
	coeff.	z	coeff.	z	coeff.	z	coeff.	z	coeff.	z	coeff.	z	coeff.	z	coeff.	z	coeff.	z	coeff.	z
Exp	0.0138	1.01	-0.0021	-0.14	-0.0090	-0.56	-0.0073	-0.46	0.0871	4.59	0.1523	1.78	0.0317	1.5	-0.0480	-1.7	0.0573	3.1	0.0300	1.39
Exp_sq	0.0173	0.64	0.0204	0.68	0.0644	2.04	0.0276	0.9	-0.1416	-3.65			-0.0395	-0.85	0.0862	1.48	-0.0586	-1.77	-0.0213	-0.53
Female	-0.2931	-1.14	2.2123	11.18									-0.4851	-1.93	2.5334	7.74	-0.2894	-0.84	2.6197	7.63
Non_Muslim	-0.0610	-0.47	-0.2248	-1.38	0.1313	0.86	-0.2300	-1.36	-0.5997	-2.95	-1.1701	-0.82	-0.0515	-0.29	-0.2937	-0.93	-0.0130	-0.08	-0.0702	-0.31
Rural_WrkP	-0.1923	-1.8	0.5341	4.19	-0.2365	-1.81	0.5117	3.89	0.3366	2.39	2.0070	1.4								
EDU_HSC	0.1530	0.98	0.7396	5.65	0.3086	1.38	0.7162	5.23	0.2174	1.16	10.2050	2.08	0.0797	0.44	0.6836	2.8	0.0000	0	0.7852	4.4
BA	0.2177	1.19	1.0307	7.13	0.5054	1.8	1.0892	7.17	0.0778	0.38	1.1174	1.25	0.4033	2.27	0.8194	3.38	0.0142	0.05	1.5467	6.93
MA	0.5016	2.06	1.6634	9.78	0.8137	2.18	1.7218	9.81	0.6502	3.39	0.7602	0.68	0.5763	2.58	1.6118	5.77	0.0972	0.29	2.0088	7.55
PRIVaid_sch	-0.1627	-1.52	0.0622	0.5	-0.1169	-0.95	0.0516	0.4	-0.3531	-2.13	2.8974	1.6	-0.0644	-0.43	-0.1029	-0.5	-0.3947	-2.73	0.3143	1.6
PRIV_sch	-0.0453	-0.28	0.0258	0.13	-0.0564	-0.31	-0.0143	-0.07	-0.6132	-1.88	1.3286	0.77	-0.2746	-1.27	-0.2028	-0.62	-0.0900	-0.42	0.4020	1.35
RELIG_sch	-0.5467	-2.61	0.4734	1.68	-0.3955	-1.84	0.4400	1.54					-0.3371	-0.95	-0.7062	-1.14	-0.5510	-2.07	1.1608	2.99
SEMI_GOVT	-0.2665	-2.86			-0.1438	-1.37			-0.6591	-4.25			-0.1751	-1.43			-0.1891	-1.56		
NON_GOVT	-0.1273	-0.83			0.0001	0			-0.3870	-1.79			0.1056	0.57			-0.2943	-1.15		
LG_NGO	-0.5869	-2.55			-0.4161	-0.62			-0.3422	-1.41			-0.4091	-1.43			-0.4224	-1.36		
incb_1			-0.6175	-3.19			-0.5861	-2.9							-0.9792	-2.68			-0.3249	-1.14
incb_2			-0.1587	-1.07			-0.1538	-1							0.0559	0.2			0.0344	0.16
incb_3			-0.4305	-3.27			-0.3949	-2.88							-0.5870	-2.71			-0.1494	-0.73
inc_1			0.1098	0.19			0.0605	0.1											-0.0153	-0.02
inc_2			-0.7651	-1.22			-0.6576	-1.03											-0.6987	-0.89
inc_3			0.4366	1.23			0.3476	0.94							0.9157	1.42			0.2983	0.56
inc_4			-0.5698	-1.66			-0.8002	-1.95							-0.3303	-0.54			-0.6343	-1.43
Land_0549			-0.3394	-1.57			-0.2792	-1.25							0.4585	1.11			-0.6788	-2.24
Land_5149			0.0245	0.14			0.0305	0.17							0.1017	0.26			-0.2745	-1.16
Land_15249			-0.5716	-2.72			-0.5182	-2.36							-1.3068	-2.45			-0.5137	-1.85
Land_25			-0.2499	-1.56			-0.2443	-1.48							-0.5277	-1.26			-0.3310	-1.5
tmy8a											-0.0005	-1.45								
my8b											-0.0001	-1.29								
Land_h											0.9109	1.91								
HH_size											0.2724	1.02								
Married											0.9420	0.93								
_cons	2.8175	5.93	-1.5399	-6.31	2.4400	3.73	-1.4977	-5.93	2.0157	5.51	-3.3281	-1.52	2.7152	6.5	-0.8232	-2.1	2.4070	3.69	-1.8707	-4.88
Lamda	-0.0959	-0.45			0.1324	0.45			-0.1866	-0.54			-0.1061	-0.55			-0.2224	-0.81		
N	275		1170		202		1080		73		90		115		518		160		652	
Wald (chi_sq)	465.28				381				210				278				367			

Note: Landless individuals form the omitted category for the land dummies.

Appendix Table 4: Estimates of Earnings Function for Non-teachers with Heckman correction for selection into wage work

	Full Sample				Male Sample				Urban Sample				Rural Sample			
	Earnings Eqn		Participation Probit		Earnings Eqn		Participation Probit		Earnings Eqn		Participation Probit		Earnings Eqn		Participation Probit	
	coeff.	z	coeff.	z	coeff.	z	coeff.	z	coeff.	z	coeff.	z	coeff.	z	coeff.	z
Exp	0.0636	4.38	0.0375	3.6	0.0536	3.5	0.0364	3.4	0.0576	4.68	0.0276	1.89	0.0850	2.22	0.0735	4.3
Exp_sq	-0.0773	-2.71	-0.0680	-3.28	-0.0584	-1.97	-0.0654	-3.08	-0.0685	-2.83	-0.0470	-1.62	-0.1126	-1.55	-0.1280	-3.84
Female	-0.0273	-0.13	0.9979	5.63					0.0735	0.4	0.8652	3.82	0.0775	0.14	1.5646	4.81
Non_Muslim	-0.1842	-1.59	-0.1390	-1.34	-0.2334	-1.87	-0.1708	-1.6	-0.0116	-0.11	-0.0426	-0.29	-0.6030	-1.99	-0.2602	-1.51
Rural_WrkP	0.5739	4.86	-0.4294	-5.48	0.7229	5.54	-0.4623	-5.78								
EDU_HSC	0.2358	2.41	0.2764	3.45	0.1816	1.74	0.2728	3.34	0.2113	2.7	-0.0081	-0.07	0.5583	1.9	0.6624	5.19
BA	0.5747	4.58	0.5032	5.42	0.4277	3.09	0.5250	5.53	0.4728	5.37	0.2347	1.98	1.1261	2.84	0.9750	5.71
MA	0.7473	4.45	0.6568	5.1	0.5907	3.24	0.6767	5.19	0.6047	4.89	0.3575	2.16	1.3421	2.88	1.1147	4.8
PRIVaid_sch	-0.2172	-2.44	0.1359	1.67	-0.2096	-2.25	0.1258	1.51	-0.1262	-1.66	0.0660	0.63	-0.6346	-2.64	0.1384	0.92
PRIV_sch	-0.2191	-1.6	0.1570	1.2	-0.2391	-1.69	0.1563	1.18	-0.0578	-0.49	-0.0649	-0.38	-0.6191	-1.68	0.3291	1.44
RELIG_sch	-0.5133	-2.2	0.3174	1.39	-0.6027	-2.54	0.2960	1.29	-0.3705	-1.24	0.1319	0.31	-0.7536	-1.74	0.4120	1.33
SEMI_GOVT	0.0512	0.54			0.0588	0.61			-0.1020	-1.13			0.1131	0.56		
NON_GOVT	-0.1292	-1.42			-0.1030	-1.11			-0.1825	-2.37			-0.2142	-0.79		
LG_NGO	-0.2759	-1.64			-0.2326	-1.25			-0.1790	-1.07			-0.3605	-1.03		
incb_1			-0.0846	-0.75			-0.0827	-0.72			-0.1398	-0.86			-0.0789	-0.43
incb_2			0.0100	0.1			0.0109	0.1			0.0916	0.63			-0.0366	-0.22
incb_3			-0.1370	-1.54			-0.1181	-1.31			-0.1164	-0.98			-0.1378	-0.91
inc_1			0.3251	0.84			0.2915	0.75			0.3668	0.61			0.3578	0.66
inc_2			0.0639	0.21			0.1935	0.6			0.0570	0.09			0.0993	0.24
inc_3			0.4731	1.93			0.4301	1.71			0.7876	1.95			0.3107	0.9
inc_4			-0.8876	-3.42			-0.8643	-3.29			-0.4160	-1.14			-1.1561	-2.71
Land_0549			0.0057	0.04			0.0570	0.41			0.0516	0.22			-0.3292	-1.61
Land_5149			0.0851	0.76			0.1185	1.04			0.1546	0.85			-0.2034	-1.19
Land_15249			-0.2123	-1.64			-0.1672	-1.26			-0.4158	-2.02			-0.2877	-1.45
Land_25			-0.3013	-2.72			-0.3044	-2.69			-0.1243	-0.67			-0.6190	-3.62
_cons	2.2088	5.4	-0.4642	-2.87	2.6005	5.97	-0.4719	-2.87	2.4892	7.43	-0.1872	-0.87	2.0420	1.86	-1.4525	-4.76
Lamda	0.0798	0.25			-0.2866	-0.84			-0.2600	-0.81			0.8127	1.53		
N	833		1728		775		1653		558		961		275		767	
Wald (chi_sq)	609				555				375				305			

Note: Landless individuals form the omitted category for the land dummies.