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**Article**

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## RESEARCH ARTICLE

# Disparities in earnings and education in India<sup>1</sup>

P. Geetha Rani<sup>1\*</sup>

**Abstract:** This paper studies the impact of different levels of education, religion, caste as well as the impact of living in urban and rural communities on earnings in India. Besides these conventional stratification, yet another academic caste which influence earnings—the English language ability, is also examined. The paper uses a large cross-section sample of India Human Development Survey to estimate Mincer and augmented Mincer equations. The rates of return estimates obtained in these data and method confirm that returns to education increase with the level of education across location, caste-religion and English language ability. Returns to lower levels of education are low across different groups, indicating the low quality of basic schooling in the country. Returns to higher education vary at a great deal ranging between 4.9% among the rural workers and 38.2% among fluent English ability group. This is in contrast to Duraisamy reporting the highest returns to secondary education in India, between the period 1983 and 1993–1994. In a decade's time, with changes in the economy and in the labour market, higher education especially the English language ability along with higher education brings in the highest wage premium.

**Keywords:** returns to education, earnings, disparities

### ABOUT THE AUTHOR



P. Geetha Rani is an associate professor at NUEPA. She contributed to the financial memorandum for Right to Education Bill under Central Advisory Board on Education (CABE), the highest advisory body to advise the Central and State Governments, constituted by the Ministry of Human Resources Development and the financial implications of national and state wise estimates of Right to Education Act, submitted to the 13th Finance Commission. She is the co-author of two books on development and management of secondary education in India and published more than 30 research papers in the area of economics and financing education.

This current paper comes out with a recent estimate on returns to education with an application of large scale survey data, representative of India. Besides, the paper highlights the language wage premium in the current political discourse on language policies in India.

### PUBLIC INTEREST STATEMENT

Profitability of investing in education is measured by rates of return to education, expressed in percent. The present paper estimates the profitability of investing on different levels education by different regions (rural/urban) caste and religious groups in India. Besides these often studied groups of population, the paper assesses the profitability on the ability on English language. To do this, the paper uses data from a large-scale survey conducted by NCAER in collaboration with University of Maryland in 2005. The study finds that investing in elementary education yield very low returns across groups, indicating low quality of elementary education. On the contrary, it is found to be worth investing in higher education, for urban dwellers, socially privileged castes, Hindus, Christians-Sikh-Jains and the workers with little and fluent English language ability. Returns to higher education are highest among fluent English ability group with 38.2% as estimated returns. But, it is not profitable for rural dwellers, socially deprived castes, Muslims, and with no English language ability.

## 1. Background

Estimates on the rates of return to education would be a useful indicator of the reward for education in the labour market and also guide public and private investment in education. The literature on returns to education is one of the most extensive in labour economics. The evidence on wage returns to education in both developed and developing countries continues to grow. These studies show that, internationally, one additional year of education adds approximately 10% to a person's wage, at the mean of the distribution (Psacharopoulos & Patrinos, 2004). Until recently, the evidence has suggested that the returns in developing countries are generally larger at primary level than at secondary and higher levels of education. Some have interpreted this to be consistent with a notion of diminishing returns to education. Recent evidence suggests that the rate of return to primary education may now be lower than that to post-primary levels of education. A number of studies using 1990s and early 2000s cross-section data find that the return to primary education in wage employment is significantly lower than that to post-primary education (Bennell, 1995; Calclough, Kingdon, & Patrinos, 2009).

In this light, the primary objective of the paper is to look at the extent of disparity in earnings across location, caste and religious groups. In addition to these conventional stratification in the Indian society, yet another academic caste which influence earnings during the economic reforms and globalization is the English language<sup>2</sup> ability. Azam, Chin, and Prakash (2011) report the complementary nature between English skills and education, which appears to have strengthened over time. That more educated among young workers receive a premium for English-speaking ability.

Given this brief background, the rest of paper is organized as follows. Section 2 attempts to briefly present the review of earlier estimates on returns to education specific to Indian context. Section 3 explains the methodology of estimating rates of return to education using the Mincer's earning equation with Heckman's two-step selectivity correction. Section 4 accounts for various characteristics of households, their demographic, socio-economic, education and earning profiles. The subsequent section discusses the estimates on rates of return to education by region, caste and religious groups and English ability. The final section brings out the policy implications.

## 2. Brief review of the estimates on rates of return to education in India

Volume of research evidence has been generated in the estimates on rates of return to education. This review here is confined to the rates of return estimates of India. National level estimates of private rates of return to education made for urban India in 1960 by Gounden (1967) and Blaug, Layard, and Woodhall (1969) convincingly show that investing in education is profitable in India. Since then attempts have been made to estimate the returns to education primarily using small sample surveys for India. Notable among them are Husain (1967), Gounden (1967), Blaug (1972), Tilak (1987) and Kingdon (1999). It is commonly believed that labour market returns to education are highest for the primary level of education and lower for subsequent levels. Their estimates of the private returns to education range from -3.1 to 33% across different levels (see Appendix Table A1).

Conversely, Kingdon (1999) finds in her review of other empirical work on the returns to education that the rate of return to education tends to rise with education level. This changing pattern of returns to education is found to hold good in developing countries since the last two decades (see Calclough et al., 2009). A similar trend hold good for India as well. The estimates for the private rate of return to education at different levels in the Indian studies indicate rising returns with the level of education at least until secondary schooling (Duraisamy, 2002), and in most cases until graduate schooling (Agrawal, 2011; Unni, 2001; Vasudeva Dutta, 2006). Some of such studies examine the temporal change in returns to different levels of education for India. Table A2 in appendix suggests that there is an incentive to acquire higher levels of education as returns to higher education are positive and monotonically increasing.

## 3. Methodology

Broadly, there are two methods of estimating the rates of return to education, full accounting method and Mincer wage equations. Among the two, the discounting of actual net age-earnings profiles

is the most appropriate method of estimating the returns to education because it takes into account the most important part of the early earning history of the individual. As a complete method, the internal rate of return approach requires far more data. Much of this information is not readily available to researchers. Hence, it is less commonly applied and when it is used, it is applied to estimate the social rate of return by incorporating the social costs of education into the total cost calculation.

### 3.1. Mincer equation: earnings function method

This involves fitting a log-wages function using years of schooling, years of labour market experience and its square as independent variables (see Mincer, 1974). It is of the form:

$$\ln W_i = \alpha + \beta S_i + \gamma E_i + \delta E_i^2 + \varepsilon_i \tag{1}$$

where  $S$  is years of schooling and  $E$  is experience.  $E^2$  is experience squared, and  $\varepsilon$  is a random disturbance term capturing unobserved characteristics. Experience is measured by age of the respondent by taking away the sum of number of years spent in schooling and age at which the respondent started schooling.<sup>3</sup> In this function, the  $\beta$  coefficient on years of schooling can be interpreted as the average rate of return (or the percentage change in wages) to an additional year of schooling, regardless of the educational level. The function assumes the rate of return to be the same for all levels of schooling. The experience variable is incorporated in the equation since an individual with higher experience in a job is likely to earn more. The experience squared term captures the possibility of a non-linear relationship between earnings and experience.

Yet another well-known difficulty is the selection bias due to ability, school quality, non-cognitive skill arising from the correlation between wages and the unobservable determinants of schooling. Heckman selection is a statistical model developed by James Heckman to correct for selection bias (Heckman, 1979). It is a means of correcting for not having a randomly selection sample. The selection equation is estimated by using either Heckman’s two-step consistent estimator or full maximum likelihood using information from the whole sample of workers and non-workers. A statistically significant inverse of Mills ratio (estimated expected error) indicates the presence of sample selection (Greene, 2011).

The present paper uses Heckman’s two-stage procedure. The first step is using all observations, estimating a probit model of work on  $z$  and compute the inverse of Mills ratio. The model is specified as:

$$z_i = x_i \beta + \varepsilon_i \tag{2}$$

where the dependent variable ( $z$ ) takes a value of one if an individual participates in work and a value of zero if not;  $x_i$  is a vector of explanatory variables includes education, experience variables, set of socio-economic, family and ability controls, all of which are exogenous in the population, and  $\varepsilon_p \sim N(0, \sigma^2 \varepsilon)$ . From the estimation of Equation 2, a selection variable ( $\lambda$ ), known as the inverse Mills ratio, is created.

In the second step, using the selected sample, log of wage is regressed on education, experience and a set of socio-economic, family and ability controls. The equation also includes the inverse Mills ratio as an additional regressor obtained after the estimation of the first stage. This stage estimation is carried out only for the uncensored observations, i.e. only for those who participate in wage work. Therefore, the second stage reruns the regression with the estimated expected error included as an extra explanatory variable, removing the part of the error term correlated with the explanatory variable and avoiding the selectivity bias. It is of the form:

$$\ln W_i = \alpha + \sum_k \beta_{ik} S_{ik} + \gamma_1 E_i + \gamma_2 E_i^2 + \delta x_i + \theta \lambda_i + \varepsilon_i \tag{3}$$

where  $S_{ik}$  represents a dummy variable for different level of education,  $x$  is a set of other (socio-economic, family and ability) variables assumed to affect earnings, and  $\varepsilon \sim N(0, \sigma^2\varepsilon)$ .  $\lambda$  indicates the inverse Mills ratio as an additional regressor obtained after the estimation of the first stage. Though, Mincer equation is an effective way to summarize earnings data, it ignores the direct private costs of education (tuition fees, expenditure on books, etc.). Further, this method is slightly inferior to the full or complete method, as it assumes flat age-earnings profiles for different levels of education (see Psacharopoulos, 1995). Despite its popular usage, the Mincer-type earnings equation method can only be applied to estimate private (monetary) rates of return to education.

### 3.2. Data and selection of variables

The study uses the India Human Development Survey (IHDS) data, made available by the National Council of Applied Economic Research (NCAER), New Delhi, and the University of Maryland. The IHDS is a nationally representative survey, covering of 41,554 households across India, corresponding to the year 2005. These households include 215,754 individuals. The IHDS was conducted in all states and union territories of India except Andaman and Nicobar Islands, and Lakshadweep (Desai et al., 2010).

The survey collected information on demographic characteristics: age, household size, number of children per household, location of the household rural/urban, social and religious group, literacy,

**Table 1. Description of variables**

Variable	Description	Base category
Log hourly wage	Natural logarithm of hourly wages in rupees	
Work participation	Participation in work if more than 240h=1, otherwise, 0	
Education	Completed years of schooling	
D_Elementary	Elementary=1, others=0	Completed years of education between 1 and 8 years
D_Secondary	Secondary=1, others=0	Completed years of education between 9 and 12 years
D_Higher	Higher=1, others=0	Completed years of education with 13 years and above
Experience	Measured by age of the respondent by taking away the sum of number of years spent in schooling and age at which the responded started schooling	Assumed that children start schooling at the age of five
Experience square	Experience square/100	
<b>Ability control</b>		
D_Repeated	No=1, yes=0	Not repeated
D_Perfsec	No division=0, any division=1	Not passed
D_Graduate	Yes=1, No=0	Not graduate
D_Eng_fluent	Yes=1, No=0	No English ability
D_Eng_little	Yes=1, No=0	No English ability
<b>Family control</b>		
D_Marital	Yes=1, no=0	Married
D_Male	Male=1, female=0	Male
<b>Social and religion control</b>		
D_High_caste	Forward/high caste=1, others=0	Forward/high caste
D_OBC	Yes=1, others=0	OBC
D_Muslim	Yes=1, others=0	Muslims
<b>Exclusion restrictions</b>		
N children	Number of children	
Household size	Number of persons	
D_Wksalary	Salaried work=1, others=0	If salaried work>240h
D_Rural	Rural=1, urban=0	Rural

attended school, number of school years completed, gender, marital status, relation to the household head; income related: household income, consumption, household assets, poverty; source of income: agriculture—family farm income, income from animal care, agriculture wage labour; non-agriculture—salaried work, family business, non-agriculture wage labour; employment related: occupation, industry, number of hours of work, etc.

With regard to the quality of education, the survey collected information on whether an individual failed or repeated a class, division of marks secured in both secondary and higher education, English language ability. The IHDS has collected this information on the English language ability in three ways, whether the individuals possess the English language ability or not. If yes, then the information sought was the nature of the language ability of the individual whether little or fluent. The description of the variables used for the estimation of Mincer with Heckman corrected OLS equations<sup>4</sup> is given in Table 1.

The earnings variable used here is logarithm of hourly earnings of the individuals as widely used in the literature in the age group 10–60. The wage distribution is trimmed at .1% level at the top and bottom tails of the distribution to circumvent the possibilities of outliers.

#### 4. Pattern of earnings and education

The patterns of demographic characteristics of the households do not vary much in terms of mean age. As reported in Table 2, mean age ranges from age 27 to 31, clearly indicating the young Indian population, the demographic dividend of India. In terms of household size, the highest number of persons in a household is observed across Muslims, compared to the least number of persons across Christians, Sikhs and Jains (referred as other minorities). Similar is the story in terms of number of children per household that highest number of children is found across Muslim groups. The smallest number of children is found across Christians, Sikhs and Jains along with the group of fluent English ability. On the other hand, similar average number of children (1.4) is found across the groups of urban, forward and high caste and little English ability; yet, another two groups, Dalit-Adivasi also known as Scheduled Caste (SC) and Scheduled Tribe (ST) and no English ability also have similar average number of children. But in terms of mean years of schooling of the highest education of the adult in the household vary to a great deal from a minimum of 6.2 years among Dalit-Adivasi to a maximum of 13.9 years of schooling across the fluent English ability group (see Table 2).

The total annual household income vary from Rs. 37,687/- in no English ability group to a maximum of Rs. 1,67,211/- in fluent English ability group as reported in Table 3. per capita income range from a

**Table 2. Demographic characteristics of households**

	Mean age	Household size	Children per household	Highest education of adult
Rural	29.5	5.84	1.92	6.9
Urban	30.1	5.34	1.47	9.9
Forward/high caste	30.8	5.31	1.41	10.4
OBC	29.9	5.63	1.73	8.0
Dalit/Adivasi	29.1	5.70	1.89	6.2
Muslim	28.0	6.51	2.28	6.7
Other minorities	31.6	5.00	1.16	10.7
No English	30.1	5.73	1.88	6.8
Little English	27.8	5.63	1.47	11.5
Fluent English	31.2	5.11	1.15	13.9

Source: Based on IHDS.

**Table 3. Income, expenditure, assets owned and poverty levels of households**

	Household income	per capita income	per capita consumption expenditure	No. of assets owned	Percentage of poor
Rural	38,032	7,092	623	9	29.05
Urban	83,501	17,806	1,165	16	23.29
Forward/high caste	85,690	18,637	1,229	15	10.83
OBC	47,845	9,442	760	11	24.95
Dalit/Adivasi	39,502	7,675	614	9	36.54
Muslim	51,775	8,675	752	11	31.30
Other minorities	96,870	21,605	1,362	17	9.17
No English	37,687	7,237	630	9	32.38
Little English	94,318	19,062	1,255	17	9.29
Fluent English	167,211	37,661	2,087	21	1.57

Source: Based on IHDS.

minimum of Rs. 7,092/- among the rural to a maximum of Rs. 37,661/- among the fluent English ability group. The minimum and maximum are the same two groups with the per capita consumption expenditure of Rs. 623/- and Rs. 2,087/-, respectively. Besides the current income and expenditure measures, the household assets, as acquired over several years, the number of asset owned (list of assets owned is given in Appendix Table A3) reflects a household's medium or long-term economic position. The minimum number of household assets owned is by rural, Dalit-Adivasi and no English ability groups, while the maximum number of assets owned is by the fluent English ability group. The per cent of poor<sup>5</sup> is the least, 1.57 in the fluent English ability group and the highest 36.54 in the Dalit-Adivasi group. The poverty levels are almost equally high among no English ability group and Muslims (see Table 3).

Indian workforce can be broadly classified into those engaged in agriculture and non-agricultural sectors. Within agriculture, the individuals are engaged in either family farm work or agricultural wage labourers. In the non-agricultural sector, the workers are engaged in salaried work, family business and non-agricultural wage labour. As reported in Table 4, apparently more than 90% of the rural work force is engaged in family farm work and agriculture wage labourers. In the non-agriculture category, majority of the rural work force is engaged in family business and as non-agriculture wage labourers. On the contrary, the workforce engaged in salaried work is the highest in the urban areas.<sup>6</sup>

Highest share of 41% of Dalit-Adivasi group, followed by 36.4% of Other Backward Castes (OBC) is engaged in family farm work. Similar is the case with agricultural wage labourer. With regard to non-agricultural sector source of income, OBC and Dalit-Adivasi groups occupy the highest share in family business and Dalit-Adivasi and OBC groups owe the highest share in non-agriculture wage labourer. However, in salaried work, forward caste and OBC groups equally occupy the share followed by Dalit-Adivasi groups. More than 90% of no English ability group is engaged in family farm work, agriculture wage labour and non-agriculture wage labourer. The share of 85% is engaged in family business and around 52% in salaried work. It may be noted that a major share of the household belong to no English ability group. Yet, 32 and 15% of little and fluent English ability group is engaged in salaried work with mean years of schooling of 11 and 14 years, respectively.

**Table 4. Share of households engaged by location, gender, social and religious group and English ability and sources of income**

	Agriculture			Non-agriculture		Mean years of schooling
	Family farm work	Agricultural wage labour	Salaried work	Family business	Non-agricultural wage labour	
Rural	97.5	94.6	38.4	76.4	67.8	4.19
Urban	2.5	5.4	61.6	23.6	32.2	7.92
Forward caste	15.9	9.6	30.6	13.4	10.5	8.64
OBC	36.4	36.0	30.4	39.9	32.0	5.34
Dalit/Adivasi	41.4	47.9	24.4	34.0	40.2	3.92
Muslim	5.7	5.6	10.5	12.0	15.6	4.70
Others	.5	.9	4.1	.7	1.7	9.21
No English	90.8	96.2	52.7	85.6	90.6	3.69
Little English	8.1	3.7	32.9	10.9	8.7	11.41
Fluent English	1.2	.1	14.5	3.5	.7	14.01
Male	69.5	58.4	82.7	79.4	82.4	6.31
Female	30.5	41.6	17.3	20.6	17.6	2.95

Source: Based on IHDS.

Note: Persons engaged in such work for more than 240h.

Over 70% of the population is rural and family farms and non-farm businesses continue to absorb much of the labour force. While most men work, women’s labour force participation rates are considerably lower. Share of women workforce across agriculture is 30 and 40% in family farm work and agriculture wage labour, respectively. Whereas in the case of non-agriculture, the share of women is either less than or around 20%. Equally worse is their mean years of schooling which was 2.95 as against 6.31 years for men (see Table 4). As only a tiny proportion of female participate in labour force (see Appendix Table A4), no separate equation estimated for male and female.

Education and employment is the key mechanism through which these disparities emerge. Mean earnings of the salaried worker with higher education reports as in Table 5 the highest earning of Rs. 1,22,987/-, while the least annual earning is Rs. 1,117/- of the family farm work with no education. Access to salaried jobs and education (a prerequisite for salaried work) is a major source of disparity in earnings. The disparity in earnings by levels of education, viz., elementary, secondary and higher<sup>7</sup> education is illustrated with the age-earnings profiles of the sample population in the age group

**Table 5. Earnings by levels of education and sources of income of households**

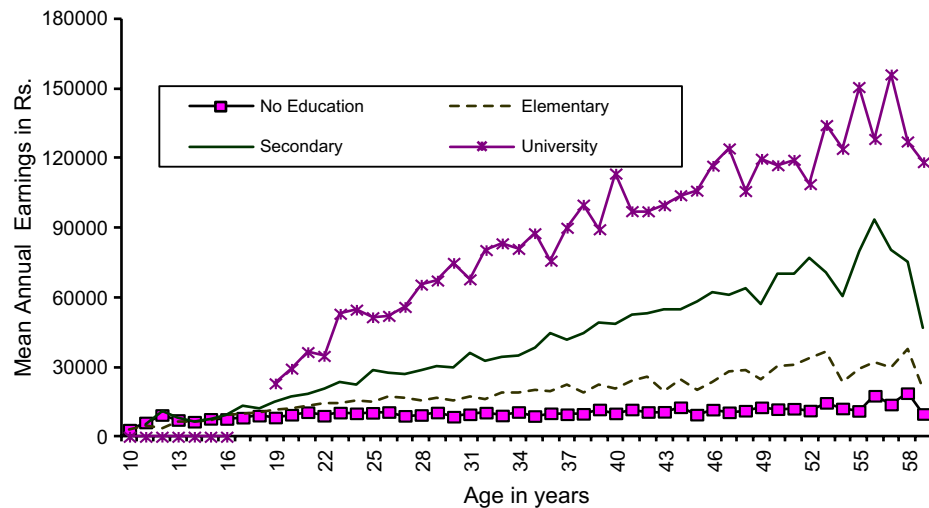
Major source of income	Levels of education			
	No education	Elementary	Secondary	Higher
<i>Agriculture</i>				
Family farm work	1,117	1,961	3,300	8,813
Agricultural wage labour	9,535	6,836	4,216	-
<i>Non-agricultural</i>				
Salaried position	5,083	13,720	42,592	122,987
Family business	10,560	18,058	36,817	84,849
Non-agricultural wage labour	8,716	11,227	8,910	2,579
All	10,172	17,814	36,556	84,438

Source: Based on IHDS.



**Figure 1. Age-earnings profiles of persons between age group 10 and 60 by levels of education in India.**

Source: Estimated from IHDS.  
 Available from [www.ihds.org](http://www.ihds.org).



10–60. It displays a positive relationship between age and annual earnings, such a relationship getting strengthened as moving along in the educational ladder (see Figure 1).

The general shape and slope of the curves in this Figure are in accordance with the human capital theory. The slope of the education–earnings relationship provides a measure of the private rate of return to education. The slope of the curve, and thus returns to education, *increase* with education level as experienced since 1990s in India. Additional education has a much stronger proportionate impact on earnings at higher than at lower educational levels.

### 5. Returns to education

From a national perspective education enriches the stock of human capital that serves as a production factor while from an individual’s perspective acquiring education yields economic benefits in the form of higher wages. As a result, education outcomes are interlinked with economic growth and inequality across different groups. To begin with, the paper estimates (1) the basic Mincer equation, (2) Mincer equation with ability control, (3) Mincer equation with ability and family control, and (4) Mincer equation with ability and family and social and religion controls. Subsequently, selectivity corrected OLS semi-log wage regressions are estimated for locations—rural, urban; caste groups—Forward/High Caste, OBC, Dalit-Adivasi; religious groups—Muslims, Christians-Sikh-Jain; English language ability groups—no English ability, little English ability and fluent English ability groups.

#### 5.1. Estimates of the Mincer equations

The basic Mincer equation is estimated with education measured in years of schooling as a continuous variable, experience and experience square as explanatory variables. This equation estimates the average rates of return to education as 14% and is statistically significant. This indicates that an additional year of schooling will increase the earnings by 14%. As the basic question often raised is to what extent this 14% of returns is solely due to education? Adding ability controls (a dummy variable on repeated, dummy variable on performance in secondary, dummies on little and fluent English ability) in the basic Mincer equation reduces the average returns to education to 10.1%.

Further, it is not ability alone that influences returns to education, but also family endowments and connections influence the returns. Omitting family background was found to overestimate the returns to education at the graduate and higher levels as individuals who acquire higher education generally belong to privileged backgrounds so that some part of their return to education arises from their backgrounds (Kingdon, 1999).

As expected, the family controls (dummy on Marital status and dummy on Male) added to the specification further considerably reduces the average returns to education to 8.8%. The socially deprived caste groups and religious minorities such as Muslims are the marginalized sections of the Indian society. By adding these caste and religious groups (dummy on high caste, dummy on other backward caste and dummy on Muslims) to the wage equation marginally reduces the average return to education to 8.6% (see Table 6). It is because the influence of OBC on earnings is negative in the model. It can be inferred here that the influence of upper caste on earnings get offset by the inclusion of OBC and Muslims in the model.

**Table 6. OLS and selectivity corrected OLS estimates of wage equations**

	Basic Mincer equation	Ability control	Ability and family control	Ability, family, social and religion control	Selectivity corrected
Education	.141*** (.00)	.106*** (.00)	.088*** (.00)	.086*** (.00)	.051*** (.00)
Experience	.047*** (.00)	.041*** (.00)	.038*** (.00)	.038*** (.00)	.002 (.00)
Experience square	-.040*** (.00)	-.035*** (.00)	-.034*** (.00)	-.033*** (.00)	.009*** (.00)
D_Repeated		-.077*** (.01)	-.096*** (.01)	-.093*** (.01)	-.078*** (.01)
D_Perfsec		.060*** (.01)	.100*** (.01)	.097*** (.01)	.062*** (.01)
D_Graduate		.187*** (.01)	.256*** (.01)	.241*** (.01)	.135*** (.01)
D_Eng_fluent		.613*** (.02)	.643*** (.02)	.624*** (.02)	.515*** (.02)
D_Eng_little		.278*** (.01)	.281*** (.01)	.269*** (.01)	.230*** (.01)
D_Marital			.021** (.01)	.027*** (.01)	.023** (.01)
D_Male			.410*** (.01)	.400*** (.01)	.242*** (.01)
D_High_Caste				.148*** (.01)	.188*** (.01)
D_OBC				-.042*** (.01)	.000 (.01)
D_Muslim				.114*** (.01)	.178*** (.01)
Intercept	.528*** (.02)	.734*** (.02)	.567*** (.02)	.572*** (.02)	1.559*** (.03)
$\lambda$					-.297*** (.01)
Wald $\chi^2$					24933
R <sup>2</sup>	.366	.404	.447	.453	.473
N	48328	47363	47363	47363	46515

\*\*p < .01, \*\*\*p < .001.

In all four OLS wage specifications, all the explanatory variables are statistically significant. The value of  $R^2$  from basic Mincer function to the fourth specification of ability, family and caste-religion controls, keeps improving in every specification. The selectivity corrected OLS wage regression estimates the average returns to education as 5.1% and is statistically significant. The statistically significant  $\lambda$  indicates the possible presence of sample selection. As already noted, the standard procedure to account for the problem of sample selection is Heckman correction.

### 5.2. Estimates of the augmented Mincer equation

The earnings function with Heckman corrections is used to estimate returns to education at different levels by converting the continuous years of schooling variable into a series of dummy variables, say Elementary, Secondary and Higher, to denote that a person has completed the corresponding level of education, and there are workers in the sample with no education in order to avoid matrix singularity (Psacharopoulos, 1995). The Heckman estimates of augmented Mincer equation are estimated for rural, urban, no English ability, little English ability, fluent English ability, high caste, OBC, Dalit-Adivasi, Muslims and other minorities (Christians-Sikh-Jains).

In both rural and urban specifications, all variables are statistically significant and reported the expected relationships among human capital variables and ability control with earnings. In the family controls, in rural specification, with regard to Married, reported negative influence with earnings. However, with regard to caste-religion, in the urban model, it was found that being a OBC or a Muslim reduces the earnings of an individual unlike in rural areas. This indicates the discrimination of caste and minorities in influencing earnings is well known in urban than in rural areas.

In the English language ability group, no English ability specification reports all the variables are statistically significant and exhibit positive relationship with earnings except Married. This is not the case with regard to little English ability equation, that variables such as Elementary, Secondary, family controls and Muslim are not statistically significant. Being elementary or secondary level educated and having little English ability is not influencing the earnings of individuals. Family controls Male is not influencing earnings with little English ability. Muslim is not only statistically insignificant but also report negative sign that being Muslims and having little English ability reduces the earnings of individuals as found in the urban specification as well. With regard to fluent English ability specification, the variables that are statistically significant are Experience, Repeated, Graduate, OBC and Muslim (Table 7).

With regard to caste groups, in the forward caste all the variables are statistically significant except fluent English ability and report the expected relationship with earnings except Graduate. It is surprising to note that Graduate in a household negatively influences the earnings of an individual among forward caste groups. In the OBC equation, all variables are statistically significant and report the expected relation with earnings. Similar to forward castes equation, OBC equation reports a negative relationship with Graduate in a household with earnings of an individual. In the Dalit-Adivasi equation, all the variables are statistically significant except Repeated and all variables report the expected relationship with earnings.

In case of religious groups, the Muslims equation, exhibit that all variables are statistically significant except Graduate and report expected relationship with earnings. In other minorities equation, experience square and repeated are not statistically significant. All statistically significant variables exhibit the expected relationship with earnings (see Table 8). The statistically significant  $\lambda$  indicates the possible presence of sample selection in all these specifications.

### 5.3. Estimates on returns to education

Using the estimates of the augmented earnings function of the dummies for different levels of education, private rate of return to different levels of education can be derived from the formulas:

$$r_e = \beta_e / S_e$$

**Table 7. Selectivity corrected OLS wage equations by locations and English language ability**

	Rural	Urban	No English	Eng_little	Eng_fluent
D_Elementary	.195*** (.01)	.277*** (.02)	.275*** (.01)	.630 (.38)	.127 (.13)
D_Secondary	.305*** (.01)	.487*** (.02)	.556*** (.01)	.855 (.38)	.510 (.14)
D_Higher	.354*** (.03)	.727*** (.04)	.812*** (.05)	1.034* (.38)	.892* (.05)
Experience\$	.005*** (.00)	.011*** (.00)	.005*** (.00)	.023*** (.00)	.024*** (.00)
D_Repeated	-.043*** (.01)	-.088*** (.02)	-.048*** (.01)	-.134*** (.02)	-.251*** (.05)
D_Perfsec	.110*** (.01)	.136*** (.02)	.180*** (.01)	.094*** (.02)	.126 (.08)
D_Graduate	.170*** (.03)	.136*** (.03)	.164*** (.05)	.188*** (.03)	.110* (.05)
D_Eng_fluent	.649*** (.03)	.409*** (.02)			
D_Eng_little	.291*** (.01)	.186*** (.02)			
D_Male	.277*** (.01)	.268*** (.01)	.326*** (.01)	.022 (.02)	
D_Marital	-.120*** (.01)	.122*** (.01)	-.079*** (.01)	.043* (.02)	.074 (.04)
D_High_caste	.190*** (.01)	.073*** (.01)	.237*** (.01)	.060** (.02)	
D_OBC	.024*** (.01)	-.116*** (.01)	.022*** (.01)	-.078*** (.02)	-.179*** (.03)
D_Muslim	.197*** (.01)	-.082*** (.02)	.197*** (.01)	-.012 (.03)	-.165** (.05)
Intercept	1.711*** (.02)	1.644*** (.02)	1.657*** (.01)	1.657*** (.38)	2.620*** (.64)
R <sup>2</sup>	.369	.434	.300	.346	.225
λ	-.297*** (.01)	-.186*** (.01)	-.257*** (.01)	-.330*** (.01)	-.262*** (.03)
Wald χ <sup>2</sup>	10,294	7,026	8,670	1,688	489
N	31,999	14,516	37,647	6,759	2,109

\*p<.05, \*\*p<.01, \*\*\*p<.001.

§ Experience square excluded from the models due to reported multicollinearity.

$$r_s = (\beta_s - \beta_e) / (S_s - S_e)$$

$$r_h = (\beta_h - \beta_s) / (S_h - S_s)$$

where  $r$  refers to rates of return to education,  $e$  stand for elementary,  $s$  for secondary and  $h$  for higher levels of education.  $\beta_e$  is the coefficient of Elementary,  $\beta_s$  is the coefficient of Secondary and  $\beta_h$  is the coefficient of Higher education.  $S$  refers to school cycles of different levels of education (see Psacharopoulos, 1995).

**Table 8. Selectivity corrected OLS wage equations by caste and religious group**

	Forward caste	OBC	Dalit-Adivasi	Muslims	Other minorities
D_Elementary	.313*** (.03)	.312*** (.02)	.363*** (.02)	.121*** (.04)	.407*** (.10)
D_Secondary	.590*** (.05)	.644*** (.03)	.636*** (.03)	.432*** (.05)	.605*** (.13)
D_Higher	.851*** (.07)	.926*** (.05)	.345*** (.05)	.555*** (.09)	.792*** (.20)
Experience	.019*** (.00)	.026*** (.00)	.028*** (.00)	.014*** (.00)	.026* (.01)
Experience square	-.012* (.00)	-.024*** (.00)	-.027*** (.00)	-.013* (.01)	-.017 (.01)
D_Repeated	-.082*** (.02)	-.059*** (.01)	-.011 (.01)	-.054* (.03)	.017 (.05)
D_Perfsec	.232*** (.03)	.138*** (.02)	.154*** (.02)	.132*** (.04)	.243*** (.07)
D_Graduate	-.273*** (.05)	-.235*** (.04)	.165*** (.05)	.102 (.07)	.299** (.12)
D_Eng_fluent	.048 (.04)	.078* (.04)	.815*** (.04)	.393*** (.06)	.349*** (.09)
D_Eng_little	.211*** (.02)	.238*** (.02)	.332*** (.02)	.163*** (.03)	.126* (.05)
D_Male	.424*** (.02)	.635*** (.01)	.612*** (.01)	.569*** (.03)	.248*** (.05)
D_Marital	.063** (.02)	.065*** (.01)	.078*** (.01)	.190*** (.02)	.138* (.06)
Intercept	1.016*** (.07)	.517*** (.05)	.452*** (.04)	1.104*** (.08)	1.160*** (.22)
$\lambda$	3.963*** (.24)	6.372*** (.24)	6.444*** (.20)	1.605*** (.22)	.345 (.35)
Wald $\chi^2$	77.75***	78.46***	79.65***	265.73***	232.63***
$R^2$	.487	.419	.389	.323	.339
$N$	7,695	15,143	17,274	4,671	990

\* $p < .05$ , \*\* $p < .01$ , \*\*\* $p < .001$ .

#### 5.4. Inter-sectoral disparity

Rates of return to education indicate the profitability of investing on education. At the elementary level, the private rate of return is 2.4% in rural and 3.4% in urban areas (Table 9). While at the national level it is just at 1.3%. The returns to secondary education improve considerably in the urban than in rural areas.

The rate of improvement between urban is more than rural and is around 2% age points. Returns to higher education is quite substantial with 24% in urban than at 4.9% in rural India. In urban India, the returns to secondary to that of higher education is a quantum jump. Such high private returns to higher education influence a great deal the demand for higher education in urban India. Though majority (65%) of the workers in the sample live in rural areas, their returns to secondary and higher levels of education are substantially lesser compared to urban areas (see Table 9). The inequality in

**Table 9. Private rates of return to education by location and English language ability (in %)**

	All	Rural	Urban	No English ability	Little English ability	Fluent English ability
Elementary	1.27	2.44	3.46	3.44	7.88*	1.59**
Secondary	3.72	2.75	5.25	7.03	5.63*	9.58*
Higher	15.40	4.90	24.00	25.60	17.90	38.20

Source: Estimated from Table 7.

\*Very few observations in this category; \*\*Not statistically significant co-efficient values.

earnings arise from the both quantity and quality of educational facilities and employment opportunities available in urban than in rural areas.

### 5.5. Disparity among the English language ability groups

The English language ability creates another kind of disparity among workers not only in India but across the world. This demand for English language ability has been on the rise with globalization. This is being reflected in the demand for private schools even among the poor households as such schools promise to offer English as the medium of instruction than the government schools which follow state specific language as medium of instruction (see Tooley & Dixon, n.d.). Estimating returns to such skills like English, Mathematics, etc. is not so new in the literature. Azam et al. (2011) present a brief review of such studies while estimating returns to English skills in India.

Returns to education of the no English ability groups are almost similar to the return to education of urban India across all levels of education. With regard to the other two groups of little and fluent English ability, the coefficients of the Elementary and Secondary variables are not statistically significant (Table 9). However, at the higher education level, one can find the highest wage premium of having fluent English language ability. One additional year of schooling would bring in 38% increase in earnings of individuals. This is the major source of earning disparity across various groups.

### 5.6. Disparity among caste-religious groups

Stratification based on caste in India is deep rooted and about 3000 years old. Labour markets in India have historically been organized along caste lines. An important feature of these caste networks is that they are typically the most active among the highly skilled or educated (or white collar) occupations, dominated by high caste. Low caste men and women historically did not participate in the labour market and hence did not benefit from these caste networks. This also meant that when low caste men and women chose to enter the labour market, they did not have the caste-based apprentice system to depend on. The implications could be extremely varied.

However in post independent India, the system of reservation policies make special provisions for the promotion of the educational, social, political and economic interests of these deprived SC/ST (also referred as *Dalits* and *Adivasis*) and OBC population. These are positive discriminatory measures to encourage the participation of SC/ST and OBC sections of the population in the form of seat reservation in higher educational institutions and in political bodies like Central and state legislatures and employment reservation in Government services. Among workers of different caste groups, it can be found the forward caste and OBC report almost similar rates of return to elementary education (see Table 10).

**Table 10. Private rates of return to education by caste and religion (in %)**

	Forward/high caste	OBC	Dalit/Adivasi	Muslim	Other minorities
Elementary	3.91	3.90	4.54	1.51	5.09
Secondary	6.93	8.30	6.83	7.78	4.95
Higher	26.10	28.20	-29.10	12.30	18.70

Source: Estimated from Table 8.

Rates of return to post elementary levels corresponding to OBC group are reporting marginally better returns than the forward caste. Hence, it can be argued that the system of reservation policies of OBCs influenced positively. But the disparity is found extreme among the socially deprived sections of the workers is Dalit and Adivasi group. Their return to elementary schooling was marginally better than forward and OBC workers, while returns to secondary education were lowest among the three caste groups. The negative returns accruing to *Dalits* and *Adivasis* in higher education indicate the reality of reservations in higher education and in the hierarchy of employment prospects continue to be met with a great deal of resistance leading to under-enforcement.

Additionally, there has been widespread public opposition to reservations for Dalits in various government bodies, continue to be significantly underrepresented in most professional strata. Indeed, implementation of the reservations policy is challenged by the exclusion of tangible and intangible kinds that pervade in higher educational institutions. Later, the hierarchy of occupations restrict their economic mobility as the deprived sections as a group lack social networking and the cultural capital in the social landscape of India. Very few studies prevail that explore the forms of caste-based ideologies pervading in Indian higher education and also in the public and private sector occupations (Thorat & Attewell, 2007). According to Guru, social sciences in India operate with a certain form of divisive interests which convert academicians to different camps of producers of theory and constructors of empirical investigation. Thus, it produces “theoretical brahmins” and “empirical shudras”. This divide marginalizes the Dalits into stigmatized identities in the terrain of intelligentsia (Guru, 2002).

Despite the rhetoric on empowerment of Dalits and Adivasis, the existence of extensive laws and provisions, not much has been achieved in actual terms. Thorat and Senapati (2006) find that though, the low percentage share of the marginalized social groups in higher categories of employment suggests that forms of resistance are higher in the higher echelons of jobs. There have been recorded instances of the SC/STs being discriminated and denied rights through the non-implementation of reservations. Perhaps, what remain even more important are the unrecorded incidences of the forms of coercion and oppression despite considerable government investment into the education of the “backward castes”, there is little evidence of economic benefit to these castes, partly because of the inability of the education to deliver superior jobs. This leads naturally to a “discouraged worker” effect and withdrawal of funds for educational purposes by such castes. In an important study, Jeffrey, Jeffery, and Jeffery (2004) conclude that “Without a substantial redistribution in material assets within society, development initiatives focused *merely* on formal education are likely to be only partially successful in raising social standing and economic position of subordinate groups”. All these social and economic realities of Dalit-Adivasi get reflected in the negative returns to higher education in India.

With regard to the religious group, Muslims group report the least returns in elementary and higher education. While the Other minorities group report higher returns than Muslims (see Table 10).

Low returns to elementary education across groups are almost universal across different groups. Least returns are 1.51% among Muslim to highest returns of 5.09% among other minorities. Secondary level educated workers report 2.75% among rural workers to the highest returns of 8.30 among the OBC group. Returns to higher education vary to a great deal ranging from 4.90 among the rural workers with the highest returns of 38% among fluent English ability group. This is in contrast to Duraisamy (2002) reporting the highest returns to secondary education in India, refereeing to the period 1983 and 1993–1994. In a decade’s time, with changes in the economic scenario and in the labour market, higher education especially the English language ability along with higher education brings in the highest returns to education.

The rates of return estimates obtained here confirm that returns to education increase with the level of education across location, caste-religion and English language ability. Similar increasing returns by level of education were observed earlier for other studies in India (Agrawal, 2011; Duraisamy, 2002; Kingdon & Unni, 2001; Unni, 2001).

## 6. Policy implications

Estimates of returns to education are often used to inform education policy decisions on the allocation of public investment on different levels of education. The finding of relatively low returns to lower levels of education does not necessarily imply that educational policy in India should not emphasize elementary and secondary schooling. Elementary and secondary education serve as necessary inputs to higher levels of education and as such it is necessary to understand the reasons for low returns rather than simply directing public investment according to the highest rates of return. It is important to highlight that first, these estimates pertain to adult workers. Second, quality of schooling is one of the factors that can be attributed to low returns to elementary education. Nonetheless, the study does not control for quality of schooling due to lack of data. Third, estimates here do not take into account the social costs and benefits of each education level. Fourth, the private returns here are the gross returns, does not include the cost of education both direct and indirect.

Despite these limitations, the pattern of returns exhibit rising with the education level along with English language ability which exacerbates wage and income inequality. The high private returns to higher education indicate that there is room for the government to shift some of the costs of acquiring higher education to individuals. Since the middle of 1990s, half of the total public expenditure on education is allocated to elementary education and government policy lays great stress on achieving elementary education for all. However, the emphasis is on quantity in terms of targets by gross enrolment ratios across all levels of education. As a result, quality is traded off at the cost of expansion especially in government funded schools. At this juncture, public investment to raise the returns to school education by improving the quality of schooling would be desirable.

Given the extremely unequal distribution of returns to higher education, the policy option suggested is for a differential fee in higher education. In response to such inequitable distribution, Atkinson (1995) and Sen (1995) establish the need for targeting of government expenditures towards the poor. The theoretical rationales for targeting extend to both equity and efficiency. According to Sen (1995), “the more accurate a subsidy in fact is in reaching the poor, the less the wastage, and less it costs to achieve the desired objective”. However, the political question concerns the actual feasibility and acceptability of aiming public policy toward particular deprived groups. The political economy of targeting has to be concerned not just with the economic problems of selection, information and incentives but also with the political support for, and feasibility of, aiming public policy specifically at removing the deprivation of particular groups. Now the 11th and 12th five year plans emphasis more on inclusive growth as the economic growth during the reforming period has not resulted in redistribution of income. In this debate, measures to improve equality of education opportunity deserve special attention. Hence, it is argued for differential treatment of the deprived sections both socially and economically (see details Geetha Rani, 2014).

Though identification of the differential fee is a difficult task, still targeting should be tried which would involve errors of commission and omission. Such errors of targeting often influence policy advice. The key issue is not whether a scheme avoids errors of targeting, but how well it meets its stated objectives given budget constraints, the information that is available to policymakers, and the behavioural and political responses to targeted interventions (van de Walle, 1996). It is argued that categorical indicators that capture multi-level deprivation can aid to reduce such errors. Nevertheless, there could be some imperfection in these measures, but *rough justice* in estimating ability to pay is still preferable to equal subsidies for all.

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### Notes

1. This is a revised version of the paper presented in the 55th Indian Labour Economic Conference, held at Jawaharlal Nehru University, New Delhi and 23rd Annual Conference on Contemporary Issues in Development Economics, held at Jadavpur University, Kolkata.
2. In government schools, the lessons are taught in regional languages and English is learned as second language while private schools use English to teach most of the subjects. However, in higher education, the lessons are taught to a large extent in English.
3. It is assumed that children start schooling at the age of five.
4. The variables were selected using a correlation co-efficient analysis.
5. IHDS uses the official rural and urban poverty lines for 2004–2005; average poverty line is Rs. 356 per person per month in rural areas, and Rs. 538 in urban areas (Desai et al., 2010).
6. Each of the groups, viz., location, caste–religion group and English language ability group are mutually exclusive groups in terms of different work participation rates.
7. The length of the school cycle, as per the National Education Policy, 1986, as followed in many states is eight of elementary, four years of secondary (including higher secondary) schooling and above 12 years of schooling is higher education consisting of under graduation and/or post graduation levels of education.

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## Appendix

**Table A1. Private rates of return to education by levels in India (in %)**

Author(s)	Primary	Middle	Secondary	Graduate
Blaug (1972)	16.5	14	10.4	8.7
Psacharopoulos (1973)*	24.7	19.2	–	14.3
Husain (1967)	–	–	4.8	12
Tilak (1987) unadjusted estimates	33.4	25	19.8	13.2
Tilak (1987) adjusted estimates	7.82	8.54	Negative**	6.82
Kingdon (1999) men	–3.1	4.93	5.65	4.49
Kingdon (1999) women	1.95a	1.56	4.18	5.75

Source: \*As quoted in World Bank Staff Working Paper, 1979, No. 327; \*\*Tilak (1987) did not report the actual returns, Kingdon (1999).

**Table A2. Private rate of return to educational levels in recent studies (in %)**

Author(s)	Primary	Middle school	Secondary	Graduate
Duraisamy (2002) unadjusted estimates	7.9	7.4	17.3	11.7
Duraisamy (2002) adjusted estimates	7.8	7.4	17.7	12.7
Vasudeva Dutta (2006) regular workers 1983	1.32	2.35	5.31	9.02
Vasudeva Dutta (2006) 1993	.85	1.69	4.27	9.15
Vasudeva Dutta (2006) 1999	.97	2.02	4.64	10.26
Agrawal (2011)	5.47	6.15	12.21	15.87

Source: Duraisamy (2002), Vasudeva Dutta (2006), and Agrawal (2011).

**Table A3. List of assets owned by household**

Cycle/bicycle	Air cooler	Car
Sewing machine	Clock or watch	Computer
Generator set	Electric fan	Credit card
Mixer/grinder	Chair or table	AC: Air conditioner
Motor cycle/scooter	Cot	Washing machine
Black and white television	Two pairs of clothes	Mixer/grinder
Colour television	Shoes or chappals	Telephone/cell phone
Pressure cooker		Fridge/refrigerator

Source: IHDS.

**Table A4. Earning by educational levels by gender**

Levels of education	All		Male		Female	
	Mean income	Education (%)	Mean income	Education (%)	Mean income	Education (%)
No education	10,172	36.3	13,937	26.5	5,950	62.3
Elementary	17,814	32.2	20,004	35.8	8,716	22.8
Secondary	36,556	22.7	37,925	27.7	26,011	9.5
Higher	84,438	8.8	87,415	10.0	69,815	5.4
Total	25,126	47,675	30,123	34,582	11,930	13,093

Source: Based on IHDS.



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