

# Indian Labour Markets and Returns to Education

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## Abstract

The present study is an attempt to examine the trends in returns to education in the context of long-term economic growth in India during 1983 to 2009–2010. It outlines various forms of inequality issues prevalent in the Indian labour markets for male as well as female workers in the rural and the urban areas as regular and casual workers. The unit level data from six rounds of National Sample Survey during 1983, 1987–1988, 1993–1994, 1999–2000, 2004–2005 and 2009–2010 were used for this study. The Mincer wage function was estimated separately for male and female workers and also for regular and casual workers. To account for sample selection bias, the Heckman two-step procedure was used. The results reveal that returns to education were higher in casual labour market for rural and urban male workers till some intermediate levels. For female workers, the returns to education have not changed much in both the rural and the urban areas, with an increase in level of education over time. However, the returns to education have improved for regular workers, indicating towards higher wages for improved education over time, as a result of increased employment opportunities, especially in the tertiary sector, for better educated in India during the last decade of relatively faster economic growth.

## Keywords

Education, economic growth, labour markets, mincer wage and heckman model

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## 1. Introduction

Education is perceived as one of the most important engines for economic development. However, the educational achievements may differ significantly across various regions and strata of the population. The human capital investment theory highlights that individual decisions to go for certain level of education are determined by the comparison of present value of expected benefits with the expected costs of acquiring such education (Becker, 1993). The decision to go for education happens only when the expected benefits exceed expected costs. The benefits can be evaluated at two levels. First, at the macro level, to guide public policy for public investments in education to facilitate future economic growth, and second, at the individual level, to determine the extent of education one should have to optimize individual earnings and income levels with a given level of constraints. The decisions at both the levels may vary considerably depending upon the resource constraints, mismatch between the objectives at the national level and the individual level and the extent of inequality prevalent within the society with respect to caste, gender, asset ownership and rural/urban divide in an economy. The evaluation of returns to education is an important pre-requisite for prioritizing educational investments in an economy and determining the size of such investments. It also helps in comparative evaluation of the investments across different segments of the economy including physical versus human capital.

Indian economy has undergone significant structural changes during the last more than six decades since independence in 1947. Delineating the Indian growth story, the first change in the economy happened in the form of a shift from the colonial era of economic stagnation to the period of 'Hindu rate of growth'. There was a rapid industrialization phase till mid-1960s followed by a decade of stagnation till late 1970s. After 1980s, the Indian economy tended to shed the tag of 'Hindu rate of growth' and registered faster growth at 5.5–6 per cent per annum. A significant shift in the pattern of economic growth happened with liberalization starting in India after 1991, out of the compulsions of dismal foreign exchange reserves, deteriorating balance of payments, continuously large fiscal deficit and ever-increasing external debt. The Indian economy shifted to a higher growth trajectory of more than 8 per cent per annum during 2003–2004 to 2010–2011 (except 2007–2008), after showing some slowdown in the recent years. Relatively faster growth during the last decade can be attributed largely to the expansion of service sector in India, termed by many as 'services revolution'. Such transition has also been termed as premature at relatively low levels of per capita income and in the absence of sufficient industrial development in the country. Increased share of the service sector in the GDP has failed to bring a corresponding increase in the share of employment of such sector (GOI, 2011).

In view of such a growth story in India, it is clear that while a smaller proportion of workers were a part of the growth story of the service sector in India, comparatively larger proportion employed in agriculture and industrial sector were sharing the stagnating or even declining output levels resulting into lower per capita incomes. Highly skewed pattern of returns across different levels of education in India might be one of the most important reasons for such skewed

growth and emerging inequalities. Such widely differential returns to education have the potential to widen the inter-sectoral, regional, caste and gender gaps in earnings in the long run. This paper intends to estimate the returns to education for individual workers in India during the period of 1983 to 2009–2010 by estimating the wage equation. The unit-level data collected by the National Sample Survey Organization (NSSO) during six quin-quennial rounds were utilized for this investigation. Most of the previous studies that attempted to estimate the returns to education in India confined only to the urban male workers in regular wage category (Azam, 2012; Chamarbagwala, 2006; Madheswaran & Attewal, 2007). However, the returns to education are expected to differ considerably between rural and urban areas, male and female workers and across casual wage and regular wage employment categories. The present study, thus, contributes to better insight into the pattern and extent of returns to education by focusing separately on casual/regular and male/female workers in the rural and urban areas. The findings of this study are expected to throw light on the pattern of changes in returns to education in India with more focus in the recent period after the liberalization and will help in guiding the education policy in terms of investment decisions and better targeting.

This paper is divided into six sections. A brief review of the relevant literature on returns to education has been provided in the next section. While the third section discusses different approaches being used for estimation of the returns to education, the fourth section explains the database and methodology used for deriving the estimates. The results of the estimation are elaborated in the fifth section and the last section concludes with policy implications.

## 2. Literature Review

A brief review of important studies highlights some important aspects of Indian labour markets and returns to education in India. It was established that improvement in education increased the likelihood of entering into the workforce and also the wages as returns to education were better for higher and technical education (Duraismamy, 2002). There were considerable differences in returns to education across gender, rural–urban markets, caste and skills (Chamarbagwala, 2006; Duraismamy, 2002; Kijima, 2006). The returns to education for females were reported higher than their male counterparts (Duraismamy, 2002) but the differences had narrowed down over time (Chamarbagwala, 2006). However, the returns to education changed considerably after the trade liberalization in India and it widened the skill gap (Chamarbagwala, 2006; Duraismamy, 2002). Even the gap in returns to primary and graduate levels of education increased substantially (Dutta, 2006). The rising wage inequality in urban India was attributed to skill inequality (Kijima, 2006) and there were widening gaps across the castes (Madheswaran & Attewal, 2007), owing to the differences in educational achievements (Ito, 2009). All these studies point towards the need to explore the returns to education across various dimensions, over time, to draw more meaningful conclusions for the labour markets in India.

### 3. Approaches for Estimating Returns to Education

Though there have been various concepts of returns to education, two important ones are social returns and private returns (Psacharopoulos, 1994). The social rate implies the benefits realized by society or state in relation to the costs incurred by it. The costs include not only those incurred by the students but also by the society, and benefits also include those accruing to the society along with the private benefits. It is also argued sometimes that the focus in this approach should not be on the benefits but the productivity differentials (*ibid.*). However, this approach requires a huge amount of information on costs and earnings that usually is not easily available.

The other concept is the private returns that examine the gains from additional education in terms of increased earnings over the costs incurred by an individual. This is a relatively narrow concept in the sense that it underestimates the actual returns to education but it helps an individual to make a decision about her optimal level of education. While the gains in private returns are the additional earnings, the costs may include the cost of education as well as the earnings forgone for acquiring the additional education. Estimation of private returns is comparatively much easier and requires less information than that for estimating the social returns to education.

The private returns are estimated by using the standard Mincer wage earning function which has a semi-logarithmic specification with log of wage being the dependent variable and years of schooling or dummies for various levels of school education are some of the explanatory variables. The basic assumptions for estimating this function are (i) negligible private costs of education which is largely compensated by part time and summer earnings; (ii) the costs of education are forgone earnings; (iii) isomorphic earning profile (no change in the slope of earnings function at all levels of education); and (iv) absence of credit market constraints for acquiring education (Duraiswamy, 2002). However, it has also been highlighted that there is ability bias in estimating the returns to education as the estimated returns may largely be a return to ability that would arise independent of schooling (Arrazola & Hevia, 2008; Long, 2010; Trostel, Walker, & Woolley, 2002). Further, the estimation of wage equation with the ordinary least squares (OLS) method may produce biased and inconsistent estimates of the return coefficient due to positive correlation between schooling and ability (Yang, 2005). Some of the approaches that have been used for this purpose are instrumental variable approach, the fixed effects method and direct measurement of ability (Card, 1999).

Further, it is evident that the returns to education vary widely across the wage distribution and OLS estimates provide only the average rate of returns, which may lead to misleading policy implications. Such an issue has been addressed by many studies by using the quantile regressions, which assume that while the returns are same across a given quantile, it varies considerably across different quantiles. It also reduces sensitivity to outliers (Aggarwal, 2011; Azam, 2012; Chamraborty, 2006).

Heckman (1979) has provided the procedure for controlling the sample selection bias as the estimates of the Mincer wage function are not based on the randomly drawn sample but these are estimated only for those who are employed in the workforce and draw some positive wages. The OLS estimates will underestimate the returns to education. The procedure estimates the returns in two steps. First, a participation equation is estimated to find the probability of each individual in the workforce and then the wage equation is estimated at the second stage by also including the subset of the independent variables from the selection equation.

## 4. Data and Methodology

### 4.1 Data

The study used the data on employment and unemployment in India from six rounds of the NSSO during 1983 (38th round), 1987–1988 (43rd round), 1993–1994 (50th round), 1999–2000 (55th round), 2004–2005 (61st round) and 2009–2010 (66th round). Each round collects information about 120,000 households and more than half a million individuals, selected from rural and urban areas. The national level estimates of the labour and workforce participation, industrial distribution of the workers and status of their employment and wages was prepared on the basis of the data collected from these surveys. The sample is selected using two-stage stratified random sampling procedure where the first stage of sampling is the census villages and urban blocks and the second stage of sampling is the households in these villages and blocks. Apart from the information on employment, the survey also records information on the household size, age and education of the household members, social group of the household, religion and land owned.

For this study, we confined our analysis to regular and casual wage workers as defined by their current daily status within the age group of 15–65 years, as most of the workers usually fall in this age category. The individuals for whom the earnings were not reported were dropped from the analysis. The wage earnings were calculated per day by dividing the total wage earnings received during the last week with the number of days of employment. The analysis was carried out separately for rural and urban areas, male and female workers and casual wage and regular wage workers. The details of the number of workers in each round are given in Table 1. The total number of workers (regular and casual) in each round varied between 45,000 and 80,000. However, there were many missing wage values in 43rd round, especially in case of rural workers despite reported work for the current week, so these observations were deleted resulting into much smaller sample for this round as compared to the other rounds.

### 4.2 Methodology

The rate of return to investment in education is estimated by the earnings function method, also known as human capital earnings function or ‘Mincerian’ method. The basic ‘Mincerian’ earnings function is given as:

**Table 1.** Size of the Workers in Different NSS Rounds, 1983 to 2009–2010

Year/NSS Round	Work type	Rural			Urban			Overall		
		Male	Female	Total	Male	Female	Total	Male	Female	Total
1983 (38th Round)	Casual	24,316	12,797	37,113	2,559	1,051	3,610	2,6875	13,848	40,723
	Regular	9,972	1,578	11,550	8,586	1,357	9,943	18,558	2,935	21,493
1987–1988 (43rd Round)	Casual	1,667	5,230	6,897	6,328	2,218	8,546	7,995	7,448	15,443
	Regular	1,928	715	2,643	23,385	4,139	27,524	25,313	4,854	30,167
1993–1994 (50th Round)	Casual	20,829	9,939	30,768	6,798	2,415	9,213	27,627	12,354	39,981
	Regular	9,100	1,554	10,654	22,045	4,265	26,310	31,145	5,819	36,964
1999–2000 (55th Round)	Casual	23,994	10,544	34,538	8,210	2,101	10,311	32,204	12,645	44,849
	Regular	9,624	1,880	11,504	23,187	4,727	27,914	32,811	6,607	39,418
2004–2005 (61st Round)	Casual	20,883	9,108	29,991	7,672	2,153	9,825	28,555	11,261	39,816
	Regular	14,168	3,043	17,211	19,943	5,354	25,297	34,111	8,397	42,508
2009–2010 (66th Round)	Casual	17,814	6,240	24,054	7,839	1,895	9,734	25,653	81,35	33,788
	Regular	11,456	2,487	13,943	18,258	4,292	22,550	29,714	6,779	36,493

**Source:** Unit level data, Employment and Unemployment in India, National Sample Survey Organization, Government of India.

$$\ln w_i = \alpha + \sum \beta_k D_{ki} + X' \delta + e_i$$

where  $w$  represents the natural logarithm of wage for a given worker,  $D$  is the dummy for level of education and  $X$  is a vector of other variables that are expected to influence the wage of a worker such as age, experience, etc. The details of variables included in the equation are given in Appendix I.

To fix the problem of selection bias, Heckman two-step estimation procedure was used. In the first step, we derived the probability of participation in the workforce with respect to selected explanatory variables by using the probit model. The participation equation estimated by using the probit model is given below.

$$Y_i = Z'_i \Phi + u_i$$

where  $Y$  is the dependent variable that takes the value 1 if individual participates in the workforce and 0 if not.  $Z_i$  are the human capital, demographic and identifying variables and  $u \sim N(0, \sigma_u^2)$ . From this equation, a selection variable is created which is known as 'inverse Mills ratio' ( $\lambda$ ). This estimate is then used as an additional independent variable in wage equation in the second stage.

In the second step, to estimate the returns for different levels of education, an augmented wage equation was used. Here, wage rate was added as dependent variable and the earnings equation was extended by incorporating a series of dummy variables, referring to completion of education level to estimate returns at different levels.

$$\ln w_i = \alpha + \sum \beta_k D_{ki} + X' \delta + \theta \lambda_i + e_i$$

The estimation of the above equation was carried out only for the uncensored observations, that is, only for those who participated in wage work. By fitting the above earnings function, average annual rate of return to education was obtained as follows:

$$y_k = (\beta_k - \beta_{k-1}) / (\eta_k - \eta_{k-1})$$

where  $\beta_k$  is the coefficient of  $k$ th level of education and  $\beta_{k-1}$  is the coefficient of previous level of education and  $\eta_k$  is the number of years of schooling for the  $k$ th level and  $\eta_{k-1}$  is the number of years of schooling for the previous level.

## 5. Results and Discussion

In this section, we will discuss basic characteristics of the sample and estimation of returns to education along with possible reasons for the observed trends in such returns.

### 5.1 Estimate of the Earnings Function

The estimates of the wage earnings function for rural casual, rural regular, urban casual and urban regular workers have been given in Tables 2–5, respectively. As mentioned before, the estimates were controlled for age, social group, religion, regions of the survey, various national industrial classification categories, monthly per capita consumption category of the household, marital status and various sub-rounds of the survey.

*Rural casual workers:* The education appears to have become an important determinant of wage earnings for rural casual male workers over time as coefficients till secondary level of education were found significant for the years 1987–1988, 1993–1994 and 2004–2005. The male workers with education at primary or middle levels obtained higher wage earnings than their illiterate counterparts. In case of female workers in rural areas, education does not appear to be a significant determinant of wage earnings at all the education levels during most of the years. But in 2009–2010, it has become statistically significant at all education levels. This might be due to increased participation of the rural women in the Mahatama Gandhi National Rural Employment Guarantee Scheme, which could have increased the incentives to pay more wages to better educated workers in other sectors of the economy.

*Rural regular workers:* For most of the years, the coefficients at different level of education were statistically significant at 1 per cent level for regular male and female workers (except during 1999–2000 for males and during 1983 for females). The results indicate that education has become an important determinant of wage earnings for regular workers in rural areas. More educated workers were earning higher wages than their illiterate or less than primary educated counterparts. It implied an increase in wages with rise in level of education and relatively larger improvement could be materialized only after achieving middle level of education.

*Urban casual workers:* The coefficients were not statistically significant at different education levels for both male and female workers in most of the years. This might be due to rise in migration of workers from rural to urban areas in the last decade, which might have increased the supply of workforce in relation to the demand leading to rising competition within the urban areas and hence no significant returns to educational achievements. It might also reflect the distress nature of employment in urban casual labour markets in India.

*Urban regular workers:* In urban India, the coefficients were significant for all education levels for both male as well as female regular workers. Almost all the coefficients were significant at 1 per cent level during 1983 to 2009–2010, indicating that higher education has ultimately translated in higher wage earnings when compared to illiterate or below primary educated regular workers in urban areas.



**Table 2. Estimates of the Wage Equation for Rural Casual Workers, 1983 to 2009–2010**

Year	1983	1987–1988	1993–1994	1999–2000	2004–2005	2009–2010
	Male Workers					
<b>Primary</b>	0.024 (0.019)	0.133*** (0.041)	0.056*** (0.017)	0.030*** (0.135)	0.063*** (0.017)	0.017* (0.009)
<b>Middle</b>	-0.024 (0.038)	0.113** (0.058)	0.052** (0.025)	0.024 (0.022)	0.101*** (0.031)	0.044*** (0.014)
<b>Secondary</b>	-0.070 (0.069)	0.279*** (0.095)	0.095** (0.041)	0.020 (0.037)	0.136*** (0.055)	0.035 (0.024)
<b>Graduate</b>	0.027 (0.148)	0.398 (0.316)	0.063 (0.096)	-0.029 (0.072)	0.230*** (0.096)	-0.009 (0.046)
<b>Intercept</b>	1.588*** (0.033)	2.406 (0.358)	2.552*** (0.055)	3.210*** (0.807)	4.081*** (0.069)	4.395*** (0.071)
<b>Mills lambda</b>	0.194*** (0.063)	-0.112 (0.085)	0.028 (0.039)	0.115** (0.053)	-0.085 (0.069)	0.0397 (0.034)
<b>Wald <math>\chi^2</math></b>	10880.47***	736.62***	5815.77***	15717.86***	17026.41***	11460.79***
<b>Total observations</b>	116957	132312	109003	113206	125317	93224

(Table 2 continued)

(Table 2 continued)

Year	1983	1987–1988	1993–1994	1999–2000	2004–2005	2009–2010
	Female Workers					
<b>Primary</b>	0.012 (0.029)	-0.028 (0.046)	0.013 (0.031)	0.012 (0.025)	0.003 (0.028)	0.04** (0.017)
<b>Middle</b>	0.066 (0.061)	-0.041 (0.087)	0.026 (0.045)	0.006 (0.038)	-0.003 (0.049)	0.046* (0.026)
<b>Secondary</b>	-0.183 (0.149)	0.046 (0.158)	0.129 (0.081)	0.021 (0.061)	0.018 (0.072)	0.164*** (0.043)
<b>Graduate</b>	-0.044 (0.459)	-	0.232 (0.313)	0.185 (0.135)	0.168 (0.152)	0.388*** (0.132)
<b>Intercept</b>	1.374*** (0.599)	1.994*** (0.175)	2.402*** (0.067)	3.147*** (0.119)	3.434*** (0.115)	4.224*** (0.082)
<b>Mills lambda</b>	0.045 (0.056)	-0.014 (0.043)	-0.003 (0.039)	0.197 (0.065)	-0.011 (0.084)	-0.116 (0.046)
<b>Wald <math>\chi^2</math></b>	4181.75***	1416.33***	1821.70***	4028.30***	4472.10***	2225.24***
<b>Total observations</b>	116114	128808	105844	110969	123806	91569

Source: Authors' estimates from NSSO unit level data.

Notes: Figures in parentheses are the standard errors.

\*, \*\*, and \*\*\* indicate significance at 10, 5 and 1 per cent levels of significance, respectively. All other coefficients are non-significant.

**Table 3. Estimates of the Wage Equation for Rural Regular Workers, 1983 to 2009–2010**

Year	1983	1987–1988	1993–1994	1999–2000	2004–2005	2009–2010
	Male Workers					
<b>Primary</b>	0.333*** (0.025)	0.315*** (0.054)	0.334*** (0.043)	0.040 (0.043)	0.283*** (0.055)	0.110*** (0.042)
<b>Middle</b>	0.590*** (0.047)	0.415*** (0.057)	0.608*** (0.079)	0.043 (0.067)	0.493*** (0.059)	0.298*** (0.052)
<b>Secondary</b>	1.089*** (0.101)	0.821*** (0.065)	1.129*** (0.152)	0.061 (0.119)	1.065*** (0.643)	0.639*** (0.084)
<b>Graduate</b>	1.540*** (0.157)	1.195 (0.085)	1.653*** (0.226)	-0.025 (0.188)	1.307*** (0.220)	-0.930 (0.141)
<b>Intercept</b>	0.0377 (0.307)	0.650 (0.510)	-0.282 (0.663)	5.618*** (0.659)	2.928*** (0.069)	3.476*** (0.374)
<b>Mills lambda</b>	0.373*** (0.126)	0.150 (0.095)	0.554**	-0.949*** (0.163)	-0.1788 (0.309)	-0.044*** (0.112)
<b>Wald <math>\chi^2</math></b>	4398.47***	699.52***	1309.68	2424.64***	5920.80***	3355.87***
<b>Total observations</b>	116957	132312	109003	113206	66554	93224

(Table 3 continued)

(Table 3 continued)

Year	1983	1987–1988	1993–1994	1999–2000	2004–2005	2009–2010
	Female Workers					
<b>Primary</b>	0.626 (0.076)	0.345*** (0.118)	0.226** (0.105)	0.113 (0.087)	0.292*** (0.097)	0.320*** (0.089)
<b>Middle</b>	0.321 (0.225)	0.732*** (0.136)	0.773*** (0.201)	0.304* (0.175)	0.532*** (0.201)	0.656*** (0.119)
<b>Secondary</b>	0.540 (0.684)	1.372*** (0.205)	1.644*** (0.475)	0.892* (0.528)	1.383*** (0.424)	1.717*** (0.237)
<b>Graduate</b>	0.587 (0.893)	1.656*** (0.283)	2.132*** (0.697)	1.148 (0.828)	1.982*** (0.659)	2.733*** (0.398)
<b>Intercept</b>	2.814 (1.906)	1.176 (1.062)	-0.339 (1.737)	2.222*** (2.362)	0.911 (1.683)	-0.392 (0.999)
<b>Mills lambda</b>	-0.577 (0.663)	0.260 (0.200)	0.540 (0.440)	-0.109 (0.579)	0.444 (0.401)	0.839*** (0.239)
<b>Wald <math>\chi^2</math></b>	818.25***	652.63	678.14***	1097.65***	1563.45***	886.96***
<b>Total observations</b>	116,114	128,808	105,844	110,969	123,806	91,569

**Source:** Authors' estimates from NSSO unit level data.

**Notes:** Figures in parentheses are the standard errors.

\*, \*\*, and \*\*\* indicate significance at 10, 5 and 1 per cent levels of significance, respectively. All other coefficients are non-significant.

**Table 4. Estimates of the Wage Equation for Urban Casual Workers, 1983 to 2009–2010**

Year	1983	1987–1988	1993–1994	1999–2000	2004–2005	2009–2010
	Male Workers					
<b>Primary</b>	0.136 (0.096)	0.002 (0.026)	0.040 (0.032)	-0.022 (0.039)	0.075* (0.044)	0.016 (0.017)
<b>Middle</b>	0.204 (0.175)	-0.004 (0.039)	0.150 (0.051)	-0.097 (0.071)	0.124 (0.078)	0.018 (0.024)
<b>Secondary</b>	0.387 (0.289)	0.030 (0.065)	0.008 (0.087)	-0.199 (0.127)	0.215 (0.152)	-0.040 (0.044)
<b>Graduate</b>	0.687 (0.459)	0.076 (0.138)	0.009 (0.153)	-2.252 (0.201)	0.327 (0.233)	-0.122 (0.084)
<b>Intercept</b>	1.786*** (0.500)	1.654*** (0.133)	2.367*** (0.113)	2.904*** (0.209)	4.003*** (0.276)	4.153*** (0.084)
<b>Mills lambda</b>	-0.166 (0.310)	0.169** (0.056)	0.063 (0.085)	0.374*** (0.156)	-0.152 (0.195)	0.194** (0.061)
<b>Wald <math>\chi^2</math></b>	992.45***	2203.66***	1382.91***	3441.99***	4531.47***	4200.31***
<b>Total observations</b>	66832	71810	70026	77103	69859	63380

(Table 4 continued)

(Table 4 continued)

Year	1983	1987–1988	1993–1994	1999–2000	2004–2005	2009–2010
	Female workers					
<b>Primary</b>	0.029 (0.082)	-0.054 (0.049)	0.008 (0.056)	0.031 (0.118)	-0.101 (0.095)	-0.004 (0.039)
<b>Middle</b>	0.153 (0.159)	-0.178*** (0.071)	0.138 (0.086)	-0.004 (0.209)	-0.258 (0.186)	-0.049 (0.049)
<b>Secondary</b>	0.142 (0.239)	0.071 (0.125)	0.218* (0.125)	0.233 (0.259)	-0.206 (0.301)	-0.156* (0.083)
<b>Graduate</b>	1.662*** (0.571)	0.943*** (0.290)	0.076 (0.252)	0.617** (0.277)	0.009 (0.317)	-0.519*** (0.161)
<b>Intercept</b>	1.656*** (0.390)	1.601*** (0.290)	2.329*** (0.169)	2.750*** (0.624)	3.162*** (0.611)	4.218*** (0.167)
<b>Mills lambda</b>	0.144 (0.166)	0.114* (0.061)	-0.137 (0.087)	-0.0505 (0.277)	0.193 (0.331)	-0.094 (0.079)
<b>Wald <math>\chi^2</math></b>	361.42***	684.02***	479.73***	738.88***	866.49***	615.15***
<b>Total observations</b>	59923	65060	63951	71044	66554	60322

Source: Authors' estimates from NSSO unit level data.

Notes: Figures in parentheses are the standard errors.

\*, \*\*, and \*\*\* indicate significance at 10, 5 and 1 per cent levels of significance, respectively. All other coefficients are non-significant.

**Table 5.** Estimates of the Wage Equation for Urban regular Workers, 1983 to 2009–2010

Year	1983	1987–1988	1993–1994	1999–2000	2004–2005	2009–2010
	Male Workers					
<b>Primary</b>	0.091*** (0.021)	0.170*** (0.016)	0.057*** (0.022)	-0.140*** (0.042)	-0.149*** (0.049)	0.105*** (0.024)
<b>Middle</b>	0.241*** (0.220)	0.294*** (0.017)	0.172*** (0.022)	-0.092* (0.049)	-0.135** (0.062)	0.278*** (0.023)
<b>Secondary</b>	0.563*** (0.242)	0.593*** (0.019)	0.427*** (0.024)	0.084 (0.060)	0.116 (0.074)	0.632*** (0.024)
<b>Graduate</b>	0.906*** (0.351)	0.986*** (0.025)	0.737*** (0.326)	0.270*** (0.861)	0.214* (0.123)	1.104*** (0.034)
<b>Intercept</b>	1.531*** (0.205)	0.079 (0.165)	2.567*** (0.156)	6.268*** (0.542)	7.149*** (0.539)	3.513*** (0.133)
<b>Mills lambda</b>	-2.205*** (0.077)	0.334*** (0.048)	-0.248*** (0.052)	-1.345*** (0.172)	-1.531*** (0.198)	0.040 (0.044)
<b>Wald <math>\chi^2</math></b>	3428.15***	6033.61***	3162.81***	2881.79***	2418.83***	8662.99***
<b>Total observations</b>	66832	71810	70026	77103	69861	63380

(Table 5 continued)

(Table 5 continued)

Year	1983	1987–1988	1993–1994	1999–2000	2004–2005	2009–2010
	Female Workers					
<b>Primary</b>	0.174*** (0.084)	0.278*** (0.051)	0.197*** (0.068)	0.290*** (0.061)	0.283*** (0.055)	0.223*** (0.053)
<b>Middle</b>	0.717*** (0.080)	0.428*** (0.058)	0.582*** (0.062)	0.418*** (0.046)	0.493*** (0.059)	0.528*** (0.056)
<b>Secondary</b>	1.069*** (0.096)	1.005*** (0.070)	1.083*** (0.082)	0.896*** (0.099)	1.065*** (0.064)	1.097*** (0.044)
<b>Graduate</b>	1.321*** (0.158)	1.428*** (0.124)	1.262*** (0.161)	1.148*** (0.236)	1.307*** (0.220)	1.539*** (0.139)
<b>Intercept</b>	0.636 (0.665)	0.036 (0.512)	1.790*** (0.577)	2.348*** (0.980)	2.929*** (1.047)	3.210*** (0.515)
<b>Mills lambda</b>	-0.745 (0.208)	0.272** (0.128)	-0.127 (0.163)	-0.163 (0.272)	-0.178 (0.309)	-0.105 (0.169)
<b>Wald <math>\chi^2</math></b>	1342.82***	2490.23***	1386.40***	2995.52***	5920.80***	3318.25***
<b>Total observations</b>	60036	65060	63951	71044	66554	60322

Source: Authors' estimates from NSSO unit level data.

Notes: Figures in parentheses are the standard errors.

\*, \*\*, and \*\*\* indicate significance at 10, 5 and 1 per cent levels of significance, respectively. All other coefficients are non-significant.



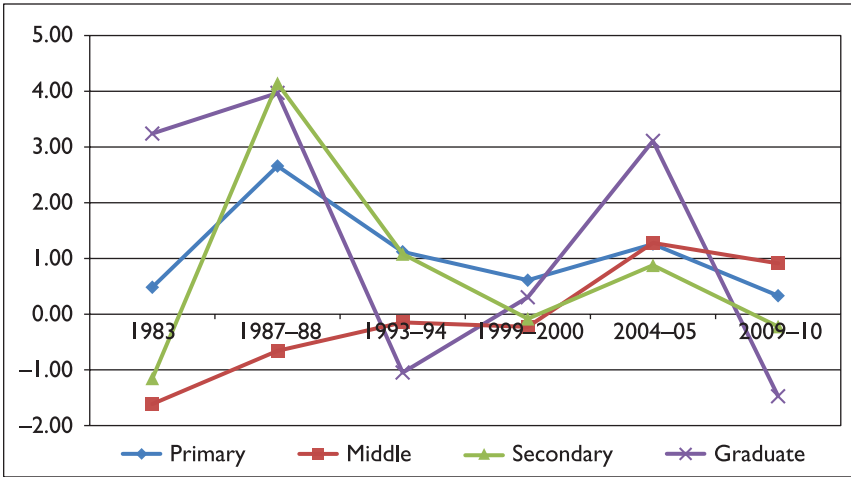
In brief, the casual work for rural and urban females appeared largely distress driven with little incentive for higher levels of education. For male casual workers, compared to the illiterate or below primary educated workers, education remained rewarding up to the secondary level in rural areas only. But regular labour markets rewarded more to the educated workers than the illiterate or below primary educated workers in rural as well as urban India.

## 5.2. Returns to Education

After ascertaining that the labour markets in India rewarded more the educated workers, though more so in urban than in rural areas, and in regular than casual wage work, we discuss the extent of returns to education for different levels of education. However, we have omitted comparing the returns to education for female casual workers for rural and urban areas as the coefficients were not significant in our wage earnings estimates.

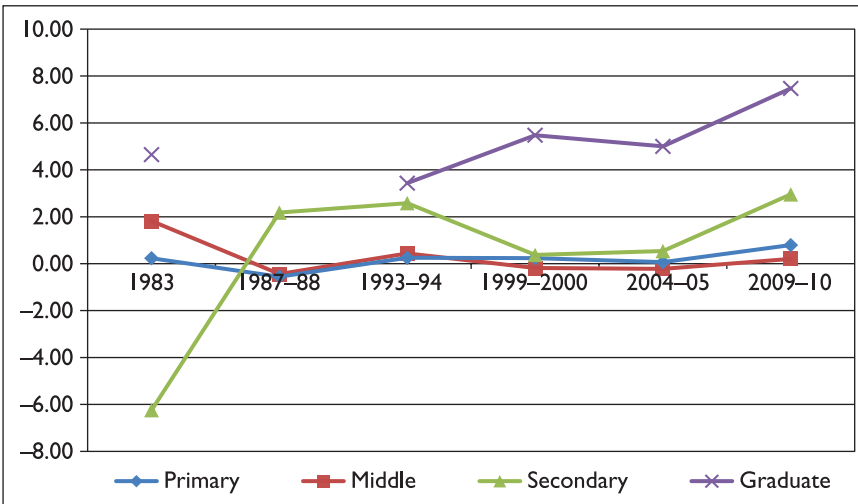
*Rural casual workers:* The trends in returns to education for rural male and female casual workers have been depicted in Figures 1 and 2. For male workers, the returns to education have shown a mixed trend over the years at different levels of education. Here, the returns to education are positive only at primary education level for all the years and has increased for middle level as well in 2004–2005 and 2009–2010. Thus, it shows more stable trend for primary and middle education level compared to secondary and graduate level in rural areas. For female workers, the returns have not increased much for primary and middle level but have followed a steady increase from 2004–2005 to 2009–2010 for secondary and graduate level.

*Male casual workers:* The returns to education for male casual workers in rural and urban areas are depicted in Figures 1 and 3. In rural areas, the returns to education were positive at primary level. In urban areas, however, the returns at all education level were quite high as compared to rural areas. The returns to primary and middle levels of education for rural casual male workers were positive but had fallen during 1983 to 2009–2010. However, the magnitude of decline is less compared to the decline in secondary and graduate levels. While for urban casual males, the returns to education are mainly pertaining at secondary and graduation level and over the years, decline in returns is mainly visible at these levels. Such a decline in rural and urban casual labour markets can be explained with the pattern of employment and changes in it during 1983 to 2009–2010. After the agriculture sector, it is the construction sector that usually provides most of the casual wage employment opportunities to rural male workers. Both these sectors do not provide any incentive for higher education and there has been a significant decline in employment elasticity of demand in Indian agriculture, resulting into larger incidence of unemployment and underemployment. Such distress usually leads to an oversupply of the labour force when compared to the demand and hence depresses wage earnings and may be the reason for decline in returns to education over time. In the recent period, the returns to education for all the levels of education seem to be converging at very low levels and strengthen our



**Figure 1.** Trends in Rate of Returns to Education for Rural Male Casual Workers in India, 1983 to 2009–2010

**Source:** Authors' estimates from NSSO unit level data.

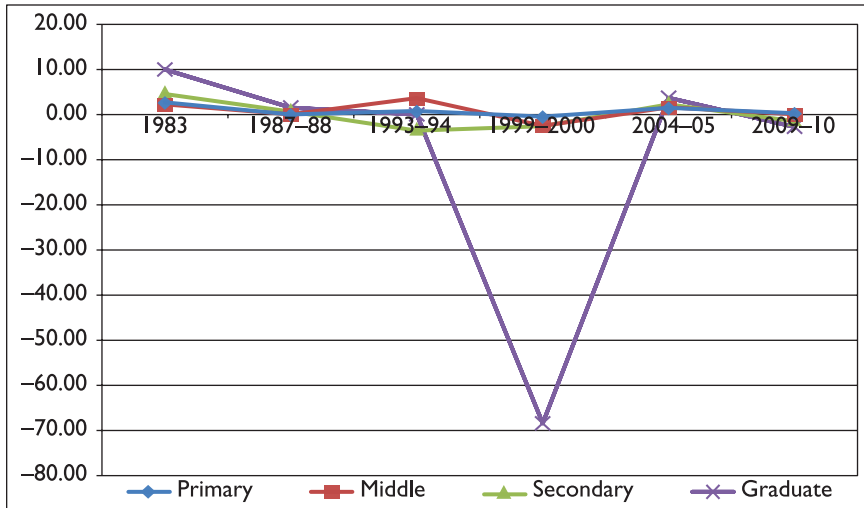


**Figure 2.** Trends in Rate of Returns to Education for Rural Female Casual Workers in India, 1983 to 2009–2010

**Source:** Authors' estimates from NSSO unit level data.

argument of the labour supply exceeding the demand and depressing wages in rural and urban casual labour markets.

*Rural regular workers:* The returns to education for rural regular male and female workers are depicted in Figures 4 and 5. Unlike the casual wage work, the

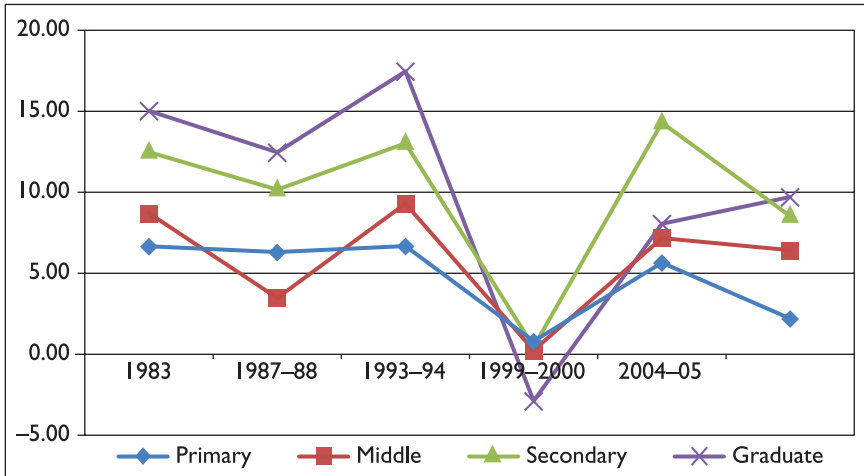


**Figure 3.** Trends in Rate of Returns to Education for Urban Male Casual Workers in India, 1983 to 2009–2010

**Source:** Authors' estimates from NSSO unit level data.

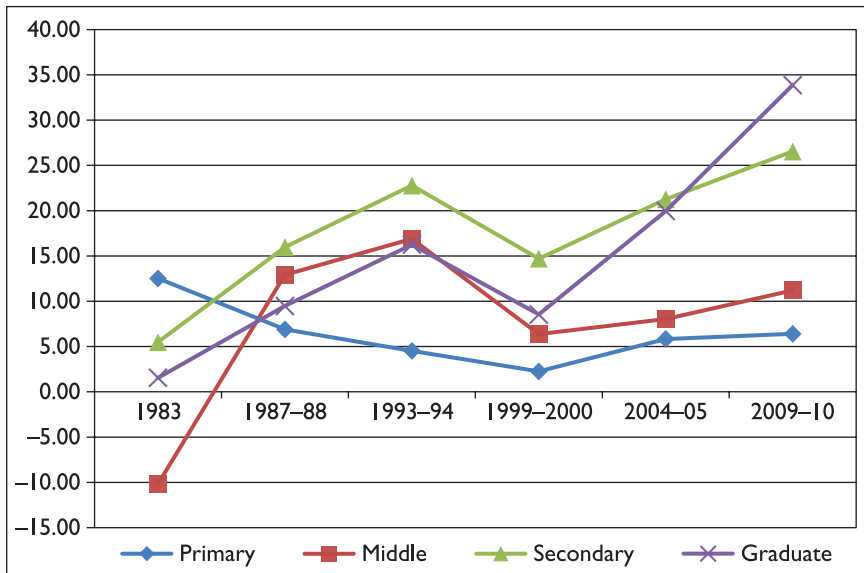
returns to education in regular wage work are quite different at different levels of education. For male workers, the rate of return increased with higher level of education for most of the years. However, the returns declined for 1987 and 1999 but increased again in 2004–2005 at all the education levels. This pattern is mainly explained by the demand and supply gap of the workforce. There has been a tremendous increase in return to education for secondary and graduate female workers mostly in all the years (except 1999–2000). While for primary and middle educated workers, the returns to education have shown a mixed trend. The rise in regular employment opportunities for rural female workers in the service sector might be the reason for increase in returns to higher levels of education.

*Urban regular workers:* The returns to education to urban regular male and female workers are given in Figures 6 and 7. The returns to education for regular workers in urban areas were higher than that for regular workers in rural areas. As for rural male workers, the returns increased with the level of education; however, the gap between returns at different levels appeared to be narrowing down over time. In case of urban areas, a declining trend in returns for any level of education was visible till 1999–2000, but during the recent period of 2004–2005 to 2009–2010, there was a sharp increase in the returns to education at secondary and graduate level education. For female workers, the returns to secondary and graduation level education have shown an increasing trend. Recent high growth in the Indian economy has largely been due to expansion of service sector in India, which has generated large number of employment opportunities for the better educated women. It might have resulted into an increase in the returns to education.



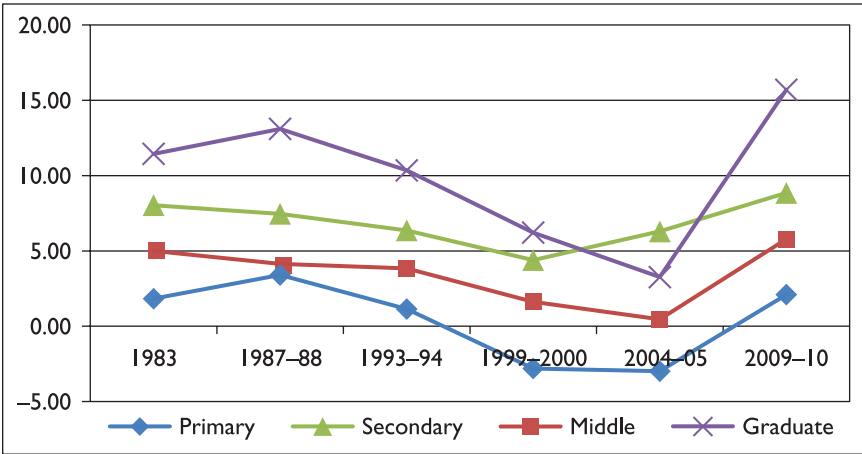
**Figure 4.** Trends in Rate of Returns to Education for Rural Male Regular Workers in India, 1983 to 2009–2010

**Source:** Authors' estimates from NSSO unit level data.



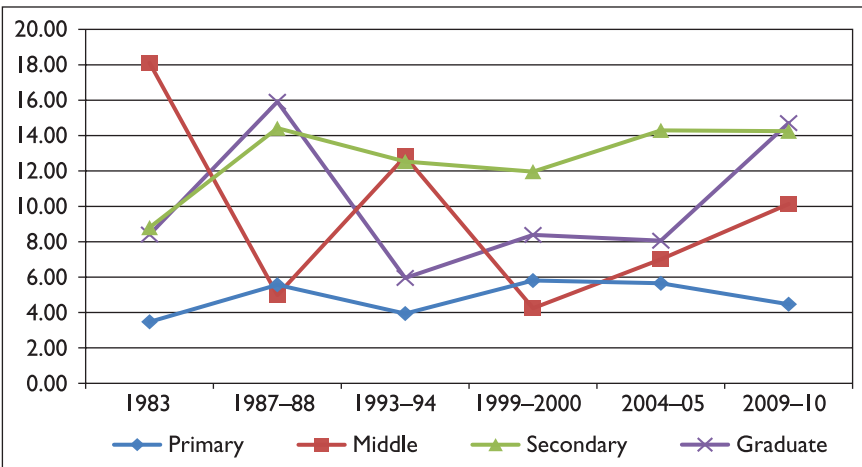
**Figure 5.** Trends in Rate of Returns to Education for Rural Female Regular Workers in India, 1983 to 2009–2010

**Source:** Authors' estimates from NSSO unit level data.



**Figure 6.** Trends in Rate of Returns to Education for Urban Male Regular Workers in India, 1983 to 2009–2010

**Source:** Authors’ estimates from NSSO unit level data.



**Figure 7.** Trends in Rate of Returns to Education for Urban Female Regular Workers in India, 1983 to 2009–2010

**Source:** Authors’ estimates from NSSO unit level data.

## 6. Conclusions and Policy Implications

The Indian labour markets show some peculiar characteristics as while the casual work is dominated largely by the illiterates or very less educated workers, the regular labour markets offer jobs to relatively better educated workers. The casual labour markets for male workers in rural areas provided incentives for education till some intermediate levels of education in the form of higher wage earnings but

not for higher education such as secondary or graduation. Also, for the urban casual workers the returns to secondary and graduate levels of education declined over time. There was no advantage for having higher education for female casual workers in rural and urban areas, as it was not translating into higher wage earnings when compared to the illiterate or below primary educated workers. But in the recent decade, scenario has changed since for the year 2009–2010 the educated females were earning more in comparison to illiterates.

The returns to education for rural male regular workers increased with an increase in the level of education. For urban male regular workers, the returns increased tremendously for secondary and graduate level in the last decade. Also, the returns for female regular workers in rural and urban India increased tremendously over time. This improvement in earnings may be due to increased employment opportunities for better educated females in the India during the last decade of fast economic growth, led largely by the growth of the service sector.

The results reveal a significant impact of recent fast economic growth of Indian economy in the form increasing returns to higher levels of education. The growth has especially benefited the educated female workers by generating employment opportunities in the regular wage category. However, the benefits have not clearly trickled down to the educated female workers in casual wage work. While there is need to enhance public investment in education for improving higher education opportunities in India, there is also need to reorient rural education that may include imparting some working skills between middle level of education and secondary levels. The reorientation of the education curriculum will translate into better rewards for the unskilled or semi-skilled majority of the rural workforce in the long run.

### Acknowledgement

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### Appendix I. Description of the Variables Used in the Study

Variable	Description
Log daily wage	Natural logarithm of daily wage earning in rupees. The daily wage was estimated by dividing the total wage earnings of an individual worker during the last week in cash and kind and the dividing these earnings with the total number of days of work during the last week.
Casual worker	The worker who received her wages on daily basis with the status code of 41 and 51 in the data.
Regular worker	The worker receiving a fixed income after regular interval for his work; pertaining to status code of 31 in the data.
Age	The number of completed years of age.

Variable	Description
Educational level dummies	There were five levels of education: (1) illiterate as well as those below primary level of education, (2) above primary but below middle, (3) above middle but below secondary, (4) above secondary but below graduate and (5) above graduate. The data during 1983 and 1987–1988 did not have the information of education at the higher secondary level, so the higher secondary category for all other rounds was merged with the secondary education category. The time taken to complete the primary, middle, secondary and graduation level of education was assumed to be 5, 8, 12 and 15 years and thus the time interval for each educational level dummy category was taken as 0, 5, 3, 4 and 3 years.
Experience	It was estimated as the potential experience in the labour market and was equal to age-years of schooling—6 years.
Marital status	Marital status of the individual
Social group	The information was classified mainly into three social groups: (1) ST, (2) SC and (3) Others. There was no information on OBC category for the first two rounds but was available thereafter and hence another dummy category was included for control.

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