Discussion Paper Series

RIEB

Kobe University

DP2012-33

Indian Labour Markets and Returns to Education, 1983 to 2009-10*

Kamal VATTA
Takahiro SATO

December 6, 2012

Research Institute for Economics and Business Administration
Kobe University
2-1 Rokkodai, Nada, Kobe 657-8501 JAPAN

Indian Labour Markets and Returns to Education, 1983 to 2009-10[#]

Kamal Vatta* and Takahiro Sato**

Abstract

The present study is an attempt to examine the trends in returns to education in light of the long-term economic growth in India during 1983 to 2009-10. It outlines various forms of inequality issues prevalent in Indian labour markets, with respect to the rural/urban areas, gender, caste and nature of work. The unit level data from 6 rounds of National Sample Survey during 1983, 1987-88, 1993-94, 1999-2000, 2004-05 and 2009-10 were used for this study. Mincer wage function was estimated by using the OLS method and the results were also compared to the median wage equation, which proved the consistency of these estimates. The casual wage markets for males provided incentives for higher education till some intermediate levels in the form of higher wage earnings than their illiterate or below primary educated counterparts but no additional advantage for secondary or graduate levels of education. Higher education could not translate into better wage earnings for female casual workers. The returns to all education levels were converging at low levels with the returns for secondary and graduate levels for urban casual male workers declining over time. There was a decline in the returns to secondary and graduate level of education for rural male regular workers with almost no change in the pattern of returns for urban male regular workers. The returns to education for graduation for female workers increased tremendously 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. While there is need to enhance public investment in education for improving higher education opportunities in India, there is also a need to reorient rural education by focusing on imparting working skills between middle level of education and secondary levels. The education curriculum must ensure that higher education translates into better wage earnings for the unskilled or semi-skilled majority of the rural workforce in the long run.

The authors are grateful to the RIEB for providing all the required facilities for the completion this study. The authors are also thankful to Prof Koichi Fujita of Kyoto University, Japan and Prof Piyush Kumar Sinha of IIM Ahmedabad, India for their useful comments during the International Conference on "Indian Economy at the Crossroads towards a New Stage" held at Kobe University, Japan on November 17, 2012 where the findings of this study were presented.

* Visiting Researcher, RIEB, Kobe University, Rokkodai, Nada, Kobe, 657-8501, JAPAN & Associate Professor of Economics, Department of Economics and Sociology, Punjab Agricultural University, Ludhiana, 141-004, INDIA.

** Professor, RIEB, Kobe University, Rokkodai, Nada, Kobe, 657-8501, JAPAN.

Indian Labour Markets and Returns to Education, 1983 to 2009-10

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 the expected benefits with the expected costs of acquiring such education (Becker, 1993). The decision to go for education happens only when the expected benefits 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 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 v/s 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 but then followed the 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 to 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 2003-04 to 2010-11 (except 2007-08), 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.

In light of such growth story in India, it is clear that while a smaller proportion of workers penned 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 2009-10 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 which attempted to estimate the returns to education in India confined only to the urban male workers in regular wage category. 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 worker in the rural and urban areas. The findings of this paper 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 seven sections. The next section gives a brief overview of Indian labour markets and some developments during 1983 to 2009-10. A brief review of the relevant literature on returns to education has been provided in the third section. While the fourth section discusses different approaches being used for estimation of the returns to education, the fifth section explains the database and methodology used for deriving the estimates of this study. The results of the estimation have been elaborated in the sixth section and the last section concludes with policy implications.

2. Indian Labour Markets: An Overview

Indian labour markets are big in size employing 459 million workers in 2009-10 (Table 1). The labour markets are dominated by male workers whose overall proportion is more than 70 per cent in the total workforce and such proportion is even higher at about 80 per cent in the urban areas.

Table 1: Estimates of the workforce in India, 1983 to 2009-10

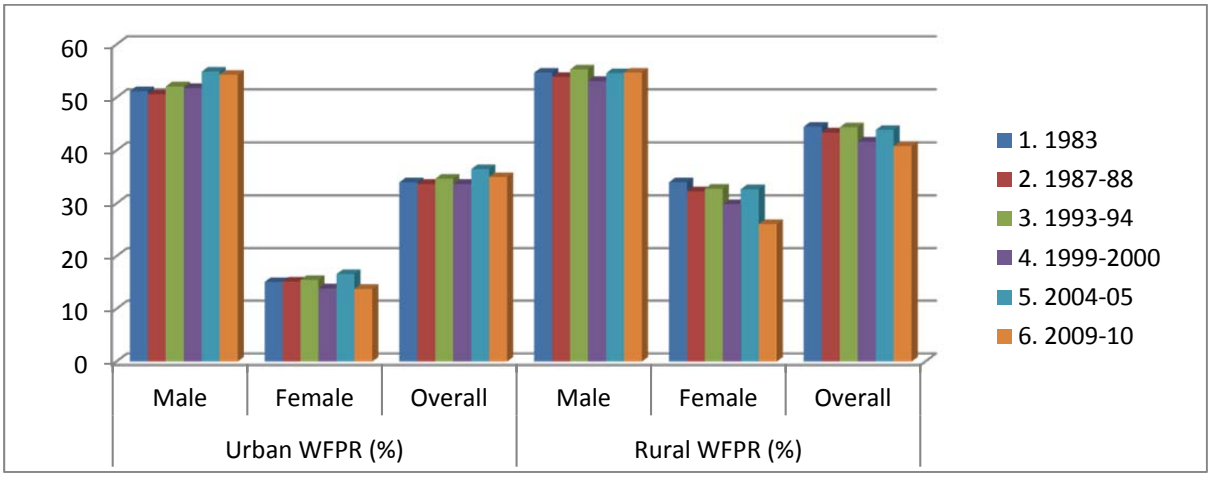
Year/NSS Round	Workforce (in million)		
	Male	Female	Total
1983 (38th)	196.2 (64.6)	107.7 (35.4)	303.9 (100.0)
1987-88 (43rd)	211.1 (65.1)	113.3 (34.9)	324.4 (100.0)
1993-94 (50th)	245.6 (65.6)	128.9 (34.4)	374.5 (100.0)
1999-2000 (55th)	265.5 (67.0)	130.5 (33.0)	396.0 (100.0)
2004-05 (61st)	300.3 (65.6)	157.6 (34.4)	457.9 (100.0)
2009-10 (66th)	323.8 (70.5)	135.2 (29.5)	459.0 (100.0)

Note: Figures in parentheses are per cent to the total workforce in a given year.
Source: NSSO, various rounds

The number of workers has increased by more than 155 million during 1983 to 2009-10 but the pattern of increase is not similar for male and female workers and also differed considerably during various intervals of time. There was a continuous increase in the number of male workers, though the number of female workers declined recently during 2004-05 to 2009-10. Almost 50 million workers during 1987-88 to 1993-94, and more than 60 million workers were added to the existing workforce during 1999-2000 to 2004-05 with increase in the number of male as well as female workers. However, the period of 2004-05 to 2009-10 was the worst period for employment generation in India with the addition of only one million workers. The period of faster economic growth in India has been characterised with the jobless growth. While the rural workforce declined by 6 million, the urban workforce increased by 7 million during this period (Chowdhury, 2011). The women workers largely bore the brunt of sluggishness in the labour markets as almost 20 million of the rural female workers withdrew from the workforce during 2004-05 and 2009-10. Similar was the case during initial periods of liberalization, i.e. 1993-94 to 1999-2000. It ultimately caused a decline in the share of female workers in the total workforce in India, over time.

The Indian labour markets show a huge bias against the female workers. Apart from the share in the total workforce, it also becomes evident from the workforce participation rates for females in both rural and urban areas (Figure 1).

Figure 1: Trends in workforce participation rates in India, 1983 to 2009-10

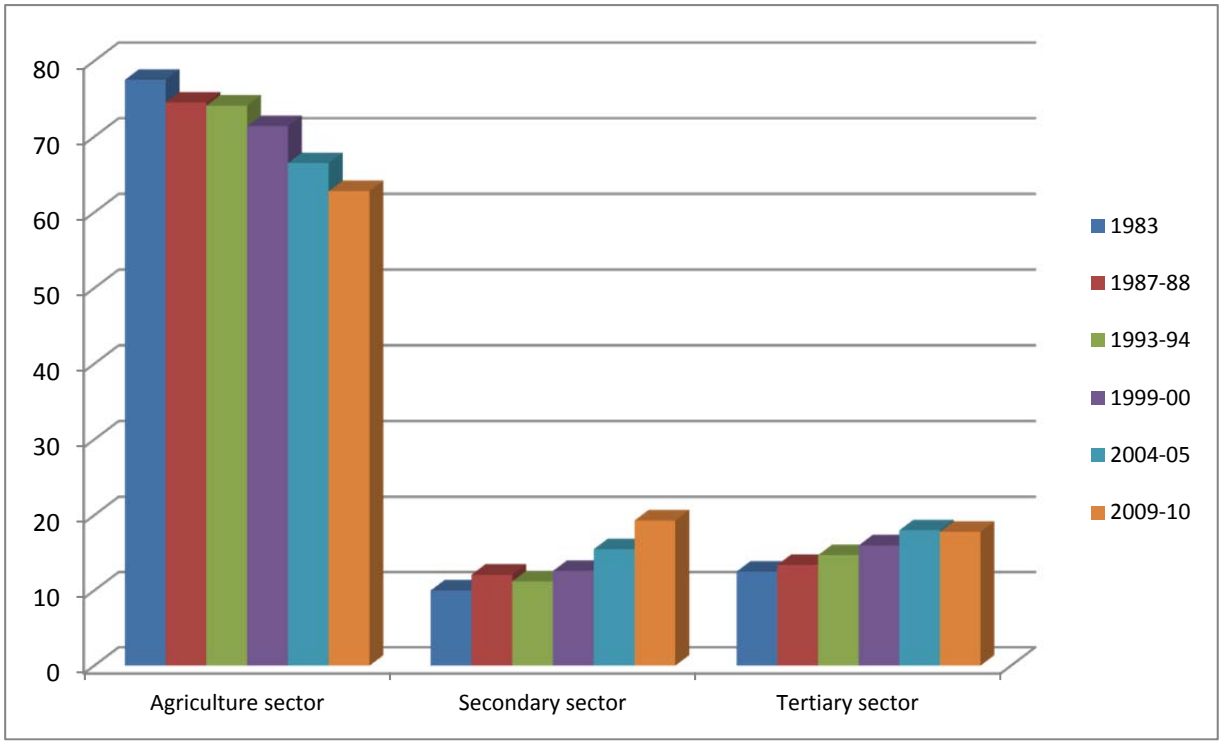


Source: Report on Employment and Unemployment in India, No. 537, NSSO.

While the workforce participation for males is more than 54 per cent in both the rural and urban areas, it is less than 14 per cent for rural females and about 26 per cent urban females. During 2004-05 to 2009-10, the workforce participation for females declined sharply by 3-6 per cent without any change in the male workforce participation rate. As mentioned before, a large proportion of female workforce withdrew from the workforce, especially in the rural areas. Very sharp decline in the female workforce participation rate was largely due to lack of sufficient employment opportunities for females as the participation declined uniformly across all the age groups (Chowdhury, 2011).

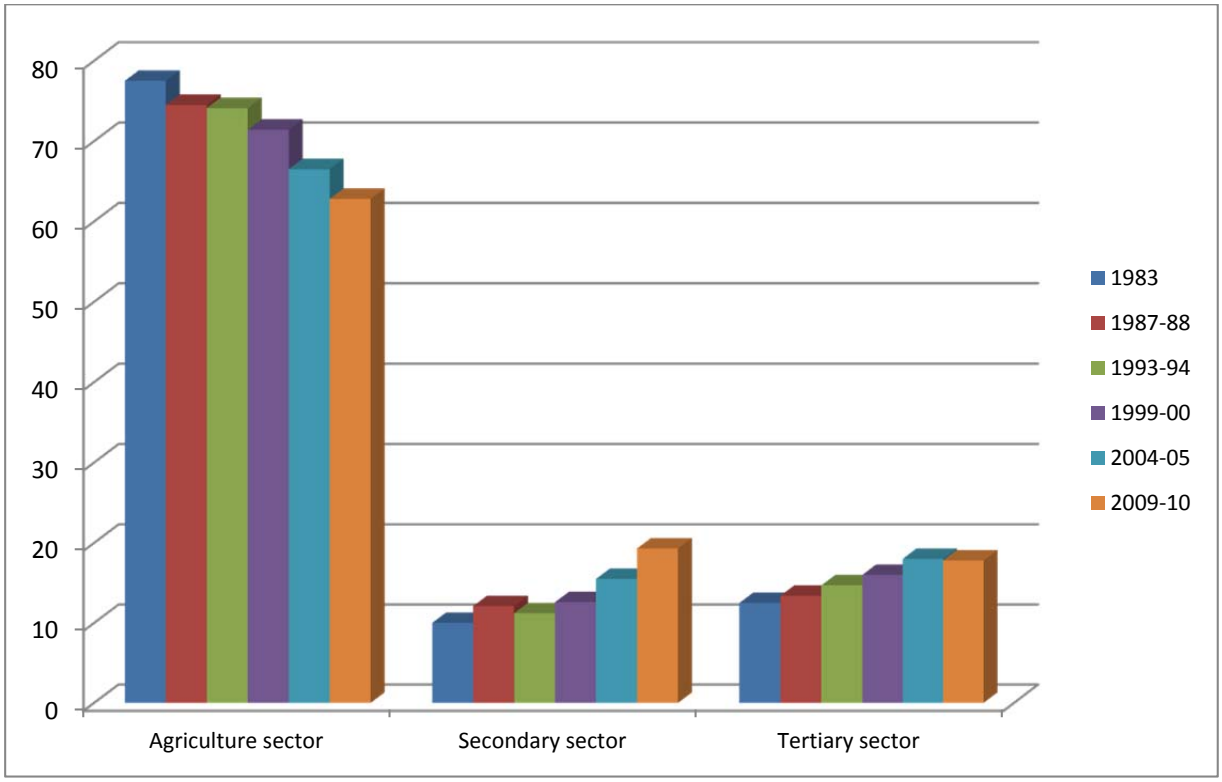
Indian labour markets exhibit a large inequality across rural and urban areas, various social groups, gender and different levels of education (Ito, 2009; Vatta and Garg, 2008; Dutta, 2006; Madheswaran and Attewell, 2007; Kijima, 2006a). The major difference in the rural and urban labour markets is that while agriculture is the most dominant sector of employment in rural areas, the service sector dominates in employment for urban areas. While the proportion of rural male workers employed in agriculture declined significantly from 77.5 per cent in 1983 to 62.8 per cent in 2009-10, such decline was relatively slow for females from 87.5 per cent to 79.4 per cent (Figure 2 & 3). There was a gradual increase in the employment in secondary as well as tertiary sector for rural male workers with the proportion of employment in the respective sectors increasing from 10.0 per cent to 19.3 per cent and from 12.5 per cent to 17.8 per cent during 1983 to 2009-10.

Figure 2: Sectoral distribution of rural male workers in India, 1983 to 2009-10 (%).



Source: Report on Employment and Unemployment in India, No. 537, NSSO.

Figure 3: Sectoral distribution of rural female workers in India, 1983 to 2009-10 (%).



Source: Report on Employment and Unemployment in India, No. 537, NSSO.

The shift in rural workers during 2004-05 to 2009-10 from farm to the non-farm sector was entirely absorbed by increased employment in the construction sector. Such a shift which may largely be driven by declining employment opportunities in agriculture and also facilitated by the implementation of the Mahatma Gandhi National Rural Employment Guarantee Scheme (MGNREGS) in India since October 2006, where most of the work opportunities were generated in the construction sector. Agricultural land is the most important productive asset in rural India and is also the best proxy for asset ownership amongst rural households. The incidence and extent of land ownership is a significant determinant of the pattern and sector of employment of a rural worker and influences the incidence of poverty (Vatta and Garg, 2008; Vatta and Sidhu, 2009). However, the distribution of land is not even. First, almost 42 per cent of the rural households in India do not own land for cultivation (except for homestead) and proportion of the scheduled castes not owning land is higher at 57 per cent as compared to the other castes at 38 per cent (Bakshi, 2008). Even for those who own land, the distribution is highly skewed as the proportion of marginal and small farmers owning less than 2 hectares of land remained above 80 per cent and also showed an increase over time (Table 2). While more than 80 per cent of the marginal and small farmers own only 40 per cent of the agricultural land, less than one per cent of the large farmers (above 15 hectare of land) own almost 12 per cent of the land area, though the share is declining over time. It is worth noting that the decline in the size of land holding renders a large number of holdings to be economically unviable day by day. Declining employment opportunities in agriculture and absence of sufficient employment opportunities in the rural non-farm sector is worsening the problem of unemployment and underemployment in agriculture.

Table 2: Some indicators of land distribution in rural India, 1995-96 to 2005-06

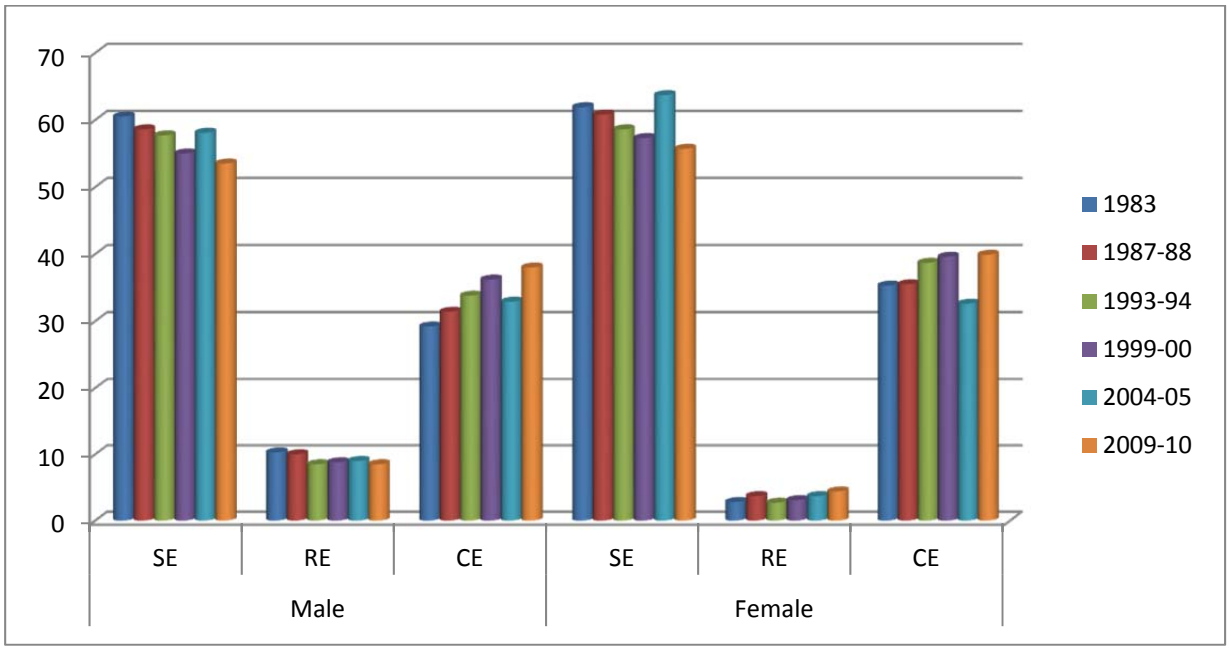
Particular	1995-96	2000-01	2005-06
Average size of land holding (hectare)	1.41	1.33	1.23
Percentage of marginal and small holdings	80.3	81.3	83.3
% area under marginal and small holdings	36.0	38.9	41.1
Percentage of large holdings	1.2	1.0	0.8
% area under large holdings	14.8	13.2	11.8

Source: Mehta, 2009; GOI, 2011

Owing to the distress nature of rural labour markets, the lack of cultivable land translates directly into the compulsion for undertaking casual wage employment activity for both the male as well female workers. That is why after self-employment in agriculture, which is largely possible with the ownership of land, most of the workers resort to the casual

wage work. The rising proportion of casual workers reveals growing incidence of casualization of the rural labour markets. Two things need to be noted here, while the proportion of self-employment in agriculture increased sharply between 1999-2000 and 2004-05, there was a similar shift to the casual work during 2004-05 and 2009-10 (Figure 4). While the increase in self-employment during the first period was due to lack of employment opportunities in the non-farm sector, the implementation of MGNREGS after 2006 explains most of the shift from self-employment to casual wage employment during the second period.

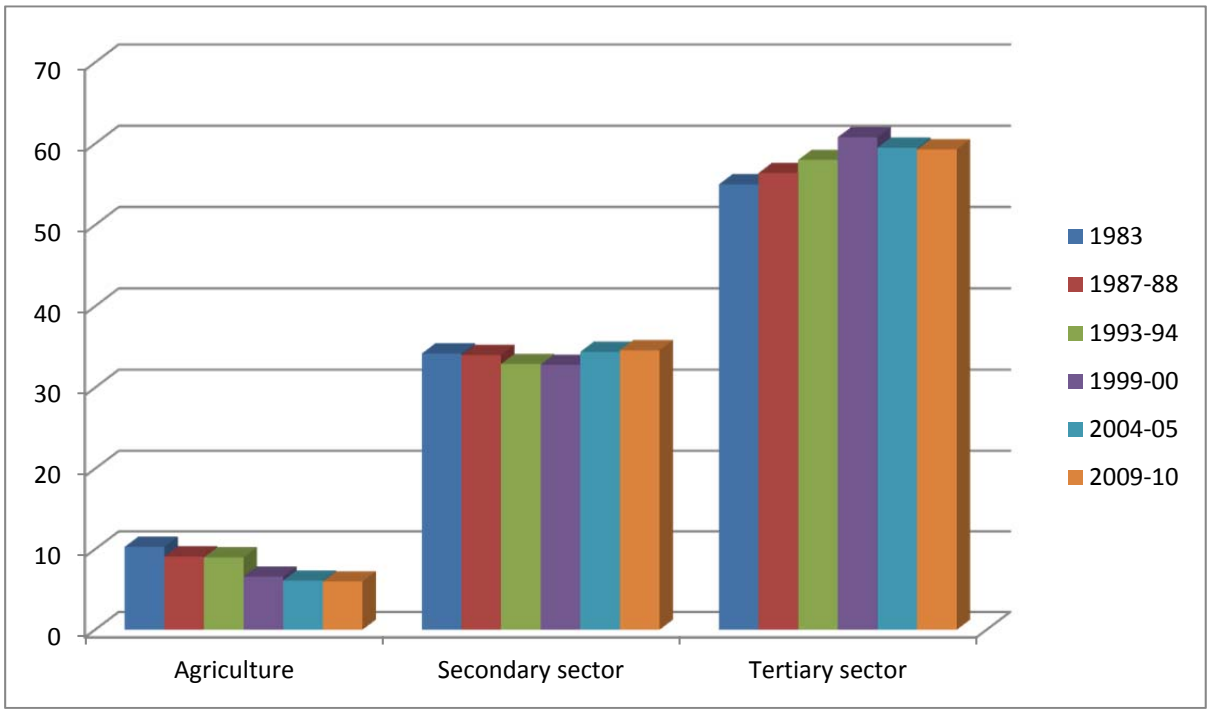
Figure 4: Status of employment in rural India, 1983 to 2009-10 (%)



Note: SE means self-employment, RE means regular employment and CE means casual employment.
Source: Report on Employment and Unemployment in India, No. 537, NSSO.

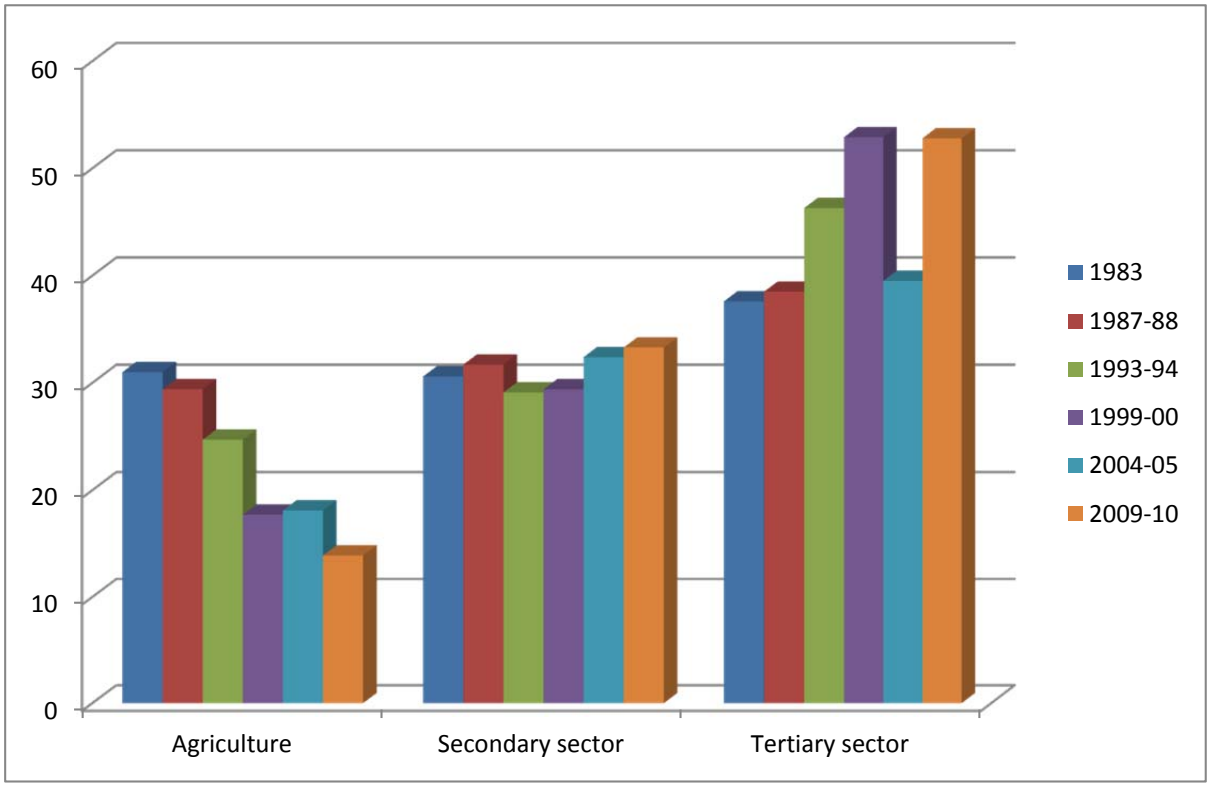
On the other hand, the urban labour markets in India are dominated by the employment in tertiary sector, followed by the secondary sector. During 2009-10, more than 59 per cent of the urban male workers were employed in tertiary sector and almost 35 per cent in the secondary sector (Figure 5). While 53 per cent of the female workers were engaged in the service sector, almost one-third were employed in the secondary sector (Figure 6). There was no considerable change in the proportion of male workers engaged in different sectors, though the share of agriculture sector declined from 10.3 per cent in 1983 to just 6 per cent in 2009-10. However, for urban female workers, the share of agriculture sector declined significantly from 31 per cent to 13.9 per cent and that of the tertiary sector increased from 37.6 per cent to 52.8 per cent, over the same period.

Figure 5: Sectoral distribution of urban male workers in India, 1983 to 2009-10 (%).



Source: Report on Employment and Unemployment in India, No. 537, NSSO.

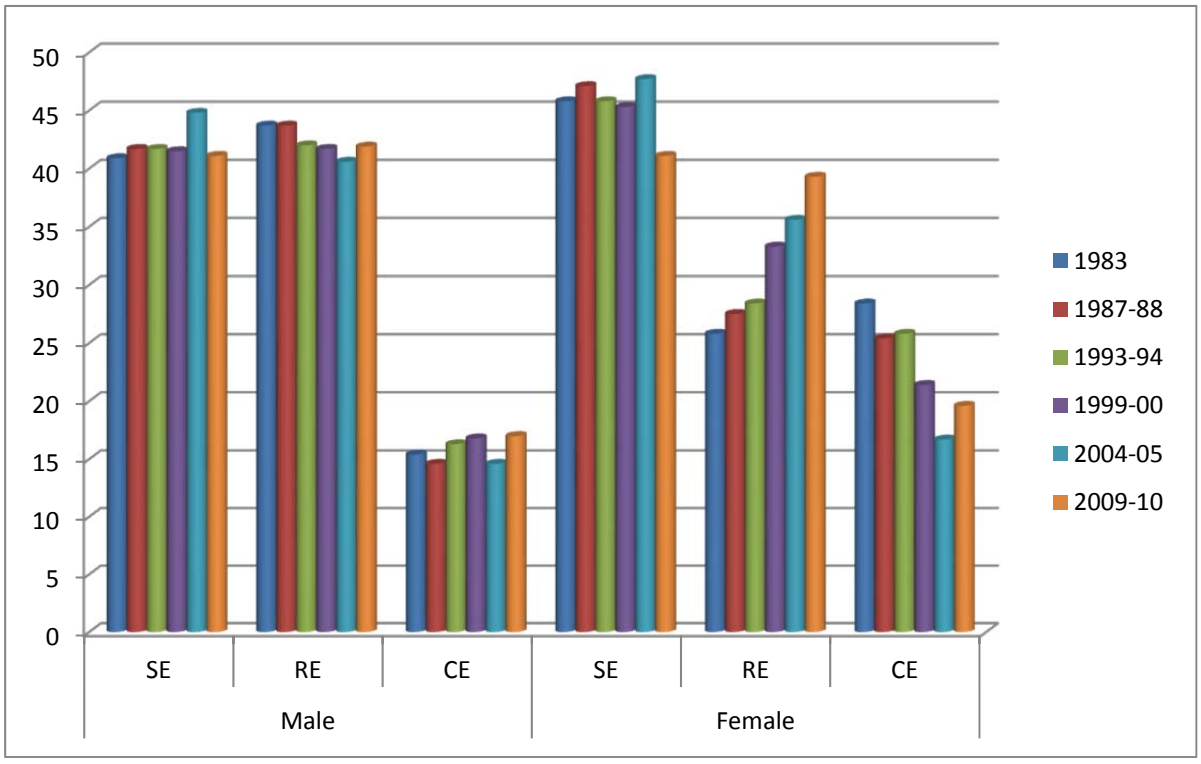
Figure 6: Sectoral distribution of urban female workers in India, 1983 to 2009-10 (%).



Source: Report on Employment and Unemployment in India, No. 537, NSSO.

Hence, more and more women workers in the urban areas are getting employed in the service sector and leaving agricultural work. During 2004-05 to 2009-10, the share of urban female workers engaged in agriculture declined by 5 percentage points. While there was a little decline in the share of the manufacturing sector and corresponding small increase in the construction sector, the share of urban female workers in the service sector increased by a whopping 14 per cent, which is encouraging. Unlike the rural labour markets, the urban labour markets provide a large chunk of regular employment activities along with the self-employment. While the self-employment in rural areas is largely in the farm sector, it is almost completely in the non-farm sector in the urban India. During 1983 to 2009-10, there was a minor increase in the extent of casualization of work for males at the cost of regular employment but the broad scenario remained almost unchanged (Figure 7). For females, however, the regular employment opportunities increased with a corresponding decline in self-employment and casual wage work. It is worth mentioning here that most of the regular wage employment generated in India during 2004-05 and 2009-10 was apportioned by the urban workers. It highlights huge inequality in rural and urban labour markets in India.

Figure 7: Status of employment in rural India, 1983 to 2009-10 (%)



Note: SE means self-employment, RE means regular employment and CE means casual employment.
Source: Report on Employment and Unemployment in India, No. 537, NSSO.

There are other aspects of inequality in the Indian labour markets with respect to education and caste which merit some discussion. There is huge inequality in educational standards of the workers. The casual work in both the rural and urban areas is dominated by a large proportion of illiterate workers or those who are below primary level of education. Though the proportion declined over time, it did not decline so sharply for female workers (Table 3). A negligible proportion of graduates are engaged in casual wage employment in India. The proportion of secondary as well graduate level workers are much higher in the regular employment and such proportion increased over time. During 2004-05 to 2009-10, the regular wage markets were accommodating more graduate workers than before, this proportion being higher in the urban areas. Almost 42 per cent of the urban female and more than 28 per cent of the rural female regular workers were graduates in 2009-10.

Table 3: Proportion of illiterate, secondary and graduate workers in India, 1983 to 2009-10

Worker category	Year	Rural areas			Urban areas		
		Illiterate	Secondary	Graduate	Illiterate	Secondary	Graduate
Casual male workers	1983	79.8	1.4	-	61.1	5.3	0.4
	2009-10	45.6	13.0	1.1	37.3	17.1	1.5
Casual female workers	1983	94.5	1.0	-	83.9	1.2	0.2
	2009-10	71.8	4.2	0.2	65.6	5.7	0.8
Regular male workers	1983	42.1	21.3	8.0	22.1	26.6	17.0
	2009-10	9.7	37.7	27.3	9.0	34.7	33.7
Regular females workers	1983	62.7	18.0	4.3	42.1	25.1	19.0
	2009-10	15.6	37.2	28.2	19.5	23.4	41.9

Source: Estimated from unit-level data, various NSS rounds.

There is fairly wide caste inequality in the Indian labour markets which has also been highlighted by Kijima (2006). Especially, the scheduled caste workers receive much lower wages in the rural as well urban areas when compared to the other castes. The estimates of the wages for the SC, ST and other workers in rural and urban areas during 2009-10 are given in Figures 8 and 9. The wage differentials are not large in the casual wage markets but are strikingly different in case of regular employment and also more in the urban areas as compared to the rural areas. Similarly, the wage differentials are higher for the female workers as compared to the male workers. There are other indicators of inequality amongst various social groups. The proportion of the other caste households, self-employed in agriculture, is much higher than that of SC and ST households due to the skewed ownership of land (Table 4). As a result, relatively higher proportion of such households is engaged in casual wage employment. Similarly, the SC and ST households are clearly disadvantaged in terms of access to education as the proportion of households with no literate male or female adult member is much higher as compared to the other castes.

Figure 8: Wage differentials in rural labour markets, 2009-10 (Rs/day)

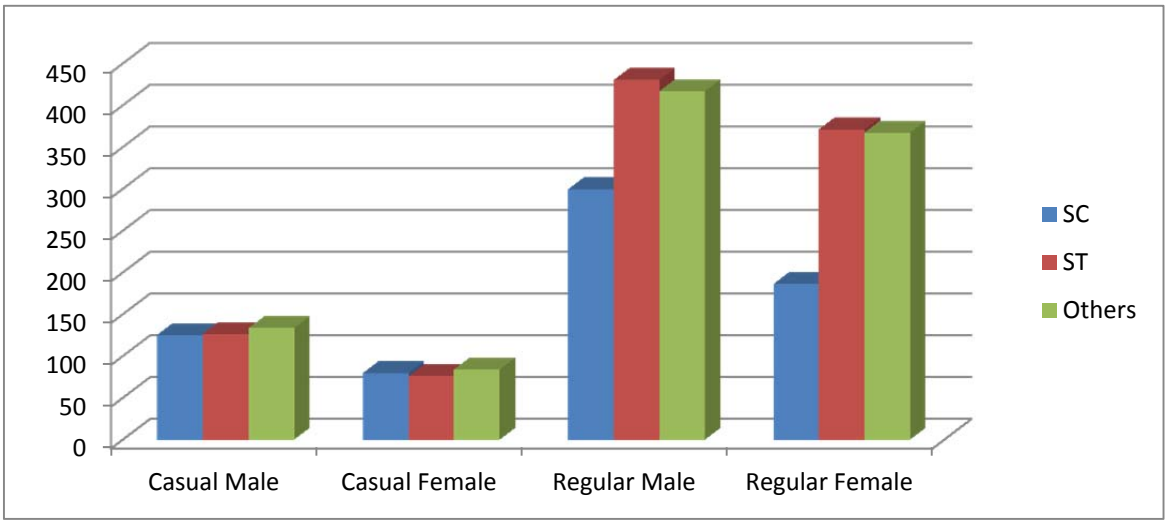


Figure 9: Wage differentials in urban labour markets, 2009-10 (Rs/day)

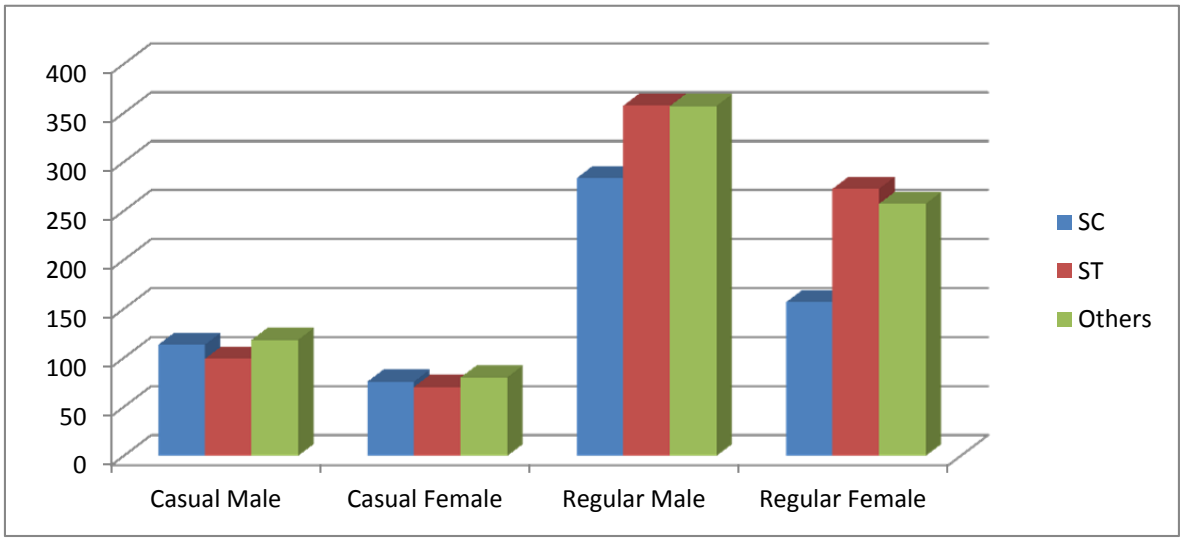


Table 4: Other features of caste differentials in Indian labour markets

Particular	Scheduled Castes	Scheduled Tribes	Other Backward Castes	Others
% households involved in self-employment in agriculture	45.7	34.2	56.2	61.4
% households involved in casual wage labour	45.3	56.0	32.7	23.3
% rural households with no literate adult member	32.7	38.1	25.7	15.9
% urban households with no literate adult member	14.8	14.3	10.3	4.6
% rural households with no literate adult female member	60.5	61.9	51.4	34.1
% urban households with no literate adult female member	33.8	30.0	24.2	10.8

Source: Mehta, 2009; GOI, 2011.

In brief, there are various dimensions of inequality in the Indian labour markets. The pattern of employment varies considerably across the rural and urban areas. The female workers are highly disadvantaged when compared to their male counterparts and similar is the case for wider caste differentials with respect to the access to employment, nature of work and earnings. It is all due to differential access to education and also owes to wide variations in the returns to education. The inequality in access to employment and returns to education ultimately translates into much wider inequality in incomes and asset ownership and may further increase the inequality in private investments in education.

3. Literature Review

A brief review of important studies carried on returns to education in India and other related aspects has been given this section. It throws light on the previous findings and the procedures adopted to reach at those estimates.

Duraisamy (2002) used the NSS data at two points of time, i.e. 1983 and 1993-94 to estimate the changes in returns to education by gender, age-cohorts and location in India. Both the OLS and joint maximum likelihood (JML) estimates of the wage equation were used to derive the returns to education. Incidence of receiving interest and dividend income was used as an instrument variable for JML estimates. The study found an increase in the likelihood of entering into wage employment with attainment of higher education such as a college degree. The private returns to education increased up to secondary level and later declined and the returns to technical education were higher than the college education. The returns to women's education were higher than that of men for middle, secondary and higher secondary levels of education; almost twice that of men at the higher secondary level. While the younger age group of workers between 15-29 years received lesser rate of returns at primary, middle and secondary levels, their returns were higher for graduation and technical diploma. Further, while the returns to primary, middle and technical education were higher in the rural areas, urban areas enjoyed higher returns to secondary education and graduation levels. The returns to female education were higher for middle, secondary and higher secondary levels in rural as well as urban areas. Lastly, the study concluded that considerable changes in returns to education, especially for women, occurred during 1983 to 1993-94. While the returns to women's education at primary and middle levels of education declined, the returns to secondary and graduation levels increased over time.

Chamarbaghwala (2006) examined widening gap in skill wage and reduction in gender wage differentials during 1983 and 1999-2000 by using the NSS data for four quinquennial rounds. The analysis was restricted to regular wage and salaried workers and used a

non-parametric approach to decompose the contribution of demand and supply changes to overall change in wages in India. The hypothesis of trade liberalization contributing to increase in demand and returns for unskilled workers in the least developed countries was rejected by the study as there was a large increase in the demand for skilled men and women workers. The demand for skilled labour increased mainly due to skill up-gradation within the industries. While the trade-in manufactures benefited skilled men, they hurt skilled women. On the other hand, the demand for both male and female graduates increased due to outsourcing of the services.

Dutta (2006) used three rounds of NSS data of 1983, 1993-94 and 1999-2000 to explore the returns to education for rural and urban male regular workers. Standard Mincerian wage equation, augmented Mincerian wage equation and two-step augmented Mincerian wage equations were estimated for the study. The study revealed U-shaped pattern of returns for the regular wage workers with relatively lower returns for primary level of education when compared to the secondary and graduate levels but higher than those at the middle level of education. The returns to education for casual workers were not well determined with very small returns at the primary level and almost none at the higher levels of education. The gap between the primary and graduate levels widened over time which was attributed to the trade liberalization and other reforms pursued during 1990s in India.

Kijima (2006a) examined the changes in wage inequality in urban India during 1983-1999 by using the data from four quin-quennial NSS rounds. The analysis was restricted to regular urban male workers of 16 major Indian states and Delhi within the age group of 21-65 years with the sample size of approximately 40,000 in each round. The author estimated the Mincerian wage equation and also decomposed the wage inequality into three components, namely observed quantities, observed prices and unobservables. The wage inequality was found to have increased over time for urban male workers. While the consumption inequality increased only in 1990s and not in 1980s, the wage inequality started rising even before 1993 before the start of economic reforms. Unequal distribution of observed skills was the main reason for rise in wage income inequality before 1993, while increase in the premium on skills acquired from observed factors was the major reason after 1993. The authors highlighted the need for facilitating school investments of the poor and flexible functioning of the labour market.

Kijima (2006b) examined the caste and tribal inequality in mean living standards in India and decomposed such inequality into two components; one, attributable to differences in economic characteristics and other attributable to the difference in returns to such

characteristics. The study was based on the data collected in the quin-quennial rounds of National Sample Survey conducted in 1983, 1987-88, 1993-94 and 1999-2000 each covering about 120,000 households and over half a million individuals. The analysis was restricted only to households in 16 major states of the country. The decomposition of inequality in the living standards revealed that it was being equally contributed by differences in the structure of income generation and characteristics of the households. The SC households were deriving lower returns to education which was adversely affecting their consumption and was widening the gap between SC, ST and other caste households.

Madheswaran and Attewell (2007) studied the caste discrimination in Indian labour market by examining the income and employment gaps in the urban formal sector and by using the NSS data for 1983, 1993-94 and 1999-2000. The analysis was carried on the regular employed workers aged between 15-65 years. The authors used three methods; single-equation estimation of the augmented Mincerian earning function, Blinder-Oaxaca decomposition and expanded approach to estimate the wage and job discrimination. The separate estimation of the Mincerian earnings function revealed significantly lower returns to education for the SC/ST workers when compared to the others. The decomposition revealed that most of the earning differentials were on account of differences in the human capital endowments between these categories, while discrimination in marketplace also accounted for almost 15 per cent of the differences. The study also revealed that occupational discrimination was more pronounced as compared to the wage discrimination.

Kumar and Mishra (2008) evaluated the effects of trade policy on wages in manufacturing industries in India by using the data on 72 three-digit manufacturing industries for the period of 1980-81 to 1999-2000. The study witnessed a significant relationship between trade policy and industry wage premiums. The industries with higher tariffs experienced lower wages than the industries with lower tariffs. The wage inequality was observed to have declined due to trade liberalization in India. Also, the tariff reductions were larger in the sectors that employed comparatively larger proportion of unskilled workers. As tariff reductions were inversely related to the increase in wages, the unskilled workers were found to have benefited more as compared to the skilled workers.

Ito (2009) quantified the caste-based discrimination in labour markets in the states of Uttar Pradesh and Bihar by using the data from Survey of Livelihood Conditions conducted in 1997-98 and covered 1035 rural households from 13 districts and 57 villages in Bihar and 1215 rural households from 12 districts and 63 villages in Uttar Pradesh. The study revealed that socially backward castes incurred higher transaction costs for entry into the labour

markets, while there was no caste discrimination in wages. The results established job discrimination against the lower castes but not the wage discrimination. The most important reason for inequality in the employment status was the difference in educational achievements across different castes.

Aggarwal (2011) estimated returns to education by using the wage function approach by using the data from India Human Development Survey conducted in 2004-05, covering 41554 households from 1503 villages and 971 urban neighbourhoods in India. Due to large variation in the labour market conditions, the returns were also estimated separately for rural and urban areas. The wage equation was estimated by using Heckman's two-step procedure and quantile regression. The returns to education were compared against the category of illiterate and below primary workers and were estimated for primary, middle, secondary, higher secondary and graduate levels of education. The study could not establish declining returns to education as the returns increased with increase in the level of education. It also established substantial earning differences across gender and social groups. The results of the quantile regression also revealed that the returns to education were higher at the upper end of wage distribution. The author explained increasing returns to education due to improvement in the quality of schooling at higher levels of education and highlights better incentives for private investments in education at higher secondary and graduation levels. The study, however, could not differentiate between the returns to education for casual and regular wage employment separately as the dynamics of these two kinds of labour markets differ significantly in India.

Azam (2012) used quantile regression to examine the changes in the wage structure in urban India during 1983 to 2004. The changes in wages were also decomposed into the covariate effect and the coefficient effect. The study was based on the 38^{th}, 50^{th} and 61^{st} rounds of the NSS data collected during 1983, 1993-94 and 2004-05, respectively. There was an increase in the real wages during 1983-84 and the increase occurred across entire wage distribution, though it was greater at higher quantile. However, during 1993-94 and 2004-05, comparatively larger wage increase was observed across the bottom and top end of the wage distribution as compared to the middle. While both the covariate and coefficient effect contributed towards the wage increase during 1983 to 1993-94, the wages increased almost entirely due to the coefficient effect during 1993-94 and 2004-05. The study projected the wage inequality in urban areas to increase further in future, owing to the increased share of higher educated workers in the workforce.

Mehta and Hasan (2012) examined the effects of trade and services liberalization on wage inequality in India by using trade protection data from such as commodity specific tariff rates and non-tariff barriers, World Bank data on the extent of liberalization of service industries and NSS data on employment and unemployment for two rounds of 1993-94 and 2004-05. The study highlighted that the wage inequality increased considerably with the gini coefficient of real urban weekly wages increasing from 42 per cent to 49 per cent during 1993-94 and 2004-05. Only about 29 per cent of the increase in wage inequality was attributable to the trade liberalization led labour relocations and wage shifts. Changes in the industry wages and skill premium accounted for 30-66 per cent of the increase in wage inequality.

4. 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 sometimes mentioned that the focus in this approach should not be on the benefits but the productivity differentials. However, this approach requires a huge amount of information on costs and earnings which usually is not easily available.

The other concept is the private returns which examines 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 largely compensated by part time and summer earnings, ii) the cost 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 (Duraisamy, 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 (Trostel *et al.,* 2002; Arrazola and Hevia, 2008; Long, 2010). Further, the estimation of wage equation with the 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 which have been used for 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).

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.

5. **Data and Methodology**

The study uses the data on employment and unemployment in India from 6 rounds of the National Sample Survey Organization (NSSO) during 1983 (38^{th} Round), 1987-88 (43^{rd} Round), 1993-94 (50^{th} Round), 1999-2000 (55^{th} Round), 2004-05 (61^{st} Round) and 2009-10 (66^{th} 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 is 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 are the census villages and urban blocks and the second stage of sampling are 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 confine our analysis to regular and casual wage workers as defined by their current daily status within the age group of 15-65 years, as the 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 5. The total number of workers in each round (regular and casual) in each round varied between 45,000 to 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.

Table 5: Size of the workers in different NSS rounds, 1983 to 2009-10

Year/ NSS Round	Work type	Rural			Urban			Overall		
		Male	Female	Total	Male	Female	Total	Male	Female	Total
1983 (38th Round)	Casual	24316	12797	37113	2559	1051	3610	26875	13848	40723
	Regular	9972	1578	11550	8586	1357	9943	18558	2935	21493
1987-88 (43rd Round)	Casual	1667	5230	6897	6328	2218	8546	7995	7448	15443
	Regular	1928	715	2643	23385	4139	27524	25313	4854	30167
1993-94 (50th Round)	Casual	20829	9939	30768	6798	2415	9213	27627	12354	39981
	Regular	9100	1554	10654	22045	4265	26310	31145	5819	36964
1999-2000 (55th Round)	Casual	23994	10544	34538	8210	2101	10311	32204	12645	44849
	Regular	9624	1880	11504	23187	4727	27914	32811	6607	39418
2004-05 (61st Round)	Casual	20883	9108	29991	7672	2153	9825	28555	11261	39816
	Regular	14168	3043	17211	19943	5354	25297	34111	8397	42508
2009-10 (66th Round)	Casual	17814	6240	24054	7839	1895	9734	25653	8135	33788
	Regular	11456	2487	13943	18258	4292	22550	29714	6779	36493

The Mincerian wage function of the following form was estimated by using the OLS method:

$$\ln w_i = \alpha + \sum \beta_k D_{ki} + \boldsymbol{X'\delta} + e_i \qquad (1)$$

Where $\ln w_i$ is the natural logarithm of wage for a given worker, D_{ki} is the dummy for ith level of education and $\boldsymbol{X'}$ is the vector of other variable that are expected to influence the wage of a worker such as age, experience, etc. The complete description of all the variables

used in estimation of the returns to education has been given in Appendix-1. Despite the sample selection bias and other related problems with the estimation returns to education, the OLS method was used for the estimation. As the present study intends to examine the trends in returns to education for various categories of education in India over the period between 1983 and 2009-10, the OLS estimates which are expected to be the underestimates of the actual returns to education can provide a fairly good analysis of the trends in returns to education for various categories. However, the OLS estimates were also compared with the estimates of the median quantile for their consistency.

The average annual returns (%) to a given level of education are given by γ_k and were estimated by using the following formula:

$$\gamma_k = \frac{(\beta_k - \beta_{k-1})}{(n_k - n_{k-1})} \qquad (2)$$

where, β_k is the coefficient of kth level of education and β_{k-1} is the coefficient of previous level of education and n_k is the number of years of schooling for the kth level and n_k is the number of years of schooling for the previous level.

While different education level dummies were used as the explanatory variables, other variables such as experience, marital status, dummies for various industries of employment, regional dummies, social group and religion were also used as control variables in the OLS estimation.

6. 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.

6.1. Descriptive statistics

The analysis of this study has been carried out separately for the casual and regular as well as male and female workers in the rural and urban areas. Hence, the descriptive statistics has also been presented in the same manner. The information on rural casual workers has been provided in Table 6, on rural regular workers in Table 7, on urban casual workers in Table 8 and on urban regular workers in Table 9.

The nominal wages have increased continuously since 1983 in rural and urban areas, for casual and regular workers and for male as well as female workers. The rate of increase was quite high during 1993-94 to 1999-2000 and then during 2004-05 to 2009-10 for all these categories. Further, the workers in urban areas obtained higher wages than their rural counterparts in both the casual and regular work. Especially, the male regular workers in both rural and urban areas were slightly more aged than the casual workers as entry into the regular labour markets is comparatively more regulated and restricted. The proportion of scheduled caste male workers in casual work in rural areas was almost double than their share in the regular work in rural areas, which is largely due to the differences in their educational and skill levels. However, the proportion of scheduled tribe male workers in rural casual work ranged between 13-15 per cent and that in rural regular work between 11-19 per cent during 1983 to 2009-10. For rural male workers from other categories, the share in regular work was 10-20 per cent higher than in the casual work. Larger representation of the other castes in relatively more remunerative regular labour markets can be explained on the basis of their superior education and skills as compared to the SC and ST workers not only in the rural but also in the urban labour markets. However after 1999-2000, the share of male workers from the ST categories increased considerably in regular rural work with a corresponding fall in the share of workers from other category with no change for SC workers.

The share of rural female regular workers from ST category also increased during the last decade. Overall, rural casual markets have not witnessed any significant change with respect to the composition of workers from different caste categories over time. The proportion of SC female workers in rural areas was higher by more than 10 percentage points in the casual work as compared to the regular work. The proportion of rural female casual workers from ST category increased regularly since 1983 and that of SC female workers since 1999-2000. Another important observation is that the share of SC workers in urban labour markets is significantly lower than that in the rural markets in both the casual and regular wage work and also for male and female workers. The share of both male and female SC workers also increased over time in the urban areas. The same is the case for the ST workers except for the urban female casual work, where the proportion declined from about 15 per cent in 1999-2000 to about 11 per cent in 2009-10.

Table 6: Descriptive statistics of rural casual workers, 1983 to 2009-10

Variable	Male workers						Female workers					
	1983	1987-88	1993-94	1999-2000	2004-05	2009-10	1983	1987-88	1993-94	1999-2000	2004-05	2009-10
Log hourly wage	1.95 (0.53)	2.53 (0.63)	3.05 (0.73)	3.75 (0.50)	4.02 (0.49)	4.63 (0.47)	1.47 (0.52)	1.89 (0.57)	2.63 (0.64)	3.31 (0.44)	3.51 (0.44)	4.22 (0.43)
Hourly wage	8.43 (20.77)	19.38 (136.84)	25.18 (25.14)	48.06 (28.62)	62.98 (43.21)	114.75 (69.93)	5.08 (12.97)	19.64 (337.79)	16.10 (8.36)	30.24 (15.86)	36.85 (18.29)	74.43 (33.83)
Age	32.69 (12.29)	32.65 (12.07)	33.26 (12.19)	33.48 (12.06)	33.30 (12.00)	34.95 (12.07)	32.95 (12.33)	32.84 (12.21)	33.83 (12.16)	34.48 (11.97)	35.05 (12.01)	36.82 (11.98)
Age-squared	1219.51 (910.20)	1211.55 (893.39)	1254.50 (910.54)	1266.36 (903.17)	1253.16 (888.47)	1367.08 (922.91)	1237.99 (90.438)	1227.33 (895.26)	1292.39 (910.46)	1332.56 (903.19)	1372.56 (908.45)	1499.26 (939.09)
%age of scheduled castes	31.38	29.96	32.77	31.79	31.76	30.14	29.82	29.20	31.90	32.60	30.52	27.45
%age of scheduled tribes	13.36	15.05	14.32	14.32	14.45	15.61	17.73	18.16	17.68	19.93	17.87	18.45
%age of other backward castes	-	-	-	33.91	35.39	37.20	-	-	-	34.56	39.80	43.36
% age of other castes	55.25	54.99	52.91	19.98	18.39	17.05	52.45	52.64	50.42	12.91	11.82	10.74
%age of illiterates and below primary	79.84	78.22	72.43	65.99	57.43	45.62	94.48	94.12	91.30	88.37	82.64	71.82
%age of above primary & below middle	12.78	12.43	13.56	13.80	18.00	19.07	4.37	4.16	5.20	6.07	8.64	13.79
%age of above middle & below secondary	5.96	6.66	9.78	13.41	16.76	21.28	1.04	1.39	2.67	4.20	6.45	10.02
%age of above secondary & below graduation	1.35	2.51	3.97	6.36	7.35	12.95	0.10	0.32	0.77	1.27	2.16	4.21
%age of above graduation	0.06	0.19	0.26	0.43	0.45	1.08	0.01	0.01	0.06	0.09	0.11	0.16

Note: The figures in parentheses are the standard deviations.

Table 7: Descriptive statistics of rural regular workers, 1983 to 2009-10

Variable	Male workers						Female workers					
	1983	1987-88	1993-94	1999-2000	2004-05	2009-10	1983	1987-88	1993-94	1999-2000	2004-05	2009-10
Log hourly wage	2.52 (0.80)	3.26 (0.91)	3.90 (0.94)	4.65 (0.85)	4.88 (0.85)	5.46 (0.85)	2.06 (0.93)	2.48 (1.05)	3.44 (1.05)	4.16 (1.03)	4.25 (1.05)	4.90 (1.04)
Hourly wage	17.24 (29.86)	42.06 (240.30)	67.47 (47.93)	144.46 (119.35)	182.23 (146.33)	325.83 (263.65)	12.91 (38.51)	19.77 (20.23)	48.71 (41.85)	105.44 (105.64)	119.88 (130.12)	224.47 (36.94)
Age	33.73 (11.17)	34.79 (11.49)	36.56 (10.94)	36.72 (11.18)	37.76 (11.10)	38.23 (10.95)	32.53 (11.24)	33.46 (11.51)	33.59 (10.45)	34.56 (10.47)	35.23 (10.61)	35.75 (10.34)
Age-squared	1262.75 (820.02)	1342.23 (855.53)	1456.44 (827.60)	1473.34 (851.77)	1549.36 (853.67)	1581.35 (858.23)	1184.43 (810.61)	1252.00 (850.88)	1237.27 (763.31)	1303.67 (781.34)	1354.08 (798.31)	1384.68 (787.95)
%age of scheduled castes	16.70	16.12	13.58	15.07	15.44	16.06	18.68	21.33	13.19	15.65	17.05	17.35
%age of scheduled tribes	11.53	11.49	11.64	11.45	18.20	19.21	13.63	13.28	13.19	16.56	19.00	19.88
%age of other backward castes	-	-	-	30.98	33.02	33.40	-	-	-	31.80	35.03	33.43
% age of other castes	71.78	72.39	74.78	42.49	35.35	31.33	67.69	65.39	73.63	35.99	28.92	29.35
%age of illiterates and below primary	42.09	38.72	23.59	19.86	14.28	9.67	62.67	53.74	35.96	34.36	24.62	15.64
%age of above primary & below middle	13.89	12.40	9.67	9.86	10.61	9.15	7.10	7.35	4.44	6.22	7.07	7.17
%age of above middle & below secondary	14.79	13.76	15.44	16.74	17.02	16.26	7.89	8.37	10.88	10.21	12.31	11.25
%age of above secondary & below graduation	21.25	24.30	33.68	34.57	36.53	37.67	18.00	21.99	34.54	32.64	35.40	37.19
%age of above graduation	7.98	10.82	17.62	18.97	21.56	27.25	4.33	8.56	14.19	16.57	20.59	28.75

Note: The figures in parentheses are the standard deviations.

Table 8: Descriptive statistics of urban casual workers, 1983 to 2009-10

Variable	Male workers						Female workers					
	1983	1987-88	1993-94	1999-2000	2004-05	2009-10	1983	1987-88	1993-94	1999-2000	2004-05	2009-10
Log hourly wage	2.27 (0.55)	2.69 (0.67)	3.33 (0.72)	4.05 (0.54)	4.22 (0.52)	4.77 (0.51)	1.55 (0.60)	2.02 (0.62)	2.77 (0.67)	3.48 (0.60)	3.68 (0.55)	4.23 (0.56)
Hourly wage	11.13 (6.21)	18.11 (41.98)	33.36 (19.07)	66.43 (44.28)	77.82 (43.22)	133.14 (70.46)	5.66 (4.68)	9.11 (7.64)	18.99 (11.38)	38.74 (25.58)	46.36 (31.13)	79.74 (44.00)
Age	31.03 (12.18)	31.51 (11.77)	31.64 (11.75)	31.90 (11.53)	32.27 (11.31)	33.99 (11.65)	33.40 (12.84)	33.79 (12.56)	34.45 (12.38)	35.33 (11.72	36.65 (11.68)	36.87 (11.72)
Age-squared	1111.25 (886.88)	1131.53 (865.48)	1138.86 (856.48)	1150.55 (841.55)	1169.47 (823.74)	1291.06 (873.55)	1280.34 (950.80)	1299.68 (934.80)	1340.37 (928.81)	1385.21 (886.50)	1407.60 (890.73)	1496.62 (919.97)
%age of scheduled castes	20.16	22.24	23.04	25.11	25.28	25.52	21.02	25.65	27.66	30.81	27.84	31.27
%age of scheduled tribes	6.48	7.64	6.86	8.94	8.16	8.54	7.50	10.19	7.84	15.18	12.09	10.98
%age of other backward castes	-	-	-	35.73	41.36	43.34	-	-	-	36.17	41.67	43.56
% age of other castes	73.35	70.12	70.10	30.21	25.19	22.60	71.48	64.16	64.51	17.884	18.39	14.19
%age of illiterates and below primary	61.09	58.58	54.49	47.64	44.02	37.25	83.89	84.39	80.39	79.00	72.93	65.60
%age of above primary & below middle	20.00	21.33	19.66	18.08	20.82	19.13	11.57	9.42	9.42	9.75	13.60	14.74
%age of above middle & below secondary	13.23	14.25	17.40	21.83	23.22	24.96	3.15	4.71	4.71	6.38	9.22	13.16
%age of above secondary & below graduation	5.26	5.37	7.76	11.29	10.85	17.14	1.20	1.31	1.31	3.90	3.42	5.72
%age of above graduation	0.41	0.47	0.69	1.16	1.06	1.53	0.19	0.17	0.17	0.97	0.82	0.79

Note: The figures in parentheses are the standard deviations.

Table 9: Descriptive statistics of urban regular workers, 1983 to 2009-10

Variable	Male workers						Female workers					
	1983	1987-88	1993-94	1999-2000	2004-05	2009-10	1983	1987-88	1993-94	1999-2000	2004-05	2009-10
Log hourly wage	2.98 (0.71)	3.49 (0.82)	4.11 (0.93)	4.87 (0.82)	4.97 (0.87)	5.58 (0.87)	2.42 (1.01)	3.12 (1.06)	3.81 (1.12)	4.60 (1.03)	4.44 (1.13)	5.19 (1.12)
Hourly wage	24.66 (18.33)	46.34 (171.97)	82.97 (64.19)	176.62 (148.52)	206.48 (230.77)	381.90 (374.71)	17.93 (36.48)	41.80 (224.07)	70.02 (56.18)	156.38 (155.17)	152.03 (163.64)	311.28 (329/96)
Age	34.90 (10.88)	36.01 (10.88)	36.54 (10.79)	37.11 (11.10)	36.72 (11.32)	37.52 (11.05)	34.33 (11.43)	34.86 (10.96)	35.58 (10.77)	35.89 (10.62)	35.96 (11.07)	36.37 (10.66)
Age-squared	1336.71 (815.59	1414.79 (825.45)	1451.65 (819.74)	1500.65 (850.22)	1476.80 (860.09)	1530.08 (857.93)	1309.17 (86.02)	1334.98 (821.76)	1381.87 (81.98)	1400.63 (799.80)	1415.35 (837.20)	1436.82 (817.98)
%age of scheduled castes	10.12	9.31	9.59	11.60	13.92	13.53	15.21	11.82	10.36	12.89	18.00	15.77
%age of scheduled tribes	5.05	5.51	6.07	6.49	8.14	8.40	7.18	7.82	8.14	9.84	10.04	10.56
%age of other backward castes	-	-	-	25.97	31.71	31.61	-	-	-	24.16	31.16	30.53
% age of other castes	84.83	85.18	84.34	55.93	46.23	46.46	77.62	80.35	81.50	53.12	40.81	43.14
%age of illiterates and below primary	22.26	18.91	15.98	13.51	13.00	9.00	42.14	30.03	24.50	21.17	28.57	19.52
%age of above primary & below middle	14.90	14.96	10.32	9.46	11.04	7.72	6.69	7.32	5.45	5.16	7.96	6.96
%age of above middle & below secondary	19.26	15.54	16.82	17.11	18.25	14.92	7.05	5.64	6.76	8.22	9.35	8.25
%age of above secondary & below graduation	26.56	28.87	31.22	33.52	32.27	34.66	25.12	27.02	28.39	28.55	24.81	23.39
%age of above graduation	17.02	21.73	25.68	26.39	25.44	33.69	19.00	29.99	34.89	36.91	29.31	41.88

Note: The figures in parentheses are the standard deviations.

The dynamics of education in the Indian labour markets are also very important. First of all, high illiteracy or education below primary level is a norm in the casual labour markets and the incidence is more pronounced for the female workers. Even during 2009-10, more than 71 per cent of the female workers and 45 per cent of the male workers in rural casual wage work were either illiterate or below primary level of education. However, the educational levels improved since 1983 with comparatively better improvement in case of male workers. The proportion of above middle and above secondary educated male workers in rural casual work showed a tremendous improvement in recent times. Likewise, there were more than 4 per cent rural female workers educated above secondary in the casual wage category in 2009-10 as compared to just 0.1 per cent in 1983. Majority of the male and female workers in rural regular wage labour were educated above secondary but below graduation level, indicating a minimum level of pre-requisite for majority of such employment activities. The proportion increased by almost 15 percentage points for the males since 1983 and almost doubled for the females. However, there was a huge progress in the proportion of graduates, which increased from about 8 per cent in 1983 to about 27 per cent in 2009-10 for males and from 4 to 28 per cent for females. The period of 2004-05 to 2009-10 witnessed a big jump in this proportion, especially for women. Similar differences prevailed between urban casual and regular labour markets in the urban areas. The situation of female workers is almost no different in urban areas from the rural areas with respect to the educational composition of the workforce. Urban male casual workers showed relatively higher levels of education than their rural counterparts. The urban regular labour markets, however, depict a completely different picture with the combined proportion of secondary and graduate level workers exceeding 68 per cent for males and 65 per cent for females. These proportions have increased from about 43-44 per cent during 1983 and the proportion of graduate workers in regular urban markets increased tremendously by 8 percentage points for males and more than 12 percentage points for females.

Before discussing the results of the estimates, it is thus important to conclude with some broad observations from the descriptive statistics which will help in supporting the results of this study later. The casual labour markets are dominated by less educated workers in both the urban as well as rural areas and the situation is more severe in rural areas than urban areas and for female workers than the male workers. Based on the nature of the Indian labour markets as discussed even before, the casual markets are largely dominated by the unskilled workforce due to lack of any skill intensive character of these labour markets. On the other hand, the regular wage work employs a large proportion of the educated workers,

more so in the urban areas. Sharp increase in the graduate workers during recent times is in line with the recent growth in Indian economy, largely supported by the growth of service sector which requires highly educated workers. More and more females are entering the Indian workforce with improvement of education and opening of the economy.

6.2. 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 Table 10 to Table 13, 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. We have discussed these results separately for each category (The readers can ask for detailed estimates of this study by e-mail at kmlvatta@yahoo.com).

Rural Casual Workers: For casual male workers in rural areas, coefficients of all the education levels till the above secondary category were statistically significant at 1 per cent level from 1983 to 2009-10 (Table 10). However, only during 1987-88, the coefficient of education at secondary level was significant at 5 per cent level and at middle level was non-significant. While education at graduation level appeared significant at 10 per cent level in 1999-2000 and at 1 per cent level in 2004-05, it was non-significant for the remaining period. The significance of the coefficients of education reveals that rural casual labour markets reward the educated workers in terms of higher wages as compared to the illiterate or below primary educated workers, though they do not reward considerably at education above graduation level. For female casual workers, education could not appear as a significant determinant of wage earnings for most of the educational levels during most of the years. Though some levels appear significant, they do not reveal any trend. It reveals no significant improvement in the wage earnings with education when compared to the wages of illiterate or below primary educated workers. It may largely reflect the distress prevailing in casual wage work for the rural female workers with no additional incentive for higher education in India. The recent significance of some of the levels of education during 2009-10 might be due to the increased participation of the rural females with relatively better education in NREGA works as education facilitates better participation in such programmes by improving the level of awareness. Interestingly, values of the coefficients of education dummies declined for the rural male casual workers indicating relatively larger increase in the wages for the illiterate and below primary workers than the educated workers. We are unable to explain the reason of this phenomenon and will try to explore it further.

Rural Regular Workers: The coefficients of all the levels of education for regular rural male workers were statistically significant at 1 per cent level (Table 11). Almost same was the case for the rural female workers, though the coefficient of the above primary and below middle level of education was non-significant in 1983 and in 1999-2000, significant at 5 per cent level during 1987-88, 1993-94 and 2009-10, while it was significant at 1 per cent level during 2004-05. The results implied that the educated rural male workers were earning higher wages than their illiterate or less than primary educated counterparts. Though, the improvement in wage earnings occurred at all levels of education above primary for males, it could materialize usually after achieving middle level of education for the female workers during most of the times during 1983 to 2009-10.

Urban Casual Workers: The estimates of the urban casual workers are almost similar to that of the rural casual workers. During 1993-94, the coefficients of different levels of education were not significant (except primary level) and even the R-square value of the regression function was quite small (Table 12). Ignoring these estimates, improvement in education was helping in earning higher wages in the casual wage work. Contrary to the rural areas, the coefficients of graduation level of education were also statistically significant. It may be justified on the grounds that urban casual labour markets demand relatively better skills and education than the rural labour markets. For urban casual female workers, however, the pattern was completely similar to that of rural casual female workers. It reveals the incidence of distress even in the urban casual labour markets for females with no incentive for better education.

Urban Regular Workers: The significance of almost all the coefficients during all the years for both the male and female workers in regular category reveals better role of education in determining wage earnings in urban areas (Table 13). Almost all the coefficients were significant at 1 per cent level during 1983 to 2009-10, indicating that higher education was translating ultimately in higher wage earnings when compared to the illiterate or below primary educated workers.

In brief, the casual work for rural and urban females appeared largely distress driven with little incentive for higher education. For male casual workers, compared to the illiterate or below primary educated workers, education remained rewarding up to secondary level but not above that. 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.

Table 10: Estimates of the wage equation for rural casual workers, 1983 to 2009-10

Variable	Male workers						Female workers					
	1983	1987-88	1993-94	1999-2000	2004-05	2009-10	1983	1987-88	1993-94	1999-2000	2004-05	2009-10
Constant	1.805***	3.066***	2.733***	3.117***	3.806***	4.326***	1.203***	2.012***	2.386***	3.687***	3.629***	4.574***
	(0.022)	(0.158)	(0.036)	(0.061)	(0.044)	(0.045)	(0.143)	(0.391)	(0.047)	(0.061)	(0.061)	(0.087)
Primary	0.057***	0.098***	0.053***	0.046***	0.035***	0.017**	0.042**	-0.006 NS	0.022 NS	0.014 NS	0.021 NS	0.024*
	(0.009)	(0.034)	(0.013)	(0.007)	(0.007)	(0.007)	(0.020)	(0.046)	(0.027)	(0.017)	(0.013)	(0.014)
Middle	0.067***	0.043 NS	0.043**	0.057***	0.052***	0.045***	0.135***	-0.045 NS	0.036 NS	0.016 NS	0.011 NS	0.013 NS
	(0.013)	(0.077)	(0.018)	(0.008)	(0.007)	(0.008)	(0.037)	(0.081)	(0.035)	(0.018)	(0.016)	(0.018)
Secondary	0.095***	0.200**	0.102***	0.087***	0.062***	0.056***	-0.008 NS	0.044 NS	0.156***	0.082**	0.035 NS	0.089***
	(0.028)	(0.086)	(0.020)	(0.012)	(0.011)	(0.010)	(0.160)	(0.172)	(0.051)	(0.041)	(0.027)	(0.024)
Graduate	0.265 NS	0.096 NS	0.078 NS	0.073*	0.146***	0.025 NS	0.028 NS	-	0.609**	-0.160 NS	0.146 NS	0.442***
	(0.226)	(0.272)	(0.099)	(0.041)	(0.063)	(0.038)	(0.034)		(0.288)	(0.199)	(0.130)	(0.170)
R-squared	0.3787	0.3862	0.2424	0.4528	0.5189	0.4461	0.3535	0.3091	0.2085	0.3373	0.4388	0.3633
Observations	24316	1667	20829	23994	20883	17814	12797	5230	9939	10544	9108	6240

Note: Figures in parentheses are the standard errors. *, ** and *** indicate significance at 10, 5 and 1 per cent levels of significance, respectively. NS means non-significant.

Table 11: Estimates of the wage equation for rural regular workers, 1983 to 2009-10

Variable	Male workers						Female workers					
	1983	1987-88	1993-94	1999-2000	2004-05	2009-10	1983	1987-88	1993-94	1999-2000	2004-05	2009-10
Constant	1.253*** (0.056)	1.300** (0.064)	1.838*** (0.088)	2.220*** (0.203)	3.018*** (0.068)	3.792*** (0.081)	1.131*** (0.254)	0.474 NS (0.476)	2.322*** (0.261)	2.113*** (0.305)	2.358*** (0.208)	3.004*** (0.159)
Primary	0.176*** (0.019)	0.205*** (0.062)	0.180*** (0.031)	0.155*** (0.023)	0.178*** (0.021)	0.134*** (0.028)	0.115 NS (0.084)	0.318** (0.155)	0.205** (0.099)	0.124 NS (0.076)	0.171*** (0.053)	0.162** (0.067)
Middle	0.291*** (0.021)	0.277*** (0.060)	0.290*** (0.029)	0.266*** (0.022)	0.324*** (0.019)	0.302*** (0.026)	0.561*** (0.101)	0.696*** (0.174)	0.494*** (0.093)	0.377*** (0.080)	0.297*** (0.052)	0.334*** (0.063)
Secondary	0.612*** (0.018)	0.608*** (0.054)	0.579*** (0.027)	0.522*** (0.023)	0.603*** (0.019)	0.581*** (0.025)	1.238*** (0.096)	1.189*** (0.157)	1.024*** (0.094)	1.038*** (0.074)	0.872*** (0.050)	0.962*** (0.062)
Graduate	0.899*** (0.026)	0.960*** (0.070)	0.877*** (0.033)	0.762*** (0.032)	0.860*** (0.023)	0.850*** (0.028)	1.434*** (0.105)	1.349*** (0.181)	1.223*** (0.118)	1.287*** (0.088)	1.136*** (0.065)	1.402*** (0.070)
R-squared	0.5347	0.4773	0.3738	0.5713	0.5393	0.4805	0.6212	0.6462	0.5666	0.6017	0.5799	0.5135
Observations	9972	1928	9100	9624	14168	11456	1578	715	1554	1880	3043	2487

Note: Figures in parentheses are the standard errors. *, ** and *** indicate significance at 10, 5 and 1 per cent levels of significance, respectively. NS means non-significant.

Table 12: Estimates of the wage equation for urban casual workers, 1983 to 2009-10

Variable	Male workers						Female workers					
	1983	1987-88	1993-94	1999-2000	2004-05	2009-10	1983	1987-88	1993-94	1999-2000	2004-05	2009-10
Constant	1.377***	1.687***	2.553***	3.330***	3.530***	4.381***	1.166***	1.381***	2.075***	3.044***	3.742***	4.509***
	(0.075)	(0.061)	(0.061)	(0.129)	(0.052)	(0.046)	(0.183)	(0.111)	(0.102)	(0.178)	(0.134)	(0.135)
Primary	0.059**	0.037*	0.052**	0.063***	0.036***	0.037***	-0.103***	0.076 NS	0.035 NS	0.067***	-0.019 NS	0.038 NS
	(0.027)	(0.019)	(0.022)	(0.014)	(0.012)	(0.013)	(0.056)	(0.047)	(0.045)	(0.038)	(0.031)	(0.035)
Middle	0.093***	0.066***	0.034	0.072***	0.053***	0.076***	0.067	0.144 NS	0.107 NS	0.021 NS	-0.071***	0.016 NS
	(0.031)	(0.022)	(0.026)	(0.014)	(0.013)	(0.013)	(0.125)	(0.072)	(0.67)	(0.054)	(0.042)	(0.037)
Secondary	0.199***	0.179***	0.040	0.128***	0.100***	0.097***	-0.115	0.062 NS	0.046 NS	0.120 NS	0.012 NS	0.142***
	(0.048)	(0.035)	(0.035)	(0.018)	(0.017)	(0.015)	(0.141)	(0.214)	(0.135)	(0.080)	(0.082)	(0.052)
Graduate	0.440**	0.348**	0.108	0.357***	0.161***	0.105**	1.474***	0.826**	-0.054 NS	0.377***	0.111 NS	0.351***
	(0.194)	(0.138)	(0.149)	(0.070)	(0.059)	(0.045)	(0.172)	(0.357)	(0.426)	(0.141)	(0.159)	(0.078)
R-squared	0.4167	0.3370	0.2090	0.3968	0.4641	0.4189	0.4925	0.4193	0.3314	0.4475	0.4586	0.4361
Observations	2559	6328	6798	8210	7672	7839	1051	2218	2415	2101	2153	1895

Note: Figures in parentheses are the standard errors. *, ** and *** indicate significance at 10, 5 and 1 per cent levels of significance, respectively. NS means non-significant.

Table 13: Estimates of the wage equation for urban regular workers, 1983 to 2009-10

Variable	Male workers						Female workers					
	1983	1987-88	1993-94	1999-2000	2004-05	2009-10	1983	1987-88	1993-94	1999-2000	2004-05	2009-10
Constant	1.062*** (0.053)	1.143*** (0.041)	1.928*** (0.567)	2.726*** (0.113)	3.514*** (0.050)	3.711*** (0.054)	1.996*** (0.246)	0.761*** (0.113)	1.377*** (0.132)	2.711*** (0.206)	2.816*** (0.206)	2.876*** (0.105)
Primary	0.103*** (0.020)	0.116*** (0.013)	0.097*** (0.020)	0.109*** (0.015)	0.141*** (0.015)	0.080*** (0.020)	-0.027 NS (0.093)	0.305*** (0.049)	0.204*** (0.062)	0.180*** (0.046)	0.133*** (0.035)	0.238*** (0.054)
Middle	0.259*** (0.018)	0.230*** (0.014)	0.232*** (0.18)	0.235*** (0.014)	0.253*** (0.014)	0.202*** (0.018)	0.325*** (0.105)	0.451*** (0.064)	0.599*** (0.060)	0.210*** (0.045)	0.236*** (0.038)	0.536*** (0.052)
Secondary	0.586*** (0.018)	0.493*** (0.012)	0.502*** (0.018)	0.472*** (0.014)	0.561*** (0.015)	0.465*** (0.019)	0.570*** (0.077)	0.889*** (0.041)	1.128*** (0.046)	0.688*** (0.043)	0.672*** (0.043)	1.129*** (0.049)
Graduate	0.960*** (0.020)	0.840*** (0.014)	0.863*** (0.030)	0.816*** (0.020)	0.977*** (0.021)	0.840*** (0.026)	0.821*** (0.086)	1.241*** (0.043)	1.367*** (0.049)	0.944*** (0.047)	0.913*** (0.049)	1.635*** (0.055)
R-squared	0.5018	0.4579	0.3263	0.5804	0.5962	0.5821	0.6953	0.5365	0.4165	0.6139	0.6723	0.5510
Observations	8586	23385	22045	23187	19943	18258	1357	4139	4265	4727	5354	4292

Note: Figures in parentheses are the standard errors. *, ** and *** indicate significance at 10, 5 and 1 per cent levels of significance, respectively. NS means non-significant.

6.3. Returns to Education

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

Male Casual Workers: The trends in returns to education for male casual workers in rural and urban areas have been depicted in Figures 10 & 11. In both the rural and urban areas, the returns to education for casual male workers were very low at all the levels of education. In rural areas, the returns to secondary and primary levels remained higher than the returns to middle and graduation levels. In urban areas, however, the returns to graduation were quite high as compared to the other levels of education. The returns to primary and middle education for rural casual male workers have fallen during 1983 to 2009-10. While the returns to secondary and graduation levels have declined for the urban male casual workers during the same period. 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 2009-10 (see Appendices VIII and X). After the agriculture sector, it is the construction sector which 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 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 12 & 13. Unlike the causal wage work, the returns to education in regular wage work are quite different at different levels of education. For male workers, the rate of return increases monotonically with increase in level of education. However, the returns for the secondary and graduation levels declined over time and there was an increase in returns to middle level of education.

Figure 10: Trends in rate of returns to education for rural male casual workers in India, 1983 to 2009-10

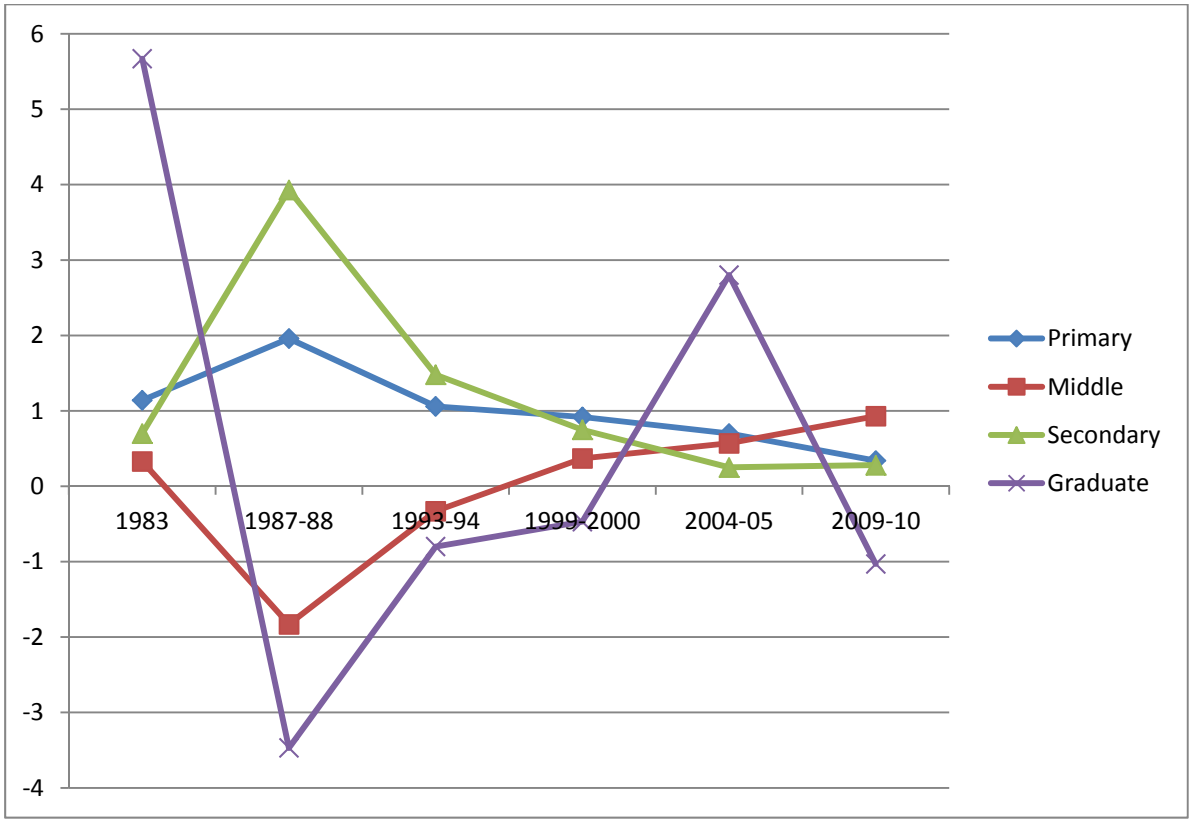


Figure 11: Trends in rate of returns to education for urban male casual workers in India, 1983 to 2009-10

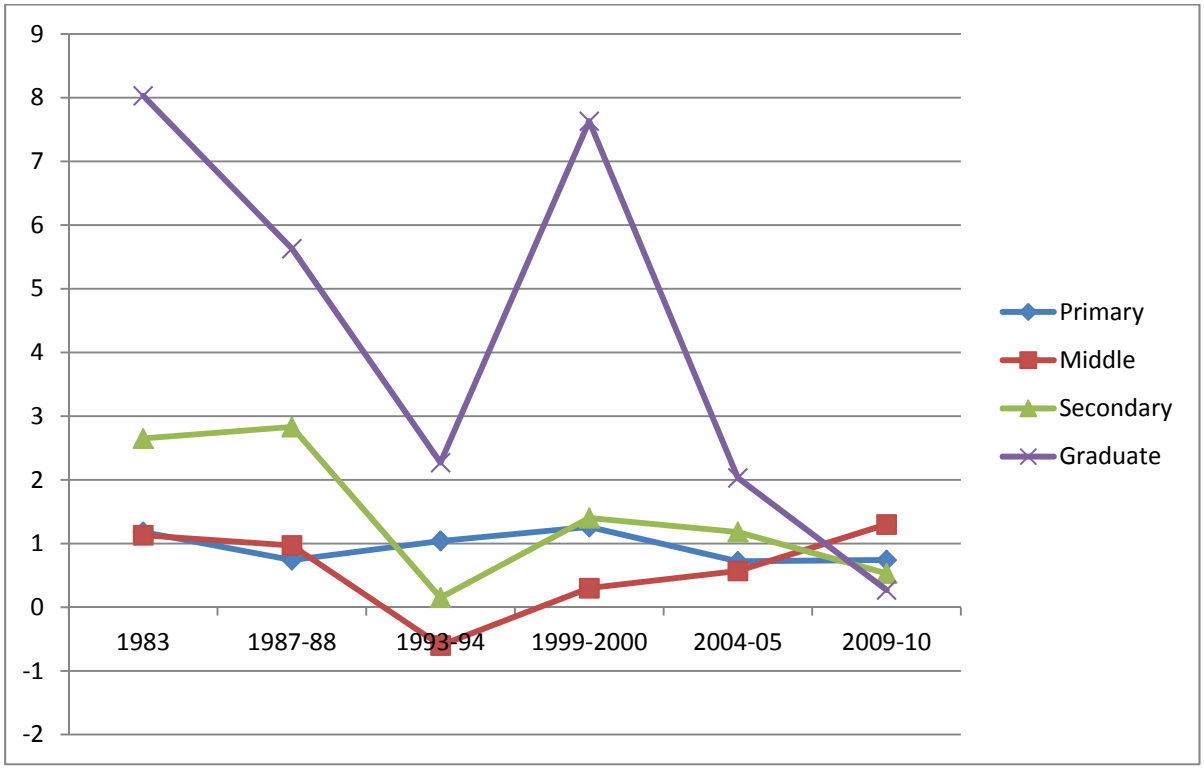


Figure 12: Trends in rate of returns to education for rural male regular workers in India, 1983 to 2009-10

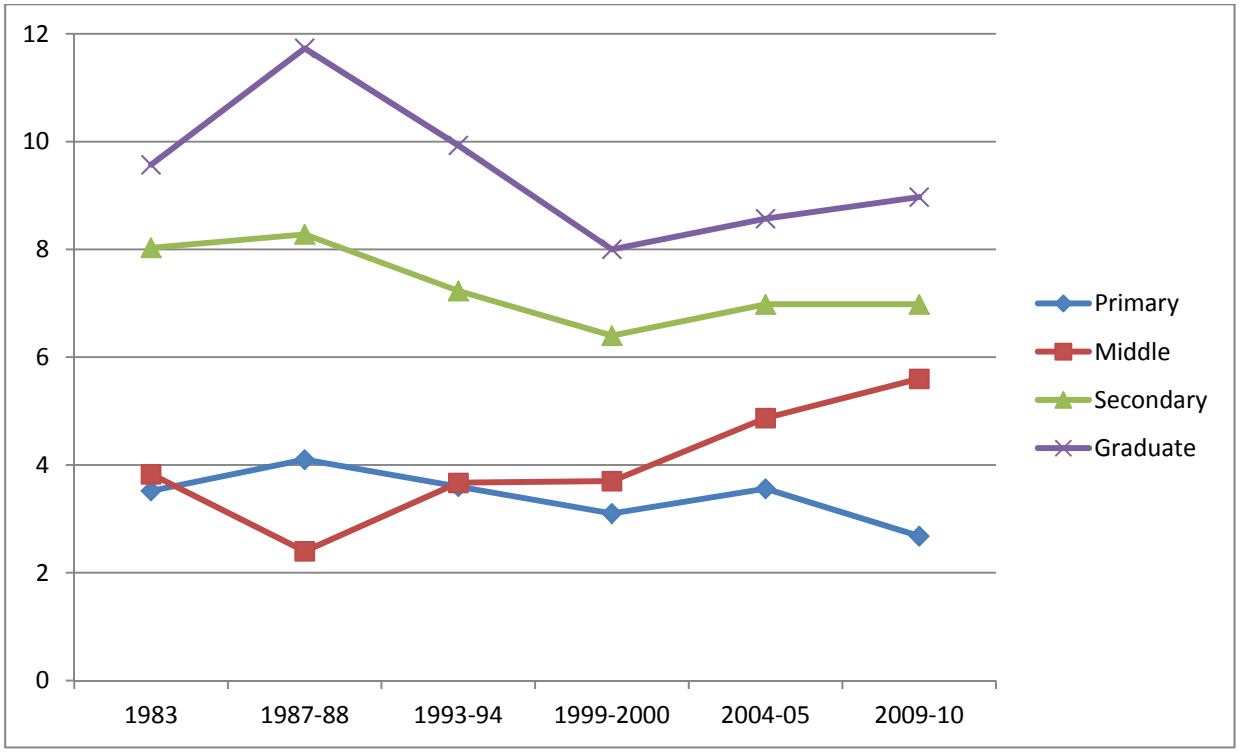
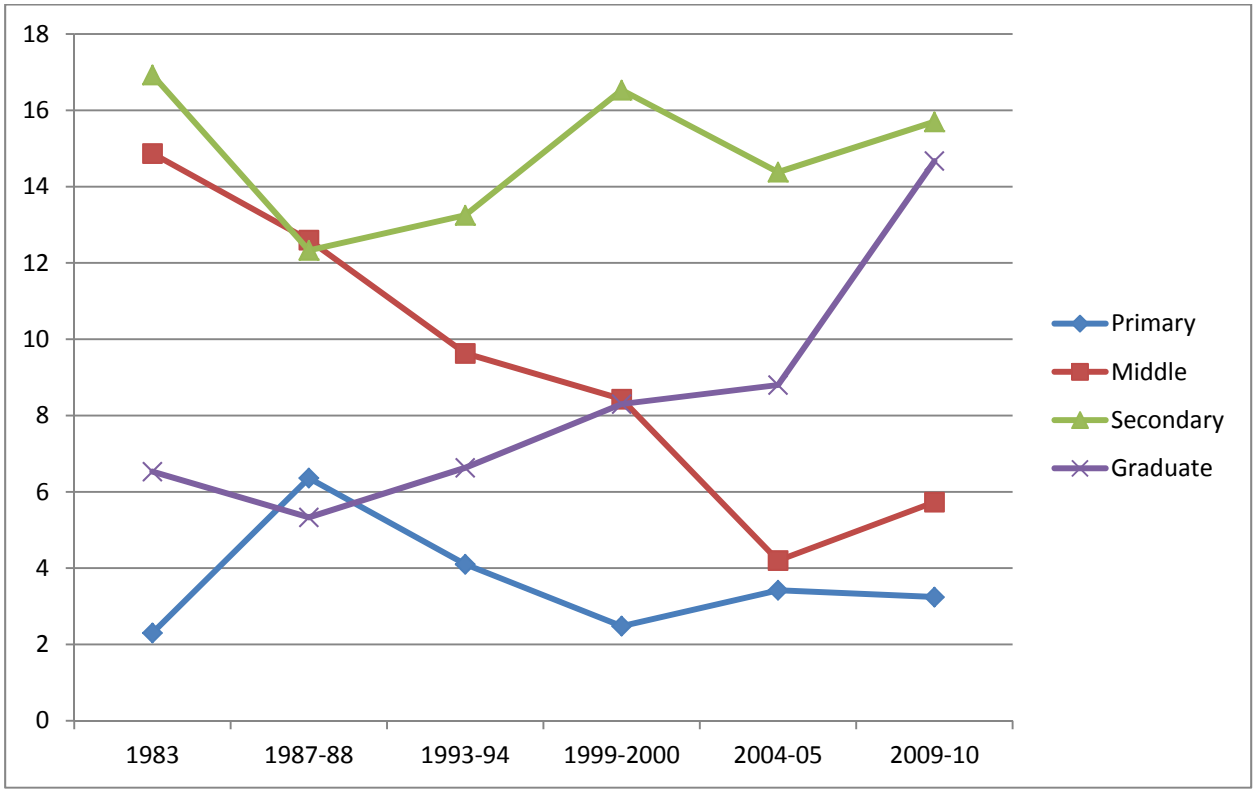


Figure 13: Trends in rate of returns to education for rural female regular workers in India, 1983 to 2009-10



The decline in returns for secondary and graduation level may be explained by a huge increase in the supply of workforce in this category as is evident from the descriptive statistics. Comparatively larger supply than demand might have caused a decline in returns to education. Most of the regular employment activities for rural males are concentrated in low skill intensive manufacturing, which might be the reason for improved returns for the middle educated workers. These employment activities in the manufacturing sector may not provide much incentive for secondary and higher levels of education for male workers. The wide gap in the returns also existed for the rural female workers, but returns were the highest for secondary level of education, followed by the graduation, middle and primary education in 2009-10. There has been a tremendous increase in returns to education for graduate female workers, while the returns declined considerably fast for the middle educated workers. For other categories, there was no particular trend in the returns. 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 14 & 15. The returns to education for regular workers in urban areas were higher than for regular workers in rural areas. As for rural male workers, the returns increase monotonically with the level of education, however, the gap between returns at different levels appeared to be narrowing down over time. There is almost no trend in returns for any level of education, though during the recent period of 2004-05 to 2009-10, there was a sharp increase in the returns to education primary, 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 opened generated large number of employment opportunities for the better educated women. It might have resulted into an increase in the returns to education.

Figure 14: Trends in rate of returns to education for urban male regular workers in India, 1983 to 2009-10

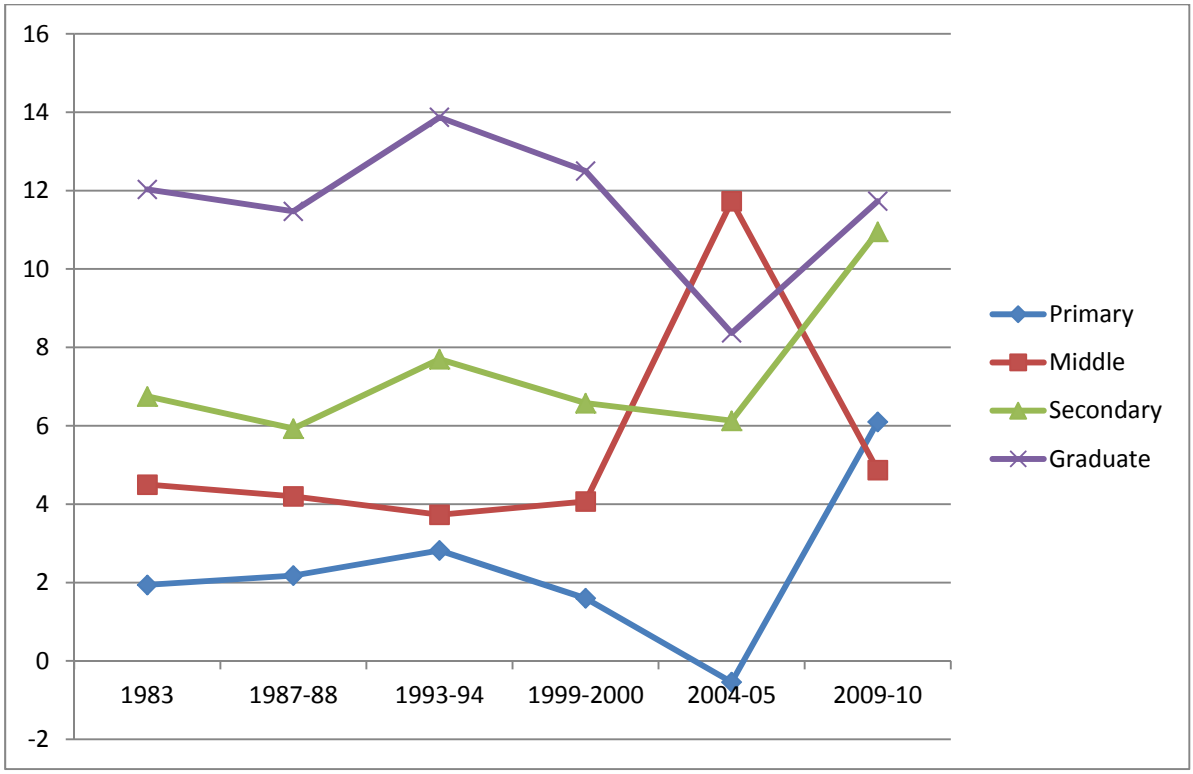
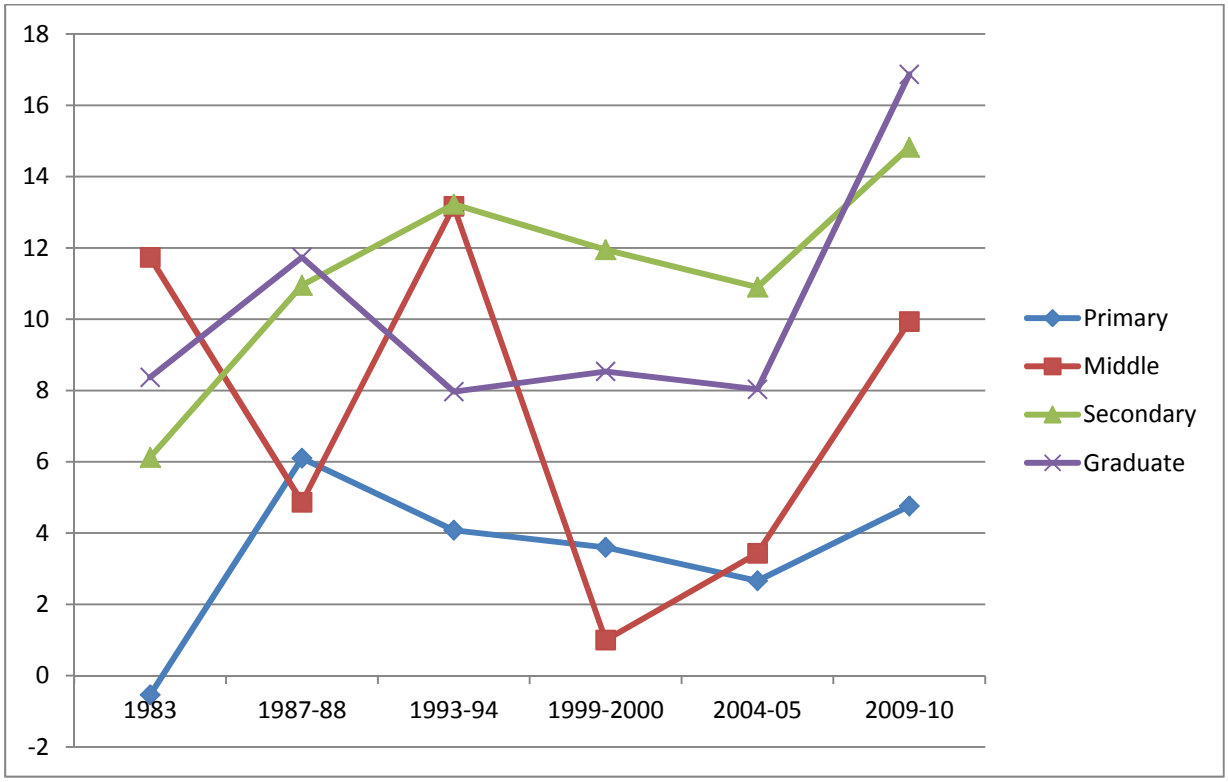


Figure 15: Trends in rate of returns to education for urban female regular workers in India, 1983 to 2009-10



7. 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 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. There was almost 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. The returns to education were significantly positive for male workers and were higher for primary and middle levels of education. While the returns to secondary and graduate levels of education for urban casual male workers declined over time, these returns seemed to be converging at very low levels in recent times for all the levels of education. The wages for uneducated casual male wage workers in rural areas increased relatively faster than their educated counterparts, which needs further exploration into its reasons.

The returns to education for rural male regular workers increased monotonically with an increase in the level of education, though there was a decline in the returns to secondary and graduate level of education. With almost no change in the pattern for urban male regular workers, the returns differed considerably across different levels of education. The returns for female regular workers in rural and urban India increased tremendously over time. It 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 which 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.

References

Aggarwal, Tushar (2011) *Returns to education in India: Some recent evidence,* WP-2011-017, Indira Gandhi Institute of Development Research, Mumbai.

Arrazola, Maria and Jose de Hevia (2008) Three measures of returns to education: An illustration for the case of Spain, *Economics of Education Review,* **27**: 266-75.

Azam, Mehtabul (2012) Changes in wage structure in Urban India, 1983-2004: A quantile regression decomposition, *World Development,* **40**: 1135-50.

Bakshi, Aparajita (2008) Social inequality in land ownership in India: A study with particular reference to West Bengal, *Social Scientist,* **39:** 95-116.

Becker, Gary S. (1993) *Human capital: A theoretical and empirical analysis with special reference to education,* Chicago University Press, Chicago.

Card, David (1999) The causal effect of education on earnings, in Orley Ashenfelter and David Card (eds.) *Handbook of labour economics,* North-Holand, Amstrerdam.

Chamarbagwala, Rubiana (2006) Economic liberalization and wage inequality in India, *World Development,* **34**: 1997-2015.

Chowdhury, S. (2011) Employment in India: What does the latest data show? *Economic and Political Weekly,* **46:** 431-51.

Duraiswamy, P. (2002) Changes in returns to education in India, 1983-94: by gender, age-cohort and location, *Economics of Education Review,* **21**: 609-22.

Dutta, Puja Vaseudeva (2006) Returns to education: New evidence for India, 1983-99, *Education Economics,* **14**: 431-51.

Heckman, James J. (1979) Sample selection bias as a specification error, *Economterica,* **47**: 153-61.

Ito, Takahiro (2009) Caste discrimination and transaction costs in the labor market: Evidence from rural North India, *Journal of Development Economics,* **88**: 292-300.

Kijima, Yoko (2006a) Why did wage inequality increase? Evidence from urban India 1983-99, *Journal of Development Economics,* **81**: 97-117.

Kijima, Yoko (2006b) Caste and tribal inequality: Evidence from India, 1983-1999, *Economic Development and Cultural Change,* **54**: 369-404.

Kumar, Utsav and Prachi Mishra (2008) Trade liberalization and wage inequality: Evidence from India, *Review of Development Economics,* **12**: 291-311.

Long, Mark C. (2010) Changes in the returns to education and college quality, *Economics of Education Review,* **29**: 338-47.

Madheswaran, S and Paul Attewel (2007) Caste discrimination in the Indian urban labour market: Evidence from the National Sample Survey, *Economic and Political Weekly,* **41:** 4146-53.

Mehta, Ashish and Rana Hasan (2012) The effects of trade and services liberalization on wage inequality in India, *International Review of Economics and Finance,* **23**: 75-90.

Mehta, Rajiv (2009) *Situation assessment survey for farm sector policy formulation in India,* Paper for FAO Consultation on Statistics in Support of Policies to Empower Small Farmers, accessed at http://www.fao.org/fileadmin/ templates/ess/documents /meetings_and_workshops /RAP2009/STAT-EMPOWER-6.pdf on October 14, 2012.

Psacharopoulos, George (1994) Returns to investment in education: A global update, *World Development*, **22:** 1325-43.

Trostel, Philip, Ian Walker and Paul Woolley (2002) Estimates of the economic returns to schooling for 28 countries, *Labour Economics*, **9**: 1-16.

Vatta, Kamal and B.R. Garg (2008) Rural non-farm Sector in Punjab: Pattern and access to employment and income, *Indian Journal of Agricultural Economics*, 63: 224-43.

Vatta, Kamal and R.S. Sidhu (2007) Income diversification among rural households in Punjab: Dynamics, impacts and policy implications, *Indian Journal of Labour Economics,* **50**: 723-36.

Yang, Dennis Tao (2005) Determinants of schooling returns during transition: Evidence from Chinese cities, *Journal of Comparative Economics*, **33**: 244-64.

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.
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 1987-88 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.

Appendix-II: Comparison of returns to education for casual rural male workers by OLS and median regression

Variable	OLS regression						Median regression					
	1983	1987-88	1993-94	1999-2000	2004-05	2009-10	1983	1987-88	1993-94	1999-2000	2004-05	2009-10
Primary	1.14	1.96	1.06	0.92	0.70	0.34	0.92	0.88	0.92	0.72	0.32	0.22
Middle	0.33	-1.83	-0.33	0.37	0.57	0.93	0.20	-1.93	0.07	0.33	0.40	0.87
Secondary	0.70	3.93	1.48	0.75	0.25	0.28	0.20	4.93	0.60	0.60	0.40	0.53
Graduate	5.67	-3.47	-0.80	-0.47	2.80	-1.03	9.73	-1.10	-1.20	-0.23	0.57	-1.53

Appendix-III: Comparison of returns to education for regular rural male workers by OLS and median regression

Variable	OLS regression						Median regression					
	1983	1987-88	1993-94	1999-2000	2004-05	2009-10	1983	1987-88	1993-94	1999-2000	2004-05	2009-10
Primary	3.52	4.10	3.60	3.10	3.56	2.68	3.00	2.30	3.87	2.94	4.10	2.44
Middle	3.83	2.40	3.67	3.70	4.87	5.60	4.47	5.10	4.57	2.43	3.87	5.47
Secondary	8.03	8.28	7.23	6.40	6.98	6.98	6.88	6.98	7.53	5.85	6.78	6.35
Graduate	9.57	11.73	9.93	8.00	8.57	8.97	8.93	9.47	10.03	7.80	8.50	9.50

Appendix-IV: Comparison of returns to education for regular rural female workers by OLS and median regression

Variable	OLS regression						Median regression					
	1983	1987-88	1993-94	1999-2000	2004-05	2009-10	1983	1987-88	1993-94	1999-2000	2004-05	2009-10
Primary	2.30	6.36	4.10	2.48	3.42	3.24	-	4.58	1.22	1.84	1.88	2.36
Middle	14.87	12.60	9.63	8.43	4.20	5.73	-	8.63	10.93	7.77	4.47	5.73
Secondary	16.93	12.33	13.25	16.53	14.38	15.70	-	20.30	13.28	20.63	13.30	14.70
Graduate	6.53	5.33	6.63	8.30	8.80	14.67	-	5.57	5.73	6.47	7.87	16.90

Appendix-V: Comparison of returns to education for casual urban male workers by OLS and median regression

Variable	OLS regression						Median regression					
	1983	1987-88	1993-94	1999-2000	2004-05	2009-10	1983	1987-88	1993-94	1999-2000	2004-05	2009-10
Primary	1.18	0.74	1.04	1.26	0.72	0.74	0.16	0.66	0.54	0.74	0.64	0.90
Middle	1.13	0.97	-0.60	0.30	0.57	1.30	2.07	0.37	0.60	0.53	0.57	0.43
Secondary	2.65	2.83	0.15	1.40	1.18	0.53	1.08	2.63	-0.13	0.63	0.80	0.07
Graduate	8.03	5.63	2.27	7.63	2.03	0.27	9.17	8.07	0.40	6.90	3.17	-0.80

Appendix-VI: Comparison of returns to education for regular urban male workers by OLS and median regression

Variable	OLS regression						Median regression					
	1983	1987-88	1993-94	1999-2000	2004-05	2009-10	1983	1987-88	1993-94	1999-2000	2004-05	2009-10
Primary	1.94	2.18	2.82	1.60	-0.54	6.10	2.00	2.44	1.78	2.06	2.40	1.54
Middle	4.50	4.20	3.73	4.07	11.73	4.87	4.97	3.87	4.20	3.77	2.93	2.97
Secondary	6.75	5.93	7.70	6.58	6.13	10.95	7.80	6.30	6.80	5.65	6.65	6.00
Graduate	12.03	11.47	13.87	12.50	8.37	11.73	11.53	12.03	11.80	10.30	10.47	11.03

Appendix-VII: Comparison of returns to education for regular urban female workers by OLS and median regression

Variable	OLS regression						Median regression					
	1983	1987-88	1993-94	1999-2000	2004-05	2009-10	1983	1987-88	1993-94	1999-2000	2004-05	2009-10
Primary	2.30	6.36	4.10	2.48	3.42	3.24	1.62	6.54	5.34	2.36	2.84	5.80
Middle	14.87	12.60	9.63	8.43	4.20	5.73	5.07	6.40	12.60	3.67	3.20	8.90
Secondary	16.93	12.33	13.25	16.53	14.38	15.70	6.20	11.43	14.80	9.78	10.55	16.18
Graduate	6.53	5.33	6.63	8.30	8.80	14.67	7.70	10.43	8.20	7.17	6.33	16.23

Appendix-VIII: Sectoral distribution of rural male workers in India

Sector	Year					
	1983	1987-88	1993-94	1999-00	2004-05	2009-10
Agriculture	77.5	74.5	74.1	71.4	66.5	62.8
Mining and quarrying	0.6	0.7	0.7	0.6	0.6	0.8
Manufacturing	7.0	7.4	7.0	7.3	7.9	7.0
Utilities	0.2	0.3	0.3	0.2	0.2	0.2
Construction	2.2	3.7	3.2	4.5	6.8	11.3
Secondary sector	10.0	12.1	11.2	12.6	15.5	19.3
Trade, hotels	4.4	5.1	5.5	6.8	8.3	8.2
Transport, comm.	1.7	2.0	2.2	3.2	3.8	4.1
Services	6.1	6.2	7.0	6.1	5.9	5.5
Tertiary sector	12.5	13.4	14.7	16.0	18.0	17.8
All non-agricultural	22.5	25.5	25.9	28.6	33.5	37.2

Source: National Sample Survey Organization, various rounds.

Appendix-IX: Sectoral distribution of rural female workers in India

Sector	Year					
	1983	1987-88	1993-94	1999-00	2004-05	2009-10
Agriculture	87.5	84.7	86.2	85.4	83.3	79.4
Mining and quarrying	0.3	0.4	0.4	0.3	0.3	0.3
Manufacturing	6.4	6.9	7.0	7.6	8.4	7.5
Utilities	-	-	0.1	-	-	-
Construction	0.7	2.7	0.9	1.1	1.5	5.2
Secondary sector	8.7	10.0	8.2	9.0	10.2	13.0
Trade, hotels	1.9	2.1	2.1	2.0	2.5	2.8
Transport, comm.	0.1	0.1	0.1	0.1	0.2	0.2
Services	2.8	3.0	3.4	3.7	3.9	4.6
Tertiary sector	4.8	5.3	5.6	5.7	6.6	7.6
All non-agricultural	13.5	15.3	13.8	14.7	16.8	20.6

Source: National Sample Survey Organization, various rounds.

Appendix-X: Sectoral distribution of urban male workers in India

Sector	Year					
	1983	1987-88	1993-94	1999-00	2004-05	2009-10
Agriculture	10.3	9.1	9.0	6.6	6.1	6.0
Mining and quarrying	1.2	1.3	1.3	0.9	0.9	0.7
Manufacturing	26.8	25.7	23.5	22.4	23.5	21.8
Utilities	1.1	1.2	1.2	0.8	0.8	0.7
Construction	5.1	5.8	6.9	8.7	9.2	11.4
Secondary sector	34.2	34.0	32.9	32.8	34.4	34.6
Trade, hotels	20.3	21.5	21.9	29.4	28.0	27.0
Transport, comm.	9.9	9.7	9.7	10.4	10.7	10.4
Services	24.8	25.2	26.4	21.0	20.8	21.9
Tertiary sector	55.0	56.4	58.0	60.8	59.5	59.3
All non-agricultural	89.7	91.3	91.0	93.4	93.9	94.0

Source: National Sample Survey Organization, various rounds.

Appendix-XI: Sectoral distribution of urban female workers in India

Sector	Year					
	1983	1987-88	1993-94	1999-00	2004-05	2009-10
Agriculture	31.0	29.4	24.7	17.7	18.1	13.9
Mining and quarrying	0.6	0.8	0.6	0.4	0.2	0.3
Manufacturing	26.7	27.0	24.1	24.0	28.2	27.9
Utilities	0.2	0.2	0.3	0.2	0.2	0.4
Construction	3.1	3.7	4.1	4.8	3.8	4.7
Secondary sector	30.6	31.7	29.1	29.4	32.4	33.3
Trade, hotels	9.5	9.8	10.0	16.9	12.2	12.1
Transport, comm.	1.5	0.9	1.3	1.8	1.4	1.4
Services	26.6	27.8	35.0	34.2	25.9	39.3
Tertiary sector	37.6	38.5	46.3	52.9	39.5	52.8
All non-agricultural	69.0	71.6	75.3	82.3	81.9	86.1

Source: National Sample Survey Organization, various rounds.