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IZA DP No. 11209

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ABSTRACT

Returns to Education and Female Participation Nexus: Evidence from India*

In this paper, we make an attempt to understand whether low labour market returns to education in India are responsible for low female work participation. The National Sample Survey Office (NSSO) Employment Unemployment Survey (EUS) unit level data of India for the year 2011–12 is used to examine the relationship between educational attainment and labour market participation through gender lens. Results show that women's education has a U-shaped relationship with paid work participation. The probability to participate in the paid labour market shows an increasing trend with education levels higher than compulsory secondary schooling. The labour market returns to education are insignificant and low for lower levels of education. The returns increase significantly along with the increase in educational levels. However, females have a significant lower rate of return for each year of education as compared to men in rural and urban labour markets as well. Though it has been said that increase in female enrolment in schooling is one of the reasons of the recent declining phenomenon of female participation, but our study shows that the low returns to education is another reason for their less participation. The findings therefore suggest that, women need to be educated above secondary level to become visible in the labour market.

JEL Classification: J16, J21, J82, O12, O15

Keywords: female labour force participation, market returns to education, development, India

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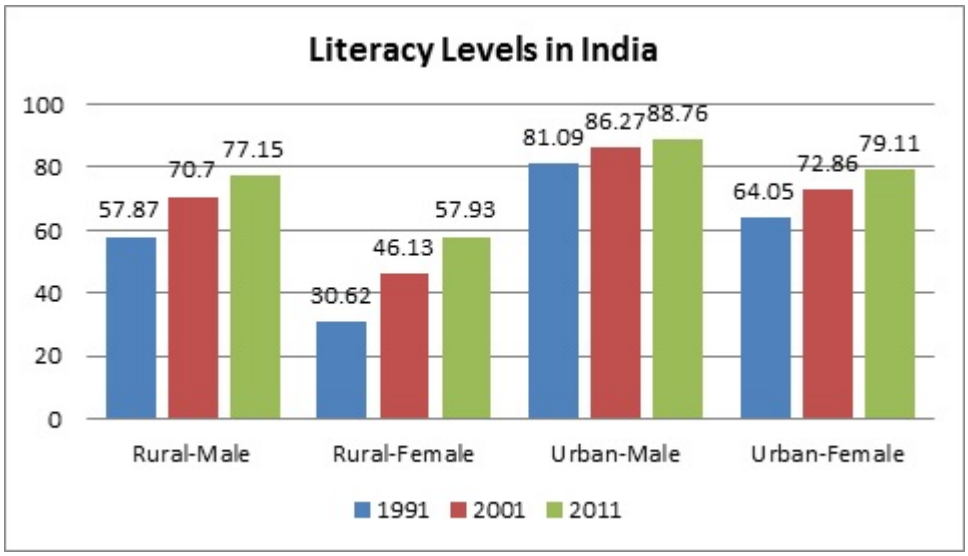
I.INTRODUCTION

Our paper adds to the literature on female work force participation in India (Ghose 2004, Masood and Ahmad 2009, Srivastava and Srivastava 2010, Mehrotra et al 2012, Shaw 2013), by providing empirical evidence on returns to education, using large scale Employment Unemployment Survey (EUS) data of National Sample Survey Office (NSSO) for the most recent period 2011-12. Estimates of the returns to education in wage employment in India by gender and location (rural–urban) are provided in this study. The most recent data collected by the NSSO, on rural and urban work participation for women reveal a decline. In the economics of education literature, an important explanation of the gender gap in education is that the labour market rewards women's education less well than men's, especially in developing countries (Kingdon, 1998). Our paper examines this argument to explain the declining work participation of women in the year 2011-12. Our aim is to study female work participation through the interlinkages between education and employment. A look at the literacy levels in India over last three decades from the rural urban lens shows us that rural literacy rate is much lower than the urban literacy rate (Figure 1). Apart from this gender disparity, it can also be noted that the urban female literacy rate is almost higher by 20% than the rural females.

Figure 1

Literacy levels in India according to Census 1991, 2001 and 2011



Source: CensusInfo India 2011

India's economic growth has rapidly increased over the past two decades (Klasen and Pieters, 2012). At the same time, the declining participation of women in work is also a well-known fact in India. Two unusual things were witnessed in the data from rounds of the National Sample Survey Office (NSSO) employment and unemployment survey since 1999–2000 (55th round). First, in 2004–05 (61st round), the work participation of rural and urban women increased by 2–3 percentage points over 1999–2000, which was contrary to the declining trend since 1983 (38th round). Second, there was a massive decrease (12 percentage points) in work participation of rural women between the 2004–05 and 2009–10 surveys. Such a decline was unprecedented in history (Mohammed Zakaria Siddiqui et al., 2017). These stylised facts raise questions about the impact of education in the labour market participation of males and females and about the differential returns to education which may be the reason behind such a decline in female work participation.

In this paper, we investigate if lower labour market returns to education in India are responsible for low female work participation in the year 2011-12. To the best of our knowledge, such a

study using the most recent NSS EUS data has not been done till now. An earlier work by Kingdon and Unni (2001) uses NSS data for the 43rd Round, i.e years 1987-88. They have studied the urban districts of two states, viz, Madhya Pradesh and Tamil Nadu; our study uses the central sample for nationally representative data, covering the entire span of rural and urban India. Our results show that the lower returns to education in the labour market discourages women workers from participating, whereas literature states that an increase in educational enrolment has caused the decline (Rangarajan et al., 2011; Kannan and Raveendran, 2012; Hirway, 2012; Neff et al., 2012; Mehrotra et al., 2014). As women become better educated, their participation in the labour force is likely to increase but many constraints keep them out of paid employment, lower returns from the labour market being one of them. The decline in women's economic activity is a cause for concern as women are valuable resources and as it implies a decline in their well-being. Women's employment is a critical factor in their progression towards economic independence and is also considered as an indicator of their overall status in society (Mammen and Paxson 2008).

The rest of the paper is structured as follows; Section II. mentions the motivation of this study, section III. provides a succinct review of literature, section IV. presents the method, section V. outlines the data, section VI. discusses the results and some concluding remarks follow in section VII.

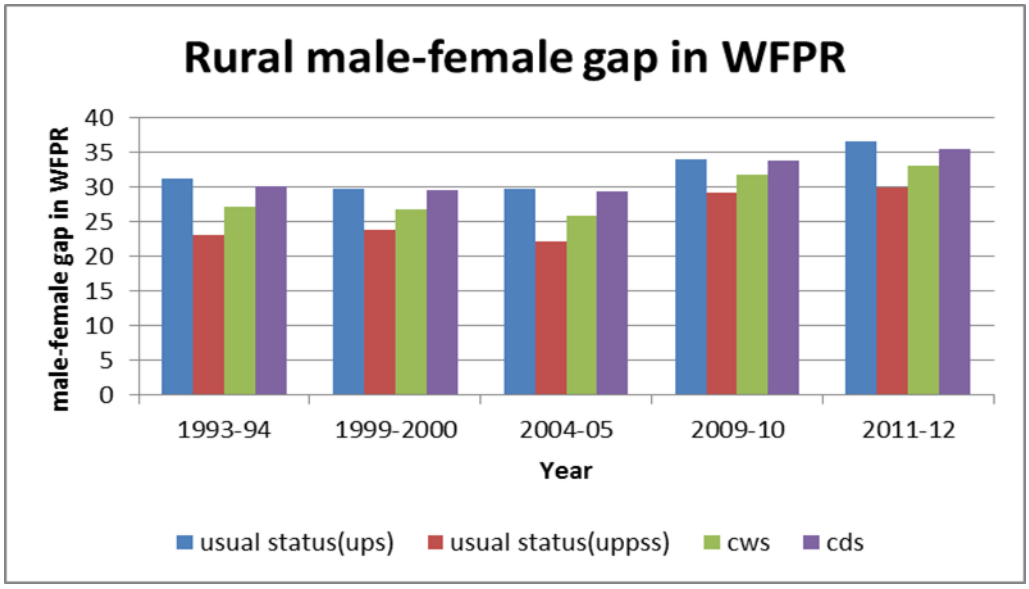
II. MOTIVATION

At less than 30 per cent, India has one of the lowest levels of female labour force participation in the world, which is the result of a complex set of demand and supply-side factors, including social norms (Verick, 2017). In contrast with global trends, India has witnessed a decline in women's employment rates over the past few decades. Such an occurrence has triggered a debate about the labour force participation rate (LFPR) of women in India (especially in rural areas) (Neff, Sen and Kling, 2012). The motivation for this research was provided by the fact that from 2009–10

(66th round) to 2011–12 (68th round), the work participation of rural women decreased by 2 percentage points while for urban women it increased by 1 percentage point (Mohammed Zakaria Siddiqui et al., 2017). Despite this, there still exists a significant gender gap in work participation. In Figure 2 and Figure 3 we highlight this gender gap in work participation that exists in rural and urban areas. The all-India participation rates decreased between 1993 and 2000, then increased again in the period between 2000 and 2005, and finally dropped again between 2005 and 2010.

Figure 2

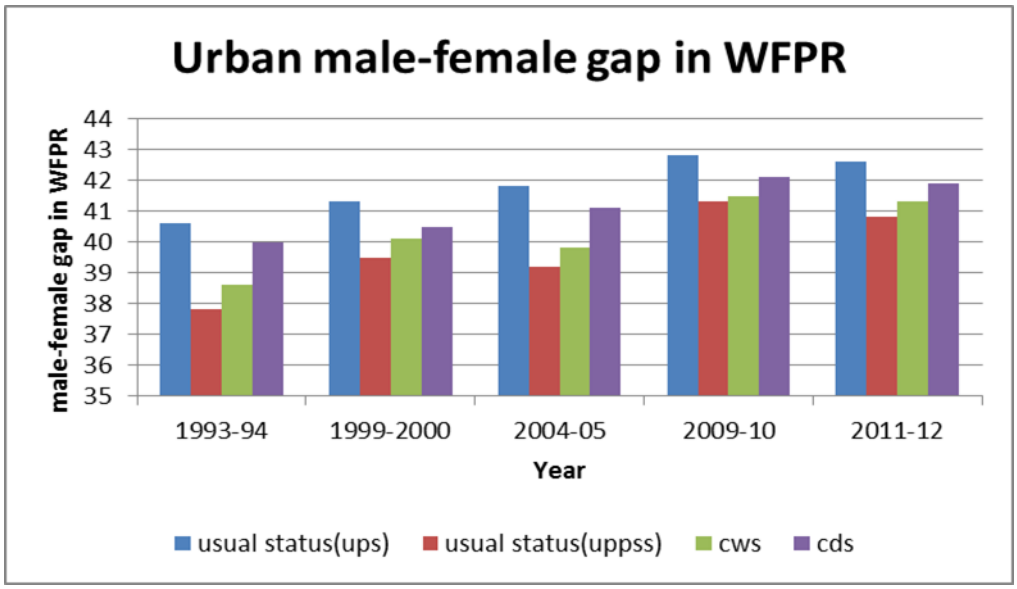
Measure of the Rural Male-Female Gap in Work Force Participation Rate



Source: Author's calculation from NSSO Employment and Unemployment Surveys: 50th Round (1993-1994),55th Round (1999-2000), 61st Round (2004-05), 66th(2009-10) and 68thRound (2011-12).

Figure 3

Measure of the Urban Male-Female Gap in Work Force Participation Rate



Source: Author's calculation from NSSO Employment and Unemployment Surveys: 50th Round (1993-1994),55th Round (1999-2000), 61st Round (2004-05), 66th(2009-10) and 68thRound (2011-12).

This decline in female labour force participation of women in India during the year 2011-12, has focused on four key explanations: a) rising educational enrolment of young women; b) lack of employment opportunities; c) effect of household income on participation; and d) measurement (Chaudhary and Verick, 2014; Kapsos, Silvermann and Bourmpoula, 2014; Mazumdar and Neetha, 2011). Over the last decade, there has been a considerable progress in increasing access to education for girls as increasing numbers of women of working age are enrolling in secondary schools. Nonetheless, the nature of economic growth has not created jobs, in large numbers, in sectors that could readily absorb women, especially for those in rural areas. Despite inadequate job creation, household incomes did rise, which potentially reduced women's participation, especially in subsidiary activities ("income effect") due to change in preferences. Finally, though most women in India work and contribute to the economy in one form or another, much of their work is not documented or accounted for in official statistics, and thus women's work tends to be under-reported.

Most studies do not quantify the relative importance of multiple factors that can explain the decline, thus prompting us to focus on the 'education effect' explanation with a different perspective. Hence, our paper extends the existing literature on women's labour force participation by quantifying one of the main determinants viz. 'education' and results prove that, inspite of an increase in literacy rate of women (as depicted in Figure 1), there is a lower rate of return for women's education in the labour market and this maybe causing decline in participation which is prevalent among all age groups. There may be a trade-off between wage employment and domestic work (Afridi, Dinkelman and Mahajan, 2016) due to the lower return in the labour market which can be an interesting extension to our present study.

III. REVIEW OF LITERATURE

The importance and effects of education on labour force participation for both men and women is a widely recognised and well-known fact by economists (Palaz, Karagal and Masatci, 2001). Numerous studies (OECD, 1989; Psacharopoulos and Tzannatos, 1991; Tansel, 1996) have found that educational attainment is a consistent and effective determinant of labour force participation rate in both developing and developed countries. It is one of the most important personal variable influencing both male and female labour force participation. The literature on human capital states that women´s labour force participation increases with education (Das and Desai, 2003). However, the strength of this relationship varies between countries; being positive (for example in developed western countries), negative (for example in South Asian countries like India) and approaching insignificance (for example in Latin American countries like Brazil). Higher returns to education for women (compared to men) are shown by several studies for different countries [Psacharopoulos,1994 (cross-country review); Chase, 1997 (Czech Republic and Slovakia); Malathy and Duraiswamy, 1993 (India) and Duraiswamy, 2000 (India)]. Human Capital theories emphasise the importance of education in employment outcomes. This is especially so for women as higher levels of education (Human Capital) would

lead to higher wages, beyond the threshold of reservation wages[1], drawing women into the labour force. Hence, female education is a key intervening variable for the achievement of several development goals (Schultz, 1994).

Analysing five Asian countries (Indonesia, Korea, Philippines, Sri Lanka and Thailand), Cameron, Dowling and Worswick (2001) find that female labour force participation rates respond differently to education across countries due to two potentially opposing effects: a wage effect and a bargaining power effect. Higher wages encourage women to join the workforce because the opportunity cost of time at home rises. However, if more education increases the relative bargaining power of women, and women prefer leisure or home production to working in the market, increasing levels of female education could lead to a fall in women's labour force participation. Moreover, even if female returns to education in the labour market rise, they may not rise fast enough to counteract the rise in the returns to education in the marriage market (Behrman et al. 1999) and in home production. For example, Lam and Duryea (1999) show that as Brazilian women get more schooling, total fertility falls and wages rise, but the share of women working does not increase. They hypothesize that in Brazil, home productivity effects are large enough to offset increases in market wages up to the first 8 years of education (Afridi, Dinkelman and Mahajan, 2016).

According to Sudarshan (2014), in India there is a U-shaped association between education and work participation, with highest levels of participation among illiterates and university educated women, in a cross-section analysis. Klasen and Pieters (2015) attribute this towards the importance of social stigma for women in low-skilled jobs. Thus, they opine that at lower levels of education women face the double dilemma of necessity to work if their household incomes are very low and at the same time face the stigma attached to working in low end

menial jobs. Low levels of education are associated with low household income and poverty acts as a driver of high work participation by women. Pradhan, Singh and Mitra (2014) conducted a household survey in 1996 and found out a U-shaped relationship between female work force participation and the educational level of the household head. Klasen and Pieters (2015) using National Sample Survey Office (NSSO) data from 1987 to 2005, trace the U-shaped relationship between education and female labour force participation in urban India. They have found out in their study that at high levels of education women face fewer constraints from their family, to participate in labour force. As women's education levels go up, they are able to participate in non-stigmatized jobs. Inspite of this fact, there is a higher level of unemployment than educated men. This could be reflective of the fact that acceptable opportunities for educated women are few, due to the mismatch of educational training and labour market requirements (Sudarshan 2014; Klasen and Pieters 2015). Munsi and Rosenzweig (2006) have pointed out that "boys are directed into existing labour networks in ways girls are not". Das (2006), using NSSO's data from 1983 to 2000, also confirms the U-shaped relationship, with higher labour participation by uneducated women and highly educated women staying out of the labour force due to an income effect. Olsen and Mehta (2006), using 1999–2000 NSSO data, also trace a U-shape relationship. Kingdon and Unni (1997) note a negative relationship between female education and labour market participation and thereby discourage families from educating the girl child because of low returns on education of women. Some more studies have found a negative relationship between the two (Das and Desai 2003; Dasgupta and Goldar 2005)

IV. METHOD

While mainly economic factors determine a man's participation in paid work, the forces that influence a woman's participation are many and diverse and include demographic, reproductive, social, religious, and cultural factors (Bettio and Villa, 1998; Guiso, Sapienza

and Zingales, 2003; Pastore and Tenaglia, 2012). Hence, the decision to participate in the labour force is influenced by women's individual preferences and/or those of her household, family circumstances. The existing literature (Klasen and Pieters 2012; World Bank 2012) suggest that important determinants of participation in India can be education (human capital endowment), family income, socio-economic and cultural factors, access to resources (skills and capital), labour market regulations, and infrastructure. The probability of participating in paid work is thus modelled in our study as a function of several explanatory variables split into categories: individual characteristics, household characteristics, social characteristics, and regional characteristics.

For the measurement of the returns to education, two variables are of importance; wages and the years of education attained. Wages are recorded in monetary units for both 'cash' and 'in-kind' income, and added together to form a total. In the questionnaires, the recall period for waged earnings is one week. Mincerian earnings functions take years of education as the measure of human capital accumulated. In the NSS samples, however, educational attainment is not recorded by years of education, but rather by level of education completed. Conversion from educational attainment categories to years of education, following Kingdon and Theopold (2008), is detailed in Table A3. In this context, educational attainment only serves as a proxy measure for the years of education completed. It does not consider any repeats. This, however, is not problematic in the context, as, the education level completed captures more accurately the level of human capital accumulated than a direct measure of years spent in schooling. The human capital hypothesis directly supports this view. However, a limitation associated with this method of conversion is the fact that high levels of education, such as postgraduate or doctoral studies, cannot be recorded. This implies a potential over-estimation of the returns of education, as high earnings associated with very high levels of education are effectively attributed to lower educational attainment. Education as a variable has thus been specified in

two ways in our analysis, viz, as a continuous variable where years of education have been considered (pure Mincerian earnings function) and as a categorical variable where we have dummies for different levels of education (extended Mincerian equation).

The standard Mincerian semi-logarithmic earnings function is used to model earnings, with modifications to take account of the possibility of endogenous sample selection using the familiar two step Heckman (1979) procedure.

The wage equation is:

$$\ln(Yi) = \beta Xi + \varepsilon i \qquad (1)$$

The basic idea of the sample selection model is that the wages are observed only for those individuals for whom $Z_i^* > 0$, where Z_i^* (the employment function), is given by:

$$Z_i^* = H_i'\alpha + \varepsilon_i \qquad (2)$$

Z_i^*, in equation (2) is a latent variable associated with employment, pertaining to paid work. Due to the lack of information regarding the hours of work, our analysis will focus on H_i', which is a vector of determinants of employment; α is the associated parameter vector and ε_i is the standard error term.

In this two-step method, initially the probabilities of paid work participation have been estimated using a probit regression. From this model, the selectivity bias correction variable is constructed which is used as an additional regressor in the earnings function in the next step.

V. DATA AND VARIABLES

The data used for analysis in this paper were collected as part of the all India quinquennial survey on Employment-Unemployment by National Sample Survey Office (NSSO). These surveys contain particularly rich data on educational attainment at the level of the individual. They also collect a wide array of data on the socio-economic characteristics of individuals including age, religion, caste and land-owned.

NSSO employs three different methods of determining the activity status of the persons. The first method identifies the Usual Principal Activity Status (called 'Usual Principal Status', UPS) of a person by using a reference period of 365 days preceding the date of survey. A person is considered as being in the Work Force if he/she is gainfully employed for a major part of the preceding 365 days. The second method considers a reference period of one week (current weekly status) and the third method considers each day of the week (current daily status). Our study is based on current weekly status. The reference period is a moving week providing an average picture for the entire year. Although ideally long-run longitudinal data are necessary to test the predictions of human capital theory, discussed above, cross-section data can be used if care is taken in interpreting the results. The analysis in this paper uses a sample of persons aged 25-59 years old.

The main sources of labour force data in India can be obtained from International Labour Organisation (ILO), Census, Indian Household Data Survey (IHDS) and National Sample Survey Office (NSSO). The NSSO sample covers both informal and formal work. This study uses the NSSO data as it provides the most recent information and is widest in coverage.

The dependent variable in the participation equation is wage or salaried employment, both regular or casual (PWP), which is binary in nature where 1 represents paid work participation (PWP) in the past week and 0=otherwise. Self-employed workers are excluded from the category of participants. Hence, the reference category is, persons not in the labour force, unemployed and self-employed persons. In the earnings equation, the dependent variable is the natural logarithm of weekly total wages.

NSS does not provide wage information for self-employment. Hence paid work participation in our data implies only those activities for which wage data is provided. Analysis captures participation in :

(a) regular salaried/wage employment and

(b) casual wage labour in public works and other types of works.

Employees are persons who work on others' enterprises and in return receive a salary or wage. A distinction is made between regular employees and casual workers. Regular employees work for a salary or wages on a relatively regular basis, whereas casual workers receive wages according to the terms and conditions of a daily or periodic wage contract which is either written or oral (Kingdon and Unni, 2001).

The independent variables used in the participation equation are the vector of individual characteristics (age, square of age, marital status and educational levels), household characteristics (landownership, monthly per capita expenditure class, presence of children under the age of 5 years in the household, presence of adults above the age of 65 years in the household), location (North, South, East, West, Central and North East), social groups, religions and interaction terms measuring the educational level of the head of household (which serves as family background in this analysis). Table A1 gives the definition of the dependent and independent variables (for the participation and earnings equations), while Table A2 gives the descriptive statistics of the variables in the participation equation. In the pure Mincerian earnings function, the independent variables represent the standard ones viz. potential work experience, potential work experience squared and education. The mean and standard deviations of the variables included in the earnings function are reported in Table A5.

VI. RESULTS

Paid work participation

Table 1 reports the specification of the probit model of wage and salaried work participation for women and men, respectively. For each gender, the table provides estimates of participation equations for urban and rural areas. Co-efficient of a unit change in a variable on the probability

of paid work participation (PWP), holding all other variables constant at their mean values are presented for females and males aged 25-59 years.

Table1

Binary Probit estimates of paid work participation for females and males aged 25-59 years, by location

	Female				**Male**			
	Urban		Rural		Urban		Rural	
Independent Variables	Coef.	R S.E.	Coef.	R.S.E	Coef.	R.S.E	Coef.	R.S.E
Age	-0.010	0.007	-0.006	0.006	-0.062	0.007***	-0.052	0.006***
Square of Age	0.000	0.000	0.000	0.000	0.001	0.000***	0.001	0.000***
Married	-0.169	0.033***	-0.035	0.038	-0.229	0.024***	-0.205	0.024***
Literate Without Formal Schooling	0.024	0.122	-0.056	0.085	0.048	0.371	-0.394	0.264
Literate Below Primary	-0.082	0.031***	-0.097	0.021***	-0.230	0.075***	-0.037	0.056
Primary	-0.086	0.027***	-0.119	0.020***	-0.193	0.064***	-0.217	0.048***
Middle School	-0.149	0.025***	-0.120	0.020***	-0.232	0.055***	-0.220	0.041***
Secondary School	-0.166	0.026***	-0.099	0.024***	-0.334	0.056***	-0.283	0.043***
Higher Secondary School	-0.061	0.029**	0.062	0.029	-0.446	0.058***	-0.271	0.046***
Graduate and Diploma	0.057	0.028**	0.150	0.033***	-0.364	0.054***	-0.200	0.045***
Post Graduate and Above	0.275	0.036***	0.252	0.056***	-0.266	0.066***	0.027	0.064
Training	0.075	0.023***	-0.060	0.022***	0.029	0.016*	-0.043	0.016***
Head of Household	0.166	0.041***	0.121	0.030***	-0.109	0.053**	-0.013	0.038
Household Head Literate without Formal Schooling	-0.018	0.299	0.175	0.248	0.169	0.389	0.188	0.281
Household Head Literate Below Primary	0.041	0.084	-0.110	0.074	0.176	0.084**	-0.037	0.061
Household Head Primary	-0.073	0.079	-0.085	0.069	0.153	0.071**	0.117	0.052**
Household Head Middle School	-0.178	0.076***	-0.090	0.067	0.082	0.062	0.056	0.046
Household Head Secondary School	-0.163	0.083**	-0.041	0.087	0.131	0.063**	0.113	0.049**
Household Head Higher Secondary	-0.213	0.103**	-0.121	0.115	0.291	0.066***	0.225	0.054***

Household Head Graduate Diploma	0.174	0.077**	0.382	0.114***	0.362	0.060***	0.382	0.052***
Household Head Post Graduate and above	0.283	0.123**	0.824	0.226***	0.420	0.074***	0.301	0.078***
Children (below age 5 years) in Household	-0.119	0.009***	-0.104	0.007***	-0.145	0.009***	-0.010	0.016
Elderly (above age 6 years) in Household	-0.162	0.016***	-0.167	0.013***	-0.137	0.016***	-0.004	0.017
Landowned	0.075	0.007***	-0.225	0.008***	0.113	0.007***	0.104	0.020***
North	0.140	0.030***	0.008	0.024	0.227	0.029***	-0.095	0.007***
South	0.331	0.028***	0.263	0.023***	0.296	0.027***	-0.105	0.013***
East	0.231	0.033***	0.040	0.026	0.236	0.032***	-0.225	0.008***
West	0.300	0.030***	0.188	0.025***	0.301	0.029***	0.033	0.023
Central	0.031	0.030	-0.168	0.023***	0.070	0.028***	0.250	0.022***
Hindu	-0.011	0.026	0.058	0.022***	0.106	0.026***	0.014	0.025
Muslims	-0.152	0.031***	-0.051	0.028*	-0.073	0.031***	0.162	0.025***
Scheduled Tribe	0.240	0.030***	0.132	0.019***	0.184	0.028***	-0.148	0.022***
Scheduled Caste	0.203	0.021***	0.209	0.016***	0.166	0.020***	0.053	0.022***
Monthly per capita expenditure (2nd quartile)	0.025	0.026	-0.033	0.016**	-0.034	0.025	-0.023	0.027
Monthly per capita expenditure (3rd quartile)	0.001	0.025	-0.046	0.017***	-0.005	0.024	0.108	0.018***
Monthly per capita expenditure (highest quartile)	0.084	0.025***	0.018	0.021	0.167	0.024***	0.201	0.016***
Constant	-0.929	0.144***	-0.349	0.125***	0.328	0.145**	0.868	0.124***

	Number of obs =46875	No. of Obs=74799	Number of obs=47793	Number of obs =74599
	Wald chi2(36)=1570.26	Wald chi2(36)=2557.72	Wald chi2(36)=2145.8	Wald chi2(36)=2765.85
	Prob> chi2=0	Prob> chi2=0	Prob> chi2=0.000	Prob> chi2=0.000
	Pseudo R2=0.037	Pseudo R2=0.0465	Pseudo R2=0.048	Pseudo R2=0.0468

Note: *, **,*** represent significance at the 10%,5% and 1% levels respectively. The base or reference category for the dependent variable is non-participation in paid work. Reference Categories for independent variables: 'Notliterate'for education level; 'HHNotLit'for the education level of household head; 'North-East' for regions; 'Other-Religions' for religion dummies; 'OBCs' for Caste; 'mpce1' for monthly expenditure level.

From table 1, it is seen that, among women, age is not a significant variable for deciding the labour supply. At all ages there is decline in participation, which refutes the fact that participation has declined in 2011-12 due to an increase in school enrolment. Had this fact been true then the decline in participation would have been restricted to the younger cohorts (25-29 years). For men, age is a significant variable and it is noticed that participation declines with age. However, this negative effect is non-linear and decreases as age increases, (implied by the the positive co-efficient of the quadratic term). This may be a reflection of informalisation of the labour market whereby younger employees are preferred over older ones. Although there has been a shift out of agriculture, construction has absorbed more workers than other sectors in recent years. A worrying fact is that, most of the new jobs being created in the formal sector are actually informal. As it is the case of most other developed and developing countries, being married have a negative impact on the propensity to do paid work. For men, it may be that marriage and its consequent responsibilities lowers the reservation wages and compels them to take up any available job (which may include self-employment). For women, marriage brings domestic and home production responsibilities, thus lowering the probability of taking up paid work[2]. Educational level of the individual has a significant impact (U-shaped) whereas the educational achievements of the household head do not impact the participation decision significantly. U-shape relationship between educational status and women's labour force participation at a given point of time emphasises the fact that among the poorly educated, women are forced to work to survive and can combine farm work with domestic duties (particularly in rural areas). Among the very highly educated, high wages induce women to work and stigmas against female employment may be low. Between these two groups, women may face barriers to labour force participation as there maybe an absence of an urgent need for

women to work (the income effect), and due to the presence of social stigmas associated with female employment (Klasen and Pieters, 2012). Figure A1 is a diagrammatic representation of this result. An increased propensity to do paid work among the backward castes in urban areas (scheduled castes and scheduled tribes) may be a manifestation of the reservation policy of Government of India[3], according to which, members of the low and backward castes have a certain proportion of seats reserved for them in wage and salaried public-sector jobs.

For men, the relationship between education and paid work is almost linear and negative, whereas for women it has a distinct U-shape[4]. The co-efficient of the education level dummies first fall and then rise monotonically. In urban areas, the rise starts from graduate level, whereas in rural areas the rise starts from higher secondary schooling level. Women without formal education levels, however show an increased propensity to work. Such a result indicates the fact that returns to education in self-employment may be higher at lower levels of education as compared to participation in paid work in the labour market. So, at low levels of income, the 'income effect' plays a strong role in influencing the labour supply decisions of women. Kingdon and Unni (2001) attribute the downward sloping part of this U to the process of Sanskritization: social restrictions on the lifestyles of women tend to become more rigid as households move up in the caste hierarchy (Chen and Drèze, 1992). The rising part of the U-curve is explained by the fact that highly educated women are pulled towards the labour market with high wages, thus strengthening the 'substitution effect' (Goldin, 1995). Women's ambitions and work aspirations change with educational levels and hence the 'substitution effect' overpowers the 'income effect' at this part of the U-curve. Another plausible explanation is the working of the 'rigidity of social hierarchies[5]' process. Such rigidity also causes a significant positive impact on the propensity to do paid work for Scheduled Castes

and Scheduled Tribes. Vocational training has a positive impact towards participation in paid work for males and females in urban areas but not so in rural areas. The difference in nature of jobs in the rural and urban areas in India may be responsible for such an outcome. Availability and access to vocational training for women is now being prioritised in the rural areas through many self-help groups.

Being head of household significantly increases the possibility of women participating in paid work. It impacts men's participation negatively but not significantly, thus implying that for men, if paid work opportunities are not available then it compels them to take up self-employment. Share of female headed households is very insignificant as compared to male headed households. For women, being the head of household brings in added responsibility which increases their propensity of doing paid work. Availability of jobs in the area and region maybe a possible instrument of inclusion in the participation equation. The regional dummies have tried to capture this effect to a certain extent. Education levels of the head of household, which is a proxy for family background has a positive impact on male paid work participation. High levels of education of the female is associated with high level of education of the head of household and a positive impact on participation in paid work, thus corroborating the modernising influence that education has on the household's mindset. Presence of dependents in the household (children under the age of 5 years and adults over the age of 65 years) has a very significant negative impact on paid work participation for females in urban and rural areas, thus emphasising the burden of care work on women. This is very interesting and shows that cultural factors are very important; it also warrants a look into the importance of institutional factors like child care facilities[6]. For males, the negative impact is significant in rural areas only. This is puzzling, as the gender division of work dictates that care for the young and aged dependents of the household is the responsibility of the females and hence might inhibit their

work participation. However, such a result has been obtained previously by three other studies of the Indian labour market, using different datasets (Divakaran, 1996; Kingdon, 1998; Kingdon and Unni, 2001). In urban areas, there is a positive impact. This emphasises the role of joint family in rural areas and nuclear families in the urban areas.

Ownership of land (proxy for the wealth availability of the household) very significantly reduces the propensity of paid work participation for males and females in rural areas[7]. It points towards the fact that people are involved in the management of their own land and property. In urban areas, wealth index of the household may not be correctly measured by the ownership of land, as it is quite possible that some households own ancestral land in the rural areas from where no income is generated. The economic class of the household as proxied by the monthly per capita expenditure[8] can be a better indicator. Results depict that men belonging to the highest quartile of monthly per capita expenditure (mpce) have a very significant positive propensity to do paid work.

Labour market Earnings

In this section, we have investigated if the returns to education differ for males and females. In other words, whether the labour market discriminates against female workers or not. The mean and standard deviations of the variables included in the earnings function are reported in Table A5. The dependent variable is the log of weekly wages. The reference category is thus, persons not having wage work during last week (at the time of the survey). Two specifications of the earnings function are presented :- (i) pure mincerian specification with education, experience and experience-squared as the independent variables only and (ii) an extended earnings function which also includes the household characteristics, social groups and religion as added regressors. Education as a variable has been specified in two ways, viz, as a continuous variable

where years of education have been considered (in the pure mincerian earnings function) and as a categorical variable where we have dummies for different levels of education.

The measure of 'potential work experience (pwe)' is calculated as follows: pwe=[age – education – 6(age at which primary schooling starts in India)], (Pastore and Verashchagina, 2004). Data relating to actual work experience is not provided by NSSO. Therefore potential work experience has been taken as measure of experience. This specification does not allow us to consider the voluntary breaks which may have been taken. Thus, it may overstate the potential work experience of females as compared to males.

Table 2

Mincerian Earnings Functions with education years for females and males

	Females		**Males**	
	Rural	Urban	Rural	Urban
Intercept	(5.295)***	(6.024)***	(5.868)***	(6.088)***
pwe	(0.035)***	(0.028)***	(0.026)***	(0.040)***
pwesq	(-0.000)***	(-0.000)***	(-0.000)***	(-0.000)***
Education	(0.182)***	(0.223)***	(0.199)***	(0.242)***
lambda	(0.267)***	(-0.145)***	(-0.216)***	(-0.520)***

Note: ***,**,* Significance at the 1%, 5% and 10% levels respectively.

Table 2 present the results of the pure Mincerian specification of the earnings function for males and females in rural and urban areas. The selectivity term lambda is well defined and highly significant in all the four earnings equations. Education has a highly significant effect on earnings for both male and female workers in the labour market. The Mincerian rate of return to education is 18.2% and 22.3% for females in rural and urban India respectively, whereas for males it is 20% and 24.2%. A potential gender gap in returns to educational attainment is evident from this study which, it is assumed, is the reason for the lower participation of females in paid work participation.

To further explore the relationship between education and earning we have relaxed the restriction of linearity implicit in table 2 and have considered the educational level dummies in the earnings equation. Table 3 shows that, with respect to no-education, non-formal education

has insignificant returns. Formal education in schools, colleges and university have significant returns. The rate of return increases with the level of education attained. Thus, returns are very significantly highest for Post Graduate and above level of education. The turning point in returns occurs at Higher Secondary Level for both males and females. Such a pattern of results on returns to education is also shown in studies on India by Kingdon and Unni (2001), Unni (1996) and Kingdon (1998).

Table 3

Mincerian Earnings Function with Education Level Dummies for females and males

	Females		**Males**	
	Rural	Urban	Rural	Urban
Intercept	(5.130)***	(5.925)***	(5.896)***	(6.410)***
pwe	(0.051)***	(0.041)***	(0.038)***	(0.048)***
pwesq	(-0.000)***	(-0.000)***	(-0.000)***	(-0.000)***
Literate Without Formal Schooling	-0.109	-0.052	-0.102	0.000
Literate Below Primary	(0.182)***	(0.186)***	(0.117)***	(0.136)***
Primary	(0.260)***	(0.288)***	(0.179)***	(0.243)***
Middle School	(0.481)***	(0.539)***	(0.330)***	(0.454)***
Secondary School	(0.787)***	(0.919)***	(0.685)***	(0.741)***
Higher Secondary School	(1.243)***	(1.230)***	(1.014)***	(1.080)***
Graduate and Diploma	(1.469)***	(1.536)***	(1.410)***	(1.509)***
Post Graduate and Above	(1.768)***	(1.838)***	(1.716)***	(1.764)***
lambda	(0.414)***	0.078	-0.025	(-0.391)***

Note: ***,**,* Significance at the 1%, 5% and 10% levels respectively.

VII. CONCLUSION

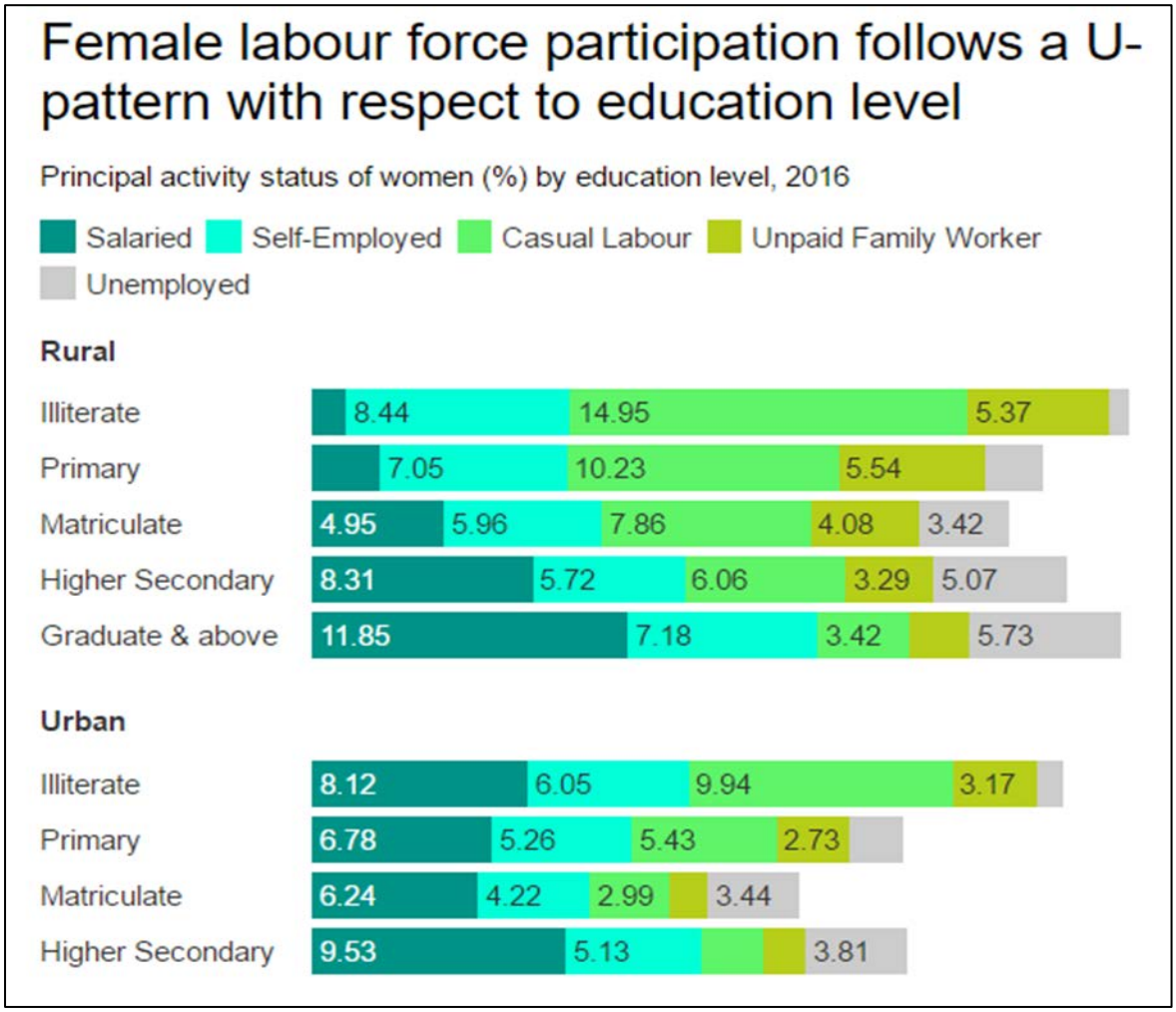
India's labour market is complex and the trends of recent decades have shown that it has been characterized by stronger employment growth in urban areas and for men. Consequently, female labour force participation in India, which is low by international standards, fell further in the 2000s. Though many interrelated and complex factors are driving the decline, including increased educational enrolment, and rising incomes, the lack of higher returns to education in the labour market appears to be a major constraint.

This study shows that women's education has a U-shaped relationship with paid work participation. Education levels higher than compulsory secondary schooling causes an increase

in propensity to take part in paid work. This is because the returns to education are insignificant and low for lower levels of education. The returns increase significantly along with the increase in educational levels. Thus, education has a strongly significant relationship with wages of both males and females in rural and urban labour market. However, women have a significant lower rate of return for each year of education as compared to men in rural and urban labour markets. This may be the reason for a decline in work participation of women, along with an increased enrolment in schooling. Policies to encourage education beyond secondary levels, for females, might enhance their paid work participation. Universalization of elementary education alone will not suffice in the economy because modern industry needs higher education. A person with a mere eight years of schooling will be disadvantaged in an economy dominated by modern industry and services. Secondary education is vital because it is in this age group that the child, particularly the girl child is extremely vulnerable and is pushed into child labour, early marriage or trafficking. Measures to improve employability have to be taken through skill development and vocational training. Removal of discrimination against women in the labour market may increase the returns to education.

APPENDIX

Figure A1: Relationship of Female Labour Force Participation and Education Levels



Source: http://www.ice360.in/events/despite-economic-progress-gender-divide-in-india-s-labour-force-remains-stark

TableA1

Definitions of variables used in the paid-work participation and earnings functions

Variable	Definition
PWP	Paid Work Participation in past week, yes=1 no=0
logwg	Log of weekly total wages
Personal Variables	
age	Age in years
agesq	Square of age
Education	Number of years of education (as defined in tableA3)
Female	Gender dummy; male=0, female=1
Male	Gender dummy; male=1, female=0

Married	Marital Status dummy; never married=0,
	married, divorced, widowed, separated=1
Training	Gained vocational training; yes=1, no=0
Not Literate	Years of education gained=0; yes=1, no=0
Literate without formal schooling	Years of education gained=1; yes=1, no=0
Literate Below Primary	Years of education gained=3; yes=1, no=0
Primary	Years of education gained=5; yes=1, no=0
Middle School	Years of education gained=8; yes=1, no=0
Secondary School	Years of education gained=10; yes=1, no=0
Higher Secondary School	Years of education gained=12; yes=1, no=0
Graduate and Diploma	Years of education gained=15; yes=1, no=0
Post Graduate and Above	Years of education gained=17; yes=1, no=0
Demographic Variables	
headofhh	Head of household; yes=1, no=0
hhschildren	Number of children <=5 years of age
hhselderly	Number of adults>=65 years of age
mpce1	Household's monthly per capita expenditure
	lowest quartile; yes=1, no=0
mpce2	Household's monthly per capita expenditure
	second quartile; yes=1, no=0
mpce3	Household's monthly per capita expenditure
	third quartile; yes=1, no=0
mpce4	Household's monthly per capita expenditure
	uppermost quartile; yes=1, no=0
Landowned	Household owns land; yes=1, no=0
North	Region dummy (according to Table A4)
South	Region dummy (according to Table A4)
East	Region dummy (according to Table A4)
West	Region dummy (according to Table A4)
Central	Region dummy (according to Table A4)
North East	Region dummy (according to Table A4)
Hindu	Religion dummy; yes=1, no=0
Muslims	Religion dummy; yes=1, no=0
Other-Religions	Religion dummy; yes=1, no=0
Scheduled Tribe	Social Group dummy; yes=1, no=0
Scheduled Caste	Social Group dummy; yes=1, no=0
Other Backward Castes(OBC)	Social Group dummy; yes=1, no=0
Rural	Location dummy; yes=1, no=0
Urban	Location dummy; yes=1, no=0
HHNotLit	Interaction headofhh*NotLiterate
HHLitwithoutFS	Interaction headofhh*LiterateWithoutFormalSchooling
HHLitBP	Interaction headofhh*LiterateBelowPrimary
HHPrimary	Interaction headofhh*Primary
HHMS	Interaction headofhh*MiddleSchool
HHSS	Interaction headofhh*SecondarySchool
HHHS	Interaction headofhh*HigherSecondarySchool
HHGrDip	Interaction headofhh*GraduateandDiploma
HHPG	Interaction headofhh*PostGraduateandAbove

pwe	Years of potential work experience=age-education-6
pwesq	Square of pwe
lambda	Selectivity term, Inverse of Mill's Ratio

TableA2

Descriptive Statistics of the variables used in paid-work participation function

	Females age 25-59			**Males age 25-59**		
	All	Non-Participants	Participants	All	Non-Participants	Participants
Variable		Mean			Mean	
age	38.420	38.295	39.077	38.867	38.887	38.773
	(9.579)	(9.569)	(9.605)	(9.498)	(9.419)	(9.858)
agesq	1567.816	1558.089	1,619.342	1600.880	1600.953	1600.541
	(775.760)	(775.590)	(774.650)	(773.460)	(767.420)	(801.160)
Married	0.965	0.968	0.955	0.900	0.909	0.858
	(0.183)	(0.177)	(0.208)	(0.300)	(0.288)	(0.349)
Training	0.082	0.081	0.090	0.183	0.181	0.192
	(0.275)	(0.273)	(0.286)	(0.387)	(0.385)	(0.394)
NotLiterate	0.335	0.332	0.346	0.155	0.153	0.166
	(0.472)	(0.471)	(0.476)	(0.362)	(0.360)	(0.372)
LiterateWi~g	0.005	0.005	0.005	0.004	0.004	0.004
	(0.070)	(0.070)	(0.067)	(0.064)	(0.065)	(0.063)
LiterateBe~y	0.094	0.095	0.087	0.084	0.084	0.084
	(0.291)	(0.293)	(0.282)	(0.278)	(0.278)	(0.278)
Primary	0.123	0.125	0.110	0.124	0.124	0.119
	(0.329)	(0.331)	(0.314)	(0.329)	(0.330)	(0.324)
MiddleSchool	0.156	0.160	0.135	0.190	0.194	0.168
	(0.363)	(0.367)	(0.342)	(0.392)	(0.396)	(0.374)
SecondaryS~l	0.116	0.119	0.102	0.157	0.162	0.135
	(0.321)	(0.324)	(0.303)	(0.364)	(0.369)	(0.341)
HigherSeco~l	0.072	0.071	0.073	0.106	0.109	0.094
	(0.258)	(0.258)	(0.260)	(0.308)	(0.312)	(0.292)
Graduatean~a	0.074	0.069	0.099	0.139	0.132	0.169
	(0.262)	(0.254)	(0.299)	(0.345)	(0.338)	(0.375)
PostGradua~e	0.025	0.022	0.042	0.040	0.036	0.060
	(0.157)	(0.146)	(0.201)	(0.197)	(0.186)	(0.238)
mpce1	0.226	0.231	0.197	0.224	0.233	0.185
	(0.418)	(0.421)	(0.398)	(0.417)	(0.423)	(0.389)
mpce2	0.244	0.248	0.227	0.246	0.253	0.213
	(0.430)	(0.432)	(0.419)	(0.431)	(0.435)	(0.410)
mpce3	0.258	0.261	0.243	0.258	0.261	0.239
	(0.438)	(0.439)	(0.429)	(0.437)	(0.439)	(0.427)
mpce4	0.272	0.261	0.333	0.272	0.253	0.362
	(0.445)	(0.439)	(0.471)	(0.445)	(0.435)	(0.481)
hhschildren	0.648	0.681	0.475	0.675	0.713	0.497
	(0.929)	(0.951)	(0.781)	(0.933)	(0.955)	(0.799)
hhselderly	0.214	0.226	0.150	0.213	0.226	0.149

	(0.495)	(0.508)	(0.411)	(0.500)	(0.515)	(0.418)
Landowned	2.614	2.629	2.534	2.642	2.650	2.607
	(0.804)	(0.802)	(0.813)	(0.820)	(0.812)	(0.855)
North	0.165	0.167	0.150	0.165	0.165	0.165
	(0.371)	(0.373)	(0.357)	(0.371)	(0.371)	(0.371)
South	0.221	0.207	0.297	0.209	0.196	0.273
	(0.415)	(0.405)	(0.457)	(0.407)	(0.397)	(0.445)
East	0.104	0.103	0.110	0.105	0.104	0.110
	(0.305)	(0.304)	(0.110)	(0.307)	(0.306)	(0.313)
West	0.120	0.116	0.141	0.124	0.120	0.143
	(0.325)	(0.320)	(0.348)	(0.330)	(0.325)	(0.350)
Central	0.246	0.260	0.177	0.249	0.263	0.184
	(0.431)	(0.438)	(0.381)	(0.432)	(0.440)	(0.387)
NorthEast	0.144	0.148	0.124	0.147	0.152	0.125
	(0.351)	(0.355)	(0.330)	(0.354)	(0.359)	(0.331)
Hindu	0.745	0.739	0.774	0.749	0.742	0.781
	(0.436)	(0.439)	(0.418)	(0.433)	(0.437)	(0.414)
Muslims	0.136	0.141	0.106	0.134	0.139	0.110
	(0.342)	(0.348)	(0.308)	(0.134)	(0.346)	(0.312)
OtherRelig~s	0.120	0.120	0.120	0.117	0.119	0.110
	(0.325)	(0.325)	(0.325)	(0.321)	(0.323)	(0.312)
ST	0.136	0.136	0.138	0.139	0.140	0.133
	(0.343)	(0.343)	(0.345)	(0.346)	(0.347)	(0.339)
SC	0.149	0.140	0.195	0.151	0.143	0.190
	(0.356)	(0.347)	(0.396)	(0.358)	(0.350)	(0.393)
OBC	0.393	0.397	0.369	0.389	0.392	0.373
	(0.488)	(0.489)	(0.483)	(0.488)	(0.488)	(0.484)
headofhh	0.076	0.071	0.105	0.700	0.693	0.734
	(0.265)	(0.257)	(0.306)	(0.458)	(0.461)	(0.442)
HHNotLit	0.031	0.029	0.045	0.131	0.130	0.139
	(0.175)	(0.167)	(0.208)	(0.338)	(0.336)	(0.346)
HHLitwitho~S	0.001	0.000	0.001	0.004	0.004	0.004
	(0.022)	(0.021)	(0.027)	(0.061)	(0.061)	(0.060)
HHLitBP	0.008	0.007	0.010	0.069	0.069	0.069
	(0.088)	(0.086)	(0.099)	(0.254)	(0.254)	(0.254)
HHPrimary	0.009	0.009	0.011	0.095	0.095	0.094
	(0.095)	(0.094)	(0.104)	(0.293)	(0.293)	(0.291)
HHMS	0.011	0.011	0.011	0.129	0.132	0.115
	(0.103)	(0.103)	(0.105)	(0.335)	(0.338)	(0.319)
HHSS	0.007	0.007	0.007	0.102	0.105	0.092
	(0.082)	(0.081)	(0.085)	(0.303)	(0.306)	(0.290)
HHHS	0.004	0.004	0.004	0.063	0.063	0.063
	(0.060)	(0.060)	(0.065)	(0.242)	(0.242)	(0.242)
HHGrDip	0.005	0.004	0.011	0.082	0.075	0.116
	(0.069)	(0.059)	(0.105)	(0.275)	(0.264)	(0.116)
HHPG	0.001	0.001	0.004	0.025	0.021	0.042
	(0.036)	(0.028)	(0.064)	(0.155)	(0.143)	(0.201)
N	121674	102351	19323	122392	100842	21550

Note: The figures in parentheses are standard deviations.

TableA3

Transformation of education coding to years of education

Educational Attainment Code	NSS Code	Imputed Years Of education
Not Literate	1	0
Literate through attending NFEC/AEC, TLC or others	2,3,4	1
Literate, but below primary	5	3
Primary	6	5
Middle	7	8
Secondary	8	10
Higher Secondary	10	12
Graduate and Diploma	11,12	15
Post Graduate and above	13	17

Source: Kingdon and Leopold, 2008; Table 1. Note: NFEC = Non-Formal Education Centre, TLC = Total Literacy Campaign, AEC = Alternative Education Centre

Table A4

Regions and States

Region	States
North	Haryana, Himachal-Pradesh, Jammu-Kashmir,Punjab
	Rajasthan, Chandigarh, and Delhi.
South	Andhra-Pradesh, Karnataka, Kerala, Tamil-Nadu,
	Lakshadweep and Puducherry
East	Orissa, West-Bengal, Andaman&Nicobar Islands.
West	Goa, Gujarat, Maharashtra, Dadra&Nagar Haveli,
	Daman& Diu
Central	Bihar, Madhya-Pradesh, Uttar-Pradesh, Chhattisgarh,
	Jharkhand and Uttarakhand
North-East	Arunachal-Pradesh, Assam, Manipur, Meghalaya,
	Mizoram, Nagaland, Sikkim, and Tripura

Source: NSSO Unit Level Data, 68th Round

Table A5

Descriptive Statistics of Variables used in Earnings Function

	Rural Males		Urban Males		Rural Females		Urban Females	
Variable	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev	Mean	Std. Dev
logwg	7.005	0.931	7.464	0.976	6.952	0.916	7.450	1.026
pwe	26.325	10.713	24.771	10.224	27.712	11.178	25.641	10.989
pwesq	807.796	610.177	718.121	552.383	892.908	664.241	778.230	615.684
education	4.632	2.294	5.625	2.274	3.384	2.305	4.772	2.536
Married	0.915	0.280	0.877	0.329	0.974	0.160	0.952	0.213

LiterateWi~g	0.005	0.069	0.003	0.056	0.006	0.075	0.004	0.060
LiterateBe~y	0.098	0.297	0.063	0.243	0.105	0.307	0.075	0.264
Primary	0.139	0.346	0.099	0.298	0.132	0.339	0.109	0.312
MiddleSchool	0.199	0.399	0.176	0.380	0.151	0.359	0.164	0.370
SecondaryS~l	0.153	0.360	0.165	0.371	0.097	0.296	0.148	0.355
HigherSeco~l	0.096	0.294	0.123	0.329	0.053	0.225	0.101	0.301
Graduatean~a	0.097	0.296	0.203	0.402	0.039	0.194	0.130	0.336
PostGradua~e	0.025	0.156	0.064	0.245	0.011	0.104	0.048	0.213
Training	0.168	0.374	0.207	0.405	0.077	0.266	0.092	0.289
headofhh	0.702	0.458	0.698	0.459	0.071	0.256	0.085	0.279
HHLitwitho~S	0.004	0.064	0.003	0.054	0.000	0.022	0.001	0.023
HHLitBP	0.082	0.274	0.050	0.218	0.007	0.086	0.009	0.092
HHPrimary	0.108	0.310	0.075	0.263	0.009	0.092	0.010	0.100
HHMS	0.134	0.340	0.121	0.326	0.010	0.097	0.013	0.112
HHSS	0.095	0.293	0.114	0.318	0.005	0.069	0.010	0.098
HHHS	0.052	0.222	0.079	0.269	0.003	0.051	0.005	0.073
HHGrDip	0.053	0.224	0.129	0.335	0.002	0.047	0.009	0.093
HHPG	0.013	0.115	0.042	0.201	0.000	0.022	0.003	0.051
hhschildren	0.726	0.966	0.595	0.874	0.693	0.967	0.576	0.860
hhselderly	0.221	0.509	0.199	0.486	0.219	0.499	0.206	0.486
Hindu	0.758	0.428	0.736	0.441	0.755	0.430	0.728	0.445
Muslims	0.118	0.323	0.158	0.365	0.121	0.326	0.160	0.367
ST	0.172	0.377	0.088	0.283	0.167	0.373	0.088	0.283
SC	0.164	0.370	0.132	0.339	0.162	0.369	0.128	0.334
lambda	1.600	0.260	1.395	0.254	1.634	0.259	1.470	0.223

Notes

1. In a model involving possible labour force participation, the reservation wage rate is the minimum wage rate at which an agent will accept employment. The reservation wage rate is generally greater than zero because the agent's alternatives to paid employment have positive value. The alternatives might be taking care of children (rather than paying for child care services), pursuing education, or simple leisure.

2. Some of the covariates are likely to be endogenous as there might be underlying factors simultaneously affecting the covariates and the dependent variable. This might particularly be the case for marital status and number of children. Such endogeneity will bias the coefficients on marital status and children downwards (as the marriage decision and the decision to have children might be jointly determined with the decision not to work). When interpreting the coefficients, we must keep in mind these potential biases (Klasen and Pieters, 2012).

3. Reservation to job placements and enrollment in Education in India is an action designed to improve the well-being of backward and under-represented communities defined primarily by their caste. It's a phenomenon that commenced with the coming into force of the Indian Constitution. This reservation system is also applicable to entry in to Government Service.

4. Kingdon and Unni (2001), Kingdon (1998) also find a U-shaped relationship between education and paid work participation in two separate studies involving urban areas of Uttar Pradesh and Tamil Nadu.

5. In India, women from low educated, low income and low caste households can work (even in menial jobs) without facing disapproval from the society. Caste and Class diktats, however, forbid women from highly educated, high income class and high caste households from doing such work. This is the 'Sanskritisation' process.

6. In an attempt by the central government of India to make the community creche dream a reality for working women of all strata and enhance access by bringing it closer to home and work space, the ministry of women and child development is in the process of finalising a National Programme for Creche and Day Care Facilities. The draft proposes that creche facilities meant for children of age six months to six years should not be more than one and half kilometres from either the home of child or the workspace of mother (http://timesofindia.indiatimes.com/india/national-creche-policy-to-bring-day-care-closer-to-home/articleshow/57928206.cms)

7. In a previous study by Kanjilal, 2016, it has been established that an increase in land ownership causes an increased participation in self-employment for males and females in rural areas (especially unpaid work in household farms, for women).

8. NSSO does not provide data on income levels

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