Education and women's labour market outcomes in India

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Abstract

In this paper we pose the question: to what extent is education responsible for the differential labour market outcomes of women and men in urban India. In particular, we investigate the extent to which education contributes to women's observed lower labour force participation and earnings than men, and whether any contribution of education to the gender wage differential is explained by men and women's differential educational endowments or by labour market discrimination. Our findings suggest that women do suffer high levels of wage discrimination in the Indian urban labour market, but that education contributes little to this discrimination: the wage-disadvantage effect of women's lower years of education than men is entirely offset by the wage-advantage effect of women's higher returns to education than men's. The data also indicate that for both men and women, returns to education rise with education level, confirming the findings of other recent educational rate of return studies in India and elsewhere.

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I. Introduction

It is well documented in India that women acquire substantially less education than men. This is clear not only from adult literacy rates and figures for average years of education among men and women - which reflect past educational achievements - but also from enrolment figures, which signal the more current position[1]. It is also well known that women's labour force participation and earnings are both considerably lower than men's in India. For example, according to National Sample Survey (NSS) data from the Fourth Quinquennial Survey of Employment and Unemployment, in urban Madhya Pradesh, women's participation in wage work was only 21% that of men's and, once in waged work, their average daily wage was only 64% that of men. The corresponding figures for another large state, Tamil Nadu, were 30% and 54%. These stylized facts raise the question: to what extent is education responsible for the differential labour market outcomes of women and men. In this paper, we want to investigate the extent to which education contributes to women's observed lower earnings than men, and whether any contribution of education to the gender wage differential is explained by men and women's differential educational endowments or by labour market discrimination.

While it is believed that schooling generally has important effects on people's labour market outcomes such as labour force participation and earnings, the nature of the relationship between schooling and each of these outcomes is not well known. For example, it is not well understood whether the relationship between women's education and labour force participation is linear or whether there are certain threshold levels of education above which women are much more likely to be labour market workers. Such understanding would be useful in education and labour market policy making.

[1] Data from the National Sample Survey's (NSS) Fourth Quinquennial survey of employment and unemployment show that women's average years of schooling in 1987-88 was only about 65% of men's in urban Madhya Pradesh and Tamil Nadu. In rural areas, the gender gap is likely to be worse. According to the 1991 census, the literacy rate of women in the 7+ age group at 39% was only three fifths of the literacy rate of men in that age group (64%) (Drèze and Sen, 1995, p112). Moreover, according to 1987-88 NSS data, the proportion of children attending school in the 10-14 age group was 42% among girls and 66% among boys in India (Drèze and Sen, *op cit*).

Apart from the substantial non-market gains of female education, it is thought that many of the benefits of women's education accrue via its role in enhancing women's propensity to work in the labour market[2]. However, in the few empirical studies of women's labour force participation (lfp) in India, there is no consistent evidence of a positive relationship between education of females and their probability of lfp. For example, while Duraisamy (1988) and Nirmala *et al* (1992) find a negative relationship between women's education and their lfp in rural and urban India respectively, Mathur (1994) finds a U-shaped relationship. Moreover, some of the studies suffer from certain drawbacks such as non-random samples, the use of linear probability models, and use of aggregate data[3]. The research here contributes to the econometric evidence in India on this important issue, using a method and data that overcome some of these shortcomings.

Knowledge of the relationship between education and *earnings* is also useful for discovering whether the rates of return to education differ for men and women. Such evidence suggests whether boys and girls face different economic incentives to acquire schooling or, since parents make schooling decisions, whether parents face different economic incentives to educate their sons and daughters. Moreover, it allows us to test whether any of the gender wage gap is discriminatory. While a few studies now exist that calculate rates of return to education in India in a statistically consistent manner, empirical research on sex-discrimination in wages is rare. Moreover, all past studies appear to be based on small datasets collected from single districts in single states or are based on aggregate data. The present study uses state-wide representative household data from two large states - Madhya Pradesh and Tamil Nadu - collected by the NSS.

[2] For example, if educated women have higher work aspirations than uneducated women, they may choose lower fertility than uneducated women. Also, a greater proportion of women's income is spent on child goods so that women's labour market work may have particular benefits for child quality (see Haddad, Hoddinott and Alderman 1994). Further, the economic rate of return to education is thought to be at least as high for women as for men (Schultz 1993).

[3] For example, Nirmala *et al*'s study chose 25 labour force participants and 100 non-labour force participants in urban Pondicherry for the urban labour force participation equation. Apart from being non-random, the sample is

Sections II, III, and IV describe the data, method, and the variables respectively. Labour force participation and the determination of wages are analysed in sections V and VI respectively. Section VII decomposes the gross gender wage gap into 'explained' and 'discrimination' components and the final section concludes.

II. The Data

The data used in this study are taken from the NSS Organisation's Fourth Quinquennial Survey of Employment and Unemployment collected during 1987-88 (43rd Round). While the data under this survey were collected nationally, we have available data on employment and unemployment only from the urban districts of two states: Madhya Pradesh (MP) and Tamil Nadu (TN). The survey covered 2952 households in urban MP and 4222 households in urban TN, yielding a sample of 15055 individuals in MP and of 18681 individuals in TN.

The survey collected data on gainful and non-gainful activities undertaken by individuals and on wage earnings of employees during the 7 days preceding the date of the survey. On a nation-wide basis, very few sources collect information on wages or on incomes accruing to workers. The survey was spread over the entire year, from July 1987 to June 1988, divided into four sub-rounds of three months each. The sample was distributed over the four sub-rounds in a manner so as to provide equally valid estimates for the country for each of the four sub-round periods separately and also for the whole year. The reference period was thus a moving week providing an average picture for the entire year. The analysis in this paper is restricted to adult males and females between 15 and 64 years of age, that is, on 9093 persons in MP and 11966 persons in TN.

The occupational distribution of the sample by daily status is presented in Table 1. Using the "current daily status approach", the NSS recorded upto two activity statuses on each day of the reference week

likely to be too small to allow reliable inferences. Mathur (1994) uses district-level aggregated data from the 1971

for persons pursuing more than one activity. While the data show that approximately 20% of the population reported more than one activity status, for our purposes, we have taken the first activity, *i.e.*, in which the person spent the major time, as the daily status activity of the person.

The difference in the labour force participation rates by gender in Table 1 is striking: 19% for women and 80% for men in MP; 30% for women and 87% for men in TN. The participation rates are also higher, particularly for women, in urban TN compared to MP. Women's labour force participation rate ranges from 19% in MP to 30% in TN, and men's from 80% in MP to 87% in TN.

A relatively large proportion of men and women are engaged in self employed activities even in urban areas. Self employed persons are engaged on their own farms or family non-farm enterprises. They also include unpaid family workers who are not paid in cash nor receive any share in earnings, but get food and shelter as members of the household.

Table 1 - approximately here

Employees, on the other hand, are persons who work on others' enterprises and get in return 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 employees get wages according to the terms and conditions of a daily or periodic wage contract, mostly oral.

Among the employed persons, the proportion of employees, both regular and casual together, is the highest among men in TN (65 per cent) and lowest among women in MP (nearly 50 per cent). Among the employees, while the share of regular employees is about 60 per cent among women in both states, it is 73 and 83 per cent among men in TN and MP respectively.

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census, rather than recent, individual-level data.

The analysis of wage-work participation and earnings functions in this paper refer to the participation and earnings of employees, both regular and casual, in the sample. While this sub-sample constitutes 42 and 52 per cent of the sample population among men in the two states, it constitutes only 9 and 16 per cent of the women in MP and TN.

III. Method

Education and labour force participation

While modelling the choice of lfp is an important exercise in its own right - suggesting the way in which education influences people's participation in the labour market - it is also needed for the consistent estimation of earnings functions. Modelling participation in employment is the first step of the Heckman correction (Heckman, 1979): probabilities predicted by the work-participation model are used to derive the selectivity term that is used in the earnings function.

Following most applied work, we adopt the standard work force participation model derived from the neo-classical theory of labour supply. Individuals base their decision to participate in the labour market upon their evaluation of a reservation wage, say E_r, which may be interpreted as the opportunity cost of working or the value put on leisure or on non-market work. Individuals will only enter the labour market if the wage offer (E) exceeds the reservation wage. Thus, working individuals, *i.e*. individuals for whom wages are observed are those for whom $E>E_r$. For non-working persons, $E<=E_r$.

Let I^* be the net benefit of working. That is,

$$I^* = E - E_r \qquad (1)$$

I^* is a function of a set of variables W which affect either the wage offer or the reservation wage or both. This can be expressed as

$$I_i^* = \gamma W_i + \varepsilon_i \qquad (2)$$

where γ is a vector of coefficients and ε a stochastic disturbance term. As I^* is unobserved, we define an indicator variable I such that I=1 when an individual is observed to be a labour force participant, and I=0 when an individual is not a labour force participant. Thus, individuals are faced with a dichotomous choice:

$$I_i = 1 \text{ if } I_i^* > 0 \Rightarrow \gamma W_i + \varepsilon_i > 0$$

$$I_i = 0 \text{ if } I_i^* \leq 0 \Rightarrow \gamma W_i + \varepsilon_i \leq 0 \qquad (3)$$

Thus, the sample selection rule (SSR) for work force participation is that

$$I^* > 0$$

$$\Rightarrow \quad \gamma W_i + \varepsilon_i > 0$$

$$\Rightarrow \quad \varepsilon_i > -\gamma W_i \qquad (4)$$

If it is assumed that ε is normally distributed with zero mean and unit variance, then the choice between participation or not can be written as a probit model[4] where the probability of participation is given by

$$pr(I_i = 1) = pr(I^*_i > 0) = pr(\gamma W_i + \varepsilon_i > 0)$$

$$= pr(\varepsilon_i > -\gamma W_i)$$

$$= \Phi(-\gamma W_i) \qquad (5)$$

where $\Phi(.)$ is the normal distribution function. This probability can be estimated using maximum likelihood methods (see Greene 1993 for a discussion of these methods) . Since the choice under consideration is dichotomous - participation or not - a binary formulation of the probit is used.

Education and earnings

It is desired to estimate the rate of return to education separately for men and women in an

4 Under alternative assumptions about the distribution of the error term in equation (2), the logit model can also be employed to predict probabilities of work force participation; however, we intend to use the probit model which is

unbiased fashion. This involves the correction for sample selection into paid employment. We will employ the standard Mincerian semi-logarithmic earnings function to investigate the determinants of earnings but we modify it to take account of the possibility of sample selection. A simple least squares model of earnings is inadequate if persons for whom earnings are observed are not a random draw from the population but a self-selected group. This is plausible if more highly ambitious or motivated persons are more likely to be in the paid work force than persons with lower levels of these unobserved qualities. With self-selected samples, the mean value of the error term in the earnings equation may not equal zero, violating a basic assumption of the classical OLS model. More seriously, the error term may be correlated with the included variables, leading to biased estimates.

In order to correct for the possibility of sample selection we estimate selectivity-corrected earnings functions using the Heckman two step procedure. Let the earnings function be

$$LnY_i = \beta X_i + u_i \tag{6}$$

where lnY_i is the natural log of earnings of the ith worker, X is a vector of variables that influence earnings, β is a vector of coefficients and u an error term representing unobserved traits.

However, lnY is observed only for individuals who participate in paid work, that is, who are a self-selected or hierarchially selected group[5]. Taking the expectation of lnY in equation (6) given the sample selection rule (SSR) in equation (4),

$$\begin{aligned} E(LnY_i|SSR) &= \beta X_i + E(u_i|SSR) \\ E(LnY_i|\varepsilon_i > -\gamma W_i) &= \beta X_i + E(u_i|\varepsilon_i > -\gamma W_i) \end{aligned} \tag{7}$$

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the discrete choice model most used in applications of the Heckman correction described in the next section.

5 It is not possible in our model to distinguish between the two reasons for not being in the labour force, namely unemployment and preferences, since their effects are not readily separable. Those people who prefer to work rather than stay at home are 'self-selected'. If there is no full-employment, employers may offer work on the basis of certain traits and attributes of applicants, that is 'hierarchial selection'.

If there is any correlation between the unobserved influences on work participation (ε_i) and the unobserved influences on earnings (u_i) *i.e.* if Corr(ε_i, u_i) ≠ 0 then $E(u_i|\varepsilon_i) \neq 0$. Heckman (1979) shows that under the assumption that ε_i and u_i are jointly distributed as bivariate normal with zero means, variances σ_ε^2 and σ_u^2 and covariance $\sigma_{u\varepsilon}$,

$$E(u_i|\varepsilon_i > -\gamma W_i) = c\lambda_i \tag{8}$$

where $$\lambda_i = \phi(\gamma W_i) \Big/ \Phi(\gamma W_i) \tag{9}$$

and $$c = \sigma_u(\sigma_{u\varepsilon} / \sigma_u \sigma_\varepsilon) \tag{10}$$

$\phi(.)$ is the standard normal density and $\Phi(.)$ the normal distribution function. λ_i is the inverse of the Mill's ratio and it is a monotone decreasing function of the probability that an observation is selected into the participants' sub-sample.

Following Heckman (1979), the earnings equation (6) can be corrected for sample selection by estimating λ_i from the predicted probabilities of the work-participation model, and then including it in (6) so that

$$LnY_i = \beta X_i + c\lambda_i + v_i \tag{11}$$

where v_i is the new error term such that E(v_i|SSR) = 0 and v_i is uncorrelated with *X*. This method of correcting for sample selectivity has come to dominate the literature in applications where selected samples are used, such as samples of working women, of migrants, of home owners (rather than renters), of persons who ever enrolled in education *etc*. We will apply the Heckman correction in our earnings functions by estimating the lambda term from the paid work participation model of the next section. Identification of lambda is achieved by plausible exclusion restrictions, as discussed below.

Decomposition of the gender wage gap

Assume that the mean earnings of females (*f*) are $\overline{Y}_f$ and those of males (*m*) are $\overline{Y}_m$. Mean earnings are determined by

$$\overline{Y}_i = \hat{b}_i \overline{X}_i \qquad\qquad i = f,m$$

where $\overline{X}$ is the vector of the mean values of characteristics and $\hat{b}$ is the vector of estimated coefficients of the earnings function.

The mean earnings of men, if they earned according to the women's earnings function would be the dot product $\hat{b}_f \overline{X}_m$. The total gender difference (*T*) in mean earnings can be divided into the part explained (E) by the different personal characteristics of men and women and the part unexplained (D), reflecting differences in the earnings structure, that is, differences in $\hat{b}$ for the two sexes.

$$T = \overline{Y}_m - \overline{Y}_f$$

$$T = \hat{b}_m \overline{X}_m - \hat{b}_f \overline{X}_f$$

$$T = \left\{\overline{X}_m (\hat{b}_m - \hat{b}_f)\right\} + \left\{\hat{b}_f (\overline{X}_m - \overline{X}_f)\right\}$$

$$T = D + E$$

This can be referred to as standardising by male means. Similarly, the estimation of the earnings of women if they are paid according to the men's earnings function permits the decomposition into D + E as follows:

$$T = \overline{Y}_m - \overline{Y}_f$$

$$T = \hat{b}_m \overline{X}_m - \hat{b}_f \overline{X}_f$$

$$T = \left\{\overline{X}_f (\hat{b}_m - \hat{b}_f)\right\} + \left\{\hat{b}_m (\overline{X}_m - \overline{X}_f)\right\}$$

$$T = D + E$$

This can be referred to as standardising by female means. Since the decomposition may be sensitive to the choice of index (standardising according to male means or female means), ideally

both decompositions should be carried out.

IV. Variable Specification

The dependent variable in the participation equation is wage or salaried employment, both regular or casual (EMPLOYEE). The definitions of the variables used in the earnings functions are presented in Table 2. Self employed workers are excluded from the category of participants. The reference category is, thus, persons not in the labour force, unemployed and self employed persons.

Table 2 - approximately here

The education variable has been included in two ways in the participation choice model. It has been specified simply as the years of education (EDUYRS) and also with education splines. The five education splines included are literate (LIT), those who completed primary school (PRIM), middle school (MID), secondary school (SECON) and graduation (GRAD).

Some household composition variables which might affect the participation decision are included. These include the number of children below 14 years of age (CHILD14), whether the individual is currently married (MARRIED) and whether he/she is the head of the household (HHEAD). Some personal characteristics included are AGE of the individual, whether the individual belonged to a scheduled caste or tribe (CASTE) and whether he/she is a muslim (MUSLIM). Two variables used to identify the wage-paid participation equation are area of land owned by the household (LAND) and ownership of a homestead (HOMEST).

Table 3 - approximately here

The earnings function includes the variable years of experience (EXP) and its quadratic (EXPSQ). This variable has been computed as follows to take care of the fact that much of the labour force is illiterate or did not attend formal schooling. For persons with positive years of schooling, Experience = (age-years of schooling -5). For persons with zero years of schooling, Experience = (age - 14). Table

3 presents the means of the variables included in the participation equation by gender and state separately for wage workers and non wage-workers.

V. Wage Work Participation

The probit model of wage and salaried participation is estimated separately for men and women in the two states. The results are presented in Table 4. The marginal effects of a unit change in a variable on the probability of wage work participation (WWP) holding all other variables constant at their mean values are also reported. The specification in Table 4 includes education as a series of dummy variables for different levels.

Table 4 - approximately here

Household Composition: Being currently married significantly reduces the chances of wage work participation (WWP) among women in both states. However, among men it increases their chances of WWP in MP, though not in TN. The marginal effects are -3.4 and -9.4 per cent for women in the two states and 15.6 per cent for men in MP. While marriage increases the domestic responsibilities on women, thereby reducing their chances of participation in wage work, it magnifies the economic responsibilities of men.

The proportion of women who are heads of the household (HHEAD) is a less than 10%; among men this proportion is above 50%. Being head of household significantly increases WWP among both men and women in both states. The marginal effects are slightly higher for men in both states.

The number of children below the age of 15 years in the household (CHILD14) has a significant negative affect on the WWP of both men and women. This is puzzling since it is generally expected that – given the typical gender division of childcare duties - children would inhibit women's participation in the labour force, but not men's. Indeed, since more children means greater economic

responsibility for men, it might be expected that the greater their probability of participation in the labour market would be, perhaps via lowering their reservation wage. However, a negative coefficient on 'number of children' in men's wage work participation equation is not unique to this study. For example, two other studies of the Indian labour market using different datasets (Divakaran, 1996; Kingdon, 1998) also find that number of children reduces the probability of paid work participation for men, though the effect is not statistically significant in either of these studies.

Personal Characteristics: There is a significant quadratic effect in AGE for both men and women. However, the age at which waged work participation peaks for women is 41 in MP and 29 in TN compared to 34 and 33 for men in the two states respectively. Scheduled caste (CASTE) men and women are more likely to be wage work participants than general caste persons in both states. In urban areas, where regular wage or salaried jobs are an important component, this might reflect the reservation policy of the Government of India, whereby members of the low and backward castes have a certain high proportion of all public sector jobs reserved for them. However, Muslims (MUSLIM) - who also generally constitute the weaker and poorer sections of society - are not covered under the reservation policy. Thus, in general, Muslim women in both states and Muslim men in TN are less likely to participate in wage work than their non-Muslim counterparts. Among Muslim men in MP this variable is, however, insignificant.

Wealth of the household is captured here by ownership of land (LAND) and ownership of a homestead (HOMEST). In both states, higher values of both of these variables lower the probability of men and women doing wage or salaried work.

Education: Probit models with years of education (EDUYRS) as a continuous variable and in quadratic form (not reported), showed a pronounced and significant U-shaped relationship between

years of education and WWP in both states, suggesting that imposing a linear relationship between years of schooling and the probability of labour force participation is restrictive and unjustified.

Hence the preferred specification in Table 4 uses the education splines, as discussed earlier. Education has a U-shaped relationship with participation in wage or salaried employment, though the relationship is much stronger for women, only the Middle school level dummy being significant for men. The coefficients fall monotonically upto middle school level, and rise thereafter, becoming positive at the graduate level. In MP, women with primary schooling are about 8% less likely, those with middle level schooling 9% less likely, and those with secondary schooling about 1% less likely to be in paid work than illiterate women. In TN, the corresponding figures are 9%, 15%, and 5%. However, in both states, women who have graduated from college are about 5% more likely than illiterate women (and about 14% more likely than middle school-completing women) to be in wage paid or salaried jobs.

An explanation for the downward sloping part of the U-shaped relationship between education and work participation for women may lie in the 'sanskritization' hypothesis (see Chen and Drèze 1992). Just as it is socially acceptable for lowcaste women to work but not for high caste women, in the same way, women with no education may work while those with some education have a social standing to preserve and may not want to compromise it by working.

However, sanskritization does not explain the upward-sloping part of the U-shape: why, even after controlling for caste, highly educated women are more likely to participate in paid work than women with low or no education. The answer may lie in one or more of the following observations:

(i) women who opt for high levels of education are a self-selected group, perhaps coming from progressive families where attitudes to women's work are favourable,

(ii) high levels of education have a modernising influence and they change women's ambitions and work aspirations, perhaps lowering their reservation wage, and

(iii) if rates of return to education rise with education level, then those with high levels of education will have stronger economic incentives to work than those with low or no education. The results of the next section - which show very low returns to women's primary education - provide some support for this explanation.

VI. Earnings Function

The mean and standard deviations of variables used in the earnings functions are reported in Table 5. In logs, the average daily earnings of men are about 21 per cent higher than those of women in MP, whereas they are 33 per cent higher in TN. In absolute terms, women's average daily earnings are Rs. 20.64 and Rs. 12.96 in MP and TN respectively whereas they are Rs. 32.31 and Rs. 24.03 for men[6].

The results of the Mincerian earnings functions are presented in Table 6a for MP and in Table 6b for TN. In each table, columns a and b present the OLS earnings function for women and columns e and f the OLS earnings functions for men. The remaining columns set out the selectivity corrected earnings equations.

Focus on the male-female comparison of the returns to education in columns a and e which include only EDYRS, EXP, and EXPSQ. The marginal return to a year's extra education is 10% for females and 8.6% for males in MP. In TN, the corresponding figures are 9.4% and 8.1% respectively. Thus, in both states, returns to education are approximately 16% higher for women. According to a wald test, this gender difference in returns to schooling is statistically significant.

It should be mentioned that the returns estimates here may suffer from omitted family background bias

6The explanation for the higher daily earnings in the less developed state of Madhya Pradesh is a greater proportion of government sector jobs paying higher wages and salaries compared to the private sector, which is

since studies for some countries have found that estimates of returns fall substantially when family background is controlled (Heckman and Hotz, 1986; Behrman and Wolfe, 1984; Lam and Schoeni, 1993, Kingdon, 1998) [7]. Unfortunately, as in most studies, our pre sent data do not allow us to control for family background.

To explore the relationship between education and earnings, we relax the assumption of linearity implicit in columns a and e and introduce a quadratic term of years of education (EDYRSQ) in columns b and f. There is clear indication of non-linearity in the relationship between education and earnings, with earnings rising with years of education but at an increasing rate.

As stated in the methodology section, selectivity corrected earnings functions rather than OLS ones are needed in order to obtain consistent regression estimates. Accordingly, columns c, d, g, and h present our preferred specifications of the earnings function, corrected for sample selection bias using the Heckman two-stage correction procedure. The selectivity term, lambda, is well identified, has a large coefficient, and is statistically significant in each of the four earnings functions. The effect of including the lambda term is to reduce the estimated return on years of education in all cases except for women in TN. In MP, the inclusion of lambda reduces the return to female education by 10% (1.4 standard errors) and to male education by 10% as well (nearly 2.5 standard errors), suggesting that OLS overestimates the return to education. However, the returns to education are still significantly greater for women than for men in both states.

The fact that the selectivity -corrected earnings functions here exclude many of the variables used in the work participation probit is simply because we wished to estimate the pure Mincerian earnings

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more prevalent in Tamil Nadu.

[7] Kingdon's (1998) study on urban Uttar Pradesh in India finds that women's returns to education fall significantly once family background is controlled but men's returns fall comparatively less. The net effect is that, controlling for background, women's returns to education fall below men's. However, this study is based on a relatively small sample of 182 women and 1009 men from a single city.

equation with the conventional variables education, experience, and experience square as the only regressors other than lambda. The extended earnings function presented in the Appendix includes all of the probit equation variables except CHILD14 (which was statistically insignificant in all four earnings equations) and HOMEST and LAND, which are the identifying variables whose exclusion is justified on a priori grounds. This allows us to test whether the identification of lambda in Tables 6a and 6b was the result of the arbitrary exclusion restrictions imposed there. It also allows us to observe the effect of personal and household composition variables such as caste, religion, and headship and marriage status.

The extended earnings functions in the Appendix show that CASTE and MUSLIM are insignificant except for caste among women in TN. This suggests that neither the low castes nor the Muslims face direct wage discrimination in the labour market. The result for caste is surprising in the light of evidence elsewhere that there is caste based discrimination in wages in urban India (Banerjee and Knight, 1985; Santhapparaj, 1996). Headship (HHEAD) and marriage status (MARRIED) both influence wages positively and significantly in most cases. We also note that LAMBDA is still well identified and highly significant when we include the first step (probit) variables in the earnings function, suggesting that the identification of lambda in our selectivity-corrected earnings function in Tables 6a and 6b was not due to the arbitrary exclusion restrictions imposed there.

To further explore the relationship between education and earnings, we relax the restriction of linearity implicit in Tables 6a and 6b and estimate earnings functions with education level dummies in Table 7. Specifying education as a series of dummy variables rather than as a continuous variable reduces the point estimate of the coefficient on LAMBDA in all equations but the change is insignificant on a wald test in each of the four equations[8].

[8] The fact that wald tests show no significant difference is unsurprising because the coefficients on lambda are not very different from each other. For example, for women in MP, the coefficient on lambda falls from –0.215 to –0.173 between tables 6 and 7 and in TN from –0.175 to –0.141 and in neither case are point estimates very

Table 7 shows that there are insignificant returns to literacy and to primary education for both men and women in both states and that returns generally rise with the level of schooling. In the education splines, we have made a distinction between literate (ie those with two years or less of schooling) and those who completed primary schooling. The coefficients on literate (LIT), as well as primary schooling (PRIM), are insignificantly different from zero. This implies that these persons' earnings are insignificantly different to those of illiterate persons. This has an important policy implication, namely that just being `literate' or with only primary schooling is not enough to enhance productivity sufficiently, or to obtain better labour market rewards[9].

The dummies for middle level schooling (MID) are significant for men in both states and weakly significant for women in TN. However, education dummies for secondary and graduate education (SECON and GRAD) are invariably highly significant and have large coefficients. The pattern here of low and insignificant returns to primary education and progressively greater returns to higher levels of education is corroborated in a number of recent studies from different parts of India (Kingdon, 1998; Santhapparaj, 1996; and Unni, 1996) and elsewhere[10], and it casts doubt on received wisdom that the returns to primary education are the greatest (Psacharopoulos, 1994).

VII. A Simple decomposition exercise

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precisely determined, i.e. the t-values are only 1.7 and 2.0 respectively in Table 6 and 0.55 and 0.45 in Table 7; similarly, for men, the coefficients hardly change between tables 6 and 7.

[9] That primary schooling yields no wage benefits could be to do with the low quality of primary schooling in much of the country. Alternatively, it could be because of the excess supply of persons with primary education.

[10] Recent research suggests that, over time, the rate of return to primary education may have collapsed in many countries. For example, Moll (1996) reports that the Mincerian rate of return to African primary education in South Africa has been 2-4% since the early 1970s. In Cote' d-Ivoire and Uganda the rates are 5 and 4% respectively (Appleton, Hoddinott, and Knight, 1996), and in Ethiopia the rate is estimated at 1% (Appleton, Hoddinott, Krishnan and Max, 1995). In Ecuador, the return to primary education is about 4% and returns increase with education level (World Bank, 1996). In urban areas of Sri Lanka, there are zero wage returns to primary and secondary education, and the rates of return rise with education level (Sahn and Alderman, 1988). These findings call into question the long-held view that rates of return to primary education are high (typically much greater than 10%) and greater than those in higher levels of education. Indeed, the rate of return calculations reported in Psacharopoulos (1994) and which form the basis for the conventional wisdom that returns to primary education are the highest, are now thought to be out-of-date and methodologically suspect (Bennell,

We decompose the difference in mean earnings between men and women into the component 'explained' by differences in characteristics between the two groups, and the 'unexplained' component, which can be regarded as the extent of labour market discrimination. We use Oaxaca's (1973) technique - as described in section III - for measuring discrimination when two groups of people differ in their characteristics and differ in the earnings functions relating these characteristics to earnings.

The results of the decomposition analysis using the earnings functions of Tables 6a and 6b are presented in Tables 8a and 8b. Table 8a shows the decomposition based on the OLS earnings functions and Table 8b the one based on selectivity corrected earnings functions. When expressed in natural logs, the gross wage difference between men and women in 0.539 in MP and 0.716 in TN.

Observe the totals row in Table 8a first. Standardising according to male means, 0.067 of the total gender wage gap of 0.539 in MP is due to men's better wage-enhancing characteristics such as their greater average number of years of education, as seen in Table 5. The remaining 0.473 (or 87.8%) of the 0.539 wage gap between the sexes is not explained by men and women's differing characteristics and may be attributed to wage discrimination in the labour market. Standardising by female means gives a somewhat lower estimate of discrimination, namely that 77.9% of the gender difference in average log wage is discriminatory. These estimates of discrimination are quite close to those for TN (75.3% and 78.5%)[11]. Thus, using the OLS earnings function suggests that the observed male-female average wage difference is largely discriminatory.

However, when we use the selectivity corrected earnings functions of Table 6, the estimate of

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1996, 1998).

[11] These estimates are higher than the estimate of 65% discrimination in Duraisamy and Duraisamy (1994, as quoted in Divakaran 1996, p248) which appear to be based on Mincerian OLS earnings functions. Divakaran's own estimate of discrimination in urban Tamil Nadu based on selectivity corrected earnings equations is 24% and this is based on standardising by female means only. The corresponding figure in the present study is 35% (see table 8b).

discrimination falls greatly in Table 8b. When standardised by female means, only 18% of the gender gap in earnings is due to discrimination, though standardising according to male means, 52.1% of the gender-difference in earnings is due to discrimination in MP. In TN, the female standardisation suggests that 35% and the male standardisation suggests that 55.7% of the gender wage gap is due to discrimination[12]. Many studies note that the sample selection correction lowers the estimated amount of discrimination by a large margin, by increasing the weight attached to the depreciation effect of female non-participation in the wage work force (for example, see Zabalza and Arrufat, 1983; Dolton and Makepeace 1986, p336; and Choudhury 1993, p337). Taking the average of the estimates from the male and female standardisations as the best measure of gender discrimination in wages (as suggested by Greenhalgh, 1980), we surmise that 35.1% of the gender wage gap in MP and 45.4% of the gap in TN is discriminatory.

Our estimates that, on average, 35% of the gender wage gap in MP and 45% in TN is due to labour market discrimination[13], appear generally higher than those in developed countries but similar to those in some developing countries. For example, wage discrimination against women is between 1%-5% in the UK, using the General Household Survey (Zabalza and Arrufat, 1983), 12%-17% among UK graduates (Dolton and Makepeace, 1986), and 12% in USA (Choudhury, 1993), but is about 40% in Pakistan (Ashraf and Ashraf, 1993). It is likely that such wage discrimination in India acts as a deterrent to women's wage work participation.

Notice the contribution of the education variable to the male-female wage gap in table 8b, taking the

12 Many studies have noted the sensitivity of the decomposition analysis to the choice between OLS and Two-stage Heckman techniques (eg Dolton and Makepeace 1986, p335; Sorensen 1991) and for this reason some have chosen to rely on OLS estimates without selectivity controls in the decomposition analysis (for example, Kidd and Shannon, 1994, see p930). Moreover, the fact that the decomposition results are sensitive to the choice of index (male standardisation or female standardisation) is well documented in almost all studies of discrimination.

13 Wage discrimination against women appears stronger in TN than in MP probably because private sector wage employment is more prevalent in TN while public sector employment is more dominant in MP, and private employers are likely to be more discriminatory. In Divakaran's (1996) study of wage discrimination in Madras City, Tamil Nadu, 23.7% of the gender (log) wage gap was discriminatory (standardising by female means) when the selectivity corrected earnings function was used. Divakaran does not report the results of standardisation by

female standardisation as an example. Education (EDYRS and EDYRSQ taken together) explains 0.005 of the total gender wage-gap of 0.539 in MP (and 0.038 of 0.716 in TN). That is, only about 1% of the gender wage difference in MP and 5% in TN is due to education. In MP, of the 0.005, 0.087 is due to men's greater average years of schooling than women, and -0.082 is due to men's lower returns to education. In TN, of the total contribution of education (0.038) to the gender wage gap, 0.123 is due to men's greater years of education than women and -0.085 is due to men's lower returns to education than women. In other words, in both states, the effect - on the male-female wage gap - of men's superior educational endowment than women is largely offset/cancelled by the effect of men's lower *returns to* education than women's. Thus, education contributes little to the overall gender gap in wages.

VIII. Conclusions

The data and analysis in this paper suggest that women's education has a U-shaped relationship with wage work participation and that only schooling beyond the junior/middle level enhances their wage work participation. Though our estimates of returns to education may suffer from omitted family background bias due to data limitations, this drawback applies to most studies of returns to education. Subject to this caveat, education has a strong and statistically highly significant relationship with wages for both the sexes, with wages increasing with schooling at an increasing rate, *i.e.*, returns to education rising with education level. This confirms the findings of other recent educational rate of return studies in India and elsewhere, and casts doubt on the conventional wisdom that returns to schooling are the greatest for primary and lowest for higher education. Women's returns to education are significantly higher than men's, each extra year of schooling raising women's wages (or productivity) by about 10% and men's by about 8%. Finally, our data suggest that women suffer high levels of wage discrimination in the Indian urban labour market, though education contributes little to this discrimination: the wage-disadvantage effect of women's lower years of education than men is entirely offset by the wage-

male means.

advantage effect of women's higher returns to education than men's.

The results suggest that policies to encourage women's education beyond the middle level will enhance their wage work participation - given our evidence of a positive relation between education above junior level and work participation[14]. Given the evidence of substantial discrimination, policies to remove wage-discrimination against women in the labour market will also raise women's wage work participation. The data show that low levels of schooling do not raise wages so that education beyond the junior level is needed if it is desired to raise both women and men's productivity and wages. The result that women's returns to education are higher than men's suggests that women do not face poorer economic incentives to invest in schooling than men, though this conclusion may not be robust to the inclusion of family background in the analysis.

Our finding of low or insignificant returns to both and women's and men's education at the primary and junior (elementary) education levels should not be used to suggest that it is no longer necessary for education policy to emphasise elementary education in India. For one thing, our rate calculations refer only to the private returns of education. The social returns of elementary education may be substantial. Moreover, elementary education is a necessary input into education at the secondary level and above; the indirect benefit of elementary education is its role in helping access to post-elementary education. A recent attempt to quantify this indirect benefit in Cote d'Ivoire and Uganda showed that the value of acquiring this 'option' to continue on to secondary education can be quantitatively important even if the direct private returns to elementary education are very low (see Appleton, Hoddinott, and Knight 1996).

The findings in this paper strengthen the economic efficiency case in India for promoting girls'

[14] Several studies show that increases in women's work participation bring about improvements in social outcomes such as child mortality and fertility. One prominent example is a recent paper by Drèze and Murthi (2000) where district female labour force participation rate had an important negative impact of the district total fertility rate in

education. Juxtaposing this with the substantial social benefits of female schooling[15] further strengthens the overall efficiency case for promoting girls' schooling in India.

India. In another paper Murthi, Guio, and Drèze (1997) find that women's work participation rate reduces both child mortality rates and the gender disadvantage in child mortality rates in India.

[15] For an international review of the social benefits of female education see Subbarao and Raney (1995) and King and Hill (1993). For evidence on the same issue for India, see Murthi, Guio, and Drèze (1997).

Table 1
Percentage Distribution of Sample Persons Aged 15-64 by Daily Activity

	Women		Men	
	N	**%**	**N**	**%**
		MADHYA PRADESH		
Self Employed (x)	378	8.8	1600	33.4
Employee (y = a+b)	373	8.6	1999	41.7
Regular (a)	226	5.2	1664	34.7
Casual (b)	147	3.4	335	7.0
Employed (z = x+y)	751	17.4	3599	75.1
Unemployed (u)	60	1.3	211	4.4
Labour Force (l = z+u)	811	18.7	3810	79.5
Non-Workers (c)	3500	81.3	972	20.5
All Persons (d = l+c)	4311	100	4782	100
		TAMIL NADU		
Self Employed (x)	687	11.5	1671	27.7
Employee (y = a+b)	931	15.6	3148	52.3
Regular (a)	567	9.5	2300	38.2
Casual (b)	364	6.1	848	14.1
Employed (z = x+y)	1618	27.1	4819	80.0
Unemployed (u)	164	2.7	427	7.1
Labour Force (l = z+u)	1782	29.8	5246	87.1
Non-Workers (c)	4166	70.2	772	12.9
All Persons (d = l+c)	5948	100	6018	100

Table 2
Definition of Variables Used in Wage-Work Participation and Earnings Functions

Variable	Description
EMPLOYEE	Participation in regular salaried or casual wage work during the reference week.
LOG Y	Natural log of daily earnings
AGE	Age in years
AGESQ	Square of Age
LIT	Literate without formal schooling or gained 1 to 2 years schooling Yes = 1; No = 0
PRIM	Gained upto 4 years of education? Yes = 1; No = 0
MID	Gained upto 8 years of education? Yes = 1; No = 0
SECON	Gained upto 11 years of education? Yes = 1; No = 0
GRAD	Gained 14 or 15 years of education? Yes = 1; No = 0
CASTE	Belongs to scheduled caste or tribe? Yes = 1; No = 0
MUSLIM	Religion Muslim? Yes = 1; No = 0
HHEAD	Head of household? Yes = 1; No = 0
MARRIED	Currently married? Yes = 1; No = 0
CHILD14	Number of children below the age of 14 in the household.
LAND	Land owned by the household in hectares.
HOMEST	Own a homestead? Yes = 1; No = 0
EDUYRS	Number of years of education acquired.
EDUYRSQ	Square of years of education.
EXP	Number of years of experience.
EXPSQ	Square of years of experience.
LAMBDA	Selectivity term, inverse of Mill's Ratio

Table 3
Means of Variables Used in the Wage-Work Participation Function,

Variable	Women 15-64 years old			Men 15-64 years old		
	Wage work participants	Non-participants	All	Wage work participants	Non-participants	All
			MADHYA PRADESH			
AGE	35.26	31.97	32.26	35.72	30.02	32.41
EDUYRS	5.35	4.44	4.52	7.17	6.81	6.96
LIT	0.05	0.10	0.10	0.11	0.12	0.11
PRIM	0.03	0.14	0.13	0.15	0.18	0.17
MID	0.01	0.12	0.11	0.13	0.21	0.18
SECON	0.14	0.15	0.15	0.21	0.22	0.22
GRAD	0.25	0.07	0.09	0.21	0.13	0.16
MARRIED	0.69	0.73	0.73	0.83	0.53	0.65
CASTE	0.29	0.16	0.17	0.20	0.13	0.16
MUSLIM	0.05	0.14	0.13	0.12	0.14	0.13
HHEAD	0.13	0.03	0.04	0.73	0.40	0.54
CHILD14	1.57	2.21	2.15	1.90	2.11	2.02
HOMEST	0.47	0.59	0.58	0.41	0.66	0.56
LAND	0.41	1.40	1.32	0.52	1.54	1.18
N	373	3938	4311	1999	2783	4782
			TAMIL NADU			
AGE	32.76	32.68	32.69	33.96	32.11	33.08
EDUYRS	4.00	4.71	4.60	6.63	6.66	6.64
LIT	0.12	0.12	0.12	0.13	0.11	0.12
PRIM	0.14	0.21	0.20	0.22	0.23	0.22
MID	0.06	0.17	0.15	0.20	0.24	0.22
SECON	0.15	0.17	0.17	0.23	0.24	0.23
GRAD	0.08	0.03	0.04	0.10	0.07	0.09
MARRIED	0.57	0.68	0.67	0.69	0.51	0.60
CASTE	0.24	0.10	0.13	0.14	0.10	0.12
MUSLIM	0.05	0.09	0.09	0.06	0.10	0.08
HHEAD	0.16	0.06	0.08	0.66	0.46	0.56
CHILD14	1.29	1.53	1.50	1.40	1.44	1.42
HOMEST	0.44	0.49	0.48	0.40	0.53	0.46
LAND	0.12	0.29	0.27	0.16	0.35	0.26
N	931	5017	5948	3148	2870	6018

Table 4
Binary Probit Estimates of Wage-Work Participation, by Gender

Variable	coefficient	t-value	marginal effect	coefficient	t-value	marginal effect
			MADHYA PRADESH			
		Women			**Men**	
Intercept	-3.662	-12.00 ***	-0.37	-2.476	-12.51 ***	-0.95
AGE	0.163	8.74 ***	0.02	0.136	10.90 ***	0.05
AGESQ	-0.002	-8.46 ***	0.00	-0.002	-11.36 ***	-0.00
LIT	-0.303	-2.53 **	-0.03	-0.109	-1.46	-0.04
PRIM	-0.775	-5.46 ***	-0.08	-0.086	-1.23	-0.03
MID	-0.918	-4.90 ***	-0.09	-0.226	-3.17 ***	-0.09
SECON	-0.099	-1.03	-0.01	-0.117	-1.72 *	-0.05
GRAD	0.543	5.62 ***	0.06	0.114	1.55	0.04
CASTE	0.471	6.04 ***	0.05	0.317	5.61 ***	0.12
MUSLIM	-0.304	-2.61 ***	-0.03	0.036	0.59	0.01
HHEAD	0.664	5.09 ***	0.07	0.303	5.23 ***	0.12
MARRIED	-0.334	-3.92 ***	-0.03	0.404	6.54 ***	0.16
CHILD14	-0.077	-3.98 ***	-0.01	-0.043	-3.61 ***	-0.02
LAND	-0.060	-2.55 ***	-0.01	-0.037	-4.95 ***	-0.01
HOMEST	-0.170	-2.72 ***	-0.02	-0.586	-14.11 ***	-0.23
Log L		- 1044.47			- 2667.72	
Restricted Log L		- 1269.24			- 3250.07	
Psuedo R^2		0.18			0.18	
			TAMIL NADU			
		Women			**Men**	
Intercept	-2.196	-11.94 ***	-0.47	-1.897	-11.40 ***	-0.76
AGE	0.116	9.72 ***	0.03	0.131	12.92 ***	0.05
AGESQ	-0.002	-10.26 ***	0.00	-0.002	-14.36 ***	-0.00
LIT	-0.117	-1.70 *	-0.03	-0.011	-0.16	-0.00
PRIM	-0.415	-6.64 ***	-0.09	-0.085	-1.41	-0.03
MID	-0.691	-8.95 ***	-0.15	-0.152	-2.48 **	-0.06
SECON	-0.251	-3.89 ***	-0.05	-0.101	-1.65 *	-0.04
GRAD	0.242	2.49 **	0.05	0.015	0.19	0.01
CASTE	0.522	9.02 ***	0.11	0.249	4.69 ***	0.10
MUSLIM	-0.229	-2.75 ***	-0.05	-0.275	-4.45 ***	-0.11
HHEAD	0.36	4.67 ***	0.08	0.28	5.16 ***	0.11
MARRY	-0.442	-8.02 ***	-0.09	0.032	0.54	0.01
CHILD14	-0.075	-4.66 ***	-0.02	-0.063	-4.93 ***	-0.03
LAND	-0.146	-2.70 ***	-0.03	-0.13	-5.13 ***	-0.05
HOMEST	-0.132	-3.13 ***	-0.03	-0.249	-7.22 ***	-0.10
Log L		-2312.78			-3816.34	
Restricted Log L		-2580.59			- 4164.94	
Psuedo R^2		0.104			0.084	

Note: *, **, and *** represent significance at 10%, 5% and 1% levels respectively. The marginal effects are evaluated at the sample means. McFadden's Psuedo R^2 is calculated as 1- (LnL/LnLo), where LnL is the log likelihood and LnLo is the restricted log likelihood.

Table 5
Descriptive Statistics of Variables Used in the Earnings Function

Variable	Women		Men	
	Mean	s.d.	Mean	s.d.
MADHYA PRADESH				
LOGY	2.61	0.96	3.15	0.91
EXP	20.30	11.50	21.88	11.40
EXPSQ	5.44	5.39	6.09	5.66
EDUYRS	5.35	6.24	7.20	5.26
EDUYRSQ	67.48	85.68	79.10	76.78
LIT	0.05	0.22	0.11	0.31
PRIM	0.03	0.18	0.15	0.35
MID	0.01	0.12	0.13	0.34
SECON	0.14	0.35	0.21	0.41
GRAD	0.25	0.43	0.21	0.41
CASTE	0.29	0.46	0.20	0.40
MUSLIM	0.05	0.23	0.12	0.32
HHEAD	0.13	0.34	0.73	0.44
MARRY	0.69	0.46	0.83	0.38
LAMBDA	1.52	0.44	0.75	0.37
N	373		1999	
TAMIL NADU				
LOGY	2.14	0.91	2.85	0.86
EXP	19.67	11.57	21.17	11.72
EXPSQ	5.21	5.31	5.85	5.95
EDUYRS	3.99	4.91	6.33	4.54
EDUYRSQ	40.09	63.13	64.67	64.69
LIT	0.12	0.33	0.13	0.33
PRIM	0.14	0.34	0.22	0.41
MID	0.06	0.24	0.20	0.40
SECON	0.15	0.36	0.23	0.42
GRAD	0.08	0.27	0.10	0.30
CASTE	0.24	0.43	0.14	0.35
MUSLIM	0.05	0.23	0.06	0.24
HHEAD	0.16	0.37	0.66	0.48
MARRY	0.57	0.49	0.69	0.46
LAMBDA	1.37	0.37	0.69	0.24
N	931		3148	

Table 6a
Mincerian Earnings Functions - Madhya Pradesh

	Women				Men			
	OLS		Selectivity corrected		OLS		Selectivity corrected	
	(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)
Intercept	1.7508	1.7339	2.4930	2.1788	1.7514	1.8286	2.5514	2.4732
	(12.0)***	(12.1)***	(8.5)***	(7.4)***	(26.0)***	(27.2)***	(20.9)***	(20.7)***
EXP	0.0239	0.0287	0.0095	0.0187	0.0508	0.0557	0.0188	0.0272
	(1.8)*	(2.3)**	(-0.6)	(1.3)	(8.7)***	(9.5)***	(2.6)***	(3.7)***
EXPSQ	-0.0295	-0.0361	-0.0019	-0.0177	-0.0543	-0.0625	0.0016	-0.0130
	(-1.1)	(-1.3)	(-0.1)	(-0.6)	(-4.6)***	(-5.3)***	(0.1)	(-0.9)
EDUYRS	0.1004	-0.0445	0.0907	-0.0049	0.0861	0.0006	0.0780	0.0220
	(14.9)***	(-1.2)	(10.9)***	(-0.1)	(26.0)***	(0.1)	(20.5)***	(1.6)
EDUYRSQ		0.0108		0.0074		0.0061		0.0041
		(4.0)***		(2.2)**		(7.1)***		(4.2)***
LAMBDA			-0.3622	-0.2145			-0.5031	-0.4214
			(-3.1)***	(-1.7)*			(-7.8)***	(-6.5)***
Adjusted R^2	0.378	0.403	0.400	0.406	0.307	0.324	0.334	0.341
N	373	373	373	373	1999	1999	1999	1999

Note: The figures in parentheses are t-statistics. *** denotes significance at the 1% level, ** at the 5% level, and * at the 10% level.

Table 6b
Mincerian Earnings Functions - Tamil Nadu

	Women				Men			
	OLS		Selectivity corrected		OLS		Selectivity corrected	
	(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)
Intercept	1.2718	1.3507	1.9125	1.6078	1.4024	1.6013	2.2285	2.1209
	(15.0)***	(16.3)***	(12.0)***	(10.6)***	(27.6)***	(30.8)***	(19.1)***	(20.0)***
EXP	0.0419	0.0451	0.0301	0.0396	0.0716	0.0743	0.0383	0.0517
	(5.2)***	(5.8)***	(3.2)***	(4.7)***	(16.9)***	(17.9)***	(6.2)***	(8.9)***
EXPSQ	-0.0636	-0.0700	-0.0363	-0.0573	-0.1028	-0.1069	-0.0401	-0.0644
	(-3.6)***	(-4.1)***	(-1.8)*	(-3.1)***	(-12.3)***	(-13.0)***	(-3.4)***	(-5.7)***
EDUYRS	0.0938	-0.0498	0.0986	-0.0233	0.0810	-0.0410	0.0780	-0.0234
	(17.5)***	(-2.6)***	(16.0)***	(-1.0)	(27.6)***	(-4.1)***	(22.0)***	(-2.0)**
EDUYRSQ		0.0116		0.0096		0.0089		0.0075
		(7.7)***		(5.2)***		(12.6)***		(9.2)***
LAMBDA			-0.4153	-0.1754			-0.6761	-0.4514
			(-4.9)***	(-2.0)**			(-7.9)***	(-5.6)***
Adjusted R^2	0.257	0.301	0.282	0.303	0.271	0.306	0.292	0.314
N	931	931	931	931	3148	3148	3148	3148

Note: The figures in parentheses are t-statistics. *** denotes significance at the 1% level, ** at the 5% level, and * at the 10% level.

Table 7
Mincerian Earnings Functions with Education Dummies

	Madhya Pradesh		Tamil Nadu	
	Women	**Men**	**Women**	**Men**
Intercept	2.097	2.482	1.574	2.071
	(2.98)***	(18.77)***	(3.30)***	(16.22)***
EXP	0.022	0.028	0.041	0.054
	(1.11)	(3.64)***	(3.58)***	(8.38)***
EXPSQ	-0.024	-0.015	-0.061	-0.069
	(-0.62)	(-1.06)	(-2.30)**	(-5.57)***
LIT	0.062	0.030	-0.091	-0.008
	(0.27)	(0.43)	(-0.88)	(-0.14)
PRIM	0.176	0.084	0.062	0.037
	(0.57)	(1.32)	(0.41)	(0.74)
MID	-0.024	0.360	0.400	0.292
	(-0.05)	(5.50)***	(1.76)*	(5.78)***
SECON	0.889	0.787	0.932	0.664
	(7.15)***	(13.70)***	(8.60)***	(13.60)***
GRAD	1.414	1.075	1.518	1.176
	(6.85)***	(18.04)***	(12.78)***	(19.91)***
LAMBDA	-0.173	-0.394	-0.141	-0.415
	(-0.55)	(-5.42)***	(-0.45)	(-4.16)***
Adjusted R^2	0.398	0.336	0.293	0.306
N	373	1999	931	3148

Note: The figures in parentheses are t-statistics.

Table 8a: Decomposition of the Gender Difference in Log of Daily Earnings
(Based on the OLS earnings function of Table 6, columns b and f)

Variables	Women			Men		
	Standardising by female means			Standardising by male means		
	characteristics	coefficients	combined	characteristics	coefficients	combined
			Madhya Pradesh			
Intercept	0.000	0.095	0.095	0.000	0.095	0.095
EDUYRS	0.001	0.242	0.243	-0.081	0.324	0.243
EDUYRSQ	0.070	-0.320	-0.250	0.126	-0.375	-0.250
EXP	0.088	0.547	0.635	0.045	0.590	0.635
EXPSQ	-0.040	-0.144	-0.184	-0.023	-0.161	-0.184
TOTAL	**0.119**	**0.420**	**0.539**	**0.067**	**0.473**	**0.539**
Explained by coefficients		**77.9%**			**87.8%**	
		Average estimate of discrimination: 82.9%				
			Tamil Nadu			
Intercept	0.000	0.251	0.251	0.000	0.251	0.251
EDUYRS	-0.108	0.035	-0.073	-0.131	0.058	-0.073
EDUYRSQ	0.220	-0.106	0.113	0.285	-0.172	0.113
EXP	0.111	0.575	0.686	0.067	0.619	0.686
EXPSQ	-0.069	-0.193	-0.262	-0.045	-0.217	-0.262
TOTAL	**0.154**	**0.562**	**0.716**	**0.176**	**0.539**	**0.716**
Explained by coefficients		**78.5%**			**75.3%**	
		Average estimate of discrimination: 76.9%				

Table 8b: Decomposition of the Gender Difference in Log of Daily Earnings
(Based on the Selectivity-corrected earnings function of Table 6, columns d and h)

Variables	Women			Men		
	Standardising by female means			Standardising by male means		
	characteristics	coefficients	combined	characteristics	coefficients	combined
			Madhya Pradesh			
Intercept	0.000	0.294	0.294	0.000	0.294	0.294
EDUYRS	0.040	0.144	0.184	-0.009	0.193	0.184
EDUYRSQ	0.047	-0.226	-0.179	0.086	-0.265	-0.179
EXP	0.043	0.173	0.215	0.030	0.186	0.215
EXPSQ	-0.008	0.026	0.018	-0.011	0.029	0.018
LAMBDA	0.321	-0.314	0.007	0.163	-0.156	0.007
TOTAL	**0.443**	**0.097**	**0.539**	**0.259**	**0.281**	**0.539**
Explained by coefficients		**18.0 %**			**52.1 %**	
		Average estimate of discrimination : 35.1%				
			Tamil Nadu			
Intercept	0.000	0.513	0.513	0.000	0.513	0.513
EDUYRS	-0.062	-0.000	-0.062	-0.061	-0.001	-0.062
EDUYRSQ	0.185	-0.085	0.100	0.236	-0.137	0.100
EXP	0.077	0.238	0.315	0.059	0.256	0.315
EXPSQ	-0.042	-0.037	-0.079	-0.037	-0.042	-0.079
LAMBDA	0.307	-0.379	-0.072	0.119	-0.191	-0.072
TOTAL	**0.465**	**0.250**	**0.715**	**0.317**	**0.398**	**0.715**
Explained by coefficients		**35.0%**			**55.7%**	
		Average estimate of discrimination: 45.4%				

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Appendix
Extended Earnings Functions

	Madhya Pradesh		Tamil Nadu	
	Women	**Men**	**Women**	**Men**
		With EDUYRS		
Intercept	2.509	2.484	2.250	2.043
	(5.57)***	(16.41)***	(8.47)***	(15.74)***
EXP	-0.010	0.014	0.007	0.030
	(-0.52)	(1.96)**	(0.58)	(4.94)***
EXPSQ	0.036	0.005	0.012	-0.036
	(0.91)	(0.37)	(0.45)	(-3.10)***
EDUYRS	0.093	0.075	0.100	0.074
	(7.93)***	(18.48)***	(13.43)***	(22.20)***
CASTE	0.013	-0.088	0.010	-0.061
	(0.09)	(-1.73)*	(0.10)	(-1.41)
MUSLIM	0.171	-0.009	0.074	0.022
	(0.70)	(-0.15)	(0.46)	(0.36)
HHEAD	0.225	0.136	-0.091	0.198
	(1.22)	(2.25)**	(-0.77)	(3.80)***
MARRIED	0.336	0.030	0.275	0.102
	(2.58)***	(0.48)	(3.01)***	(2.16)**
LAMBDA	-0.440	-0.430	-0.631	-0.432
	(-2.30)**	(-5.22)***	(-4.12)***	(-4.11)***
Adjusted R^2	0.411	0.337	0.296	0.300
		With education splines		
Intercept	1.720	2.419	1.450	1.862
	(3.34)***	(16.09)***	(4.62)***	(15.03)***
EXP	0.014	0.022	0.033	0.044
	(0.76)	(3.00)***	(2.73)***	(7.39)***
EXPSQ	-0.012	-0.008	-0.047	-0.063
	(-0.31)	(-0.59)	(-1.77)*	(-5.54)***
LIT	0.044	0.035	-0.04	0.046
	(-0.23)	(0.51)	(-0.46)	(-0.87)
PRIM	0.123	0.088	0.085	0.074
	(-0.49)	(-1.41)	(-0.82)	(-1.58)
MID	0.034	0.346	0.402	0.287
	(-0.09)	(5.35)***	(2.66)***	(6.10)***
SECON	0.986	0.755	0.984	0.651
	(7.80)***	(12.87)***	(11.82)***	(14.02)***
GRAD	1.560	1.040	1.598	1.160
	(8.71)***	(16.56)***	(13.50)***	(20.72)***
CASTE	0.123	-0.077	0.192	-0.041
	(-0.99)	(-1.56)	(2.01)**	(-0.01)
MUSLIM	0.046	-0.005	-0.026	-0.021
	(-0.24)	(-0.09)	(-0.22)	(-0.37)
HHEAD	0.400	0.136	0.077	0.231
	(2.30)**	(2.33)**	(0.73)	(4.81)***
MARRIED	0.235	0.034	0.086	0.079
	(2.01)**	(0.58)	(0.99)	(1.83)*
LAMBDA	-0.077	-0.342	-0.095	-0.177
	(-0.34)	(-4.16)***	(-0.49)	(-1.79)*
Adjusted R^2	0.412	0.344	0.302	0.318
N	373	1999	931	3148

Note: The figures in parentheses are t-statistics.