Returns to Education in India: Some Recent Evidence

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Extended Abstract

Introduction

Whether to continue education beyond a certain level or to enter the labor market is an important investment decision. According to the human capital investment theory, an individual would prefer to attend school only if the present value of the expected benefits from schooling exceeds that of the expected costs (Becker, 1993). Thus, an important determinant of the demand for schooling or training is its expected benefits. Since the benefits depend upon the quantity and quality of an individual's labor input, which in turn depends upon the human capital acquired during schooling, the education-wage relationship can be used to measure the returns to schooling.

The estimation of rates of return to education is important for setting policy guidelines and evaluating specific programs. The estimates act as a useful indicator of the productivity of education and provide incentive for individuals to invest in their own human capital. While private rates of return are useful in explaining individuals' behavior in seeking education of different levels and types, social rates of return help in setting priorities for future educational investments.

This paper presents recent evidence on the private rates of return to education using a large scale household survey. We also examine the hypothesis of diminishing returns to education. We use the ordinary least squares and quantile regression methods for the estimation purpose. The latter method provides a more comprehensive picture of the conditional wage distribution and allows for investigating the effect of education at different quantiles of the wage distribution. Since labor market conditions differ very much across the rural and urban sectors, the returns are estimated separately for the two sectors.

Data

We use the data from the India Human Development Survey (IHDS) 2005. The dataset is made available by the National Council of Applied Economic Research (NCAER), New Delhi, and the University of Maryland with particular focus on the issues related to human development. The IHDS is a nationally representative survey of 41,554 households covering 215,754 individuals. The survey has information on household characteristics: household residence (rural or urban), household size, membership of a social group, and religion; individual characteristics: age, education (number of standard years completed), gender, marital status and relation to the household head. The survey also has information on occupation, industry, number of hours work in a usual day and wages and salaries of individuals, and the principal source of income for the household.

Methodology

We use the standard 'Mincerian' earnings function (Mincer, 1974). To account for the possibility, Heckman selection model is used. The procedure involves two stages: in the first stage, a participation (selection) equation estimates the probability of having worked, and second stage involves estimation of the wage (outcome) equation (Heckman, 1979). The first stage estimation, participation equation is given as:

$$y_i = z_i'\varphi + u_i \tag{1}$$

where, the dependent variable (y) takes a value of 1 if an individual participates in work and a value of 0 if not, z is a set of human capital variables, demographic variables, and identifying variables, and $u \sim N(0, \sigma_u^2)$. From the estimation of participation equation, a selection variable (λ), known as the inverse Mills ratio, is created. This estimate is then used as an additional independent variable in the wage equation in the second stage.

The second stage involves estimating the wage function by ordinary least squares. Since we are also interested in estimating returns for different levels of education and investigating the existence of diminishing returns (across educational levels), an augmented wage function is used. The equation can be extended by incorporating a series of dummy variables referring to the completion of education level in place of schooling variable s_i, to estimate returns at different levels:

$$\ln w_i = \alpha + \sum_k \beta_{i,k} s_{i,k} + \gamma_1 exp_i + \gamma_2 exp_i^2 + \delta x_i + \theta \widehat{\lambda}_i + \varepsilon_i \qquad (2)$$

where, $s_{i,k}$ represents a dummy variable for kth level of education, x is a set of other (demographic and family background) variables assumed to affect earnings, and $\varepsilon \sim N\ (0,\ \sigma^2{}_\varepsilon)$. The equation also includes the inverse Mills ratio as an additional regressor obtained after the estimation of the first stage. This stage estimation is carried out only for the uncensored observations, i.e., only for those who participate in wage work.

By fitting such an earnings function, the average rate of return per year to each education level can be obtained by comparing the coefficients of the adjacent dummy variables:

$$r_k = (\beta_k - \beta_{k-1})/\Delta n_k \qquad (3)$$

where, β_k is the coefficient of kth education level, β_{k-1} is the coefficient of the previous education level, and Δn_k is the difference in years of schooling between kth and $(k-1)$th schooling levels.

We also use quantile regression method. The advantage of this method is that one can assess the entire distribution by setting different quantile and can get different parameter estimates of the conditional distribution of the dependent variable (wage rate). The method also allows to examine whether the effect of explanatory variables differ across the conditional wage distribution.

Results

We find that the rates of return to education increase with educational level, i.e., returns are lower for primary level and higher for graduate level. The rates of return to education for the primary, middle, secondary, higher secondary and graduate levels are 5.5, 6.2, 11.4, 12.2 and 15.9% respectively. Therefore, our findings do not support the hypothesis of diminishing returns to education.

Private Rates of Return to Education (%): 2005

Educational Level	All	Rural	Urban
Primary	5.47	4.64	6.59
Middle	6.15	5.80	6.20
Secondary	11.38	10.29	12.73
Higher Secondary	12.21	9.60	14.67
Graduate	15.87	16.43	15.12

The returns to education differ along the wage distribution; the returns are higher at the upper end of the wage distribution. The returns to education within educational level also differ considerably. The rates of return increase for primary, middle, secondary and higher secondary levels across the wage distribution. For graduate workers per year returns are higher in the bottom quantiles. This shows that education is not rewarded in a uniform manner in the labor market.

The increasing pattern of private rates of return suggests that for an individual, as a private decision, there is an incentive to invest at higher secondary and graduate levels. This result also has implication for the public funding on education. High and rising returns to tertiary education indicate that large public subsidies on higher education should be avoided.

The increasing pattern of returns by level of education could be due to quality of schooling among the other reasons. One can expect that quality of schooling may be ameliorating as an individual ascends upwards in the educational hierarchy. Another reason which could explain this phenomenon is ability of the people. If people with higher ability attain more schooling then higher rates of return will be as a result of higher ability.

However, recent evidence from other developing countries indicates that the concave pattern of returns to education does not hold more. Higher education is becoming scarce and workers with secondary level are becoming abundant. There are some possible reasons which could be attributed to higher returns for higher education like increased openness to trade and foreign investment and introduction of new technologies which promote the demand for skilled labor especially those with higher education.

References

Becker, Gary S. 1993. *Human Capital: A Theoretical and Empirical Analysis with Special Reference to Education*. Chicago: University of Chicago Press [1st ed., 1964].

Heckman, James J. 1979. "Sample Selection Bias as a Specification Error." *Econometrica*, 47:1, pp. 153-61.

Mincer, Jacob. 1974. *Schooling, Experience and Earnings*. New York: National Bureau of Economic Research.