

Income Differentials and Returns to Education

This paper studies the determinants of personal income, including the returns to education. In the process it estimates how incomes are affected by characteristics such as gender, caste, language, etc. Using a maximum likelihood probability model, private returns to education are estimated; it emerges that greater levels of education increase both the likelihood of being employed as well as the income earned from work. However, the returns from elementary (primary and middle) education are quite low. Also, ceteris paribus, women, lower social groups, rural residents, non-English speakers have both significantly lower incomes and a lower likelihood of being employed. The results indicate that quality of education delivery and ensuring that the child remains in school should form important elements of education policy.

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I Introduction

There is a consensus that formal education is an important determinant of individual earnings as well as of economic growth. International evidence is also quite unambiguous. Greater education leads to higher economic growth. Though the quantum and levels might differ, the evidence from a host of studies is quite clear – those with greater levels of education, greater skills, and greater experience have greater incomes after correcting for individual, household, and other differences.¹

There are few studies based on data at the all-India level on private returns to education in India. Duraisamy (2000) is a notable exception. The study used data from 1983-84 and 1993-94 for those receiving wage incomes from the large sample NSSO employment surveys conducted in those years. However, since the NSSO does not collect income information for the non-wage earners, about half of the Indian households were not included in their sample. Moreover, factors such as knowledge of English and caste were not studied. However, despite these differences, our results are not completely incomparable and generally follow similar patterns.²

It has been argued that many of the benefits of education are enjoyed by society as a whole and not only the individual; these positive externalities may lead to less than desirable education choices by private individuals, and therefore public-subsidisation of education is necessary. Subsidisation by itself does not fully correct the sub-optimal demand for education as the costs of education are not purely in monetary terms but also in terms of (i) opportunity loss of current income, and (ii) the effort costs of learning. This is all well known, as is also well known that if private returns to education are high enough, it would be in the interest of the households to ensure that their children join school and remain in school. However, the expectation of greater incomes is most likely to be based on the returns to education observed among the currently working cohort.³ And that is precisely what we seek to estimate – the private observed returns to education.

Returns to education include two elements. The first is how the likelihood of being employed varies with different levels of education. The second is related to how income varies with varying levels of education. Our method allows us to simultaneously test for the causal factors behind both these benefits. The rest of the paper proceeds as follows. Section II details the data used, Section III discusses the methods. The results are presented in Section IV along with a discussion on some of the data issues. Section V concludes.

I Data

The ministry of finance, government of India, sponsored a survey on pensions and saving habits of Indians, overseen by the Invest India Economic Foundation and conducted by AC Nielson in 2004-05.⁴ The dataset from this survey called *National Data Survey on Savings Patterns of Indians* (NDSSPI) has been used for the analysis. The sample size included over 40,000 households from 26 states and union territories. One earning member was randomly chosen from each household as the eligible respondent to collect various information on their income, saving and investment patterns.

Unlike many other surveys on savings and expenditures, the data is available publicly for research purposes. More important, to our knowledge this is the only survey that has a specific method for ascertaining the incomes of the respondents. Incomes for wage earners are easy enough to ascertain; however, for self-employed, entrepreneurs, farmers, fisher people, etc, simply asking a question on income can yield poor results as respondents may confuse revenues with incomes. For non-wage earners of all types, the survey tool specifically queried respondents on the revenues from their business and expenditures related to business. The income was then specifically derived.

Annual income is therefore self-reported by individuals who are earning members of the family. The reported incomes (used in the analysis) are individual incomes from work (not including rental, interest, etc), net of taxes, and net of profession/business related expenditures for the self-employed.

The survey data, related to income and saving patterns, is based on one earning member randomly selected from each sampled household. However, the survey also contained information on all other members of the households including the unemployed ones if at all there were any in the household.⁵ The “unemployed” are those who are looking for a job but haven’t yet got one. In those households where there was one unemployed person, that person was also included in the sample (but with missing income). In households where there was more than one unemployed person, we randomly selected one person.⁶ Thus our base data for analysis includes both “working and earning” and “unemployed and not earning” individuals randomly selected, not more than one per household from both groups.

III Method

We estimate the impact on the natural log of incomes of various characteristics such as education levels, gender, type of household, caste, etc.

$$\ln y = a_1 x_1 + a_2 x_2 + \dots + a_n x_n + e$$

This is standard in the literature and sometimes is also referred to as Mincer’s equation following Mincer (1974).⁷ Natural log of post tax income (y) is considered to be affected by independent characteristics (x_i) and the coefficients (a_i) that are to be determined empirically.

The following characteristics have been studied in the model: gender, caste – SC/ST or non-SC/ST, place of residence, marital status, relationship to head of household, ability to read and write English, and ability to speak in English; these are all dummy variables that take the value 1 when the conditions are met and 0 otherwise. In addition we also include the impact of work experience in years and work experience squared, value of household property in Rs lakh, household income from other sources in Rs lakh. Education has been captured by dummy variables for completing each level of education: illiterates, literates but less than primary, primary, middle, high school (class 10), higher secondary, technical education/diploma, graduate, professional degree, and postgraduate and above. Since incomes are likely to be affected by location aspects, we also include state fixed effects in the model.

We take the view that the set of factors that are likely to affect incomes are similar as those that are likely to affect the earning status. We use a form of the Heckman 2-step procedure known as Heckman’s Maximum Likelihood Estimate or MLE [Kennedy 2003]. This allows us to estimate both (i) the likelihood of earning an income, and (ii) the impact on income, as a function of various individual, household and other characteristics.

The MLE commands in most software yield probit estimates that are not easy to interpret. We therefore convert the probit estimates such that the coefficients are nothing but marginal probabilities associated with the likelihood of earning. That is, each coefficient in the “likelihood of earning” column of Appendix 1, tells us how the likelihood of being employed (earning income) changes with a unit change in the independent variable.

The model yields coefficients that are difficult to interpret as they are in the form of logarithmic differences. We therefore convert them to arithmetic percentages (refer Columns 2 to 7, Appendix 1) to facilitate easier discussion.⁸

We conduct the exercise on the following population groups: (i) all respondents, (ii) male respondents, (iii) female respondents. These are all provided in Appendix 1. The discussion here focuses on the first (all respondents) and draws from the other results when required.

IV Results

We consider a wide range of factors that are likely to affect (i) the likelihood of earning income, and (ii) amount of income earned by a person. These characteristics can broadly be characterised as those of the (a) household, (b) individual, and (c) others. We also discuss the impact of education and its interaction with occupation. Appendix 1 provides the detailed results.

Overall we find that formal education accounts for only one part of the total variation in income. Factors such as gender, caste, knowledge of English and experience play a highly significant role as well. The economic class of the household does not directly impact incomes as much, however, inasmuch as higher economic class also reflects greater likelihood of being educated, being from a higher caste, and being educated in English, the indirect impact is significant.

Impact of Individual, Household and Other Characteristics

The following discussion is based on results presented in Table 1 and Appendix 1.

Household assets: This is the self-reported total accumulated market value of agricultural land, owner occupied house, any other real estates, owned by the household at the time of survey,

Table 1: Key Results on the Impact of Individual, Household and Other Characteristics on Income and Likelihood of Employment

Explanatory Variables	Per Cent Difference in Income	Per Cent Difference in Likelihood of Employment
Females (compared to males)	-36	-13
Rural (compared to urban areas)	-27	0.7
Work experience	4	
Household asset in rupees lakh	3	-0.1
Other household income in rupees lakh	-2	4
Can speak, read and write English (compared to those who cannot)	23	
Can read and write English (compared to those who cannot)	18	
SC/ST (compared to “others”)	-11	1
Marital status (compared to “currently married”)		
never married	-7	-24
Widow/widower	-5	-8
Divorced	-14	-4
Separated/deserted	-18	-4
Relationship with head of household (compared to “head of household”)		
same generation	-15	-7
Direct descendants	-3	-16
Other relatives	1	-45

Notes: Numbers denote co-efficients.

Absolute value of z statistics in parentheses.

* Significant at 10 per cent;

** significant at 5 per cent;

*** significant at 1 per cent.

Refer to Appendix 1 for detailed results.

financial assets of the household are not included. The results indicate that after correcting for all factors, there exists a significant positive relationship between income and household assets. For every lakh rupees increase in household assets, an individual's income from his/her profession is higher by about 3 per cent.

Other household income: This includes annual income of the household from sources other than the earnings of members residing in the household, such as rents, interest receipts, remittances, etc. Imbens et al (2001) found that in the case of the US, the effect of income from other sources on income earned from work was fairly significant – of the order of about 11 per cent. The results of the current analysis in India's context also suggest that "other incomes" do have some explanatory power – for every Rs 1 lakh increase in income of a household from other sources, income of any household member from own effort based income is likely to be lower by about 2 per cent.

The likelihood of being employed is only significantly higher for those from higher asset/income households, but only marginally so. In other words, greater economic power of the household does appear to help in having a job, but not necessarily in having higher incomes.

Caste: The survey data categorised the individuals into "SC/STs" and "others" (implying higher castes). Compared to others, SCs and ST's tend to have lower education and are more likely to be in non-skilled jobs. Even after correcting for factors such as education one may expect their incomes to be lower because of the social biases at the workplace.

Many studies have shown the poor condition of SC/STs as far as educational achievement is concerned (see Bajpai et al (2005) for instance). It is well known that discrimination on the basis of caste, race and ethnicity in accessing employment and education is prevalent across the globe [see Thorat 1999 for instance]. In order to correct these imbalances many countries have turned to practices of affirmative action, preferential treatment or equal opportunity policies. The results of our analysis also reinforce the presence of a similar underprivileged situation for the socially backward castes. Compared to those from "others" or higher castes category, though the SC/STs are more likely to be employed (by about 0.8 per cent); their income is likely to be about 10.5 per cent lower. This is after correcting for household, individual, and educational differences. The combination of higher likelihood of being employed but lower earned income suggests that the lower income is at least in part due to the SC/STs working at lower wages than their non-SC/ST counterparts. In an environment where social biases are strong, many SCs/STs will have little choice, but to accept a job that comes their way even if it is at lower incomes than received by a similar but non-SC/ST person. In other words not only are SC/ST less prepared for the labour market in terms of poor education, health, and other characteristics, they are also likely to earn significantly less for the same level of education.

As in the case of Deshpande (2001) we recognise that SC or ST is a highly simplistic way of capturing class inequality in India. Religion, sub-castes, lingual groups, etc, all are required to better capture the social biases that exist. However, lack of such information prevents any further analysis in this direction.

Gender: As suggested by our results, "gender" is found to play a very significant role for both amount of income earned as well as the likelihood of an individual being employed. Women in India are found to have a 12 per cent lower likelihood of being

employed than men. But even among the employed, female annual incomes are likely to be lower by 36 per cent than otherwise similar males.

Why do females earn so much less? The fact that even after correcting for education, experience, etc, women earn much less as compared to males, is a clear indication that gender discrimination is still very much prevalent in the labour market. A study by Swamy (2004) found that in a number of countries export growth has created wage employment for women in large numbers. Their incomes, quality of life and status have improved. However, gender equality has not always improved and there is continued evidence of gender discrimination in income earned. But other factors might also play a role in this. Lower number of hours and months worked is one factor. Being involved only sporadically in income earning work (for instance during harvesting seasons) is another. Being involved in occupations that generally have low incomes (such as harvesting, or home based subcontracting) is a third. This calls for a more focused study that we hope to conduct as a follow up to this exercise. Despite these possible reasons, it is unlikely that any study can reject gender bias in the labour market. This issue is taken up again in later sections, though in a different context of differing returns to education between males and females.

Marital status: Individuals are categorised as currently married, never married, widow/widower, divorced and separated/deserted. This is used as a set of dummy variables in the model ("Currently married" being the reference group). Others have found that even after correcting for age, experience, gender, etc, those who are married tend to have higher incomes than others. Our results for India for the early 2000s are not any different. That is, married persons are more likely to be employed and earn higher incomes. *Knowledge of English language:* Knowledge of English language is considered in two ways. First, the characteristics of those who can speak write and read English, and second, those who can read and write but not speak English.

Given that a large part of the Indian economy functions in English, one would expect that those with a sound understanding and knowledge of the language would have both a greater likelihood of being employed as well as higher incomes. The only question is how important is this effect. Therefore those who can read and write in English would be expected to have a higher likelihood of being earning, and earn more. Along with the ability to read and write, those who can also speak English are expected to have an even higher probability of being employed and earning more.

As expected, the results reveal that an individual's knowledge of English language has a strong influence on his income level. A person who can read and write English is expected to earn 18 per cent more as compared to the one who can not, all other factors remaining the same. But along with reading and writing, if an individual can also speak English, then his income is likely to be higher by 22 per cent than those who cannot read, write

Table 2: Impact of 'Marital Status' on Income and Likelihood of Earning

Marital Status	Percentage Difference in Income from those Currently Married	Percentage Difference in Likelihood of Employment from those Currently Married
Reference: 'Currently Married'		
Widows/Widowers	-4.8	-7.5
Never married	-6.5	-24.3
Divorced	-13.8	-3.6
Separated/deserted	-18.1	-3.8

Figure 1: Change in Income with Work Experience



or speak English. Data on the knowledge of English of those who are unemployed were not available and therefore it is difficult to test whether they are more likely to be employed. In all likelihood, however, this would be the case.

Place of residence: The place of residence of an individual is divided into rural and urban areas. This is considered as dummy variables in the model (“Urban Area” being the reference category). In rural India, most are engaged in agriculture and allied activities. For instance, during 1999-2000 (NSSO 55th round), around 37 per cent of rural population was from households that were self-employed in agriculture and another 30 per cent population were involved as agricultural labourers. On the other hand, most of the high-income occupations have their base in urban areas due to better infrastructure, communication facilities and accessibility to all kinds of information and facilities. The results are expected in these same lines.

After correcting for all other factors, income earned by those who reside in rural areas, is likely to be 26 per cent lower as compared to those in urban areas. These results are not highly different than those obtained by Duraisamy (2000) using data from 1993-94. On the other hand, the likelihood of being employed for rural labour force is marginally higher (0.7 per cent) than their urban counterparts.

Work experience: This is the experience that a person obtains at this workplace and is the same as the number of years for which the person is working. Since there was no explicit query on experience it has been estimated as follows:

$$\text{Work experience (w)} = \text{Age} - \text{Years of education} - 5$$

Though it is obvious that greater experience should generally lead to greater incomes, it is not very clear whether the returns are constant, increasing or reducing. We therefore include a quadratic term ($aw + bw^2$, where a and b are coefficients to be estimated and w is the work experience) that gives the flexibility to estimate how experience affects incomes.

Duraisamy (2000) found that during the late 1990s in India, an additional year of work experience increases the wages by 6 and 4 per cent respectively, for men and women. However, that study had considered income earned by only the salaried and wage earners, for the year 1993-94.

As expected, the results of the analysis reveal that work experience plays a very significant role in income earned by an individual. The effect of experience is positive and “experience square” is negative exhibiting positive but decreasing returns. Every one-year increase in work experience is associated with

a 3.8 per cent rise in income in initial years. However, the impact is lower for higher levels of experience. Incomes levels to reach the maximum level at about 40 years of experience. Figure 1 draws out how greater levels of experience affect incomes.

Private Returns to Education

It is well known that those having higher education levels tend to show greater unemployment rates. There could be many reasons for this, the lack of availability of jobs commensurate with the qualifications, higher reservation incomes of those better educated, etc. However, this goes contrary to what one might expect that greater levels of education and skills should lead to lower likelihood of being unemployed. Indeed we find enough evidence that the latter is true.

Then why are unemployment rates higher for those who are better educated when the better educated (all things remaining equal) have greater likelihood of being employed? The answer of course lies in the term “all remaining equal”. After correcting for factors such as age/experience we find that the greater likelihood of being employed for greater levels of education is true but only after having corrected for experience levels. Of course we also find that those with greater levels of education also have greater incomes (discussed below).

We expect an ordering where incomes from greater education are concerned – those with greater levels of education are expected to have higher incomes and those with professional and skill-oriented education would have greater incomes than others with similar years of education. This follows both international and Indian evidence [see Duraisamy 2000].

First, consider the extra income earned in percentage terms as shown in Table 4. Between those who are illiterate and those who have completed primary education there is a 31-percentage point difference in the incomes. Since primary schooling is for 4 to 5 years depending upon the state, this translates into about 6 per cent increase in income for every extra year of primary schooling. Middle school is for another three years and here the returns to an extra year of schooling are somewhat lower – about 4 per cent for every extra year of schooling. Overall for the eight years of schooling in elementary school every extra year of schooling yields about an additional 5 per cent in incomes.

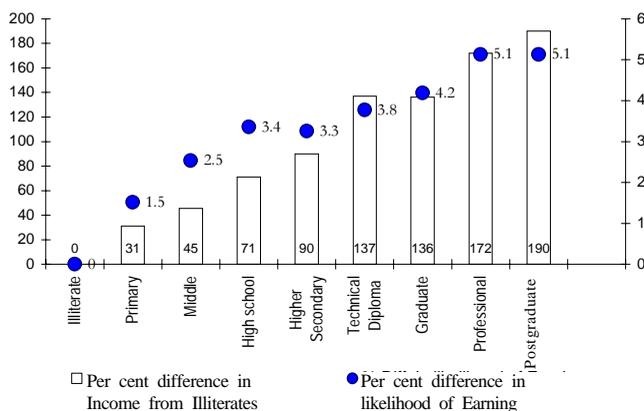
For high enough time discount factors therefore it would make sense for rational decision-makers to drop out of school. Every extra year of schooling has certain benefits and costs. The costs we have listed are the explicit cost of education, the opportunity cost, and the cost of effort. The benefits include greater incomes due to an additional year of schooling, and the greater potential income if even more schooling is achieved. Of these the former is quite low as for elementary schooling time discounted returns may well be even in the negative.

Table 3: Unemployment Rate (Usual Principal Status)⁹ for the Persons of Age 15 Years and Above

Education Completion Levels	Rural		Urban	
	Male	Female	Male	Female
Not literate	0.4	0.2	1.4	0.6
Literate up to primary	1.1	0.9	3.0	2.5
Middle	2.8	4.7	5.6	11.1
Secondary	5.2	14.7	5.5	14.4
Higher secondary	7.3	22.7	8.3	18.9
Graduate and above	10.6	33.1	6.6	16.3

Source: National Sample Survey Organisation, 55th round, 1999-2000.

Figure 2: 'Income' and 'Likelihood of Earning' as Compared to Illiterates



Greater expected incomes are also a function of the expectation of clearing the exams that lie at the end of middle, secondary and higher secondary levels. Given the relatively high failure rate, the expectation of realising those incomes at the end of schooling would be low for many. In other words, if early education cannot promise greater incomes, it must promise accessing greater incomes available for those who have completed schooling. But due to poor quality of education even the latter is not feasible for many. Quality of schooling in the early years therefore becomes even more important in a country where higher returns are realised only in later years.

Significant jumps in income levels can be seen between those completing higher secondary and graduates/diploma holders in technical education. Graduate and diploma holders are likely to earn almost 47 per cent more than those who have studied till higher secondary level. Assuming three years for graduation this translates to a 16 per cent average increase per year of study for graduation. Income earned by professional degree holders is found to be around 82 per cent more than that earned by higher secondary pass outs. Translating into a 27 per cent increase per year of professional or postgraduate education.

Overall, our results suggest that those who have completed the higher levels of education realise the greatest returns for every extra year of study. Lower levels have the lowest returns. Moreover, professional and skill-based education leads to greatest increases in incomes. These results are in line with those reported by Duraisamy (2000).

The likelihood of being employed also increases with greater levels of education. Primary schooling increases the likelihood of being employed by 1.5 per cent, upper primary or middle by another 1 per cent. The difference between higher secondary and secondary (high school) is marginal; graduation, professional education, and postgraduation lead to significant incremental increases even in the case of the likelihood of being employed.

Overall, the results indicate that greater education increases the benefits in terms of both employability as well as incomes quite significantly. However, these returns are concentrated more towards the higher grades. This suggests two possibilities for future work – are the relatively low returns for primary education a result of poor quality of schooling? Or is it the result of economic conditions that favour the highly educated and not so much those with lower levels of education. Duraisamy (2000) is the only work we can refer to for pre-reform data, however the methods and data sources are different and it is difficult to draw any conclusions on the basis of the differences between these results and theirs.

The Male-Female Difference

Studies such as Tsakloglou and Cholezas (2000-01) for the US have shown that returns to schooling are higher for females than for males. Kingdon (1998) finds that that is not necessarily the case, though her sample was limited to a single district in UP. Duraisamy (2000) also found that returns to greater education till the primary level were lower for females for the years 1983-84 and 1993-94. Beyond the primary stage, however, returns for females were higher. We find that returns to education for females are higher than males in the primary as well as later stages. The difference in returns from primary school education is however less than 2 percentage points between males and females.

However our results (refer to Table 6) differ in one respect from those of Duraisamy. He found that for post-school education,

Table 4: Percentage Increase in Income

	Years of Education	Relative to Illiterates	Relative to Previous Level of Education*	Returns Per Year of Education
(1)	(2)	(3)	(4)	(5)
Primary school	5	31.0	31.0	6.2
Middle school	3	45.5	14.5	4.8
High school	2	71.1	25.6	12.8
Higher secondary	2	89.8	18.7	9.4
Tech educ/diploma	2	137.0	47.2	23.6
Graduate	3	136.3	46.5	15.5
Professional degree	3	171.8	82.0	27.3
Postgraduate and above	2	190.0	53.7	26.9

* Previous level of education in Column 4 is considered to be higher secondary for (a) technical education and diploma, (b) graduates, and (c) professional degree holders. Graduation is considered to be previous level for postgraduate and above. The returns for postgraduation may be biased upwards as many with professional degrees also undertake postgraduation.

Source: See Appendix 1 for details.

Table 5: Percentage Difference Likelihood of Employment Compared to Those Who Are Illiterates

Education Completion levels	Percentage Difference in Likelihood of Employment from Illiterates
Reference group: Illiterate	
Primary school	1.5
Middle school	2.5
High school	3.4
Higher secondary	3.3
Tech educ/diploma	3.8
Graduate	4.2
Professional degree	5.1
Postgraduate and above	5.1

Source: See Appendix 1 for details.

Table 6: Percentage Difference in Income Earned by Individuals with Various Levels of Education Compared to Those Who Are Illiterates

Education Level	Years of Education	Relative to Illiterates (Male + Female)	Relative to Illiterates (Females)	Relative to Illiterates (Males)
(1)	(2)	(3)	(4)	(5)
Primary school	5	31	31	29
Middle school	3	46	52	42
High school	2	71	87	66
Higher secondary	2	90	133	83
Tech educ/diploma	2	137	286	125
Graduate	3	136	208	126
Professional degree	3	172	296	159
Postgraduate and above	2	190	299	177

Source: See Appendix 1 for details.

returns for males were higher than for females. That is, returns for females versus males followed an inverted U path, lower in the initial stages, then higher, and once again falling below those for males for post-school education. We find that females achieve greater returns than males even for higher levels of education.

In other words, our results indicate a monotonically increasing pattern for females vis-à-vis males.

Why are returns so much higher for females? The answer lies in the “base” incomes for females. As discussed in the previous sections, female incomes are about 36 per cent lower than males.

Appendix 1: Regression Results: Maximum Likelihood Estimates, All India, 2004-05

Coefficient * 100=Percentage Difference

(1)	Males + Females		Males		Females	
	Income (2)	Likelihood of Employment (3)	Income (4)	Likelihood of Employment (5)	Income (6)	Likelihood of Employment (7)
Gender, Reference: males						
Females	-0.36 (27.143)***	-0.13 (28.279)***				
Type of place of residence, Reference: Urban						
Rural	-0.27 (37.247)***	0.01 (2.340)**	-0.27 (36.81)***	0.01 (2.58)***	-0.22 (9.08)***	0.01 (-0.90)
Work experience	0.04 (29.720)***		0.04 (27.19)***		0.05 (12.69)***	
Work experience square*10-2	-0.05 (26.454)***		-0.05 (24.51)***		-0.06 (10.69)***	
Household asset in rupees lakh	0.03 (33.065)***	0.00 (2.313)**	0.03 (32.39)***	0.00 (-1.02)	0.02 (6.71)***	-0.01 (7.18)***
Other household income in rupees lakh	-0.02 (2.515)**	0.04 (9.063)***	-0.03 (3.86)***	0.03 (7.21)***	0.06 (2.15)**	0.07 (4.08)***
Knowledge of English (read, write and speak), Reference: Those who can't speak, read and write English						
Can speak, read and write English	0.23 (14.374)***		0.20 (12.43)***		0.37 (6.21)***	
Knowledge of English (read and write), Reference: Those who can't read and write English						
Can read and write English	0.18 (13.687)***		0.18 (13.24)***		0.28 (4.97)***	
Caste, Reference: "Others"						
SC/ST	-0.11 (12.011)***	0.01 (2.676)***	-0.12 (12.75)***	0.00 (-0.17)	-0.03 (-0.96)	0.07 (4.32)***
Education level, Reference: Illiterates						
Literate, without formal schooling						
Less than primary	0.17 (6.240)***	-0.01 (-1.29)	0.15 (5.36)***	0.00 (-0.33)	0.19 (2.36)**	0.01 (-0.35)
Primary school	0.19 (9.399)***	-0.01 (1.893)*	0.17 (8.08)***	0.01 (-0.90)	0.18 (2.71)***	-0.06 (1.88)*
Middle school	0.31 (17.707)***	0.02 (3.139)***	0.29 (15.77)***	0.02 (5.85)***	0.31 (5.50)***	-0.02 (-0.62)
High school/matriculate	0.46 (25.611)***	0.03 (5.722)***	0.42 (23.00)***	0.03 (8.12)***	0.52 (8.34)***	0.02 (-0.81)
Secondary/intermediate	0.71 (33.310)***	0.03 (7.608)***	0.66 (30.27)***	0.04 (9.64)***	0.87 (10.82)***	0.04 (1.86)*
Technical education/diploma	0.90 (31.857)***	0.03 (6.450)***	0.83 (29.03)***	0.03 (7.38)***	1.34 (11.56)***	0.10 (3.58)***
Graduate	1.37 (25.112)***	0.04 (3.954)***	1.25 (23.06)***	0.03 (3.66)***	2.86 (10.49)***	0.20 (3.34)***
Professional degree	1.36 (39.199)***	0.04 (8.268)***	1.26 (35.83)***	0.03 (7.27)***	2.08 (15.00)***	0.22 (7.99)***
Postgraduate and above	1.72 (27.596)***	0.05 (5.438)***	1.59 (25.13)***	0.03 (3.84)***	2.96 (11.83)***	0.31 (5.88)***
Other education	1.90 (32.450)***	0.05 (6.128)***	1.77 (29.47)***	0.03 (4.11)***	2.96 (13.61)***	0.31 (7.34)***
Marital status, Reference: "currently married"						
Never married	0.69 (3.713)***	-0.03 (-0.87)	1.38 (5.78)***	0.00 (-0.03)	-0.68 (2.87)***	-0.25 (-1.54)
Widow/widower	-0.07 (4.392)***	-0.24 (55.284)***	-0.12 (6.73)***	-0.19 (43.09)***	-0.06 (-1.02)	-0.39 (27.27)***
Divorced	-0.05 (2.217)**	-0.08 (9.746)***	-0.16 (5.71)***	-0.11 (10.67)***	0.03 (-0.58)	-0.17 (6.60)***
Separated/deserted	-0.14 (2.113)**	-0.04 (-1.44)	-0.28 (3.62)***	-0.03 (-0.83)	0.01 (-0.10)	-0.11 (-1.51)
Relationship with head of the household, Reference,"head of household/self"						
Same generation	-0.18 (3.607)***	-0.04 (2.106)**	-0.22 (3.08)***	-0.07 (2.59)***	-0.12 (-1.47)	-0.07 (-1.34)
Direct descendants	-0.15 (8.662)***	-0.07 (10.840)***	-0.11 (3.95)***	-0.18 (18.87)***	-0.17 (4.00)***	-0.15 (5.64)***
Other relatives	-0.03 (2.430)**	-0.16 (36.559)***	-0.04 (2.90)***	-0.13 (32.65)***	-0.17 (3.24)***	-0.37 (17.65)***
Observations	0.01 (-0.24)	-0.45 (35.825)***	-0.08 (-1.31)	-0.45 (29.49)***	-0.10 (-0.86)	-0.45 (18.93)***
	47574	47574	39710	39710	7864	7864

Absolute value of t statistics in parentheses.

Significant at 10 per cent; ** Significant at 5 per cent; *** Significant at 1 per cent.

Greater education serves to reduce that disadvantage. In other words, even if incomes increase by the same rupee amount, the fact that the “base” is lower for females serves to increase the returns in percentage terms. But that is only one part of the story. The more important one is that greater education can reduce the effect of gender bias.

There is a general consensus that despite improvements in self-assessed literacy and improvements in enrolments, educational achievement of large masses leaves much to be desired. Lower than required investment and expenditure, poor service delivery, etc are considered to be among the key impediments to the schooling for all objectives. However, these are all supply-side issues.

This study finds that returns to lower levels of education being what they are, the poor education achievement/continuation levels may also be affected by demand-side factors. That is, low returns to greater education may be responsible for the high dropout rate even before elementary education is complete. However, the results indicate a positive aspect. Once a girl child has entered the schooling system, she has much more to lose by not continuing education. This natural incentive for parents of potentially income earning daughters however gets reduced as after marriage the greater incomes may benefit other households.

V Conclusion

Using a recently made available data on incomes we analyse how a range of household, individual and educational factors affect incomes. We find that the data for India show similar patterns as found for other countries, however the quantum differs. The key results are as follows:

Non-education Characteristics

- Individuals from SC and ST households are likely to have about 10 per cent lower incomes than those from non-SC/ST households everything else remaining the same.
- Women’s incomes are likely to be about a third lower than males having the same household and educational characteristics. They are also much more likely to be unemployed than males.
- Those who are currently married are likely to have higher incomes and higher likelihood of being employed.
- Knowledge of the English language has a significant impact on incomes. Incomes of those who have knowledge of the language are between 18 and 22 per cent higher depending upon whether they can merely understand or converse in it.

Education Characteristics

- Compared to illiterates those who have completed primary have 50 per cent greater incomes, those who have completed middle school have incomes greater by 75 per cent, those who have completed schooling have incomes greater by 172 per cent, graduates by 278 per cent and professional courses by 356 per cent.
- After correcting for household and individual characteristics and state effects, compared to illiterates those who have completed primary have 31 per cent greater incomes, those who have completed middle school by 45 per cent, those who have completed schooling by 89 per cent, graduates by 136 per cent and professionals by 171 per cent.

Appendix 2: Summary Statistics

Variable	Observation	Mean	Standard Deviation	Minimum	Maximum
Female	47574	0.165	0.371	0	1
Rural	47574	0.497	0.500	0	1
Work experience	47574	24.638	14.815	0	94
Work experience square*10-2	47574	8.265	8.937	0	88.36
Household asset in rupees lakh	47574	2.836	5.353	0	170
Other household income in rupees lakh	47574	0.128	0.496	0	70.09
Can speak, read and write English	47574	0.195	0.396	0	1
Can read and write English	47574	0.389	0.488	0	1
SC/ST	47574	0.290	0.454	0	1
Literate, without formal schooling	47574	0.029	0.168	0	1
Less than primary	47574	0.064	0.244	0	1
Primary school	47574	0.120	0.325	0	1
Middle school	47574	0.180	0.384	0	1
High school/marticulate	47574	0.188	0.391	0	1
Secondary/intermediate	47574	0.089	0.285	0	1
Technical education/diploma	47574	0.017	0.128	0	1
Graduate	47574	0.092	0.289	0	1
Professional degree	47574	0.015	0.122	0	1
Postgraduate and above	47574	0.020	0.142	0	1
Other education	47574	0.001	0.032	0	1
Never married	47574	0.195	0.396	0	1
Widow/widower	47574	0.043	0.203	0	1
Divorced	47574	0.003	0.055	0	1
Separated/deserted	47574	0.005	0.071	0	1
Same generation	47574	0.082	0.274	0	1
Direct descendants	47574	0.309	0.462	0	1
Other relatives	47574	0.017	0.128	0	1
Other traditional farmer/cultivator	47574	0.116	0.321	0	1
Organised farmer practising					
mechanised farming	47574	0.012	0.109	0	1
Animal husbandry/dairy	47574	0.011	0.104	0	1
Agricultural labourers	47574	0.078	0.267	0	1
Skilled wage labourers	47574	0.072	0.258	0	1
Semi/unskilled wage labourers	47574	0.099	0.299	0	1
Salaried employee (pvt sector with less than 10 employees)	47574	0.047	0.211	0	1
Salaried employee (pvt sector with 10 to 19 employees)	47574	0.011	0.105	0	1
Salaried employee (pvt sector with more than 20 employees)	47574	0.032	0.177	0	1
Salaried employee (central govt)	47574	0.025	0.158	0	1
Salaried employee (state govt)	47574	0.100	0.300	0	1
Owner: Trading/retail business, with fixed premises	47574	0.120	0.325	0	1
Owner: Trading/retail business, with no fixed premises	47574	0.032	0.175	0	1
Owner: Small-scale manufacturing unit	47574	0.003	0.055	0	1
Owner: Medium and large-scale manufacturing unit	47574	0.000	0.011	0	1
Self-employed professionals	47574	0.009	0.092	0	1
Other self-employed workers	47574	0.071	0.257	0	1
Home-based workers	47574	0.014	0.118	0	1
Arunachal Pradesh	47574	0.028	0.165	0	1
Assam	47574	0.041	0.199	0	1
Bihar	47574	0.044	0.206	0	1
Chhattisgarh	47574	0.038	0.191	0	1
Delhi	47574	0.018	0.132	0	1
Gujarat	47574	0.043	0.203	0	1
Haryana	47574	0.040	0.196	0	1
Himachal Pradesh	47574	0.029	0.168	0	1
Jharkhand	47574	0.037	0.189	0	1
Karnataka	47574	0.041	0.198	0	1
Kerala	47574	0.062	0.241	0	1
Madhya Pradesh	47574	0.048	0.215	0	1
Maharashtra+Goa	47574	0.046	0.209	0	1
Jammu and Kashmir	47574	0.027	0.162	0	1
Other NE states excluding Manipur	47574	0.033	0.178	0	1
Orissa	47574	0.042	0.201	0	1
Punjab	47574	0.041	0.197	0	1
Rajasthan	47574	0.032	0.177	0	1
Sikkim	47574	0.045	0.207	0	1
Tamil Nadu	47574	0.049	0.216	0	1
Tripura	47574	0.035	0.184	0	1
Uttar Pradesh	47574	0.047	0.213	0	1
Uttaranchal	47574	0.034	0.182	0	1
West Bengal	47574	0.053	0.225	0	1

– In other words, we find that the returns to greater education increase significantly as the level of education increases. This would be fine if the returns at the lowest level were high. However, that is not the case and may be an important reason behind the high dropout rate. We also find evidence that there are significant rigidities in the labour market in the sense that household and gender factors explain a significant part of the variance in incomes. With greater education one may be able to break these rigidities, however, that requires children to remain in school.

For educational policy the message is quite clear: Quality of delivery, and content that enables flexibility in later occupational choice. This will ensure that rational children can expect to gain from the benefits of formal education, and therefore also remain in school longer.

The above results throw up three distinct insights for education policy:

(i) Improve quality of education services – quality not necessarily in terms of school facilities (though they do need to be improved) but as assessed by the consumers, and in its ability to generate higher incomes.

(ii) Ensure that quality is maintained such that students especially from poorer and underprivileged sections are able to access primary school and remain in school through higher levels of schooling.

(iii) Greater focus on development of skills and professional expertise. The results also show that though those traditionally considered to be underprivileged do have lower incomes – scheduled castes and tribes, and females; but greater education has the potential to counter the inherent disadvantages. A greater focus on schooling is essential not only from a growth and efficiency perspective, but also equity. One of the more positive results was related to the low impact of household economic status on an individual's income. With improvements in access to schooling, and improvements in school achievement, the equity objective (however it may be defined) is achievable.

Further research issues include an analysis of state-level differences as well as the interaction of education with other factors. It is clear that quality of education, its appropriateness, the nature of the economy, etc, all affect the returns to greater education in a complex manner. With the public availability of this dataset, we believe that such analysis can throw important insights into the design of education policy and the impact of education on better livelihoods for all. 

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Notes

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- 1 See Sianesi and Reenen (2000) for a review of the macro economic literature on returns to education. Also see for Psacharopoulos (1985); Card (1995); Denison (1974); and Mankiw, Romer and Weil (1992) for reviews of international evidence.
- 2 Admittedly there are some differences between our and those results, but the differences in data sources and structure prevents us from drawing inferences as to pre- and post-reform differences.
- 3 Rational households would base their current education choices on the expectation of future incomes. But that expectation is likely to be determined by the currently observed income differentials between those who are less educated and those who have greater levels of education.
- 4 See "http://www.finmin.nic.in/stats_data/pension_data/index.htm" for further details of the survey.

5 Table: Average number of earners and unemployed in a household across different household sizes

Household Size Category	Sample	
	Average Number of Earners	Average Number of Unemployed
1 member	1.00	0.00
2 members	1.22	0.04
3 members	1.33	0.10
4 members	1.41	0.15
5 members	1.54	0.24
6 members	1.73	0.29
7 members	1.92	0.36
>7 members	2.46	0.45
All	1.63	0.23

- 6 The data does not include responses from those households where everyone is unemployed. This also does not introduce any biases in the income related estimations as for such households, work related income will by definition be nil. The method of randomly "choosing" the unemployed also does not introduce any biases. However, since the households where everyone is unemployed are more likely to be those that are poorest and least well educated OLS estimates would have led to results that would have been biased downwards.
- 7 Some have explicitly tried to test the appropriateness of this form.
- 8 That is, the estimates obtained from the method is of the form $-\ln(a/b)$ but for exposition it would be better to convert it to the form $((a-b)/b)$. Say $\ln(a/b) = x$, therefore $a/b = \exp(x)$, which in turn implies that $((a-b)/b) = \exp(x)-1$. Multiplying with 100 gives the percentage difference. Therefore, the coefficients for the explanatory variables that are discussed in the text as well as figures in this paper have been converted to reflect percentage difference and not logarithmic changes.
- 9 Unemployment rate is defined as the number of persons unemployed per thousand people in the labour force (NSSO, 'Employment and Unemployment Situation in India, 1999-2000').

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