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Returns to Education in Nepal: Evidence from Living Standard Survey

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Abstract

The empirical literature detailing the mechanisms underlying schooling and earnings is limited in the context of Nepal, a country characterized by low enrollment rates and education levels, high illiteracy and a large disparity between male and female education. This paper employed standard Mincerian earning function method to estimate returns to education using Nepal living standard measurement survey 1995-96. The private rate of return for persons wage employed (both in agriculture as well as not in agriculture) are estimated for the full sample and by gender, region of birth, age cohorts and province. Ceteris-paribus, one additional year of schooling confers a benefit of 6% only. The findings report wide earnings disparity across gender. Family background doesn't influence significantly the innate ability of siblings and thereby the earnings and education is not endogenous in the context of Nepal. Overall, the marginal return to education level is consistent with the pattern observed world wide-higher returns to primary and higher education as compared to secondary education. By region of birth, the rates of return are higher for born in urban relative to rural counterparts and by gender, the marginal rate of return for female is higher than male for all education levels. The rate of return to primary for second cohort (36-50) is higher than the younger cohort and the marginal rate of return for primary education is highest in Central province and Mid-eastern province for higher education.

Key words: Rate of return, schooling, education, Nepal

I. Introduction

Despite the indispensable role played by the educational system in the overall development, there is limited research detailing returns of education in Nepal, a country characterized by low enrollment rates and educational levels, high illiteracy and a large disparity between male and female education. Returns to investment in education based on human capital theory have been estimated since early 1960s and it is observed that investment to education behaves in a more or less similar manner as investment to physical capital (Psacharopoulos and Patrinos, 2002). Similarly, estimates on return to education implemented by various researchers using data from different countries has convincingly shown that investment in education is profitable (Psacharopoulos 1994, Brunello and Comi 2003, Duraisamy 2001). National level estimates of private rate of return to education made for urban Nepal in 1982 by USAID and compiled by Psacharopoulos (1994) showed increasing rate of return across educational levels- 15% and 21.7% for secondary and higher education respectively. Parajuli (1999) estimated both social and private rate of return for wage employed workers in Nepal and reported lower rate of return- the highest rate being for those with primary education- 16.6%. While these studies have made important contribution to the limited literature in this area in Nepal, their estimates are based either on firm level data or urban sample which are highly selective and therefore not representative of Nepalese labor market. Besides monetary benefits, education also confers non-monetary or social benefits such as increased agricultural productivity reduced family size, better health status and child care, women empowerment and increased political awareness and representations. Duraisamy (1992) reported that farmers with 4 years and plus education increases the gross value of farm output by 4% in India and also showed that the educated farmers are more technically and allocatively efficient than their uneducated counterparts. Similarly, Basu (1992) showed that in urban in India, the infant mortality rate for educated mothers is 34 per thousand but escalates to 82 per thousand for mothers with no education. In terms of policy formulation, studies on returns to education are useful in number of ways. For example, a significant difference in returns to primary and secondary education signals the policy makers and households to invest relatively more in the education level that yield higher returns. To extent that the returns to education in particular country may show declining trend, it is necessary to identify the causes of such decline. Further, households evaluate benefits of schooling decisions in terms of expected future benefits and if the benefits are too low, then the policies advocating for the use of education services as part of poverty alleviation package may be ill-conceived (Manda et. al., 2004).

The purpose of this paper is to estimate returns to education for workers in wage employment including those in the agriculture sector by gender, age cohort, region of birth (born urban vs born rural) and province. In addition, the current work also addresses some estimation issues, particularly the endogeneity posed by years of education.

II. Education and Labor Market Perspective

In 1951, Nepal had 310 primary and middle schools, eleven high schools, two colleges, one normal school, and one special technical school. Access to schooling is limited to general public. The average literacy rate was 5 percent. A major educational reform started after the revolution of 1951 with the introduction of new education system operationalized in 1971 with the launching of the National Education System Plan (NESP). Primary education was made free in early 1970s and the government became responsible for providing school facilities, teachers and educational materials. By 2000, Nepal had 25,927 primary schools, 7,289 lower secondary schools, 4,350 higher secondary schools. Primary enrollment totaled 3,623,150 persons, lower secondary and higher secondary enrollments figures stood at 957,446 and 372,914 persons respectively (CBS, 2002). Total investment in education remained roughly around 2% of the GDP during the period 1970 thru 1996. Correspondingly, annual government expenditure on education stood at an average of 12% of the total annual budget. The academic structure is divided into six levels: Primary, Lower Secondary, Secondary, Higher Secondary (general), Higher Secondary (technical) and University education. Primary Education is the first level of schooling and lasts for 5 years. The minimum entry age for this level of schooling is six years. Secondary Education lasts for 5

years- (lower secondary takes two years and upper secondary takes 3 years). The School Leaving Certificate examination (SLC), a nationally administered and monitored high school matriculation examination, was given after completion of the upper secondary level. Higher Secondary Education consists of grade 11 and 12. The higher secondary education (general) is available in specialized streams such as science, commerce, humanities and education. University Education starts after grade 12 and is of three-year duration. The Bachelor's Degree courses in technical institutes like Engineering and Medicine takes four years. The level of education attainment of the workforce in Nepal is abysmally low even by the standards of South Asia. According to the ILO report (1997), about 71% of the population age 6 years or more had no schooling at all and less than 4% had schooling leaving certificate (SLC) or more. Another important point discernable is that the educational attainment of female is by far less than males at all levels.

The work participation rate in Nepal in 1991 was 56.56% while that of 1981 was 65.14%. The rate has been decreasing over time, perhaps because of rising enrollment of children in schools. The participation rate is lower in urban than in rural areas and lower for females than for males. In 1996, 21.7% of all the workers were in wage employment; 12.2% in agriculture and 9.5% outside agriculture. Desegregation by location showed 21% (13% in agriculture and 8% outside agriculture) of rural work force and 43% (5% in agriculture and 38% outside agriculture) of the urban work force in wage employment. By developing region, wage employment was 26% of the total employment in Eastern, 24% in the Central, 20% in the Western and Mid western and 12% in the far-western development regions, and more than half of all wage employment was in agriculture in all development regions except for the Far-Western development region where it was 47% (CBS, 1997). Most available estimates of unemployment put the rate of unemployment in the country at 3%-5%. Provisional results from Living Standard Measurement Survey 1995/96 shows the rate to be around 4.9%-8% for urban males, 5.3% for rural males, 8.8% for urban females and 4% for rural females.

III. Data and Variables

The data used in the analysis comes from Nepal Living Standard Measurement Survey (LSMS) 1995/96. The survey was implemented by the Central Bureau of Statistics (CBS), Nepal with technical and financial assistance from the World Bank. It is the first comprehensive household survey ever conducted and contains information on broad range of economic and social indicators such as housing, consumption, education, health, migration, employment, maternity, credit & savings, remittances and community characteristics. The survey covers information from 30,043 individuals living in 3,373 households. The sample was divided into four strata based on the geographic and ecological regions of the country; mountains, urban hills, rural hills and terai. The sample is representative of 73 of 75 districts. The added advantage of using household survey over firm based survey is that the former is more likely to be representative of the country's population relative to the later. Estimates obtained by using firm based surveys are vulnerable to bias and have to be interpreted with some amount of caveat. The variables used in this analysis are listed below the table 1.

Table. 1. Definition of Variables

Variables	Definition
Hourly wage	Natural logarithm of hourly earnings
Years of education	Number of years of schooling completed
Potential experience	Number of years an individual has been working
Potential experience squared	The square of potential experience
No schooling	1 if an individual has no formal schooling, 0 otherwise
Primary or less schooling	1 if an individual has primary or less schooling, 0 otherwise
Secondary education	1 if more than primary but less or equal to secondary schooling, 0 otherwise
Higher secondary or more	1 if higher secondary education or more, 0 otherwise
Male	1 if an individual is male, 0 otherwise
Female	1 if an individual is female, 0 otherwise
Born_urban	1 if an individual is born urban, 0 otherwise
Born_rural	1 if an individual is born rural, 0 otherwise
Married	1 if an individual is married, 0 otherwise
Single	1 if an individual is divorced, separated or widow, 0 otherwise
Age1	1 if an individual is in the age cohort of 22-35 years, 0 otherwise
Age2	1 if an individual is in the age cohort of 36-50 years, 0 otherwise
Age3	1 if an individual is in the age cohort of 51-65 years, 0 otherwise
Age4	1 if an individual is in the age cohort of 66-90 years, 0 otherwise
Father_noeduc	1 if father has no education, 0 otherwise
Father_primeeduc	1 if father has with primary or less education, 0 otherwise
Father_highereduc	1 if father with more than primary education, 0 otherwise
Mother_noeduc	1 if mother has no education, 0 otherwise
Mother_primeeduc	1 if mother has with primary or less education, 0 otherwise
Mother_highereduc	1 if mother with more than primary education, 0 otherwise
Father_agri	1 if father wage employed in agriculture, 0 otherwise

Father_selfagri	1 if father self employed in agriculture, 0 otherwise
Father_selfnonagri	1 if father is self employed not in agriculture, 0 otherwise
Mother_agri	1 if mother wage employed in agriculture, 0 otherwise
Mother_selfagri	1 if mother self employed in agriculture, 0 otherwise
Mother_selfnonagri	1 if mother is self employed not in agriculture, 0 otherwise

IV. Empirical Specification

Returns to investment in education can be estimated by using two different basic methods: namely 'full' or 'elaborate' method and the 'earnings functions' method. The two methods is said to yield similar results (Psacharopoulos, 1994). While the full method is said to be the most appropriate method for estimating returns to education, it is found to be very much data-demanding and hence is rarely used (Psacharopoulos, 1994). Instead, Mincerian earnings functions method has been widely used in returns to education literatures. However, the earnings function method rests on a number of assumptions which makes it difficult to interpret the estimated returns as the true internal rate of return. Despite of some shortcomings, the Mincerian earning function method has gained popularity and is widely used in return to education literature mainly because of its simplicity and ease of estimation.

The empirical framework adopted in this paper is the human capital earnings function method developed by Mincer (1974). According to Mincer, earnings determinants could be estimated by using the following functional form:

$$\ln Y_i = \beta_0 + \beta_1 S_i + \beta_2 Exp_i + \beta_3 Exp_i^2 + \beta_4 Gen_i + \beta_5 MS_i + \beta_6 BR_i + \beta_7 P_i + \beta_8 HS_i + \varepsilon_i \quad ....(i)$$

where $\ln Y_i$ is the natural logarithm of hourly labor market earnings, S_i is the number of years of schooling, Exp_i & Exp_i^2 are the years of potential experience and its square and, Gen_i, MS_i, BR_i, P_i *and* HS_i are binary variables representing gender (male or female), marital status (married or single), region of birth (urban or rural), province indicator and household size respectively. The dependent variable in the wage or salaries (both cash & in-kind) received during the reference year, month or week divided by total numbers of hours reported working in wage work during that period. A square term in potential experience is included to capture non-linearity in the experience-earnings profile. The coefficient β_1 in this semi log specification is interpreted as percentage point increase in return to education as a result of one additional year of schooling irrespective of the level of schooling. The parameters of two experience variables explain the relationship between experience and earnings. Equation (i) is also estimated separately by including family background characteristics in addition to the existing variables. The family characteristics are included to account and control for the genetic ability of children as well as the complementary home learning for those with educated parents. In this paper, family background characteristics are proxied by series of dummies representing parent's education level and occupational type.

The earnings specification described in equation (i) is based on the assumption that log wages are linear in years of schooling which suggest that ceteris-paribus, one additional year of schooling yields the same return irrespective of the level of education. In order to account for marginal returns across educational levels, the earnings education (i) can be modified by converting the continuous years of schooling variable into series of dummy variables representing different levels of schooling as shown below:

$$\ln Y_i = \beta_0 + \Sigma_k a_{ik} SL_{ik} + \beta_2 Exp_i + \beta_3 Exp_i^2 + \beta_4 Gen_i + \beta_5 MS_i + \beta_6 BR_i + \beta_7 P_i + \beta_8 HS_i + \varepsilon_i \quad ....(ii)$$

where, SL_i are the schooling levels representing k level dummies. The levels of education considered are primary or less, secondary (lower & upper) and higher education (Higher secondary & Bachelor degree). Persons with no formal schooling belong to the reference group. From equation (ii), the marginal rate of return per year of schooling for the kth level (r_k) can be computed as:

$$r_k = \left(a_j - a_{j-1}\right) \Big/ S_k$$

Where S_k is the number of years of schooling at the kth level. However, in the case of primary level, only 2 years is considered as they do not forego earnings during the entire length of studies. The rate of return for reference group is assumed to be zero since no investment is made for their education. Equation (ii) is also estimated separately by including age cohort dummy variables to account for differential effect of schooling. The estimation is implemented given the fact that access to and quality of schooling varies over a space of time. And thus, different cohorts of the sample may have undergone schooling of different quality. The sample is categorized into four cohort's dummies: age1 (22-35), age2 (36-50), age3 (51-65) and age4 (66-90) and the estimation is implemented separately for each cohort. Similar estimation is also implemented for region of birth and province.

V. Estimation Issues

Estimates of return to education may suffer from several draw backs. These arise from omission of relevant variables, unobserved ability & quality of education and measurement error. As documented in returns to human capital literature, years of education is suspected to be endogeneous due to the fact that higher educational attainment is partly attributable to individual's innate ability. To tackle these issues, various estimation methods have been implemented and IV methods using wide range of instruments has become one of the predominantly employed alternatives. A group of literatures (Card, 1999; Levin & Plug, 1999 and Ashenfelter & Rouse, 1998) estimating the return to

schooling have used family background either as control or as an instrument to address the issue arising from unobserved ability. Another group of researchers (Angrist & Krueger, 1991; Kane & Rouse, 1993; Harmon & Walker, 1995) used institutional features of the school system such as quarter of birth, tuition fees, proximity to college, minimum schooling leaving age as instruments to identify the casual effect of schoolings on earnings. In this paper, family background is used as a control rather than as instruments. We state that using family background as a control sounds more logical/intuitive as opposed to using it as instruments owing largely to the endogeneity posed by the correlation of family background variables and the residual unobserved variable still imminent in the error term. Family background in this analysis is proxied by parent's education and parent's occupation dummies. Parents with no education and wage employed in agriculture belong to the reference group. Finally to check endogeneity of education, we used Hausman specification test statistic.

VI. General Characteristics

The general characteristics of the sample are presented in Table 2. For the analysis, the sample is restricted to individuals who reported having wage employed either in agriculture or non-agriculture and, who actually reported their wages and other individual characteristics such as hours worked per day, age, schooling information, family and community characteristics. Only 4,565 individuals have been reported as wage employed (both agriculture & non-agriculture). The sample size shrinks further when the annual, monthly and daily wages are converted into hourly wages. Thus, the sample used for the analysis is 3,569 of which 2,518 are males and 1,051 are females. The average hourly earning is Rs. 8.77. Male receives nearly Rs. 3 more than females and there exists large gap in hourly earnings between those born urban and born rural. The mean hours worked per day is 7.8 hours and is similar across gender and birth regions. The educational attainment is very low- just around 2%. Male attainment is by far better than the female. Also, those born in the urban area have relatively more years of schooling than those born rural. The education level is also very low. Nearly, 70% of those wage employed have had no schooling at all. Just about 15% of them have secondary or more education. The major chunk of the sample, almost 91% is born rural. The mean age of the sample is 36 and 32 for male and female respectively. Close to 60% of the sample are wage employed in agriculture.

Table. 2. Descriptive statistics (standard deviation in parenthesis)

Variables	All	Male	Female	Urban born	Rural born
N	3569	2518	1051	318	3251
Earnings (Rs.)	8.77 (15.85)	9.98 (12.77)	6.3 (21.31)	17.0 (44.23)	8.0 (8.81)
Potential experience (Rs.)	26.8 (13.77)	27.4 (14.05)	25.3 (12.94)	24.5 (13.19)	27.0 (13.80)
Hours worked per day	7.8 (1.60)	7.9 (1.65)	7.6 (1.47)	7.5 (1.68)	7.8 (1.59)
Age (years)	34.8 (12.97)	35.9 (12.95)	31.8 (12.55)	35.7 (13.08)	35.1 (12.96)
Years of education	1.9 (3.46)	2.5 (3.78)	0.5 (1.84)	4.5 (4.92)	1.6 (3.16)
Had no schooling	0.69 (0.464)	0.60 (0.490)	0.90 (0.296)	0.43 (0.495)	0.71 (0.453)
Primary and less	0.16 (0.369)	0.21 (0.405)	0.06 (0.236)	0.19 (0.394)	0.16 (0.366)
Secondary	0.12 (0.323)	0.15 (0.361)	0.03 (0.179)	0.24 (0.425)	0.11 (0.309)
Higher education	0.03 (0.174)	0.04 (0.201)	0.01 (0.069)	0.15 (0.352)	0.02 (0.141)
(22-35 yrs) cohort	0.41 (0.492)	0.41 (0.493)	0.40 (0.490)	0.41 (0.493)	0.41 (0.492)
(36-50 yrs) cohort	0.30 (0.457)	0.31 (0.462)	0.27 (0.444)	0.30 (0.458)	0.30 (0.457)
(51-65 yrs) cohort	0.11 (0.318)	0.13 (0.334)	0.08 (0.272)	0.11 (0.314)	0.11 (0.318)
(66-90 yrs) cohort	0.01 (0.112)	0.02 (0.127)	0.00 (0.061)	0.02 (0.136)	0.00 (0.109)
Married	0.81 (0.393)	0.84 (0.364)	0.72 (0.446)	0.76 (0.427)	0.81 (0.389)
Single (separate, divorced, widow)	0.19 (0.393)	0.16 (0.363)	0.27 (0.446)	0.24 (0.425)	0.19 (0.389)
Wage employed agri.	0.59 (0.492)	0.47 (0.499)	0.88 (0.321)	0.22 (0.419)	0.63 (0.484)
Wage employed non-agri.	0.39 (0.488)	0.52 (0.499)	0.10 (0.296)	0.76 (0.425)	0.36 (0.479)
Self-agri	0.02 (0.123)	0.02 (0.120)	0.02 (0.129)	0.01 (0.096)	0.01 (0.125)

VII. Empirical Results

The estimation is done for full sample and, by gender, region born, age cohorts and province (development regions) by stata 10 (Stata, 2008).

Table. 3. OLS estimate of returns

Variables	OLS		OLS (family background as control)	
	Coefficient	Standard Error	Coefficient	Standard Error
Years of education	0.06	0.004***	0.06	0.005***
Experience	0.03	0.004***	0.02	0.004***
Experience squared	-0.00	0.000***	-0.00	0.00***
Female	-0.28	0.024***	-0.29	0.024***
Born urban	0.38	0.044***	0..35	0.045***
Married	-0.00	0.033	-0.01	0.032
Eastern province	-0.05	0.027*	-0.05	0.027*

Western province	-0.05	0.035	-0.05	0.035
Mid western province	0.14	0.041***	0.13	0.041***
Far western province	0.11	0.047**	0.11	0.047**
Household size (6-10)	0.01	0.029	0.01	0.029
Household size (11-15)	0.01	0.029	0.01	0.029
Household size (16-24)	0.05	0.035	0.05	0.035
Mom educated	-	-	-0.12	0.045**
Father educated	-	-	-0.01	0.045
Mom work not in agri	-	-	0.01	0.070
Father work not in agri	-	-	0.11	0.044**
Constant	1.43	0.049***	1.50	0.056***
R squared	0.17		0.17	
Observation	3569		3569	
F(4,3551)	-		5.35***	

Note : ***significant at 1%, **significant at 5%, *significant at 10%

Table 3 presents the estimates of wage equation with and without family background as control variables. Family background variables are added to the model to control for differential ability that might arise from genetic markings. Surprisingly, in either case, the estimate doesn't differ except the standard errors. The average rate of return becomes 6% in both cases for one additional year of schooling when all other variables remains fixed, which is statistically significant at 1% level of significance. The results suggest that the average rate of return on education remains same whether family background variables are controlled or not. Potential experience and its square have the expected sign and are statistically significant. One additional year of potential experience increases the hourly rate of earnings by 2%. While estimate of potential experience squared has the expected sign indicating non-linear relationship, the magnitude of its coefficient is very small that no economic interpretation can be made (Wooldridge, 2009). . The result exhibits wide inequality in earnings across gender. As compared to males, females earn roughly 28% less. This is not surprising since the educational attainment of female is far lower than that of male. Region of birth plays a significant role in determining the earnings. The dummy variable for urban born is positive and statistically significant suggesting that log of hourly earnings are significantly higher (about 38%) for urban born as compared to rural born. This is a clear evidence of urban/rural disparity in enrollment and attainment since those born rural may have access to fewer schools and less qualified teachers. The result also demonstrates to a certain degree the labor market conditions. Nonetheless, the significant disparity in earnings need to be interpreted with caution since some part of it may be attributable to sample selection bias arising mainly from few observations (10% of the sample size) in the urban sample. The coefficient of married dummy has the expected sign but is statistically not significant. The province indicator controls for differences in development, labor market conditions and also the existence of social facilities. The reference group considered is central province. The coefficient of the eastern province has the expected sign and is statistically significant suggesting that the earnings in this province is 5% less than the reference group. Although western province coefficient has expected sign it is not significant. Strangely, the estimates suggest that mid-western and far-western province fetches higher earnings relative to central province despite the fact that they are relatively far-off and less developed. Possible reasons for higher earnings may be because of the few number of observations coupled with the fact that demand for qualified manpower exceeded supply or it may be that only those who are truly wage employed in non-agricultural sectors (salaried individuals) have responded to the survey. The household size variables are statistically not significant and hence no reliable inferences can be made. Like most literatures, the estimates for mother's education is found to be negatively associated to earnings. Father's education also have negative coefficient but is statistically not significant. The coefficient of father wage employed in non-agriculture sector bears the expected sign and is significant indicating positive association between father's occupation and earnings.

Table. 4. OLS estimates and marginal returns by education level

Variables	OLS estimates			Marginal returns		
	Full sample	Male	Female	Full sample	Male	Female
Primary or less	0.12***	0.13***	0.13***	0.06***	0.06***	0.07***
	(0.034)	(0.037)	(0.061)	(0.017)	(0.019)	(0.031)
Secondary	0.33***	0.32***	0.50***	0.04***	0.04***	0.07***
	(0.042)	(0.042)	(0.172)	(0.009)	(0.009)	(0.033)
Higher secondary	0.98***	0.97***	1.45***	0.13***	0.13***	0.19***
	(0.066)	(0.068)	(0.413)	(0.015)	(0.015)	(0.092)
R squared	0.18	0.12	0.15			
Observation	3569	2518	1051			

Note : ***significant at 1%, **significant at 5%, *significant at 10%

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The estimates and the marginal rate of return per year across levels of education computed from OLS using education level dummies is reported in Table 4. In general, the marginal rate of return is higher for primary and higher education as compared to secondary. The rate of return per year of schooling for primary, secondary and higher education is 6, 4 and 13% respectively. This is in line with the conventional pattern observed world wide (Psacharopoulos and Patrinos, 2002). It is a signal for stake holders and policy makers to invest more in primary education and of course to higher education. By gender, the marginal rate of return for female is higher than male for all education levels. Men receives 6, 4 and 13% returns to primary, secondary and higher education while that of female is 7, 7 and 19% respectively, suggesting investment in female education is relatively profitable.

Table. 5. OLS estimates and marginal returns by education level of age cohorts

	OLS estimates			Marginal returns		
	Full sample	**Male**	**Female**	**Full sample**	**Male**	**Female**
Cohort1 (22-35)						
Primary or less	0.12 (0.051)	0.14 (0.056)	0.18 (0.119)	0.06 (0.026)	0.07 (0.028)	0.09 (0.059)
Secondary	0.29 (0.064)	0.29 (0.069)	0.61 (0.178)	0.03 (0.014)	0.03 (0.014)	0.09 (0.037)
Higher education	0.91 (0.133)	0.94 (0.139)	0.63 (0.260)	0.12 (0.026)	0.13 (0.028)	0.004 (0.043)
R squared	0.15	0.08	0.19			
Observation	1459	1040	419			
Cohort2 (36-50)						
Primary or less	0.20 (0.073)	0.17 (0.075)	-0.04 (0.107)	0.10 (0.037)	0.09 (0.038)	-0.02 (0.054)
Secondary	0.37 (0.108)	0.27 (0.100)	2.39 (1.00)	0.03 (0.022)	0.02 (0.021)	0.49 (0.205)
Higher education	0.99 (0.135)	0.93 (0.139)	2.07 (0.818)	0.12 (0.025)	0.13 (0.023)	-0.07 (0.226)
R squared	0.21	0.16	0.24			
Observation	1061	777	284			
Cohort3 (50-65)						
Primary or less	-0.00 (0.169)	-0.02 (0.172)	-	0.002 (0.084)	-0.007 (0.086)	-
Secondary	0.53 (0.188)	0.46 (0.193)	-	0.11 (0.048)	0.10 (0.048)	-
Higher education	0.82 (0.327)	0.68 (0.363)	2.16 (0.248)	0.06 (0.059)	0.04 (0.062)	-
R squared	0.25	0.21	0.39			
Observation	406	321	85			

Note : ***significant at 1%, **significant at 5%, *significant at 10%, standard errors reported in parenthesis

The estimates are computed from the OLS results and the return to education estimates by level for different age cohorts is reported in Table 5. Overall, the estimates are consistent- market reward to primary and higher education being higher than that of secondary. But the rate of return to primary for 2nd cohort (36-50) is higher than the 1st cohort (younger cohort) by 4%. This may perhaps be the effect of experience on earnings profiles. Another plausible reason may stem from the fact that older cohort may have experienced relatively favorable demand owing to fewer supply of primary graduates during those period. The estimates from male sample showed similar and consistent results while the estimates of female sample is inconsistent and can't be relied on because of few observation. The fact that primary and higher education fetches higher returns relative to secondary is further supported by these estimates. The return to secondary education reported highest for 3rd cohort.

Table. 6. OLS estimates and marginal returns to education by region of birth

Variables	OLS estimates			Marginal returns		
	Full sample	**Male**	**Female**	**Full sample**	**Male**	**Female**
Born urban						
Primary or less	0.17 (0.112)	0.13 (0.133)	0.29 (0.226)	0.08 (0.056)	0.07 (0.067)	0.15 (0.113)
Secondary	0.36*** (0.134)	0.24** (0.112)	1.09* (0.631)	0.04 (0.027)	0.02 (0.028)	0.16 (0.106)
Higher education	0.85*** (0.139)	0.75*** (0.142)	1.43** (0.577)	0.10*** (0.031)	0.10*** (0.028)	0.06 (0.169)
R squared	0.25	0.20	0.51			
Observation	318	252	66			
Born rural						
Primary or less	0.12*** (0.035)	0.13*** (0.039)	0.09 (0.065)	0.06*** (0.018)	0.07*** (0.019)	0.04 (0.035)
Secondary	0.31*** (0.042)	0.34*** (0.046)	0.18** (0.077)	0.04*** (0.009)	0.04*** (0.01)	0.02 (0.018)
Higher education	1.06*** (0.072)	1.07*** (0.075)	1.25*** (0.039)	0.15*** (0.016)	0.15*** (0.016)	0.22*** (0.017)
R squared	0.14	0.08	0.08			
Observation	3250	2266	984			

Note : ***significant at 1%, **significant at 5%, *significant at 10%, standard errors reported in parenthesis

The region of birth accounts for earnings differential that may arise due to difference in quality and availability of schooling infrastructure. The estimation results are reported in Table 6. At least for the full and male sample, the pattern of returns is similar to previous estimates by educational level. However, most of the coefficients in urban born

sample are statistically not significant even after adjusting for corrected standard errors. Thus, an attempt to infer any comparison (urban vs rural) from this estimate should be made with difference and care. At this point, the maximum that can be extracted from it would be that higher education fetches higher returns for those born rural and the overall returns for males born rural are higher as compared to urban counterparts. Although surprising result, the likely explanation could be the effect of rural to urban migration.

Table. 7. OLS estimates and marginal return to education by province

Variable	OLS estimates					Marginal returns				
	Eastern	Central	Western	Mid eastern	Far western	Eastern	Central	Western	Mid eastern	Far western
Primary or less	0.003	0.30***	0.04	-0.04	0.13	0.002	0.15***	0.02	-0.02	0.07
	(0.063)	(0.056)	(0.111)	(0.074)	(0.129)	(0.032)	(0.028)	(0.056)	(0.037)	(0.065)
Secondary	0.30***	0.48***	0.32***	0.03	-0.03	0.06***	0.04***	0.06**	0.01	-0.03
	(0.076)	(0.074)	(0.095)	(0.105)	(0.115)	(0.017)	(0.015)	(0.028)	(0.020)	(0.036)
Higher education	0.84***	0.98***	1.10***	1.57***	1.24***	0.11***	0.10***	0.16***	0.31***	0.26***
	(0.156)	(0.091)	(0.124)	(0.259)	(0.312)	(0.033)	(0.021)	(0.028)	(0.051)	(0.067)
R squared	0.17	0.24	0.19	0.10	0.11					
Observation	919	1311	448	405	262					

Note : ***significant at 1%, **significant at 5%, *significant at 10%, standard errors reported in parenthesis

The estimate of return to education levels by province is reported in Table 7. The province indicators accounts for differential effect arising from difference in province characteristics. The marginal rate of return for primary education is highest in Central province (15%) while the marginal rate of return is 31% in Mid-Eastern province, 26% in Far-Western province and 16% in Western province for higher education. The estimates from the Central province are in line with conventional pattern and are statistically significant. Whereas the highest returns for higher education in Mid-eastern and Far-western may have been grossly over estimated due to selection bias- only those qualified and employed as wage/salaried workers may have been included in the sample. Hausman specification test suggest that education is not endogenous in the context of Nepal according to the Stata reference manual (Stata, 2008).

VIII. Conclusion

The findings confirm the conventional theory that investment in education behaves more or less in a similar manner as investment in physical capita. Ceteris-paribus, one additional year of schooling confers a benefit of 6%. However, the rate of return is low as compared to the world and regional averages (10%). Family background variables (proxied by parent's education and occupation) don't significantly influence the earnings. In Nepal, female earn less as compared to males. This finding suggests wide earnings disparity across gender. This implies that policies directed towards increasing girl's access to school, recruiting more female teacher and removing barriers imposed by prevailing social stigma for girl's enrollment would be more rewarding. Earnings inequality is also prevalent across one's region of birth implying that the distribution, access and quality of education are poor in rural areas. While the unequal distribution of school facilities between rural and urban can not be ignored, some part of earnings inequality perhaps might have come from rural urban migration- i.e. it is likely that those who had education in rural areas are currently working in urban or that those born rural might have had schooling in urban. Strangely, the market reward for Mid and Far-western provinces are better as compared to Central region. But the results are likely to be inflated because of sample selection bias. The impact of house hold size on earnings is unknown. One surprising finding of this paper is that the years of education in Nepal is not endogenous. This is in contrast with many literatures which found evidence of endogeneity. The results suggest that after controlling for family characteristics, the distribution of unobserved variables (ability and quality of education) are not markedly different across individuals.

The market reward to primary and higher education is higher than secondary. The higher return to primary goes well with the Government's policy of providing free and universal primary education. Since higher return to higher education itself provides conductive environment for investment, increasing state's investment in primary education may entail more benefits in long run as this would benefit the mass. Per year return from primary is higher than from secondary which confirms to other studies. The return of women's education exceeds that of men at all levels of education suggesting that policies geared towards increasing girl's enrollment would better the economic status of women.

The older age cohort (36-50) receives higher return to one additional year of schooling from primary education than the younger cohort (22-35). Nonetheless, the higher return observed is likely to have stemmed from the difference in labor market experience rather than from the quality of education over years. In other words, it is fair to claim that the quality of education in Nepal have remained almost same over the years. In terms of variation of returns by region of birth, the overall returns are higher for those born rural. Similarly, the overall return for those males born rural is higher as compared to the urban counterparts. No further conclusions can be made as the sample is skewed largely to rural born. For Central province, the market reward is highest for primary education while the secondary education fetches highest return for Eastern and Western provinces. Strangely, the most remote and relatively less developed province (Mid and Far Western Provinces) recorded highest returns from higher education.

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