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Disability and Returns to Education in a Developing Country[*]

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August 5, 2009

Abstract

In this paper, we estimate wage returns to investment in education for persons with disabilities in Nepal, using information on the timing of being impaired during school-age years as identifying instrumental variables for years of schooling. We employ unique data collected from persons with hearing, physical, and visual impairments as well as nationally representative survey data from the Nepal Living Standard Survey 2003/2004 (NLSS II). After controlling for endogeneity bias arising from schooling decisions as well as sample selection bias due to endogenous labor participation, the estimated rate of returns to education is very high among persons with disabilities, ranging from 19.4 to 33.2%. The coexistence of these high returns to education and limited years of schooling suggest that supply side constraints in education to accommodate persons with disabilities and/or there are credit market imperfections. Policies to eliminate these barriers will mitigate poverty among persons with disabilities, the largest minority group in the world.

Keywords: Disability; Nepal; Returns to the Investment in Education

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1. Introduction

Eighty percent of the world's people with disabilities live in developing countries, making the worldwide disabled population collectively one of the poorest and most marginalized segments of society (ILO, 2007; UN 2006; UNDP, 2006). Historically, people with disabilities were treated as passive recipients of support based on feelings of pity. During the civil rights era of the 1960s and 70s, a wide variety of strategies and programs intended to effect a shift from policies (whether formal or informal) based on exclusion with targeted charities, toward policies embracing persons with disabilities were introduced worldwide (Cook and Burke, 2002). However, it is still unclear to what extent inclusive development for persons with disabilities has been successfully implemented in developing countries. Indeed, low-income countries have significantly limited information on the socioeconomic status of people with disabilities.

The purpose of this paper is to bridge this gap by focusing on the role of education in the labor market of a developing economy, namely, Nepal. Numerous existing studies in both developed and developing countries have shown that better-educated individuals earn higher wages, experience less unemployment, and work in better occupations (higher wages, greater job security, etc.) than their less-educated counterparts (Card, 1999). These returns to investment in education have been quantified for nondisabled people since the late 1950s (Card, 1999, 2001; Heckman et al., 2006; Psacharopoulos and Patrinos, 2004). Even in the case of people with disabilities, there have been two significant studies on returns to education performed in the US (Hollenbeck and Kimmel, 2008). Stern examined the problems of measurement and endogeneity when creating a definition of disabilities for census-taking purposes (Stern, 1989), while DeLaire and Hotchkiss (DeLaire, 2000, 2001; Hotchkiss, 2003) investigated employer discrimination in the labor market. However, as far as developing countries are concerned, almost no studies that estimate the return to education of persons with disabilities can be found.[1] Therefore, with this paper, we aim to at least partially fill this gap in existing knowledge by estimating the wage returns to education of individuals with disabilities in Nepal. By doing so, we intend to help identify constraints preventing people with disabilities from becoming socially and economically independent, and from being fully included in society. Such an analysis will better enable governments and concerned organizations to design policies to mitigate poverty among persons with disabilities, the largest minority group in the world.

We believe that there are two novel aspects to our study. To begin with, the first author has collected unique data from persons with hearing, physical, and visual impairments living in Nepal's Kathmandu Valley using carefully-structured questionnaires. The size and coverage of this survey are unprecedentedly large in Nepal; it is essentially the first of its kind, given the general lack of studies on disability issues in Nepal (Lamichhane, 2009). We also checked the reliability of the results using available information on disability from the nationally representative survey data of the Nepal Living Standard Survey 2003/2004 (NLSS II).

Second, information on each of the three types of impairment has been used as identifying instrumental variables in order to estimate a Mincerian wage equation. The labor market outcome of education is not dependent on a distinction between congenital or acquired disabilities; rather, because the education of disabled people is confined to institutional settings in Nepal, the main barrier to education arises from institutional problems or, more succinctly, from the fact of disability itself. Hence, using congenital or acquired disability information as well as the timing of being impaired, we may be able to identify the

[1] The only study we are aware of is the one by Mori and Yamagata (2009), who collected survey data to estimate the returns to education. Their OLS and Tobit estimate reveal that the estimated rates of returns are 24.7% and 30.1% respectively. However, their estimates are likely to be biased owing to endogeneity arising from unobserved heterogeneity.

causal effect of education on earnings. As Card (2000, 2001) and Heckman, Lochner, and Todd (2006) have pointed out, identifying the causal effect of education on labor market earnings is one of the most important issues in labor economics; hence, we believe that we are making an important contribution to the existing studies.

To create a preliminary outline of our paper, we worked with three main sets of findings. First, in Nepal, education exerts a significant influence on wages, with estimated returns to education for people with disabilities ranging from 19.4 to 33.2%. This is a significantly higher estimate than those for nondisabled people in developing countries, as reported in Psacharopoulos and Patrinos (2004).[2] Second, in spite of the very high returns to education, our estimates confirm that hearing-impaired people have benefited from significantly fewer years of schooling than people with visual and/or physical impairments. Indeed, there are significant institutional barriers in the Nepalese education system for people with hearing impairments: there is only one school for the deaf and hard of hearing in the entire Kathmandu Valley. Furthermore, thus far, no arrangement has been made to facilitate the higher education of this group beyond the first 10 years of schooling. These barriers, however, could be eliminated in the future through appropriate policy interventions to improve the quantity and quality of schools for people with hearing impairments. Finally, according to our estimation results, around 20% to 30% of the wage differences can be explained by differences in job position (white- or blue-collar status) and job tenure (full- or part-time employment status). These results suggest the importance of labor market policies to improve job position and tenure stability for people with disabilities.

The rest of this paper is organized as follows: in Section 2, we explain our empirical strategies for identifying the causal effect of education on earnings among people with disabilities; Section 3 describes the data set from Nepal; and Section 4 discusses our findings.

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[2] According to Parajuli (1999), the returns to education in Nepal are 9.7%.

Finally, in Section 5, we present concluding remarks.

2. Empirical strategy

Numerous studies regress log earnings (ln *w*) on years of schooling (*S*), and report estimated coefficients as the estimated returns to education (Heckman, Lochner, and Todd, 2006; Card, 1999, 2001). The theoretical underpinning for such a semi-log earnings equation is attributed to Jacob Mincer, with the standard Mincer wage equation usually specified as follows:

$$\text{(1)} \qquad \log w = rS + X\beta + u,$$

where *r* represents the returns to education, i.e., how much the wage rate increases in response to an additional year of schooling. *X* is a set of other determinants of wage earnings, and *u* is an error term.

One of the most serious econometric problems of estimating equation (1) is that the cross-sectional correlation between education and earnings may differ from the causal effect of education owing to the correlation between the years of education and the error term that involves unobserved factors such as abilities. The instrumental variable method is a natural method to mitigate such a problem using an observable variable that affects schooling choices; however, it is uncorrelated with the error term. As summarized by Card (1999, 2000), recent studies have begun to employ supply-side variables that capture institutional features of the education system such as the minimum school-leaving age, tuition costs, or the geographic proximity of schools in order to form credible instrumental variables.

We augment this strategy by using novel instrumental variables. In Nepal, the lack of proper education services for those with disabilities has restricted the schooling of children with disabilities to institutional settings that often lack the proper facilities and equipment to keep them up to speed with their nondisabled counterparts. Specifically, students with disabilities face problems such as inadequate availability of materials on sign language or Braille, or, in the case of those with physical impairments, inaccessible buildings.[3] In particular, the supply-side constraints are serious for those who are hearing impaired. Moreover, whether the impairments are congenital or acquired and the age at which a person becomes impaired affects the number of years of schooling, while these variations do not affect labor market outcomes directly. Hence, we believe that the type of disability and the timing of becoming impaired satisfy the criteria of the instruments for schooling choices, i.e.,

$$S = Z\gamma + \varepsilon, \tag{2}$$

where Z is a set of observables that affect schooling choices but are uncorrelated with the unobserved factors, u, in equation (1), i.e., $E(SZ) \neq 0$ and $E(Zu) = 0$.

Another econometric consideration is that of sample selection bias. Since many disabled people are unemployed in Nepal, we cannot ignore the endogeneity problem arising from labor market participation decisions. In order to control for the sample selection bias, we employ Amemiya's (1985) Type 1 Tobit model with endogenous regressors. We adopt Newey's (1987) modified minimum chi-squared estimator with the two-step estimation method.

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[3] Indeed, using multiple data-sets from 11 nationally representative household surveys conducted in nine countries, Filmer (2005) found that youth with disabilities are almost always substantially less likely to start school and more likely to achieve lower schooling attainment.

3. Data

The survey for this study was conducted in Nepal's Kathmandu Valley over the course of two study-specific information-gathering trips. The first and second rounds of the survey were conducted from May to June of 2008 for employed respondents, and again from October to November of the same year for unemployed respondents, respectively. The Kathmandu Valley is the most populous area of the country, with a total population of approximately one million in the Kathmandu, Lalitpur, and Bhaktapur districts, including the metropolitan capital city of Kathmandu.

Persons with visual, hearing, and physical impairments were chosen for face-to-face interviews using carefully-structured questionnaires. The term "visual impairment" has been used for those who are blind, partially sighted, or have low vision. For those with hearing impairments, people with deafness and hardness of hearing were considered. Similarly, we have defined people with physical impairments as those having problems with their legs or hands, spinal injuries, and so on. The term "disability" has been used for all types of impairments covered in this study. To approach these respondents, we randomly selected interview participants from the name lists of the five disability-related organizations in Kathmandu, Lalitpur, and Bhaktapur districts: Nepal Association for the Welfare of the Blind (NAWB), Nepal Association of Physically Disabled Persons (NAPD), Nepal Association of the Deaf and Hard of Hearing (NADH), Nepal National Federation of the Deaf and Hard of Hearing (NFDH), and Nepal Association of the Blind (NAB). We further divided the members and contacts aged between 16 and 65 years in each disability group into male and female subgroups.

Then, out of a total of 993 potential participants who met our age and impairment criteria, 423 respondents were randomly selected using proportionate stratified random sampling, in which the individuals' type of impairments and sex were employed to set each stratum. The study was carried out with informed consent from the participants, who were aware that they could withdraw from the study at any time, during or after, without incurring any personal consequences. Only two participants chose to withdraw from the study once it was underway; both of these individuals had physical impairments, and the data we collected from them has been excluded from our final data set.

The survey covers a wide variety of socioeconomic information including impairment, demographic characteristics, education background, employment status, attitudes of family and employers, and income and expenditure. As regards sociodemographic characteristics, the questionnaire covers age, sex, type and cause of disability, marital status, family type, and living status, that is, whether the respondent is originally an inhabitant of the Kathmandu Valley (someone who has been born in Kathmandu) or had recently migrated from some other area of Nepal. Questions on educational status included the level of education obtained, as well as the type and location of the respondent's school. Questions about skills and training included information about the respondent's training in Braille or sign language, for example, as well as such things as computer and vocational skills. Employment-related information included level, type, and sector of employment, current job position, and weekly hours worked.

Descriptive Statistics

Table 1 shows the descriptive statistics of the variables used in this paper. Among the 398 fully usable responses, 222 respondents (55.8%) currently participate in the labor market, while the rest were unemployed at the time of this survey. The proportion of full-time workers was about 41.7%. The proportion of women respondents was 42%; the average age of the respondents was around 31 years; and the average number of years of schooling was 8.84 years, which is roughly equivalent to an upper secondary level of education. The proportions of visually, hearing, and physically impaired people were 30.2%, 37.9%, and 31.9%, respectively. Of the respondents with an acquired impairment, 71.1% had become disabled before the age of six. Moreover, 13.6% of the respondents claimed that they had received no institutional support for their studies, and a further 23.1% reported that their families had suffered financial constraints in order to send them to school. We also found variations in families' understanding of the rights of their members with disabilities and in their views on the general abilities of people with disabilities.

4. Results and findings

Tables 2 and 3 show the first-stage regression results with a different set of independent variables for two variables—for example, a years-of-schooling variable plus a dummy variable which takes one for full-time work and zero otherwise. According to Table 2, with regard to the years-of-schooling regression, hearing impairment is shown to have negative and statistically significant coefficients. The point estimate reveals that the years of schooling of a hearing-impaired person are fewer than those of visually impaired individuals by two years on average. On the other hand, physically impaired persons have an average of 0.9 more years of schooling; however, this result is not statistically significant. These findings are consistent with the institutional setting in Nepal, where there are insufficient educational resources for hearing-impaired people. Comparatively, physically impaired people face less difficulties in continuing their education in ordinary schools with peers without disability as they can receive education through the same method of teaching. Furthermore, unless facilities such as an adequate number of sign language interpreters to solve communication problems for hearing-impaired persons are available, it is difficult for them to enter the ordinary institutes for higher education. However, there are no special institutes for hearing-impaired persons that offer higher education. Their fewer years of schooling clearly indicate the possible institutional barriers in educational institutes. Moreover, our results regarding employment rates reveal a systematic pattern: those who become visually or physically impaired are, respectively, more and less likely to obtain full-time positions.

In Table 2, therefore, the findings are threefold. First, in the schooling regression, disability acquired at a later age is correlated with fewer years of schooling. This is consistent with casual observations that when people become disabled later in life, it is often difficult for them to readjust to school—for example, learning the use of Braille or sign language can pose significant difficulties for older, newly disabled students who were already accustomed to one system of learning. These persons with disabilities are more likely to give up their education and, accordingly, the number of years of their schooling will be fewer. Second, in the case of those who answered that their family had experienced financial difficulties, the numbers of their years of education were significantly fewer than the number of years for those who did not report this as a factor. This indicates the seriousness of the financial constraints commonly faced by families living below the poverty level, which prevents parents from sending their children with disabilities to school. Finally, the estimation result shows that families' subjective views on the rights and abilities of people with disabilities affect years of schooling significantly.

In Table 3, we show more elaborated specifications of the first-stage regression. In fact, we have discovered that the previous finding—namely, that disability at a later age is correlated with fewer years of schooling—is specific to people with visual impairments. Moreover, this negative schooling effect among people with visual impairments is larger if a person becomes visually impaired at a later age. This is consistent with the hypothesis that it is difficult for people who become disabled later in life to readjust to school, particularly when it involves learning different, disability-specific skills, such as learning to use Braille or Orientation and Mobility (O&M) skills in the case of visually impaired students. On the whole, the age at which a person becomes disabled appears to have a significant impact on the number of years they remain in school: specifically, individuals who become disabled later tend to have fewer years of schooling.

Table 4 summarizes our estimated results of wage earnings equations. The first two specifications are based on OLS estimates; the third and fourth control for endogeneity bias in labor market participation; and the fifth and sixth specifications consider endogeneity of schooling. The final two specifications utilized a different set of instruments. In all specifications, education influenced wages, but the estimated returns to education vary. In OLS estimates, the rate of return is about 5.3–5.9%, which may be consistent with the existing estimate for nondisabled people, as reported by both Card (1999, 2001) and Psacharopoulos and Patrinos (2001). However, once we control for the endogenous sample selection bias, the estimated returns to education jump to 21.4–22.9%. In addition, controlling for endogeneity of schooling decisions and full-time working status further increases the estimates to 30.4–33.2%.

These estimates suggest the seriousness of estimation biases in returns to education arising from sample selection and endogeneity problems. Moreover, unlike estimates with non-disabled people, comparisons of Tobit and IV-Tobit results imply that years of schooling and the error term of the wage equation are negatively correlated, suggesting the existence of institutional rigidities in education among people with high unobserved abilities. [4]

[4] Note that the concept of abilities here is the one used in the context of Micerian wage equation and that being disabled does not mean low unobserved abilities.

Especially, the systematically fewer years of schooling experienced by hearing-impaired individuals imply that there are specific institutional barriers in schooling for people with hearing impairments. The coexistence of high returns to schooling and limited years of schooling suggest the existence of credit market imperfections, a finding that is consistent with the significantly negative effect of family financial constraints on years of schooling, as presented in Tables 2 and 3. Since human capital cannot be used as collateral in general, people cannot invest in education without first having the credit to finance it, even if there is a sufficiently large rate of returns. The government can eliminate these barriers to education through appropriate policy interventions to relax the borrowing constraints of families with children with disabilities.

Robustness Tests

In order to test the robustness of our estimated results, we have performed three additional analyses. First, we used a semi-parametric regression model to relax the function form and mitigate specification errors. Second, we conducted tests to handle the weak instrument problem. In both approaches, we employed the whole sample by setting aside the possible sample selection problems in endogenous labor market participation. Hence, the estimated rate of returns to education presented below may involve a downward bias arising from the endogenous sample selection problem. Finally, we employed alternative, large-scale, and nationally representative data from NLSS II conducted by the Central Bureau of Statistics (CBS) of the government of Nepal.

First, we relaxed the parametric assumption of the returns to education by adopting the semi-parametric instrumental variable approach used by Holly and Sargan (1982), Blundell et al. (1998), and Gong et al. (2005). We allowed the education term in equation

(1) to be represented by a nonparametric function, while years of education and full-time work are both endogenous variables. Then, we estimated the augmented regression model of Holly and Sargan (1982) using Lokshin's (2006) algorithm, which is based on the differencing method in the estimation of the partial linear models introduced by Yatchew (1997).[5] The estimation result of the nonparametric part is shown in Figure 1, and the significance test of the years-of-schooling variable, which enters the specification nonlinearly, indicates that the variable is highly significant, with a p-value of 0.006. As we can see, the returns to education seem to be positive only after a minimum of ten years of schooling.[6] This result suggests that it is desirable for the government to have a target of providing up to at least 10 years of schooling—namely, up to the secondary school level. Thus, more people with disabilities can stand to benefit from the significant returns to investment in education.

Second, in order to check the robustness against the weak instrument problem, we followed Andrews, Moreira, and Stock (2009), adjusting the critical values of test statistics in the presence of weak instruments. In this model, we allowed endogeneity of the years-of-education variable only. According to the limited information maximum likelihood estimate of Andrews, Moreira, and Stock (2009), the returns to education are 19.1%, and statistically different from zero: the computed p-values for this coefficient based on the conditional likelihood ratio method of Andrews, Moreira, and Stock (2009), the method of Anderson and Rubin (1949), and the Lagrange multiplier test proposed by Kleibergen (2002) and Moreira (2001) are 0.0083, 0.0005, and 0.0142, respectively. These results suggest that the weak instruments issue is not serious in our analysis.

Finally, we checked the robustness of the results presented in Table 4 using the

[5] In particular, first-order differencing was used to estimate the model. It is assumed that the nonparametric part is a smooth function that belongs to a particular parametric family with bounded first derivatives.

[6] Note that the unit of the vertical axis is in the raw point estimate and not in percentage.

nationally representative data of NLSS II. The sample is representative of the population of the country. NLSS II is the second multi-topic national household survey conducted by CBS from April 2003 to April 2004, after the first NLSS of 1995/96 (NLSS I). The survey follows the World Bank's Living Standards Measurement Survey (LSMS) methodology and uses a two-stage stratified sampling scheme covering 3,912 households from 326 Primary Sampling Units (PSU) of the country.

Since NLSS II is not designed to capture impairments and disabilities, there is only limited information on persons with disabilities. In particular, NLSS II does not include detailed information on types of impairments, unlike the data employed above. However, we were still able to use the two sets of samples for our analyses: first, the full sample, which did not distinguish persons with disabilities from those without disabilities; and, second, the sample of those who suffered from a chronic illness, those who could not work because of a disability, and those who did not attend school because of the same reason. Tables 5 and 6 show the results of the first-stage and the main equations respectively. According to Table 5, years-of-schooling is affected negatively and significantly by financial constraints and disability. These results suggest that there are credit market imperfections as well as supply-side constraints in education to accommodate persons with disabilities. More importantly, the age when a person became disabled has a positive effect on years-of-schooling in the first specification (1) with the full sample, which is consistent with the results reported in Table 4.

Table 6 shows the main results of estimating returns to investment in education. The first two specifications are based on OLS and IV using the full sample, with and without disabilities. The point estimates on the returns to education are 13.1% and 9.1% respectively. These figures are consistent with the estimate made by Parajuli (1999), which shows that the returns to education in Nepal are 9.7%.

However, once we confined our data to the second sample of the NLSS II data, i.e., the sample that dealt with persons with chronic illnesses or disabilities, the returns to schooling become significantly higher. In particular, when we controlled for sample selection and endogeneity biases arising, respectively, from endogenous labor participation and schooling investments, the returns to education became as high as 19.4%. Again, this result suggests that the estimated rate of returns to education is very high among persons with disabilities in Nepal. Moreover, the higher rate of returns of the IV-Tobit estimates than that of OLS estimates suggest that years of schooling and the error term of the wage equation are negatively correlated and there are institutional barriers in schooling among people with high unobserved abilities

5. Conclusions

In this paper, we estimated the wage returns to education of individuals with disabilities in Nepal, using information on the type and duration of the experience of the given impairments as identifying instrumental variables. After controlling for sample selection to account for endogenous labor participation, as well as endogeneity of schooling decisions and full-time working status, the estimated rate of returns to education is very high, ranging from 19.4 to 33.2%. These estimates, together with OLS estimates, indicate significant estimation biases in returns to education arising from sample selection and endogeneity biases. More importantly, our results will be of use to policymakers in the future, especially those aiming to facilitate human capital investments among persons with disabilities. First, the implied negative endogeneity bias and a trend of systematically fewer years of schooling on the part of hearing-impaired individuals implies that there are significant institutional barriers in education especially for people with hearing impairments.

This can be eliminated by supply-side interventions aimed at hearing-impaired people. Second, the coexistence of a high rate of returns to schooling and a limited number of years of schooling suggests the existence of credit market imperfections and/or supply-side constraints in education for individuals with disabilities. The former is also consistent with the significant negative effect of family financial constraints on years of schooling. Again, credit provisions or scholarship programs to relax the borrowing constraints of families with children with disabilities are suggested as possible policy instruments; supply-side interventions will be indispensable for such families. It is universally acknowledged that education is a basic human right. However, there are also clear economic benefits of higher education both for individuals and societies. Education is a tested and sound means of escaping poverty in the developing world; previous studies on returns to education for nondisabled individuals in developing countries indicated around 10% wage returns. Comparing this figure with our findings of more than 19% returns for individuals with disabilities shows just how necessary supporting the education of disabled persons is for their advancement, both socially and as individuals.

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Table 1. Descriptive Statistics

Variable name	# of Obs.	Mean	Std. Dev.	Min.	Max.
Log hourly income (observed only for labor market participants)	222	3.389	1.555	-4.719	6.438
Dummy = 1 if female	398	0.420			
Age	398	31.053	8.131	16	65
Years of schooling	398	8.844	4.766	0	17
Dummy = 1 if full-time worker	398	0.417			
Dummy = 1 if visually impaired (default category)	398	0.302			
Dummy = 1 if hearing impaired	398	0.379			
Dummy = 1 if physically impaired	398	0.319			
Dummy = 1 if congenital disability	398	0.457			
Dummy = 1 if disabled when age is below 6 (default category)	398	0.711			
Dummy = 1 if disabled when age is between 6 and 11	398	0.146			
Dummy = 1 if disabled when age is between 11 and 16	398	0.060			
Dummy = 1 if disabled when age is above 16	398	0.083			
Age when a person became disabled	398	4.275	7.225	0	46
Dummy = 1 if there is no support for studying	398	0.136			
Dummy = 1 if financially constrained	398	0.231			
Family's understanding of the rights of persons with disabilities					
1. Very high (default category)	385	0.200			
2. High	385	0.190			
3. Moderate	385	0.270			
4. Low	385	0.226			
5. Not at all	385	0.114			
Family's positive view on the ability of persons with disabilities					
1. Very high (default category)	380	0.266			
2. High	380	0.218			
3. Moderate	380	0.313			
4. Low	380	0.150			
5. Not at all	380	0.053			
Dummy = 1 if permanent resident of Kathmandu Valley	392	0.500			

Table 2. First-Stage Regression

Dependent variable	Years of schooling			Full-time worker		
	Coef.	Std. Err.		Coef.	Std. Err.	
Dummy = 1 if hearing impaired	-2.078	0.598	***	0.130	0.069	*
Dummy = 1 if physically impaired	0.895	0.609		-0.338	0.071	***
Dummy = 1 if congenital disability	-0.245	0.611		-0.305	0.071	***
Dummy = 1 if disabled when age is between 6 and 11	-0.729	0.900		0.237	0.104	**
Dummy = 1 if disabled when age is between 11 and 16	-2.365	1.274	*	0.139	0.148	
Dummy = 1 if disabled when age is above 16	-4.718	2.450	*	0.541	0.284	*
Age when a person became disabled (which is set at 23 if above 23)	0.168	0.126		-0.045	0.015	***
Dummy = 1 if there is no support for studying	-1.569	0.666	**	-0.208	0.077	***
Dummy = 1 if financially constrained	-1.501	0.493	***	-0.127	0.057	**
Family's understanding of the rights of persons with disabilities						
2. High	1.624	0.807	**	0.164	0.094	*
3. Moderate	0.767	0.806		0.047	0.094	
4. Low	-0.103	0.890		0.034	0.103	
5. Not at all	-0.531	0.999		0.069	0.116	
Family's positive view on the ability of persons with disabilities						
2. High	-1.109	0.747		0.005	0.087	
3. Moderate	-1.861	0.746	**	-0.059	0.087	
4. Low	-1.947	0.951	**	-0.162	0.110	
5. Not at all	-1.722	1.197		-0.054	0.139	
Dummy = 1 if permanent resident of Kathmandu Valley	-1.892	0.445	***	-0.011	0.052	
Dummy = 1 if female	-0.699	0.456		-0.004	0.053	
Age	0.527	0.154	***	0.049	0.018	***
Age squared	-0.008	0.002	***	-0.001	0.000	***
Constant	4.335	2.857		-0.059	0.332	
Number of observations	373			373		
F statistics for the jointly zero coefficients	8.61			4.48		
[*p*-value]	[0.000]			[0.000]		
R-squared	0.3399			0.2114		
Adjusted R-squared	0.3004			0.1642		

Robust standard errors in parentheses. * significant at 10%; ** significant at 5%; *** significant at 1%

Table 3. First-Stage Regression

Dependent variable	Years of schooling			Full-time worker		
	Coef.	Std. Err.		Coef.	Std. Err.	
Dummy = 1 if hearing impaired	-1.157	1.488		0.218	0.172	
Dummy = 1 if physically impaired	2.027	1.302		-0.277	0.151	*
Dummy = 1 if congenital disability	0.747	1.137		-0.158	0.132	
(interacted with hearing impairment dummy)	-1.419	1.599		-0.240	0.185	
(interacted with physical impairment dummy)	-1.085	1.540		-0.123	0.178	
Dummy = 1 if disabled when age is between 6 and 11	-3.683	1.760	**	0.034	0.204	
(interacted with hearing impairment dummy)	3.465	2.423		0.246	0.280	
(interacted with physical impairment dummy)	4.722	2.405	**	0.246	0.278	
Dummy = 1 if disabled when age is between 11 and 16	-4.822	2.395	**	0.146	0.277	
(interacted with hearing impairment dummy)	3.348	3.430		-0.003	0.397	
(interacted with physical impairment dummy)	2.901	3.440		-0.163	0.398	
Dummy = 1 if disabled when age is above 16	-12.019	4.469	***	0.235	0.517	
(interacted with hearing impairment dummy)	11.806	5.913	**	0.764	0.684	
(interacted with physical impairment dummy)	10.997	6.685	*	0.243	0.773	
Age when a person became disabled (which is set at 23 if above 23)	0.521	0.224	**	-0.030	0.026	
(interacted with hearing impairment dummy)	-0.406	0.333		-0.017	0.039	
(interacted with physical impairment dummy)	-0.577	0.348	*	-0.012	0.040	
Dummy = 1 if there is no support for studying	-1.841	1.710		-0.488	0.198	**
(interacted with hearing impairment dummy)	0.409	1.888		0.352	0.218	
(interacted with physical impairment dummy)	0.706	2.969		0.242	0.343	
Dummy = 1 if financially constrained	-1.571	0.505	***	-0.131	0.058	**
Family's understanding of the rights of persons with disabilities						
2. High	1.809	0.829	**	0.181	0.096	*
3. Moderate	0.895	0.827		0.070	0.096	
4. Low	0.075	0.918		0.043	0.106	
5. Not at all	-0.231	1.024		0.098	0.118	
Family's positive view on the ability of persons with disabilities						
2. High	-1.235	0.763		-0.003	0.088	
3. Moderate	-1.989	0.766	***	-0.071	0.089	
4. Low	-2.001	0.968	**	-0.150	0.112	
5. Not at all	-2.020	1.229	*	-0.081	0.142	
Dummy = 1 if permanent resident of Kathmandu Valley	-1.873	0.457	***	0.003	0.053	
Dummy = 1 if female	-0.744	0.469		-0.009	0.054	
Age	0.546	0.158	***	0.051	0.018	***
Age squared	-0.008	0.002	***	-0.001	0.000	***
Constant	3.087	3.010		-0.184	0.348	
Number of observations	373			373		
F statistics for the jointly zero coefficients	5.68			3.16		
[p-value]	[0.000]			[0.000]		
R-squared	0.3560			0.2350		
Adjusted R-squared	0.2933			0.1605		

Robust standard errors in parentheses. * significant at 10%; ** significant at 5%; *** significant at 1%

Table 4. Estimation Results of Earnings Regression
Dependent variable: Log hourly wage

	(1)	(2)	(3)	(4)	(5)	(6)
	OLS	OLS	Tobit	Tobit	IV-Tobit	IV-Tobit
Years of schooling+	0.053	0.059	0.229	0.214	0.332	0.304
	(0.026)**	(0.031)*	(0.060)***	(0.066)***	(0.109)***	(0.100)***
Dummy = 1 if female	-0.351	-0.288	-0.349	-0.195	-0.083	-0.202
	(0.245)	(0.23)	(0.562)	(0.572)	(0.598)	(0.558)
Age	-0.035	-0.025	0.473	0.52	0.206	0.256
	(0.119)	(0.124)	(0.221)**	(0.220)**	(0.239)	(0.222)
Age squared	0.001	0.001	-0.005	-0.006	-0.002	-0.002
	(0.002)	(0.002)	(0.003)*	(0.003)**	(0.003)	(0.003)
Dummy = 1 if full-time worker+	0.082	-0.01	8.057	7.899	10.971	9.598
	(0.282)	(0.275)	(0.583)***	(0.612)***	(1.359)***	(1.187)***
Dummy = 1 if hearing impaired		-0.065		-1.519		
		(0.256)		(0.695)**		
Dummy = 1 if physically impaired		-0.477		-1.891		
		(0.371)		(0.723)***		
Constant	2.976	2.975	-16.539	-15.589	-13.982	-13.704
	(2.012)	(1.959)	(3.811)***	(3.784)***	(3.986)***	(3.733)***
Number of observations	222	222	398	398	373	373
R-squared	0.06	0.07				

Robust standard errors in parentheses
* significant at 10%; ** significant at 5%; *** significant at 1%
+ endogenous variable
Specifications (5) and (6) are based on the first-stage regression in Tables 2 and 3 respectively.

Table 5. First-Stage Regression
Dependent variable: Year of Schooling

	(1)		(2)	
	While Sample		Disabled Sample	
	Coef.	Std. Err.	Coef.	Std. Err.
Dummy = 1 if female	-2.809	(0.145)***	-2.744	(0.575)***
Age	0.192	(0.033)***	0.031	(0.143)
Age squared	-0.003	(0.000)***	-0.001	(0.002)
Dummy = 1 if born in urban area	4.405	(0.349)***	3.131	(1.030)***
Dummy = 1 if not suffered from chronic disease	-0.526	(0.320)**	-1.392	(1.049)
Dummy = 1 if did not attend school because of disability	-2.465	(2.905)	-1.976	(1.101)**
Dummy = 1 if financially constrained	-3.888	(0.221)***	-3.635	(0.828)***
Age when a person became disabled (which is set at 23 if above 23)	0.189	(0.094)***	0.083	(0.065)
Constant	-1.030	(2.179)	2.944	(2.713)
F statistics for the jointly zero coefficients	124.18		9.55	
[*p*-value]	[0.000]		[0.000]	
R-squared	0.216		0.221	
Adjusted R-squared	0.214		0.198	
Number of observations	3,601		278	

Robust standard errors in parentheses. * significant at 10%; ** significant at 5%; *** significant at 1%

Table 6. Estimation Results of Earnings Regression

Dependent variable: Log hourly wage

	(1)	(2)	(3)	(4)	(5)
	OLS	IV	OLS Disabled Sample	IV Disabled Sample	IV-Tobit Disabled Sample
First-stage specification in Table 5		(1)		(2)	(2)
Years of Schooling	0.131	0.091	0.156	0.200	0.194
	(0.004)***	(0.014)***	(0.029)***	(0.080)**	(0.099)**
Dummy = 1 if female	-0.697	-0.811	-0.559	-0.437	-0.501
	(0.038)***	(0.054)***	(0.219)**	-0.316	-0.396
Age	0.082	0.09	0.182	0.175	0.257
	(0.008)***	(0.009)***	(0.065)***	(0.053)***	(0.074)***
Age squared	-0.001	-0.001	-0.002	-0.002	-0.003
	(0.000)***	(0.000)***	(0.001)**	(0.001)***	(0.001)***
Dummy = 1 if born in an urban area	0.488	0.673	0.81	0.65	0.841
	(0.076)***	(0.108)***	(0.269)***	-0.494	-0.616
Dummy = 1 if not suffered from chronic disease	0.037	0.029	-3.243	-3.164	-5.828
	-0.073	-0.077	(0.227)***	(0.320)***	(0.630)***
Constant	-0.536	-0.431	-3.559	-3.617	-5.405
	(0.167)***	(0.169)**	(1.273)***	(1.038)***	(1.509)***
Number of Observations	3,601	3,601	278	278	278
R-squared	0.4	0.38	0.56	0.55	
Adjusted R-squared		0.38		0.54	

Robust standard errors in parentheses
* significant at 10%; ** significant at 5%; *** significant at 1%
+ endogenous variable

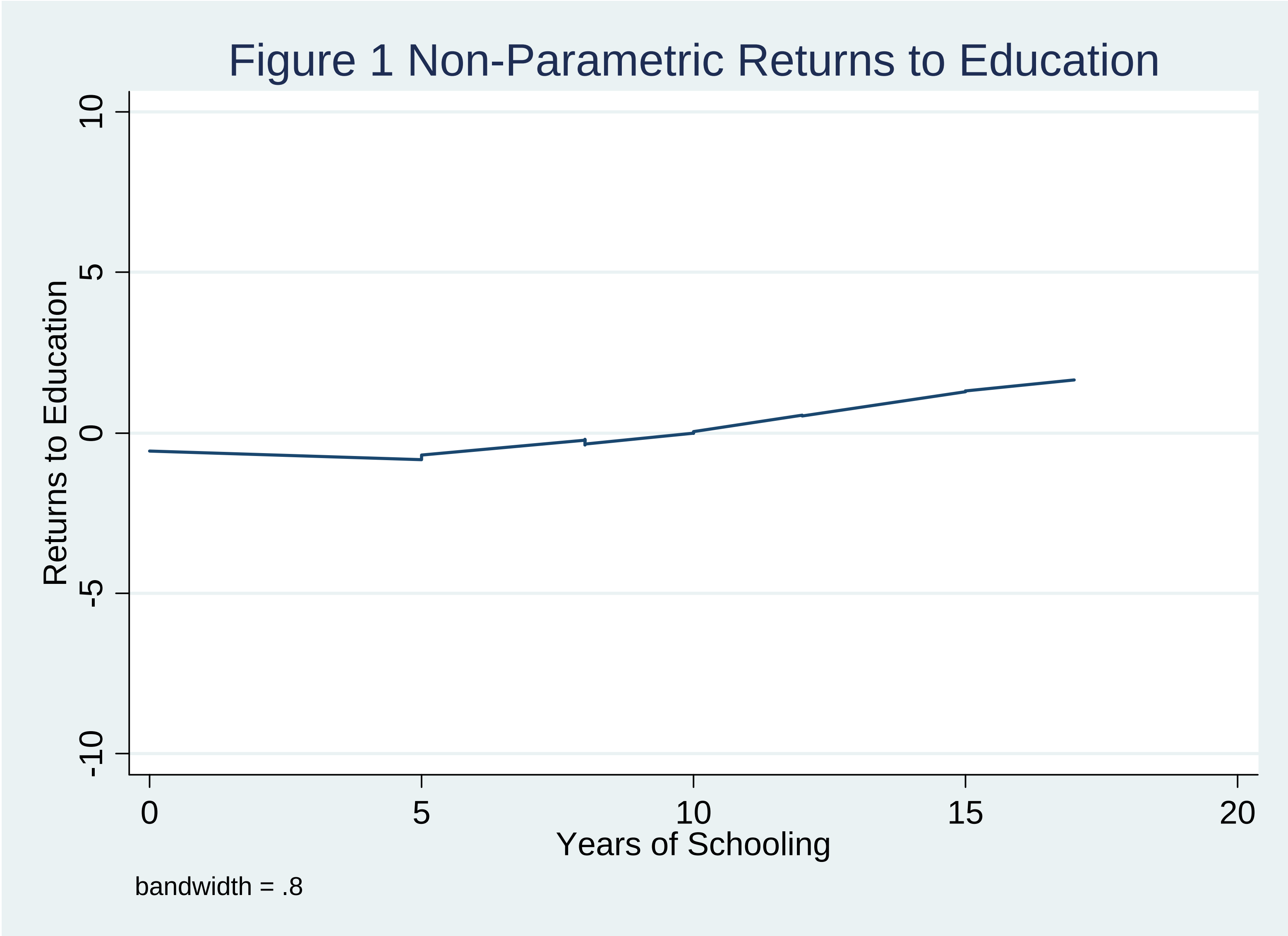
Figure 1 Non-Parametric Returns to Education
Returns to Education
10
5
0
-5
-10
0
5
10
15
20
Years of Schooling
bandwidth = .8