The Trade-Off Between Child Labor and Schooling: Influence of Social Labeling NGOs in Nepal

Chakrabarty, Sayan and Grote, Ulrike and Lüchters, Guido

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Sayan Chakrabarty, Ulrike Grote,
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Walter-Flex-Strasse 3
D – 53113 Bonn
Germany
Phone: +49-228-73-1861
Fax: +49-228-73-1869
E-Mail: zef@uni-bonn.de
http://www.zef.de

The authors:
Sayan Chakrabarty, Center for Development Research (ZEF), Bonn, Germany (contact: sayan@uni-bonn.de).
Ulrike Grote, Center for Development Research (ZEF), Bonn, Germany (contact: u.grote@uni-bonn.de).
Guido Lüchters, Center for Development Research (ZEF), Bonn, Germany (contact: mail@GuidoLuechters.de).

Contents

List of Tables

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Abstract

Does the labeling of products which have been produced without any child laborers contribute to increased welfare of children? This paper presents some results of a survey in Nepal conducted to analyze which factors determine the probability of a child to work, and to examine the influence of non governmental organizations (NGOs) which are engaged in social labeling, on the incidence of child labor and child schooling. Data were obtained from interviews with 410 households of Kathmandu Valley in Nepal. The results of the econometric analysis show that the probability of child labor (i) decreases if the carpet industry has implemented a labeling program, (ii) decreases if the adult's income increases ('luxury axiom'), (iii) decreases if the head of the household is educated, (iv) increases with the age of the head of the household, and (v) is increased in the presence of more children (aged 5-14) in the household. It can also be shown that labeling NGOs have a significant positive influence on sending the ex-child laborers to school.

Kurzfassung

Erhöht die Kennzeichnung von Produkten, die ohne Kinderarbeit hergestellt werden, die Wohlfahrt von Kindern? Dieses Papier präsentiert Ergebnisse einer Befragung in Nepal, die durchgeführt wurde, um zu analysieren, welche Faktoren die Wahrscheinlichkeit bestimmen, dass ein Kind arbeitet. Darüber hinaus wird untersucht, welchen Einfluss Nichtregierungsorganisationen (NROs), die sich mit der Zertifizierung von Produkten nach sozialen Kriterien beschäftigen, auf das Vorkommen von Kinderarbeit bzw. auf die Schulausbildung haben. Dazu wurden 410 Haushalte im Kathmandu Valley in Nepal befragt. Es zeigt sich, dass die Wahrscheinlichkeit von Kinderarbeit (i) sinkt, wenn die Teppichindustrie ein soziales Kennzeichnungsprogramm implementiert hat, (ii) sinkt, wenn das Einkommen der Erwachsenen steigt ("Luxus-Axiom"), (iii) sinkt, wenn der Haushaltsvorstand über Bildung verfügt, (iv) zunimmt mit dem Alter des Haushaltsvorstandes und (v) zunimmt mit der Anzahl der Kinder (im Alter von 5-14) in einem Haushalt. Zudem kann gezeigt werden, dass NROs, die soziale Kennzeichnungsprogramme implementieren, einen signifikant positiven Einfluss auf die Schuleinweisung von ehemaligen Kinderarbeitern haben.

1 Introduction

In the process of globalization, the labor-intensive industries in South Asian Countries do not only earn a large share of foreign exchange, but also provide a significant share of employment by emphasizing export-led growth. In addition, the growth and expansion of these industries is determined by intra and inter industry competition to gain better comparative advantage across the South Asian Countries. This process contributes to an increased demand for child labor because of intensified competition over wage costs to gain comparative advantage. Children are generally fast and quick learners, they do not have any labor union for support, and they are very cheap laborers. Therefore, some industries prefer using children to improve their comparative advantage, so that these export-led industries are responsible for generating huge employment for child laborers, which certainly raises strong concern for future growth and development.

In recent years, the discussion about the impact of globalization on the incidence of child labor has evoked a controversial debate in the literature. Neumayer and de Soysa (2004) argue that countries being more open towards free trade and/or having a higher stock of foreign direct investment also have a lower incidence of child labor. They conclude that globalization is associated with less, not more, child labor. Maskus (1997), however, considers globalization as an expanded opportunity to engage in international trade so that a larger export sector will raise the demand for child labor inputs. According to Brown (2002), the rise in the demand for child labor will be accompanied by a rise in the child's wage. This change lowers the return to education and raises the opportunity cost of education, thereby stimulating child labor. On the other hand, Basu and Van (1998) and Basu (2002) argue that any positive income effects that accompany free trade openness will help families by meeting or even exceeding the critical adult-wage level at which child labor begins to decline. Contrary to this argument, Edmonds (2002) postulates that increased earning opportunities for parents may change the types of work performed by parents. As a result, children may be forced to take over some of the activities usually performed by adults within their household.

It might not seem to be worth to debate whether changes in local labor markets caused by globalization increase or decrease child labor because no developing country can afford not to participate and/or accept the opportunity of receiving foreign investment by trade creation and trade diversion. However, it might be well argued that the globalization process has been playing a major role in pushing the issue of fair and ethical trade as a priority issue in the international trade debate. That is why the above intellectual debate is very important to address the child labor problem in the international trade literature, especially after the nineties when consumers

have learned from the media that a number of the products they purchase could have been produced by child laborers.

Therefore, strong concern throughout the importing countries about the social status of the commodity as well as questions of ethical trade in the globalization process have been raised. India's profits from exporting hand-woven carpets increased from US$ 65 million to US$ 229 million between 1979 and 1983. Due to consumer boycotts that figure dropped to US$ 150 million in 1993, indicating the power consumers have to putting an end to child labor by not buying carpets made by children (Charlé 2001). Activists have been quick in blaming trade liberalization for the negative effects on local labor markets, and have suggested trade sanctions as tools to coerce policy changes aimed at mitigating child labor (Edmonds, 2004). Trade intervention may take the form of either the threat of or the immediate imposition of trade sanctions.

Strong support to the idea of using trade interventions for abolishing child labor arose from the Harkin's Bill, also called the US Child Labor Deterrence Act from 1993. This bill proposed to partially or fully ban the import of goods produced by child laborers. It was based on concerns raised by Senator Harkin about the lack of child protection and the need to ensure mass education (UNICEF, 2003). The immediate influence of the bill, which eventually never became law, was dramatic in the case of Bangladesh. Fearing a trade sanction and a loss in market share, all child laborers were fired from the export sector in Bangladesh. An estimated 50,000 children lost their jobs (UNICEF, 2003), and nearly 1.5 million families were affected (CUTS, 2003). According to UNICEF (2003), 77 percent of the children retrenched from the garment industries were adversely affected in Bangladesh. A majority of the children were pushed into the informal sector, which offers more hazardous and lower paid jobs.

Trade sanctions, thus, might have severe consequences. Some authors doubt the ability of trade sanctions to eliminate child labor (Bhagwati, 1995; Maskus, 1997). Theoretical models by Maskus (1997) and Melchior (1996) show that trade sanctions or import tariffs against countries where the use of child labor is prevalent do not necessarily reduce the incidence of child labor. On the contrary, the multinational company insisting that its subcontractors fire all child laborers may be doing those children more harm than good (Freeman, 1994). After being displaced from the export sector, these children may find themselves worse-off if no viable alternative like education or better working conditions in other sectors exists (Hemmer, 1996). In many developing countries, children may also have to work for the economic survival of the family (Grote, Basu and Weinhold, 1998).

As a result, several measures and initiatives like 'Social Labeling' or Codes of Conduct are directed towards ending the use of child labor. They are increasingly suggested in the context of ethical trade and implemented as an alternative tool to trade sanctions. Social labeling for example acts as a signal in the market informing consumers about the social conditions of production, and assuring them that the item or service they purchase is produced under equitable

working conditions (Hilowitz, 1997). It is praised as a market-based and voluntary, and therefore more attractive instrument to raise labor standards (Basu, Chau and Grote, 2000).

Many labeling programs have been developed, especially by non governmental organizations (NGOs) like Rugmark, Care & Fair, STEP or Kaleen. Some characteristics of these programs for Nepal and also India are highlighted in Table 1.1. To make sure that these labels remain credible, regular monitoring of the programs is conducted. Generally, if after one or two inspections, children are found working, the licensee is decertified and no longer permitted to use the NGO's label. Nevertheless, labeling programs have been criticized on the grounds of the credibility of the claims made on their labels. Some organizations believe that credible monitoring is simply an impossible task. For example, the Secretary General of Care & Fair stated that there are "…280,000 looms in India spread over 100,000 square kilometers…" (U.S. Department of Labour, 1997, p. 46.). Thus, it is argued that credible monitoring of such a large number of geographically dispersed looms is simply not feasible.

Table 1.1 : Overview of Labeling Initiatives (Nepal and India)

	RUGMARK	Kaleen	STEP	Care & Fair
Number of Exporters				
India	215	256	22	138
Nepal	149	N/A	8	72
Monitoring				
Self	Yes	No	No	No
Hired external agency	No	Yes	Yes	No
Rehabilitation and welfare measures				
schools	Yes	Yes	Yes	Yes
Rehabilitation center	Yes	No	No	No
medical facilities	Mobile	Yes	Mobile	Hospitals, dispensary, and clinics
adult education	Yes	No	No	No
women carpet weaving training center	No	No	Yes	No
Certification				
Individual carpets	Yes	Yes	No	No
Company			Yes	Yes
Source of financing				
% of FOB contribution by exporters	0.25 %			0.25 %
External funding	Yes	Yes (ministry)	Yes	

Source: Sharma (2002); TEP Foundation, U. S. Department of Labor (1997)

Only legislation, however sincere it might be in purpose, is unlikely to solve the problem. Since the nature of the problem is rather economic than legal, the labeling NGOs provide schools, health care facilities and hospitals for the displaced child laborers. In addition, various supporting programs like school tuition exemption, books, uniforms, and even food are offered by the labeling NGOs to former child laborers. Thus, they aim at compensating some opportunity cost of child schooling.

Labeling NGOs also often place priority to community-based rehabilitation. Consequently every effort is made to reunite the children with their families, so that they do not become alienated from their communities. Children who return to their families are given for example four levels of support depending upon their need, like support for school fees, books, uniforms and other materials. Children over 14 years are encouraged to join vocational training programs, which are also financed by labeling NGOs. An emphasis is also put on physical fitness, and extra-curricular pursuits such as music and art for the children.

Labeling as a strategy for reducing child labor has received analytical support from Freeman (1994) and Basu et al. (2000), but empirical evidence on this topic is still scarce. Moreover, several recent studies have highlighted the fact that Nepal lacks basic data needed for monitoring employment and labor market conditions[1]. Therefore, this study is an attempt to collect and analyze primary data from Nepali carpet industries. It will focus on the two labeling programs Rugmark and Care & Fair which have been in operation now for 10 years in Nepal. The Rugmark Foundation, established by "Brot fur die Welt", "Misereor", "terre des hommes" and UNICEF in 1995, aims at eliminating the employment of children in the carpet industry by assigning the Rugmark-label to carpets made without child labor. A fund has been set up which is financed by contributions of the exporting companies. This fund is intended to support the establishment of schools and training institutions in those regions where many children were employed prior to the campaign (Hemmer, 1996). Care & Fair is an association established by the German federation of carpet importers. The label does not promise child labor-free products, and monitoring is therefore not needed. It rather supports rehabilitation and education programs for children, financed by the imposition of an export charge levied on all carpet imports of member companies to Germany from India, Nepal and Pakistan (Hemmer, 1996).

Not clear is whether the children go to school after they were dismissed from the exporting carpet industries. If they do not go to school and are employed in more hazardous jobs, then labeling obviously decreased their initial welfare. Therefore, empirical evidence from Nepal regarding the impact of social labeling on schooling will provide insights about whether social labeling can be used as an effective tool to reduce child labor as well as poverty. The results of this study will also contribute to a better understanding of whether the marketing signals carried by the logos of labeling NGOs are reliable or credible in terms of reducing child labor supply.

[1] See for instance the report: International Labour Organization Nepal Labour Statistics: Review and Recommendations – A report prepared by an ILO mission, 1-10 July 1996, Kathmandu.

2 Child Labor and Child Schooling in Nepal

Nepal is one of the poorest countries in the world with a GNP per capita of US$ 220, and with over half of the population living on less than one dollar a day. The adult illiteracy rate is 60 percent, and the average household size in Nepal is 5.1 being slightly higher in rural (5.1) than in urban areas (4.8). According to the report on the Nepal Labor Force Survey (NLFS) 1998-99, there are an estimated 3.7 million households in Nepal with a total population of about 19.1 million. The estimated number of Nepalese children under the age of 15 amounts to 7.9 million. Child labor is a widespread problem in Nepal, and can be found with respect to many economic activities. About 500,000 children aged 5 to 9, and 1.5 million children aged 10 to 14 are classified as economically active. This means that their labor force participation rate is 21 percent, and 61 percent respectively (NLFS, 1998-99).

There are some provisions regarding children in the *Nepal Labor Act 2048 (1991).* According to the Act, a 'child' is defined as a person who has not attained the age of 14 years (Chapter 1, para. 2). The Act also establishes that "no child shall be engaged in work of any enterprise" (Chapter 2, para. 5). In addition, Nepal ratified the ILO Minimum Age Convention 138[2] in 1997, and the Worst Forms of Child Labor Convention 182 in 2002.

The national child labour and Nepal labour force surveys indicated that children who do not attend school have a 50% higher work participation rate. In rural areas only 36% of working children are illiterate, while this rise to 54% in urban areas. Studies also indicate that labor participation rates decreases with the level of education of the household head. Girls are more likely than boys to work by about 14.4 percent percentage points, and to neither attend school nor work by about 10 percent. As a consequence, girls' probability of attending school is around 25 percentage points lower than that for boys (UCW, 2003). Data indicates that the economic participation rates of children have dropped substantially over time (e.g. from 51% in 1971 to 29% in 2001 for children ten to fourteen years) due mainly to school enrolment. The larger rate drop for boys (59% to 27%), compared to girls (40% to 30%), can be explained by a male bias in school enrolment (Gilligan, 2003).

Table 2.1 shows the number of children attending school, and demonstrates how the rates of economic activity for children are affected by whether or not children are at school. It also

[2] International Labor Organization, Convention concerning minimum age for admission to employment (Convention No. 138), Geneva 1976. See also Ministry of Labor, Main provisions of the constitution of ILO and collection of some of ILO conventions ratified by His Majesty's Government of Nepal, HMG, Nepal, 1997.

demonstrates how the work participation rates rise as children get older. At the age of 14, for instance, 68 percent of boys and 80 of girls are currently economically active.

Table 2.1 : Rates of School Attendance and Labor Force Participation of Children Aged 5 to 9, and 10 to 14, by Gender and Locality (in 1000)

	Total			Urban			Rural		
	Total	Male	Female	Total	Male	Female	Total	Male	Female
Age group									
				Number of children attending school					
5-9	1653	919	735	225	122	103	1428	796	632
10-14	1800	1056	744	247	133	114	1554	923	630
Total	1454	1975	1479	472	255	217	2,982	1720	1262
				Percentage of children currently at school					
5-9	67.8	74.5	61.0	86.1	89.2	82.7	65.6	72.7	58.5
10-14	74.3	84.7	63.3	88.6	91.7	85.2	72.4	83.7	60.5
Total	71.1	79.6	62.1	87.4	90.5	84.0	69.0	78.2	59.5
				Percent of those at school who are currently active in labor					
5-9	19.1	17.9	20.7	6.5	6.1	6.9	21.1	19.7	22.9
10-14	52.6	50.2	56.1	24.3	23.3	25.5	57.1	54.0	61.6
Total	36.6	35.2	38.5	15.8	15.1	16.7	39.9	38.1	42.2
				Percent of those not at school who are currently active in labor					
5-9	24.7	19.5	28.3	12.7	9.0	15.2	25.3	20.0	28.9
10-14	85.0	82.7	86.0	74.3	74.3	74.3	85.6	83.3	86.6
Total	51.4	43.4	55.9	41.4	38.2	43.5	51.9	43.7	56.5

Source: NLFS 1998/99

About 68 percent of the children aged 5 to 9, and 74 percent of children aged 10 to 14, currently attend school. The rate of school attendance for those aged 5 to 14 is much higher in urban areas (87 percent) than in rural areas (69 percent). The contrast in the attendance rates for boys and girls is particularly marked in rural areas, with 78 percent of boys, but only 60 percent of girls, in this age group attending school. As we would expect, labor activity rates are higher amongst those not attending school than amongst those attending. But even among children currently attending school, as many as 40 percent are recorded as currently active in labor, because they did at least one hour of 'work' activities in the past seven days.

Table 2.2 : The Occurrence of Child Labor in Nepal, by Hours Worked, Occupation, Sector, and Gender (in 1000)

	Total			Whether currently attending school					
				Yes			No		
	Total	Male	Female	Total	Male	Female	Total	Male	Female
Total number aged 5-14	**4860**	**2480**	**2380**	**3454**	**1975**	**1479**	**406**	**05**	**01**
Number employed	1982	911	1072	1263	694	569	719	216	503
Total hours worked per week (million hours)	44	20	24	23	13	10	22	7	14
Average hours per week per person	22.4	22.1	22.7	18.1	18.5	17.5	30.1	33.8	28.5
Occupations	**1982**	**911**	**1072**	**1263**	**694**	**569**	**719**	**216**	**503**
Service workers	39	23	17	33	19	14	6	4	2
Housekeeping & restaurants	*13*	*7*	*6*	*9*	*4*	*5*	*3*	*3*	*1*
Shop salespersons	*26*	*15*	*11*	*23*	*14*	*9*	*3*	*1*	*2*
Agricultural producers	1686	788	899	1084	617	467	602	170	432
Animal producers (market)	*53*	*23*	*30*	*39*	*18*	*21*	*14*	*5*	*9*
Subsistence agriculture	*1617*	*761*	*856*	*1037*	*597*	*440*	*581*	*164*	*417*
Craft and related trades	22	9	13	8	3	5	14	6	8
Plant and machine operators	4	2	2	3	2	2	1	1	0
Elementary occupations	231	90	142	135	54	82	96	36	60
Agricultural labourers	*39*	*17*	*23*	*8*	*3*	*5*	*31*	*14*	*17*
Fetching water	*78*	*28*	*50*	*70*	*27*	*43*	*8*	*1*	*7*
Collecting firewood	*78*	*25*	*53*	*44*	*19*	*25*	*34*	*6*	*27*
Industries	**1982**	**911**	**1072**	**1263**	**694**	**569**	**719**	**216**	**503**
Agriculture, hunting & forestry	1725	804	921	1094	620	474	631	184	448
Manufacturing	26	11	16	12	4	8	14	6	8
Construction	10	7	3	3	1	2	7	6	1
Wholesale & retail trade	29	17	12	24	15	9	5	2	3
Hotels & restaurants	16	9	7	11	4	7	5	4	1
Private with employed persons	165	58	107	114	47	68	51	11	40
All other categories	10	5	5	4	2	2	6	3	2

Source: NLFS 1998/99

Table 2.2 highlights the kind and amount of work that children do. Two million children aged 5 to 14 who are classified as currently employed work a total of 44 million hours per week, representing 22 hours a week on average for every child who is currently employed. Boys and girls do about the same amount of work (22.1 and 22.7 hours respectively). Most (76 percent) of the boys who work are also still attending school, implying that they are continuing with their schooling. Girls who work are less likely to continue with their schooling, with only 53 percent of employed girls still attending school.

The Nepali carpet industry is the largest employer and foreign exchange earner in the country. Carpet production in Nepal is concentrated in and around the Kathmandu Valley. Nepal's carpet sector experienced its first export boom in 1976. The volume of exports more than doubled within one year, increasing from close to 20,000 square meters in 1975 to 47,500 square meters in 1976 (KC, 2003). By 1991, this sector contributed to more than 50 percent of the nation's total exports (Shrestha, 1991). The year 1993-94 recorded the highest ever volume of carpet exports, with more than 330,000 square meters amounting to a value of US$ 190 million. By destination of Nepalese carpets, the European market accounts for the biggest share of total export absorption.

After 1994, however, it became internationally well known that the carpet industry intensively employs child laborers - for long hours in any given day. The children work as wool spinners and weavers, and some also dye and wash carpets (CUTS, 2003). In a study by the Child Workers in Nepal Concerned Centre (CWIN, 1993) from the early nineties, 365 carpet factories within the Kathmandu Valley were surveyed, and it was estimated that about 50 percent of the total 300,000 laborers were children. Of them, almost 8 percent were below 10 years old, 65 percent between 11 and 14, and the remaining 27 percent were between 15 and 16 years (CWIN, 1993). A recent study by ILO (2002) estimated that about 7,700 or 12 percent of the total 64,300 laborers were child laborers in the carpet industries of the Kathmandu Valley. According to a survey of 17 carpet factories by the Nepal office of the Asian-American Free Labor Institute (AAFLI), 30 percent of the workers were found to be less than 14 years of age (CUTS, 2003).

However, after hearing about the use of child laborers in the Nepalese carpet sector, consumers in the German market refrained from buying Nepalese carpets (KC, 2002). Therefore, from 1995 onwards the carpet sector in Nepal experienced a declining trend in terms of production volume and export earnings. Until the mid nineties, Germany was buying over 80 percent of Nepali Carpets (Graner, 1999) but it then decreased to 64% of the total carpet export from Nepal to Germany (Bajracharya, 2004). The decline in the demand for Nepali carpets motivated the government, manufacturers and exporters to participate in the child labor-free labeling schemes. Subsequently, a number of social labeling initiatives in Nepal such as Rugmark and Care & Fair were introduced. The label became a legally binding international trademark in Germany in December 1995, and in 1996 in the US; these are the largest markets for carpet exports from South Asia (CUTS, 2003). Currently, almost 70% of the Nepalese carpet industry is licensed by the Rugmark certification system.

3 Data Collection and Method of Analysis

The main objective of this paper is to identify the effect of social labeling NGOs on the child labor supply decision in Nepal. This study takes into account the determinants of child labor used in various theories mentioned above and considers the influence of social labeling NGOs as a new determinant of the child labor decision by households. In accordance with the ILO convention 138, this study defines children from 5 to 14 years of age who were working in the last two months when this survey was conducted, as 'child laborers', no matter whether the children were working full or part time.

3.1. Survey in Nepal

The data collection in the Kathmandu valley in Nepal was based on primary and some secondary information of households working in the carpet industry. In order to decrease the variances and therefore increase the efficiency of the tests and precision of the estimations, the population was stratified with respect to sources of disturbing heterogeneity. The main suspected sources of heterogeneity were:

a) Administrative differences of regions.
b) Important time points[3].

This study stratifies the population and sample data by equi-proportional sizes with respect to the level of these variables and then draws a simple random sample from each stratum (Levy and Lemeshow, 1999). After stratification, the field workers visited carpet industries from the lists of *Rugmark* and *Care & Fair* to locate the labeled carpet industries, and visited the non labeled carpet industries from the same area as well.

The major challenge of this study was to locate the stratified households and getting a large enough random sample, so that a reasonable degree of confidence could be reached for statistically significant results. Appendix 1A, 1B, 1D shows sample sizes of different administrative regions at Kathmandu Valley.

There was no base line survey after 1993 that lists the children who lost their job from the carpet industries by the social labeling initiatives but there was a list of the children who were educated in the labeling NGOs' schools in different parts of the Kathmandu Valley. The other

[3] The NGOs came into operation in 1995. Therefore this sampling has to consider whether a present member of a household was a child before 1995 or after 1995. The results shown here consider the second group.

three available lists contain the addresses of the carpet industries provided by Central Carpet Industries Association (CCIA), *Rugmark* and *Care & Fair*.

In selecting the sample of carpet industries, the status of its registration by the labeling NGOs was taken into account. So, the sample was stratified by labeling households and non labeling households (see Appendix 1C & 1D). A labeling household is defined as a household with at least one person working in industries registered by labeling NGOs, and no member working in any non labeling industry. A non labeling household is a household with at least one person working in the unregistered carpet industry and nobody of the household working in the registered industry.

To compare the situation of labeling and non labeling households, the surveyed households were split into two parts; approximately half of them were selected from labeling and half of them from non labeling households. Appendix 1C shows that the quantitative study covered a total of 1,971 persons in 410 households. 56 percent of the households were involved with labeling NGOs and 44 percent were not involved with labeling NGOs.

3.2. Econometric Method

Logistic regression is the most appropriate statistical method to assess the influence of the independent variables on a dichotomous or polytomous dependent variable. A list and description of the dependent and independent variables is to be found in Tables 3.1 and 3.2.

Table 3.1 : Variables used for statistical calculation at household level

Variable name (SAS)	Variable Description	Type of the Variable
HH_Id	Household Id	Key
HH_HoH_Age	Age of the Head of Household	Continuous
HH_HoH_Sex	Gender of the Head of the Household	Binary Categorical
HH_HoH_Edu	Education of the Head of the Household	Categorical
HH_Size	Actual total permanent members of the household	Continuous
HH_IncGT14	Last month total income of family members older than 14 (adults)	Continuous
HH_Debts	Actual total outstanding debts incl. interest and costs	Continuous
HH_N_ChildLE14	Total actual number of children (<=14)	Continuous
HH_N_Child0514School	Total actual number of children in school (5-14) at least 20 days	Continuous
HH_IsAnybodyInLBLInd	Is anybody of the family working in a labeled industry?	Binary Categorical
HH_IsAbsDolPov	Absolute poverty ($)	Binary Categorical
HH_IsAnyChildLab	Has there any child been working in the household in the last two months full time or part time?[4]	Binary Categorical

[4] If the working time per day is eight hours or above, then the child laborer works full time. If the working time per day is at least two and less than eight hours, then the child laborer works part time.

Table 3.2 : Variables used for statistical calculation per child in household

Variable name (SAS)	Variable Description	Type of the Variable
Ind_IsThisChildLab	Has this child (age 5-14) been working in the last two months full time or part time?	Binary Categorical
Ind_NGOAssistChild	Is the child helped by labeling NGO?	Binary Categorical

We use a binary multiple logistic regression, and define the probability that a child is being employed in the following way:

$$\text{logit}(p) := \ln\left(\frac{p}{1-p}\right) = \alpha + \beta' X \qquad \textbf{(3.2.0)}$$

where
p = Probability (Child is employed | X)
α = Intercept parameter
ß = Vector of slope parameters
X = Vector of explanatory variables

The null hypothesis is $\beta_i = 0$ for all i. We divided the explanatory variables into two sets: Variables describing household characteristics and variables describing each individual child of a household. That will lead to two approaches: In the first sub-model **(3.2.1)**, we only concentrate on household characteristics as explanatory variables (X_H) (see Table 3.1) and determine the probability that at least one child in a household is employed (see definition above).

$$\text{logit}(p_H) := \ln\left(\frac{p_H}{1-p_H}\right) = \alpha + \beta' X_H \qquad \textbf{(3.2.1)}$$

where
p_H = Probability (HH_IsAnyChildLab | X_H)

In the second sub-model **(3.2.2)**, we are interested in the probability of an individual child to work. In this case, household and individual characteristics are used as explanatory variables (X_{HC}) (see Tables 3.1 and 3.2) to determine whether a child was employed in the last two months

$$\text{logit}(p_C) := \ln\left(\frac{p_C}{1-p_C}\right) = \alpha + \beta' X_{HC} \qquad \textbf{(3.2.2)}$$

where
p_C = Probability (Ind_IsThisChildLab | X_{HC})

The above econometric approach is to estimate the odds of child labor by using binary multiple logistic regression.

However, not included in model **(3.2.2)** is whether and to which extent social labeling NGOs activities influence choices of child activities between previous time (at least 2 months before June 2004) and at present (June 2004). From all combinations of previous and present children status with respect to school attendance, idle time or paid work, six not ordered, mutually exclusive, options where selected:

- previously child labor and now schooling
- previously idle and now idle
- previously idle and now working
- previously schooling and now child labor
- previously schooling and now schooling
- previously working and now working.

A multinomial logistic regression with baseline-category logits is performed to test the influence of social labeling NGOs activities on these six options

More formally:

If the dependent variable takes K nominal values then the multinomial logistic regression model with baseline-category logit is defined as:

$$\log(\frac{p_j}{p_K}) = \alpha_j + \beta'_j X \quad j = 1,..,K-1 \qquad \textbf{(3.2.3)}$$

The model consists of K-1 logit equations, with separate parameter for each j=1,…,K-1. For each j=1,…K-1 :

$\log(\frac{p_j}{p_K})$ is called baseline-category logit

p_j= Probability (Child chose option j | X)

α_j= Intercept parameter

$ß_j$= Vector of slope parameters

and

p_K= Probability (Child chose option K | X) Baseline option K: ‘previously working and now working’

X= Vector of explanatory variables

4 Discussion of the Model Results

4.1. Descriptive Statistics

For the households who are working in the carpet industry in Kathmandu Valley this survey estimates a mean household size of 4.8 ([4.6 ; 4.9]$_{95\% CI}$). The mean monthly income is 5,535Rs and the mean per capita income of the household is 1,284Rs ([1,229 ; 1,340] $_{95\% CI}$). According to the Nepal Living Standards Survey Report (1996), the per capita income was 2,007Rs for Kathmandu and 641Rs for the whole country. The average per capita income in the carpet belt of Kathmandu Valley (1,284 Rs) is significantly lower than that of the overall per capita income estimated in 1996 for the Kathmandu Valley (2,007 Rs); but the households who are working in carpet industries in Kathmandu Valley have a higher per capita income than in the whole country estimated in 1996 (641Rs). This immense wage gradient between Kathmandu Valley and the rest of the country might induce an intra country migration of child labourers to Kathmandu Valley.

The mean of the household's monthly expenditure is estimated as 4,469Rs. The estimated mean consumption expenditure of the household is 83% ([81 ; 85]$_{95\% CI}$ of their income, and the estimated net savings rate is 12% ([11 ; 14]$_{95\% CI}$ as the monthly saving amount to 665Rs, and the remaining 4-5 percent of the income is assumed to be spend to repay a household loan. The net savings per household in this study are derived from the total income of a household from all sources minus the consumption expenditure during the reference period and loan payment. Consumption expenditure includes the amount spent by a household on food and non food items.

From survey data we estimate that 91 percent of the household members joined their first job already in their childhood. The mean age of first joining a profession is 11 (median and mode age is 10). It follows that almost all household members were children when they joined the first job. The mean age of starting school is 8 years for children ($CI_{95\%}$: [7 ; 8]). On average 53 percent ([46 ; 60] $_{95\% CI}$) of the children work up to 8 hours and of them 27 percent ([21 ; 34] $_{95\% CI}$) work in labeling carpet industries and 26 percent ([20 ; 32] $_{95\% CI}$) in non labelled carpet industries.

Roughly 29 percent ([23 ; 35] $_{95\% CI}$) of the total child laborers work more than 8 hours up to a maximum of 14 hours per day in both labeling and non labeling industries. Of them 12 percent ([7 ; 16] $_{95\% CI}$) work in labeling carpet industries and 17 percent ([12 ; 22] $_{95\% CI}$) in non labeling carpet industries.

Almost 18 percent of the child labourers work more than 14 hours per day in both labeling and non labeling carpet industries. Of them 6 percent ($[3 ; 10]_{95\% CI}$) work in labeled industries and 12 percent ($[8 ; 17]_{95\% CI}$) work in non labeled carpet industries.

Hence, exploitation in terms of working hours is higher in the non labeling industries than in the labeling industries.

4.2. Econometric Estimates

The results of testing the influence of variables on the chance of child labor at the household level (3.2.1) or the individual level (3.2.2) are shown in Table 2B and 2C respectively:

i) The labeling status of a household is an important factor in decreasing child labor participation.
A comparison of tables 2B and 2C shows that for each family as well as for each child, the magnitude of the estimated child labor decreases with labeling NGO intervention.
The estimated odds ratio of the labeling status are 0.481[5] for the family-wise regression. This means, that the odds of having a child laborer in the family not being assisted by an NGO are more than 2 times[6] the odds of having a working child in an NGO-assisted family. For the child-wise model we get an odds ratio of 0.117 which means, that the odds for a child from an unassisted family to work are more than 8 times[7] higher than the odds for a child to work from an NGO-assisted family. Thus, the null hypothesis of "NGO has no influence" in model (3.2.1) and (3.2.2) is not only clearly rejected but also the NGO factor turns out to be the most important factor in preventing child labor.

[5] In Table 2B the point estimator of the odds ratio of HH_isAnybodyInLBLInd of registered vs. unregistered is 0.481 which is defined as:

$$0.481 = \frac{odds(\text{any child in the family working} \mid \text{any one in family in registered industry})}{odds(\text{any child in the family working} \mid \text{all in family in unregistered industry})}$$

For confidence intervals, please refer to table 2B and 2C in the appendix.

[6] 2.08 = 1 / 0.481

[7] 8.55 = 1 / 0.117

Table 2B : Logistic regression (3.2.1) results for the probability of child labor (Household Level, N = 410)

Analysis of Maximum Likelihood Estimates				Odds Ratio Estimates		
Parameter		**Estimate**	**Pr > ChiSq**	**Point Estimate**	**90% Confidence Limits**	
Intercept		0.7929	0.4239			
HH_IsAnybodyInLBLInd	**Registered vs Unregistered**	-0.3659	0.0106	0.481	0.300	0.770
HH_IsAbsDolPov	**No vs Yes**	0.8154	0.1162	5.108	0.926	28.180
HH_HoH_Sex	**Female vs Male**	-0.1479	0.5979	0.744	0.296	1.872
HH_HoH_Edu	**At least rimary education vs No education**	-0.3920	0.0175	0.457	0.265	0.786
HH_IncGT14_SC(*)		-0.7768	0.0272	0.460	0.258	0.820
HH_N_ChildLE14		1.3055	<.0001	3.690	2.455	5.544
HH_Debts_SC(**)		0.1461	0.0887	1.157	1.005	1.333
HH_HoH_Age_SC(***)		0.2151	0.0332	1.240	1.050	1.464
HH_N_Child0514School		-1.2665	<.0001	0.282	0.204	0.389
HH_Size		-0.4196	0.0065	0.657	0.510	0.847

(*) HH_IncGt14_SC is the scaled adult income of the household (in 5,000 rupies)

(**) HH_Debts_SC is the scaled household's debts (in 5,000 rupies)

(***) HH_HoH_Age_SC is the scaled head of household's age (in 5 years)

Table 2C : Logistic regression (3.2.2) results for the probability of child labor (Individual Level, N = 525)

Analysis of Maximum Likelihood Estimates				Odds Ratio Estimates		
Parameter		Estimate	Pr > ChiSq	Estimate Point	90% Confidence Limits	
Intercept		0.5249	0.5520			
Ind_NGOAssistChild	Yes vs No	-1.0727	0.0408	0.117	0.021	0.657
HH_IsAbsDolPov	No vs Yes	0.4191	0.2881	2.312	0.631	8.467
HH_HoH_Sex	Female vs Male	0.0222	0.9103	1.045	0.547	1.998
HH_HoH_Educ	At least primary education vs No education	-0.2510	0.0334	0.605	0.411	0.892
HH_IncGT14_SC(*)		-0.4568	0.0699	0.633	0.418	0.959
HH_N_ChildLE14		0.2370	0.1082	1.267	0.994	1.616
HH_Debts_SC(**)		0.0881	0.0502	1.092	1.014	1.176
HH_HoH_Age_SC(***)		0.0690	0.2482	1.071	0.971	1.182
HH_N_Child0514School		-0.8792	<.0001	0.415	0.343	0.503
HH_Size		-0.2324	0.0309	0.793	0.664	0.946

(*) HH_IncGt14_SC is the scaled adult income of the household (in 5,000 rupies)
(**) HH_Debts_SC is the scaled household's debts (in 5,000 rupies)
(***) HH_HoH_Age_SC is the scaled head of household's age (in 5 years)

ii) Following the luxury axiom[8] of Basu and Van (1998), this study tests whether there is a relationship between child labor and adult income ('HH_IncGt14_SC' scaled adult's income in 5,000 Rupies). It can be concluded that the sign and the statistical significance of the estimated adult income coefficient support the Basu and Van model. The estimated odds ratio for adult income are 0.460 in the household level regression and 0.633 in the individual level regression. This means, that for each additional 5,000 Rupies in the family income, the odds for

[8] The family will send the children to the labor market only if the family's income from non child labor sources drops significantly.

child labor are more than halved (46%) by each 5,000 Rs more (household level) or around 37 percent (individual level) lower. This shows a strong and negative association between the adult income and child labor in the household.

iii) Improvement in the head of the household's education ('HH_HoH_Edu') significantly decreases the probability of a child's employment in the labor market. This is confirmed by the negative and significant estimates in the odds ratio of 'at least primary education' and 'no education' concerning the variable 'head of the household's education' in both, the individual level and household level regressions. The estimated odds ratio for 'head of the household's education' are 0.457 in the family-wise regression and 0.605 in the child-wise regression. This means that the odds of child labor are about 54 percent and 39 percent lower for those households where the head of the household completed at least primary school compared with those households where the head of the household has no education. This shows a strong and negative association between the education status of the head of the household and child labor.

iv) The age of the head of the household ('HH_HoH_Age_SC' Scaled head of the houshold's age in 5 years of age) shows a significant and positive effect on child labor supply in household level regressions. The use of children as a form of insurance (Pörtner, 2001) also provides some insight into the role of the 'age of the head of the household' in determining child labor. The idea behind this might be that the older the head of the household is, the more aware will he be of his dependency for livelihood in the future. Child laborers could be seen as an 'economic insurance' in old age for the head of the household. Thus, the probability of a child to work is increasing with the age of the household head. The estimated odds ratio for 'age of the head of the household' are 1.240 in the family-wise regression and 1.071 in the child-wise regression, which means that the odds of child labor are 24 percent and 7 percent higher for each 5 years increase of the age of the household head. This shows a strong and positive association between the age of the head of the household and child labor.

v) The sign of the coefficient for the size of a household 'HH_Size' shows that with an increase in the household size, the probability of child labour decreases in both, the individual level and household level regressions. This is contrary to what would have been expected, however, it might be explained by an increased number of adults - and not children - in the household. In fact, the more adults there are in the household, the less likely it is that a child works. The variable 'total number of children' ('HH_N_ChildLE14') shows a statistically significant and positive relation with the occurrence of child labor. This indicates that the higher the number of children in a household, the more likely it is that some children of this family will go to work. The estimated odds ratio for 'total number

of children' are 3.690 in the household level regression which means that the likelihood (odds) of a child to work increases by the factor 3.7 for each additional child in the household. This shows a strong and positive association between 'total number of children' in a family and child labor, which is described frequently in the literature (Patrinos, 1997).

vi) In the household level and individual level regressions, there is a positive correlation between child employment and family debts ('HH_Debts_SC' scaled household's debt in 5,000 Rupies). In both cases, the odds are increased by around 10 to 15 percent (although not significantly at household level). That means that the odds of child employment are increased by around 10 to 15 percent if the debt burden of the household rises by each 5,000 Rupies.

vii) This study neither finds a significant influence of absolute poverty ('HH_IsAbsDolPov' household per capita income less than US$ 1per day) nor a significant influence of the 'gender of the head of the household' ('HH_HoH_Sex') on child labor supply of the household. Although the sample size is relatively high to gain a high power this result is likely to have been caused from the fact that 98 percent of the households report that they live in absolute poverty (less than US$ 1 income). In addition, most people generally underestimate their income if asked in a survey. Also 93 percent of the households are male-headed. Thus, influences of the 'head of household's gender' or of absolute poverty on child labor supply might still be hard to detect.

Results of testing whether and to which extent social labeling NGOs activities and other variables influence choices of child-activities between previous time and present (3.2.3) are presented in Table 2D.

i) NGO assistance ('IsNGOAssist') had a significant positive impact on those who once were child laborers and are now going to school. The variable 'NGO assistance' is almost perfectly discriminating[9] the outcome. Labeling NGOs have also a positive impact on those children who once were in school and still are. The estimated odds ratio is 54.9. This means, that the odds for a child of continuing school are on average 55 times higher for those children who are helped by labeling NGOs than those children who are not helped by labeling NGOs.

ii) The adult's income ('HH_IncGt14_SC' scaled adult's income in 5,000 Rupies) has a significant positive influence on child schooling, in other words adult income is negatively related with child drop out from school. The estimated odds ratio is

[9] One can predict the sample outcomes perfectly by knowing the predictor values (except possibly at a boundary point). In such cases, an ML parameter estimate for logistic regression model is infinite.

4.6. This means that the odds of continuing school for a child are about 4.6 times higher per 5,000 Rupies. This finding again supports the luxury axiom (Basu and Van, 1998).

iii) The total number of children in a household ('HH_N_ChildLE14') has an impact on child activities between previous and present time. The result indicates that the higher the number of children in a household, (a) the more likely it is that a previously idle child is still idle (odds are 2.4 times higher per one more child), (b) the less likely that a school going child would continue his/her school (odds are 79 percent smaller per one more child), and (c) the less likely that previously school going child is now working (odds are 72 percent smaller per one more child), because the child might be idle and finding no work.

iv) The age of the head of the household ('HH_HoH_Age_SC' Scaled head of the houshold's age in 5 years of age) has played a significant positive role for those children who were previously idle and now working. The estimated odds of working for the idle children increase by 47 percent per 5 years of age of the head of the household. Also, the odds of the child drop out rate increase by 24 percent for those children who have a more aged head of the household than others.

v) As the number of school going children in a household ('HH_N_Child0514-School') increases, the likelihood of schooling for the ex child laborer increases. The estimated odds of school attendance for the ex child laborers are 23 times higher per one more school going child in the family. Also the previously idle child does not want to remain idle when the household has more school going children than a household with less school going children. The estimated odds of a previously idle child to be idle presently are 70 percent lower in the case where the more children are going to school in a household than the less. The drop out rate from school decreases by the increased number of school going child in a household. The odds of continuing schooling for a school going child are 22 times higher for the household where at least one more child is going to school. Odds for previously ‘schooling now working’ are 11 times higher per one more child going to school.

5 Conclusion

The empirical results support policies aimed at taking children out of paid employment and sending them to school. The trade-off between child employment and child schooling, as reflected in the negative and highly significant coefficient estimates of the corresponding variables, confirm that a child's labor market participation as a wage laborer puts the biggest obstacle to her/ his school enrolment.

This study finds that improvement in the child's and household's welfare through the intervention of social labeling NGOs is an effective way of combating child labor and vis a vis increasing child schooling. One of the main factors which could influence the success of labeling NGOs is 'monitoring frequency'[10]. However, this study does not consider 'monitoring frequency' as an explanatory variable because of the high collinearity with 'HH_IsAnybodyInLBLInd' (Is anybody of the family is working in a labeled industry?) and 'Ind_NGOAssistChild' (Is the child helped by labeling NGO?). In the household level analysis the most important factor is the number of the children under 14 years of age; a household with more children is much more likely to send a child to work than a household with less children. A combination of policies like labeling NGO's welfare activities, birth spacing, access to the formal credit market, increase of the adult income, and adult education could be suggested from this study to remove a child from the 'work place' to 'school'.

10 According to the 'RUGMARK BULLETIN' (2003), the frequency of the factory visits varies from once a week to once in two months, depending on the confidence of Rugmark in the factory's commitment and performance with regard to the non use of child labor.

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Appendix

Table 1A : Number of Households in the Kathmandu Valley, Nepal, 2004

District	Households	Percent
Kathmandu	138	33.7
Lalitpur	128	31.2
Bhaktapur	144	35.1
Total	410	100.0

Source: Own survey.

Table 1B : Places of Interview in the Kathmandu Valley, Nepal, 2004

District	Location
Kathmandu	Bauddha
Kathmandu	Bhungmati
Kathmandu	Chabahil
Kathmandu	Chuchepati
Kathmandu	Jorpati
Kathmandu	Kirtipur
Kathmandu	Mahankal
Kathmandu	Swayambhu
Kathmandu	Koteshwor
Kathmandu	Sallaghari
Lalitpur	Bhaisepati
Lalitpur	Ekantakuna
Lalitpur	Nakhkhu
Lalitpur	Sanepa
Lalitpur	Jawalakhel
Lalitpur	Sat Dobato
Bhaktapur	Surya Binayak
Bhaktapur	Sanothimi
Bhaktapur	Jagati
Bhaktapur	Byasi
Bhaktapur	Thimi

Source: Own survey.

Table 1C : Labeling Status of Households

	Households	Percent
Labeling	229	55.9
Non Labeling	181	44.1
Total	410	100.0

Source: Own survey.

Table 1D : Labeling Status of Household Members

District	Members of Labeling Households	Members of Non Labeling Households	Total Household Members
Kathmandu	307 48.5%	326 51.5%	633 100.0%
Lalitpur	311 51.9%	288 48.1%	599 100.0%
Bhaktapur	489 66.2%	250 33.8%	739 100.0%
Total	1107 56.2%	864 43.8%	1971 100.0%

Source: Own survey.

Table 2D : Multinomial logistic regression (3.2.3) results (Individual Level, N = 417)

Parameter		School-Work History	Estimate	Pr > ChiSq	Odds Ratio Estimates		
					Estimate Point	90% Confidence Limits	
Intercept		previously child labor and now schooling	-10.4411	0.9058			
Intercept		previously idle and now child idle	-15.1101	0.8804			
Intercept		previously idle and now working	-21.5699	0.9459			
Intercept		previously schooling and now child labor	-15.1866	0.9386			
Intercept		previously schooling and now schooling	1.9132	0.2120			
IsNGOAssist	Yes vs No	previously child labor and now schooling	4.2638	<.0001	*	196.448	
IsNGOAssist	Yes vs No	previously idle and now child idle	-5.7739	0.9187	<0.001	<0.001	>999.999
IsNGOAssist	Yes vs No	previously idle and now working	-4.7824	0.9830	<0.001	<0.001	>999.999
IsNGOAssist	Yes vs No	previously schooling and now child labor	-3.0979	0.9838	0.002	<0.001	>999.999

* perfect discrimination; see Agresti, A. (1996), p. 134 for further discussion

Table 2D : Multinomial logistic regression (3.2.3) results (Individual Level, N = 417) continued

Parameter		School-Work History	Estimate	Pr > ChiSq	Odds Ratio Estimates		
					Estimate Point	90% Confidence Limits	
IsNGOAssist	Yes vs. No	previously schooling and now schooling	2.0027	0.0203	54.892	3.211	938.503
HH_IsAbsDolPov	No	previously child labor and now schooling	-2.9823	0.9257	0.003	<0.001	>999.999
HH_IsAbsDolPov	No	previously idle and now child idle	-4.6394	0.9554	<0.001	<0.001	>999.999
HH_IsAbsDolPov	No	previously idle and now working	-5.6496	0.9769	<0.001	<0.001	>999.999
HH_IsAbsDolPov	No	previously schooling and now child labor	-3.7035	0.9721	<0.001	<0.001	>999.999
HH_IsAbsDolPov	No	previously schooling and now schooling	-0.7220	0.2370	0.236	0.032	1.758
HH_HoH_Sex	female	previously child labor and now schooling	-5.5360	0.9463	<0.001	<0.001	>999.999
HH_HoH_Sex	female	previously idle and now child idle	-0.1048	0.8588	0.811	0.117	5.631
HH_HoH_Sex	female	previously idle and now working	-4.7278	0.9666	<0.001	<0.001	>999.999
HH_HoH_Sex	female	previously schooling and now child labor	-4.8909	0.9406	<0.001	<0.001	>999.999

Table 2D : Multinomial logistic regression (3.2.3) results (Individual Level, N = 417) continued

Parameter		School-Work History	Estimate	Pr > ChiSq	Odds Ratio Estimates		
					Estimate Point	90% Confidence Limits	
HH_HoH_Sex	female	previously schooling and now schooling	0.1413	0.5946	1.327	0.554	3.177
HH_HoH_Educ	at least primary education	previously child labor and now schooling	-0.3499	0.5564	0.497	0.070	3.516
HH_HoH_Educ	at least primary education	previously idle and now child idle	0.4541	0.0537	2.480	1.143	5.379
HH_HoH_Educ	at least primary education	previously idle and now working	0.2942	0.6433	1.801	0.223	14.560
HH_HoH_Educ	at least primary education	previously schooling and now child labor	0.0621	0.8957	1.132	0.238	5.381
HH_HoH_Educ	at least primary education	previously schooling and now schooling	0.1079	0.6036	1.241	0.626	2.458
HH_IncGT14_SC(**)		previously child labor and now schooling	1.1622	0.3765	3.197	0.368	27.766
HH_IncGT14_SC(**)		previously idle and now child idle	0.7316	0.2284	2.078	0.765	5.645

Table 2D : Multinomial logistic regression (3.2.3) results (Individual Level, N = 417) continued

Parameter		School-Work History	Estimate	Pr > ChiSq	Odds Ratio Estimates		
					Estimate Point	90% Confidence Limits	
HH_IncGT14_SC(**)		previously idle and now working	1.8814	0.2842	6.563	0.365	118.068
HH_IncGT14_SC(**)		previously schooling and now child labor	-0.8545	0.3639	0.426	0.090	2.001
HH_IncGT14_SC(**)		previously schooling and now schooling	1.5224	0.0006	4.583	2.211	9.501
HH_N_ChildLE14		previously child labor and now schooling	-1.2353	0.0855	0.291	0.089	0.948
HH_N_ChildLE14		previously idle and now child idle	0.8597	0.0119	2.362	1.347	4.145
HH_N_ChildLE14		previously idle and now working	1.7155	0.1178	5.559	0.915	33.762
HH_N_ChildLE14		previously schooling and now child labor	-1.2793	0.0293	0.278	0.106	0.731
HH_N_ChildLE14		previously schooling and now schooling	-1.5845	<.0001	0.205	0.126	0.334
HH_Debts_SC(***)		previously child labor and now schooling	-0.8678	0.4649	0.420	0.060	2.960
HH_Debts_SC(***)		previously idle and now child idle	0.1218	0.4956	1.130	0.842	1.516

Table 2D : Multinomial logistic regression (3.2.3) results (Individual Level, N = 417) continued

Parameters		School-Work History	Estimate	Pr > ChiSq	Odds Ratio Estimates		
					Estimate Point	90% Confidence Limits	
HH_Debts_SC(***)		previously idle and now working	-1.1399	0.4656	0.320	0.024	4.179
HH_Debts_SC(***)		previously schooling and now child labor	-1.8915	0.2116	0.151	0.012	1.821
HH_Debts_SC(***)		previously schooling and now schooling	0.1447	0.2510	1.156	0.939	1.422
HH_HoH_Age_SC(****)		previously child labor and now schooling	-0.1218	0.7288	0.885	0.497	1.578
HH_HoH_Age_SC(****)		previously idle and now child idle	-0.0484	0.7479	0.953	0.744	1.221
HH_HoH_Age_SC(****)		previously idle and now working	0.3833	0.0960	1.467	1.004	2.143
HH_HoH_Age_SC(****)		previously schooling and now child labor	0.1640	0.3990	1.178	0.856	1.622
HH_HoH_Age_SC(****)		previously schooling and now schooling	-0.2709	0.0168	0.763	0.633	0.919
HH_N_Child0514School(*****)		previously child labor and now schooling	3.1271	<.0001	22.808	6.103	85.232
HH_N_Child0514School(*****)		previously idle and now child idle	-1.2101	0.0009	0.298	0.164	0.543

Table 2D : Multinomial logistic regression (3.2.3) results (Individual Level, N = 417) continued

Parameters		School-Work History	Estimate	Pr > ChiSq	Odds Ratio Estimates		
					Estimate Point	90% Confidence Limits	
HH_N_Child0514School(*****)		previously idle and now working	-0.9008	0.2911	0.406	0.100	1.653
HH_N_Child0514School(*****)		previously schooling and now child labor	2.3709	0.0008	10.707	3.365	34.071
HH_N_Child0514School(*****)		previously schooling and now schooling	3.0717	<.0001	21.578	12.629	36.868
HH_Size		previously child labor and now schooling	0.1609	0.6877	1.175	0.608	2.269
HH_Size		previously idle and now child idle	0.2480	0.3329	1.281	0.841	1.953
HH_Size		previously idle and now working	-0.9748	0.2405	0.377	0.096	1.479
HH_Size		previously schooling and now child labor	0.1632	0.5535	1.177	0.748	1.852
HH_Size		previously schooling and now schooling	0.0987	0.6011	1.104	0.809	1.506

(**) HH_IncGt14_SC is the scaled adult income of the household (in 5,000 Rupies)

(***) HH_Debts_SC is the scaled household's debts (in 5,000 Rupies)

(****) HH_HoH_Age_SC is the scaled head of household's age (in 5 years)

(*****) There is only 1 child in 148 households, so in order to test the robust ness of the variable 'HH_N_Child0514School' in the model we preclude the 148 households and run the regression in the same model, the variable 'HH_N_Child0514School' is significant and shows 'spill over effect' of schooling.

Multicollinearity

To test for multicollinearity in multiple logistic regression the model was recalculated in an linear regression approach were multicollinearity-tests are available (Allison, 2003).

No unacceptable values of multicollinearity - neither condition indices nor tolerance values - were detected.

Condition indices and tolerance values are the two measures of multicollinearity commonly used.

Condition indices are defined as the square roots of the ratios of the largest eigenvalue to each successive eigenvalue. If the condition index of a variable is “large” then the model contribution of that variable in terms of "new" i.e. orthogonal information is small.

Tolerance values are defined as the proportion of a variable's variance not accounted for by other independent variables in the equation. It is calculated as 1 minus R squared for an independent variable when it is predicted by the other independent variables already included in the analysis. Thus a variable with very low tolerance could contribute not much to the model in terms of variance reduction.

Equivalent to tolerance values are variance inflation factors (VIFs) which are defined as the reciprocal of tolerance values.

Although no formal criteria or tests are available - neither for condition indices nor for tolerance values – the following limits are commonly used: the condition indices should be below 10 (week collinearity) and certainly below 100 (pronounced collinearity). Tolerance values should be larger than 0.25 (equivalent to: VIFs should be smaller than 4) (Garson, 2004).

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