

Root Causes of Child Labor in Cambodia: Testing the “Luxury” Hypothesis

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1. Introduction

Child labor has been a research subject of increasing interest since the mid-1990s. One of the contributing factors is the growing concern with poverty reduction among the poorest, particularly working children who are the most vulnerable to exogenous shock. Another factor is that the importance of human capital accumulation as a source of development is being recognized and child labor is being viewed as a major impediment to economic development. (Basu and Tzannatos [2003])

Over the last decade, there have been many researches on child labor resulting in an increased understanding of the causes and determinants of child labor. Among these researches, Basu and Van [1998] proposed a theoretical model in their seminal paper; this model studied the case of parents sending their children to work when driven to do so by poverty. In other words, it suggested child schooling and leisure as luxuries. A number of subsequent empirical studies support the hypotheses mentioned in this model (for the literature, see Basu and Tzannatos [2003]).

However, if we assume intergenerational transfer between parents and children in conjunction with a perfect capital market under the Basu and Van framework, child labor is not observed. Therefore, capital market failure can explain child labor.

Baland and Robinson [2000] assume parental “bequests” constraint and “capital market imperfections” to conclude that parents’ decisions on the trade-off

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between child labor and human capital accumulation are rational even though parents are altruistic and child labor is socially inefficient. This is because parents fail to internalize the negative effects of child labor when bequests are zero or capital markets are imperfect.

Raut [2001] argues that credit constraints encountered by poor households result in excessive child labor and reduce children's human capital. This indicates that there exists some positive correlation between poverty and child labor in an imperfect capital market.

However, although capital markets in developing countries are usually imperfect, the hypothesis that poverty engenders child labor has been questioned by empirical studies.

French [2002] and Psacharopoulos [1997] present evidence that some amount of work can help children acquire human capital by enabling them to earn money to go to school. Fan [2004] explains these findings theoretically.

Nielsen [1998] in Tanzania and Ray [2000] in Pakistan fail to discern a positive relationship between poverty and child labor.

Bhalotra and Heady [2003], Canagarajah and Coulombe [1997], Edmonds and Turk [2004], and Kanbargi and Kulkarni [1991] serve as other counter examples.

Bhalotra and Heady [2003] studied the wealth paradox by using data from Pakistan and Ghana and found that children of land-rich households are often engaged in more work than those of land-poor households.

Edmonds and Turk [2002] and Canarajah and Coulombe [1997] found that in Vietnam and Ghana, respectively, households with their own businesses are more likely to send children to work. Although this does not rule out poverty as a determinant of child labor, it implies that households that start their own businesses have a greater proclivity to employ child labor, such as land-rich farm households.

Kanbargi and Kulkarni [1991] determine that in India, raising the number of cattle induces a higher incidence of child labor.

Another study that appears to raise valid doubts on the relationship between poverty and child labor is the study by Fallon and Tzannatos [1998]. This study notes in the World Bank issues paper that there exists a negative association

between household income and the incidence of child labor in low-income countries (USD500 or less). However, this association becomes less marked in the more affluent developing countries (USD1,000-4,000).

As mentioned above, investigations do not confirm the relevancy of the “poverty” hypothesis even though many researches have focused on the causes of child labor and an increased understanding of it.

The main objective of this paper is to investigate the relevancy of the poverty hypothesis and the validity of other hypotheses pertaining to the incidence of child labor in Cambodia.

In Cambodia, many households live below the poverty line.¹ Although a significant 12 percentage point decrease in poverty has been registered over the last decade, population growth has increased the actual number of poor people.²

The common understanding is that poverty is the seedbed of child labor. Further, child labor is often regarded as detrimental to human resource development. Consequently, the international community’s efforts to achieve the Millennium Development Goals (MDGs) pertaining to education and the elimination of child labor have been reinforced. However, the perception of child labor among Cambodian communities is that it is beneficial because it helps children understand the difficult lives of their parents. Thus, the household income earned through child labor is regarded as important to sustain the level of consumption in a household. As is evident herein, there exists a difference between the perceptions of child labor in the international and Cambodian communities.

In Cambodia, a positive correlation between poverty and child labor is evident. It can also be observed that more than a few households below the poverty line send their children to school and that the number of non-poor households that send their children to work is not negligible either, as shown in Table 1. Therefore, the case of Cambodia is appropriate for an empirical examination of the poverty hypothesis as well as that of alternative hypotheses.

This paper is organized as follows. In the next section, we explain the alternative hypotheses on the incidence of child labor. Next, in section 3, we employ a multinomial logit model to capture four possible outcomes of “child’s activities” (“works only,” “combines work with study,” “studies only,” and “idles”); we also

Table 1: Children's Activities by Poverty Status in 1999 (Percentage of All Households with at least One Child Aged 5-14 Years)

Child's activities	Age group: 5-14 years Different poverty lines								
	using overall poverty line(1)			using food poverty line(2)			using the hypotheses of Basu and Van(3)		
	Poor	Non-poor	Total	Poor	Non-poor	Total	Poor	Non-poor	Total
Works only: Persons	278	172	450	170	280	450	3	447	450
Works only: Row %	61.78	38.22	100.00	37.78	62.22	100.00	0.67	99.33	100.00
Works only: Column %	5.83	3.23	4.46	6.29	3.79	4.46	6.25	4.45	4.46
Both works & studies: Persons	348	242	590	177	413	590	6	584	590
Both works & studies: Row %	58.98	41.02	100.00	30.00	70.00	100.00	1.02	98.98	100.00
Both works & studies: Column %	7.30	4.55	5.85	6.55	5.59	5.85	12.50	5.81	5.85
Studies only: Persons	2,582	3,754	6,336	1,401	4,935	6,336	17	6,319	6,336
Studies only: Row %	40.75	59.25	100.00	22.11	77.89	100.00	0.27	99.73	100.00
Studies only: Column %	54.14	70.52	62.78	51.81	66.80	62.78	35.42	62.91	62.78
Idles: Persons	1,561	1,155	2,716	956	1,760	2,716	22	2,694	2,716
Idles: Row %	57.47	42.53	100.00	35.20	64.80	100.00	0.81	99.19	100.00
Idles: Column %	32.73	21.70	26.91	35.36	23.82	26.91	45.83	26.82	26.91
Total: Persons	4,769	5,323	10,092	2,704	7,388	10,092	48	10,044	10,092
Total: Row %	47.26	52.74	100.00	26.79	73.21	100.00	0.48	99.52	100.00
Total: Column %	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00

(1) The 1999 Overall Poverty Line sets the values of 2305 riels per person per day in Phnom Penh, 1926 riels in other urban areas, and 1687 riels in rural areas

(2) The 1999 Food Poverty Line sets the values of 1737 per person per day in Phnom Penh, 1583 in other urban areas, and 1379 in rural areas.

(3) Using the hypotheses of Basu and Van, "the lowest income group among studying children" is considered to construct the poverty line, wherein values of 843 riels per person per day in Phnom Penh, 417 riels in other urban areas, and 364 riels in rural areas are set.

Note: These poverty lines refer to the cost of achieving the standard of living provided by the reference bundle of food, as constructed by Prescott and Pradhan (1997), with allowances for non-food, non-rent, and non-medical consumptions based on the typical value of non-food spending by households whose total expenditure just equals the value of the food poverty line.

Source: Author's calculation

test the hypotheses, including the "luxury hypothesis," by using the national dataset of the Cambodia Socio-Economic Survey 1998/99 (CSES 1998/99) and present empirical evidence in this section. The final section presents the conclusions.

2. Alternative Hypotheses: Key Determinants of Child Labor

We explain the following alternative hypotheses on the incidence of child labor.

1) Parents' Occupations

Several studies outline the importance of parent employment characteristics with regard to child labor. For example, Bhalotra and Heady [2003] note that

children from land-rich households work more than children from land-poor households; by this, they imply that the incidence of child labor does not decrease with wealth. Similarly, Edmonds and Turk [2004] determine that Vietnamese households with businesses of their own tend to engage their children in more work than other households do. Khanam [2003] indicates a positive relationship between parents’ education and the probability of children’s schooling. Further, Khanam notes that parents’ occupation is very important for determining children’s activities. If the father’s occupation is not secure, for example, day labor or wage labor, the probability of his child working full time or combining work and study is increased.

Similarly, Parikh and Sadoulet [2005], in their studies on the effect of parents’ occupation on child labor and school attendance in Brazil, investigate how child labor and schooling are influenced by work opportunities, particularly opportunities provided by parents. After controlling for household, parental, regional, and child characteristics, they found that children whose parents are self-employed or are employers are more likely to work than the children of employees, irrespective of the sector of parental occupation. Furthermore, their paper also confirms a recent finding that children from areas with high average adult employment rates are more likely to work than those from areas with low average adult employment rates. The number of working and school-going children of parents who are self-employed or are employers is twice the corresponding number for parents who are employees. Therefore, their paper suggests that child labor does not necessarily represent a trade-off with schooling, since the former depends on parents’ occupation.

2) Parents’ Education

Parents’ characteristics, particularly their education, have been shown to have an impact on human capital accumulation of children in studies such as Ray [2000], Deb and Rosati [2004], Blunch et.al [2002], Bhalotra and Heady [2003], and Khanam [2003]. These studies confirmed that there exists a positive link between parents’ education and the likelihood of their children attending school and a negative link between parents’ education and the likelihood of their

children having to work. Among these studies, some such as Deb and Rosati [2004] and Ray [2000] tend to emphasize the crucial role of mother's education on child schooling. However, the evidence provided by Kim and Zepeda [2004] reveals a contradiction in the view that the higher the parents' educational level, the higher is the probability that their children will work and the fewer the number of hours that the children will work for.

3) Gender

In most empirical works, the relationship between gender and child labor (male and/or female child labor) is variable, based on the social, cultural, and political environments. Bhalotra and Heady [2003], besides studying the wealth effect, found that in Pakistan, children's age has a positive effect on the number of hours worked, which is much larger for boys than for girls. Additionally, children of the household head are more likely to be at work on farms than other children in the household. Moreover, children in matriarchal households in Pakistan work significantly more, and the effect is bigger for boys and girls. Khanam [2003] studied child labor and school attendance by using Bangladeshi data and indicated a positive gender coefficient such that girls are more likely than boys to combine schooling with work in Bangladesh.

In the Ghanaian case study, Blunch and Dort [2000] confirm a positive link between poverty and child labor. They also indicate the evidence of a gender gap in poverty-related child labor, since girls across urban, rural, and poverty subsamples are consistently found to be more likely to engage in harmful child labor than boys do; further, there exist structural differences in the process underlying harmful child labor in Ghana across gender, rural and urban locations, and poverty quintiles of households.

4) Number of Children

Child labor and number of children are endogenous in the household decision-making model (Becker [1960]; Deb and Rosati [2004]). However, this problem exists in empirical works, being clearly seen in previous studies on the model of children's activities. For example, Ray and Lancaster [2005], Ray [2000], Blunch

et.al [2002], and Khanam [2003] treated the number of children as exogenous.

The number of children in each household naturally has a direct impact on food consumption and human capital accumulation of children; this is on account of the trade-off between the number of children in a family and the quality of life. Models studying the relationship between child labor and number of children date back to Becker [1960] who explained the empirical regularity that families with higher incomes have fewer children. He theorized that as income rises, individuals may choose to increase quality and reduce quantity. A key element of this model involves the relationship between quantity and quality within the budget constraint; this leads to rising marginal costs of quality with respect to family size and then generates a trade-off between quality and quantity. With regard to household consumption, the recent empirical study by Nagaraj [2002] found that the number of school-going children aged 5-14 years rose monotonically as the monthly household expenditure increased from less than 120 rupees to 455-560 rupees in Tamil Nadu and Karnataka in India.

Basu and Van [1998] also presented the interaction between fertility decisions and labor market outcomes. In an economy is characterized by small families, either labor is scarce, adult wages are high, and families can afford to keep children out of the labor force, thereby leading to all families preferring to remain small. Alternatively, adult wages are low, families are so poor that all children must work, and each family decides to have many children. Rosenzweig and Evenson [1977] author another study that explains the relationship between child labor and fertility. Their work studies child farm labor by explicitly taking into account the economic contribution of children in rural agricultural areas in India. The findings support the hypothesis that one of the basic factors motivating Indian families to have relatively large numbers of children in the late 1950s was the high returns obtained from the employment of child labor as compared to the returns from investments in skills obtained in schools.

5) Social Infrastructure

Other factors, particularly social infrastructure, play significant roles with regard to children’s schooling. Chao and Alper [1998] analyze the access to basic

education in Ghana for children aged 10-14 years. They find that the school participation rate is closely related to the distance to primary school, pupil-teacher ratio at the primary level, access to drinking water, and roads. Deb and Rosati [2004] also emphasize the importance of social infrastructure, especially the fact that greater numbers of primary and secondary schools in rural areas increases school attendance and reduces the probability that a child works or is idle. In his study, Ray [2000] presents empirical evidence for Peru and Pakistan and concludes that the availability of good schools can considerably reduce child labor in South Asia and break the strong link between poverty and the number of hours of child labor.

6) Other Factors

Note that the following alternative hypotheses suffer from a lack of theoretical and empirical findings. However, this study also tests them.

Regional differences between rural and urban areas will naturally impact children's activities. For instance, external or neighboring effects on child education might play an important role in child schooling. In a scenario where parents attach high regard to children's achievements that have been made possible on account of the latter's education, parents in urban areas might tend to consider child education with more seriousness than those in rural areas. This is because parents in urban areas are more aware of the value of education by virtue of their exposure to urban media.

In the context of Cambodia, it is believed that the Chinese tend to train their children for business, while other ethnic groups prefer to send their children to public schools. Therefore, the present study will also test this hypothesis to determine whether or not these tendencies still exist.

Female household heads exhibit a high degree of altruism and she tend to admit children in schools.

In Cambodia, the number of adopted sons or daughters cannot be neglected. Children of household heads show a tendency to attend school, while children of other household members tend to be engaged in work.

As children grow, their ability as a labor force increases; therefore, children's

age is strong correlated to child labor. Older children tend to work more than younger children do.

Finally, the more educated a child is, the greater are the expectations of his /her earnings as a child worker from the parents, with all other factors remaining the same. Therefore, we can hypothesize that the more educated a child is, the more likely the parents are to send him/her to work.

3. Empirical Analysis of the Root Causes of Child Labor

3.1 Analytical Framework

As mentioned in section 1, we use a logit model with multiple choices that allows us to capture four possible outcomes that are reflective of the overall picture pertaining to parents’ decisions on children’s activities. This framework tests the alternative hypotheses on child labor and child schooling.

The dependent variable Y_i is a qualitative variable representing parents’ decision with regard to the child’s activity in household i (works only, combines work with study, studies only, or idles). X_i is an independent variable representing one of the causes of child labor and child schooling.

The choice of the child’s activity is modeled using the standard utility-maximizing interpretation of a multinomial logit framework.

Therefore, $Y_i = k$ iff $Y_k(X_i) + v_{ik} > Y_j(X_i) + v_{ij}$ for $j \neq k$, where Y_k is a latent function reflecting the net utility of choosing alternative k ($= 0, 1, 2$ or 3) for parents, and v_{ik} is the error term for household i and activity k .

3.2. Empirical Model

As mentioned above, we model the child’s activity, which is categorized into four categories, as follows:

- $J=0$, if the child works³ only,
- $j=1$, if the child both works and studies,
- $j=2$, if the child attends school⁴ only, and
- $j=3$, if the child neither works nor studies (idles).

Let P_j be the probabilities associated with $j=0, 1, 2, 3$ categories. By considering “ $j=2$ if the child attends school only” as the base/reference ($j-1$) category,

we can express the probabilities and the likelihood function of the multinomial logit model as follows:

$$P(Y_{ij} = j | X_i) = P_{ij} = \frac{\exp(\beta_j X_i + Z_i)}{1 + \sum_{j=0}^{j-1} \exp(\beta_j X_i + Z_i)} \text{ for } j \neq 2 \quad (3.1)$$

$$P(Y_{i2} = 2 | X_i) = P_{i2} = \frac{1}{1 + \sum_{j=0}^{j-1} \exp(\beta_j X_i + Z_i)} \quad (3.2)$$

$$\log L = \sum_{i=1}^n \sum_{j=0}^{j-1} Y_{ij} \log P_{ij}. \quad (3.3)$$

Here, Y_{ij} is the polytomous set or set of dummy variables ($Y_{ij} = 1$ if the i th individual falls in the j th category, and 0 otherwise). β_j represents the covariate effects of response categories of children's activities. The vector X_i denotes observed individual and exogenous variables that include the following: child characteristics, i.e., age, age², sex, primary education, and secondary education, and household characteristics, i.e., poverty status (1 if household consumption above poverty line, 0 otherwise), parents' employment status, parents' education, and female household head.⁵ The vector Z_i represents community characteristics such as access to clean water and sanitation, distance to school, and the regional dummy that indicates Phnom Penh, other urban areas, or rural areas. Although there are more community characteristics such as pagodas, water irrigation, roads, and access to market that may affect the utility of parents, we do not include them into our model due to limited data.

The model is automatically accounted for heteroskedasticity in the variance of Y due to the conditioning on X variables (Wooldridge [2003]). Moreover, multicollinearity is checked by the correlation matrix of covariates, and it is confirmed by the results that there are no any independent variables that possibly undermine our model. However, we know that the problem of endogeneity is most important to our model if we are not careful in understanding the nature of the covariates and selecting them accordingly. Household income constitutes one of the possible sources of endogeneity; this may imply that wealthier households could be expected to not send their children to work. However, the problem is that households are able to sustain a relatively high per capita household income because they send their children to work. In fact, this factor leads to biased estimates in this case and also in the cases of other parameters in the

model. Being aware of this potential problem, we only use the parental household income by excluding children’s income, in order to avoid such endogeneity resulting from children’s activities. We also construct the poverty status of each individual based on the parental income and treat the resultant value as the threshold level indicating minimum need. Consideration of parental income allows this study to test the parental altruistic model of Basu and Van (1998) for the luxury and substitution hypotheses wherein parents’ wage play a significant role in determining children’s activities. Alternatively, if household income were to be used, an instrumental variable would serve as a possible solution to avoid endogeneity; however, it is rather difficult to design an instrumental variable that is not correlated with children’s activities.

Previous studies on children’s activities, such as Ray and Lancaster [2004], Ray [2000], Blunch, et. al [2002], and Khanam [2003], treated the number of children as exogenous while ignoring the abovementioned endogeneity. This can be possibly ascribed to the following reasons.

1. There is insufficient available data for employing an appropriate proxy or instrumental variable of the covariate of the number of children.
2. There is no econometric program that can command the simultaneous equations of endogeneity in the multinomial logit model without the problem of larger standard errors; however, we can solve this by a two-stage process, although it may result in downward biases due to larger standard errors
3. It may not be necessary to ascertain an exact partial effect since the results of a multinomial logit model attach importance to the direction of magnitude rather than to the coefficients; therefore, knowing the direction is sufficient for policy implication (Wooldridge [2003]).

Endogeneity implies that the number of children is determined by parental decisions. However, use of contraceptives, timing of breast-feeding, frequency of intercourse, infant mortality rate, age of marriage, household economy, and other environmental factors such as the influences of neighbors and the cultural context (Das [1987]; Pranab and Udry [1999]) are the proximate determinants of fertility. Given the complexity and the difficulties encountered in finding an

appropriate instrument variable, the assumption pertaining to the factors affecting the number of children is relaxed. Similarly, the study by Heady [2000] with Ghanaian data recognized the endogeneity of the number of hours of child labor with respect to children's schooling; however, it does not tackle this endogeneity in the estimation.

The present model regards the covariate of the poverty status as important for understanding most of the causes of child labor. Many studies support this hypothesis, including the recent study by Nagaraj [2002] who found that the number of school-going children aged 5-14 years rises monotonically as the monthly household expenditure increases from less than 120 rupees to 455-560 rupees in Tamil Nadu and Karnataka in India. Other covariates also help to explain the phenomenon of child labor. The child's age is included to capture the parental behavior with respect to children's activities. This is motivated by the fundamental belief that a child's age tends to explain his/her activities. Another important covariate is the parental occupational status. The study by Bhalotra and Heady [2003] using data from Pakistan and Ghana found that land-rich households tend to make their children work more than land-poor households do because of labor market imperfections. Edmonds and Turk [2004] found something similar in Vietnam. Self-employed households or households with private businesses are more likely to send their children to work. Thus, parental occupations do play a part in determining children's activities.

In a broader sense, simple economic poverty need not be the sole reason behind child labor. It is beyond doubt that cultural and social factors need to be considered too. Therefore, this model includes community characteristics to capture these dimensions, even though the characteristic do not represent all the factors. However, this helps us understand a greater number of dimensions and interactions pertaining to children's activities. More importantly, the gender of the child, apart from consumption, contributes to parents' decisions. As mentioned earlier, cultural practice may vary across regions based on sex, religion, and security. In Cambodia, for safety reasons, parents tend to keep female children at home and send male children for higher education.

3.3. Data Used in This Study

The sample of households with children is taken from Cambodia Socio-Economic Survey 1998/99 (CSES 1998/99). The survey is conducted by the National Institute of Statistics (NIS) of the Ministry of Planning, serving as a cross-sectional multipurpose survey to supplement the database generated through CSES 1996/97. Its objectives include filling in critical data gaps with regard to a number of topics, meeting the data needs for analyzing and monitoring poverty, and supporting the anti-poverty program. The total sample size of this survey is 6,000 households, which were divided into two halves of 3,000 households for each round. This is in order to capture the seasonal change in the Cambodian context. The first round was conducted in March 1999 and the second round was in August 1999. More importantly, CSES 1998/99 included more features of employment status, child labor, per capita expenditure of households, and health and education expenditure. The sampling design of CSES 1998/99 involved the stratification of the country into five domains based on the ecological zones in the country. Herein, Phnom Penh was treated as a separate domain, and the cross-cutting rural and urban sectors were considered separate strata. Thus, 10 strata were created in all (0-Phnom Penh, 1-Plain, 2-Tonle Sap, 3-Coastal and 4-Plateau, and mountains). Each domain was classified into rural and urban regions.

The working definition of child labor,⁶ which covers children aged 5-14 years, allows us to extract from the micro-data in the employment module and in the economic activity status. This survey population had excluded children engaged as workers and living in boarding houses; in this study, we have included these characteristics into children’s activities categorized as “idle,” which comprises a broad category of children who neither work nor study. We consider the activities of children belonging to this category as “subsistence work” or “household chores,” rather than “non-economic activity”.⁷

Therefore, the sample in this study considers households with children aged 5-14 years because child labor, schooling, and other categories are prevalent in this group. We disaggregate “sector” into three areas: Phnom Penh, other urban, and rural. We treat Phnom Penh as a separate sector due to the special nature

of its rapid development that is different from the other urban areas in the country. From the total sample, we draw a subsample of 10,092 individuals that considers every child who spends time in one or more of the following activities: works only, both works and studies, studies only, and idles. A multinomial logit model is used to capture the nature and phenomena of children's activities. The explanatory variables comprise a set of children's characteristics, i.e., child's age, child's education, child of the household head, and gender of child. The household characteristics include the age of parents (mother and father separately), parents' education, number of children in the household, parents' occupation, female household head, female labor force, and status of poverty in each household. Poverty lines are drawn separately based on the poverty line of Phnom Penh (2470 riel equivalence of 0.64 US dollars), other urban areas (2093 riel equivalence of 0.55 US dollars), and rural areas (1777 riel equivalence of 0.46 US dollars). Households where income and consumption fall below the poverty line are considered poor and coded "zero," while those where income and consumption lie above the poverty line are considered non-poor and coded "one." We use a dummy variable to represent the poverty status, instead of employing a continuous measure of income; this is because it is well known that the measure of income in developing countries has significant measurement errors in the lower end of income distribution. Furthermore, we avoid endogeneity by subtracting the children's income from the total household income. This supports our economic premise that parents' income or consumption is the main factor determining children's activities. We also assume fertility, reflected in the number of children in each household, as exogenous. The level of parents' education is used as a discrete variable instead of being grouped as "primary, secondary, high school, or advanced level." This is because we want to reflect the origin of the question and grouping becomes complex for advanced educational levels. The summary statistics for the variable used in the analysis is given in Table 2.

Children's activities are obtained from question 3, columns 4, 6, and 9, in page 6 (of 23) of the "Module of Income and Employment." Children are divided into 4 groups with a sufficient condition to extract these groups. By the origin of question 3, column 4, children were divided into only three groups; however,

by combining question 3 and columns 6 and 9, we were able to cover the entire range of children’s activities.

3.4. Results of Empirical Estimate

Table 2 presents the descriptive statistics of variables and the hypotheses used in this study. Table 3 presents the results of the maximum likelihood estimation in the multinomial logit model. The regressors used in the child activity model include the following variables: age of child and age of child squared, child’s education, child of the household head, female child, number of children in the household, mother’s education, father’s education, poverty status, type of employer of household head (government, state enterprise, joint venture, private, foreign government/international organization, NGO, self-employed), female labor force, female household head, clean water, electricity, distance to primary school, distance to secondary school, distance to high school, ethnicity (Cham, Chinese, Vietnamese, local groups), other urban areas, and rural areas. The structure of the model allows the estimation of marginal effect, which is important for policy directions pertaining to child labor in Cambodia.

The results suggest that Cambodian children tend to attend school or combine school and work at a younger age; further, combined activity persists in the later stages of childhood. The variable of “child’s education” has showed the positive impact for the category of “works only,” “both works and studies,” and “idles.” These results imply that children study up to one level, following which they either shift their activities to work or combine work and study. Alternatively, they do neither, i.e., “idles,” instead of continuing with their studies. Although it is highly peculiar, it is true that children tend to stop schooling and be engaged in other activities because of the absence of an “education-for-all” policy in 1999, which discouraged children from attending school when they had reached junior high school. Furthermore, in many parts of Cambodia, particularly rural areas, there are no junior high schools. In such a case, children have to relocate to urban centers to attend school, which could be the reason behind their discontinuation of higher studies. The number of children in a household has a positive impact on the probability of child labor. The coefficient of poverty

status (“dummy variable_ code 1 if above poverty line, 0 otherwise”) indicates that children in poor households are more likely to engage in child labor, regardless of the category, i.e., “works only,” “works and studies,” or “idles.” This implies that there exists a positive association between poverty and child labor and a negative association between poverty and children’s human capital accumulation. The evidence supports the “luxury” hypothesis. However, the strength of this association is open to debate because the results of Table 1 indicate that the number of poor households that send their children to school cannot be neglected. Further, our study also finds that the number of non-poor households that send their children to work is not negligible. Hence, the model of child labor developed by Basu and Van [1998] that uses adult income as a threshold to predict the existence or non-existence of child labor may not be truly applicable when “altruistic parents” come into consideration.

Parents’ occupation tends to determine their children’s activities. The employment status of parents, such as government employee or non-governmental employee, has a positive effect on the probability of children’s schooling and a negative influence on child labor.

Father’s education has a positive impact on children’s human capital accumulation.

This study also finds that there exists a parental preference bias with respect to the gender of the child in terms of schooling, child labor, and other activities. The coefficient of the female child (“dummy variable_ 1 if female child, and 0 otherwise”) indicates that female children are found to work or combine work and study. This phenomenon clearly indicates parental preference bias toward the gender of the child. A higher demand for female child workers is closely linked to the female-dominated industries in the Cambodian context, for instance, work related to traditional textiles, garment manufacturing, farming, retail, and restaurants. These results show the female children are important economic actors for improving the economic status of their families.

Social infrastructure factors such as clean water and electricity are extremely important for increasing the probability of children’s schooling.

Ethnicity groups appear to be one of the determinants of child labor

Table 2: Descriptive Statistics (Aged 5-14 Years)

Variables and Related Hypotheses		Definition	Mean	Std.Dev.
Variables	Related Hypotheses			
Age of child	Hypothesis 6 (Elder child tends to work more than the younger child)	Age in year	10.0222	3.129216
Age of child^2	Hypothesis 6	Age in year^2	110.2354	63.41253
Child's education	Hypothesis 6	Education of the child	3.320848	2.155787
Child of the HH head	Hypothesis 6 (Children of the household head are more likely to be in school)	= 1 if child of the household head	.8899128	.3130139
Female child	Hypothesis 3 (Parents' preferences toward the gender of the child)	= 1 if child is female	.4841459	.4997733
No. of children in HH	Hypothesis 4 (Number of children and child labor)	Number of children in the household (1-14 years)	3.6739	1.468522
Mother's education	Hypothesis 2 (Relationship between parents' education and human capital of the child)	Education of mother	5.432521	2.211425
Father's education	Hypothesis 2	Education of father	6.726615	2.891023
Poverty status	Hypothesis of Basu and Van (1998) (Poverty and child labor)	= 1 if is above poverty line	.5274475	.4992708
Employer of HH (government)	Hypothesis 1 (Parents' occupation tends to determine children's activities.)	= 1 if is a civil servant	.1462545	.3533786
Employer of HH (state enterprise)	Hypothesis 1	= 1 if works for a state enterprise	.003369	.0579481
Employer of HH (joint venture)	Hypothesis 1	= 1 if works for a joint venture	.0058462	.0762405
Employer of HH (private)	Hypothesis 1	= 1 if works for a private company	.0826397	.2753505
Employer of HH (foreign gov./int.org.)	Hypothesis 1	= 1 if works for a foreign government or an international organization	.0021799	.0466413
Employer of HH (NGO)	Hypothesis 1	= 1 if works for a non-governmental organization	.0034681	.0587912
Employer of HH (self-employed)	Hypothesis 1	= 1 if self-employed	.6957987	.4600911
Female labor force	Hypothesis 6 (Female labor force has bargaining power; hence, females are altruistic toward child's education.)	= 1 if female is employed	.1229687	.3284175
Female household head	Hypothesis 6 (Female household head has a high degree of altruism for child's education.)	= 1 if female is the household head	.1486326	.3557436
Clean water	Hypothesis 5 (Social infrastructure and the probability of schooling)	Access to clean water (percent)	15.56342	31.26297
Electricity	Hypothesis 5	Access to electricity (percent)	29.40815	39.14817
Dist. to pri. school	Hypothesis 5	Distance to primary school (kilometer)	14.41677	9.030921
Dist. to sec. school	Hypothesis 5	Distance to secondary school (kilometer)	53.01467	71.11883
Dist. to high school	Hypothesis 5	Distance to high school (kilometer)	109.8806	142.788
Cham	Hypothesis 6 (Difference in ethnicity tends to influence children's activities)	= 1 if Cham	.025763	.1584353
Chinese	Hypothesis 6	= 1 if Chinese	.0046572	.0680876
Vietnamese	Hypothesis 6	= 1 if Vietnamese	.010107	.1000293
Local group*	Hypothesis 6	= 1 if Local group	.0035672	.0596222
Other urban	Hypothesis 5 (Regional differences and child labor)	= 1 if other urban	.295977	.4565033
Rural	Hypothesis 5	= 1 if rural	.6059255	.4886752

Source: Author's calculation

Total observations: 10,092

Note: Local groups referred herein denote local ethnic minority groups such as Charai, Pnong, Kavet, Kreung, and Thampuen. These ethnic groups are mostly hill-dwelling tribes of northeastern Cambodia.

Table 3: Maximum Likelihood Estimates of Children's Activities (Aged 5-14 Years)

Variables	Parameters				Marginal effects (dy/dx)		
	Works only	Works & studies	Idles	Studies only	Works only	Works & studies	Idles
Age of child	-.5647422*** (.1731576)	.1761312 (.1408344)	-.3659512*** (.0992556)	.046315*** (.01348)	-.0082827*** (.00303)	.0065671* (.00368)	-.0445994*** (.01292)
Age of child^2	.0372018*** (.0079225)	.0003363 (.0063506)	-.003391 (.0052273)	-.0001028 (.00066)	.0006049*** (.00015)	5.90e-06 (.00017)	-.000508 (.00063)
Child's education	.4480189*** (.0342851)	.0626348** (.0271544)	.9023365*** (.0244283)	-.1130498*** (.00303)	.0050358*** (.00065)	.0021608*** (.00071)	.1101748*** (.00285)
Child of HH head	-.3609908** (.1831343)	-.1798617 (.1619816)	-.4837814 (.1270487)	.0732308*** (.02027)	-.0048456 (.00356)	-.0025038 (.00469)	-.0658814*** (.01993)
Female child	.3728089*** (.1086478)	-.1380359 (.0889907)	.1833281 (.0671355)	-.023348*** (.00875)	.0056662*** (.00177)	-.0046872* (.00241)	.0223692*** (.00832)
No. Children in HH	.0635405* (.0362754)	.0300082 (.0323074)	-.0161773 (.0245004)	.0003686 (.0031)	.0010441* (.00058)	.0008577 (.00088)	-.0022704 (.00301)
Mother's education	.0044885 (.0252555)	-.080658*** (.0216124)	-.0169437 (.0163927)	.0037673 (.00214)	.000149 (.0004)	-.0021403*** (.0006)	-.001776 (.00201)
Father's education	-.0628799*** (.023328)	.021046 (.0182401)	-.051145 (.01387)	.0063421*** (.0018)	-.0008984** (.00038)	.0008127* (.00049)	-.0062565*** (.00172)
Poverty status (food)	-.3659028*** (.1180257)	-.1480021 (.0996607)	-.2997745 (.0773066)	.0452594*** (.01085)	-.0054366** (.00221)	-.0026262 (.00283)	-.0371966** (.01045)
Employer of HH (government)	-.1039086*** (.3357055)	.2779762 (.3207689)	-.6710889*** (.2202095)	.0695455*** (.02211)	-.0114995*** (.00294)	.0115842 (.01118)	-.0696302*** (.01919)
Employer of HH (state enterprise)	-.34.79871*** (.4565152)	-.35.7100*** (.3815718)	.1049717 (.940546)	.0283351 (.12963)	-.0182437*** (.00169)	-.0315805*** (.00224)	.0214891 (.1296)
Employer of HH (joint venture)	-.6403945 (.1.201961)	.6646311 (.6753667)	1.401699*** (.4206732)	-.2550556*** (.09589)	-.0104689 (.00704)	.00936 (.02462)	.2561645*** (.09981)
Employer of HH (private)	.1587997 (.3214914)	.4739852 (.3405993)	.167018 (.227736)	-.0352125 (.03229)	.0019611 (.0056)	.0145838 (.01318)	.0186675 (.0304)
Employer of HH (foreign gov./int.org.)	-.8005417 (.1.30717)	.6656655 (.8006083)	-.1.723474** (.8234916)	.0915215* (.05211)	-.0081714 (.01057)	.0327506 (.04555)	-.1161007*** (.02349)
Employer of HH (NGO)	-.35.56373*** (.4311103)	.3056567 (.7940289)	-.2.297048* (.1.177662)	.1303801*** (.03889)	-.0183976*** (.0017)	.0161607 (.03347)	-.1.281432*** (.02093)
Employer of HH (self-employed)	-.3399582 (.2756557)	.4874517 (.2991789)	.0750087 (.2009583)	-.0141171 (.02536)	-.00628 (.00506)	.0121725* (.00695)	.0082246 (.0242)
Female labor force	.6414577 (.4396256)	.0894803 (.4545225)	.6405866** (.3013604)	-.0994033*** (.05064)	.0102211 (.01032)	.0010926 (.01199)	.0902748* (.05016)
Female head HH	.320144 (.4222668)	.0631127 (.4355598)	-.4228315 (.2857545)	.037868 (.03177)	.0068222 (.00868)	.0031893 (.01275)	-.0478794* (.02812)
Clean water	-.0079062* (.0047156)	-.011405*** (.0032143)	-.0055796*** (.0021541)	.0010186*** (.00029)	-.0001085 (.00008)	-.0002858*** (.00008)	-.0006244*** (.00026)
Electricity	-.0125266*** (.0028642)	.0019761 (.0018349)	-.008584*** (.001501)	.0011261*** (.0002)	-.0001817*** (.00005)	.0000947* (.00005)	-.0010391 (.00018)
Dist. to pri. school	.0129662*** (.0048208)	-.0143916** (.0068149)	.0154984*** (.0033231)	-.0016582*** (.00046)	.0001782** (.00008)	-.0004628** (.00019)	.0019428 (.00041)
Dist. to sec. school	.0016829** (.0007166)	.0017431** (.0007251)	.0022539*** (.0006269)	-.0003261*** (.00008)	.0000209* (.00001)	.0000378* (.00002)	.0002674*** (.00008)
Dist. to high school	.0025402*** (.0003817)	.0007619* (.0004453)	.0012675** (.000289)	-.0001995*** (.00004)	.0000374*** (.00001)	.0000145 (.00001)	.0001475*** (.00004)
Cham [†]	-.3529869 (.3743743)	-.4199686 (.296557)	.3659926 (.2260922)	-.0376314 (.03507)	-.005438 (.00418)	-.0106375** (.00529)	.0537069 (.03553)
Chinese [†]	-.35.76386*** (.5755359)	-.35.9113*** (.3169971)	1.830899** (.8977876)	.1683942*** (.02494)	-.019095*** (.00176)	-.0329754*** (.00234)	-.1163237*** (.02482)

Variables	Parameters				Marginal effects (dy/dx)		
	Works only	Works & studies	Idles	Studies only	Works only	Works & studies	Idles
Vietnamese [†]	1.050284* (.5832957)	-35.6746*** (.2037901)	2.300957*** (.3125098)	-.4461192*** (.0703)	.0043623 (.01102)	-.0400314*** (.00281)	.4817884*** (.07068)
Local group [†]	2.61835*** (.5873322)	.2692113 (1.028767)	1.070362 (.7440332)	-.2670246* (.15046)	.132676** (.06186)	.0034248 (.02414)	.1377734 (.13582)
Other urban [†]	.4609731 (.4562226)	1.808241*** (.4040072)	.4694422** (.1898801)	-.1238507*** (.0321)	.0051697 (.00809)	.071548*** (.02349)	.0471329* (.02573)
Rural [†]	.6852924 (.4668131)	1.807558*** (.4010913)	.4476921** (.194527)	-.0979578*** (.02498)	.0086816 (.00671)	.0440404*** (.0097)	.0452358** (.02242)
Constant [†]	-3.226138*** (1.141452)	-6.11681*** (.9495765)	-.1858545 (.5772007)				

(Outcome Child's activities = 2 ((child attends school only) is the comparison group))

Note: ***, **, *are statistically significant at the 1, 5, and 10 percent levels respectively.
 The sign “ ‡ ” indicates the ethnic dummy in which the comparison group is Khmer ethnic majority.
 The sign “ † ” indicates the regional dummy in which the comparison group is the capital city of Phnom Penh.
 Numbers in parentheses are robust standard errors.
 Multinomial logistic regression: Number of obs.=10,092 Wald chi2(87)=106484.60
 Pseudo R2=0.3770 Prob>chi2=0.0000 Log pseudo-likelihood=-5974.4556

although the directions of their impacts are different. For instance, Chinese families are more likely to send their children to school, while Vietnamese households are more likely to send them to work.

Lastly, location also significantly affects the incidence of child labor. Distance from school positively affects the incidence of child labor. Further, residents in Phnom Penh are more likely to send their children to school than those in the other regions.

4. Conclusion

This study estimates the model of parents’ decision to allocate children’s activities by using maximum likelihood estimation in a multinomial logit function. The structure of estimation allows us to analyze a wider scope of the dynamics of child activity. Our findings are summarized as follows:

(1) The poverty hypothesis is only partially supported because other determinants of child labor, i.e., those apart from poverty, can also explain the observation that more than a negligible number of households below the poverty line send their children to school. The number of non-poor households who send their children to work is not negligible, as shown in Table 1. In cases where there are older children, better infrastructure, and Chinese households, parents are more

likely to send their children to school even when they are poor. On the other hand, in cases where children are older than 8 years with some years of education and the distance to the school is far, parents tend to send their children to work, even when they are non-poor.

(2) We find that father's education has a significant influence on human capital accumulation of children. This finding corroborates with those in previous works such as Ray [2000], Deb and Rosati [2004], Blunch et.al [2002], Bhallowra and Heady [2003], and Khanam [2003]. However, our finding is different from those of the other works in that they reveal that father's education significantly influences child labor whereas mother's education does not. This can only be explained by the prevalence of male-dominated households, which is a cultural aspect. Therefore, gender mainstreaming of women into society is needed to increase their say in decision making.

(3) Social infrastructures are shown to be important for the reduction of child labor and increase in children's enrollment in schools. This is proved to be valid in other studies as well. For example, Chao and Alper [1998] found that in the case of Ghana, the school participation rate is closely related to the distance to primary school, access to drinking water, and roads. Deb and Rosati [2004] also note the importance of social infrastructure. In particular, they observe that increasing numbers of primary and secondary schools in rural areas increase school attendance and reduce the probability that a child works or is idle. In the results of his study, Ray [2000] also presents empirical evidence for Peru and Pakistan that the availability of good schools contributes substantially toward the reduction of child labor in South Asia; additionally, this factor can also break the strong link between poverty and number of hours of child labor. Therefore, the policy implication entails increasing the access to basic infrastructure through school reconstruction, roads, clean water, and electricity.

(4) Female children are more likely to be engaged in child labor than in schooling. This implies there are many other barriers besides economic factors that hinder female participation in education. The policy implication requires prioritizing women's education by implementing special policies for female education, for example, providing girl dormitories, school boarding programs, and

toilets. Further, assessments need to be periodically conducted, so that an appropriate policy could be formulated with regard to female education.

Notes

- 1 The Cambodia Socio-Economic Survey 1993/94 (CSES, 1993/94) highlighted a high incidence of poverty, i.e., 39 percent of the total population. CSES 2003/04 shows that the poverty rate has dropped to 35 percent.
- 2 Based on the author’s calculation using independent data from CSES 1993 and CSES 2004, the population of the poor has increased from 4,157,192 in 1993 to 4,703,697 in 2004, while the poverty ratio fell from 39% to 35% in the same period.
- 3 In order to capture the entire population of child workers, any duration of work in any economic activity during the reference period makes a child eligible for enumeration as a child worker. Furthermore, work is defined as an economic activity that a child performs for pay, profit, or family gain. It includes the following categories: paid employment; operating a farm or business; working for a household economic activity (like food processing or raising of livestock) without pay; working as an apprentice in order to learn a skill or craft without necessarily receiving wages; and production of paddy or vegetables for household consumption. Further, the holding of a job even if the employee is temporarily absent because of vacation, strike, or illness is regarded as work. Production of fixed assets for household use, such as building or repairing houses, is also considered as work.
- 4 The term schooling includes attendance at kindergartens, primary schools, lower or upper secondary schools, technical or professional schools, colleges, and universities.
- 5 A female household head is the adult female member of the household who is accepted and recognized by other household members as the head.
- 6 In order to capture the entire population of child workers during the reference period, children engaged in any duration of work in any economic activity were considered eligible for enumeration as child workers. The child labor module of CSES 1999 considered those children as child workers who were aged 5-14 years, lived in households, and engaged in work as mentioned above.
- 7 An additional issue related to child activity in Cambodia is that we have observed that as much as 27 percent of all children are classified in the category of “idles.” This result implies that many children neither engage in economic activity nor study at school. Such a high percentage of idle children raises issues about the type of households they belong to and the reason behind their idleness. This is explained in the national report of CSES 1999 wherein it is stated that “the inclusion of children aged 5 years” as idle children contributes to the high percentage because the minimum age for admission in schools is “6 years.” It should also be noted that this study includes children doing household chores in the idle category as well. The separation of this category will make the data more complex since four categories of children’s activities, i.e., “works only, studies only, combines work and study, and idles” already exist. For a more precise understanding of this issue, Appendix Table provides more details of children’s activities by breaking down the category of children aged of 5-17 years. We find that many children aged 5-6 years do not attend school, which accounts for the large number of idle children.

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Appendix Table: Frequency, Row, and Column Percentage of Children's Activities by Age

Age of the child	Childworks only	Child works and studies	Child studies only	Child idle	Total
5	4	3	190	632	829
	0.48	0.36	22.92	76.24	100.00
	0.43	0.40	2.68	21.46	7.08
6	7	10	311	565	893
	0.78	1.12	34.83	63.27	100.00
	0.75	1.32	4.39	19.19	7.63
7	11	21	532	430	994
	1.11	2.11	53.52	43.26	100.00
	1.19	2.77	7.52	14.60	8.49
8	12	29	620	293	954
	1.26	3.04	64.99	30.71	100.00
	1.29	3.82	8.76	9.95	8.15
9	11	39	604	163	817
	1.35	4.77	73.93	19.95	100.00
	1.19	5.14	8.53	5.53	6.98
10	24	73	847	186	1,130
	2.12	6.46	74.96	16.46	100.00
	2.59	9.62	11.97	6.32	9.65
11	15	48	622	88	773
	1.94	6.21	80.47	11.38	100.00
	1.62	6.32	8.79	2.99	6.60
12	34	68	766	100	968
	3.51	7.02	79.13	10.33	100.00
	3.66	8.96	10.82	3.40	8.27
13	64	93	676	71	904
	7.08	10.29	74.78	7.85	100.00
	6.90	12.25	9.55	2.41	7.72
14	90	99	648	86	923
	9.75	10.73	70.21	9.32	100.00
	9.70	13.04	9.16	2.92	7.88
15	178	107	520	102	907
	19.63	11.80	57.33	11.25	100.00
	19.18	14.10	7.35	3.46	7.75
16	221	86	441	107	855
	25.85	10.06	51.58	12.51	100.00
	23.81	11.33	6.23	3.63	7.30
17	257	83	301	122	763
	33.68	10.88	39.45	15.99	100.00
	27.69	10.94	4.25	4.14	6.52
Total	928	759	7,078	2,945	11,710
	7.92	6.48	60.44	25.15	100.00
	100.00	100.00	100.00	100.00	100.00

Source: Author's calculation from the sample CSES1999