CHILD LABOR IN VIETNAM: THE RELATIVE IMPORTANCE OF POVERTY, RETURNS TO EDUCATION, LABOR MOBILITY, AND CREDIT CONSTRAINTS

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by
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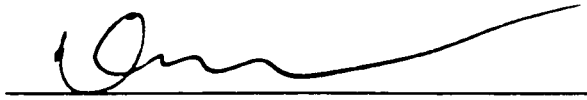

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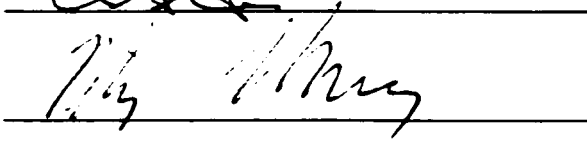

I dedicate this dissertation to my elder sister,

Sanchayita Dutta,

who is no more among us, but whose love, affection,

and support is always with me.

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ABSTRACT

This empirical work on child labor in Vietnam analyzes some of the determinants of child labor by addressing four interrelated questions. First, we try to find a threshold poverty line, if any, that affects the child labor decisions of families. Results from different model specifications support the idea that child leisure (or schooling) is a luxury good. Second, we explore the relationship between returns to education and child labor. Different specifications of the model in this section indicate that returns may not be important in the determination of children's work hours. A third model is unable to find support for the hypothesis that an increase in returns to education in the urban areas can reduce child labor in rural areas due to labor mobility. Finally, a fourth model is unable to find any relationship that would support the hypothesis that poor people are more credit-constrained, a possibility that returns to education may not matter for them in their child labor decisions. Therefore this work suggests that poverty alleviation should be the most important policy for reducing child labor, whereas policies for improving the returns to education may not help to abate child labor in Vietnam.

LIST OF TABLES

LIST OF FIGURES

Figure Page

LIST OF MAPS

Map Page

TABLE OF CONTENTS

CHAPTER I

INTRODUCTION

This work intends to study some of the supply side factors that determine child labor in Vietnam. Child labor is mainly a problem in low-income countries, whereas its extent is barely noticeable in the developed world. Therefore, if one assumes that parents are altruistic, then household poverty must be considered as one of the determinants of child labor. Following Basu and Van (1998), this study investigates whether child labor is mainly the consequence of extreme household poverty.

Secondly, another purpose of this study is to investigate the effect of returns to education on the households' decisions regarding child labor. If returns to education are higher, then parents may think about investing more in their children's human capital development, which may reduce the extent of child labor.

Thirdly, this analysis has been further extended to include the possibility of labor mobility. If people can easily move and are willing to move to an area with higher returns, then there should be more investment in human capital, which may reduce child labor even more in the presence of labor mobility.

Finally, this analysis also addresses the issue of credit constraints, because this may be one of the important issues in poor families' decisions about investment in human capital. The presence of credit constraints could also be the main reason that poverty affects child labor. If there were no credit constraints, then poor people could

always borrow money, and child labor decisions would depend solely on returns to education.

It is a well-known fact that child labor is mainly a problem in developing countries. There have been several studies measuring the number of economically active children. The International Labor Organization (ILO) estimated that 120 million children around the world ages 5 to14 years worked full-time in 1996. The total became as high as 250 million when the ILO included part-time work. Estimates show that 61% of these children are from Asia, 32% from Africa, and 7% from Latin America (Grootaert and Patrinos, 1999). These estimates vary widely among different sources. The variations are mainly due to the method of data collection or to the different definitions of 'child' or 'work.' For example, some of these studies include only economically active children as child labor, whereas others include all domestic unpaid work in the child labor category[1].

Many policy makers and observers advocate banning child labor completely. Their position is based on the valid arguments that, first, children should be protected from working in harmful conditions or from doing any exploitative work, and second, most forms of child labor prevent normal child development. So, outlawing child labor would not be an inappropriate policy for the countries trying to abolish it, particularly when most of the developed countries have been able to completely abolish child labor after banning it. But it seems that a complete ban works only for those households where child labor is, in part, a consequence of "parental selfishness," where parents use their

[1] Economically active children denote children who have some contribution in production, either outside their households or in any production owned by the same household. It does not include domestic unpaid work such as cooking, cleaning, looking after siblings, etc..

children's incomes for the parents' own consumption only. In this case a ban would be to the child's benefit.

On the other hand, if child labor emerges due to extreme poverty, then a complete ban on child labor would be detrimental to families. Also, such a policy may reduce education in poor families. In underdeveloped countries, it is very common for poor families to want their children to both work and study; and sometimes the cost of education is paid by the children's own earnings. So, a complete ban may, instead, reduce demand for education. The struggle for survival caused by the enforcement of a ban may also drive children into other illegal forms of child labor.

Theories of development also posit the idea that child labor is a facet of poverty on the one hand, and on the other, it creates a "poverty trap" for the households. Poor households send their children to work mainly to earn money to support the household's minimum requirements. But this child work may prevent the children from accumulating human capital, which may further cause them to remain in extreme poverty because of lower future earnings. In this way, child labor may create a "poverty trap" for generations.

Another factor that adds to the severity of this problem is the household's inability to manage risk. As pointed out by Grootaert and Kanbur (1995), households want their children to work in order to protect themselves from any sudden income shock such as sudden job loss, failed harvest, or other shocks to their income stream. The inability to manage risk arises from the fact that households have very limited assets. This problem becomes more severe in the presence of credit constraints which prevail in most underdeveloped countries.

Credit constraints make it harder for poor families to survive any income shock, thus inducing them to employ their children. Credit constraints may also make household wealth an important factor for the households to consider when making decisions about child labor. Jacoby (1994) points out that household wealth has a positive effect on school attendance, particularly in a borrowing-constrained household. If there is some negative relation between schooling and child labor, then a borrowing-constrained household will increase child labor more with a reduction in household wealth.

Returns to education also seem to be more important in the decision about child labor for a household without borrowing constraints as compared to a borrowing-constrained household. Higher returns to education may not increase the demand for education in a borrowing-constrained household with limited wealth. If the family does not have enough initial wealth and the family cannot borrow money for children's education then even higher returns to education cannot increase demand for education. Again, if schooling or demand for education is negatively related to child labor, then an increase in returns to education may reduce child labor more in a household which is less borrowing-constrained.

This paper studies the determinants of child labor in Vietnam focusing particularly on the role of poverty, returns to education and considers factors of credit constraints and labor mobility. Vietnam has gone through major economic and political changes during the 1990s. It experienced an economic growth rate of more than 6% per annum during this decade. The poverty headcount has fallen from 58% to 37% between 1993 and 1998. In a panel study on Vietnam, Edmonds and Turk (2002) found that the improvement in living standards during the 1990s caused a decline in child labor. School

enrollment rates also increased during this period. But the decline in the incidence of child labor was not homogeneous across regions. The decline in the probability of child work was largest in provincial towns, minor cities, the Southeast, and the rural Mekong River Delta; and the decline was smallest in the urban areas, the South Central Coast and the Central Highlands.

This work finds that poverty is the most important factor causing children to work in Vietnam. Poverty affects the family's decision to send a child to work, as well as affecting the number of hours of work. Analyses concerning returns to education suggest that returns do not have much effect on the households' child labor decisions. Also, even after including the possibilities of labor mobility and credit constraints, returns to education still do not seem to be an important factor in a household's decision on child work.

This study is divided into several chapters. Chapter II discusses some of the important literature in this area. The purpose of this study is explicitly discussed in Chapter III. Chapter IV presents some analysis of the data that has been used in this work and some background studies about Vietnam. Chapter V explains the methodologies and the variables used in the study and presents the corresponding results. Chapter VI summarizes the study, presents some concluding comments, and suggests some possible avenues for future work in this area as well as some policy implications.

CHAPTER II

PREVIOUS WORK

2.1 Theoretical Work

Basu and Van (1998) established one of the important theoretical models in this area, where they found the possibility of multiple equilibria in child labor market. Their model was based on two main assumptions. The first was the "luxury axiom" in which they assumed that families send their children to work only if the household's income from non-child-labor sources is very low. The second assumption was the "substitution axiom" in which they assumed that from the viewpoint of firms, child labor and adult labor are substitutes. Their study shows that given these assumptions, the economy has a potential of exhibiting multiple equilibria. If the economy is very unproductive, then child labor exists in equilibrium; and if it is very productive, then the adult wage is high enough to prevent the children from working. When productivity is at some intermediate level, there may exist two equilibria: one with and one without child labor. In this case a ban may produce the desired result of eliminating child labor. Therefore, they suggested that a ban on child labor may be a powerful instrument; but the empirical context must be considered very carefully before using the policy. Very poor countries seem to have only one of these equilibria, and a ban on child labor might worsen their condition. Following Basu and Van, this work tests the hypothesis that an increase in household income from adult sources can reduce child labor in Vietnam.

With the above two "micro-level" assumptions, Swinnerton and Rogers (1999) added another assumption, the "distribution axiom," which is related to the distribution of income and wealth in the economy. They stated that income and wealth from non-labor sources have to be concentrated among few agents in order to hold the Basu and Van (1998) results.

The main concern of the above two works was household poverty as a factor contributing to child labor, and they did not consider the presence of credit constraints in their model. If poor people can easily borrow to sustain any sudden income shock or to invest in their child's human capital development, then they may not send their child to work. Ranjan (2001) developed an overlapping generations general equilibrium model to show how the phenomenon of child labor can arise due to a combination of poverty and credit constraints. The study further shows that in the presence of credit constraints, the incidence of child labor is positively related with inequality in the distribution of income.

Another work by Baland and Robinson (2002) established a relationship between child labor and credit constraints in a two-period model. Assuming parental altruism in their model, they suggested that availability of credit is a factor predicting the incidence of child labor. If parents cannot borrow to level their consumption between two periods, then they will send their children to work in the first period at the expense of the child's human capital formation, giving rise to inefficient child labor.

2.2 Empirical Work

Among the important empirical work that analyzes child labor, its causes and its consequences in different parts of the world, Grootaert (1999) models the

determinants of child labor in Cote d'Ivoire. He looked at the determinants from the supply side as well as the demand side of child labor. The important variables affecting child labor from the supply side were household characteristics, child characteristics, and cost of schooling. The demand side factor was the region of residence of the households. Grootaert used region of residence as weak proxy for child wage rate. Since it is difficult to get data on child wages, he used the region indicators, expecting that they may reflect some difference in child wages among regions.

There are some other purely empirical studies by Cartwright (1999) on Colombia, Cartwright and Patrinos (1999) on urban Bolivia, Sakellariou and Lall (1999) on the Philippines. The key findings of all these analyses are that the child's age and gender are important determinants of child labor. The education and employment of parents are also very important. More educated parents are less likely to send their children to work. Usually the mother's employment tends to increase child labor because the daughter usually assumes parenting responsibilities to allow the mother to join the labor force. These studies found that the effects of age and gender of siblings are country-specific. Ownership of a farm or household enterprise is one of the most important factors found in their analysis. They found that a family enterprise increases the probability of a child's participation in work and decreases the probability of combining work and school. Their analysis also supports the view that household poverty status is very important in determining the children's participation because poor families are unable to borrow or insure themselves against income shocks; thus they depend more on children's income for their survival. Direct monetary cost of schooling is less important in their findings, but the location of residence is a very important determinant.

In a work based on the Peru 1991 Living Standards Survey, Patrinos and Psacharopoulos (1997) showed that family size is an important factor in determining child labor. Also, the number of siblings not enrolled in school is an important control variable in at least one specification of this empirical model. They concluded that having younger siblings might lead to less schooling, to more "age-grade distortion" in the classroom, and to more child labor. The results of their work imply some substitution between schooling and child labor.

The substitution between school enrollment and child labor has been investigated more explicitly by Ravallion and Wodon (2000) in their study on Bangladesh. By using the 1995-96 Household Expenditure Survey, they tried to determine whether child labor displaces schooling or not. Their theoretical models predicted that a subsidy increases schooling, but their models did not tell anything about the effect of subsidy on child labor. Their empirical models indicated that a subsidy increased schooling by an amount greater than the reduction in child labor.

There are several other empirical studies that analyze the relation between child labor and child schooling. Nielson (1998) studied child labor and schooling in Zambia. He established that a gender gap exists in terms of schooling and that the transport cost of reaching school affects schooling adversely. But the paper does not find any significant gender difference in terms of child work.

Canagarajah and Coulombe (1997) studied 1991-92 data on child labor in Ghana. They also found some evidence of a gender gap in schooling but no significant gender gap in terms of child labor.

The above two papers used multinomial logit models to analyze the child work and schooling decision. Using per-capita household expenditure as a measurement of poverty, both studies were unable to establish any significant contribution of poverty in the determination of child labor.

Ray did several studies on child labor in Peru and Pakistan. In one of those studies Ray (2000a) tested two hypotheses. The first hypothesis tested the existence of a positive relationship between child labor and poverty; and the second hypothesis tested the existence of a negative relationship between child schooling and poverty. Both the hypotheses were supported by the Pakistani data, but not by the Peruvian data.

In another study, Ray (2000b) used the data from Peru and Pakistan again to analyze children's labor force participation and its main determinants. He rejected both the "luxury" and "substitution" hypotheses in the context of child labor in Pakistan and suggested that income and related variables may not be negatively related to children's work input. The poverty line used in this work was 50% of the median per capita expenditure of the whole country. Results using this variable do not support the "luxury axiom" outlined by Basu and Van (1998).

In another study, Blunch and Verner (2000) re-established the positive relationship between the poverty status of a household and the amount of harmful child labor. They estimated a univariate probit model and used the poverty quintiles in their analysis depending on household consumption patterns.

Even if enrollment is not negatively related to a child's work/not work decision, that is if children can work and they are also enrolled in school, still their work may take away their time from studies or leisure. In this way, child labor may also

prevent human capital formation, even if it is not negatively related to enrollment. Psacharopoulos (1997) used household surveys in Bolivia and Venezuela to find the relation between educational attainment and child labor. He found that grade repetition, which is a common phenomenon in Latin America, is very much related to child labor. Therefore, this study supports the notion that child work prevents human capital formation even if enrollment and work are not negatively correlated.

One of the important works that studies child labor and its relation to human capital formation is by Akabayashi and Psacharopoulos (1999). They tried to measure the degree of trade-off between child labor and human capital formation in Tanzania. They found that there is a trade-off between hours of work and study, and that hours of work tend to be more affected by social conditions than hours of study. Hours of work tend to be negatively related to reading and mathematical skills through the reduction of human capital investment activities, which indicates a trade-off between child labor and human capital formation. Lack of sufficient human capital formation leads a country to be less productive, paying lower wages and therefore causing lower income to households, leading to poverty. These conditions make it necessary for the families to send their children to work and may explain why several countries are speaking in favor of banning child labor completely. But, recently, economists have raised doubt whether the banning of child labor will improve welfare in these countries or whether will lead them to an even worse condition.

In relation to the above determinants, there have been only a few empirical work that explicitly consider the role of access to credit as one of the determinants of child labor. One important empirical work in this area by Dehejia and Gatti (2002) uses

cross-country data to look at the effects of credit constraints on the extent of child labor. They used the ratio of private credit issued by banks to GDP as the proxy for access to credit across countries. The measurement of child labor in their model is the percentage of working children in different countries. The results from their tobit model suggest a significant relation between the access to credit and child labor, which is much stronger in poor countries with less-developed financial markets. They also found that income variability has more impact on child labor in countries with underdeveloped financial markets. They argued that in order to deal with sudden income shocks, households are forced to send their children to work.

2.3 Major Work on Vietnam

Since this study concerns child labor in Vietnam, it is necessary to discuss the major work done in this area on Vietnam. During the 1980s and 1990s Vietnam has gone through a major economic transition, and its effects are still prominent. In the 1980s the economy of Vietnam was one of the poorest in the world, depending on highly subsidized imports from the Soviet Union. But the scenario started changing when Vietnam adopted a liberalized economic policy, "Doi Moi," in the late 1980s. Glewwe, Gragnolati and Zaman (2001) analyzed the effect of economic changes in Vietnam on the standard of living, as measured by poverty and inequality between the period from 1992 to 1998. Their panel study used the data on consumption expenditures to measure household living standards. Using a poverty line based on the 2100-calorie requirement per day, they showed that there was a substantial decline in the incidence of poverty, from 58.2% in 1992-93 to 37.4% in 1997-98. They found that the occupation of household heads and

regions of residence have some role in increasing welfare by reducing poverty. It appeared that urban households and households living in the Red River Delta and the Southeast experienced improvements in living standards.

During this period of economic transition, several different kinds of jobs were created that might have changed the returns to education in Vietnam. If returns were higher that might also reduce the child labor. Moock, Patrinos and Venkataraman (1998) examined the effects of "Doi Moi" on returns to education during the transition period of the 90s, using the 1992-93 living standards measurement survey. They calculated returns to education among different groups, such as male-female, private sector workers-public sector workers, etc., by estimating a Mincerian log-wage function. They found that males experienced lower returns to schooling than females and workers from the public sector realized higher returns to schooling than private sector workers. They also found large regional differences in general levels of education and earnings. The level of education is higher in the North than in the South, and wage levels are higher in the South than in the North, implying some kind of negative relation between education and earnings in private enterprises.

Glewwe and Jacoby (2000) studied the relationship between household resources and the demand for education using panel data from Vietnam. They found that if households are credit-constrained and they need to self-finance investment in human capital, then school enrollment and school attainment should be related to household resources. They also concluded that changes in returns to education did not contribute much to increase the demand for education in Vietnam during the 1990s, and that providing greater access to schools may not necessarily help in human capital

development. These conclusions were based on the finding that even after controlling for changes in education returns, supply and quality of schools, and opportunity cost of schooling, the households with greater increases in wealth experienced faster increases in child enrollment rate during this period.

One of the important empirical studies that analyzed the relationship between living standards and child labor in Vietnam is by Edmonds (2001). By using panel data from Vietnam in the 1990s, he found that improvements in living standards, measured in terms of per capita expenditures during the 1990s, contributed to the decline in child labor.

In another work, Edmonds and Pavcnik (2001) examined the impact of a liberalized trade policy in Vietnam on the incidence of child labor. The liberalized trade policy, through the elimination of an import quota, raised the price of rice in Vietnam during 1990s. The results of the above work suggested that a 30% rise in the price of rice through the elimination of a quota resulted in a 9-percentage point decline in child labor. By using an interaction between the logarithm of price of rice and the household landholdings in their analysis, they suggested that the reduction of child labor is bigger for households with better endowments of land.

Most of the above empirical work, except for that of Akabayashi and Psacharopoulos (1999), analyzes the child labor decision by examining the binary "work/not work" variable. It is true that by looking at the decision to work or not work, one can examine the determinants and suggest policy issues; but the analysis can be more complete if one can investigate the determinants in terms of hours of work. The contribution of this dissertation to the literature on child labor of Vietnam is that this

work extends the analysis beyond the binary decision by also analyzing child hours of work. Also, the analysis in this dissertation measures the returns to education and includes them directly in the model as one of the determinants of child labor. The analysis also deals with the endogeneity problem that arises due to the inclusion of per capita expenditure as a measure of poverty, a problem which has been ignored in most of the empirical studies done on the determinants of child labor. Lastly, this work allows the possibility of labor mobility in one of the specifications and incorporates the issue of credit constraints by looking at the change in hours of work among different groups of people with different income levels. This last hypothesis is based on the idea that people at different income levels may not face the same credit constraints. So, if it is possible to make some finer divisions among people with different income groups, then it might be possible to find one group for whom the returns to education matter and another group for whom the returns do not matter at all. If that is the case, then it might be concluded that the latter group is credit constrained whereas the former group is not. This approach of analyzing child hours of work and its relation to returns to education is an area to be explored in the empirical work on child labor.

CHAPTER III

PURPOSE OF THE STUDY

3.1 Overview

The purpose of this empirical study is to analyze the relationship between child labor in Vietnam and some of its determinants. The study starts by investigating the role of household poverty in child labor and then considers the role of returns to education in the supply of child labor. While looking at the role of returns to education, this study is also concerned with labor mobility and credit constraint issues that might change the role of returns to education on child labor decisions.

3.2 Relationship between Child Labor and Poverty

In theoretical as well as empirical studies, it has been well documented that poverty is the main reason for child labor. Basu and Van (1998) suggested that if parents were altruistic, and the adult wage were high enough, then there would be no child labor. The study of child labor in Vietnam by Edmonds (2001) found that improvement in living standards in Vietnam reduced child labor during the 1990s. In underdeveloped countries, poor families need their children to work in order to provide the families with the bare necessities. Also, these poor families do not have enough resources to support themselves during sudden income shocks; that insecurity drives these families to send their children to work.

In order to find the relation between poverty and child labor, the purpose of this work is to find some threshold poverty levels, if any, which determine the households' decision regarding child work. After controlling for all other factors, if it is possible to find some threshold "poverty lines," which affect the household decision of sending the children to work or not, then it can be suggested that poverty is one of the reasons for child labor. This work examines different poverty measures to find the threshold level, above which the extent of child labor drops.

3.3 Relationship between Child Labor, Poverty, and Returns to Education

The next section of this study is based on the theory of investment in human capital. If there is a possibility of higher return from investment in human capital, then parents would invest more on their children's education. The cost of that investment may include the direct cost of the child's schooling as well as the indirect costs of the child's time spent on education. Therefore, as returns to education increase there is the possibility that parents will not want their children to work any more – if there is perfect substitutability between education and work. But even if there is no perfect substitution between work and schooling, parents may still decide to reduce their child's hours of work and may want them to spend more time on education. In the latter case, the decision will only be reflected in the analysis of the children's hours of work.

3.4 Child Labor and its Relation to Returns to Education: Possibility of Labor Mobility

After analyzing the relationship between returns to education and child labor explicitly, this work further explores the possibility of labor mobility on child labor.

About 80% of the population of Vietnam live in rural areas. But if urban areas have higher returns to education, in particular, the big cities with higher returns to education may attract people for work. Therefore, when considering returns to education in decisions about child work, families may also consider the possibility of future migration to another place where returns to education are higher. For example, all of the educated people living in the same region may be attracted to the nearest big city for work if that city has higher returns to education. In such a case, parents may plan ahead for their children's future. They may want to educate their children more, while reducing the burden of their work. If this is the case, then returns to education in the nearest urban area or nearest big city may matter as much as returns to education in the local region of residence. Therefore, for rural people, the extent of child work may be less with higher returns to education in urban areas, even if the extent of child labor does not show any significant relation to the returns to education in the rural area.

But the effect of higher returns in urban areas on the child labor in rural areas may not be same for all the households. For some households, moving to a city may not be very costly in the sense that they may have some relatives, friends, or other contacts living in that city. In that case, these families have a higher possibility of sending their children to cities after the children receive enough education. But there may be other families who do not have an adequate opportunity to send their children to a city after

finishing their education. So, the effect of higher returns to education in cities might be different for these two groups of people.

3.5 Child Labor and its Relation to Returns to Education: Possibility of Credit Constraints

The last part of this analysis addresses the issue of credit constraints. This problem is very important for underdeveloped countries, and when discussing any effect of returns to education, it becomes necessary to discuss this issue as well. Consider two families with same level of per capita income, one of them being credit-constrained and the other not. In such a case, the effect of higher returns to education on child work in those two families may be different. If the return to education is high and neither family has enough money to pay for the cost of their children's education, then the latter may consider the possibility of borrowing, which may help to reduce child labor in those families. But the effect of returns to education on child labor may not be same for the borrowing-constrained household. Even the higher returns to education may not be attractive enough for them to reduce child labor because it is not possible for them to incur the present opportunity cost of education. However, the hypothesis in this part of the analysis tests mainly whether credit constraints affect poor households or not.

Therefore, the fourth model begins by dividing all families into three groups according to their expenditure levels. Group A consists of the richest people who will not send their children to work anyway. The consumption value of their children's education is so high to them that their decisions about child work do not depend on returns to education. But for groups B and C, the consumption value of education may not be that

high and children's education to those families may depend on returns to education. Therefore both groups' child labor decisions may also depend on returns to education. If group B does not have any constraints in borrowing money when needed or they do not need to borrow at all for their children's education, but group C has credit constraints, then the reduction in child labor from higher returns to education may be higher for the households in group B than for the households in group C.

Therefore if it is possible to find these breakpoints in income which distinguish among these three groups of people, then the relationships between returns to education and child labor decisions among these three groups might differ. The difference in the relationship between returns to education and child labor among the people in groups B and C may be accounted for by the presence of credit constraints in the households of group C. The hypothesis in this part of the analysis is mainly that poor people are credit-constrained and rich people are not.

CHAPTER IV

DATA

4.1 Overview

This study uses the Vietnam Living Standards Survey (VLSS) 1997-98 data, the latest household survey conducted by the General Statistical Office in Vietnam with technical assistance from the World Bank. This survey was part of the Living Standards Measurement Study (LSMS) household surveys, funded by the United Nations Development Program (UNDP) and the Swedish International Development Authority. This nationally representative household survey was the second of its kind in Vietnam and was conducted during the period December 1997 to December 1998 on 6,002 households living in 194 communes.

The survey has household level information on 28,636 individuals as well as community and village level information. Here households consist of people living and eating meals together in the same house. All the household level questions were designed to ask the household head, who is usually the highest-earning member in the family. All relatives of the household head, both living in the same household and living elsewhere but supported by the same household, are considered as the household members.

4.2 Sample Design

The number of targeted households in the VLSS 97-98 was 6,000. Of these, 4,800 came from the VLSS 92-93 sample and 1,200 households were selected from the 1995 Multi-Purpose Household Survey (MPHS).

The first in the three stages in drawing the VLSS sample was choosing communes/wards and small towns as the primary sampling unit. A total of 150 communes was selected from the VLSS 92-93, where the probabilities of selection of those communes were proportional to the population size. In the second stage, two villages/blocks were chosen within each commune. Finally, in the third stage, 16 households were chosen for sample from each village/block. That means a total of 32 households were selected from each of the 150 communes, which gave a sample of 4,800 households from VLSS 92-93.

The 1,200 households selected from the MPHS were not proportional to the population size. The selection from the MPHS sample was done to over-sample the total of 6,000 households in some specific areas. But the sampling weights have been properly calculated to avoid any major bias in the analysis of this data.

4.3 Information about Household Members

The household level information consists of the number of people with their individual codes, the relationship to the head of the household, age, gender, occupation, education, employment, health, asset holdings, information about expenditures, borrowing, lending, savings, migration, and so forth.

The employment information is explicit in the sense that it distinguishes between self-employed people and any kind of wage earners. The data provides detailed information about the work hours in different kinds of jobs, whether primary or secondary, paid or unpaid. The data have wage information on the wage-earning people, but it does not have any measurement of income for the self-employed, non-wage working people.

The data set helps to distinguish between agricultural families and families with other professions. This information is very important for Vietnam where 80% of the population depends on agriculture for their livelihood. The employment information is asked only to people of age 6 years or older.

Community level information was collected only in rural and minor urban areas. This information consists of price data for all important items, the geographic region and population in the commune, the availability of school in the village, and the availability of other important utilities and resources, such as transportation, roads, electricity, water, etc., in the commune.

4.4 Analysis of the Data

This data set consists of 28,636 individuals with 9,937 children aged 15 years or younger. Looking at the enrollment rate, 85.21% of the population has attended school at least at some point. That enrollment rate is much higher, that is, 95.78%, for the 6-15 years old school-aged children.

Estimates from the VLSS 1997-98 study show that 25.02% of the 6-15 year-old children do some kind of work excluding household core work in Vietnam. Here,

household core work means the domestic unpaid work such as cooking, cleaning, washing, or looking after siblings, etc. Again, analyzing these working children by gender, the data shows that 24.79% of all girls and 25.25% of all boys of the same age do some kind of work. A child between 6 to15 years of age is included in the child labor category here if described by at least one of the following: the child worked in the last 12 months for pay for someone not a member of the household (e.g., for the government, a collective, foreign, or joint venture, or private employer); the child worked in the last 12 months in a field, garden, or forest plot belonging to the same household; the child worked in the last 12 months raising livestock or aquatic products or process home-produced crops or output for the household; or the child worked in the last 12 months in a business or profession managed by the same household, or in some other self-employed activity.

None of the estimates of child labor here include the core household tasks such as cooking, cleaning, or looking after siblings, etc. These tasks might take away a major part of children's leisure, which is also important for a child's overall development. Even a school-going child may not have enough time to spend on studies if he or she is responsible for doing these tasks. In all of these cases, household core tasks might hinder children's normal development. But due to lack of available information to properly distinguish different types of harmful tasks, and due to the fear of misinterpreting results, most of the studies exclude these domestic unpaid tasks from the definition of child labor.

Table 4.1 Labor Force Participation Rates and Enrollment Rates between Ages 6-15 with Division by Genders

Age	Labor Force Participation Rates (%)			Enrollment Rates (%)		
	Boys	Girls	Overall	Boys	Girls	Overall
6	1.64	0.46	1.06	62.09	59.86	60.99
7	2.92	1.71	2.32	68.74	66.17	67.47
8	8.39	8.01	8.19	67.41	68.71	68.09
9	7.39	8.94	8.15	73.74	67.89	70.89
10	17.09	13.38	15.37	63.93	68.87	66.21
11	26.83	24.71	25.82	63.72	68.13	65.82
12	30.52	33.79	32.07	66.52	62.12	64.44
13	38.29	41.55	39.83	66.59	53.68	60.48
14	47.63	46.65	47.14	59.41	50.37	54.96
15	57.24	56.79	57.02	51.47	46.53	49.06

A more explicit analysis of the data in Table 4.1 presents a clearer view of the extent of child labor in Vietnam. In Table 4.1, looking at all age groups separately, it is clear that the rate of participation in the labor force increases consistently with age. The table also shows that only 1.06% of 6 year-old children work, whereas that number increases to as high as 57.02% when one considers 15 year-old children. Comparing genders, one can see that in some of the age groups, boys work more than girls, and in some age groups, it is the opposite. The statistics here do not show any major gender difference in terms of child work.

Since this study is interested in the determinants of children's participation in the labor force, one should be aware of the education levels of these children. Table 4.1 shows that the overall enrollment rate is very high in Vietnam and that the rate goes up until the primary school age; that is, enrollment peaks at around 9 years of age. After age 9, schooling drops consistently. That means there is a high dropout rate in Vietnam, and the dropouts may occur mainly after primary school.

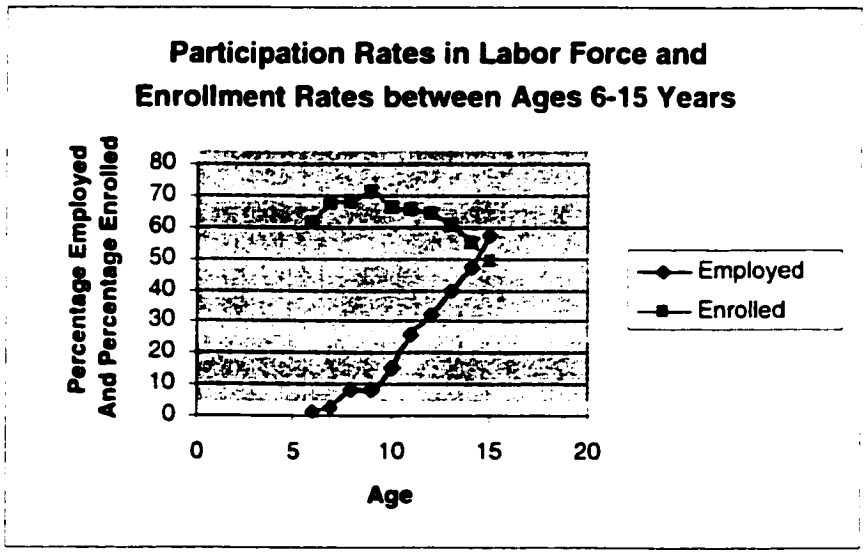

Figure 4.1

The same story works for both genders, the only difference being that for most of the age groups, boys have a higher percentage of schooling than girls.

Comparing overall children's participation in employment and schooling simultaneously, Figure 4.1 shows that, both of these increase between 6 and 9 years of age. But starting from 10 years of age, the percentage of children going to school starts decreasing for the first time since age 6, whereas the percentage of children employed increases. Overall employment rises from 8.15% to 15.37% between the ages of 9 and 10 years, and overall schooling drops from 70.89% to 66.21% between these ages. These numbers suggest that children start working more after finishing their primary education.

It is not clear from Table 4.1 whether children drop out of school in order to join the labor force at an early age. At the age of 15 years, it is seen that the overall enrollment rate is lower than the overall employment rate, which may imply that some children of that age group drop out of school to join the labor force. These statistics on

the extent of child labor in Vietnam analyze the participation rate in the labor force only and that participation rate in work does not seem to have much substitution with schooling in Vietnam.

This work also tries to analyze the relation between hours of work and school enrollment in Fig 4.2. It shows that enrollment is as high as 93.28% among 6-15 year-old children who work between 0 to 100 hours per year. But it is as low as 7.56% for the children in the same age group who work as much or more than 2100 hours in a year. The figure also implies that enrollment may have a negative relationship with hours of work, and that working less than 100 hours a year may not prevent children from attending school.

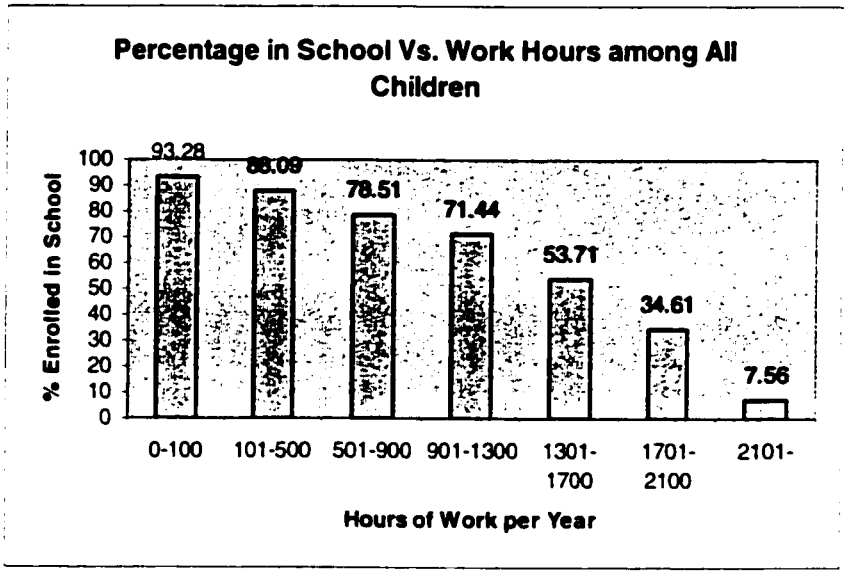

Figure 4.2

Table 4.2a Correlation Matrix of Some of the Important Variables

	CHLHR	CHLWK	ENROL	RTE	AGECH	GIRL	KINH	AGE
CHLHR	1.00							
CHLWK	0.73	1.00						
ENROL	-0.44	-0.29	1.00					
RTE	-0.12	-0.14	0.021	1.00				
AGECH	0.36	0.41	-0.18	0.036	1.00			
GIRL	0.02	0.001	-0.064	0.21	-0.004	1.00		
KINH	-0.12	-0.099	0.14	0.16	0.034	-0.002	1.00	
AGE	0.044	0.035	-0.078	0.063	0.20	-0.013	0.061	1.00

Where, CHLHR: Hours of work in a year
CHLWK: Child participation in work=1, otherwise=0
ENROL: Currently attending school=1
RTE: Returns to education
AGECH: Age of child
GIRL: Girl child=1
KINH: Ethnicity is Kinh=1
AGE: Age of household head.

The Pearson's correlation coefficients of some of the important variables presented in Tables 4.2a and 4.2b help reveal a clearer picture of the factors concerning child labor. The correlation between labor force participation and current enrollment, as presented in Table 4.2a is as low as -0.29 in Vietnam. The sign may imply some extent of substitution, though. The correlation between child labor and living in an urban area in Table 4.2b is -0.19, whereas, the correlation between child labor and being in the highest income group is -0.087. The correlation between age of a child and hours of work per year is 0.36, and that of the age of a child and the binary work variable is 0.41. Being a Kinh (the majority ethnic group in Vietnam) is negatively related to child labor. The correlation between being Kinh and children's labor force participation is -0.099.

Table 4.2b Correlation Matrix of Some Important Variables in Relation to Child Labor

	CHLWK	URB	REG1	REG2	REG3	REG4	REG5	REG6	PCINC1	PCINC2	PCINC3	PCINC4
CHLWK	1.00											
URB	-0.19	1.00										
REG1	-0.11	0.22	1.00									
REG2	-0.12	-0.012	-0.20	1.00								
REG3	-0.093	0.033	-0.14	-0.18	1.00							
REG4	0.14	-0.12	-0.17	-0.22	-0.15	1.00						
REG5	0.046	0.019	-0.19	-0.25	-0.17	-0.20	1.00					
REG6	0.12	-0.11	-0.20	-0.26	-0.18	-0.21	-0.24	1.00				
PCINC1	-0.12	-0.019	0.01	0.041	0.027	-0.05	0.10	-0.13	1.00			
PCINC2	-0.11	0.24	0.18	0.0046	-0.0026	-0.06	-0.016	-0.073	-0.24	1.00		
PCINC3	-0.093	0.25	0.15	-0.037	-0.0058	-0.031	0.025	-0.079	-0.15	-0.058	1.00	
PCINC4	- 0.087	0.31	0.21	-0.034	-0.023	-0.041	-0.0002	-0.084	-0.13	-0.052	-0.032	1.00

Where, URB: Urban=1
REG1: South C. Coast and C. Highlands=1
REG2: Southeast=1
REG3: Mekong River Delta=1
REG4: Red River Delta=1
REG5: Northeast and Northwest=1
REG6: North C. Coast=1,
PCINC1-PCINC4: 4 consecutive poverty dummies as seen in detail in Table 5.2a.

Table 4.3 presents the education levels of people in Vietnam by dividing the people into different groups.

Dividing by genders, column 5 shows that 84.69% of males and 79.85% of females have completed primary or some other degree[2].

[2] It is important to note here that all the education levels in this table represent a terminating degree, which implies that a person with secondary education as the terminating degree may have primary education also, but he is only included in column 2 of the table.

Table 4.3 Statistics of Education Levels: By Gender, North-South, Rural-Urban and Six Regions

Terminating Degree By Different Groups			(1) Primary	(2) Secon-dary	(3) Voca-tional	(4) Univer-sity	(5) Educated‡	(6) Total Obs*
Gender	Male	Percent†	33.76	44.64	3.30	2.99	84.69	48.45
		Obs*	4667	6108	455	477	11707	13928
	Female	Percent†	37.89	37.69	2.29	1.98	79.85	51.55
		Obs*	5502	5474	352	343	11671	14696
North-South	North	Percent†	31.14	47.01	3.63	2.29	84.07	51.26
		Obs*	3682	5758	492	367	10299	12220
	South	Percent†	40.88	34.79	1.88	2.65	80.20	48.74
		Obs*	6487	5824	315	453	13079	16406
Urban-Rural	Urban	Percent†	25.97	48.87	5.02	7.63	87.49	22.45
		Obs*	2002	3764	384	616	6766	7758
	Rural	Percent†	38.76	38.79	2.13	0.97	80.65	77.55
		Obs*	8167	7818	423	204	16612	20868
Six Regions	South Central Coast	Percent†	35.90	35.49	2.43	2.06	75.88	11.33
		Obs*	1668	1649	107	92	3516	4685
	Southeast includes HCMC	Percent†	35.86	39.46	2.29	4.57	82.18	15.93
		Obs*	2279	2416	125	256	5076	6202
	Mekong River Delta	Percent†	47.22	30.96	1.30	1.55	81.03	21.48
		Obs*	2540	1759	83	105	4487	5519
	Red River Delta includes Hanoi	Percent†	26.53	53.30	4.50	3.58	87.91	19.56
		Obs*	1223	2517	235	220	4195	4756
	Northeast and North-west	Percent†	35.53	42.95	1.15	1.16	80.79	17.87
		Obs*	1421	1809	61	63	3354	4149
	North Central Coast	Percent†	31.97	43.35	5.59	1.94	82.85	13.83
		Obs*	1038	1432	196	84	2750	3315
Total		Percent†	35.52	40.46	2.82	2.86	81.66	100.00
		Obs*	10169	11582	807	820	23378	28626

† All percentage measures are properly weighted to represent the nation.

* These are the numbers of corresponding observations available in the data.

‡ Here educated people include all the people who have terminated their education after completing at least primary, secondary, vocational, or university degree. It does not include people who did not complete at least one of these degrees

But looking at the highest level of education achieved, it is clear that more females terminate their education after the primary level as compared to males. The data also shows that 44.64% of males terminate their education after the secondary level, whereas that number is 37.69% for females.

Analyzing different education levels in the North-South separately, column 5 of Table 4.3 shows that the North has a slightly higher percentage of educated people than the South. 84.07% of people living in the North have at least a primary or some other education, compared to only 80.20% of the people in the South. Also, the North has more people having a secondary education as their terminating degree as compared to the South. It seems more people drop out in the South after finishing their primary education as compared to people in the North.

The analysis presents a similar result when the people are divided between rural and urban regions. Column 5 of the table shows that 87.49% of the urban population has a primary or some other degree, whereas only 80.65% of rural people achieve that education level. Also, the percentage of people terminating their education after the primary level is higher in the rural areas than in the urban areas of Vietnam; and more people have secondary education as their terminating degree in the urban areas as compared to rural areas.

Dividing all people according to their six regions of residence[3] in Table 4.3, the results show that the Red River Delta has the highest percentage of educated people. In this region, 87.91% of the people are educated, whereas this percentage is only 75.88%

[3] These six geographic regions have been created from eight administrative regions according to the most recent classifications available in the data. These regions have been used for several purposes throughout our analyses as explained later.

in the South Central Coast. Comparing the two most urbanized areas in Vietnam, one finds that the percentage of people having secondary education as the terminating degree is much higher in the Red River Delta region, which includes Hanoi, than in the Southeast region, which includes Ho Chi Minh City.

Comparing overall education levels in Vietnam, the data shows that about 35.52% of people have terminated their education after the primary level, and 40.46% of people have terminated it after secondary level. The percentage of people having university education is as low as 2.86%.

Finally, besides knowing education levels, it is also relevant for this study to know the standard of living in Vietnam. Vietnam had a per capita annual income of $370 in 1999 (source: World Development Indicators 2001, The World Bank, Washington D.C.). From Table 4.4, one can also get some idea of the percentage of people living below the poverty line in different regions. Based on the standard 2,100-calorie requirement per day, Glewwe, Gragnolati, and Zaman (2001) calculated the poverty line as 1,789,871 dong a year. Using this as the poverty line, one can see that the Northeast and the Northwest regions have the highest percentage of people living below the poverty line, whereas the Southeast has less than one fourth of its population living below the poverty line. Also, Vietnam, overall, has 37.34% of its population living below the poverty line.

Table 4.4 Statistics of Percentage of Population below Poverty Line: by Six Geographic Regions
(Poverty line measure is based on 2100/day calorie requirement)

Regions	South Central Coast	Southeast- includes HCMC	Mekong River Delta	Red River Delta includes Hanoi	Northeast and Northwest	North Central Coast
% People Below Poverty line	40.36	13.40	36.88	28.67	58.53	48.04
Observations' Below Poverty line	1898	835	1969	1237	2333	1502
Total Observations	4685	6202	5519	4756	4149	3315

*All percentage measures are properly weighted to represent the nation.
' Numbers of observations in tables are the available numbers of observations in the data.

Comparing the extent of poverty in the northern part of the country with that in the southern part, one can see that the North has 44.31% of the people living below poverty line, whereas that measurement reduces to 30.01% in the South. Poverty is more severe in rural areas as compared to the urban areas. 45.51% of rural the population live below the poverty line as compared to 9.14% of the urban population.

Summary statistics of the data in Table 4.5a show that the average household size in Vietnam is 4.7 and average number of children in a household is 1.6, whereas the number of adults in a household is 3 on average. An average household head has 7 years of schooling and average per capita total expenditure in a household is 2,987,900 dong.

Table 4.5a Summary Statistics of Some Household Level Variables from the Full Sample

Variables	Observations	Mean	Standard Deviation	Minimum	Maximum
Number of Children	5999	1.647187	1.387947	0	8
Number of Adults	5999	3.069221	1.402541	1	14
Household Size	5999	4.700221	1.908688	1	19
Years of Education of Household Head	5999	7.137586	4.342918	0	22
Age of Household Head	5999	47.78897	13.81606	16	95
Gender of Household Head (1:M; 2:F)	5999	1.263478	0.440519	1	2
Education Expenditures ('000 Dong)	5999	780.2909	1537.82	0	29808
Monthly & Regional Price- Adjusted Food Expenditure ('000 Dong)	5999	6468.07	3783.96	576.1477	87890.52
Monthly & Regional Price- Adjusted Per Capita Total- Expenditure ('000 Dong)	5999	2987.9	2487.54	357.318	45801.71

Table 4.5b Summary Statistics from the "Child Only" Sample Used in Estimations

Variables	Number of Observations	Mean	Standard Deviation	Minimum	Maximum
Hours of work	7079	217.58	521.85	0	4792
Child Participation in Work	7079	0.25	0.43	0	1.00
Participation in School	7079	0.88	0.33	0	1.00
Age of Child	7079	10.71	2.85	6	15.00
(Age of Child)^2	7079	122.83	60.91	36	225.00
Girl Child	7079	0.49	0.50	0	1.00
Kinh	7079	0.82	0.38	0	1.00
1,789,871< Per capita Net Income<=3,579,742*	7079	0.38	0.49	0	1.00
3,579,742<Per capita Net Income<=5,369,613*	7079	0.085	0.28	0	1.00
5,369,613<Per capita Net Income<=7,159,484*	7079	0.035	0.18	0	1.00
7,159,484<Per capita Net Income*	7079	0.028	0.17	0	1.00
7,159,484<Per capita Net Income<=9,000,000*	7079	0.013	0.11	0	1.00
9,000,000<Per capita Net Income*	7079	0.015	0.12	0	1.00
Age of Household Head	7079	42.78	9.89	20	86
Gender of Household Head	7079	0.17	0.37	0	1
Years of Education of Household Head	7079	7.54	4.036	0	22
No. of Adults	7079	2.95	1.29	-2	14
No. of Children	7079	2.84	1.26	1	8
Land Area	7079	28370.69	58729.69	0	3080690
Prim School	7054	0.53	0.50	0	1.00
Secondary School	7054	0.25	0.43	0	1.00
Road Transportation	7079	0.81	0.39	0	1.00
Water Transportation	7079	0.50	0.50	0	1.00
Quality of water supply	7054	0.32	0.47	0	1.00
Electricity	7054	0.91	0.29	0	1.00
Price of Rice	7024	3428.56	492.14	2033.33	5600
Urban	7079	0.17	0.38	0	1.00
Southeast	7079	0.13	0.34	0	1.00
South Central Coast and Central	7079	0.21	0.41	0	1.00
Highlands	7079	0.11	0.32	0	1.00
North Central Coast	7079	0.15	0.36	0	1.00
Red River Delta	7079	0.19	0.39	0	1.00
Northeast and Northwest	7079	0.21	0.40	0	1.00
Leaders	7079	0.043	0.20	0	1.00
Professionals	7079	0.061	0.24	0	1.00
Sales	7079	0.13	0.33	0	1.00
Agriculture and Forestry	7079	0.78	0.41	0	1.00
Skilled Manual	7079	0.18	0.38	0	1.00
Machine Operators	7079	0.036	0.19	0	1.00

*All income measurements are in VN Dong.

Table 4.5b presents the summary statistics of all variables from the sample of 6-15 year-old children used throughout the analysis. It shows that 25% of these children do work, about 88% of them are enrolled in school, 49% of them are females, and 82% of them belong to the Kinh ethnic group. The statistics further show that 53% of them have

a primary school in their own village and 25% of them have a secondary school in their village, 78% of these children have a household head working in agriculture or forestry.

Concentrating on the sample of child labor only, Table 4.5c shows that among all the working children in Vietnam, 51.82% are males and 48.18% are females. 95.05% of the working children belong to rural areas and only 4.95% of them belong to the urban areas. Separating all the working children by their six regions of residence, one finds that the Northeast and Northwest areas have the highest percentage (29.22%) of working children, whereas the South Central Coast and the Central Highlands area has the lowest percentage (6.16%) of working children. Dividing the sample between the North and the South, this table shows that about ¾ of the working children live in the northern regions.

Table 4.5c Child Labor in terms of Participation Rates among Different Categories from the Sample of Working Children

By Different Categories		% Working
By Gender	Boys	51.82
	Girls	48.18
By Rural-Urban	Rural	95.05
	Urban	4.95
By Regions	South C. Coast and C. Highlands	6.16
	Southeast	6.78
	Mekong River Delta	12.33
	Red River Delta	21.86
	Northeast and Northwest	29.22
	North C. Coast	23.65
By North-South	North	74.73
	South	25.27

Analysis of the yearly hours of work for all of these working children in Table 4.5d shows that, on average, boys work about 828 hours per year, whereas girls work more hours than boys in a year. Hours of work per year are much higher in the rural areas as compared to the urban areas. Rural children work as many as 877 hours in a year

on average, whereas urban children work only 770 hours in a year on average. Hours of work in a year are highest in the South Central Coast and the Central Highlands, and lowest in the Red River Delta region.

Table 4.5d Summary Statistics of Child Labor in terms of Hours of Work/Year among Different Categories from the Sample of Working Children

By Different Categories		Observations	Mean (Hours/Yr)	Standard Deviation	Minimum (Hours/Yr)	Maximum (Hours/Yr)
By Gender	Boys	812	828.22	683.70	3.00	4792.00
	Girls	767	919.95	757.27	8.00	3934.00
By Rural-Urban	Rural	1485	877.50	721.82	3.00	4792.00
	Urban	94	770.41	708.44	8.00	3060.00
By Regions	South C. Coast and C. Highlands	176	1079.97	768.55	17.00	3276.00
	Southeast	176	966.02	653.25	28.00	3008.00
	Mekong River Delta	191	981.56	768.95	8.00	3668.00
	Red River Delta	292	554.33	536.25	3.00	3253.00
	Northeast and Northwest	411	997.88	808.88	30.00	3934.00
	North C. Coast	333	874.06	640.34	40.00	4792.00
By North-South	North	1036	829.21	709.73	3.00	4792.00
	South	543	1001.52	740.90	8.00	3668.00

CHAPTER V

METHODOLOGIES USED IN THE STUDY AND RESULTS

5.1 Overview

The basic model used throughout the analyses is as follows:

Child Labor = β_0 + β_1(*Poverty Measures*) + β_2(*Child Characteristics*) + β_3 (*Family Characteristics*) + β_4 (*Community Characteristics*) + u.

Where,

Poverty Measures: Vector of dummy variables created from some proxies for per capita household income, net of the child's income[4].

Child Characteristics and *Family Characteristics*: Vector of some dummy and some continuous variables representing the individual child's characteristics and the child's family characteristics respectively.

Community Characteristics: Vector of some community level variables.

u: Vector of error terms, assumed to be identically, independently distributed normal with zero mean.

5.2 Role of Household Poverty in Work/Not Work Decisions about Children

The goal of the first model is to find the relationship between household poverty and the decision to work or not work. In this stage, the purpose is to find the

[4] The methodologies used in this adjustment are explained later in this section.

threshold poverty line, if any, which drives the household to choose work versus not work.

5.2A Model The basic model in this part of the analysis is as follows:

Probability of Participation in Work = β_0 + β_1(*Poverty Measures*) + β_2(*Region Indicators*) + β_3(*Child Characteristics*) + β_4 (*Family Characteristics*) + β_5 (*Community Characteristics*) + *u*.

Where, all variables are same as explained before, and,

Probability of Participation in Work: 1=work, 0=do not work.

Region Indicators: Vector of six regions created from eight administrative regions originally present in the data.

This part of the analysis uses a probit model, where the probability of participation is the dependent variable[5]. The explanatory variables of concern in this section are some poverty measures. The poverty measures could be calculated from the measurements of per capita income. But it is not possible to correctly calculate income for all people from the given data. To be precise, it may not be appropriate to use the income measurements either because about 80% of the population in Vietnam do not have wage income; rather, they are self-employed, and the VLSS does not have enough income information for self-employed people. So, it is not possible to use income directly in the model. Also, income itself is very much sensitive to short term fluctuations, whereas households try to smooth consumption and the VLSS has been designed to take care of the abrupt or seasonal changes in consumption. Lastly, in terms of the permanent income hypothesis, it is better to look at household expenditures rather than income

[5] The basic results do not change even if we use the logit model instead of probit.

because household expenditures reflect their permanent income. Therefore in all the models, the calculation of income categories are based on real per-capita household expenditure adjusted for regional price indices.

There is a problem of endogeneity in this model. The main purpose of this model is to investigate whether poverty is one of the main reasons for child labor or not. If the child's income is included in household income, then it is not possible to conclude anything about the relationship between household income and that particular child's working decision because the relation can also hold true the other way. That is, an increase in child labor may also cause per capita household income to rise.

Therefore, this study deals with this endogeneity issue by subtracting out the child's income from the household income. An imputed yearly income is calculated for each particular working child, and that income is called "imputed child income." Then "imputed child income" is subtracted from total household expenditure. This gives the total household income net of that particular child's income. Then, that "net household income" is divided by the household size to calculate each individual's income, or "per capita net income." This work deals with the potential endogeneity problem in the above way.

The next few paragraphs explain the process of calculating this "per capita net income." The first stage of the task is to calculate the hourly wage for all people.

Since the VLSS does not provide wage information for all self-employed people, the hourly wage has been calculated for all wage earners only. The data does not provide any direct information about all individuals' hourly wage. The hourly wage information that the data has is only for the people who get paid on an hourly basis. The

data does have information about wage for other wage earners, but such information is based on the time unit of their payment. For example, for people who get paid on a monthly or weekly basis, the data provides their monthly or weekly wage information. Depending on that time unit and the total time worked in the past year, the yearly wage for all wage earners has been calculated. Then the yearly income is divided by the total number of hours worked in this wage job during the past year to calculate the hourly wage.

The following log wage function is estimated using Ordinary Least Squares for all the wage earners separately for six different regions.

$$Log\ Hourly\ Wage = \beta_0 + \beta_1(Secn) + \beta_2(Voc) + \beta_3(Univ) + \beta_4(Exper) + \beta_5(Exper^2) + \beta_6(Female) + \beta_7(Log\ Hours\ per\ Week) + u.$$

The independent variables are education dummies, experience, its square, log hours of work per week in that wage job, and a gender dummy. The three dummy variables for education levels include people having a secondary education, people having a vocational education, and people having a university degree. Among the education dummies, the omitted group is people who have an education level below the lower secondary level[6]. These dummy variables for different education levels are included to control for the potential wage difference that may arise due to the difference in education levels. The following formula is used for calculating experience: Experience = Age – 5 – Years of Schooling[7].

[6] The omitted group is not constructed by including people below primary education only because there are some regions that do not have enough wage earners with education below primary level.

[7] In order to avoid some negative values in the measurement of experience, the standard formula of calculating experience (where experience=age – 6 –years of schooling) has been modified a little. It seems

The square term of experience has also been included to allow for a possible quadratic effect. The gender dummy has been included to take care of the potential wage difference between male and female with same levels of education and experience. Also, a male with the same education and experience who works 40 hours a week may earn a different hourly wage than another male with same education experience who works only 10 hours per week. That is why the logarithm of hours of work per week has been included as one of the controls in this OLS estimation.

The results from these OLS estimations are presented in Table 5.1. The table shows that coefficients of secondary education are not very high in any of the regions, but university education seems to have a higher return as expected. Experience does not tend to be important in terms of earnings, but average hours of work per week tend to have a consistently negative relation with hourly wage in all the regions. Female workers earn less than males, as expected, but the difference is not very high in terms of hourly wage.

The purpose of estimating the above function using OLS in this part of the analysis is to calculate the imputed hourly wage for all the working children, whether they are earning any wage or not. Therefore the next step is to use all the coefficients from this log wage regression to calculate the imputed hourly wage for every working child, whether they did any wage-earning job, or self-employed job, or any other unpaid jobs. For example, a girl, having a vocational education and 2 years of experience, living in the Red River Delta region, and working 8 hours a week on average in the last year (including 5 hours in a self-employed non-wage family business, plus 3 hours in a wage-earning job) should have the following hourly wage based on Table 5.1.

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that in the VLSS there are some children who started schooling at the age of 5, so the sum of years of schooling and 6 becomes greater than their age.

Table 5.1 Log Wage Regressions in 6 Regions - Used for Calculating Imputed Hourly Wage

Dependent Variable is Log Hourly Wage	Coefficient Estimates** for 6 Different Regions					
	South Central Coast and Central Highlands	Southeast - includes HCMC	Mekong River Delta	Red River Delta - includes Hanoi	Northeast and Northwest	North Central Coast
Intercept	8.046 (0.15)	8.14 (0.15)	8.45 (0.16)	8.84 (0.22)	8.96 (0.27)	8.91 (0.24)
Secondary*	0.055 (0.04)	0.35 (0.038)	0.16 (0.04)	0.0083 (0.092)	-0.032 (0.089)	0.0304 (0.0943)
Vocational*	0.051 (0.077)	0.58 (0.083)	0.10 (0.11)	0.21 (0.11)	0.30 (0.18)	0.23 (0.12)
University*	0.21 (0.083)	1.00 (0.064)	0.54 (0.099)	0.91 (0.12)	0.34 (0.19)	0.73 (0.15)
Experience in years	0.019 (0.0051)	0.026 (0.0046)	0.019 (0.0047)	0.0096 (0.0062)	0.042 (0.011)	0.011 (0.0086)
Experience in Years^2	-0.0004 (0.0001)	-0.0005 (0.0001)	-0.0003 (0.0001)	-0.0002 (0.0001)	-0.0009 (0.0002)	-0.0004 (0.0002)
Female*	-0.25 (0.037)	-0.18 (0.035)	-0.29 (0.036)	-0.28 (0.056)	-0.14 (0.073)	-0.24 (0.068)
Log Hours Worked Per Week	-0.10 (0.037)	-0.16 (0.038)	-0.24 (0.04)	-0.34 (0.047)	-0.46 (0.0570)	-0.40 (0.051)
No. of Obs. R^2 Adjusted R^2	726 0.09 0.08	1525 0.19 0.18	1175 0.13 0.13	827 0.19 0.18	405 0.20 0.19	504 0.18 0.17

*Dummy Variable=1, otherwise=0;
** Standard errors are presented in parentheses.

$$Log\ Hourly\ Wage = ((8.84 + 0 + (0.21 \times 1) + 0 + (0 \times 2) + (0 \times 2^2) - (0.28 \times 1) - (0.34 \times log8))^{8}.$$

This way of calculating imputed wage for everyone is based on the assumption that non-wage workers earn the same as wage workers when they have the same individual characteristics and live in the same region. In this case, there might be a possibility that the difference in productivity that might arise due to unobserved heterogeneity among different children has been ignored. But if there is not much variation in child wages or if there is variation but that is accounted for by their education and experiences, then these two assumptions will not invalidate this procedure.

[8] In order to avoid overestimation of hourly wage, the coefficients that are not significantly different from zero (at 10% level of significance) have been assumed to be zero for the purpose of calculating imputed hourly wage.

After calculating the hourly wage for all children, in the next step, each individual child's total hours of work in the past year is multiplied by his or her hourly wage rate to calculate that particular child's yearly income from all kinds of jobs. Then for each individual working child, his or her imputed income is subtracted from total household income (proxied by total household expenditure as explained before). This gives household income without that particular child's earning, or "net household income." Then, "net household income" is divided by the household size to calculate "per capita net income" for that individual child.

This way of calculating per capita household income for each individual working or non-working child helps to get rid of the endogeneity problem in this model when discussing a family's decision on any particular child's work. This "per capita net income" has been used throughout the study for the purpose of calculating different poverty line measures.

In order to find the threshold poverty level, if any, this work starts with the value of the poverty line calculated by Glewwe, Gragnolati and Zaman (2001). Using the same VLSS 97-98 data, they calculated the poverty line to be 1,789,871 dong per year in Vietnam. Their calculation was based on the 2,100-calorie requirement per day, the standard requirement in poverty studies. Different income dummies have been used throughout this study, but in all of the models, mainly four income groups have been considered. The omitted groups are people who have a "per capita net income" less than the above-mentioned poverty line. The next group includes people above the poverty line and below 3,579,742 dong (=1,789,871×2) and so forth for the other consecutive groups, which include higher income people (as shown later in Table 5.2a). The goal is to find the

relationship between child labor and different income groups. In some of the later models some other income groups have been introduced to test the sensitivity of income levels.

While using these per capita income measurements, one should keep in mind that there is a possibility of a scale effect that might make a difference between the consumption expenditures of households with different sizes. A larger household may be able to share public goods more than a smaller household. In order to control for this fact, the number of adults and the number of children have been included as two of the controls in this analysis. But even after using these two controls, one should keep in mind that this analysis does not calculate any equivalence scale for children and adults. A household with more children and less adults may have less consumption needs as compared to a household of the same size with fewer children and more adults. On the other hand, a household with more children may need more money for schooling and tuition expenses than a household with fewer children. But the effect of the latter may not be as big as the former, which implies that the cost of children might have been overestimated throughout the analysis. But the purpose here is to find some threshold poverty line that is relevant for the household in making the child labor decision. This issue of equivalent scale may not change the relation between poverty and child labor that we seek here.

Another set of important independent variables in this probit model 5.2a is the set of region indicators, which are supposed to take care of the regional differences. The eight administrative regions have been considered for this purpose. Looking at their geographic location, the South Central Coast and the Central Highlands have been merged, as well as the Northeast and Northwest. Other regions are left the same as the

original division in the data. The necessity of regrouping of these regions[9] arose from the insufficiency of observations in the two regions.

The other variables which account for the individual characteristics are children's age, sex, and ethnicity. In Vietnam, the major ethnic group is Kinh. Being a member of this ethnic majority might change the probability of work. Therefore this model controlled for an individual being Kinh against any other ethnicity. The age of a child might also be important in the working decision because it is quite possible that a 6 year-old child is less apt to work than a 15 year-old child. The model included the squared age variable in order to allow for a possible quadratic effect of age. The other household level controls are the age of the household head, the sex of the household head, and the years of education of the household head. These household level variables are expected to take care of some of the heterogeneity that exists among different households.

Some other community level and household level controls have also been included throughout the analysis. The community level controls include whether the community has a primary or secondary school, supply of electricity, good quality drinking water, good roads for transportation, or other waterways. Household controls include the amount of family wealth. In the VLSS, all community questions were asked only to people living in either rural areas or in minor urban areas. The fact that the VLSS did not collect this information in the major urban areas indicates that those questions may not be very important for them. Therefore, whenever the full sample is used in the

[9] Boundaries of regions should be clear from the map presented in the Appendix, where the Northeast and the Northwest regions are shown together as the Northern Uplands, and the South Central Coast is shown as Central Coast.

analysis, it has been assumed that other urban people have all these facilities available to them, a reasonable assumption regarding the issues of concern in this work. All these community indicators have been included as the independent variables because the access to school or other facilities, such as electricity or transportation, is a good indicator of that particular region's economic condition, and that may have some relation to the child labor decision. For example, the absence of a primary or secondary school in the village may increase the cost of education and that may induce families to invest less in human capital. This factor may increase the extent of child labor in that village. Also, the availability of good transportation may improve the living standards or reduce the cost of schooling, which may have some effect on child labor. Good quality drinking water in a village may contribute to the improvement of people's health, which may increase their productivity.

Rice being the main product in Vietnam, the price of rice may affect the decision to work differently among different households. In some households, people are mainly producers of rice, and in others people are mainly consumers of rice. So, an increase in the price of rice may affect people of different households in different ways. For example, in a rice-producing family, a rise in the price of rice may increase their household income. The increase in income may reduce the probability of their children going to work outside, but it may also induce their children to work more on family farms. Again, in rice-consuming families, the rise in price may reduce the family's real purchasing power, which may cause them to send their child to work. Therefore, this factor should be controlled for while trying to find the relation between child labor and its other important determinants.

Household wealth may also affect the family's child labor decision. If a household has much less income but enough wealth to sustain it during sudden income shocks, then the probability that their children would work might be less when compared to another household with same income but no wealth. In order to control for the household wealth, the amount of household landholdings has been included in all the models. Since Vietnam is mainly an agricultural economy, controlling for landholding may help to control for household wealth. Also, it can be used as a control for families using their own land for their earnings. The household with more land may have a higher chance of employing their children on their own farms, and may have more wealth in terms of land, thus preventing them from sending their child to work.

Profession of the household head may also be important in the decision of child labor. For example, a farming family may face a higher possibility that their children will work on their family farm, or a non-farming family (with a business) may have children helping in the family business. In order to control for this difference among households, six professional codes for household heads have been included, with the omitted group being unskilled labor.

5.2B Results The results from the probit model presented in Table 5.2a show that poverty has a very significant role in the household decision to send children to work. Improvement in living standards above the poverty line reduces the probability of work. The marginal effects in Table 5.2a show that the drop in probability of work is not much different among all the groups as compared to the omitted group living below the poverty line.

Table 5.2a Marginal Effects in Probit Model on Child Work

Dependent Variable is Child-work=1	Marginal Effects**
Child Characteristics	
Age of Child	0.11
	(0.021)
(Age of Child)2	-0.0017
	(0.0009)
Female Child*	0.00035
	(0.011)
Kinh*	-0.05
	(0.033)
Family Characteristics	
PCINC1* (=>1,789,871< Per Capita Net Income<=3,579,742)†	-0.13
	(0.015)
PCINC2*(=>3,579,742<Per Capita Net Income<=5,369,613)†	-0.14
	(0.013)
PCINC3 *(=>5,369,613<Per Capita Net Income<=7,159,484)†	-0.15
	(0.012)
PCINC4*(=>7,159,484<Per Capita Net Income)†	-0.14
	(0.013)
No. of Children	-0.00028
	(0.0053)
No. of Adults	-0.018
	(0.0053)
Female Household Head*	-0.046
	(0.016)
Age of Household Head	0.000049
	(0.00071)
Years of Education-Household Head	-0.0051
	(0.0021)
Regions	
Southeast*	-0.084
	(0.028)
Mekong River Delta*	-0.13
	(0.028)
SC Coast & C Highlands*	-0.13
	(0.021)
North Central Coast*	0.085
	(0.062)
Red River Delta*	0.018
	(0.047)
Other	
Primary School*	0.0068
	(0.029)
Secondary School*	-0.0062
	(0.038)
Road Transportation*	0.0018
	(0.035)
Water Transportation*	-0.00085
	(0.025)
Water Supply*	-0.036
	(0.032)
Electric*	0.03
	(0.035)
Total Land Area (in M^2)	4.50E-08
	(8.8E-08)
Professions of Household Head:	
Leaders*	0.068
	(0.037)
Professionals*	0.022
	(0.029)
Sales*	0.027
	(0.026)
Agriculture and Forestry*	0.055
	(0.021)
Skilled Manual*	0.0021
	(0.021)

Continued from Table 5.2a Marginal Effects in Probit Model on Child Work

Dependent Variable is Child-work=1	Marginal Effects**
Machine Operators*	-0.048
	(0.025)
Price of Rice	6.66e-06
	(0.000025)
No. of Observations	7024
Pseudo R2	0.3488
Log Likelihood	-2573.37

*These are dummy variables=1, 0=otherwise, in all through our analyses

**Standard errors are in the parentheses and are adjusted for clustering on the commune.

† All income measurements are in VN dong

This implies that that this poverty line may be a threshold income level that makes a difference in child labor decisions. Once families reach beyond that threshold income level, their child labor decisions may not vary much with a change in the adult income. This finding further corroborates the Basu and Van (1998) "luxury axiom."

Among individual characteristics, the age of the child is important in the decision to work. The marginal effects in Table 5.2a show that a 12 year-old child is more than twice as likely as a 7 year-old to work. There is not much gender difference between the children in terms of the work/not work decision. A child being of Kinh ethnicity may reduce the probability of work, but its effect is also not significantly different from zero.

At the household level, the number of adults in the family reduces the probability that the child will work by 0.02. An increase in one year of education of the household head tends to reduce the probability of child work by 0.01. A female-headed household results in a 0.05 less probability of work than a male-headed household. The number of children in the family does not seem to be important in terms of the work/not work decision.

Looking at the region of residence, it seems that the probability of work drops if a child lives either in the South Central Coast and the Central Highlands or in the

Southeast or in the Mekong River Delta, as compared to living in the Northeast and the Northwest. But comparing the people living in the Red River Delta or in the North Central Coast region with the people in the Northeast and the Northwest, the probability of work does not change significantly in the first two regions. There is one interesting issue concerning returns to education here that we may want to notice. Table 5.1 shows that returns to secondary education are significantly higher in the Southeast, the South Central Coast and the Mekong River Delta region, as compared to the other three regions. In the other three regions, returns are not significantly different from zero. That might be one of the factors reducing the probability of work if someone lives in the Southeast, South Central Coast and Central Highland, or Mekong River Delta region. But that effect is not clear from the above comparison among regions.

None of the community variables seem to be important in the decision to work or not work. The price of rice also does not seem to have any influence on the decision to work. The reason that school variables are not important may be explained by Vietnam's very high enrollment rate, as compared to other underdeveloped countries. It may be the case that children work for some moderate amount of hours and go to school during their early years. They start dropping out of school more for work as they grow older. The presence of primary or secondary school in one's own village may not affect their work/not work decision.

The presence of good transportation through waterways or roads, and the availability of good quality drinking water also do not seem to be important factors in the decision to work. A community having good transportation facilities may have more job opportunities for adults because they can commute easily to other places for jobs. Since

adult labor can be substituted for child labor, the probability of child work could drop. On the other hand, good transportation may also give easy access to unskilled jobs outside one's own area of residence to the children, which may increase the possibility of child work. Similarly, good quality drinking water may improve health conditions, which may cause adult labor to be more productive and may reduce the probability of child work. On the other hand, it may increase the productivity of children, too, thus increasing the probability of child work. For similar reasons, it is possible that a supply of electricity in the community does not seem to have a very significant effect. Because the supply of electricity in a community may increase job opportunities for both adults and children, and that may further reduce or increase the probability of child work. If adults can work more, then they may not be interested in sending their child to work. Therefore, in all the above cases, the total effect of these factors appears to be ambiguous.

One of the most important household level controls here is the amount of landholdings by the households, which have been used as a proxy for household wealth. But looking at the marginal effects, it seems that the landholding may not have any significant effect on the probability of work. To be more specific, this variable may have two opposing effects that cancel each other out. Because a household with more land has more wealth, which implies that they do not need their children's earnings, an increase in the amount of landholdings may reduce the probability of working. On the other hand, an increase in the amount of landholdings may increase the opportunity cost of schooling. Because an increase in the amount of landholding may help the household earn more if their child works on their own land, this may increase the probability of working in a

household with larger landholdings. So, the combined effect of landholding may not be very clear.

The price of rice does not have any significant role in the child labor decision. The reason may be the same as previously explained. That is, due to two opposing effects of the price of rice, the final effect on the probability of work is not clear. An interaction between the price of rice and parental occupation could be used to control for this fact.

Most of the profession indicators do not really explain any change in probability except for households where the heads of the household work in agriculture or forestry or as some kind of machine operators. The households, with the head doing some work in agriculture and forestry, have a higher probability that their children will work, as compared to other households where the head does not work in agriculture or forestry. This result is not surprising because an agricultural family might need their child's time more to work on the family farm than families engaged in any other profession, particularly in agricultural seasons. Other profession indicators are not really significant in explaining the difference in probability as compared to the households where the head does some kind of unskilled menial job. One of the possible reasons for these insignificant results may be that those categories are too broad to capture any difference.

5.3 Role of Household Poverty and Returns to Education on Child Labor: Considering Hours of Work instead of the Binary Dependent Variable

After establishing the importance of poverty in the child labor decision, the goal of the next section is to investigate the role of returns to education on child labor.

The reason that returns to education may also be important in the child labor decision is if returns are high, then families may consider investing more in their children's education and may not want their children to work. So, there may be a negative relation between returns to education and child labor. But this relationship is based on the assumption that a child's work is a substitute for schooling. If work and schooling have some degree of substitution then higher returns may increase schooling and reduce the probability of work.

Therefore, before looking at the relationship between returns and child labor directly, this segment starts by investigating the determinants of schooling. Here, the purpose is to investigate the substitution between schooling and child labor, if any, which can be directly found by examining the schooling versus not schooling decision regarding a child. Therefore, the following probit model on schooling is estimated.

Probability of Participation in School = β_0 + β_1(*Poverty Measures*) + β_2(*Region Indicators*) + β_3(*Child Characteristics*) + β_4 (*Family Characteristics*) + β_5 (*Community Characteristics*) + u.

Where, *Participation in School*=1, if the child is currently going to school,

=0, if not going to school.

Here, the independent variables are the same as the previous probit model of child participation in work.

Table 5.2b shows that comparing the coefficient of poverty measures in this model with that on child labor (in Table 5.2a), there does not seem to be perfect substitution between work and schooling.

Table 5.2b Marginal Effects in Probit Model on Current Schooling

Dependent Variable is Currently in School=1	Marginal Effects**
Child Characteristics	
Age of Child	0.11
	(0.011)
(Age of Child)2	-0.006
	(0.00053)
Female Child*	-0.031
	(0.0057)
Kinh*	0.014
	(0.012)
Family Characteristics	
PCINC1* (=>1,789,871< Per Capita Net Income<=3,579,742)†	0.066
	(0.0069)
PCINC2 *(=>3,579,742<Per Capita Net Income<=5,369,613)†	0.062
	(0.0052)
PCINC3 *(=>5,369,613<Per Capita Net Income<=7,159,484)†	0.056
	(0.0063)
PCINC4* (=>7,159,484<Per Capita Net Income)†	0.059
	(0.005)
No. of Children	-0.0039
	(0.0028)
No. of Adults	0.0071
	(0.003)
Female Household Head*	0.015
	(0.0077)
Age of Household Head	-0.00034
	(0.0004)
Years of Education-Household Head	0.0077
	(0.0015)
Region Indicators	
Southeast*	-0.10
	(0.034)
Mekong River Delta*	-0.083
	(0.027)
SC Coast & C Highlands*	-0.039
	(0.026)
North Central Coast*	0.014
	(0.015)
Red River Delta*	-0.013
	(0.017)
Other Family and Region Specific Factors	
Primary School*	0.0076
	(0.011)
Secondary School*	0.008
	(0.011)
Road Transportation*	0.031
	(0.017)
Water Transportation*	0.0035
	(0.009)
Water Supply*	0.0097
	(0.0098)
Electric*	0.049
	(0.03)
Total Land Area	2.76E-07
	(1.29E-07)
Professions of Household Head:	
Leaders*	0.044
	(0.0092)
Professionals*	0.021
	(0.015)
Sales*	0.015
	(0.0098)
Agriculture and Forestry*	0.045
	(0.014)
Skilled Manual*	0.0045
	(0.0094)

Continued from Table 5.2b Marginal Effects in Probit model on Current Schooling

Dependent Variable is Child-work=1	Marginal Effects**
Machine Operators*	0.034
	(0.01)
Price of Rice	-4.76E-06
	(1.17E-05)
No. of Observations	7024
Pseudo R2	0.28
Log Likelihood	-1865.78

*These are dummy variables =1, 0=otherwise, all through our analyses

**Standard errors are in the parentheses and those are adjusted for clustering on the commune.

† All income measurements are in VN dong.

In Table 5.2a, the coefficients of poverty variables are higher in absolute value, as compared to the coefficients in Table 5.2b. That means the difference between the poorest groups and other groups is much higher in terms of the decision to work; but that difference reduces when one considers the decision for enrollment in school. Therefore, it seems that the decision to work/not work and enroll/not enroll is school are not perfect substitutes here, even for the poorest groups.

The above results suggest that if one wants to investigate the relation between returns to education and child labor by looking at the work/not work decision, one may not be able to capture the extent of the relation completely because there is a possibility that some children both work and attend school. If returns to education increase, then children can start going to school more, but they may still work some hours every day. Children do not necessarily have to leave their job completely to attend school. They may only have to reduce their hours of work. This relationship between returns and child labor can only be captured by looking at the total hours of work, instead of looking at the binary decision variable. Also, as stated before, the correlation coefficient between those two binary variables of school attendance and child labor is as low as -0.29. This implies that one needs to reconsider the analysis in terms of hours of work instead of looking at

the binary decision, especially if one is interested in investigating the relation between returns to education and child labor.

5.3A Model Therefore, this section explores the relationship between hours of work and returns to education, accepting poverty to be one of the important factors influencing hours of work, too. The following tobit model of total hours of work of the child in the past year is estimated here:

Hours of Work in a Year = β_0 + β_1(*Poverty Measures*) + β_2(*Returns to Education*) + β_3(*Child Characteristics*) + β_4 (*Family Characteristics*) + β_5 (*Community Characteristics*) + u.

In the rest of the work, the total hours of work by a child in the past year is used as the dependent variable. These hours of work include wage work as well as other non-wage work, including the hours in self-employed jobs. The main difference between this model of child labor and the earlier model is that here, hours of work is the dependent variable, returns to education are introduced directly into the model as one of the independent variables. The method of calculating returns to education makes the inclusion of the region indicators redundant in this part of the analysis. This will be clear as we further explain the method of calculating returns to education in the next few paragraphs.

The "returns to education" variable is created in a way so that it assumes 24 values for 24 different "groups" of people where,

groups = (6 Regions of Residence)×(Rural or Urban)×(Male or Female).

In this analysis, there are six possible regions of residence, as we used before, and two possible genders, who can live in either rural or urban areas. Dividing all wage earners among the above possible "groups," there are 24 possible groups (=6×2×2).

Once the "groups" have been defined, the standard OLS estimation of log hourly wage can be used separately for each wage-earning "group," where,

$Log\ Hourly\ Wage = \beta_0 + \beta_1(Secondary\ and\ Above) + \beta_2(Exper) + \beta_3(Exper^2) + \beta_4\ (Log\ Hours\ per\ Week) + u.$

In all estimates of the "Mincerian wage function," the hourly wage has been used as the dependent variable, instead of using yearly income. Because individuals may choose to work different numbers of hours, depending on their levels of education, the rate of returns to education might depend on whether returns are based on hourly wage or on annual wage. If hours of work increase with education levels, then the change in annual income from schooling may overestimate the returns to schooling, "because the offsetting loss of non market production and leisure is not deducted from the gains in the market earnings." [10] Therefore, the change in hourly wage for change in education is a more suitable measure for returns to education.

The above OLS estimate of log wage is the same as the one used before, except for some modifications necessary for the analysis. First, instead of using four different education categories, only two of them are considered here; that is, people with education below secondary level and people having education up to or above secondary level. The reason that the education categories have been reconstructed is that there are not sufficient observations in all "groups" when we divide them into four education categories as before. Also, the gender dummy is removed because it is used in constructing the 24 "groups," which means we are estimating the log wage regression separately for males and females here. The coefficients of "secondary and above"

[10] See Schultz (1988, pp. 543-630).

education for all those 24 "groups" are considered throughout the analysis as the corresponding returns to education. This gives 24 values for the returns to education (hence RTE) variable. The results of the OLS estimation for the 24 groups are presented in Tables 5.3a through 5.3f.

Table 5.3 Results from OLS of Log Wage Used to Construct the Returns to Education Variable which Assumes 24 Different Values Corresponding to the Coefficients.

Table 5.3a Region 1: South Central Coast and Central Highlands

Dependent Variable is Log Hourly Wage	Coefficient Estimates			
	Urban Female	Urban Male	Rural Female	Rural Male
Constant	11.082 (0.74)	9.88 (0.75)	7.70 (0.22)	7.74 (0.20)
Above Secondary	0.34 (0.18)	0.32 (0.14)	-0.03 (0.059)	-0.01 (0.052)
Experience in Years	0.027 (0.018)	0.034 (0.015)	0.0037 (0.0071)	0.023 (0.0079)
(Experience in Years)^2	-0.0004 (0.0004)	-0.0007 (0.0003)	-0.0001 (0.0001)	-0.0004 (0.0001)
Log Hours Worked Per Week	-1.019 (0.18)	-0.65 (0.18)	-0.023 (0.056)	-0.022 (0.048)
No. of Observations R^2 Adjusted R^2	76 0.36 0.33	136 0.15 0.12	183 0.01 -0.01	331 0.03 0.02

Table 5.3b Region 2: Southeast

Dependent Variable is Log Hourly Wage	Coefficient Estimates			
	Urban Female	Urban Male	Rural Female	Rural Male
Constant	8.32 (0.36)	9.092 (0.32)	8.21 (0.25)	7.76 (0.24)
Above Secondary	0.56 (0.10)	0.41 (0.093)	0.31 (0.059)	0.13 (0.059)
Experience in Years	0.013 (0.010)	0.05 (0.01)	0.0069 (0.0082)	0.019 (0.0076)
(Experience in Years)^2	-0.0001 (0.0002)	-0.0010 (0.0002)	-0.0001 (0.0001)	-0.0003 (0.0001)
Log Hours Worked Per Week	-0.22 (0.087)	-0.40 (0.076)	-0.20 (0.064)	-0.034 (0.058)
No. of Observations R^2 Adjusted R^2	1013 0.11 0.10	419 0.13 0.13	302 0.12 0.11	450 0.03 0.02

Table 5.3c Region 3: Mekong River Delta

Dependent Variable is Log Hourly Wage	Coefficient Estimates			
	Urban Female	Urban Male	Rural Female	Rural Male
Constant	8.99 (0.49)	8.22 (0.52)	8.14 (0.35)	8.49 (0.21)
Above Secondary	0.54 (0.14)	0.051 (0.13)	0.17 (0.083)	0.14 (0.051)
Experience in Years	0.063 (0.013)	0.044 (0.016)	0.0062 (0.0089)	0.015 (0.0067)
(Experience in Years)^2	-0.0010 (0.0002)	-0.0007 (0.0003)	-0.0007 (0.0001)	-0.0002 (0.0001)
Log Hours Worked Per Week	-0.65 (0.13)	-0.22 (0.13)	-0.21 (0.087)	-0.24 (0.051)
No. of Observations R^2 Adjusted R^2	104 0.36 0.33	165 0.07 0.05	385 0.03 (0.02)	521 0.06 0.05

Table 5.3d Region 4: Red River Delta

Dependent Variable is Log Hourly Wage	Coefficient Estimates			
	Urban Female	Urban Male	Rural Female	Rural Male
Constant	10.72 (0.49)	9.40 (0.48)	7.93 (0.62)	9.042 (0.32)
Above Secondary	-0.19 (0.30)	0.21 (0.23)	0.13 (0.27)	0.044 (0.12)
Experience in Years	0.0050 (0.018)	0.023 (0.013)	0.021 (0.015)	-0.0032 (0.011)
(Experience in Years)^2	-0.0004 (0.0004)	-0.0005 (0.0003)	-0.0002 (0.0002)	-0.00005 (0.0002)
Log Hours Worked Per Week	-0.69 (0.10)	-0.48 (0.11)	-0.29 (0.14)	-0.37 (0.069)
No. of Observations R^2 Adjusted R^2	162 0.24 0.22	249 0.08 0.07	119 0.07 (0.04)	297 0.09 0.08

Table 5.3e Region 5: Northeast and Northwest

Dependent Variable is Log Hourly Wage	Coefficient Estimates			
	Urban Female	Urban Male	Rural Female	Rural Male
Constant	10.77 (0.87)	7.88 (0.70)	8.71 (0.56)	9.21 (0.43)
Above Secondary	1.082 (0.52)	0.29 (0.29)	0.097 (0.18)	-0.098 (0.13)
Experience in Years	0.031 (0.02)	0.09 (0.024)	0.052 (0.02)	0.021 (0.02)
(Experience in Years)^2	-0.0005 (0.0004)	-0.0022 (0.0005)	-0.0011 (0.0004)	-0.0005 (0.0004)
Log Hours Worked Per Week	-1.22 (0.23)	-0.29 (0.15)	-0.49 (0.13)	-0.46 (0.085)
No. of Observations R^2 Adjusted R^2	64 0.36 0.32	74 0.26 (0.22)	85 0.25 0.21	182 0.17 0.15

Table 5.3f Region 6: North Central Coast

Dependent Variable is Log Hourly Wage	Coefficient Estimates			
	Urban Female	Urban Male	Rural Female	Rural Male
Constant	8.79 (0.88)	8.95 (1.20)	8.76 (0.43)	9.057 (0.33)
Above Secondary	0.50 (0.21)	0.46 (0.26)	-0.015 (0.17)	0.15 (0.14)
Experience in Years	0.0017 (0.022)	0.043 (0.021)	0.016 (0.017)	0.0060 (0.013)
(Experience in Years)^2	0.0003 (0.0005)	-0.0009 (0.0005)	-0.0004 (0.0003)	-0.0003 (0.0002)
Log Hours Worked Per Week	-0.44 (0.21)	-0.45 (0.28)	-0.43 (0.092)	-0.45 (0.070)
No. of Observations	56	74	119	255
R^2	0.23	0.10	0.17	0.16
Adjusted R^2	0.17	0.05	0.15	0.15

After the construction of RTE, the tobit model of child labor as presented above is estimated, where the dependent variable is hours of work and independent variables include the same poverty indicators as before and this newly created RTE. All other individual, household level, and community level controls are left the same as before in the analysis. Throughout this analysis of the relationship between RTE and hours of child work, the hypothesis is that there is a negative relation between these two. But in expecting this kind of relationship, one needs to remember the assumption that everybody should have the same accessibility to jobs. The RTE calculated before comes from the wage-earning people, but if an increase in the RTE causes a decrease in child labor, that means everyone wanting to work does have access to the labor market. As professions of household heads are included in the model, those may be able control for at least a part of the difference in job accessibility. A household whose head is a leader in the communist party or a higher level government official may have more advantages in the labor market in terms of getting jobs, whereas a household head doing unskilled menial work might not have the same access. In considering the returns to education

while making decisions about child labor, households may also consider the availability of jobs after the child finishes his or her education.

The same tobit model is estimated three times, one with a full sample, one with a rural only sample, and one with an urban only sample because we think that might capture some rural/urban differences in the effect of returns to education on child labor.

5.3B Results Column 1 of Table 5.4 presents the results of the tobit model for the full sample with all of the above variables included.

One noticeable fact is that poverty is consistently found to be one of the important reasons for child labor. As a family's living standards improve from the poorest to higher standards, the hours of child work drops. Comparing the marginal effects for the income groups in column 1 of Table 5.4, the results suggest that the reduction in hours of work, as compared to the people living below the poverty line, is not much different for any of the income groups. That may again imply that the threshold poverty line only matters for the families in their child labor decisions. Once they attain that threshold level of income, their child labor decision may not vary much with further increases in income. This fact supports the same finding as in the probit model of child work in Table 5.2a.

The other important variable in this analysis, RTE, does not seem to have any important impact on the hours of work while considering the full sample. The same story applies when one does not control for gender in column 2 of Table 5.4. In column 3, not controlling for the community variables, it seems that RTE has a negative relation to child hours of work. But that relation may capture some relationship between community variables and hours of work.

Table 5.4 Tobit Results of Hours of Work: Full Sample

Dependent Variable Hrs of Work	(1)*		(2)*		(3)*	
	Coeff**	M.E	Coeff.**	M.E	Coeff**	M.E
Intercept	-4539.49 (656.07)		-4508.15 (653.23)		-4626.34 (666.28)	
Age of Child	450.63 (91.31)	59.43	448.90 (90.97)	59.32	464.68 (90.77)	62.52
(Age of Child)2	-5.43 (3.88)	-0.72	-5.35 (3.87)	-0.71	-6.10 (3.83)	-0.82
Female Child	67.34 (47.40)	8.90	—	—	87.17 (51.11)	11.76
Kinh	-142.40 (101.84)	-20.20	-142.48 (101.87)	-20.24	-185.02 (119.22)	-27.31
PCINC1***	-770.52 (78.03)	-93.16	-771.97 (78.16)	-93.51	-801.82 (82.50)	-98.78
PCINC2***	-1282.19 (131.80)	-82.97	-1288.59 (131.38)	-83.37	-1329.35 (134.93)	-86.78
PCINC3***	-1816.06 (224.80)	-79.05	-1819.65 (224.66)	-79.32	-1907.87 (223.96)	-82.52
PCINC4***	-1727.57 (238.43)	-77.03	-1735.16 (238.62)	-77.32	-1855.62 (243.07)	-80.71
No. of Children	-8.63 (21.08)	-1.13	-6.96 (20.76)	-0.92	-16.47 (21.02)	-2.22
No. of Adults	-89.55 (22.79)	-11.81	-89.43 (22.75)	-11.82	-98.01 (23.89)	-13.19
Female Household Head	-168.68 (78.29)	-20.48	-167.72 (78.38)	-20.41	-169.73 (85.15)	-21.04
Age of Household Head	0.77 (3.15)	0.10	0.75 (3.13)	0.098	1.45 (3.27)	0.20
Years of Education-Household Head	-5.76 (10.25)	-0.76	-5.68 (10.24)	-0.75	4.76 (10.49)	0.64
RTE	-440.68 (320.42)	-58.12	-376.14 (303.24)	-49.703	-615.61 (333.05)	-82.83
Primary School	-245.55 (105.98)	-33.71	-245.65 (105.99)	-33.78	—	—
Secondary School	127.99 (145.72)	17.66	125.41 (145.80)	17.32	—	—
Road Transportation	160.22 (128.54)	19.52	165.44 (128.08)	20.15	—	—
Water Transportation	-103.99 (98.062)	-13.76	-106.21 (98.32)	-14.079	—	—
Water Supply	-202.64 (141.32)	-25.45	-205.92 (141.34)	-25.89	—	—
Electric	-63.55 (162.39)	-8.72	-68.06 (162.91)	-9.38	—	—
Total Land Area	-0.00022 (0.00038)	-2.9E-05	-0.00021 (0.00038)	-2.8E-05	-0.00039 (0.00057)	-5.2E-05
Leaders	176.93 (121.78)	26.43	181.00 (121.98)	27.16	158.52 (125.48)	23.80
Professionals	3.0452 (108.27)	0.40	3.96 (108.22)	0.53	14.32 (109.52)	1.94
Sales	153.66 (95.98)	22.09	154.38 (95.66)	22.25	162.69 (96.56)	23.95
Agriculture and Forestry	276.22 (107.84)	32.83	280.14 (107.35)	33.32	352.67 (100.11)	41.71
Skilled Manual	104.42 (76.62)	14.52	103.00 (76.51)	14.34	117.94 (77.86)	16.83
Machine Operators	-267.09 (143.48)	-29.07	-267.31 (142.81)	-29.16	-252.18 (145.07)	-28.40
Price of Rice	0.050 (0.097)	0.0065	0.049 (0.096)	0.0064	-0.0021 (0.10)	-0.00029
No. of Observations	7024		7024		7024	
Log Likelihood	-43651014		-43655275		-43749323	

*Column 1 includes all variables, columns 2 and 3 check for robustness. Column 2 excludes gender of child and column 3 excludes all community variables.

**Standard errors of coefficients are in the parentheses and are adjusted for clustering on the commune.

*** All income measurements are in VN dong.

For example, column 1 of Table 5.4 shows that the presence of a primary school in one's village reduces the hours of work. So, community variables may be important to avoid any biases in estimating the relationship between RTE and child hours of work. It is worth mentioning here that when community variables are included in the model, there may not be much variation left due to RTE only. This is possible if RTE is correlated with the community variables. In that case, if inclusion of community variables reduces the significance of the results, one may not ignore the fact that there is still some effect of RTE on child labor. But the results in column 1 of Table 5.4 show that the presence of a primary school is negatively related to hours of work, and there is nothing to suggest that the presence of a primary school should be related to RTE. Therefore, in this case it is not unreasonable to believe that the results in Table 5.4 do not find any significant role of RTE in child labor. One interesting thing to note here is that the presence of a primary school does not seem to be important for the decision to work/not work (in Table 5.2a), but it seems to have some importance when one considers the decision regarding hours of work for the full sample in column1 of table 5.4.

In the next section, the purpose is to verify if the insignificance of RTE is due to some rural/urban difference. The intuition for this part is that RTE may not matter for one of them, but it may matter for the other; so it may not be captured by looking at the whole sample together.

Tables 5.5 and 5.6 present the results of the rural sample and the urban sample, respectively, where poverty has the same significance.

Table 5.5 Tobit Results of Hours of Work: Rural Only Sample

Dependent Variable Hrs of Work	(1)*		(2)*		(3)*	
	Coeff**	M.E	Coeff**.	M.E	Coeff**	M.E
Intercept	4052.55 (659.99)		-4017.45 (658.17)		-4137.26 (669.29)	
Age of Child	404.57 (93.10)	76.11	402.17 (92.78)	75.73	411.92 (91.44)	78.67
(Age of Child)2	-3.49 (3.97)	-0.66	-3.38 (3.97)	-0.64	-3.82 (3.89)	-0.73
Female Child	66.36 (49.24)	12.51	—	—	92.16 (55.75)	17.65
Kinh	-166.60 (102.77)	-33.64	-168.42 (103.18)	-34.06	-189.19 (120.62)	-39.10
PCINC1***	-710.36 (77.46)	-124.13	-711.72 (77.52)	-124.48	-732.31 (81.77)	-129.82
PCINC2***	-1175.42 (144.76)	-111.10	-1184.24 (144.0012)	-111.61	-1180.3 (146.87)	-114.13
PCINC3***	-1792.72 (269.19)	-110.10	-1800.06 (268.29)	-110.37	-1772.46 (262.52)	-113.21
PCINC4***	-1084.07 (267.86)	-96.83	-1099.96 (267.48)	-97.43	-1088.24 (279.58)	-99.57
No. of Children	-5.56 (21.20)	-1.045	3.85 (20.95)	-0.72	-12.15 (21.77)	-2.32
No. of Adults	-80.49 (24.23)	-15.14	-80.20 (24.17)	-15.10	-84.30 (25.32)	-16.10
Female Household Head	-157.68 (83.47)	-27.36	-155.47 (83.54)	-27.04	-161.78 (90.49)	-28.48
Age of Household Head	1.75 (3.14)	0.33	1.70 (3.13)	0.32	2.48 (3.34)	0.47
Years of Education-Household Head	1.40 (10.95)	0.26	1.52 (10.92)	0.29	12.62 (11.22)	2.41
RTE	-362.28 (345.13)	-68.15	-243.18 (314.95)	-45.79	-706.23 (366.53)	-134.88
Primary School	-280.62 (110.19)	-53.87	-281.14 (110.16)	-54.02	—	—
Secondary School	214.81 (162.63)	44.96	215.82 (162.31)	45.24	—	—
Road Transportation	159.30 (129.94)	28.14	166.87 (129.31)	29.42	—	—
Water Transportation	-111.50 (99.90)	-20.77	-115.00 (100.26)	-21.44	—	—
Water Supply	-110.48 (144.46)	-19.86	-114.83 (144.83)	-20.62	—	—
Electric	-86.36 (165.32)	-16.99	-93.49 (166.28)	-18.48	—	—
Total Land Area	-0.00063 (0.00064)	-0.00012	-0.00064 (0.00066)	-0.00012	-0.0012 (0.00093)	-0.00022
Leaders	120.15 (127.80)	24.40	124.75 (128.44)	25.43	112.21 (130.34)	22.99
Professionals	-23.90) (111.50)	-4.43	-21.13 (111.31)	-3.93	-29.28 (115.83)	-5.49
Sales	138.63 (109.55)	28.21	140.95 (109.30)	28.74	150.01 (109.42)	31.14
Agriculture and Forestry	91.17 (102.37)	16.34	94.88 (102.24)	16.98	157.68 (100.52)	27.73
Skilled Manual	102.74 (78.28)	20.30	101.66 (78.22)	20.09	124.53 (79.26)	25.22
Machine Operators	-320.84 (163.84)	-48.66	-320.58 (163.39)	-48.69	-323.57 (159.52)	-49.92
Price of Rice	0.012 (0.10)	0.0022	0.011 (0.10)	0.002	-0.038 (0.11)	-0.0073
No. of Observations	5595		5595		5595	
Log Likelihood	-41531503		-41535349		-41624289	

*Column 1 includes all variables, columns 2 and 3 check for robustness. Column 2 excludes gender of child and column 3 excludes all community variables.

**Standard errors of coefficients are in the parentheses and are adjusted for clustering on the commune.

*** All income measurements are in VN dong.

Table 5.6 Tobit Results of Hours of Work: Urban Only Sample

Dependent Variable Hrs of Work	(1)*		(2)*	
	Coeff**	M.E	Coeff**	M.E
Intercept	-14199.91 (2403.99)		-11455.1 (2155.00)	
Age of Child	1561.69 (324.29)	6.46	1317.64 (298.03)	8.091
(Age of Child)2	-47.02 (13.29)	-0.19	-37.51 (12.87)	-0.23
Female Child	48.04 (220.09)	0.20	-104.15 (262.23)	-0.64
Kinh	-35.60 (430.97)	-0.15	28.17 (448.04)	0.17
PCINC1***	-1593.96 (336.29)	-6.37	-1334.63 (323.71)	-7.39
PCINC2***	-1866.58 (431.39)	-4.61	-1592.84 (417.93)	-5.90
PCINC3***	-2100.48 (419.61)	-3.30	-1797.87 (392.70)	-4.56
PCINC4***	-2657.97 (542.76)	-4.35	-2357.83 (523.77)	-5.87
No. of Children	-82.33 (94.41)	-0.34	-76.04 (105.0034)	-0.47
No. of Adults	-200.73 (61.16)	-0.83	-187.34 (58.72)	-1.15
Female Household Head	-37.92 (198.25)	-0.15	9.93 (222.48)	0.061
Age of Household Head	-14.36 (13.94)	-0.059	-16.90 (13.67)	-0.10
Years of Education-Household Head	-96.18 (33.25)	-0.40	-94.68 (35.44)	-0.58
RTE	453.55 (389.06)	1.88	866.76 (459.41)	5.32
Primary School	684.68 (357.96)	1.91	—	—
Secondary School	-265.16 (414.06)	-1.33	—	—
Road Transportation	1011.20 (439.73)	1.65	—	—
Water Transportation	580.52 (227.16)	1.64	—	—
Water Supply	-536.68 (360.75)	-3.58	—	—
Total Land Area	—	—	0.009 (0.0033)	5.55E-05
Leaders	947.30 (584.49)	11.43	913.53 (594.39)	14.29
Professionals	425.12 (374.07)	2.60	237.34 (400.38)	1.77
Sales	456.71 (257.33)	2.40	417.97 (256.01)	3.12
Agriculture and Forestry	618.96 (266.07)	3.91	449.76 (261.16)	3.61
Skilled Manual	-7.46 (283.03)	-0.031	-45.38 (277.27)	-0.27
Machine Operators	569.30 (376.80)	4.30	456.20 (348.53)	4.33
Price of Rice	0.51 (0.19)	0.0021	0.47 (0.20)	0.0029
No. of Observations	1429		1429	
Log Likelihood	-1911941.5		-1934245.4	

*Column 1 includes all variables, column 2 checks for robustness by excluding all community variables.
**Standard errors of coefficients are in the parentheses and are adjusted for clustering on the commune.
*** All income measurements are in VN dong.

Comparing the marginal effects in column 1 of Table 5.5 with that of Table 5.6, it is seen that hours of work drop more for rural children when living standards improve, as compared to the urban children. Marginal effects are much higher in absolute terms for rural children, as compared to the urban children in column 1 of Table 5.5. There may be some reasons for this kind of difference among rural and urban people. Some possible explanations for this will be suggested at the end of the analyses.

Also, RTE seems to be unimportant for both rural and urban people in the child work decisions. Although it has a negative impact on child labor in rural areas and a positive impact in urban areas, none of them are significantly different from zero. Even after removing the control for gender in column 2 of Table 5.5, the results do not seem to change.

Most of the other community and household level variables tend to have the same kind of relation with child work hours as compared to the relation in the work versus not work decision in the full sample. The only difference is seen in the presence of a primary school in the village. A primary school in the village reduces the hours of work in a year by 33 hours, whereas it does not show any significant relation when looking at the binary decision. There probably are some children who work and go to school together, and the presence of a primary school in the village might reduce their hours of work; that is not reflected in the binary decision. This relation does not seem to hold true for urban people, but it holds for rural people.

Professions of household heads do not seem to make much difference when considering the urban sample in column 1 or 2 of Table 5.6. But in the rural sample, when the household head is a higher level professional, the hours of child work decrease;

whereas, when the household head has some agricultural job, it does not have any significant role in the decision about the child's hours of work.

From the above set of analyses, one can suggest that RTE seems to be consistently insignificant in the decision of child labor both in rural and urban areas. But before suggesting any reason for that, the next section investigates whether the possibility of labor mobility can cause any difference in the importance of RTE on the child labor decision.

5.4 Role of Household Poverty and Returns to Education on Child Labor: Considering Labor Mobility

The basic idea of this section is to check the effect of returns to education of urban areas on the child labor decision in rural areas. If moving is not very costly, then people in rural areas may consider moving to urban areas. This may be because of the availability of more jobs in big cities and higher returns in urban areas. In the latter case, there is some possibility of relation between returns in urban areas and child labor in rural areas. If returns in urban areas increase and if moving is not very costly, then parents may consider investing more in their children's education and may not want them to work during their childhood. Parents may expect that the investment in their children's education is going to help the children earn a higher income in the future if the children can move into the urban areas with higher returns to education.

5.4a Model In order to test this idea, the following tobit model for rural people only is estimated in this section:

Hours of Work in a Year = β_0 + β_1(Poverty Measures) + β_2(Returns to Education) + β_3(Returns to Education in Urban Areas) + β_4(Child Characteristics) + β_5(Family Characteristics) + β_6 (Community Characteristics) + u.

The only difference between this model and the earlier one is that one extra variable measuring returns to education in urban areas (hence RTEURB) has been added here. By including RTE and RTEURB in the same model for rural people only, one is able to analyze their decision about child labor when one compares the difference between the returns in their own rural area and the returns in the urban area.

5.4b Results The results of this section in column 1 of Table 5.7 show that returns in one's own area is still insignificant for the rural people in the decision of child labor. Returns in urban areas may have some positive impact on child labor for the people living in rural areas. The marginal effect of urban returns to education on child labor is about 43 hours, after including all other controls for the model.

Column 2 of Table 5.7 presents some interesting results when the community variables are removed from the model to test for robustness. If one does not control for community level variables, then an increase in returns in the rural area tends to decrease the hours of work, whereas an increase in returns in urban area tends to increase the hours of work of the rural child. Column 3 of Table 5.7 shows that if one does not control for community variables or professions of household heads, then an increase in rural returns reduces hours of work in a rural area more, and an increase in urban return increases hours of work in rural areas.

Table 5.7 Tobit Results of Hours of Work: Rural Only Sample-Labor Mobility

Dependent Variable Hrs of Work	(1)*		(2)*		(3)*	
	Coeff**	M.E	Coeff**	M.E	Coeff**	M.E
Intercept	-4157.59 (664.81)		-4268.03 (670.09)		-4188.98 (542.72)	
Age of Child	410.24 (93.28)	77.29	418.05 (92.03)	79.99	414.29 (91.19)	80.25
(Age of Child)2	-3.79 (3.98)	-0.71	-4.15 (3.91)	-0.79	-4.023 (3.88)	-0.78
Female Child	20.39 (56.76)	3.84	22.72 (62.85)	4.35	23.95 (64.49)	4.64
Kinh	-126.23 (104.25)	-25.09	-124.93 (117.87)	-25.19	-115.35 (114.24)	-23.44
PCINC1***	-699.23 (75.14)	-122.44	-713.71 (77.75)	-126.86	-724.16 (75.70)	-130.25
PCINC2***	-1173.27 (144.05)	-110.95	-1175.12 (145.50)	-113.68	-1183.58 (143.86)	-115.90
PCINC3***	-1777.98 (261.92)	-109.81	-1754.75 (253.68)	-112.61	-1810.60 (254.38)	-115.15
PCINC4***	-1120.91 (273.57)	-97.71	-1141.08 (283.54)	-100.71	-1294.52 (254.40)	-105.86
No. of Children	-11.49 (19.97)	-2.17	-19.91 (20.99)	-3.81	-21.37 (20.65)	-4.14
No. of Adults	-83.64 (23.54)	-15.76	-87.81 (24.49)	-16.80	-96.32 (24.51)	-18.66
Female Household Head	-157.33 (83.49)	-27.34	-159.15 (89.79)	-28.09	-147.53 (89.70)	-26.53
Age of Household Head	1.87 (3.12)	0.35	2.61 (3.28)	0.50	1.86 (3.22)	0.36
Years of Education-Household Head	1.15 (10.96)	0.22	11.15 (10.94)	2.13	13.90 (10.64)	2.69
RTE	-473.69 (355.82)	-89.25	-792.86 (367.53)	-151.70	-915.26 (370.31)	-177.28
RTEURB	230.53 (129.81)	43.43	319.14 (136.30)	61.06	332.55 (139.90)	64.41
Primary School	-261.48 (108.23)	-50.19	—	—	—	—
Secondary School	217.90 (164.30)	45.77	—	—	—	—
Road Transportation	142.67 (129.27)	25.40	—	—	—	—
Water Transportation	-94.94 (100.70)	-17.74	—	—	—	—
Water Supply	-98.23 (142.12)	-17.77	—	—	—	—
Electric	-64.91 (167.69)	-12.65	—	—	—	—
Total Land Area	-0.00057 (0.00063)	-0.00011	-0.001 (0.0009)	-0.0002	—	—
Leaders	103.86 (127.56)	20.92	92.95 (129.75)	18.86	—	—
Professionals	-11.78 (111.52)	-2.20	-12.012 (114.53)	-2.28	—	—
Sales	146.44 (106.83)	29.99	161.17 (106.26)	33.75	—	—
Agriculture and Forestry	89.59 (101.14)	16.09	148.05 (98.45)	26.20	—	—
Skilled manual	104.40 (76.98)	20.68	126.94 (78.43)	25.79	—	—
Machine operators	-306.61 (164.56)	-46.99	-306.13 (162.72)	-47.80	—	—
Price of Rice	0.0083 (0.10)	0.0016	-0.035 (0.10)	-0.0067	—	—
No. of Observations	5595		5595		5595	
Log Likelihood	-41514146		-41590202		-41627634	

*Column 1 includes all variables, column 2 excludes community, and column 3 excludes community and profession variables.
**Standard errors of coefficients are in the parentheses and are adjusted for clustering on the commune.
*** All income measurements are in VN dong.

Comparing all these results, it seems that the presence of some of the community variables may have some influence on child hours of work; and when one does not include them in the model, RTE may have been possibly capturing those relations.

The analysis of the relationship between returns and child labor thus far indicates that there may not be any relation between return and child labor at all. In order to investigate the reason for this again, the next section considers the possibility of credit constraints.

5.5 Role of Household Poverty and Returns to Education on Child Labor: Possibility of Credit Constraints

The intuition behind considering the possibility of credit constraints is that if a family can easily borrow money to pay for their children's education, then it is possible that as returns increase, their children work less. On the other hand if the family is credit-constrained and they do not have enough resources to pay for the cost of their children's education, then even if the returns increase, there may not be any impact on child labor.

5.5a Model In order to test for the possibility of credit constraints, the following tobit model has been estimated:

$$Hours\ of\ Work\ in\ a\ Year = \beta_0 + \beta_1(Poverty\ Measures) + \beta_2(Returns\ to\ Education) + \beta_3(Poverty\ Measures \times Returns\ to\ Education) + \beta_4(Child\ Characteristics) + \beta_5(Family\ Characteristics) + \beta_6\ (Community\ Characteristics) + u.$$

Where, *Poverty Measures* × *Returns to Education* = the vector of interaction terms between the income groups (or poverty measures) and RTE.

This is the same model which has been used before, except different sets of poverty lines and their interactions with returns to education are considered here. Different sets of income groups are used here because, as explained before, there is a possibility that some people are credit-constrained and some are not. For the credit-constrained people, returns may not matter. If they do not have enough money to pay for their children's education and if there is no opportunity for borrowing, then higher returns to education are not going to change their child labor decision. But if there are some people who can borrow money, then higher returns to education may induce them to borrow and their child might work fewer hours. Therefore, the purpose of the next step is to look at different income categories and their interactions with RTE in order to distinguish between these two groups of people. The same exercise is repeated for the full sample, the rural only sample and the urban only sample separately.

5.5b Results In the first of these models, the same income categories as previously described and their interactions with RTE have been used. The result of this model on the full sample with all variables included in column 1 of Table 5.8 shows that neither RTE nor the interaction terms tend to have any significant impact on child labor. It seems that RTE does not matter for any of these groups of people with different income levels when analyzing it for the full sample.

Column 1 of Tables 5.9 and 5.10 presents the results of the same exercise for rural people and urban people respectively. The result does not seem to change much even when considering rural people and urban people separately. In the rural area, the highest income groups of people might want their children to work more with a higher RTE; but again, that is not very clear from the results here.

Table 5.8 Tobit Results of Hours of Work: Full Sample-Credit Constraints

Dependent Variable Hrs of Work	(1)*		(2)*		(3)*	
	Coeff**	M.E	Coeff**	M.E	Coeff**	M.E
Intercept	-4536.34 (656.05)		-4506.74 (653.78)		-4533.39 (655.93)	
Age of Child	448.56 (91.26)	59.026	446.87 (90.96)	58.88	447.74 (91.21)	58.62
(Age of Child)2	-5.33 (3.87)	-0.70	-5.24 (3.87)	-0.69	-5.29 (3.87)	-0.69
Female Child	65.65 (47.43)	8.66	—	—	64.67 (47.42)	8.48
Kinh	-144.46 (102.24)	-20.46	-145.54 (102.55)	-20.66	-144.25 (102.27)	-20.33
PCINC1†	-750.23 (87.18)	-90.61	-747.82 (86.99)	-90.46	-750.00 (87.15)	-90.11
PCINC2†	-1275.24 (159.51)	-82.55	-1278.25 (159.32)	-82.80	-1274.66 (159.46)	-82.05
PCINC3†	-2158.51 (258.06)	-81.49	-2161.02 (259.05)	-81.70	-2157.99 (258.23)	-80.98
PCINC4†	-1686.44 (327.52)	-76.45	-1679.54 (328.17)	-76.56	—	—
PCINC5***†	—	—	—	—	-1613.43 (462.96)	-71.10
PCINC6***†	—	—	—	—	-1754.71 (411.21)	-72.45
RTE	-365.71 (295.05)	-48.12	-277.75 (273.12)	-36.60	-364.76 (295.04)	-47.75
RTExPCINC1	-195.68 (402.02)	-25.75	-235.06 (405.85)	-30.97	-196.00 (401.89)	-25.66
RTExPCINC2	-85.62 (554.29)	-11.27	-116.84 (555.89)	-15.40	-85.56 (554.28)	-11.20
RTExPCINC3	1184.69 (792.96)	155.89	1155.80 (799.01)	152.30	1185.02 (793.42)	155.13
RTExPCINC4	-200.77 (844.68)	-26.42	-267.75 (859.65)	-35.28	—	—
RTExPCINC5	—	—	—	—	388.24 (1117.99)	50.83
RTExPCINC6	—	—	—	—	-1176.07 (832.78)	-153.96
No. of Children	-8.86 (21.11)	-1.17	-7.28 (20.80)	-0.96	-8.87 (21.07)	-1.16
No. of Adults	-89.42 (22.79)	-11.77	-89.31 (22.76)	-11.77	-89.86 (22.78)	-11.76
Female Household Head	-167.53 (78.07)	-20.30	-166.29 (78.08)	-20.19	-167.20 (78.11)	-20.16
Age of Household Head	0.75 (3.15)	0.099	0.73 (3.13)	0.096	0.76 (3.15)	0.099
Years of Education-Household Head	-5.72 (10.24)	-0.75	-5.62 (10.22)	-0.74	-5.71 (10.24)	-0.75
Primary School	-248.009 (106.01)	-33.98	-248.27 (106.02)	-34.06	-247.68 (105.99)	-33.76
Secondary School	131.29 (145.14)	18.093	128.95 (145.23)	17.78	131.16 (145.08)	17.98
Road Transportation	161.61 (129.01)	19.63	167.31 (128.53)	20.30	161.98 (129.00)	19.57
Water Transportation	-102.44 (98.00)	-13.52	-104.59 (98.27)	-13.82	-102.69 (97.99)	-13.48
Water Supply	-205.31 (141.31)	-25.71	-208.87 (141.42)	-26.17	-204.90 (141.26)	-25.52
Electric	-67.57 (163.68)	-9.27	-73.29 (164.50)	-10.11	-67.83 (163.66)	-9.26
Total Land Area	-0.00021 (0.00038)	-2.7E-05	-0.0002 (0.0038)	-2.7E-05	-0.0002 (0.00038)	-2.6E-05
Leaders	176.16 (121.41)	26.24	179.95 (121.62)	26.91	179.48 (121.91)	26.67
Professionals	-0.081 (108.63)	-0.011	1.037 (108.58)	0.14	-4.59 (108.16)	-0.60

Continued from Table 5.8 Tobit Results of Hours of Work: Full Sample-Credit Constraints

Dependent Variable Hrs of Work	(1)*		(2)*		(3)*	
	Coeff**	M.E	Coeff**	M.E	Coeff**	M.E
Sales	156.36	22.47	157.53	22.68	153.84	21.97
	(96.21)		(95.94)		(96.35)	
Agriculture and Forestry	278.34	32.98	282.87	33.52	278.03	32.78
	(108.27)		(107.65)		(108.22)	
Skilled Manual	105.08	14.59	103.98	14.44	105.14	14.52
	(76.77)		(76.69)		(76.77)	
Machine Operators	-264.48	-28.78	-265.26	-28.89	-269.94	-29.10
	(145.33)		(144.68)		(144.68)	
Price of Rice	0.051	0.0067	0.05	0.0066	0.052	0.0068
	(0.097)		(0.10)		(0.097)	
No. of Observations	7024		7024		7024	
Log Likelihood	-43646110		-43655275		-43643168	

*Column 1 includes all variables, column 2 excludes gender of child, and column 3 includes more income groups.
**Standard errors of coefficients are in the parentheses and are adjusted for clustering on the commune.
*** PCINC5=1, if 7,159,484<Per Capita Net Income<=9,000,000 and PCINC6=1, if 9,000,000<Per Capita Net Income
† All income measurements are in VN dong.

However, for urban areas RTE does not seem to have any role in child labor. Column 2 of Tables 5.8 and 5.9 show that these results do not change, even after excluding the gender dummy, while checking for robustness. Returns may increase the hours of work only for the highest income group in a rural area, but they do not tend to be important for people in other income groups or any people living in urban areas.

The purpose in this part of the analysis is to find a group of people for whom returns to education may matter, while they may not matter for other groups in their child labor decision. If it is possible to find the above two groups then, it may be possible to suggest that there is a possibility that credit constraints prevent the latter from reaping the results of higher returns. Because they cannot borrow money to pay for the cost of their children's education and a higher return is not going to change the hours that their children spend in work. In order to test this, the next section contains several exercises with different sets of income groups.

Table 5.9 Tobit Results of Hours of Work: Rural Only Sample-Credit Constraints

Dependent Variable Hrs of Work	(1)*		(2)*		(3)*	
	Coeff**	M.E	Coeff**	M.E	Coeff**	M.E
Intercept	-4055.37 (664.07)		-4020.43 (662.31)		-4052.68 (663.83)	
Age of Child	404.99 (93.35)	75.99	402.62 (93.03)	75.61	404.45 (93.30)	75.90
(Age of Child)2	-3.50 (3.98)	-0.66	-3.39 (3.98)	-0.64	-3.48 (3.98)	-0.65
Female Child	64.87 (48.84)	12.19	—	—	65.01 (48.91)	12.22
Kinh	-169.80 (103.21)	-34.24	-171.56 (103.64)	-34.65	-169.33 (103.20)	-34.15
PCINC1†	-678.93 (90.99)	-118.58	-680.08 (91.36)	-118.88	-678.54 (90.96)	-118.53
PCINC2†	-1144.69 (194.35)	-109.60	-1155.42 (193.74)	-110.18	-1143.16 (194.11)	-109.55
PCINC3†	-2242.72 (526.88)	-112.35	-2262.44 (531.69)	-112.65	-2239.71 (526.32)	-112.34
PCINC4†	-1953.79 (664.20)	-107.05	-2002.37 (665.70)	-107.43	—	—
PCINC5***†	—	—	—	—	-2309.66 (898.35)	-106.98
PCINC6***†	—	—	—	—	-1667.92 (1022.04)	-104.23
RTE	-245.17 (394.73)	-46.00	-129.99 (360.59)	-24.41	-244.97 (394.76)	-45.97
RTExPCINC1	-386.69 (556.32)	-72.56	-388.13 (558.70)	-72.89	-387.39 (556.20)	-72.70
RTExPCINC2	-314.20 (1167.61)	-58.96	-294.15 (1171.48)	-55.24	-319.38 (1165.48)	-59.94
RTExPCINC3	2895.31 (2485.98)	543.27	2971.84 (2518.89)	558.12	2875.78 (2478.35)	539.68
RTExPCINC4	4468.54 (2326.76)	838.46	4637.89 (2339.72)	871.01	—	—
RTExPCINC5	—	—	—	—	7470.06 (2815.17)	1401.87
RTExPCINC6	—	—	—	—	1534.63 (4209.61)	288.00
No. of Children	-5.15 (21.22)	-0.97	-3.47 (20.97)	-0.65	-5.032 (21.22)	-0.94
No. of Adults	-79.93 (24.29)	-15.00	-79.64 (24.22)	-14.96	-80.79 (24.39)	-15.16
Female Household Head	-156.07 (83.58)	-27.03	-153.89 (83.68)	-26.71	-156.30 (83.66)	-27.07
Age of Household Head	1.65 (3.16)	0.31	1.59 (3.15)	0.30	1.68 (3.17)	0.32
Years of Education-Household Head	1.14 (11.04)	0.21	1.26 (11.01)	0.24	1.0026 (11.05)	0.19
Primary School	-285.07 (110.63)	-54.60	-285.63 (110.60)	-54.76	-284.92 (110.61)	-54.58
Secondary School	219.61 (162.37)	45.97	220.71 (162.04)	46.26	219.58 (162.44)	45.97
Road Transportation	158.34 (130.37)	27.91	165.63 (129.74)	29.14	158.88 (130.39)	28.00
Water Transportation	-109.65 (99.81)	-20.38	-113.05 (100.16)	-21.02	-109.94 (99.84)	-20.44
Water Supply	-113.03 (144.70)	-20.24	-117.28 (145.08)	-20.99	-112.99 (144.71)	-20.24
Electric	-90.59 (166.87)	-17.82	-97.46 (167.79)	-19.26	-90.73 (166.83)	-17.85
Land	-0.00069 (0.00067)	-0.00013	-0.0007 (0.00069)	-0.00013	-0.00066 (0.00066)	-0.00012
Leaders	115.15 (125.95)	23.26	119.64 (126.50)	24.25	115.09 (125.90)	23.25
Professionals	-20.13 (111.64)	-3.73	-17.38 (111.48)	-3.23	-22.77 (111.60)	-4.21

Continued from Table 5.9 Tobit Results of Hours of Work: Rural Only Sample-Credit Constraints

Dependent Variable Hrs of Work	(1)*		(2)*		(3)*	
	Coeff**	M.E	Coeff**	M.E	Coeff**	M.E
Sales	141.15	28.69	143.38	29.21	138.57	28.13
	(109.20)		(108.96)		(109.47)	
Agriculture and Forestry	93.76	16.73	97.30	17.35	94.43	16.85
	(103.66)		(103.48)		(103.47)	
Skilled Manual	102.70	20.24	101.58	20.03	103.06	20.32
	(78.19)		(78.13)		(78.20)	
Machine Operators	-304.12	-46.52	-303.50	-46.50	-307.28	-46.91
	(165.04)		(164.59)		(164.75)	
Price of Rice	0.013	0.0024	0.012	0.0022	0.013	0.0024
	(0.10)		(0.10)		(0.10)	
No. of Observations	5595		5595		5595	
Log Likelihood	-41526340		-41530009		-41524788	

*Column 1 includes all variables, column 2 excludes gender of child, and column 3 includes more income groups.
**Standard errors of coefficients are in the parentheses and those are adjusted for clustering on the commune.
*** PCINC5=1, if 7,159,484<Per Capita Net Income<=9,000,000 and PCINC6=1, if 9,000,000<Per Capita Net Income.
†*** All income measurements are in VN dong.

Column 3 of Table 5.8 presents the same kind of results for the whole sample when the previous highest earning group of people is broken into two separate income groups and their interactions with RTE have been included, keeping all other variables the same as before. Here, the expectation is that one of these income groups may not be credit constrained and that this difference may have been reflected in the relation between RTE and child labor. The results of the full sample do not imply any relation between returns and child labor that may arise from the possibility of credit constraints.

Tables 5.9 and 5.10 imply that all the specifications of the model tend to present the same kind of results in terms of a relation between RTE and child work hours.

Column 3 of Table 5.9 shows that in the rural area, there is one income group which is not the richest; for this group, there may be a positive relationship between child labor decisions and returns to education.

Table 5.10 Tobit results of Hours of Work: Possibility of Credit Constraints- Urban Only Sample

Dependent Variable is Hours of Work in a Year	Coefficients*	Marginal Effects
Intercept	-13724.08 (206.06)	
Child Characteristics		
Age of Child	1523.76 (338.69)	6.32
(Age of Child)2	-45.55 (13.78)	-0.19
Girl	78.66 (221.99)	0.33
Kinh	-0.33 (435.98)	-0.0014
Income and Returns to Education		
PCINC1†	-1868.65 (525.74)	-8.02
PCINC2†	-2172.99 (549.84)	-5.45
PCINC3†	-2598.76 (672.57)	-3.88
PCINC4†	-2439.17 (829.60)	-4.03
Returns to Education (RTE)	-130.25 (653.09)	-0.54
RTE×PCINC1	687.90 (655.98)	2.85
RTE×PCINC2	784.74 (746.49)	3.25
RTE×PCINC3	1219.17 (1322.56)	5.06
RTE×PCINC4	-620.60 (1730.36)	-2.57
Family Characteristics		
No. of Children	-91.41 (94.96)	0.38
No. of Adults	-197.41 (61.84)	-0.82
Female Household Head	-42.13 (201.66)	-0.17
Age of Household Head	-14.95 (13.59)	-0.062
Years of Education of Household Head	-97.95 (32.80)	-0.41
Other Family and Region Specific Factors		
Primary School	680.86 (356.69)	1.91
Secondary School	-228.61 (404.17)	-1.12
Road Transportation	992.23 (443.44)	1.64
Water Transportation	559.89 (224.39)	1.60
Water Supply	-526.86 (356.59)	-3.49
Electric Supply	—	—
Total Land Area	—	—
Professions of Household Head:		
Leaders	912.70 (568.70)	10.63
Professionals	433.17 (358.69)	2.68
Sales	435.06 (255.84)	2.26
Agriculture and Forestry	601.16 (266.96)	3.76
Skilled Manual	2.16 (279.50)	0.0089

Continued from Table 5.10 Tobit results of Hours of Work: Possibility of Credit Constraints- Urban Only Sample

Dependent Variable is Hours of Work in a Year	Coefficients*	Marginal Effects
Machine Operators	580.90 (379.54)	4.46
Price of Rice	0.52 (0.19)	0.0022
No. of Observations	1429	
Log Likelihood	-1909957.6	

*Standard errors of coefficients are in the parentheses and those are adjusted for clustering on the commune.
†All income measurements are in VN dong.

There is also some possibility that as urban return increases, rural people may consider having their child work more hours. There are two reasons that may explain the possible positive effects of urban returns on child work hours. One reason may be related to the structure of the labor market, where returns to education and unskilled jobs are positively related. It may be the case that increases in returns in urban areas correspond to some other economic changes in that area, which further increase the availability of more unskilled jobs. If skilled jobs are not accessible to everyone, and if unskilled jobs increase corresponding to higher returns, then the results of both of these factors may lead to a situation where children work more as returns increases. It is not really hard to believe that even if returns increase, all people may not have access to those jobs. So, the accessibility of jobs may be one factor that can be considered for future work in this area if the goal is to find the relation between returns and child labor.

Except for accessibility of jobs, there can be a difference in intra-household allocation of resources that may further cause the children to work more as return increases. If households have some kind of heterogeneity in terms of intra-household allocation of resources, then it may be the case that as returns increase the family wants to invest more in one of their children. But in order to support that child, other children

may have to work more. This may also cause a positive relation between returns to education and child labor.

After going through the analyses done so far on child labor in Vietnam, it seems that a return to education is not an important factor in the child labor decision. It is not an important factor either in rural areas or in urban areas, neither among rich people, nor among poor people. This finding is somewhat interesting but may not be surprising because of the explanations set forth above.

Chapter VI

SUMMARY AND CONCLUSION

This work tries to answer four inter-related questions by analyzing two factors that can be important in the determination of child labor. All of the models and respective results of the work are summarized in Table 6.1.

The first question addresses the importance of poverty in the household's decisions about child participation in the workforce. Following the theories in this area, the purpose in this section is to see the effects of poverty: whether households will be less likely to send their children to work if it is possible to improve their economic status above some minimum level. Both the probit and the tobit analyses support the theory that the extent of child labor drops with improvement in living standards.

The next section includes returns to education in the tobit model and analyzes its relation with children's work hours. The hypothesis here is that higher returns will reduce the children's work hours. Different specifications of the model in this section show that returns may not be important in the determination of children's work hours.

The third section tries to find the relation between work hours and returns to education after considering the possibility of labor mobility. The intuition is that labor mobility may cause urban returns to education to have an important effect on child work hours among rural people. The results show that returns to education in the urban areas do not reduce children's work hours in rural areas.

Table 6.1 Summary of Findings

Models		Hypotheses	Summary of Results
1. Role of Household Poverty in Working/Not Working Decision about Child:	Probit: *Probability of Participation in Work* = β_0 + β_1(*Poverty Measures*) + β_2(*Region Indicators*) + β_3(*Child Characteristics*) + β_4 (*Family Characteristics*) + β_5 (*Community Characteristics*) + *u*.	1. $\beta_1 < 0$	$\beta_1 < 0$, and the threshold poverty line matters only for child labor decisions, corroborating the Basu and Van (1998) "luxury axiom."
2. Role of Household Poverty and Returns to Education on Child Labor- Considering Hours of Work- instead of the Binary Dependent Variable:	Tobit: *Hours of Work in a Year* = β_0 + β_1(*Poverty Measures*) + β_2(*Returns to Education*) + β_3(*Child Characteristics*) + β_4 (*Family Characteristics*) + β_5 (*Community Characteristics*) + *u*.	1. $\beta_1 < 0$. 2. $\beta_2 < 0$.	1. $\beta_1 < 0$, and the threshold poverty line matters only for child labor decisions, supporting the result of the probit model. 2. Unable to find any result supporting $\beta_2 < 0$; implies that RTE may not matter in the child labor decisions.
3. Role of Household Poverty and Returns to Education on Child Labor - Considering Labor Mobility: (Rural Sample Only).	Tobit: *Hours of Work in a Year* = β_0 + β_1(*Poverty Measures*) + β_2(*Returns to Education*) + β_3(*Returns to Education in Urban Areas*) + β_4(*Child Characteristics*) + β_5(*Family Characteristics*) + β_6 (*Community Characteristics*) + *u*.	1. $\beta_1 < 0$. 2. $\beta_2 < 0$. 3. $\beta_3 < 0$	1. $\beta_1 < 0$. 2. Unable to find any result supporting $\beta_2 < 0$. 3. Unable to find any result supporting $\beta_3 < 0$, and there is a possibility that $\beta_3 > 0$, implying an increase in returns to education in the urban area may increase child labor in the rural area.
4. Role of Household Poverty and Returns to Education on Child Labor – Possibility of Credit Constraints:	Tobit: *Hours of Work in a Year* = β_0 + β_1(*Poverty Measures*) + β_2(*Returns to Education*) + β_3(*Poverty Measures* × *Returns to Education*) + β_4(*Child Characteristics*) + β_5(*Family Characteristics*) + β_6 (*Community Characteristics*) + *u*.	1. $\beta_1 < 0$. 2. RTE should be negatively related to child labor for one of the higher income groups and it will not matter for the poor groups.	1. $\beta_1 < 0$. 2. RTE may not reduce child labor for any of the income groups. Therefore unable to support that poor people are credit constrained.

The significance of poverty measures in the child labor decision could reflect the presence of credit constraints for the poorer households. The last model addresses the issue of borrowing-constraints and their possible effects on the child labor decision by including the returns to education and their interactions with different income groups directly in the model. The hypothesis here is that poor people are more credit-constrained and that this affects their child labor decisions. Different specifications of the model in

this section are also unable to find any significance of credit constraints among poor people.

Summarizing all results, it seems that poverty is the most important factor causing child labor, whereas this work is unable to find any evidence that returns to education matter for any people in their child labor decision; and it is also unable to establish whether or not poor people are more credit-constrained. Furthermore, the relationship between child labor and income is non-linear. Child labor falls significantly when income is above a threshold but does not change much beyond that. This result implies a "luxury good" nature for child leisure or child schooling, as suggested by Basu and Van (1998).

There are several issues that one needs to keep in mind here. First, there is a possibility that this work might not have been able to control for different levels of job accessibility or some measurement of the unemployment rate throughout the analysis. If richer people have easier access to jobs, then the higher returns to education could cause a decline in child labor among rich people. Not controlling for that fact properly, it might overestimate the effects of poverty on child labor. Job accessibility might have some relation to child labor when one thinks about its relation with returns to education. If some people have easier access to jobs, then they may think about spending more on their child's human capital development because that investment could be more profitable in the future, as compared to others who lack this accessibility. Therefore, one possible avenue for future work in this area could be controlling for the factors that can cause a difference among households in terms of job accessibility.

One other limitation of this study is that the returns to education are calculated based on the sample of wage earners. In Vietnam wage earners constitute a very small part of the population. One may be interested in exploring other ways to calculate returns to education in future studies. The data provides some community level information on the average agricultural wage rates in the rural areas. Instead of using the calculated returns to education of the 24 groups, one may be interested to use the above wage information to test if the variation of that average wage rate among the 158 communes[11] causes any difference in the child labor decision.

Also, to explore the possible effect of labor mobility, another direction of work could be to consider the cost of moving, either direct or indirect. For example, if someone has relatives living in urban areas of higher returns, then the cost of moving could be less for them as compared to someone who does not have any acquaintances living in the urban areas. Due to the unavailability of this information in the data, it was not possible to use the above possibility to measure the cost of migration. One may be interested to find some other possible measurements of the cost of migration, thus giving this work another direction of extension.

With respect to the relationship between child labor and credit constraints, one may think about including some measurements of credit constraints directly in the model. The data includes household level information on credit and savings. One may be interested to extract some information about borrowing-constraints to use as a measurement of credit constraints while analyzing the effects of poverty and returns to education.

[11] Note that the data provides the community level information for only 158 communes including rural and minor urban areas, out of 194 communes.

In terms of policy, this work suggests that alleviating poverty should be targeted first if these poor countries want to reduce child labor. Even if one can find that the presence of credit constraints enhances the problem of child labor, still the main reason continues to be poverty. If people have enough household income irrespective of their children's contribution, then they do not need to send their children to work and they will not even care whether or not they can borrow money.

But alleviating poverty being a long-term policy, the underdeveloped countries may also think about allowing children to do some moderate amount of work which does not hinder their education. If poverty is the main cause of child labor, then a ban on child labor would worsen their condition. School hours could be flexible to allow the children to do both work and study. Also, some subsidies in education may encourage children to attend school while doing some moderate amount of work. Many children in Vietnam both attend school and participate in the labor force. The binary decisions work/not work and enroll/not enroll do not seem to be mutually exclusive. But child labor and enrollment present more evidence of substitution when one considers the child hours of work. So, one of the policy implications may be to make school hours flexible so that school attendance does not interfere with a child's moderate work hours. In this way, a child's earnings could also be used by the family to pay for the cost of his or her education.

APPENDIX

A1. Description of Sources Used to Create New Variables from VLSS 1997-98

A1.A Variables Required for the Two OLS Estimations

Variables required for estimating the following two OLS estimations are presented in Table 7.1a. The following model has been estimated in six different regions for the calculation of imputed child wage:

$$Log\ Hourly\ Wage = \beta_0 + \beta_1(Secn) + \beta_2(Voc) + \beta_3(Univ) + \beta_4(Exper) + \beta_5(Exper^2) + \beta_6(Female) + \beta_7(Log\ Hours\ per\ Week) + u.$$

Table A1.a Variables for Calculating Imputed Child Wage and RTE

Constructed Variable/s	Original Variable/s from Data	Source File/s in VLSS 97-98
Log Hourly Wage	S4AQ08, S4AQ14, S4BQ04, S4BQ09, S4BQ20, S4BQ21U, S4BQ21A, S4BQ07, S4BQ10, S4BQ11, S4BQ22IU, S4BQ22IA, S4CQ10, S4CQ09, S4CQ07, S4CQ04, S4CQ14, S4CQ11, S4CQ15U, S4CQ15A, S4CQ16, S4CQ17, S4CQ18, S4DQ12, S4DQ13U, S4DQ13A, S4DQ09, S4DQ08, S4DQ06, S4DQ03, S4DQ05, S4DQ10, S4DQ14IU, S4DQ14IA, S4DQ21, S4EQ03, S4EQ05, S4EQ12U, S4EQ11, S4EQ12A, S4EQ06, S4EQ07, S4EQ08, S4EQ13, S4EQ14, S4EQ15.	scr04a, scr04b1, scr04b2, scr04b3, scr04b4, scr04c, scr04d1, scr04d2, scr04e.
Secn, Voc, Univ, Secondary and Above.	S2AQ04, S2BQ01.	scr02a, scr02b.
Exper, Exper^2.	S1AQ06Y, S2AQ19, S2AQ20, S2AQ15, S2AQ16, S2AQ11, S2AQ12, S2AQ05, S2AQ07, S2AQ02, S2AQ03, S2AQ04, S2BQ07, S2BQ01, S2CQ01, S2BQ11.	scr01a2, scr02a, scr02b, scr02c.
Log Hours Per Week	S4BQ09, S4BQ10, S4CQ09, S4CQ10, S4DQ08, S4DQ09, S4EQ07, S4EQ08	scr04b1, scr04c, scr04d1, scr04e.
Female	S1AQ02	scr01a2.
Regions, Groups	REG8, URBAN98, S1AQ02	hhexp98n, scr01a2.

The above model, with minor modifications as seen below, has been estimated to construct RTE for 24 groups.

Log Hourly Wage = β_0 + β_1(*Secondary and Above*) + β_2(*Exper*) + β_3(*Exper*^{2}) + β_4 (*Log Hours per Week*) + *u*.

A1.B Variables Required to Estimate the Two Probit Models

All of the variables required to estimate the following two probit models are presented in Table 7.1b.

The following probit model estimates child work:

Probability of Participation in Work = β_0 + β_1(*Poverty Measures*) + β_2(*Region Indicators*) + β_3(*Child Characteristics*) + β_4 (*Family Characteristics*) + β_5 (*Community Characteristics*) + *u*.

Table A1b Variables Required to Estimate Probit Models

Constructed Variable/s	Original Variable/s from Data	Source file/s in VLSS 97-98
Child Work	S1AQ06Y, S4AQ08, S4AQ09, S4AQ10, S4AQ14.	scr01a2, scr04a.
Child Schooling	S1AQ06Y, S2AQ03.	scr01a2, scr02a.
Age of Child, (Age of Child)2 Female Child Kinh	S1AQ06Y S1AQ06Y, S1AQ02. TRIBE	scr01a2. scr01a2. scr00a.
Poverty lines: PCINC1-PCINC4 No. of Children, No. of Adults Female HhHead, Age of Hh Head, Years of Education HhHead	RLHHEX1, HHSIZE, and all variables used to calculate imputed child wage from table 7.2a. IDCODE, HOUSEHOL, S1AQ06Y, HHSIZE. SEX, AGE, EDUCYR98.	hhexp98, all files required to calculate imputed child wage from table 7.2a. scr01a2, hhexp98n. hhexp98n.
Region Indicators	REG8	hhexp98n
Primary and Secondary School Road and Water Transportation Water and Electric Supply	S081Q1, S081Q2. S061Q1, S061Q6, S061Q7, S061Q9, S063Q221, S063Q23.	j.cmt081. j.cmt061. j.cmt063.
Total Land Area Leaders, Professionals, Sales, Agriculture and Forestry, Skilled Manual, Machine Operators. Price of Rice	S9A1Q04, S9A1Q07, S9A2Q03, S9A2Q05, S9A2Q07, S9A4Q05, S9A4Q07, S9A4Q09, S1AQ03, S4AQ13, S4BQ01, S4CQ01, S4DQ01, S4EQ01. GOODS, S31PR1, S31PR2, S31PR3.	a.scr09a12, a.scr09a22, a.scr09a42. scr01a2, scr04a, scr04b1, scr04c, scr04d1, scr04e. j.cmt31.

The following probit model estimates child schooling:

Probability of Participation in School = β_0 + β_1(*Poverty Measures*) + β_2(*Region Indicators*) + β_3(*Child Characteristics*) + β_4 (*Family Characteristics*) + β_5 (*Community Characteristics*) + u.

A1.C Variables Required to Estimate the Tobit Models

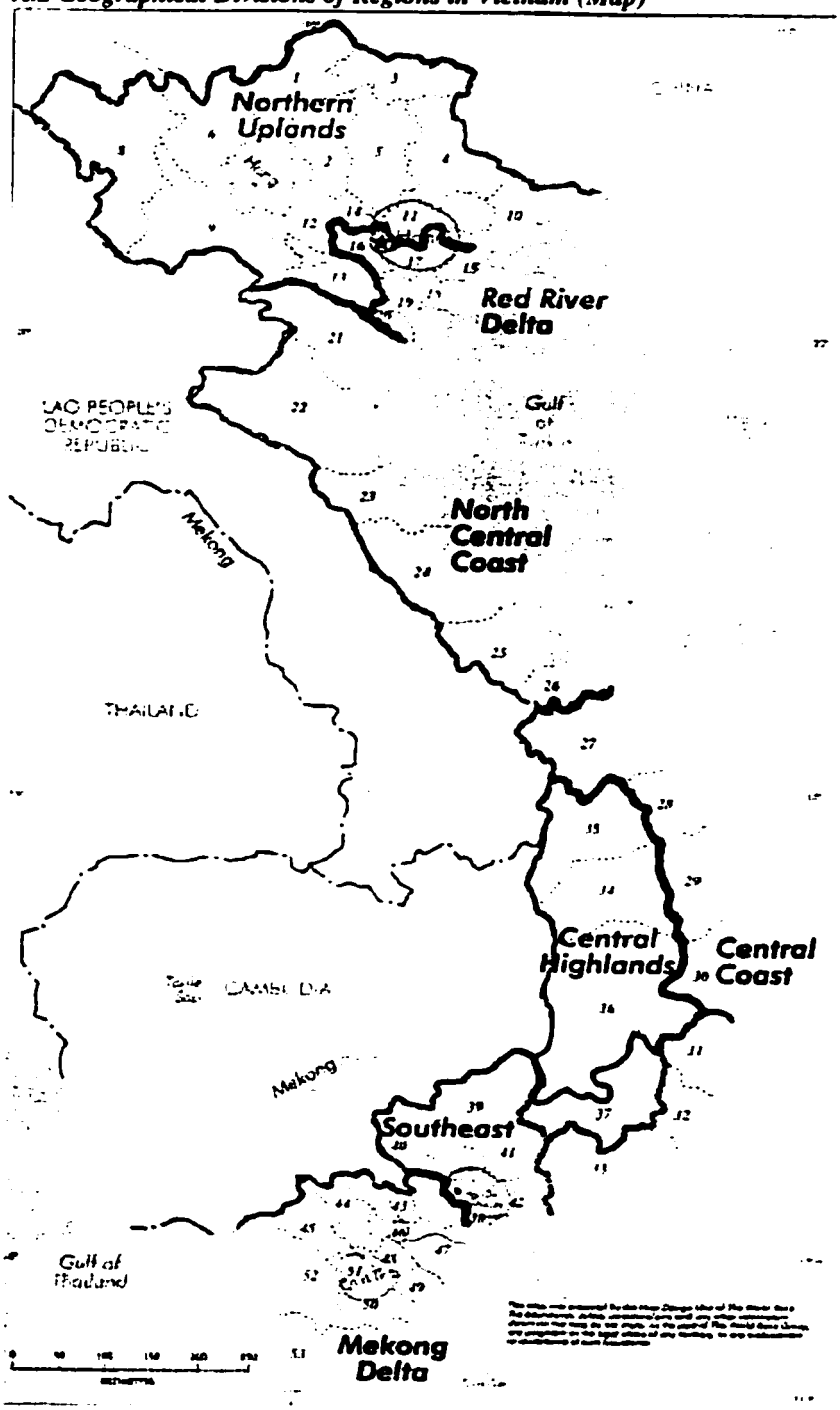
All variables required to estimate the following tobit model (given in its general form) are presented in Table 7.1c.

Hours of work in a Year = β_0 + β_1(*Poverty Measures*) + β_2(*Returns to Education*) + β_3(*Child Characteristics*) + β_4 (*Family Characteristics*) + β_5 (*Community Characteristics*) + u.

Table A1c Variables Required to Estimate All Tobit Models

Constructed Variable/s	Original Variable/s from Data	Source file/s in VLSS 97-98
Hours of Work in an Year	S1AQ06Y, S4AQ04, S4AQ05, S4AQ08, S4AQ14, S4BQ04, S4BQ07, S4BQ09, S4BQ10, S4BQ12, S4BQ33, S4CQ04, S4CQ07, S4CQ09, S4CQ10, S4DQ03, S4DQ05, S4DQ06, S4DQ08, S4DQ09, S4DQ21, S4EQ03, S4EQ05, S4EQ06, S4EQ07, S4EQ08, S4FQ02, , S4FQ03, S4FQ04, S4FQ05, S4FQ06, S4FQ07, S4FQ08, S4FQ09, S4FQ10, S4FQ11, S4FQ12, S4FQ13, S4FQ14, S4FQ15, S4FQ16, S4FQ17, S4FQ18, S4FQ19, S4FQ20, S4FQ21, S4FQ22, S4FQ23, S4FQ24, S4FQ25, S4FQ26, S4FQ27, S4FQ28, S4FQ29, S4FQ30, S4FQ31, S4FQ32, S4FQ33, S4FQ34, S4FQ35, S4FQ36, S4FQ37, S4FQ38, S4FQ39, S4FQ40, S4FQ41, S4FQ42, S4FQ43	scr01a2, scr04a, scr04b1, scr04b4, scr04c, scr04d1, scr04d2, scr04e, scr04f1, scr04f2, scr04f3.
Poverty lines: PCINC1-PCINC6	All the poverty measures used the same variables as in Table 7.2b.	—
RTE, RTEURB	All the variables used in constructing these two have been presented in Table 7.2a.	—
Child, Family and Community Characteristics:	All these explanatory variables are same as presented in Table 7.2b	—

A.2 Geographical Divisions of Regions in Vietnam (Map)[12]



Source: Dollar, D., Glewwe, P., and Litvack, J., (1998)

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12 In order to avoid the confusion of boundaries among the regions, it is worth mentioning that the Southeast region includes all the places marked by 31, 32, 33, 37, 38, 39, 40, 41, and 42, whereas the Central Highlands includes the places marked by 34, 35, and 36, and the South Central Coast includes the places marked by 27, 28, 29 and 30.

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VITA

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