ADDIS ABABA UNIVERSITY
SCHOOL OF GRADUATE STUDIES

DETERMINANTS OF CHILD LABOUR AND SCHOOLING IN RURAL HOUSEHOLDS OF ETHIOPIA

A Thesis Submitted to the School of Graduate Studies of Addis Ababa University in Partial Fulfillment of the Requirements for the Degree of Master of Science in Economics (International Economics)

BY

TSEGANESH WUBALE

JUNE, 2011
ADDIS ABABA

DEDICATION

This thesis would be incomplete without a mention of the support given me by my beloved mother, W/o Dasash Bezabih to whom this thesis is dedicated for she kept my spirits up when I was to fail. Without her lifting me up when this thesis seemed interminable, I doubt it should ever have been completed.

It may not be enough to contain the words of thanksgiving; it may not capture the countless contributions you made throughout my way and the eternal love that I have for you but now I am just making this wording to let the world know what special place you have in me.

ACKNOWLEDGEMENTS

I would like to extend my deepest gratitude to my advisor, Teshome Mulat (Professor), for his advice and guidance. I am highly indebted to IFPRI, the Department of Economics of Addis Ababa University and CSA for data used in my study. I would like to warmly acknowledge the African Econoic Research Consortium (AERC), for its financial support. It is an honor for me to thank Ato Demirew Getachew, head of Ethiopian Economics Association Secretariat, for his stimulating support that I will never forget.

My special thanks go to my mother, W/o Dasash Bezabih for her sacrifice and support along my way. It gives me eternal joy to express my thanks to my sisters, Sefinesh, Meseret and Yeserash for their unconditional love which ever inspires me to do my best in my endeavor. I owe my heartfelt gratitude to Yeshwas, without whose encouragement this study would not have been materialized. I offer my regards to all of those who supported me in any respect during the completion of the thesis.

TABLE OF CONTENTS

Title **Page**

LIST OF TABLES AND FIGURES

Title **Page**

LIST OF ANNEXES

Title Page

ABBREVIATIONS AND ACRONYMS

AERC=African Economic Research Consortium

CSA=Central Statistics Agency

ELFS=Ethiopian Labour Force Survey

IFPRI=International Food Policy Research Institute

IIA=Independence of Irrelevant Alternatives

ILO=International Labour Organization

LFP= Labor Force Participation

MDGs=Millenium Development Goals

MNL=Multinomial Logit Model

OPHCC=Office of the Population and Housing Census Comission

SNNP=Southern Nations, Nationalities and Peoples

SSA=Sub-Saharan Africa

TGE= Transitional Government of Ethiopa

WB= World Bank

ABSTRACT

Ethiopia is characterized by high incidence of child labour and low school enrollment. There is no specialized body with the primary responsibility of mitigating child labour; even worse, the existing legal provisions about child rights are far from implementation in the rural parts of the country where the vast majority of the children reside and where child labour is pervasive. With the objective of investigating factors that determine child labour and schooling the study adopted a more inclusive definition of child work. Using the seventh round Ethiopian Rural Household Survey data the study adopted multinomial logit (MNL) model to estimate child work-schooling outcomes.

The results from the empirical analysis suggest that both economic and sociological factors are important determinants of child labour and school attendance in rural Ethiopia. The main findings from the study are the existence of positive and significant association between child work and number of infants and biological relationship to the household head while age and education level of the household head, household size and average schooling level of the community, among others, having significant but negative effect on child work specialization. The major determinants of school attendance include education level of the household head, eqqub membership of household, average schooling level in the peasant association and distance to school. The finding that some of the variables (number of adults, number of infants, access to loan) affect work-school outcomes differently for boys and girls shows the presence of gender bias. From policy perspective, provision of productive and labour saving assets, instituting saving and credit associations and investment in educational infrastructure should deserve essential place in the move to curb child labour and promote school attendance.

CHAPTER ONE

INTRODUCTION

1.1. Background

Child labour is a widespread and growing phenomenon in the world especially in developing countries. However, it has been very difficult to get the exact figure of children engaged in labour in many countries partly due to the hidden nature of the problem (Kebebew, 1998) and differences in definition of who is considered child and what constitute labour. ILO defines all those under 18 as children. According to it, labour is defined as "economically active," when a person works on a regular basis for which he/she is remunerated or that results in output destined for market. But in the Ethiopian context where labour market is missing, this definition is too restrictive. In our study labour is used alternatively with work which includes all work related activities which potentially affect the overall development of a child.

In 2008 there were 215 million children working illegally in the eyes of international law, almost 14% of all the world's children under 18. The global total includes 115 million children under 18 engaged in "hazardous work" which could threaten their safety or health, such as handling chemicals, carrying heavy loads, mining, quarrying or enduring long hours. The remaining 100 million child labourers are those aged under 15 whose tasks are not hazardous but are more substantial than permitted light work.

Recent estimates by ILO have showed that there has been a declining trend in child labour. As compared to the previous four year report period estimates (2000-2004), the reduction in child labour for the period 2004-2008 is modest– 10% versus 3%. Among 5-14 year olds, the number of children in child labour has declined by 10 per cent and the number of children in hazardous work by 31 percent (ILO, 2010). Despite signs that the number of children in hazardous work is declining, it is evident that the overall rate of reduction has slowed. Concerning the trend across gender, there has been a 15 % and 24% decrease in the number of girls in child labour and in hazardous work, respectively. However, trend is the opposite for boys with an increase both in incidence rate and absolute terms. The decline in child labour incidence for the 5-14 age category, there has been an alarming 20 per cent increase in child labour in the 15-17 years age group – from 52 million to 62 million (ILO, 2010).

The observed fall in the economic activity of the 5-14 aged children is not evenly distributed even across the developing economies where the incidence of child labour is higher. The Asian-Pacific region and Latin America and the Caribbean experienced a decrease. In contrast, for the same age group, the number of children in economic activity is increasing in Sub-Saharan Africa (ILO, 2010). The situation is particularly alarming in Sub-Saharan Africa, where one in four children aged 5-17 are child labourers, compared to one in eight in Asia-Pacific and one in ten in Latin America and the Caribbean (ILO, 2010). Slow or negative economic growth, famine and disease, war and conflict, poor governance and the spread of HIV/AIDS in Africa are all likely to have contributed to keeping the incidence of child labour high (Bhalotra, 2003).

Children work for a multitude of reasons- economic and socio-cultural. Poverty is the main cause for the involvement of millions of children in work related activities which are deemed to be detrimental for their normal, psychological and educational development. Poor parents send their children to work, not out of choice, but for economic reasons (Beliyou, 2003). In such scenarios, child labour is a matter of survival than of a choice. Many of the working children have neither access to education nor have adequate remuneration, satisfactory working and living conditions. They are not protected from the most harmful and exploitative practices.

Global political initiatives to combat child labour are undertaken by the International Labour Organization (ILO) which devised two key instruments of international law; the 1973 Minimum Age Convention 138 and the 1999 Convention on the Elimination of the Worst forms of Child Labour[1].

Almost all child labour occurs in developing countries, with about 60% engaged in agriculture. In addition to subsistence farming, African child labourers are also employed in commercial farming, which is concentrated in two geographical regions: the countries of coastal West Africa and the East African plateau (Canagarajah and Nielson, 1999).

The darkest category of child labour relates to those children caught up in criminal activities such as prostitution, military enrolment, slavery (such as bonded labour), or trafficking (which involves the removal of a child from its home, often involving deception and payment, for a

[1] *The 1973 Minimum Age Convention 138 establishes the obligation for countries to work towards a minimum age of 15 for legal employment whereas 1999 ILO Convention on the Elimination of the Worst Forms of Child Labour(No. 182) Focused world attention on the need to take immediate action to eradicate those forms of child labour that are hazardous and damaging to children's physical, mental or moral well-being.*

wide range of exploitative purposes). These categories are beyond the reach of statistical surveys. Together with hazardous work, they are described as the worst forms of child labour.

Child labour is prevalent in Africa (Hazan and Berdugo, 2002), especially in the agricultural sector. In addition to subsistence farming, African child labourers are also employed in commercial farming, which is concentrated in two geographical regions: the countries of coastal West Africa and the East African plateau (Canagarajah and Nielson, 1999).

Ethiopia, as one of the developing African Countries, encounters exorbitant child labour. The problem is pervasive in the rural part where not less than 85% of the national population resides. Apart from the short-run impacts exploitative child labour limits (in many cases denies) children's access to schooling which in the long-run threatens the future development prospect of the country.

Ethiopia has ratified the ILO Minimum Age for Admission to Employment Convention of 1973 and the ILO Convention Against the Worst Forms of Child labour. Besides International Conventions, the country has instituted protection for children in its constitution which provides that children under 18 have a right to be protected from work that is exploitative, hazardous or otherwise inappropriate for their age, detrimental to their schooling, or detrimental to their social, physical, mental, spiritual or moral development. According to the Ethiopian Labor Law, the minimum age to start work is 14 (TGE, 1993). The term 'work' is not limited to work in so-called economic activities (e.g. paid employment) but includes chores or household activities in the child's household (such as collecting wood and fuel), where such work is exploitative, hazardous, inappropriate for their age or detrimental to their development.

Notwithstanding the availability of these legal provisions for the protection of children many children are victims of the worst forms of child labour in the region.

Added to insufficient and inefficient supply of schools widespread child labour suppresses human capital accumulation and hence growth potential of nations. Ethiopia is no exception to this as manifested by unsatisfactory schooling records (indicators). Literacy rate for above 15 years of age was 36% in 2008. The gross literacy rate for adults (15-24 years of age) was 50% in the same year. During this year it is reported that only 39% and 62% of females and males respectively were literate in the country (WB, 2009). Overall school enrolment rate at the primary level in Ethiopia is reported to be 82, 87, 95 and 99% from 2005 till 2008. Despite the seemingly increasing enrolment rate in 2008, 1, 180,121 male children and 1,551,929 female children were out of school. The lower enrolment is accompanied by lower ratio (89%) of female to male primary school enrolment (WB, 2009).

1.2. Statement of the Problem

Ethiopia is a country where the incidence of child labour is higher and at the same time the rate of schooling is far lower. Child participation rate is estimated to be higher than 40% in the country. Children often begin to participate in work activities at their early age usually when they are 4 or 5 (Assefa, 2002; Assefa and Arjun, 2005) and on average contribute 29-30 hours of labor per week (Assefa and Arjun, 2005). Children are engaged in all forms of paid work, in factories, commercial as well as subsistence agriculture, service industries, shops, market places and in household chores (Kifle et al, 2005). Engagement in economic activities at an early age and participation especially in hazardous and exploitative work could have a

devastating effect on children's physical and mental development and might also cause irreversible damage leading to permanent disability (ILO, 1998).

It is a general consensus that human capital accumulation is the way out from poverty and hence to ensure economic growth and development in any nation. Education is believed to have a special place in such endeavor. The problem is that if children are compelled to start work at their early ages and toil for longer hours means that their ability to attend (and do well in) school is seriously impaired. This proposition indicates that child work is forgone human capital which translates to economic retardation in the long-run.

Child work may be viewed as a means to socialization and acquiring necessary skills for adult life but not a problem per se. In this case, parents prefer keeping them at home and do along with them to sending them to school (Beliyou, 2003). This temptation would be more the case in poor rural households.

It has long been recognized that promoting and ensuring universal basic education is crucial to get rid of poverty. Moreover, having access to education is part of the basic rights of humanity. This has been formally stipulated in the Millenium Development Goals (MDGs) that achieving universal primary education is a priority. As part of the international community Ethiopia has placed significant value on the multi-faceted role that education can have in efforts to bring about development. In the past policies and strategies were devised to expand access to education to the rural children which are the main subject of this study. In spite of these efforts

the vast majority of them are out of school owing to different demand side and supply side factors.

It has been shouted aloud by different researchers and agencies that poverty is the driving force behind exploitative child labour. Studies on developing countries have revealed that child labour is badly needed to supplement the subsistence income of families both in rural and urban areas restricting healthy overall development of children and which can mainly be manifested by reduced or complete absence of access to formal education.

So far, some studies (Assefa, 2002; Assefa and Arjun, 2005; Arjun and Assefa, 2009; Beliyou, 2003; Cockburn, 2000; Cockburn, 2001; Tasew et al, 2005; Chaudhury et al, 2006; Getinet and Beliyou, 2007) have been conducted to investigate the child labour in Ethiopia. However, they didn't capture the role of informal saving and credit associations which would have important child work-school participation implications. Hence, the study aims to fill the gap by incorporating "eqqub" variable to assess the role informal saving and credit associations might play. Besides, detailed analysis of the determinants of child labour and child schooling drawing on up-to-date data is of a paramount importance for the future development prospect of children in particular and the country in general as children of today are growth engines of tomorrow. We pose three questions that the thesis will seek to address:

• What factors influence family's decision to subject their child to specialize in work only?

• What factors contribute significantly to child school attendance and/or its combination with work?

• What policy options are available to curb child labour and promote child schooling?

Hence the main focus of this study is to assess the major determinants of child labour and child schooling amongst the 7-14 aged children in the rural households of Ethiopia drawing on recent data.

1.3. Objective of the study

In order to curb the problem of Child labour, it is of paramount importance to identify the major demand as well as supply side determinants that force parents to let their children go for work. Child work tends to affect the normal development of children in various ways one of which is their ability to attend school as child activities compete for time. Hence, determining factors need to be empirically investigated so as to provide pertinent information on which to base policies. The main objective of the study is, therefore, to investigate the major determinants of child labour in rural Ethiopia. The specific objectives are;

- To establish the presence of high incidence of child labour in Ethiopia via assessment of children's participation in economic life.
- To empirically assess the major factors those determine children's participation in work, school and/or a combination of them.
- To examine the existence of gender bias, if any, related to child work- school participation.
- To provide empirical evidences and hence guidelines for policy making in the move against exploitative child labour and promote schooling.

1.4. Significance of the Study

This study aims to investigate the major factors determining child labour and schooling amongst children in the 7-14 age category. Some studies have been conducted to find out the factors that determine the time allocation decision between child work and schooling by parents on behalf of their children in Ethiopia. They didn't attempt to capture the role that informal saving and credit associations can play in smoothing the consumption of poor rural households and thereby affecting the decision to send their children to school or to work in the face of credit market imperfections. This study will be an impetus to the understanding that efforts to mitigate child labour and foster schooling should have a look in to such associations as well. Besides, the majority of the studies so far encompass those children aged 4-15 with some adjustments on the lower and upper age limits. Even if such works are important for the investigation of the incidence of child labour, the findings would be biased to show the right picture of tradeoff between child work and school, if any, since the official age to start formal schooling in the country is seven.

The result of the study will provide policy makers with invaluable information to devise appropriate policies and to make competent decisions to address the issue. It will also inspire further academic work and hence broaden the frontier of knowledge in the area.

1.5. **Scope and Limitation of the Study**

This study attempts to assess the major determinants of child labour and school attendance. It does not go forth to examine the effect of working and its duration on school performance/achievement of enrolled children and also the detrimental impacts working would have on the health of children. This potentially limits the scope of the study.

1.6. Organization of the Paper

This paper comprises five chapters. It begins with introduction which encompasses background of the study, statement of the problem, objective, significance, and delimitation of the study. Chapter two provides review of pertinent literature while the third chapter deals with the methodology used in the study. The forth chapter presents the major findings from the study. The last chapter concludes and puts forward policy implications.

CHAPTER TWO

LITERATURE REVIEW

2.1. Review of Theoretical Literature

Even if there exist a wide array of and growing empirical literature on child labour, theoretical writings on the area are scanty.

Early theoretical explanations about child labour do emphasize on the close interdependence between household fertility decisions and the preference to engage children in work (Beliyou, 2003). In subsistence economies parents often view children as old age insurance and favour having many children. This economic value of children tends to increase their quantity at the expense of quality which can be explained in terms of investment in their education (Rosenzweig and Evenson, 1977). By the same token, Baland and Robinson (2000) explain the phenomenon by emphasizing on the time inconsistency problem faced by parents. The authors stipulate that parents may overuse child labor to secure old age savings while denying them access to formal education (Baland and Robinson, 2000).

The "Substitution Axiom" stresses on the interaction between child time allocation and adult labour market conditions. The argument states that child and adult labour are close substitutes. In situations of paid employment child labour could have adverse labour market effects by increasing adult unemployment. On the other hand, child labour may be employment enhancing if children are engaged in domestic and unpaid activities thereby enabling adult household members to go for remunerative outside home employment (Basu and Van, 1998; 2006a).

Basu (1999) also shows that the presence of employers who do not feel bad about having child laborers in their work places depresses wage rates, under fairly general conditions. It is based on his sexual harassment argument (pecuniary externality): allowing sexual harassment (violence on child labor) penalizes workers (households) that do not allow sexual harassment (sending kids to work with violence) through a decrease in wage (Basu, 1999).

Another strand of theoretical explanation on why children do work is the poverty hypothesis. Families that allocate their time optimally between various forms of work and school presumably compare the current value of the child's labor against the future value of increased productivity of an educated worker. There is no particularly compelling reason why the productivity gains from educating a child from a poor family should be any larger or smaller than the gains for a child from a high-income family. Nevertheless, poverty could have a direct effect on schooling decisions. Families who are barely surviving are likely to discount the future heavily, thereby giving less weight to future income earned by their educated children (Drusilla, 2001).

Despite their differences in initial assumptions the existing few theoretical explanations have the central idea that child work-school decisions are made by parents on behalf of children and that child labour should be reduced for it is socially undesirable.

2.2. Review of Empirical Literature

2.2.1. Determinants of Child labour

A long list of factors can be made regarding reasons why children are forced to work. Children contribute to household labor supply when reserves of labor are essential at critical periods of the production process, supervision of labor is costly, and household production by children frees other household members to pursue remunerative market activities. Without children's work, poor households lose one of the few mechanisms they have to increase incomes or smooth consumption in the face of economic shocks.

Poverty: Poverty, of course, is the most commonly cited cause of child labour. Children aged 10 to14 comprise the group for which the labor force participation (LFP) rate is most sensitive to economic conditions (Drusilla, 2001).

The history and geography of child labour reveal a negative relation of economic development and the incidence of child labour. For example, using cross-country data for 83 rich and poor countries, Dessy and Vencatachellum (2001) find a negative correlation of child labour and the log of GDP per capita (at purchasing power parity). They also find a positive relation of child labour incidence and the log of the Gini index of inequality. However, the relation of household income and child labour in micro-data tends to be non-linear and, in many cases, is weak (Bhalotra and Tzannatos, 2002).

Household surveys support the view that poverty plays a major role in the child employment decisions in low-income households. For example, Spindel (1985) surveyed Brazilian adolescents in the labor force. For the poorest children in the sample, 54 percent cited

economic motivation as the primary reason for working while for working children in the higher income brackets, only 35 percent worked primarily for financial (Spindel, 1985).

A study on Ethiopia reveals that both poverty constraints and income opportunities play important roles in the decision to send children to school or to work. It is also found that work and school conflict substantially but not entirely (Cockburn, 2001).

Ethiopia as one of the poorest countries in the world suffers from socio-economic and political problems that primarily embedded in the extreme poverty in which it has been trapped in its long history. As is the case in many aspects of life in the country poverty plays major role for the ever growing involvement of children in the labor market that is characterized by exploitation and denial of basic rights of the working children.

In both rural and urban areas child labour is in one way or another attributable to poverty at local and national level. The national Child labour Survey conducted by the Central Statistics Agency (CSA) provides data on the distribution of child work between rural and urban areas and among regions in the country due to the pressure created by poverty. About 52% of the children were reported to be engaged in productive activities. Girls were mainly engaged in domestic activities (e.g. collecting firewood and water, food preparation, washing clothes) while boys were involved in productive activities (e.g. cattle herding, weeding, harvesting, ploughing, petty trading, wage work). The participation rate in productive activities was 62% for boys and 42% for girls. For domestic activities, this figure was 22% for boys and 44% for girls. In rural areas, children were more frequently engaged in productive activities than in domestic activities, whereas in urban areas the opposite was true.

In rural parts of the country household poverty is caused by large family size, increasing fragmentation of farm land that ultimately leads to low family income. The situation in urban areas is also so severe that , lack of employment opportunities that lead to low family income deprive parents to send their children to school and provide their basic needs. Instead they tend to encourage and even sometimes force their children to inter into the labor market in their early ages so as to enhance the household income to sustain the families. Considering the extreme poverty in both rural and urban conditions, the use of child labour in on farm and off farm activities and in other sectors of the economy has become not a matter of choice (Tassew, et al, *2005)*.

Parents' choice: Bonnet (1993) reports that in Africa child labour is understood to be a form of education which initiates the child into a communal life and is valued by many societies (Bonnet, 1993). Similarly, the report of a National Workshop on Child labour in Ethiopia states: "Many societies, especially poor rural ones, do not necessarily view child work as "bad" rather, it may be part of the socialization process, or it can be termed as a gradual socialization into adult life" (ILO, 1995).

Cost of schooling: whether households for whom it is more costly to send children to school (using distance from the nearest school as a proxy for this cost) are more likely to use child labour. The demand for schooling responds to lower costs, both in school expenses (fees, clothing, books, and the like) and the opportunity costs of traveling over poor roads to distant locations and not having children to do productive work. These costs to families can be lowered. The recent elimination of school fees for primary education in Kenya and Uganda induced major increases in school enrollment.

Quality of Education: Despite progress over the past decade in increasing access to schooling in the developing world, education levels measured by years of schooling are still dismal in many countries (WB, 2008). Low attainment in rural areas is often attributed to farm work; in those areas, children miss school or drop out to help with farm or household work. But studies of child labour show that of the 5- to 14-year-old children not in school, 37 percent do not work and an additional 32 percent do only domestic work. Other reasons for dropping out include the inability to meet costs of attendance, distance to school, a curriculum or language incompatible with local conditions, beliefs that education is not necessary and poor school quality. Improving basic education in rural areas, neither primary education in Africa nor secondary in Latin America, is essential to energize the process of rural development (WB, 2008).

Returns to Schooling: Behavioral theory argues that parents use their own experience (i.e., returns to education) in the labor market to decide whether to send their children to work. Though rates of returns to education may be increasing as a country develops, parents may still use their own experience in making schooling decisions for their children (Beegle et al, 2004). Reducing child labour will require parents to be farsighted (i.e., to recognize the future returns to schooling) and to be able to engage in costly long-horizon investments (either through internal funding or borrowing).

Capital Market Imperfection: Baland and Robinson (2000) emphasize the importance of capital market failure as a contributing factor to inefficient child labour. They take as a point of departure the fact that child labour is a device for transferring income from the future into the present. A child who works today at the expense of acquiring an education will contribute to

family income today at the expense of future productivity (Baland and Robinson, 2000). Ranjan (2001) argued that credit constraints facing households result in excessive child labour and hinder children's human capital development. Rammohan (2001) also consider the role of credit constraints.

A government loan that is tied to the child's educational performance and becomes the liability of the child, rather than the parent, allows the child to access the capital markets to meet required contributions to the family. Such a loan is efficient provided there is some reason to believe that the child would have voluntarily undertaken the loan if he/she had the cognitive ability to analyze the choices like an adult (Drusilla, 2001).

Using household wealth (log per capita durable assets and household expenditures) as a proxy for a household's ability to borrow, Beegle *et al.*, (2004)assert that households who face a lower discount rate are less likely to resort to child labour (Beegle *et al.*, 2004)[2].

Even if parents treat their child's future as a contributing factor to their own sense of well-being, they may be willing to borrow against their own assets or future income in order to finance their child's education. In this case, a lack of collateral will prevent parents from accessing the capital markets, thus again giving rise to an inefficiently low level of education.

Labor Market Imperfection: Labor market imperfections may make it difficult for land-cultivating parents to hire extra labor, for example during peaks of agricultural activity, leading children to work though their household's resources may be above subsistence levels (Leclercq, 2001).

[2] See also Beegle *et al (*2003) and Jacoby (1994) for similar analyses.

Two papers by Bhalotra and Heady (2000) and Cockburn (2000) argue that agricultural households who do not need their children's income to survive may still use child farm labor if labor market imperfections prevent them from hiring extra adult labor, notably during seasonal peaks of activity.

Family Assets: In the absence of access to formal capital markets, the household may still be able to tap internal assets. The presence of the father in the household, the presence of an older sibling in the household (particularly a brother), the capacity of the mother to engage in market work or property associated with a family enterprise can all be thought of as assets that can be drawn upon even if the family has no access to formal capital markets. For this reason, the presence of such household assets might be expected to lower child labour.

Ownership of productive assets like land can increase child labour. Bhalotra and Heady (2000) illustrate this argument with a theoretical model, and present evidence from rural Ghana and Pakistan (Bhalotra and Heady, 2000). Land ownership may have detrimental effect to child schooling while increasing child labour. Studies try to stipulate the effect of landowning on child labor and schooling decisions, with the view that landowning households could have a greater demand for child labour (Beegle *et al*, 2004).

Cockburn (2001) stresses that the ownership of productive assets increases the marginal returns to child labour, though some assets are rather labor-decreasing. He provides evidence on rural Ethiopia —probably the country with the highest incidence of child work in the world today— but does not control for income, so that his estimates mix up the contribution of assets to household income and their impact in terms of substitution between child and adult labor.

Child labour-increasing (-decreasing) assets are characterized by a dominant wage (income) effect (Cockburn, 2001). Using a multinomial logit analysis of data from rural Ethiopian households the author find that small livestock and land ownership are child labour-increasing, whereas ownership of oxen, bulls and ploughs, land quality and proximity to a source of water are child labour-decreasing (Cockburn, 2001).

Nevertheless, it may not be possible to determine *a priori* in which direction these family assets alter child labour rates. For example, in order for a mother with small children to engage in market work, she may require her older female children to engage in child-care rather than school. It is generally the case that gender plays a key role in whether a child is engaged in home or market work. In addition, as a consequence of the rigidities of market work, children may have time to attend school but are required to work while school is in session (Drusilla, 2001).

In his study of a Bangladeshi village, Cain (1977) finds that "children of owners of productive assets, therefore, can begin work at a considerably earlier age in a large number of directly productive activities requiring assets" (Cain, 1977).

Beegle et al (2004) also show that child labour is prevalent among households likely to have higher borrowing costs, that are farther from schools, and whose adult members experienced negative returns to their own education suggesting that reducing child labour will require facilitating access to credit and will also require households to be forward looking (Beegle et al, 2003).

Assets such as livestock have mixed effects on child labour and schooling, depending on the shock and asset type. However, household durables are substitutes for increased child labour when households face health shocks (Andrew, 2007).

Agricultural Technologies: The fact that child labour is mainly agricultural phenomenon in developing countries implies that agricultural technologies would have important implications for child labour. On the one hand, farmers who adopt new and improved agricultural practices are more likely to enjoy a substantial income increase that should lead to an increased demand for education (Basu and Van, 1998; Edmonds, 2005; Basu and Tzannatos, 2006; Kazianga, 2007). On the other hand, it might be the case that the productivity of child labor is relatively high when used along with improved practices (Collins and Margo, 2006; Levy, 1985; Foster and Rosenzweig, 1996) which reduces families' willingness to send their children to school. Self and Grabowski (2007) assumed that adult labor and child labor are substitutable when agricultural technology is labor intensive, but not when technology is more advanced which not only reduces/eliminates the need for child laborers, but also makes the agricultural sector more productive.

According to Hayami and Ruttan (1985), agricultural technology is generally divided into two types or varieties: biochemical and mechanical. The former involves the use of high yield seeds, fertilizer, and irrigation that allows for a more intensive cultivation of the land while the later utilize machinery to substitute for labor. Even though the impact of these different types of technology on child labor is not so straightforward, the application of mechanical technologies would likely reduce the employment of children while biochemical technologies might increase opportunities for child labor (Self and Grabowski, 2007). However, the successful application

of biochemical technologies requires a careful and precise application of water and fertilizer at appropriate times (Nkamleu, 2009). Thus the labor required will need to be more skilled resulting in parents deciding to send their children to school.

Demand for Child Labour: The demand aspect in the labour market can have a share in determining the incidence of child labour. In this respect, Kaijace and Kanyala (1998) argued that the demand for cheap labor by most employers was another reason for children to be involved in child labour. They further continue to argue that employers in Tanzania prefer children below the age of 15 because they are cheaper, easier to access and less demanding compared to adult employees who have the relative advantage of bargaining the terms of employment in the labor market. They conclude that the prevalence of child labour in Tanzania is a result of "push-pullover" effect (Kaijace and Kanyala, 1998).

2.2.2. Child labour and Schooling

Child labour is perceived to be a serious problem as it is believed to be destructive to children's intellectual and physical development, especially that of young children. The danger is exacerbated for those children who work in hazardous industries. Children engaged in exploitative activities are deprived of their childhood and potential by the demands of long hours and exposure to physical, social or psychological stress. Inadequate pay, high responsibility and lack of access to education all contribute to undermining the dignity and self-esteem of children (ILO, 2002).The same report further stated that apart from being detrimental to the full social and cognitive development of children, child labour is also frequently a cause of physical and emotional abuse (ILO, 2002).

It is possible that children who engage in child labour may benefit from the work experience. Beegle *et al* (2004) found that child labour significantly reduces school attainment. However, this negative effect is offset by increased earnings from wage and farm work among those who worked as children. A moderate amount of work in safe conditions can allow children to develop useful skills and a sense of responsibility (Edmonds and Turk, 2003). Children working within their family acquire experience that enters their human capital, and there is a trade-off between these skills and those acquired through schooling. Antoine and Sylvie (2000) show that this can explain why rural Tanzanian children typically start schooling at the age of 8 or 9 rather than 6 years: they are sent to school only when the marginal returns to schooling become larger than those to work experience (Antoine and Sylvie, 2000).

Participation to household chores or labor on the family farm may represent children's participation to family life, the acquisition of household and farm skills which enter children's human capital, or undesirable child work. They become really problematic when they conflict with schooling, affect children's health, or deprive them from leisure, but defining a general threshold beyond which this happens is impossible (Leclercq, 2001).

A study on the analysis of the socio-economic consequences of child labour in the age range of 8 to 13 in Vietnam, find that children who worked when they were young are significantly less likely to be attending school five years later and have a significantly lower level of educational attainment (Beegle et al , 2004). The authors find that a mean level of child labour (7 hours) leads to a decrease in educational attainment of half a year. This reduction in schooling in turn implies future earnings that are 2.5 percent lower.

Patrinos and Psacharopoulous (1997), in their attempt to show that working children contribute substantially to household incomes using Peruvian data, revealed that child labour was not detrimental to schooling and left the authors wondering if in some cases "working actually makes it possible for the children to go to school". It can be assumed here that this result only holds for part-time work, which is funding the cost of the education. Hence this evidence suggests that a small amount of child labour can be a complement to schooling.

Empirical evidences show that child labour is not the exact inverse of school attendance. Many children combine work and school and this is especially common when the work they do is on family-run farms or enterprises. This is facilitated by school schedules that accommodate agricultural seasons.

CHAPTER THREE

METHODOLOGY

3.1. The Model

Previous studies on the determinants of children's participation (Assefa, 2002; Nkamleu, 2009 and Cockburn, 2001) in different activities (work, school and/or a combination of them) have used categorical outcome models.

With the underlying assumption that child labour is a logical response to household utility maximization problem subject to production, time and cash income constraints (Assefa, 2002), this study attempts to model the choices regarding child time allocation activities as a function of child-specific, parental, household, and cultural characteristics. Following Assefa (2002), the study assumes that the time allocation decisions for the children are made either through a complete agreement among family members regarding the choices or by an altruistic adult, who often is considered to be the household head (Assefa, 2002).

In an attempt to investigate the determinants of children's participation in different activities, the empirical model used to analyze the data is Multinomial Logit Model (Maddala, 1983; Crammer, 1991)**.** For regressors that are invariant across alternatives the appropriate model is the multinomial logit model. The advantage of this model is that it allows the analysis of decisions across more than two categories- enabling the determination of choice probabilities for different categories of child exploitation. This approach is more appropriate than the conventionally used tobit or probit models which have two dichotomous alternatives (Nkamleu,

2009). The Multinomial Logit has S possible states or categories i.e., s=1, 2, 3,…, S that are exclusive and exhaustive (Crammer, 1991).

The specific assumptions that lead to the Multinomial Logit Model are:

1) Error components are extreme-value (or Gumbel) distributed;

2) Error components are identically and independently distributed across alternatives;

3) Error components are identically and independently distributed across observations/individuals.

At the heart of Multinomial Logit Model is the assumption of Independence of Irrelevant alternatives (IIA). IIA states that for any individual, the ratio of probabilities of choosing two alternatives is independent of the presence or attributes of any other alternative. The premise is that other alternatives are irrelevant to the decision of choosing between the two alternatives in the pair. The ratios of the probabilities for each alternative depend only on the attributes of those alternatives and not on the attributes of the third alternative and would remain the same regardless of whether that third alternative is available or not. In effect IIA argues that there are neither substitutes nor compliments for the alternatives. The major implication of the IIA property is that it allows additions or removals of an alternative from the choice set without affecting the structure or parameters of the model.

The IIA assumption has been tested using Hausman test. The basic approach in the test is to compare the outcomes when some alternatives are included and excluded.

The MNL model is specified as follows:

Chact = $ß_0$+ $ß_1$Age+ $ß_2$Age2+ $ß_3$Sex+ $ß_4$ Biochild+ $ß_5$Head_age+ $ß_6$ Headsex+

$ß_7$ head_lit+ $ß_8$ Head16+ $ß_9$ Headab7+ $ß_{10}$Hhsize+ $ß_{11}$M15+ $ß_{12}$ F15+ $ß_{13}$ NF+

$ß_{14}$ Ninfant+ $ß_{15}$ Depratio+ $ß_{16}$ Lsize+ $ß_{17}$ Nland+ $ß_{18}$ Oxen+ $ß_{19}$ Ozerlsk+

$ß_{20}$ Roof+ $ß_{21}$ Wall+ $ß_{22}$ Offarm+ $ß_{23}$Business+ $ß_{24}$ Eqqub+ $ß_{25}$ Loan+

$ß_{26}$ Remit+ $ß_{27}$Lsharing+ $ß_{28}$Manure+ $ß_{29}$Impseed+ $ß_{30}$Machin+ $ß_{31}$Avgschp+

$ß_{32}$Avgsch+ $ß_{33}$Dis_sch+ $ß_{34}$Amhara+ $ß_{35}$Oromia+ $ß_{36}$SNNP+ ε_i…… (3a)

Where, the variables ar as defined in table 1;

ε_i is the disturbance term of the equation which is iid gumble distributed

i.e., $\varepsilon_i \sim$ Gumble (0, λ).

Our study assumes that the child's unit time endowment can be used for four mutually exclusive activities. At a particular time, a child could be only attending school, only working, working and attending school at the same time and being idle, i.e., neither working nor attending school (leisure). This gives rise to a polychotomous choice framework. Hence the probability of a child having activity j (j=1 school only; j=2 school and work; and j=3 work only &j=4 inactive) is given by the following multinomial logit model.

$$\text{Prob}(Y_i=j) = \frac{\exp(\alpha_j + \beta_j)}{\sum_k \exp(\alpha_k + \beta_k)} \quad \text{for j,k=1,2,3,4} \text{----------} \quad (3b)$$

The multinomial probability model assumes that the possible distinct states are exhaustive in that they cover all possibilities.

The likelihood function for a sample of *N* independent observations is then:

$$L_N = \prod_{i=1}^{N}\prod_{j=1}^{m} P_{ij}^{\ y_{ij}} \quad \text{(3c)}$$

where the subscript *i* denotes the i^{th} of *N* individuals and the subscript *j* denotes the *j* th of *m* alternatives.

The log-likelihood function is:

$$L = \ln LN = \sum_{i=1}^{N}\sum_{j=1}^{m} y_{ij} \ln p_{ij} \quad \text{(3d)}$$

Where $p_{ij} = F_j(x_i, \beta)$ is a function of parameters β and regressors. More generally, the number of alternatives may vary across different individuals, so that *m* choices become *mi* choices.

The first-order conditions for the MLE_β are that it solves $\frac{\partial L}{\partial \beta} = \sum_{i=1}^{N}\sum_{j=1}^{m} \frac{y_{ij}}{p_{ij}} \frac{\partial p_{ij}}{\partial \beta_{ij}} = 0$ which is usually nonlinear in β. The distribution of y_i is necessarily multinomial that ensures consistency as then $E[y_{ij}] = p_{ij}$.

Maximizing the logliklihood function with respect to the parameters:

$$\frac{\partial LL}{\partial \beta_k} = \sum_i \left[y_{ik} - p_{ik}\right] x_i$$

$$\frac{\partial p_{ij}}{\partial \beta_j} = p_{ij} x_i - p_{ij} p_{ij} x_i$$

For $j \neq k$, $\frac{\partial p_{ij}}{\partial \beta_j} = -p_{ij} p_{ij} x_i$

The Second Order Condition becomes:

$$\frac{\partial L \partial L}{\partial \beta_J \partial \beta'_k} = -\sum_{i=1}^{N}\sum_{j=1}^{J} p_{ij}(\delta_{ij} - p_{ij}) x_i x'_i$$

Where δij is an indicator variable equal to 1 if $j=k$ and equal to 0 if $j \neq k$.

Unlike the standard regression analysis, the parameter value (ß) is not directly interpretable as the effect of the change in the explanatory variable on the mean or expected value of the dependent variable.[6] In particular, for MNL models a positive regression parameter does not mean that an increase in the regressor leads to an increase in the probability of that alternative. Instead, interpretation for the MNL model is relative to the reference or base category group.

The coefficients need to be adjusted to be marginal effects in the case of the logit model. In other words, the marginal effect, which gives the partial derivatives indicating the change in the probability of the dependent variable relative to a unit change in one of the independent variables, needs to be computed. As the relationship between the regressorrs and the absolute probabilities in non-linear, marginal effects vary according to the choice of vector X and, consequently, they will vary among individuals according to the point of evaluation. By differentiating the multinomial logit model, we find the marginal effects of the explanatory variables on the probabilities as:

$$\frac{\partial p_{ij}}{\partial x_i} = p_{ij}(\beta_j - \bar{\beta}) \quad \text{..... (3e)}$$

Where $\bar{\beta_i} = \sum_j p_{ij}\beta_j$

Alternatively, the marginal effects can be written as follows

$$\delta_j = \frac{\partial p_j}{\partial X_i} = \left[\beta_j - \sum_{k=0}^{J} P_k \beta_k \right] = P_j[\beta_j - \beta bar] \text{---------- (3f)}$$

For continuous variables the marginal effect is the probability change in response to a unit change in the value of the independent variable at the mean value. For dummy variables the

marginal effect is computed as the difference in probabilities of the dependent variable between the group with designated value 1 and the base category. Furthermore, it should be noted that the signs of the beta coefficients are not necessarily the same as that of the marginal effects.

3.2. Specification of Variables

From detailed review of literature on child labour and schooling the following variables are found to be essential factors that explain household decision as to the allocation of child time to work, school and leisure**.**

I) Child characteristics: sex of child, age of child, biological relationship with head

II) Household characteristics: age of household head, sex of household head, household head education level, household size, number of male children over 15 years old, number of female children over 15 years old, number of infants below five years, number of female members in the household, dependency ratio, household membership to eqqub, participation in labor sharing arrangements, household wealth proxied by house quality, land holding in hectares and number of livestock other than oxen and the number of oxen in standard units of livestock.

III) School related Determinants: distance to the closest school in minute and average schooling level in the community (peasant association) and household average school expenditure per enrolled child.

Variables of the model and their definitions are given in Table 1 below.

Table 1: Definition of Variables

Variable	Definition
Chact	Main activity of a child (1 if schooling only; 2 if both schooling and working; 3 if working only; and 4 if the child is neither going to school nor working)
Child Characteristics	
Age	Age of child
Age2	Age of child squared
Sex	Dummy for the sex of the child(1 if male, 0 otherwise)
Biochild	Dummy for whether a child is biological child of the household head (1 if the head's biological child, 0 otherwise)
Household Characteristics	
Headsex	Dummy for male-headed household (1 if male; 0 otherwise)
Head_age	Age of household head in years
Head_lit	Dummy for household head's literacy level(1 if literate, 0 otherwise)
Head16	Household head has 1-6 years of education
Headab7	Household head has 7-12 years of education
Hhsize	Number of household members
M15	Number of male household members aged between 15 and 65
F15	Number of female members aged between 15 and 65
NF	Number of female members in the household
Infant	Number of infants less than 5 years
Depratio	Dependency ratio calculated as the ratio of infants below 5 years old and

	elderly aged above 65 to the total household size
Household Assets	
Ozerlsk	Number of livestock other than oxen in standard livestock units the household owns
Oxen	Number of oxen the household owns
Lsize	Land holding in hectares
Nland	Number of plots of land a household owns
Roof	Dummy for roof material (1 if made from galvanized iron (korkoro), 0 otherwise)
Wall	Dummy for wall material(1 if made from cement, 0 otherwise)
Offarm	Dummy for household involvement in off-farm activities (1 if at least one household member participates in off-farm activities, 0 otherwise)
Business	Dummy for household involvement in other income generating activities (1 if at least one household member participates, 0 otherwise)
Lsharing	Dummy for Household engagement in Labor sharing arrangements (1 if the household participating in shacropping, 0 otherwise)
Eqqub	Dummy for household membership to "Eqqub" (1 if member, 0 otherwise)
Remit	Dummy for household receipt of remittance (1 if household receives remittance, 0 otherwise)
Agricultural Practices	
Machin	Dummy for improved seed usage(1 if the household uses modern machinery, 0 otherwise)
Impseed	Dummy for modern machinery usage(1 if the household uses improved seed,

	0 otherwise)
Manure	Dummy for household applying manure as soil conservation method (1 if the household applies manure, 0 otherwise)
School Related Factors	
Dis_sch	Distance to the closest government primary school in minutes
Avg_sch	Average schooling level of the community
Avgschp	Household Average school expenditure per enrolled child
Regional Dummies	
Amhara	Dummy for Amhara region(1 if Amhara Region, 0 otherwise)
Oromia	Dummy for Oromiya region (1 if Oromia Region, 0 otherwise)
SNNP	Dummy for SNNP region (1 if SNNPR Region, 0, otherwise)
Tigray	Dummy for Tigray region (1 if Tigray Region, 0 otherwise)

3.3. The Data

Data used for empirical investigation in this study is drawn mainly from Ethiopian Rural Household Survey (ERHS) Round Seven collected in 2009 by Addis Ababa University, Department of Economics in collaboration with the International Food Policy Research Institute, Washington DC. The data set covers samples of rural households in the four largest Regional States of the country i.e, Amhara, Oromia, Tigray and Southern Nations, Nationalities and Peoples Regional State (SNNPRs).Use of data from previous rounds has been made to complement some observations for some variables.

The survey covers 1577 households consisting of 9089 individuals of which 6108 are children below 15 years old. For the empirical investigation data on children in the age range of 7 years and 14 years[3] has been considered in this study. There are a total of 2323 children in the 7-14 age category. We run the empirical model for a total of 2072 children comprising 1002 females (48.35%) and 1070 males (51.65%) on whom we have complete information over the variables included in the model.

To substantiate the extent of child labour in the descriptive analysis, use has been made of the Labour Force Surveys (1999 and 2005) as well as the 2007 Population and Housing Census results of Ethiopia collected by the Central Statistics Agency (CSA) of the country.

[3] Seven years is the official age in Ethiopia for a child to enroll to formal schooling.

CHAPTER FOUR

DISCUSSION OF RESULTS

4.1 Descriptive Statistics

4.1.1. Child Work Participation

Cognizant of the detrimental effects of child labour on the overall development of children on whom tomorrow depends, the international community has legislated against it. Being the primary responsible body in this arena the ILO has devised two major conventions which obligate signatory countries to act in accordance with the convention. Many of the signatories have tried to incorporate the legislation in to their domestic laws. Yet, child labour has continued being global and complicated phenomenon. The situation would have been improving in countries who had signed for those conventions. Despite the fact that Ethiopia has ratified both conventions, there is no specialized body with the primary responsibility of mitigating child labour . Even the existing legal provisions about child rights are far from implementation in the rural parts of the country where the vast majority of the children reside and where child labour is pervasive.

To allow better understanding of the seriousness of the issue, we present information on the incidence of child labour in Ethiopia using data from labour force surveys and population census results by CSA in addition to the household survey data for the descriptive analysis. The Ethiopian Labour Force Survey conducted in 1999 has an advantage in our particular case over the recent survey conducted in 2005 in the sense that it gives information on the activity status of population aged 5 -14 with appropriate breakdown in the type of activity children engage in.

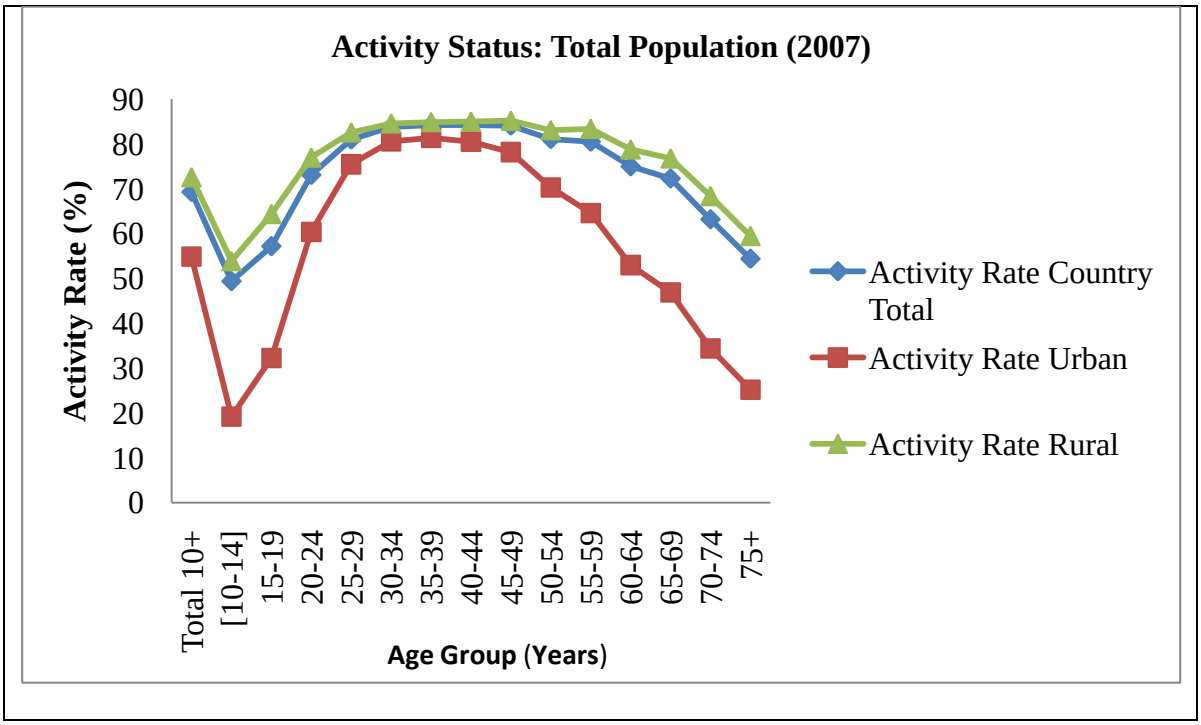
The Ethiopian Labour Force Survey of 2005 is similar to the 2007 Population and Housing Survey in its approach to reveal information on activity status of the population due to the fact that the lower age limit is set at 10 in both cases. To have a clear picture of child work participation in Ethiopia it is crucial to include children younger than 10 because early engagement in work is an existing reality in the country. In the survey there were a total of 16,185,418 children in this age category of which 51.09% are males and 48.91% are females. About 14,143,865(87.38%) and 2,041,555 (12.62%) children reside in rural and urban parts of the country, respectively. The ratio of males to females is 1.05 in rural Ethiopia while in urban Ethiopia the ratio is 0.95.

As can be clearly seen from Annex 5, children do engage in work activities in various forms even when they are too young (5 years old). At the country level 61.44% of children in the age range of 5 to 14 participate in work with similar participation rate across gender. It is observed that the participation rate is disproportionately high in the rural part where 63.52% of children in the age category engage in work[4] as compared to 46.09% in urban parts of the county. A similar phenomenon has also been observed from the 2005 Labour Force Survey. Higher current activity rate is reported for rural areas: the highest (84.2%) compared to that of the urban areas (63.2%). In the survey, children below 14 account for 47.1% of the total population. The proportion of children is higher in rural (48.9) than urban parts of the country (35.8%). As for their participation in work, children in the age group of 10-14 have a participation rate of 63.8% at the national level (CSA, 2006, pp. 17).

[4] Work encompasses all forms of work activities (unpaid,domestic, paid,etc).

From the perspective of gender the country level figure shows that there is no larger difference in work participation rates between boys and girls. However, residence specific data reveals that work participation of girls is higher than that of boys (52.67% versus 41.02%) in urban Ethiopia. Similarly the 2007 Population and Housing Survey report provides information on the activity rate[5] for population 10 years old and above.

Figure 1: Activity Rate for the Total Population: Rural-Urban (2007)



Source: Office of Population and Housing Census Commission (OPHCC) (August, 2010). The 2007 Population and Housing Census of Ethiopia: Results for Country-level Statistical Report.pp.261-2.

[5] Activity rate is defined as the percentage of labour force from the working age population (>14). However this definition is not directly applicable to our case because sample children (7-14 years old) are below the demographic working age population.

Table 2: Population Aged 10 Years and Above by Sex, Age Group and Economic Activity Rates

Age Group	Activity Rate								
	Country Total			Urban			Rural		
	Both	Male	Female	Both	Male	Female	Both	Male	Female
Total 10^{+}	69.3	75.1	63.4	54.9	61.8	48.1	72.6	78.1	67.0
10-14	49.4	51.1	47.6	19.2	20.1	18.4	53.9	55.3	52.4
15-19	57.2	58.4	56.1	32.3	31.2	33.3	64.4	65.6	63.1
20-24	73.1	76.6	69.8	60.4	62.3	58.5	77.0	81.1	73.2
25-29	81.0	90.1	73.2	75.5	85.2	66.3	82.6	91.6	75.0
30-34	83.8	94.0	73.8	80.6	91.2	68.7	84.6	94.7	75.0
35-39	84.2	94.9	74.2	81.4	92.9	69.4	84.9	95.4	75.3
40-44	84.2	94.3	73.8	80.5	91.9	66.7	85.0	94.8	75.1
45-49	84.1	94.4	73.2	78.2	92.0	63.3	85.2	94.9	75.1
50-54	81.1	93.0	69.7	70.3	88.0	54.0	83.1	93.9	72.6
55-59	80.5	92.4	66.6	64.6	83.2	45.8	83.4	93.9	70.7
60-64	75.0	88.0	60.8	53.0	71.7	36.1	78.8	90.4	65.5
65-69	72.3	85.1	56.4	46.9	64.4	30.0	76.8	88.3	61.9
70-74	63.2	76.5	48.0	34.4	50.2	21.0	68.4	80.5	53.8
75^{+}	54.4	63.2	42.2	25.2	35.3	16.0	59.5	67.1	48.2

Source: Office of Population and Housing Census Commission (OPHCC) (August, 2010). The 2007 Population and Housing Census of Ethiopia: Results for Country-level Statistical Report.pp.261-2.

As can be inferred from Table 2 above, overall activity rate for the population aged 10 and above is 69.3% with higher male participation rate (75.1%) than female (63.4%). For the total population aged 10 and above males participate more than females both in rural and urban Ethiopia. Comparable to that of adults' children in the age range of 10 and 14 have 49.4% participation rate in the economy. The incidence of child work participation is far larger in rural (53.9%) than urban (19.2%) parts for this age group. Figure 1 above also demonstrates the activity rates for the different age categories at the country level as well as for rural and urban areas of Ethiopia. While 55.3% and 52.4% of rural boys and girls participate in work the corresponding figures are 20.1% and 18.4% for the urban categories.

Data from the Ethiopian Rural Household Survey that covers the four largest regional states i.e., Amhara, Tigray, Oromia and SNNP also demonstrated the engagement of many children in work activities at their early age. Our data in table 2 shows that 3.14% of children start participation in work activities when they are 4 (see Annex 6). At the age of nine 96.67% of children are already participating in work. As far as the incidence is concerned table 3 shows that 61.14% of children in the 7-14 age category participate in work.

Besides the aggregate information it is essential to see what happens to work participation for the differing age groups and across gender. Accordingly, Table 4 shows that 75.69% and 50.44% of boys and girls in the 7-10 age group engage in work while the corresponding figures being 82.03% and 35.56% for the 11-14 age group.

Table 3: Main Activity of Children across different age groups (%)

Main Activity	All boys & girls				Both sexes	
	7-10		11-14			
	Number	%	Number	%	Number	%
School only	414	29.09	459	39.77	843	36.43
School & Work	382	26.84	454	39.34	814	35.17
Work only*	502	35.28	231	20.01	601	25.97
Inactive	125	8.78	10	0.86	56	2.42
Total (%)		100		100		100
Number of children	1423		1154		2314	

Source: Own calculation from the seventh round Ethiopian Rural Household Survey, 2009.

*work includes all work related activities.

Table 4: Main Activities by Sex and Age Groups (%)

Main Activity	Boys				Girls			
	7-10		11-14		7-10		11-14	
	Number	%	Number	%	Number	%	Number	%
School only	117	20.17	99	16.78	263	46.22	354	63.90
School & Work	233	40.17	366	62.03	123	21.62	86	15.53
Work only*	206	35.52	118	20.00	164	28.82	111	20.03
Inactive	24	4.14	7	1.19	19	3.34	3	0.54
Total (%)		100		100		100		100
Number of children	580		590		569		554	

Source: Own calculation from the seventh round Ethiopian Rural Household Survey

4.1.2. Types of Work Activities Children Perform

While some children do contribute income directly to households through formal wage labor, more often children perform a combination of market activities and/or domestic activities, especially in Africa. These market activities include unpaid agricultural production on the family farm and formal or informal family businesses. Domestic activities include household public goods such as food preparation, household cleaning, and provision of childcare for other siblings.

Assessment of the primary and secondary occupation of children in our data shows that children involve in a multitude of work activities; domestic activities such as cooking, fetching water and wood, child care, etc, herding animals, working on the farm and a number of informal activities.

Table 5: Type of work activities performed by children by age and sex (%)

Activity	Age 7-10				Age 11-14			
	Male		Female		Male		Female	
	Number	%	Number	%	Number	%	Number	%
Domestic work	178	30.63	378	66.90	117	19.47	450	76.53
Farm Work	108	18.59	41	7.26	235	39.10	58	9.86
Herding	295	50.78	132	23.36	246	40.93	74	12.59
Others*	0	0	14	2.48	3	0.50	6	1.02
Total (%)		100		100		100		100
Number of children	581		565		601		588	

Source: Own calculation from the seventh round Ethiopian Rural Household Survey, 2009.

*Others informal activities like selling food, trading, manual work, etc.

Of those children for whom it is reported that they engage in some form of work activity be it their primary and/or secondary occupation, the activities have been grouped in to domestic work, farm work, herding and others[6] and presented in table 5. To allow clear understanding of the phenomenon, the information has further been disaggregated by sex and age group. It is observed from the table that 30.63%, 18.59% and 50.78% of boys aged 7-10 engage in domestic work, farm work and herding, respectively. Whereas, the corresponding percentages for girls in the same age category are 66.90, 7.26 and 23.36. For the age category of 7-14 male children participate more in herding (40.93%) and farm work (39.10%) but less in domestic work (19.47%). On the contrary, disproportionately large percentages of their female counterparts engage in domestic work (76.53%).

Domestic work and herding are the predominant forms of activities children are involved. Overall, there is evidence that there exist gender based specialization in work types: boys and girls traditionally assume domestic tasks and herding, respectively.

4.1.3. Child Schooling

Ethiopia is characterized by lower literacy rate. The recent population and household survey report, as can be seen from Table 6 below, reveals that only 39.8% of the entire population (5 years old and above) is literate. Males have a relative advantage of literacy (46.2%) over that of females (33.2). This is a manifestation that many school age children have never been to school. Only 27.45% of children aged 5-9 are literate. For the upper category (10-14 years old children) only 57 % are literate with similar literacy rate for both sexes.

[6] Others category includes informal activities like selling food, trading, manual work, etc.

Table 6: Population 5 Years old and Older by Percent Literate, Sex and 5 Year Age Group for the Country Total: 2007

Age Group	Literacy Rate		
	Both Sexes	Male	Female
Total 5^{+}	39.8	46.2	33.3
[5-9]	27.4	27.1	27.8
[10-14]	57.1	56.6	57.6
[15-19]	60.6	65.4	55.6
[20-24]	47.3	59.5	35.9
[25-29]	39.0	52.0	27.7
[30-34]	36.2	49.4	23.3
[35-39]	34.1	48.6	20.6
[40-44]	28.1	42.0	13.6
[45-49]	25.3	38.2	11.8
[50-54]	19.4	30.4	8.8
[55-59]	19.3	28.4	8.6
[60-64]	14.4	21.3	6.8
[65-69]	16.3	22.8	8.2
[70-74]	12.3	17.5	6.3
75^{+}	12.2	15.3	7.9

Source: Office of Population and Housing Census Commission (OPHCC) (August, 2010). The 2007 Population and Housing Census of Ethiopia: Results for Country-level Statistical Report. pp.232.

Data from the Ethiopian Rural Household Survey, as summarized in tables 3 and 4, reveals information on school attendance[7] by primary school age children. For both sexes combined, about 71.6% of children in the age range of 7-14 attend school. School attendance is higher for the 11-14 age category (79.11) than the preceding primary school age category (55.93). Girls have a relative advantage in school attendance as compared to their male counterparts in each age group. It is observed that 67.84% and 60.34% of girls and boys aged 7-10 years attend school, respectively. Enrollment in school gets better in the upper primary school age category for both boys (78.81%) and girls (79.43%).

From the forgoing discussion one can In view of the fact that education is one of the basic rights of a child and human capital development is the way out from poverty, the country is lagging behind threatening the future development potential of the nation. Unless we act upon the issue of child labour and lower child schooling with appropriate policies and coordinated effort, the problems are blinking red.

4.1.4. Combining School with Work

In rural societies where the means of living demands intensive use of labour it is logical to expect that the possibility of combining school with work would be of considerable size. As can be inferred from table 3, 35.17% of primary school age children combine school with work while 36.43% attend school only. Age distribution of the possible categories in which a child can be at a particular point in time differs. The percentages of children attending school only (39.77%) and combining it with work (39.34%) are larger for the 11-14 age range than the 7-10

[7] School attendance here show children's enrollment in school whether they attend school only or combine it with work in the relevant age groups.

range with corresponding values of 29.09% and 26.84%. The proportion of children engaged in work only is lower for the former category than the later indicating late enrollment in rural Ethiopia.

4.2. Econometric Results

As has been discussed in chapter three, the method of empirical analysis is Multinomial Logit using maximum likelihood estimation to estimate the parameters of the MNL equation. Before running the model variables were assessed employing the gladder test in STATA to come up with the appropriate transformation of count variables. All count variables are found to have symmetric distribution at their level. Hence, they are used as they were.

Besides, efforts have been made to detect whether the data set suffers from the problem of multicollinearity. The variance inflation factor (VIF) test has been employed to check for the presence of severe multicollinearity problem among the explanatory variables included in the empirical model. Except for age and its squared value, the VIF test result showed that multicollinearity is not of a serious problem in our data set (see annex 2). The VIF value for the age variable was found to be less than 3 when the age squared variable is excluded. However, because there are supporting evidences that age would not have a linear effect in the Ethiopian context (Beliyou, 2003; Assefa, 2002) and due to the significant impact of this variable in the child work-school participation equation, the researcher found it important to keep the variable despite the higher VIF values. In addition, careful observation of the pair wise correlation coefficients provided in annex 3 are all below 0.8 suggesting that our data set does not suffer from severe multicollinearity problem (Gujarati, 1995).

Another test of critical concern in the multinomial logit model is the Independence of Irrelevant Alternatives (IIA) assumption. Attempt has been made to test whether the assumption holds in our case employing Hausman test making use of mlogtest available in STATA (see annex 4).

The test result conforms to the null hypothesis that an outcome is independent of all other alternatives consistently for all probability sets because for all four categories we have the calculated Chi2 values are less than the corresponding tabulated values at the respective degrees of freedom with a strong p-value of 1.000. Hence, the IIA assumption holds in our context validating the use of MNL model.

Evidence from the descriptive statistics has shown that children perform a multitude of activities which may have implications for their ability to attend school. The probability of a child to go to school, to work or to engage in a combination of them tends to be a response of various child, parental, household, school-related and community variables. The section that follows is devoted to the discussion of the econometric analysis of the impact of those variables on the child work-school participation decision.

4.2.1. Impacts of Child Characteristics

The literature identifies that child specific characteristics could have important implications for the allocation of child time across different activities; school, work and leisure. Among the attributes of children age, sex and biological relationship with the household head have been expected to have pronounced effects on the likelihood of child work and schooling. The direction of their effects on child schooling/ work are determined by socio-cultural factors. It is

important to consider the role of gender in the children's time allocation because subsistent households may be forced to chose which children should go to school; male or female.

The allocation of child time will also be determined by his/her age. In poor households older children may be needed to supplement household income by participating in paid employment restricting their access to school as compared to younger siblings in the household owing to their relative working capacity. Whereas in rural economies where paid employment is almost non-existent and when the work definition encompasses household chores, unpaid family business and farm work apart from wage employment, older children may be allowed to at least combine work and school since younger siblings may overtake the herding and home chore activities. In the Ethiopian context where late enrolment is not uncommon we would expect that the probability of schooling would rise as children age at the primary level. The relationship between child outcome and age may not be linear. Hence, the square of child age has been incorporated to capture the non-linear effect. The marginal effects of the variables on the probability of all children work- school participation are presented here in table 7.

Table 7: Marginal Effects on the Probabilities of Work- School Attendance Outcomes for All Children Combined

	School only	School and Work	Work only
VARIABLE	Marginal Effect[a]	Marginal Effect[a]	Marginal Effect[a]
CHILD CHARACTERISTICS			
Age	0.2031503* (0.05839)	0.1316249** (0.05779)	-0.3120463* (0.04956)
Age2	-0.0085125* (0.00273)	-0.0056664** (0.00271)	0.0132114* (0.00235)
Sex	-0.4139089* (0.02446)	0.3768285* (0.02422)	0.0325323 (0.02337)
Biochild	0.0217083 (0.03582)	0.0687971** (0.03414)	-0.0818747** (0.03430)
HOUSEHOLD ATTRIBUTES			
Head_age	0.0007068 (0.00131)	0.0005749 (0.00132)	-0.00096 (0.00114)
Headsex	-0.0476769 (0.03652)	-0.0434077 (0.03605)	0.08951* (0.02708)
Head_lit	0.0101109 (0.03803)	-0.0099286 (0.03712)	-0.00357 (0.03271)
Head16	0.07284*** (0.04069)	0.0098781 (0.03907)	-0.07412** (0.03227)
Headab7	0.1204706** (0.05247)	-0.0062527 (0.04935)	-0.10995* (0.03618)
Hhsize	0.0159295 (0.01203)	0.0097782 (0.01193)	-0.02775* (0.01084)
M15	-0.016193 (0.01665)	0.007585 (0.01661)	0.008286 (0.01572)
F15	-0.0179245 (0.01811)	0.0123129 (0.01792)	0.00548 (0.01714)
NF	-0.0049961 (0.01414)	0.0094155 (0.0139)	-0.00368 (0.01257)
Ninfant	-0.037527 (0.02875)	-0.015476 (0.02872)	0.055401** (0.0258)
Depratio	0.1104396 (0.16496)	0.0381158 (0.16719)	-0.13077 (0.14329)
HOUSEHOLD ASSETS			

Table 7: Continued

Nland	-0.0105009** (0.00458)	0.0100426** (0.00441)	0.000639 (0.00423)
Lsize	-0.0000365 (0.00011)	0.0001113 (0.0001)	-0.0000709 (0.00014)
Oxen	0.0006896 (0.01085)	-0.000791 (0.01103)	-0.0024772 (0.01024)
Ozerlsk	0.000172 (0.0002)	0.0000557 (0.0002)	-0.0001207 (0.00027)
Roof	-0.0289064 (0.02781)	-0.0036349 (0.02756)	0.0300495 (0.02571)
Wall	0.0497716 (0.05725)	-0.0729206 (0.04787)	0.031596 (0.05184)
Offarm	-0.0166634 (0.02691)	-.0027549 (0.02698)	0.0200974 (0.0242)
Business	0.0089726 (0.02693)	.0114846 (0.02713)	-0.0201473 (0.02362)
Eqqub	0.1069077* (0.03887)	-0.0456028 (0.0351)	-0.0609141*** (0.03155)
Loan	0.0004057 (0.02643)	-0.0052195 (0.02624)	0.0081659 (0.02337)
Remit	-0.0017337 (0.02687)	-0.0471299*** 0.02651)	0.0468754*** (0.02419)
Lsharing	-0.0153963 (0.03015)	0.071882** (0.03051)	-0.0588711** (0.02659)
AGRICULTURAL PRACTICES			
Manure	-0.0226055 (0.03264)	0.04909 (0.03375)	-0.0326722 (0.02758)
Impseed	0.0494657*** 0.03014)	-0.0411884 (0.02978)	-0.0017016 (0.02683)
Machin	-0.0380652 (0.04809)	0.0563903 (0.05273)	-0.0160331 (0.04939)
SCHOOL-RELATED FACTORS			
Avgschp	0.0002503 (0.00016)	0.0001511 (0.00016)	-0.0004125 (0.00026)
Avgsch	0.0853025* (0.01632)	0.0067123 (0.01603)	-0.0881281* (0.0145)
Dis_sch	-0.0205112** (0.0083)	0.0406559* (0.00863)	-0.0192866* (0.00738)

Table 7 Continued

REGIONAL DUMMIES			
Amhara*|	0.016773 (0.07655)	-0.161626* (0.05841)	0.1513729*** (0.07764)
Oromia*|	0.1119228 (0.07318)	-0.2910445* (0.05825)	0.1850009* (0.06897)
SNNP*|	0.0262327 (0.07328)	-0.3028972* (0.05167)	0.2796245* (0.07418)
NUMBER OF OBSERVATIONS	2072		
NUMBER OF ITERATIONS	9		
LOG LIKLIHOOD FUNCTION	-1987.2572		
RESTRICTED LOG LIKLIHOOD	-2424.032		
CHI-SQUARED	873.55		
SIGNIFICANCE LEVEL	0.0000		
PERCENT CORRCTLY CLASSIFIED	63.24		

[a] Figures in parenthesis are standard errors.

*, **, and *** represent significance at 1%, 5% and 10% levels of significance.

Another potential determinant of children's likelihood of schooling and working is their biological relationship with the household head who is assumed to make the child time use decision. It is expected that children who are the direct off-springs of the head would be more likely to attend school than the other children in the household. The head might be inclined towards the human capital development of his/her own child while those who are not his/her direct off-springs may be discriminated in favour of work jeopardizing their potential to attend school.

Our result shows that age has significant effect on child participation in work and school (similar to Tassew et el, 2005). It increases the likelihood of school attendance and combining school with work while it decreases the probability of specializing in work only with a greater impact on schooling. The square of age has the opposite impact implying that children are more likely to combine work with school if not attend school only as they age but at a decreasing rate.

The dummy variable for sex of the child is found to be significant in the schooling and school-work combination equations. This necessitates running disaggregated regression for each sex. Accordingly, the marginal effects of variables from the disaggregated models for girls and boys have been provided in tables 8 and 9, respectively.

Table 8: Marginal Effects on the Probability of Work-School Participation for Girls

	School only	School and Work	Work only
VARIABLE	Marginal Effect[a]	Marginal Effect[a]	Marginal Effect[a]
CHILD CHARACTERISTICS			
Age	0.3158187* (0.08096)	-0.0064318 (0.05304)	-0.3093582* (0.06788)
Age2	-.0124969* (0.00381)	-0.0007005 (0.00253)	0.013196* (0.00321)
Biochild	-.0105446 (0.05008)	0.0006594 (0.03279)	0.009886 (0.04163)
HOUSEHOLD ATTRIBUTES			
Head_age	0.0000349 (0.00179)	-0.0269739 (0.03415)	0.0013764 (0.00151)
Headsex	-0.0245404 (0.04747)	-0.0130295 (0.03337)	0.0515091 (0.03784)
Head_lit	0.0328855 (0.05252)	-0.0308822 (0.03171)	-0.0198586 (0.04569)
Head16	0.0489736 (0.0529)	0.0473179 (0.05552)	-0.0180887 (0.04659)

Table 8: Continued

Headab7	-0.0102001 (0.07134)	-0.0269739 (0.03415)	-0.0371178 (0.05721)
Hhsize	0.0631078* (0.01747)	-0.0120707 (0.01138)	-0.0510396* (0.01527)
M15	-0.074536* (0.02363)	0.0204266 (0.0151)	0.0541108* (0.021)
F15	-0.0714258* (0.02589)	0.0520217* (0.01678)	0.0194027 (0.02309)
NF	-0.0170373 (0.02016)	0.00294059 (0.01369)	0.0140987 (0.0172)
Ninfant	-0.1090658* (0.04004)	0.010886 (0.02483)	0.09818* (0.03509)
Depratio	0.394234*** (0.22305)	0.0337544 (0.14338)	-0.4279699** (0.19122)
HOUSEHOLD ASSET			
Lsize	0.0051387* (0.00129)	-0.0068016* (0.00168)	0.0016628* (0.0005)
Nland	-0.0191059* (0.0069)	0.0195095* (0.00486)	-0.0004041 (0.00591)
Oxen	-0.0027319 (0.01562)	-0.0029052 (0.01054)	0.0056335 (0.01377)
Ozerlsk	0.0001673 (0.00053)	-0.0001766 (0.00067)	9.56E-06 (0.0002)
Roof	-0.0124364 (0.0399)	0.0149002 (0.02584)	-0.002463 (0.03485)
Wall	0.0889156 (0.07072)	-0.0520956 (0.03192)	-0.0367643 (0.06513)
Offarm	-.0060986 (0.03771)	-0.0146105 (0.02475)	0.020709 (0.03283)
Business	-0.00049 (0.03711)	0.0244803 (0.02587)	-0.0239927 (0.03113)
Eqqub	0.0974873** (0.04638)	-0.0119307 (0.03004)	-0.0855581** (0.038)
Loan	0.0164476 (0.03674)	0.0020392 (0.02353)	-0.0184791 (0.03211)
Remit	-0.0557212 (0.03853)	-0.0237019 (0.02432)	0.0794232** (0.03368)
Lsharing	0.0233302 (0.04276)	0.0427404 (0.02881)	-0.0660799*** (0.03651)
AGRICULTURAL PRACTICES			
Manure	-0.0088988 (0.04627)	0.0125144 (0.03286)	-0.0036183 (0.0381)

Impseed	0.0225204 (0.04135)	0.0391277 (0.03027)	-0.0616359*** (0.0336)
Machin	-.0557167 (0.07341)	0.0311242 (0.05304)	0.0246128 (0.06576)
SCHOOL RELATED FACTORS			
Avgschp	0.0007346 (0.00045)	0.0001581 (0.00013)	-0.0008927*** (0.00053)
Avgsch	0.160391* (0.0243)	-0.0362352** (0.01602)	-0.124148* (0.02101)
Dis_sch |	-0.0003334 (0.01183)	0.0101658 (0.00794)	-0.0098312 (0.01041)
REGIONAL DUMMIES			
Amhara	0.0257202 (0.10881)	-0.0982437* (0.03813)	0.0725329 (0.10494)
Oromia	0.1177442 (0.10429)	-0.2502312* (0.05004)	0.1325027 (0.09571)
SNNP	-0.079906 (0.11369)	-0.2467244* (0.03877)	0.3266362* (0.10821)
MODEL SUMMARY STASISTICS			
NUMBER OF OBSERVATIONS	1002		
NUMBER OF ITERATIONS	21		
LOGLIKLIHOOD FUNCTION	-834.3704		
RESTRICTED LOG LIKLIHOOD	-1058.323		
CHI-SQUARED	447.91		
SIGNIFICANCE LEVEL	0.0000		
PERCENT CORRCTLY CLASSIFIED	70.90		

Figures in parenthesis are standard errors.

*, **, and *** represent significance at 1%, 5% and 10% levels of significance.

Contrary to the findings by Getinet and Beliyou (2007) and Chaudhury et al (2006) for rural Ethiopia and Nielson and Dubey (2002) for rural India, girls are found to be more likely to attend school relative to their boy counterparts. We found that boys are less and more likely to specialize in school only and combine school with work activities by 41% and 37%, respectively, than girls.

Being the direct off-spring of the household head is found to increase the children chance to combine school with work and decrease the probability to specialize in work related activities which implies that other children in the household are disadvantaged for they lack access to formal schooling.

Table 9: Marginal Effects on the Probabilities of Work- School Participation for Boys

	School only	School and Work	Work only
VARIABLE	Marginal Effect[a]	Marginal Effect[a]	Marginal Effect[a]
CHILD CHARACTERISTICS			
Age	0.0619554 (0.05229)	0.3188597* (0.08006)	-0.3612652* (0.07093)
Age2	-0.0031437 (0.00245)	-0.0126776* (0.00374)	0.01504* (0.0036)
Biochild	0.0186725 (0.0316)	0.1549067* (0.05175)	-0.1642915* (0.05031)
HOUSEHOLD ATTRIBUTES			
Head_age	0.00085 (0.00119)	-0.091826** (0.04664)	-0.0026262 (0.00164)
Headsex	-0.0414433 (0.03564)	0.0256864 (0.05215)	0.134798* (0.03739)

Table 9: Continued

Head_lit	-0.0205431 (0.03945)	0.0640102 (0.05516)	-0.0100145 (0.04516)
Head16	0.0638798 (0.04572)	-0.0403669 (0.0727)	-0.1130833* (0.04239)
Headab7	0.2080724* (0.07169)	-0.091826** (0.04664)	-0.1614343* (0.04383)
Hhsize	-0.0109302 (0.01093)	0.0226044 (0.0164)	-0.0133035 (0.01488)
M15	0.0255887*** (0.01555)	0.0010989 (0.02403)	-0.0291641 (0.0226)
F15	0.0280939*** (0.01669)	-0.0321657 (0.02553)	0.0045476 (0.02368)
NF	-0.0004854 (0.01302)	0.0200374 (0.01937)	-0.0202759 (0.0176)
Ninfant	0.0132194 (0.02725)	-.0385359 (0.04066)	0.0314568 (0.03658)
Depratio	-0.103372 (0.15706)	0.04612 (0.23341)	0.0703522 (0.20403)
HOUSEHOLD ASSET			
Lsize	-.0001684 (0.00028)	0.0002777 (0.00027)	-0.0000704 (0.00021)
Nland	-0.007523*** (0.00448)	0.0101811 (0.00631)	-0.0011937 (0.00578)
Oxen	0.0105452 (0.01041)	-0.0032965 (0.01544)	-0.0094375 (0.01404)
Ozerlsk	-0.0140611* (0.00451)	0.0105629* (0.00327)	0.0039506** (0.00185)
Roof	-0.0251075 (0.02462)	-0.0367992 (0.03897)	0.0564153 (0.03594)
Wall	-0.0253418 (0.05522)	-0.0622301 (0.07805)	0.0945791 (0.0745)
Offarm	-.0221395 (0.02402)	0.0172644 (0.03754)	0.0051203 (0.03391)
Business	-0.0059988 (0.0239)	0.0195041 (0.03709)	-0.0123851 (0.03331)
Eqqub	0.0837143** (0.04115)	-0.0555126 (0.05179)	-0.0269182 (0.04633)
Loan	-0.0233191 (0.02516)	-0.0069332 (0.03655)	0.0335132 (0.03226)
Remit	0.03625 (0.02458)	-0.0551976 (0.03674)	0.0166003 (0.03317)
Lsharing	-0.0426288 (0.02622)	0.0665378 (0.04121)	-0.0246616 (0.03735)

Table 9: Continued

AGRICULTURAL PRACTICES			
Manure	-0.0281764 (0.02619)	0.0462009 (0.04458)	-0.0257029 (0.04012)
Impseed	0.0392312 (0.02807)	-0.1153035* (0.0426)	0.0803858** (0.03968)
Machin	-0.0421614 (0.0421)	0.1086435 (0.07205)	-0.0678509 (0.06581)
SCHOOL RELATED FACTORS			
Avgschp	0.000015 (0.00014)	0.0000551 (0.00025)	-0.0000916 (0.00026)
Avgsch	0.0081556 (0.01456)	0.0469549** (0.02203)	-0.0538054* (0.02019)
Dis_sch	-0.0210053* (0.00748)	0.0504032* (0.01272)	-0.0288731* (0.01023)
REGIONAL DUMMIES			
Amhara	-0.022216 (0.07143)	-0.1581703 (0.10477)	0.181746*** (0.10758)
Oromia	-0.0036851 (0.07234)	-0.1835531*** (0.10075)	0.1874784** (0.09483)
SNNP	0.0062289 (0.07568)	-0.2092371** (0.10255)	0.1960974*** (0.10357)
MODEL SUMMARY STASISTICS			
NUMBER OF OBSERVATIONS	1070		
NUMBER OF ITERATIONS	7		
LOGLIKLIHOOD FUNCTION	-1018.5974		
RESTRICTED LOG LIKLIHOOD	-1180.663		
CHI-SQUARED	324.13		
SIGNIFICANCE LEVEL	0.0000		
PERCENT CORRCTLY CLASSIFIED	53.80		

[a] Figures in parenthesis are robust standard errors.

*, **, and *** represent significance at 1%, 5% and 10% levels of significance.

4.2.2. Household Attributes and Child work-School Participation

Household attributes specific to the head and variables of household composition would have important implications for child time allocation decision. The variables included are sex, age and education level of the head, size of the household, the number of females, number of infants, number of females and males above the age of 15 and below 65 and dependency ratio defined as the ratio of infants (below 5 years) and elderly (above the age of 65 years) to the total number of household members.

Female headed households in highlands are likely to be discriminated against in the provision of assets mainly land which is the most important asset for survival restricting their earning potential (Assefa, 2002). This has an implication that since children have less to do on farm they may have sufficient time for school. However, those households may be economically insecure so that children are needed to supplement family income. Female headed households need their male members to undertake farming which is traditionally the role assumed to males. On the other way some argue that female heads are often inclined towards boys and will give priority to male children to send school. In such households older female children would be more likely to assume domestic responsibilities and be out of school. Our result shows that children in male headed households are more likely to engage in work only with a marginally significant effect on boys.

Age of household head may be essential determinant of child work-school outcome. As head gets older children may be more likely at least to combine school with work if not specialize in work only owing to greater demand for labour to complement and/or substitute head's labour. Seen from other perspective, parents may learn from life that investing in education is essential

for future employment prospect of children and hence favour child schooling. We have evidence that age of the head has no as such pronounced effect on child time allocation decision[8].

Apart from sex and age, education level of the head is expected to have an important implication for child schooling- child work decision in line with the *parental education hypothesis* of Dessy (2000). Better education background of parents is likely to favour child schooling as the decision makers become more aware of the benefits of investing in human capital. Besides it is logical to hypothesize that better educated head would be well informed about the detrimental impacts of child labour on the overall development of children. However, it should be noted that uneducated poor parents tend to enroll their children because they have learnt from their lives that they are poor because they were not educated hence they do not want the fate of their children be as themselves. It is hypothesized that head education increases child schooling while decreasing child work.

To capture this possible impact three dummy variables have been introduced to the empirical analyses; dummy for whether the head is literate, dummy for head having formal schooling of up to grade six and dummy for head's schooling level above grade seven. Literacy of household head is found to be significant none of our equations however. As far as the level of schooling is concerned, heads with formal schooling favour child schooling and reduce child work as compared to others (similar results in this case are reported by Assefa and Arjun, 2003; Tassew et al, 2005). Children in households with formal schooling level of up to grade six are more likely to enroll to school only and less likely to specialize in work by 7% each. Whereas,

[8] Head_age variable is significant at only in the work-school combination equation for boys.

those in households having formal schooling level of above grade seven have a greater probability of being in school only (12%) and reduced probability of specializing in work only (7%) than others. At the gender disaggregated level, schooling level of household head has significant influence in reducing the probability that boys would specialize in work only.

The presence of adult males and females in the household is thought to liberate younger children from specializing in work only thereby increasing their potential to attend school. The presence of one more adult male or female is found to reduce the chance of a girl to be in school only by 7% alike while increasing the chance for a boy by 3%. Even worse, the addition of one more male adult heightens the probability of a girl specializing in work only by 5.4%. It is not unexpected because the socio-cultural environment of the rural Ethiopian community is that females are responsible to feed and assist male members implying that one more male adult is an addition to the burden females are expected to bear.

The presence of infants and higher dependency ratio are likely to discourage child schooling as they are required to care for infants and the elderly. An addition to the number of infants is found to increase the likelihood of children to involve in work only by 5.5%. At the disaggregated level, it decreases the probability of a girl to attend school only by 11% at the same time increasing her probability of specializing in work only by 10%. This is not surprising in the case of rural Ethiopia where child care and other domestic activities are principally put on the shoulders of females. The result shows that a point increase in the Dependency ratio is found to raise the probability for a girl to be only at school by 39.4% while decreasing her probability to specialize in work only by a substantially larger percentage (43%).

Another important variable of household composition is household size. Larger households may have sufficient labour input so that children may be likely to enroll in school. Households grow in number adding on children implying that the number of younger children may be disproportionately higher. Larger households may have little income in per capita terms which limits their ability to afford for children's schooling. We have evidence that larger size of household reduces the likelihood of a child to participate in work only. For the pooled model, one more household size leads to a 2.8% fall in the probability of a child only working with a marginally higher effect for girls (5.1%). The findings that more infants reduce child education while large household size and dependency ratio have the opposite effect imply that more numbers of elderly and large household members are assets than are demanders of child labour (Nielson and Dubey, 2002). It is not uncommon for the elderly to keep home and infants even when they are not able to work on farm and other domestic tasks partly reducing children's responsibility to care for siblings at home and there by releasing time for schooling.

4.2.3. The Role of Household Assets

As child time allocation decision is assumed to be a rational response to maximize household utility subject to full income constraint assessment of the role of household assets is indispensable to the child labour-schooling analysis. Many argue that poverty is the driving force behind the engagement of millions of children at their early age in work in a way that endangers their overall development and hence hinders their access to schooling. In non-monetized rural economies, household assets become the potential indicators of household

wealth[9]. Variables thought to measure the household asset position have been included in this study. The most important ones are land size, number of plots of land owned, number of livestock in standard units, and construction materials for roof and wall.

Overall, larger land size discourages specialization in either activity but encourages combination of school with work. This supports the proposition that larger land size demands more labour including children while at the same time increases the earning potential of the household enabling to afford for schooling. The direction of relationship holds for the male boys whereas it is the opposite for the female category. Besides its size the number of plots of land a household owns would have important implication for the demand for labour and hence child school-work outcome. Household ownership of one more plot of land diminishes the likelihood of a child being only at school by 1%. It increases the probability that a child combines school with work by the same percentage point.

Livestock is another essential asset for the rural people. It is likely that more livestock demands more children to herd. On the other hand, ownership of more livestock capacitates the household to pay for school in addition to reducing the need for children to engage in income generating activities which may hinder their schooling potential. It is evident that the vast majority of the rural community employs ox-plow system of agriculture. Hence we found it important to see the impact of the number of oxen a household owns and other livestock in standard livestock units.[10]The number of oxen owned by a household is found to be significant

[9] *Using income as a measure of household living standard will be misleading in the context of rural Ethiopian households because the vast of transaction is in kind form and may not be reported correctly and the reported income of the household may not be the current income at the time of survey.*

[10] *Calf=0.25, heifer/bull=0.75, cows/oxen=1, horse=1.10, donkey/mule=0.70, camel=1.25, sheep/goat=0.13 & chicken=0.013. The standard livestock conversion units are taken from Storck, et al, 1991 as cited in Assefa*

in none of our equations. Broadly, the result reveals that the more number of oxen owned the more likely a child is to attend school only and the less likely to work. As far as the effect of other livestock is concerned, it has been found to be significant in explaining boys' time allocation. For a unit increase in the number of livestock that the household owns the probability of a male child to only attend school falls by 1.4%. Similar results concerning the effect of livestock ownership on child work and school combination for both males and females combined have been found by Getinet and Beliyou (2007). A unit increase in the number of livestock tends to increase a boy's likelihood of combining school with work and work only by about 1% and 0.4%, respectively.

In the context of rural Ethiopia, construction materials for house could be good indicators of the wealth of a household. Accordingly, dummy variables for the construction materials from which the wall and roof of a household has been made is incorporated in our model. Relatively rich households use stone/brick/ cement/concrete for wall and galvanized iron (korkoro) for roof construction. Whereas, poor ones may build their houses from less durable materials such as thach (sar), mood, dung, wood, shembeko, etc. Hence, two dummy variables representing whether a household uses iron for roof or cement for wall has been put in to our analyses. However, these variables failed to be significant determinants in all of our equations.

(2002).The standard livestock unit for young bull which is 0.34 has been taken from Getinet and Beliyou (2007) who used ERHS, 1999.

Apart from the physical assets discussed above, household participation in labour sharing activities , membership to eqqub, access to credit, receipt of remittance, engagement in off-farm and other income generating activities would have interesting implications for child time allocation decision and hence have been included in our model. Our expectation was that household involvement in off-farm and other income generating activities would relax the budget constraint of the household making them capable of paying for educating children. It is also likely that such activities would make children disadvantaged in terms of access to schooling because the burden of domestic and on farm activities might be on children as adults go for income generating activities. In addition, those activities might require involvement of children themselves thereby reducing their probability of attending school. Our evidence tells us that dummy variables intended to capture the effect of off-farm and other income generating activities are insignificant in all our equations both for the pooled and disaggregated data probably because the opposing effects that we expected offset each other.

Despite the fact that formal financial sector is not within the reach of the rural society, people in those areas have established informal group saving and borrowing arrangements like "eqqub" to smooth consumption. Children in households where the head or other family member(s) is/are a member of at least one eqqub have 10.7% greater chance of attending school only relative to being inactive. The effect is somehow larger for girls (9.4%) as compared to boys (8.3%). Female children are more advantageous in the sense that household eqqub membership reduces their probability of specializing in work only by 8.5%.

Supplementary income in the form of remittance could have significant role in deciding whether to enroll a child. We expected that households who receive remittance would invest in

child education and reduce child work. We found that receipt of remittance decreases the likelihood of schooling and increases that of work both in the pooled model and that of girl's equation. Possible explanation for this can be that such families might use remittance income to buy livestock which is likely to increase work burden on children. In the case of boys, they are likely to attend school and combine school with work[11]. Female children are likely to participate in work only by 8% if they belong to a household that receive remittance. Our result reveals that parents use their additional income in the form of remittance disproportionately for the education of boys at the expense of girls. Rural communities may not see investment in child education as such attractive for they may think that they will have secured old age support if their children migrate to some other place or country and follow suit the role of current remitters rather than "wasting time" in school.

Credit market in rural Ethiopia is almost non-existent. Rural households might have been able and willing to educate their children if they have had access to credit under the assumption that child labour is a borrowing across generations. Hence children from households having access to credit are expected to be more likely to attend school and less likely to participate in work only. Nevertheless, the dummy variable for household access to loan is significant in none of our equations even if it is seen that it increases the likelihood of attending school in the pooled regression and for girls separately. For boys credit access has negative effect on the probability of school attendance probably because boys are highly demanded by parents to work so that the loan is to be repaid as per its conditions.

[11] The role of remittance in increasing and decreasing the probabilities of being in school and combining it with work, respectively, is statistically significant at 14% for each outcome.

In agricultural communities who are constrained by income to hire labour and where the labour market is malfunctioning, if it exists, households pool their labour input i.e., engage in traditional labour sharing arrangements to satisfy their labour demand for different activities on the farm. This arrangement, we expected, would have tremendous impact on the child schooling-work decision. Parents may decide to educate their children as labour demand could be satisfied through the sharing arrangements. From another perspective, children would be pulled away from school at peak times to discharge the responsibility of the sharing arrangement even if they were enrolled indicating that this may reduce schooling and increase work. Participation in labour sharing activities increases the probability of a child combining work with school (8%) and reduces the likelihood of specializing in work only (5.9%). Evidence from the disaggregated data tells us that the increment on the probability of combining the two activities is larger for boys (6.6%) than girls (4.3%). While it increases the probability of school attendance for girls, although not statistically significant, it has the opposite and significant effect for boys' schooling.

4.2.4. School Related Factors

Child schooling is not only a demand side phenomenon exclusively determined by the choice and ability of parents to send their children to school. Rather, a host of supply side factors play a role in determining children's chance of going to school. A child may not be in school for a multitude of reasons: because he chooses so, s/he does not have somebody to care for, the household is not able to afford for schooling, s/he is badly needed by family to work, there exist no school in a reasonable distance, the school facilities are too poor, or parents think that schooling is not appropriate for the child. Parental perception about the importance of

schooling may be influenced by their background, the situation in the community, the relevance of education for household and farm work, employment prospects in the labour market and the socio-cultural environment. As a measure of supply-side school factors three variables have been incorporated in the model; distance to the closest government primary school in minutes, household average school expenditure per enrolled child, and average schooling level in the community (peasant association).

Distance to school is expected to hinder the schooling while promoting child labour in rural areas where means of transport other than foot is non-existent. This may be due to security reasons especially for girls. In societies where abduction is not uncommon parents want to keep an eye on their children implying that the farther the school, the less likely children are to attend school. Besides, farther school requires longer time for children to get to school reducing available time for work and increasing the opportunity cost of schooling. We found that for each additional minute distance in primary school, children's probability of attending school only, combining it with school, and specializing in work decrease, increase and decrease by 2%, 4%, and 2%, respectively. This direction of influence applies for the male and female category except that the increment in the boys' probability of combining work and school is larger (5%) while distance to school is not found to be significant in all equations for girls. The result for girls is disputable in the case of rural Ethiopia where harmful cultural practices like rape and abduction are prevalent that implies distance to school should significantly affect the decision to enroll a girl child than the male one for security reasons. It may probably be that female children could perform their domestic tasks even during night reducing the impact of farther school and hence longer hours in the day to get to school. Whereas the natures of

activities male children are traditionally assigned such as herding and on farm activities are not suitable to accomplish during the night time.

Expenditure on school would have important impact on the likelihood of child schooling. In situations where school expenditure is higher parents may not be able to afford for child schooling even if they do not need their children to work. In the rural Ethiopian context where the available schools are government schools, there are no tuition fees. However, parents are expected to pay for registration, learning materials and uniforms. Our results show that average expenditure per enrolled child is significant in the wok equation for girls with 0.09% reduction in the probability of engaging in work only. We observe that a rise in average school expenditure of a household increases the probability of a child's school attendance and combination of school with work while reducing the probability of specializing in work.

Human capital level of the community would have significant influences on investment decision on children schooling. Better stock of human capital manifested by higher average schooling level in the peasant association may reflect parental exposure to the value of education. We expect positive relationship between school attendance and average schooling level of the community.

Our result supports the view that children in better educated communities have better opportunity to attend school (Burney, 1995). We found that unit rise in the average schooling level of people in the peasant association increases the probability that a child attends school only and participates in work only by about 8%. Higher community schooling level promotes a girls' schooling by a substantially greater percentage of 16%. Households in such communities are less likely to induce their female children combine work with school and also to specialize

in work only as has been manifested by the respective probabilities by 3.6% and 12.4%. Similar to the result for the pooled analysis, boys are found to be more likely to attend school at least by combining it with work, if not be at school only, while their probability of participating in work related activities only declines with a rise in the human capital stock of the community.

4.2.5. Agricultural Practices and Decision on Child Time Allocation

Agriculture is labour intensive activity especially in ox-plow farming system which is predominant in rural Ethiopia. Children contribute a lot at the different stages of the agricultural production in addition to home chores and home-based traditional income generating activities that supplement household income. It is likely that agricultural transformation could have pronounced effect on the demand for child labour. We would expect that the application of improved agricultural inputs and methods could reduce the incidence of child labour thereby liberating children to attend school.

Application of manure (compost) to improve and/ or preserve soil fertility, application of improved seeds and the use of machinery in threshing crops are used to capture the effect of improved agricultural practices on the child time allocation decision between school and work. Such practices are expected to improve productivity of available land and hence increased potential to pay for school. On the other hand, increased productivity of labour including children on farm may reduce the attractiveness of schooling. We expect the former effect to more than offset the latter. The evidence we have shows that the application of compost and the use of improved machinery do not significantly affect the likelihood that a child will be at school, at work or a combination of the two. The use of improved seeds significantly increases

the probability of schooling by 4.9% for the pooled analysis although not having statistically significant effect on the schooling outcome at the gender disaggregated level. Evidence from our disaggregated data reveals that use of improved seeds reduces the probability of female children specializing in work while having the opposite effect on boys. Similar results have been reported by Kaziang (2007) for cotton producing households in Burkina Faso.

4.2.6. Regional Differences and Child Labour- Schooling Outcome

A child with similar child specific, parental, household and community characteristics may have different likelihood of attending school and working depending on where he is living. Even if data was collected from rural households expected to have somehow similar living standard, it is still important to account for regional disparities as regions may be different in school infrastructure, socio-cultural and environmental settings. Three dummy variables have been included defined whether a child belongs to that specific region. Tigray region has been used as a reference category.

Our result shows that regional differences significantly affect the likelihood of a child combining school with work relative to being in Tigray region which is used as the reference category. Children in other regions have a reduced probability of engaging in both schooling and work at a particular time than those in Tigray region. Children in Oromia and SNNP regions have greater probability of engaging in work only with the greater influence for the latter (28%) than the former (18.5%). The work-school combination outcome for girls is similar to the pooled model whereas for boys being from Amhara region has not significant effect on the probability of this outcome relative to those in Tigray region. Boys in Tigray region are less likely to specialize in work only than those in the rest region

CHAPTER FIVE

CONCLUSION AND POLICY IMPLICATIONS

The issue of child labour has become a global concern and hence critical in the development economics literature. It is also of a crucial aspect being dealt in the field of sociology. Wide spread arguments continue as to what it constitutes and how to tackle it so as to see a better tomorrow. Despite growing concern about the detrimental effects of child labour by international and national institutions related to labour and child right the fate of the vast majority of children in the invisible and informal sector has not been empirically investigated to the extent that the seriousness of the issue demands. Work related activities such as working on the family farm and domestic chores which are often excluded from child labour definition could have implications for the overall developments of children. Compared to the reference group of non-working children, the educational achievements of those undertaking the various forms of activities would be impaired as work and schooling compete for time (Assefa, 2002).

Several evidences reveal that the incidence of child labour is higher in Sub-Saharan countries than any other part of the world. However, empirical studies in this region are far from sufficient; even the available ones are drawn from case studies. Ethiopia being one of such countries encounters rampant problem of child labour. The proportion of children in the national labour force is estimated to be over 40%. The issue is of critical concern in the sense that working children lack the opportunity to formal schooling than the non-working ones as evidenced by the lowest rate of schooling. The problem is pronounced in the rural parts of the country. Even though labour market doesn't exist in rural Ethiopia child unpaid family work

usually for longer hours is prevalent. Drawing on data from rural households of Ethiopia, adopting a broader definition of child labour that includes all work related activities that children engage in is adopted and employing multinomial logit approach, this study has attempted to assess the major determinants of child labour and schooling.

The results show that children participate in domestic and farm activities which are potentially detrimental to their educational development since considerable number of primary school age children are out of school. This study shows that child, household and community characteristics play significant roles in determining child school-work outcome. Similar to the findings by Assefa (2002), it has been observed from our result that the marginal effects of many variables on school attendance and work outcomes are opposite in the direction of influence and of comparable size. This finding suggests that well planned and research based economic and social policies with the purpose of combating the problem of child labour will have double outcomes by promoting schooling. The major conclusions that emanate from the study are the followings:

- Biological relation to household head has important effect on the likelihood of school and work. Foster[12] children are the most disadvantaged groups as they have very limited chance of schooling while at the same time bear the disproportionate burden of work.

- Number of infants in the household significantly reduces the probability of schooling with the larger effect on female children who are traditionally supposed to care for infants.

[12] In this context "foster child" is used to represent a child in a household who is not son/daughter of the household head.

- Household physical assets have significant gender differential effects. Large land size increases the probability of girls' specialization in either activity with the greater impact on schooling. Whereas, ownership of livestock increases boys' probability of participating in work only due to the fact that herding is customary activity for male children.

- In rural communities where formal financial market is non-existent informal saving and credit associations (consumption smoothing mechanisms) like eqqub play indispensable role in the fight against child labour and in the effort to stimulate child schooling.

- Productivity enhancing agricultural inputs such as improved seeds have considerable role in promoting child schooling.

- It is found that education reinforces itself meaning that apart from parental education higher average schooling level of the community increases household awareness about the importance of education and the detrimental impacts of excessive child labour with the greatest effect on increasing girl's education.

- Lack of access to school in a reasonable distance hinders school attendance. In rural areas where modern transportation to get to school is missing and where child time is highly demanded for work, unreserved efforts need to be made to ensure availability of schools within the reach of those children to reduce the opportunity cost of schooling thereby promoting its utilization.

- Regional disparities have been observed in the child work-school outcome.

On the basis of the major findings of the study the following policy implications have been forwarded.

- Building more schools within a reasonable distance to ensure easy access by rural children backed by adult education can have undisputable positive effect in increasing school attendance.

- Timely provision of improved agricultural inputs like improved seeds with appropriate technical assistance can have immense contribution in the fight against exorbitant child labour and ensure children's access to education.

- It has been clearly observed from the result that the presence of many infants hinders school attendance and induces exclusive engagement in work, especially for girls. Family planning efforts should be made with continuous monitoring about programme performance.

- It has been found that education level of the household head and average schooling level of the community have interesting implications for the child time allocation decision. Adult training through formal and informal means can be a potential area to focus on to mitigate child labour and build human capital via investment in education of children.

- Organizing saving and credit associations within the reach of the rural poor by providing them with starting capital and advice should also be made to enhance build saving habit and overcome the problem of capital market absence.

- Policies and strategies with the aim to tackle child labour and foster education should have gender dimension. Such mechanisms should also take in to consideration regional circumstances since the economic and socio-cultural environment in each region demands means particular to the existing scenario.

  Overall, the long lasting solution to curb the problem of child labour and promote human capital accumulation is to get rid of poverty!

BIBLIOGRAPHY

Andrew, D. (2007): Child Labor and Schooling Responses to Production and Health Shocks in Northern Mali, Cornell University Department of Applied Economics and Management and International Food Policy Research Institute.

Antoine, B. and L, Sylvie (2000), 'Education Demand and Age at School Enrollment in Tanzania', *Journal of Human Resources*, **35**(1), Winter, pp. 177-203

Arjun, B and Assefa, A. (2009): Attending School, Two "Rs" and Child Work in Rural Ethiopia, in the World of Child Labour: An Historical and Regional Survey, edited by Hugh D. Hindman, M.E. Sharpe, New York., pp. 265-267.

Assefa, A.and B, Arjun (2003): Attending School, Two "Rs" and Child Work in Rural Ethiopia, Institute of Social Studies, Working Paper Series No.387.

_____(2005): Attending School, Two "Rs" and Child Work in Rural Ethiopia, in Alemayehu Seyoum et al (eds), Proceedings of the Second International Conference on the Ethiopian Economy, Ethiopian Economic Association, Addis Ababa.

Assefa, A (2002): Allocation of Children's Time Endowment Between Schooling and Work in Rural Ethiopia, ZEF Discossion Paper on Development Policy no. 44. Bonn.

Baland, J. and A. Robinson (2000): Is Child Labor Inefficient? *Journal of Political Economy*, **108** (4): 663-679.

Basu, K. and P, Van (1998): The Economics of Child Labour. *American Economic Review* **88** (3), pp. 412-27.

Basu, K. and Z. Tzannatos, (2006): The Global Child Labor Problem: What Do We Know and What Can We Do?, *The World Bank Economic Review*, 17, pp. 147-173.

Basu, K. (1999): The Economics and Law of Sexual Harassment in the Workplace. *Journal of Economic Perspective*, **17**(3), pp.141-157.

_____ (2006a): Gender and Say: A Model of Household with Endogenous Balance of Power. *Economic Journal* 116(511):558–80.

Beegle et al (2004): Why We Should Care about Child Labour? The Education, Labour Market and Health Consequences of Child: NBER Working Paper Series. 10980, Cambridge.

Beliyou, A. (2003): Child Domestic Work in Ethiopia: An Empirical Investigation. MSc Thesis, Addis Ababa University, School of Graduate Studies, Addis Ababa.

Bhalotra, S. and C. Heady (2000): Determinants of Child Labour in Ghana and Pakistan: A Comparative Study. Miemo, University of Cambridge, University of Bristol and University of Barth.

Bhalotra, S. and Z. Tzannatos (2002): Child labour: What Have We Learnt?, Social Protection Discussion Paper, Human Development Department, The World Bank, December.

Bhalotra, S. (2003): Child Labour in Africa: OECD Social, Employment and Migration Working Papers NO. 4 . *University of Bristol, Bristol, United Kingdom.*

Bonnet, M. (1993): Child Labour in Africa. *International Labour Review*, 132, pp. 371-89.

Burney, N. (1995): Determinants of child school enrolment: evidence from LDCs using Choicetheoretic Approach; *International Journal of Social Economics*, Vol. 22, No., pp. 24-40.

Cain, M. T. (1977): The Economic Activities of Children in a Village in Bangladesh. Population and Development Review **3**(3): 201-227.

Cameron, A. C., and P. K. Trivedi.(2005): Microeconometrics *Methods and Applications*.Cambridge, UK, Cambridge University Press.

Canagarajah, S. and H, Nielson (1999): Child Labor and Schooling in Africa: A Comparative Study**.** Social Protection Discussion Paper Series 9916.

Chaudhury et al (2006): Schools, Household, Risk, and Gender: Determinants of Child Schooling in Ethiopia, CSAE Working Paper Series 2006-06.

Cockburn, J. (2000): Child Labour Versus Education: Poverty Constraints or income Opportunities? Paper Presented at a Conference on Opportunities in Africa: Micro Evidence on Firms and Households. April, Oxford.

Cockburn, J. (2001): Child Labour versus Education: Poverty Constraints or Income Opportunities? Nuffield College (Oxford University) and Center for the Study of African Economies and CREFA.

Collins,W. and R. Margo (2006). Historical Perspectives on Racial Differences in Schooling in the United States, in E. Hanushek and F.Welch (Eds.), Handbook of the Economics of Education, Volume 1, pp. 107-154. Elsevier.

Crammer, J.S. (1991): The Logit Model for Economists: London and New York: Edward Arnold.

CSA (1999): Report on the 1999 National Labour Force Survey, Statistical Bulletin, 225.

CSA (2006): Report on the 2005 National Labour Force Survey, Statistical Bulletin, 365.

CSA (2010): The 2007 Population and Housing Survey of Ethiopia: Results for Country Level Statistical Report, Addis Ababa.

Dessy, S. and D. Vencatachellum (2001): *Accounting for Cross-country Disparities in Child Labou*r Université Laval, Quebec, mimeo.

Dessy, S. (2000): A Defense of Compulsive Measures against Child Labour; *Journal of Development Economics*, Vol. 62, pp. 261-275.

Drusilla, K. (2001): Child abour in Latin America:Policy and Evidence.Working Paper, Department of Economics, Tufts University.

Edmonds, E. and C. Turk (2003): *Child Labor Transition in Vietnam*, in Glewe et al (eds), Economic Growth, Poverty and Household Welfare: Policy Lessons from Vietnam. Washington DC: World Bank.

Edmonds, E. (2005). Does child labor decline with improving economic status? *Journal of Human Resources* **40** (1), 77-99.

Foster, A. and M. Rosenzweig. (1996): "Technical change and Human Capital Returns and Investments: Evidence from the Green Revolution." *American Economic Review* **86(**4), pp. 931-953.

Getinet and Beliyou (2007): Child Labour and Schooling in rural Ethiopia: Is there a trade-off? *Journal of Economic Literature.*

Gujarati, D. (1995): Basic Econometrics, 3rd ed. McGraw- Hill, Inc., Singapore.

Hayami, Y.and V, Ruttan, (1985): Agricultural Development: An International Perspective, Baltimore: Johns Hopkins University Press.

Hazan, M and B, Berdugo (2002): Child Labour, Fertility and Economic Growth: *The Economic Journal*, Vol. 112, pp. 810-828.

ILO (1996b): Child Labour Surveys: Results of Methodological Experiments in Four Countries (1992-93). Geneva.

ILO (1998): Targeting the Intolerable Child Labour: International Labour Conference, 86th Session 1998: Report VoI.1, ILO, Geneva.

ILO (2002): Every Child Counts: New Global Estimates on Child Labour, International Programme on the Elimination of Child Labour (IPEC), Geneva.

ILO (1999): Worst Forms of Child Labour Convention No.182. ILO: Geneva.

ILO (1995): Report of the National Workshop on child Labour in Ethiopia; Eastern Africa Multidisciplinary Advisory Team (EAMAT), ILO: Ethiopia.

ILO (1973): Minimum Age Convention No.138.ILO: Geneva.

Kaijage, J. and P, Kanyala (1998): The situation of hazardous child labour in Tabora Region: With particular reference to the situation in Urambo District and at Tabora Railway Station. Paper prepared for Child Labour Unit, Ministry of Labour and Youth Development. International Programme on the Elimination of Child Labour (IPEC): Tanzania.

Kazianga, H. (2007): Agricultural Technology, Schooling Participation and Child Labor in Developing Countries: Cotton Expansion in Burkina Faso, Oklahoma State University, Department of Economics.

Kebebew, A. (1998): Statistics on Working Children and Hazardous Child Labour in Brief. ILO, Geneva.

Kifle, et al (2005): Report on the rapid Assessment Study on Child Labour in Selected Coffee and Tea Plantations in Ethiopia, Ethiopian Employers's Federation, Addis Ababa.

Leclercq, F. (2001): Child Work, Schooling, and Household Resources in Rural North India: Paper prepared for the Consultative Workshop on Child Work and Food Insecurity in Rural India, World Food Program and Institute for Human Development, New Delhi.

Levy, V. (1985). Cropping Pattern, Mechanization, Child Labor, and Fertility Behavior in a

Farming Economy: Rural Egypt. *Economic Development and Cultural Change* **33** (4), PP.777-791.

Maddala, G.S.(1983): Limmited Dependent and Qualitative Variables in Econoetrics: New York: Cambridge University Press.

Nielson, H and A, Dubey (2002): Child Labour in Rural India: A Micro-Economic Perspective; The Indian Journal of Labour Economics, Vol.45(3).

Nishimura, M., T. Yamano and Y. Sasaoka. Forthcoming. "Impacts of the Universal Education Policy on Education Attainment and Private Costs in Rural Uganda." *Journal of Educational Development*.

Nkamleu, G.B.(2009): Determinants of Child Labour and Schooling in the Native Cocoa Households of CÔte d' Ivore. AERC Research Paper No. 190.

Patrinos, H.A., and G. Psacharopoulos (1997): Family Size, Schooling and Child Labor in Peru: An Empirical Analysis. *Journal of Population Economics*, Vol. 10: 387-405.

Ranjan, P. (2001): Credit Constraints and the Phenomenon of Child Labor. *Journal of Development Economics*, 64, pp. 81-102.

Rosenzweig, M. and R, Evensen (1977): Fertility, Schooling, and the Economic Contribution of Children in Rural India: An Economic Analysis. *Econometrica*, **45**(50), pp. 1065- 1078.

Self, S and R, Grabowski (2007): Agricultural Technology and Child Labor: Evidence from India: Southern Illinois University Carbondale, Department of Economics, Discussion Papers.

Spindel, C. (1985): O menor trabalhador: um assalariado registrado, Sao Paulo: Nobel.

Storck, et al (1991): Farming Systems and Farm Management Practices of Smallholders in the

Hararghe Highlands. Farming Systems and Resource Economics in the Tropics, Vol. 11, Wissenschaftsverlag Vauk, Kiel, cited in Assefa Admassie(2002).

Tassew, et al (2005): Child Labor, Gender Inequality and Rural/Urban Disparities*:* How Can Ethiopia's National Development Strategies be Revised to Address Negative Spill-over Impacts on Child Education and Wellbeing*;* Young Lives, Working Paper Series No.20.

Transitional Government of Ethiopia (1993): Labour Proclamation No.42/1993. Negarit Gazeta, No. 27, Addis Ababa.

World Bank (2008): World Development Indicators. World Bank, Washington DC.

World Bank (2009): World Development Indicators. World Bank, Washington DC.

www.ilo.org.

Annex 1: Summary Statistics of Variables Used in the Model

Variable	Mean	Std. Dev.	Minimum	Maximum
Age	10.59122	2.264794	7	14
Age2	117.3007	47.93935	49	196
Sex	0.5164093	0.4998513	0	1
Biochild	0.8214286	0.3830855	0	1
Head_age	50.13851	13.04287	14	99
Headsex	0.7818533	0.4130873	0	1
Head_lit	0.6158301	0.4865158	0	1
Head16	0.2765444	0.4473971	0	1
Headab7	0.1385135	0.3455215	0	1
Hhsize	7.382239	2.376172	2	16
M15	1.861969	1.1732	0	7
F15	1.80695	0.9262469	0	6
NF	3.624035	1.609083	0	11
Ninfant	0.7157336	0.8261676	0	4
Depratio	0.1352189	0.1262284	0	0.75
Lsize	15.47579	147.6613	0.002	3303.973
Nland	5.999035	3.286129	1	21
Oxen	0.9473938	1.244062	0	8

Annex 1: Continued

Variable	Mean	Std. Dev.	Minimum	Maximum
Ozerlsk	7.137651	136.6377	-19.224	6014.786
Roof	0.2871622	0.4525471	0	1
Wall	0.128861	0.3351269	0	1
Offarm	0.5212355	0.4996694	0	1
Business	0.390444	0.4879676	0	1
Eqqub	0.1423745	0.3495182	0	1
Loan	0.6515444	0.4765962	0	1
Remit	0.4966216	0.5001093	0	1
Lsharing	0.4406371	0.4965834	0	1
Manure	0.1959459	0.3970229	0	1
Impseed	0.3185328	0.4660198	0	1
Machin	0.0704633	0.255988	0	1
Avgschp	27.55052	116.9699	0	3130
Avgsch	2.805222	0.933071	0.9642857	4.548628
Dis_sch	21.483847	1.781245	7	36
Chact	1.946429	0.8410788	1	4
Amhara	0.1978764	0.3984947	0	1
Oromia	0.3967181	0.4893347	0	1
SNNP	0.3069498	0.4613397	0	1
Tigray	0.0984556	0.2980016	0	1

Annex 2: Pair-wise Correlation Table for Variables Used in the Model

	Age	Age2	Sex	Biochild	Head_age	Headlit	Head6	Headab7
Age	1							
Age2	0.9955	1						
Sex	0.0189	0.0202	1					
Biochild	0.0316	0.0279	0.0077	1				
Headage	0.0748	0.079	-0.0204	-0.362	1			
Head_lit	-0.0006	-0.0012	-0.0058	0.1836	-0.2633	1		
Head16	-0.0371	-0.0358	-0.03	0.1277	-0.211	0.4883	1	
Headab7	-0.0017	-0.0025	0.0162	0.1031	-0.2472	0.3167	-0.2479	1
Hhsize	-0.0345	-0.0324	-0.0468	0.1344	0.0576	0.1726	0.1176	0.1384
M15	0.0046	0.0036	-0.0604	0.044	0.1953	0.1431	0.0525	0.0436
F15	0.0475	0.0484	0.0319	-0.0727	0.2005	-0.02	-0.0109	0.0157
NF	-0.0283	-0.0261	-0.3252	0.0696	0.0396	0.0868	0.0855	0.0642
Ninfant	-0.0647	-0.0653	-0.015	0.0775	-0.1915	0.0645	0.0808	0.0906
Depratio	-0.0264	-0.0249	-0.0181	-0.2294	0.216	-0.0813	-0.0471	-0.0191
Nland	0.0412	0.042	-0.0214	-0.0063	0.0562	0.1879	0.0251	0.1073
Lsize	0.0026	0.0005	0.0263	0.014	-0.0116	0.047	0.0706	-0.0121
Roof	0.0006	0.0021	0.0357	-0.0132	0.0273	0.0583	-0.0251	0.0049
Wall	0.0166	0.0157	-0.017	-0.0426	0.0678	-0.1256	-0.0671	-0.1
Offarm	0.0275	0.0256	0.0005	0.0324	-0.0415	0.0395	-0.0036	-0.0129
Business	0.0077	0.0074	-0.0154	0.0554	-0.0489	0.0403	0.0117	0.0972
Eqqub	0.0077	0.0048	-0.0009	0.0097	-0.0389	0.0975	0.0414	0.0086
Loan	-0.0144	-0.018	0.0098	0.0161	-0.0698	0.0138	-0.0008	0.0616
Remit	-0.0334	-0.0333	-0.0027	-0.0687	0.0923	-0.0986	-0.0228	0.0069
Lsharing	0.016	0.0136	-0.0515	-0.0101	-0.0751	0.1494	0.0337	0.0043
Manure	0.0075	0.0091	0.0227	0.0079	0.0031	0.0099	0.0455	0.0414
Impseed	0.021	0.0184	-0.0142	0.0213	-0.0281	0.0885	0.0497	0.2027
Machin	-0.0011	-0.0022	-0.0355	0.0004	-0.0577	0.0895	-0.0016	0.168
Avgschp	0.0001	0	-0.027	0.0243	0.0267	0.0678	0.0522	0.0817
Avgsch	0.0368	0.0352	0.0216	-0.0013	-0.0202	0.1734	0.0531	0.2642
Dis_sch	-0.0048	-0.0033	0.0115	-0.0697	0.1077	-0.0593	-0.085	-0.0095
Chact	-0.1874	-0.1723	0.2473	-0.0507	-0.0062	-0.0869	-0.0556	-0.0891
Oxen	0.0415	0.0415	-0.0169	-0.04	0.0541	0.0575	-0.0537	0.0248
Ozerlsk	0.0008	0.0008	-0.0222	-0.0082	0.0267	0.0099	-0.0192	-0.011
Headsex	-0.0118	-0.0109	-0.0247	0.2023	0.0335	0.3564	0.1986	0.1644
Amhara	0.0105	0.0097	0.0079	-0.0183	-0.0036	0.1582	-0.066	-0.136
Oromia	0.0166	0.0159	0.0188	-0.0212	-0.015	0.0726	0.0037	0.0718
SNNP	-0.0319	-0.0307	-0.0177	0.0617	-0.039	-0.0574	0.0939	0.1269
Tigray	0.0082	0.0085	-0.0141	-0.0363	0.0899	-0.2419	-0.0631	-0.1325

Annex 2: Continued

	Hhsize	M15	F15	NF	Ninfant	Depratio	Nland	Lsize
Hhsize	1							
M15	0.5593	1						
F15	0.4267	0.0843	1					
NF	0.6817	0.1311	0.5399	1				
Ninfant	0.3867	-0.0863	-0.0377	0.3042	1			
Depratio	-0.0028	-0.2006	-0.0929	0.0329	0.6444	1		
Nland	0.2203	0.267	0.1511	0.134	-0.0382	-0.0926	1	
Lsize	0.0784	0.02	0.0728	0.0162	0.0173	0.0123	0.0764	1
Roof	0.0371	0.0329	0.0805	0.0157	0.0286	0.0195	0.0031	-0.0219
Wall	-0.0425	-0.0923	0.0273	0.0129	0.0731	0.1131	-0.0933	-0.0259
Offarm	0.0615	0.066	0.06	0.0295	0.0374	-0.0302	0.0885	-0.0287
Business	-0.0097	0.0478	-0.034	-0.0571	-0.0863	-0.0827	0.0406	-0.0383
Eqqub	0.0315	0.0268	0.0432	0.0351	-0.0521	-0.0812	0.1258	-0.0123
Loan	-0.0017	-0.0101	0.0521	-0.0104	-0.0101	-0.0702	0.0093	-0.0646
Remit	-0.0131	-0.0477	0.0257	0.0383	-0.0532	0.0423	-0.0943	0.0307
Lsharing	0.063	0.0937	-0.0081	0.057	0.0489	-0.0226	0.2669	-0.0161
Manure	0.092	-0.002	0.0478	0.0572	0.111	0.0538	-0.142	0.0698
Impseed	0.1978	0.1758	0.1369	0.1199	-0.0582	-0.1263	0.2764	0.0882
Machin	0.0716	0.0453	0.0309	0.0679	0.0719	0.0151	0.112	-0.0003
Avgschp	0.1202	0.1903	0.1609	0.1027	-0.0558	-0.0524	0.1672	0.0252
Avgsch	0.1103	0.1591	0.1858	0.0718	-0.0865	-0.1095	0.3264	0.0827
Dis_sch	0.0419	0.033	-0.0055	0.007	-0.0093	0.0231	0.1421	-0.0043
Chact	-0.0692	-0.0579	-0.0548	-0.1194	0.0184	0.0253	-0.0863	-0.0109
Oxen	0.0063	0.091	0.0951	0.0384	-0.015	-0.0011	0.2197	0.0311
Ozerlsk	0.0018	0.0642	-0.0012	-0.0143	-0.0248	-0.0187	0.0267	-0.0001
Headsex	0.2709	0.3433	-0.023	0.0872	0.063	-0.0079	0.1681	0.0293
Amhara	-0.1437	-0.0324	-0.0534	-0.0948	-0.0711	0.0057	0.1145	-0.0167
Oromia	0.1008	0.156	0.0135	0.0154	0.0283	-0.0271	0.1816	-0.0098
SNNP	0.0348	-0.0689	0.002	0.0437	-0.0104	-0.0532	-0.1412	0.0449
Tigray	-0.0273	-0.1061	0.0462	0.0339	0.0647	0.1192	-0.2326	-0.0311

Annex 2: Continued

	Roof	Wall	Offarm	Business	Eqqub	Loan	Remit	Lsharing
Roof	1							
Wall	-0.069	1						
Offarm	-0.011	0.1437	1					
Business	0.0496	-0.1749	-0.0449	1				
Eqqub	0.0314	-0.0248	0.0034	0.0165	1			
Loan	-0.0172	-0.0392	0.0676	0.006	-0.0325	1		
Remit	-0.0821	0.0184	-0.0529	0.044	0.0124	0.0356	1	
Lsharing	0.1393	-0.1354	0.3057	-0.0547	0.1725	-0.016	-0.1194	1
Manure	0.0495	-0.0084	-0.0453	-0.0163	0.0668	0.0369	0.1176	-0.0732
Impseed	-0.0882	-0.1702	0.0311	0.0644	0.0712	0.0717	0.0129	0.0838
Machin	0.0712	-0.044	0.0072	0.0232	0.0551	-0.0124	-0.1075	0.1355
Avgschp	0.0298	-0.0513	-0.0179	0.0012	-0.012	0.0134	-0.0827	0.0467
Avgsch	-0.0127	-0.1742	-0.0709	0.0651	0.0156	0.1205	-0.051	-0.0044
Dis_sch	0.0877	0.1873	0.1603	0.0563	0.1257	-0.0361	0.1501	0.0283
Chact	0.0328	-0.0235	-0.0117	-0.0067	-0.0693	-0.0237	0.0484	-0.044
Oxen	-0.0032	-0.0115	0.0628	-0.0584	-0.0294	-0.0032	-0.1668	0.104
Ozerlsk	-0.0008	-0.0095	0.0291	0.0186	0.0526	-0.0437	-0.017	0.0387
Headsex	-0.0367	-0.177	0.0225	0.1401	0.0346	-0.0184	-0.0456	0.0851
Amhara	0.0596	0.0585	0.0104	-0.0027	0.2067	-0.1707	-0.0911	0.218
Oromia	0.1634	-0.253	0.0959	-0.0808	-0.082	0.0506	-0.2648	0.2619
SNNP	-0.1449	-0.2403	-0.2231	0.2352	-0.0106	0.0804	0.2933	-0.2766
Tigray	-0.1238	0.7093	0.174	-0.228	-0.1254	0.0207	0.1027	-0.2933

Annex 2: Continued

	Manure	Impseed	Machin	Avgschp	Avgsch	Dis_sch	Chact	Oxen
Manure	1							
Impseed	-0.0609	1						
Machin	0.1016	0.1072	1					
Avgschp	-0.0575	0.1274	0.0833	1				
Avgsch	-0.1136	0.3632	0.091	0.1738	1			
Dis_sch	0.054	-0.0435	0.0971	0.0495	-0.2124	1		
Chact	0.03	-0.1141	-0.0497	-0.0733	-0.2002	0.0084	1	
Oxen	-0.1873	0.123	0.1223	0.1326	0.2347	0.0049	-0.0548	1
Ozerlsk	0.0023	-0.0179	0.0249	0.0001	-0.0107	0.0249	-0.018	0.0193
Headsex	0.0252	0.1128	0.0084	0.0217	0.1235	-0.0552	-0.0045	0.066
Amhara	-0.175	-0.1784	-0.1367	-0.0629	-0.0636	-0.1559	0.01	0.0785
Oromia	-0.0076	0.1105	0.3048	0.1645	0.1668	0.2047	-0.0645	0.2794
SNNP	0.1592	0.1604	-0.1464	-0.0829	0.0148	-0.2309	0.0636	-0.3202
Tigray	0.0001	-0.1912	-0.091	-0.0576	-0.2117	0.2299	-0.0059	-0.0681

	Ozerlsk	Headsex	Amhara	Oromia	SNNP	Tigray
Ozerlsk	1					
Headsex	0.0185	1				
Amhara	0.0473	0.013	1			
Oromia	-0.0065	0.027	-0.4028	1		
SNNP	-0.0267	0.0754	-0.3305	-0.5397	1	
Tigray	-0.0112	-0.1785	-0.1641	-0.268	-0.2199	1

Annex 3: Hausman Test for Independence of Irrelevant Alternatives (IIA) Assumption

Ho: Odds(Outcome-J vs Outcome-K) are independent of other alternatives.

Omitted	chi2	df	P>chi2	evidence
1	-49.418	74	1.000	for Ho
2	-28.862	73	1.000	for Ho
3	8.729	68	1.000	for Ho
4	-2.868	70	1.000	for Ho

The test result is found to be in favour of the null hypothesis that the outcomes are independent of other alternatives as has been evidenced by the highest P-values for all the four categories alike. This provides the evidence that the independence of irrelevant alternatives assumption has not been violated and hence the use of MNL model is validated.

Annex 4: Work Participation Rate for Children Aged 5-14 by Sex and Age

Age and Sex	Country total		Rural		Urban	
All Ages	Non Working (%)	Working (%)	Non Working (%)	Working (%)	Non Working (%)	Working (%)
Total	38.56	61.44	36.48	63.52	53.01	46.09
Male	38.67	61.33	35.89	64.11	58.98	41.02
Female	38.46	61.54	37.00	63.00	47.33	52.67
5						
Total	84.94	14.06	84.18	15.82	91.35	8.65
Male	83.96	16.04	83.06	16.94	91.51	8.49
Female	85.95	14.05	85.33	14.97	91.19	8.81
6						
Total	69.94	30.06	68.32	31.68	84.39	15.61
Male	69.28	30.72	67.49	32.51	86.12	13.88
Female	70.68	29.32	69.28	30.72	82.59	17.41
7						
Total	51.42	48.58	49.30	50.70	69.59	31.41
Male	51.12	48.88	48.62	51.38	73.38	26.32
Female	51.72	48.28	49.99	50.01	66.02	33.98
8						
Total	39.60	60.40	36.60	63.40	63.41	36.59

Annex 4: Continued

Male	39.75	60.25	36.30	63.70	67.68	32.32
Female	39.46	60.54	36.90	63.10	59.32	40.68
9						
Total	27.76	72.34	24.62	75.38	50.92	49.08
Male	28.23	71.77	24.53	75.47	55.36	44.64
Female	27.30	72.70	24.70	75.30	46.54	53.46
10						
Total	23.30	76.70	20.07	79.93	44.80	55.20
Male	22.79	77.21	18.85	81.15	50.05	49.95
Female	23.84	76.16	21.33	78.67	41.13	58.97
11						
Total	21.74	78.26	18.03	81.97	42.75	57.25
Male	21.98	78.02	17.19	82.81	51.79	48.21
Female	21.47	78.53	19.00	81.00	34.27	65.73
12						
Total	17.04	82.96	14.47	85.53	33.41	66.59
Male	17.65	82.35	14.26	85.74	41.75	58.25
Female	16.34	83.64	14.72	85.28	25.52	74.48
13						
Total	15.25	84.75	11.89	88.11	33.08	66.92
Male	17.07	82.93	12.82	87.18	41.79	58.21

Annex 4: Continued

Female	13.34	86.66	10.89	89.11	25.24	74.76
14						
Total	14.61	85.39	11.44	88.56	29.77	70.23
Male	16.63	83.37	12.49	87.51	38.84	61.16
Female	12.46	87.54	10.28	89.72	21.76	78.24

Source: CSA (1999).pp.440-42

Annex 5: Work Starting Age for Children in Rural Ethiopia

Age	Number	Participation rate (%)	Cumulative rate (%)
4	68	3.14	3.14
5	417	19.25	22.39
6	652	30.11	52.50
7	639	29.50	82.00
8	269	12.41	94.41
9	49	2.26	96.67
10	58	2.67	99.34
11	10	0.47	99.81
12	3	0.14	99.95
13	1	0.05	100
Total reporting	2166	100	100

Source: Own calculation from the seventh round Ethiopian Rural Household Survey, 2009.