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CHILD DOMESTIC WORK IN ETHIOPIA:
AN EMPIRICAL INVESTIGATION

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Analysis)

By

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Abstract

Ethiopia is one of the countries with high incidence of child labour. The work participation rate of children is one of the highest in the world. More often than not, children start participating in work activities at a very young age and spend longer hours on various housekeeping and/or productive activities suggesting the high extent of child labour in the country. Pertinent to the issue of child labour in Ethiopia, existing literature has focused on the analysis of the work participation decision of children. In addition, the focus has been on child work in general and not on a specific child work activity. The objective of this study is to investigate the determinants of child domestic work hours by children in the 4-14 age category. Included in the definition of child domestic work are such work types as fetching of wood/water, minding of younger siblings, cooking, cleaning, and other work types that are domestic in nature.

Two data sets - the 4th Round Ethiopian Urban Household Survey and the 5th Round Ethiopian Rural Household survey - are used in this study. Information is used on the actual hours of domestic work as opposed to mere participation of children in domestic chores since what matters most from policy perspective is the extent of child domestic work one measure of which is hours of labour supply. So as to estimate the domestic labour hour equation for a sample of child domestic workers and in an attempt to take care of possible selectivity bias problem, the Heckman sample selection procedure is used.

The results from the econometric analysis suggest that both economic and sociological factors are important determinants of child domestic work hours. The main findings of the study, among others, included the existence of a significant and negative association between child domestic work hours and household welfare position (proxied by real expenditure), the level of parental education, the presence of electricity, access to remittance, and 'current' school attendance. In addition, female children tend to spend longer hours on domestic chores compared with their male counterparts both in rural and urban areas. Besides, some of the variables (expenditure, land size, and 'current' school attendance) affect domestic work hours by male and female children differently suggesting the existence of a gender bias.

From policy perspective, measures directed at expanding employment opportunities in urban areas (so as to improve the welfare position of households), allowing rural children have access to schools, provision of formal/informal education to adults in general and to mothers in particular, creation of profitable off-farm employment opportunities for poor rural households, and improving the level of urban electrification are of immense importance in the attempt to improve the welfare of child domestic workers. Furthermore, meaningful attempts should be made to reduce the workload on female child domestic workers both in rural and urban Ethiopia. In this regard, use can be made of the media to raise public awareness about the detrimental impact that long hours of work could have on female child domestic workers.

Keywords: Child labour; child domestic work; heckman; Ethiopia

CHAPTER ONE

1. Introduction

1.1 Background

Child labour has become a widespread socio-economic phenomenon. According to a recent global estimate, some 211 million children aged 5-14 years were at work in economic activity¹ in the year 2000. Of these total working children, about 73 million (35%) were less than 10 years old implying the greater risk the working children are exposed to. Also, of the estimated 352 million economically active child population between the ages of 5 and 17, 171 million (49 %) were reported to be in hazardous situations while 8.4 million were involved in what are called worst forms of child labour as defined in the International Labour Organization's (ILO) Convention No.182, Art.3 (ILO, 2002).

Children work for a variety of reasons - economic, traditional and cultural. First and foremost is the *poverty of financial resources* (US Department of Labour, 2000). In situations where parents are unable to earn enough to spend on essentials like food and shelter and where the household could not survive without the money and/or goods and services generated by the labouring children, children work so as to ensure the survival of the whole family. According to a study in Colombia, for example, working children in rural and urban parts of the country contribute, respectively, 35% and 19% of the total household income (US Department of Labour, 2000). In such instances, the argument continues, child work is a necessary evil and the option that parents have is not between letting their children work or not but between living and starving.

¹ *Children at work in economic activity* encompass most productive activities by children, including unpaid and illegal work as well as work in the informal sector (ILO, 2002).

In some other instances the fact that parents are too poor to cover educational expenses out of their pockets could make at least some of the children join the pool of child workers so as to cover their own school expenses and/or that of their brothers and sisters at school. This is especially the case in situations where 'free' public education is in fact very expensive. According to a study by ILO, for instance, " In some places the costs for a primary-level student may represent one-third of the entire cash income of a typical poor family and many families have more than one child of school age"(ILO, 1996a: 7).

Empirical evidence at macro level has also lent a hand to the 'child labour-poverty' nexus. In general, the poorer a country is, the higher is the incidence of child labour. This is confirmed, for example, by the fact that many of the countries in the Sub Saharan Africa (SSA) region are poor and are at the same time countries with the highest incidence of child labour in the world. In fact, economic growth by itself may not guarantee the elimination of child labour since what matters most is not the size of the cake but that of the slices distributed among the residents! The presence of child labourers in some of the world's most developed countries is an indication that economic growth by itself may not lead to the abolishment of child labour. There are, for instance, 230,000 and 13,000 child workers in the agricultural sector and in the sweatshops, respectively, in the United States of America making child labour a cause for concern even for the Americans (UNICEF, 1997).

Apart from poverty of financial resources, *poverty of opportunities* could create a fertile ground for child labour. More often than not, the choices available both to parents and their children are highly restricted. In relation to the former one, a case in point is the limited access parents have to alternative sources of income especially in times of income shocks

and irregularities. The fact that credit from the formal financial sector is barely existent coupled with the relatively high interest rate charged by informal local lenders puts parents in a difficult situation in times of income shortfalls and irregularities (US Department of Labour, 2000).

Lack of access to credit or access to credit only on exorbitant terms exacerbates poverty of financial resources by making it more difficult for families to smoothen income irregularities, to pursue possible income generating activities, and/or to find ways to afford to pay for educational expenses. In situations where the expected return from schooling is high, the argument continues, parents may have an incentive to borrow on the capital market so as to make investment on their children. Inability to borrow from the capital market, however, makes parents borrow across generations and sacrifice the education of their children (Jenson et al., 1997). Also, in the absence of alternative sources of income, parents may be forced to rely on child labour as a risk management strategy and hence a way out of poverty (US Department of Labour, 2000).

Another manifestation of poverty of opportunities that encourages child labour is the *quantitative and qualitative deficiencies of educational systems*. Inaccessibility of schools or accessibility of schools only on exorbitant terms precludes schooling as a feasible use of children's time (Basu, 1999). In some other instances, even if schools are within the reach of children that the education is of low quality and/or is of little relevance to the needs and necessities of societies could become an obstacle for school attendance and spurs parents to enter their children into more 'profitable' pursuits (Bonnet, 1993).

The *nimble-figures* argument is another important supply side factor that encourages the employment of children in various work activities (ILO, 1996a). The attitude that only children can do certain jobs or only they can perform the jobs well is an important factor that encourages the use of child labour. In this regard mention could be made about the high demand for child workers in mining and carpet industries. The *cheapness* of child labour, the docility of children and the associated *flexibility* of ‘employing’ them are also among the factors that encourage the use of child labour. ‘Employers’ often take advantage of the docility of children recognizing that these labourers cannot legally form unions to change their conditions (Siddiqi *et al.*, 2002).

Beyond the traditional effects of cost and income variables, *culture and attitude* could affect the allocation of children’s time into alternative uses. In traditional societies, it is common to perceive child work as a means that allows children “learn” and “be socialized to adulthood” (US Department of Labour, 2000; Grootaert, et al. 1995). In such instances, children in general and girls in particular may be expected to fulfill certain social requirements or functions before they reach adulthood. As such, parents could make their children perform various work activities irrespective of their financial status and/or availability of other alternatives.

It is generally accepted that child work can affect the working children’s learning ability and their aptitude for coping up with different situations thereby creating opportunities for self-expressions. True, it does also provide some material benefits to the children’s ‘employers’. However, it can and does affect the health, physical, educational, and intellectual development of the working children as well as their lifetime opportunities, among others,

the younger the work starting age, the longer the time spent on work activities and the hazardous the conditions under which work is carried out.

A child who participates in work activities at a very young age, for a long time period and under hazardous and exploitative conditions is likely to reach adulthood with impaired physical, intellectual and emotional development. Also, to the extent that work leaves little, if not no time, for school attendance (and study), child labour means forgone skilled human capital needed, *inter alia*, for growth and development thereby perpetuating inter-generational poverty. In fact, a decreased school enrollment rate is one reason that arise interest in the area of child labour (Cockburn, 1999).

At macro level, employment of children in remunerative activities is likely to aggravate poverty by increasing the unemployment and/or underemployment of adults (ILO, 1996a). There are instances where the 'employment' of children encourages adult employment, however. This is especially the case for child domestic work where involvement of children in various domestic chores releases adult labour for employment elsewhere.

In recent years child labour has become one of the central issues in development economics. The increase in the awareness about children's rights, the sharp rise in the number of child workers both in and outside the household economy as well as the increase in the number of children engaged in activities that are likely to affect their development are among the factors that made child labour a real cause for concern. In fact, apart from economic and ethical considerations, the concern for child labour sometimes arises out of vested interests and hidden protectionism (Basu, 1999). As Ray (2001a: 11) put it "The linkage of child

labour, under the guise of 'labour standards', with trade has led to the hijacking of this issue [the issue of child labour] by the WTO from child welfare agencies such as the UNICEF and the ILO".

In the fight against child labour, international organizations have attempted to maintain political pressure by making countries sign conventions meant for improving the welfare of labouring children in particular and that of children in general. The 1919 Minimum Age (Industry) Convention (No.5), the 1930 ILO's Forced Labour Convention (No.29), the 1973 ILO's Minimum Age Convention, the 1989 United Nations (UN) Convention on the Rights of the Child, and the 1999 Convention on the Worst Forms of Child Labour (No.182) are a few to mention in this regard. Also, the fight against child labour has given birth to a number of local governmental and non-governmental organizations whose main objective is the welfare the child.

Child labour exists all over the world though the problem is more perverse in developing regions of the world. Of the estimated 211 million children at work in economic activity in the year 2000, 127.3 million (60.3%) were in the Asian-Pacific region while 48 million (22.7%) were in the SSA region. On the other hand, 17.4 million (8.2%) were in Latin America and the Caribbean while the rest were distributed in the developed and transition economies, in the Middle East, and North Africa (ILO, 2002). This implies that the developing regions of the world alone account for over 90 % of the total child employment. Though Asia stands first in terms of the number of child workers it harbors, Africa is at the

top in terms of work participation rate² of children, the rate being 41%. The corresponding figures for Asia and Latin America are 21% and 17 %, respectively.

In fact the work participation rate of children does vary even in Africa. For example, the participation rate is 33% in East Africa while it is 24% and 22% in West and Middle Africa, respectively, implying the severity of the problem in the eastern part of the continent (ILO, 1996b). According to a recent estimate by the ILO also, almost one in three children below the age of 15 is economically active in SSA (ILO, 2002). In fact the figure could have been higher had it not been for the exclusion of children engaged in ‘invisible’ sectors such as domestic child workers and children engaged in illegal activities.

Ethiopia is one of the countries with high incidence of child labour in the world. The participation rate of Ethiopian children in the 10-14 age group was estimated to be 42.3% in 1995. On average, participation rate has been 48% from 1950 to 1990 (ILO, 1996c). That the Ethiopian economy is a poor agrarian one coupled with the large share of the young in the total population (around 45%) are among the factors that contributed to the high incidence of child labour.

True, Ethiopia has ratified the 1989 UN Convention on the Rights of the Child as well as other similar Conventions meant for protecting children from exploitation and abuse. It has also adopted various relevant national policies and clearly ascertains the right of children in its constitution. The Labour Proclamation (No.42/93) prohibits the employment of children younger than 15 years old, defines hours of work per day for children older than 14 years,

² Participation rate refers to the percentage of children in the relevant age group who work as labourers.

and prohibits the involvement of children in hazardous work conditions in line with the ILO's conventions³. According to article 36(1) of the country's constitution also, children "will not be subject to exploitative practices, neither to be required nor permitted to perform work which may be hazardous or harmful to [their] health and well-being". In spite of all the efforts at a national level, the incidence of child labour is one of the highest in the world.

The 2001 Child Labour Survey Report of the Central Statistical Authority (CSA) of Ethiopia has revealed the prevalence of child labour in the country. According to the nation wide report, 85% of the country's children in the 5-15 age group were engaged in productive activity, in housekeeping activity or in both during the reference week. Also, while the participation rate of boys and girls in productive activities was, respectively, 62% and 22.8%, the corresponding figure for housekeeping activities was 44.3% and 41.9% for girls and boys, respectively. As would be expected, the participation rate of girls is very high in housekeeping activities while that of boys is high in productive activities.

Child work becomes detrimental to the normal development of children the higher the extent of participation measured, among others, by hours of labour supply and work starting age of children. The younger the work starting age and/or the longer the time spent on work activities, the more detrimental child work becomes. In connection with this, the report by the CSA revealed that a third of the children in the 5-17 age group who were engaged in productive activities worked for more than 40 hours over the reference week. Also, 35.6%,

³ Note, however, that both the law and its implementation are highly restricted to the formal industrial sector only.

21%, and 19% of the children engaged in housekeeping activities spent, respectively, on average, 3-4, 5-6, and 1-2 hours a day (CSA, 2001).

In terms of work starting age, Ethiopian children do start participating in work activities at too early an age that they are highly exposed to various health and physical hazards. This is especially the case in rural areas where children often began helping their parents in farm work, herding, and/or domestic work activities as young as 4 years of age. According to the report by the CSA, 54% of the children in the 5-9 age group, 28% of the children in the 10-14 age group and 26% of the children in the 15-17 age category have started participating in work activities below the age of 6 (CSA, 2001).

Assefa (2002), in a study on the allocation of rural Ethiopian children's time, reported that 12% of the total children started participating in work activities as early as 4 years of age. A similar finding was also reported in a background document presented on the National Workshop on Child Labour in Ethiopia held in 1995 where 29.7% and 10.3% of the children in rural areas of *Domaa* and *Imdibir*⁴, respectively, were reported to begin work as early as 4 years of age.

Being a country of extremes, Ethiopia has one of the lowest school enrollment rate in the world. Only 35% of the school-aged children are able to attend schools (ILO, 1995). In this regard, the CSA report also showed that only 4 out of 10 children in the 5-17 age group (38%) were attending school (formal and informal) over the reference week. What is more,

⁴ *Domaa* and *Imdibir* are peasant associations located some 492 and 180 kilometers, respectively, away from Addis Ababa.

40% and 41% of the children aged 13-14 years and 15-17 years, respectively, never went to school (CSA, 2001).

The existence of severe shortage of schooling facility is one possible explanation for such low school enrollment rate. Equally important is also the inability of children to attend schools or to attend them well due to the heavy work responsibility they are in. Even if schools are within the reach of children, the argument continues, children may not be able to attend schools if they spend quite a large share of their time undertaking various productive and/or housekeeping activities. In some other instances, even if working children could undertake school attendance along with work, that they will be left with little time and stamina to concentrate on their education severely affects their educational performance.

1.2 Statement of the Problem

Ethiopia is a country with high incidence of child labour on the one hand and low school enrollment rate on the other. The participation rate of children in work activities is found to be, on average, 48% from 1950 to 1990 (ILO, 1996c). Children often start participating in work activities at a very young age and work for relatively longer hours. The fact that the working children start work at a very young age coupled with the long hours of work makes child labour a real cause for concern in Ethiopia.

It is generally agreed that the development of human capital is one of the inputs necessary for economic growth and development. In this regard, education is believed to have immense importance. However, if children are made to participate in work activities that leave them with little time and energy to attend schools and/or to concentrate on their studies, child

work means forgone human capital. This in turn will have a long term impact on economic growth and development.

It is not uncommon to consider child work in the domestic economy as less exploitative than other types of work activities outside the domestic economy. As a result, it may appear to be no worse than a good exercise and practical training. In this regard, that the children are staying with their 'altruist' parents is often given as a justification for child work in the domestic economy to be less exploitative. The empirical evidence does lend a hand to such sweeping a generalization, however. A case in point is children undertaking household chores.

Child domestic workers spend quite a time switching from one work type to another. This, however, means not being able to attend school for some of the child domestic workers. For other, it means attending school less frequently. Still for some of the child domestic workers domestic work means having less time and energy to concentrate on their study. Unfortunate enough, they are not considered as labourers even in the eyes of the ILO. The focus of this study is on the most common but less accredited form of child work in Ethiopia - child domestic work. Included in the definition of child domestic work are such work types as minding of younger siblings, fetching of wood/water, and cooking, cleaning, shopping, and other work activities that are domestic in nature.

1.3 Significance of the Study

According to the ILO, a child is classified as a worker or economically active if he/she is remunerated for his/her work or if his/her work participation results in a marketable output

(Basu, 1999). Many a time, child work in the domestic economy is not considered as child labour. Also, many of the studies on child labour lump up different child work activities together ignoring the fact that the various socio-economic factors do affect different work types differently. So as to allow a better understanding of the problem, this study has focused on child domestic work. That the focus of the study is on child domestic work shades some light on the most common but less accredited form of child work in the country.

So as to define policy towards child labour, information is needed both about the nature of the work undertaken by children and the nature of the relationship between the labouring child and the 'employer'. Also, factors that push and pull children into work palaces must be identified so as to curb the problem. In this regard, therefore, this study is expected to have immense importance by pinpointing activities to be undertaken and areas to be emphasized in the attempt to reduce the workload of child domestic workers. It will also have a role to play in raising the public awareness about the extent of child domestic work in the country.

In the long term and to the extent that the reduction in the work load of child domestic workers is accompanied by expansion of inputs necessary for human capital development, this study could significantly help the country's endeavurers in the area of human capital development. This in turn is likely to fuel the country's attempt in the area of poverty alleviation. This study is also expected to contribute a lot to the existing scanty body of empirical literature on the economics of child domestic work in the country.

In the absence of studies of this type, it would be difficult, if not impossible, to address problems of child domestic workers since identifying the factors that encourage domestic work would be difficult. Also, it would be difficult to prevent other children from joining the pool of child domestic child workers. This in turn severely affects the working children's prospect given the high extent of participation rate of children in domestic work activities.

1.4 Objectives of the Study

So as to curb the problem of child labour, factors that pull and push children into work places must be identified. Among others, the extent to which child work is in a trade-off position with school attendance in particular and with the normal development of the working children in general depends on the hours of labour supply. The longer the time spent on work activities, the less time and energy will be left for undertaking other activities that are deemed to be of immense importance for the well-being of children. As such the analysis of child labour calls for examining the extent to which child work conflicts with the normal development of the working children. The overall objective of this study is, is therefore, to identify the major determinants of child domestic work *hours* in Ethiopia. The specific objectives are:

1. To examine the extent to which household poverty makes children spend long hours on domestic work activities - the "Luxury Axiom";
2. To compare and contrast the nature and extent of child domestic work in rural and urban Ethiopia;
3. To examine the existence, if any, of gender bias in connection with child domestic work; and

4. To provide empirical evidences and hence guidelines for policy making in the area of child domestic work.

1.5 Limitations of the Study

So as to allow for a better understanding of the child labour problem, this study is restricted to the analysis of child domestic work and not of child work in general. This, however, limits the scope of the study. As such the results of the study should be viewed in the context of child domestic work. The study utilizes information on actual hours of domestic labour supply collected by interviewing the heads of the respective households include in the survey. One possible problem of the data collection process is the difficulty on the part of parents to exactly recall the length of time spent on domestic work activities. The problem is made worse by the very nature of domestic child work - irregularity of domestic work. Considering the inherent data collection problems, the accuracy of the data on hours of domestic work should be considered with some caution.

1.6 Organization of the Study

Five chapters are included in this paper. Following the introduction in first chapter, review of theoretical and empirical literature is provided in the second chapter. Discussion of the method of analysis and justification for the particular selection of the method is included in the third chapter. The fourth chapter is left for detailed discussion of the results from the descriptive statistics and econometric analysis. Conclusion and policy implications are included in the fifth chapter.

CHAPTER TWO

2. Review of Literature

2.1 Review of Theoretical Literature

Unlike to the huge body of empirical literature on the economics of child labour, theoretical writings on child labour are scanty. Basu (1999), in his survey on the child labour literature, wrote, “Theoretical writings on the subject are relatively few.... The empirical writings on child labour are numerous but they are usually not founded on any theory” Basu (1999:1114).

Early theoretical writings identified child labour to have important implications on a number of decisions made at a household level. Specifically, emphasis was given on the existence of close interdependence between the household’s fertility decision and the allocation of children’s time into alternative uses (Rosenzweig et al., 1977; Chernichovsky, 1985; Schuh et al.1986). That children do have economic value to low income parents, the argument continues, has a positive and significant influence on fertility decision and hence on the quantity - quality mix of children. The higher the economic value of children and hence the associated demand for higher quantity, the higher would be the cost of investment on children’s quality.

Theoretical writings on child labour do stress different aspects. While some of the studies stress on the interaction between adults’ and children’s labour market conditions (Basu and Van, 1998; Basu, 1999), others stress on the interaction between alternative uses of children’s time on the one hand and adult labour market conditions on the other (Ray, 2000b; Ray, 1998). In connection with the interaction between adult and child labour market

conditions, Basu and Van (1998) have outlined a case where child and adult labour are considered as close substitutes - the “Substitution Axiom”.

Though few, the theoretical writings on child labour try to address the question of why children work by bringing into view a number of demand and supply side factors that provide its potential determinants. Also, the theoretical writings are based on some shared premises though they differ on their initial assumptions and on the factors that are deemed to be of immense importance in explaining the phenomenon of child labour (Jafarey et al., 2001).

The fact that child labour is socially undesirable and its reduction should be worthwhile is at the heart of all theoretical writings. Also, that child labour is the outcome not of the child’s decision but that of the household about the allocation of children’s time into competing activities is a shared premise among the theoretical writings on child labour (Jafarey et al., 2001).

Another agreed upon issue is the presence of more profitable lines of activities in which children should engage in. In connection with this, the theoretical writings mention school attendance to be the most ideal activity for children. Economic theory treats time spent on education of children as investment in the children’s future productivity and income potential. This is in line with the theory of human capital that was developed by G. Becker, and T. Schultz in the 1950s and 1960s. The argument in connection with this is that to the extent child labour leaves little, if not no time, for school attendance the economic cost of child labour could be measured by the forgone economic benefits of education.

In examining the underlying relationship between child labour and school attendance, theoretical writings with different filaments have emerged (Jafarey et al., 2001). One line of argument focuses on the situation of human and physical markets as affecting the allocation of children's time into alternative uses (*the capital market explanation*). Parsons and Goldin (1989) outlined a case where school attendance and child labour are considered as outcomes of actions on the human and physical market. In their analysis, child labour was considered as arising from absence of a well functioning capital market that forces parents borrow across generations.

In the absence of perfect capital market, the argument continues, borrowing from the capital market becomes difficult or impossible thereby forcing parents to borrow across generation. In allowing the child to attend school, the family incurs various out-of-pocket costs of school attendance apart from the 'income' the child could have earned by working instead of attending school. Families, however, may not be able to bear the direct as well as the indirect costs of school attendance if they are poor and do not have access to alternative sources of income. In such situations, child work becomes a rational outcome of parents' decision in an attempt to ensure the survival of the whole family (Bonnet, 1993). Though without direct reference to child labour, Schultz (1961) and Becker (1993) have acknowledged the importance of credit markets in the long-term development of human capital.

Closely related with the capital market explanation is *the income insurance argument for the use of child labour* (Grootaert et al., 1995). The fact that parent are vulnerable to various income shocks and irregularities makes the short term return of child labour attractive to

parents thereby encouraging the use of child labour. In a way the labouring child provides one means of diversifying risk.

On the demand side, the *poverty explanation* is often mentioned as an important factor for the use of child labour. That household income is too low to sustain the whole family, the argument continues, leads to the use of child labour so as to generate enough resources to ensure the survival of the whole family. According to an altruistic model developed by Basu and Van (1998), a household would not send its children to the labour market unless its income is sufficiently low - the "Luxury Axiom". That is, children would be put in work activities only if the household's income level falls short of a certain threshold income level.

In an attempt to explain the high incidence of child labour world wide, theoretical writings have emphasized a number of supply as well as demand side factors. In connection with the former one, that there exists a *severe qualitative as well as quantitative deficiency of educational systems* is often mentioned. Child school attendance becomes an alternative so long as schools are in the reach of children and are capable of imparting an educational service that is of reasonable quality to benefit the educated child in particular and the whole society at large. In situation where schooling provides little vocational qualification, parents may be forced to withdraw their children from schools and put them in other more profitable lines of activities (Bonnet, 1993). Low expected returns from education makes more sense for parents to put their children into activities that are more profitable and are likely to equip their children with skills necessary for their future.

2. 2 Review of Empirical Literature

Along with the increased awareness about child labour worldwide, there is a rapidly burgeoning empirical literature on the economics of child labour. Also, along with the increased availability of good quality micro data on the employment of children, there has been a shift of emphasis from a mere quantification to an econometric investigation of the determinants of child labour (Ray, 2001a). The empirical literature on child labour is scattered among social sciences lacking a common theoretical foundation, however (Basu, 1999).

Though there is a growing empirical literature on child labour, a wide variety of results have emerged depending on how “child” and “labour” are defined and on the methodology employed. What is common to all the empirical studies on child labour is the consideration of various child-, household-, and community level socio-economic and cultural attributes that provide its potential determinant.

While some of the empirical writings have emphasized the issue of child labour alone, others accompanied the child labour analysis with that of schooling due to the existence of close interaction between the two decisions. Studies by Assefa (2002), Cockburn (1999, 2001), Ray (2001a), and Jenson et al. (1997) are in the latter tradition.

On the other hand, while numerous empirical studies investigated the determinants of child participation in various work types⁶, few went for identifying the determinants of the actual hours of labour supply on the premise that what matters most from policy perspective is not only whether children do participate in work activities but also the extent of participation one measure of which is the time spent on work activities.⁷

Child labour being a phenomenon mainly of developing regions of the world, almost all the empirical studies reviewed in this section are relevant to developing countries. For ease of understanding, the studies reviewed are categorized into three major groups - those relevant to Africa, Asia, and other developing region of the world.

2.2.1 The African Experience

Africa is one the least developed regions in the world. On the other hand, the continent is known for its high participation of children in work activities. The existence of severe poverty of financial resources and opportunities coupled with the low quality and quantity of educational provisions in the region are among the factors that contributed to the high incidence of child labour. This section presents empirical studies on child labour in Africa.

Jensen et al. (1997) investigated the factors that affect school attendance and child labour in Zambia. Within the human capital framework and by specifying a logit model with household - specific effects, poverty was found to be the main culprit behind the low school attendance of Zambian children. On the other hand, while saving and asset ownership had a

⁶ A brief list of studies that investigated the determinants of child work participation include: Assefa (2002), Cockburn (2001), Canagarajah et al. (1997), Jenson et al.(1997), Ray (1998), Muniz (2001), Wahba (2001).

⁷ Included in this category are studies by Bhalotra et al. (2001) and Ray (2001a; 2000b).

positive impact on school attendance, the holding of land significantly reduced the likelihood of children's school participation. Reported is also the existence of a positive (negative) association between the highest grade attained by the child (age) and the likelihood of school attendance. Being a female and having a non-biological relationship with the head were found to have a negative impact on the probability of school attendance.

Canagarajah et al. (1997) analyzed the situation of child labour and schooling in Ghana by specifying a bivariate probit model. As would be expected, boys were identified to have a higher likelihood of school participation (11%) compared with their female counterparts suggesting the existence of gender bias in schooling in favour of boys.

Using household per capita expenditure as a welfare index, the study indicated the low impact that welfare has on the likelihood of labour force participation especially by urban Ghanaian children. The authors, as a result, concluded "...this [the low impact of welfare on the probability of labour force participation] casts doubts on the traditional, simplistic view that poverty pushes children into the labour market" (Canagarajah et al., 1997:16). This conclusion, however, is more apparent than real since welfare index (log of per capita total household expenditure) is introduced into a reduced form description of child work and child schooling without taking into account the feed back effect from child work to household welfare.

On the other hand, welfare was found to have a strong positive impact on school participation of Ghanaian children. Also, while fathers' education had a negative effect on the likelihood of working, mothers' education had an impact only the likelihood of school

participation. Ghanaian children in households with parents engaged in agricultural self-employment activities were 12% more likely to work than children from other types of households⁸. Interestingly, female headship was found to increase the probability of school attendance.

In an attempt to capture the impact of culture on the allocation of children's time in Ghana, the authors did include religion in the regression though with no impact on child labour decision. It, however, had a significant impact on schooling decision of children where Protestants, Catholics and Muslims were, respectively, 18%, 13%, and 5% more likely to send their children to school compared with Animists (the reference group). In connection with community level factors, distance to the near by school was found to have a strong negative impact on the probability of school attendance. Contrary to expectations, the study revealed the existences of a positive association between school fees and school participation. Assefa (2002) also reported similar finding for Ethiopian rural children.

Ray (2000b) investigated the main determinants of child labour and child schooling in Ghana using the 1988/89 Ghanaian Living Standards Measurement Survey (GLSS). Special emphasis was given to the interaction between child and adult labour market conditions by investigating the size and direction of the impact on child labour hours of changes in adult wages. The empirical evidence from the Heckman two step procedure fails to support the premise that 'household poverty makes children work long hours' thereby lending no support for the "Luxury Axiom". Also, little linkage is found between child labour hours and

⁸ In fact, word wide estimates on child labour show that more than 70% of the child workers reside in agriculture.

the number of children in the household. On the other hand, both adult education and the quality of schooling in the neighborhood were found to have a significant negative impact on Ghanaian children's labour hours.

Cockburn (1999) analyzed the determinants of child labour supply and the trade-off households are made to make between child labour and schooling decisions in rural Ethiopia. Within the framework of agricultural household model, a multinomial logit analysis was employed using data from the 1999/2000 5th Round Ethiopian Rural Household Survey.

Among others, the study identified age to have a positive and non-linear effect of age on the probability of working and school attendance. Also, a positive (negative) association was found between the household head's years of formal schooling and the likelihood of children's school attendance (work participation) particularly for boys and older children. In an attempt to capture the impact of family composition on child work decision, family members with different age groups were considered in the study. However, only the presence of infants (0-3ages) had a significant positive impact on the likelihood of child work.

In the literature on child labour, poverty status of families is often mentioned to significantly affect children's school-work decision - the "Luxury Axiom". In this regard better off families are expected to rely less on the use of child labour so as to make ends meet. In a rural context, one indicator of the economic status of families is the holding of various types of productive assets with different implication on child time use. In connection with this,

Cockburn (1999) revealed that while livestock ownership had no apparent net effect on child time use decisions, the holding of each additional acre of land was found to increase (decrease) the probability of work participation (school attendance) by 2.4% (1.6%).

Apart from economic factors, sociological factors could have important implications on the allocation of children's time. In this regard, Cockburn (1999) reported that while age of the household head had insignificant impact on children's time use, child gender tends to affect children's time allocation. Specifically, male children were found to be 4.8% (7.2%) less likely (more likely) than female children to have work (schooling) as their main activity. Also, having a biological relationship with the head was found to increase (reduce) the probability of school attendance (work participation) by roughly 8.6% (7.6%).

Though all types of child work activities were included in the analysis, Cockburn (1999) failed to address the fact that quite different factors are responsible for determining the different kinds of child work activities - wage work, domestic work, and farm work - since it lumps up the different types of child work activities.

Numerous studies on child labour paid special attention to the determinants of child work participation and/or hours of labour supply. Only few studies have attempted to explicitly associate children's time allocation decisions with human capital development. A study by Akabayashi et al. (1999) is in the latter tradition. They examined the extent to which child work and human capital development are in a trade-off relationship by using a time-log data from the 1993 Human Resource Development Survey of (HRDS) Tanzania. So as to model household decision regarding the question of whether or not to send a child to school

regularly and how many hours spent on work and study at home, a probit and tobit specifications were used, respectively.

While mothers' education and the availability of schools had a positive impact on girls' school attendance, neither the subjective evaluation of school quality nor household expenditure seem to affect the schooling decision of Tanzanian children. Contrary to expectations, a direct relationship was found between the number of children and girls' school attendance suggesting the existence of substitution effect between the two. As would be expected, community variables were found to have important role in children's hours of work where Tanzanian children worked longer if there were fewer schools available, if there was no electricity supply, if the source of drinking water was far from home, and if distance to the near by school was shorter (significant at 5%).

For almost all exogenous variables considered in the study, the signs of the marginal effects of variables in the work hour equation were opposite to those in the schooling experience equation suggesting the existence of an overall trade-off between work and school attendance. Also, hours of work was negatively correlated with the development of reading and mathematical skills once again suggesting the existence of trade-off between a Tanzanian child's development of basic skills and long hours of work.

The common approach in the literature on child labour is to consider household poverty as a major determinant of children's participation into work activities. In a somewhat different approach, Wahba (2001) used the 1988 Egyptian Labour Force Sample Survey (ELFSS) to explore the transmission of poverty through child labour. Important is the finding that 26.5%

and 41% of the sampled children whose fathers and mothers, respectively, were child labourers were found working. The author then wrote that “ ... the proportion of children working in families where the father, the mother, or both worked as children is at least twice as much as in families where the parents were not child labourers” (Wahba, 2001:6). Such intergenerational effect does not seem to extend to school attendance decision, however.

Wahba's (2001) bivariate probit analysis revealed that while male Egyptian children were more likely to be *economically active*⁹ in the labour market, being a boy tend to increase the probability of both work and school attendance especially in rural areas. These findings, however, are more apparent than real since the definition of economically active children excludes quite many child workers many of whom are girls performing domestic chores.

Also, while having a father employed in the public sector was found to increase the probability of school attendance and decrease that of work participation, a positive (negative) association was found between parental education and the likelihood of school attendance (work participation). Unlike to Muniz's (2001) finding for Brazil, female headship did not have a significant impact on the likelihood of work participation though it increased that of school attendance. As would be expected, the presence of younger siblings (less than 6 years old) did increase (decrease) the odds of child labour (schooling).

Cockburn (2001) examined the contrasting income and productivity effects - and the resulting ambiguous net effect - of variations in asset holdings on child labour supply in rural Ethiopia. Within the framework of a simple agricultural household model with missing

⁹ Economically active children refers to children engaged in remunerative activities or in activities that result in a marketable output.

labour market, a multinomial logit analysis was employed using data from the 1994/95 Ethiopian Rural Household Survey.

Among others, important findings include: (1) the number of male, female and elderly household members had insignificant impact on child time use; (2) while female headship tends to increase the likelihood of boys' school attendance, children, especially boys, with biological relationship were more (less) likely to attend school (to work); (3) the age of the household head had a positive (negative) effect on girls' schooling (girls' work); (4) while household income has ambiguous impact on child work, a positive (negative) association was found between land quality and child schooling (child work).

In an attempt to capture the impact of infrastructural development on child time allocation, Cockburn (2001) included distance to the near by water source. The results confirmed the existence of inverse relationship between distance to the near by water source and girls' school attendance. After instrumenting income, the study found a strong positive (negative) association between income and child school attendance (child work participation) lending some support for Basu and Van's (1998) "Luxury Axiom".

Bhalotra et al. (2001) investigated the determinants of child labour on family farms in Ghana and Pakistan using data from the 1991/92 Ghanaian Living Standard Survey (GLSS) and the 1991 Pakistani Integrated Household Survey (PIHS), respectively. In an attempt to minimize the endogeneity problem, household income was introduced into a reduced form description of farm hour equation after taking into account the feedback effect from child work to

household income. This was done by instrumenting household income by using community level variables.

A number of findings are worth mentioning. First, both birth order and the nature of the child's relationship with the head had insignificant impact on child farm hours in Ghana. Second, there exists an insignificant correlation between hours spent on farm work and the standard of living of household, measured by per capita food expenditure, though there was a hint of the expected negative relation for girls (significant at 13%). Third, while the number of farms operated had a strong positive effect on hours of farm labour supply, household size and acres of land operated were found to be insignificant.

Fourth, while absence of the father from the home (the presence of public transport in the village) had a significant positive (negative) effect on girls' farm work hours, the sons of mothers with secondary - level education were found to spend less hours on farm work. Fifth, while irrigation practices, the use of tractors and fertilizers as well as the presence of a village bank all did have a significant impact on child farm work; household size was found to have inverse relationship with hours of child farm work by Pakistani children.

Assefa (2002) investigated the allocation of children's time endowment between schooling and work in rural Ethiopia. Within the framework of the household production function approach¹⁰, a multinomial logit analysis was employed by using data from the 5th Round

¹⁰ The conventional approach to the analysis of the allocation of time ignores non-market time and does not provide a framework for the economic analysis of this important factor. In the context of the conventional thinking firms are treated as producers and profit maximizes while households are considered as utility maximizing consumers. Becker (1965) demonstrated the futility of this role differentiation and defined the

Ethiopian Rural Household Survey. The results revealed that while children from female headed households had a lower probability of specializing in work activity - in line with the findings by Canagarajah et al. (1997), Cockburn (2001), and Haddad et al. (1996) - the age of the household head was found to have insignificant impact both on school attendance and work participation.

Apart from the traditional household income related factors, children may be forced to flee into work places due to supply side school related reasons. Include in this category are such factors as lack of access to schools, high cost (direct as well as indirect) of schooling and/or inability of obtaining quality and relevant education. Lack of access to education or access to education only on exorbitant terms, the argument continues, could discourage (encourage) school attendance (work participation). Also, education that does not permit an upward social mobility of the educated may discourage parents from sending their children to school thereby creating a fertile ground for child work.

In connection with this, Assefa (2002) reported that a household satisfied with the quality of the education provided was 3% (8%) more likely (less likely) to send its children to school (work). Also, satisfied households were 8% more likely to induce their children to combine work with school attendance. This finding is in sharp contrast with the one by Akabayashi et al. (1999) where neither the subjective evaluation of school quality nor household expenditure had influence on school attendance by Tanzanian children. Assefa (2000) has

household as an economic unit combining the properties of a “small factory” (that produces goods and services using capital inputs, raw materials and labour) with the traditional household role of utility maximizing consumers. He brought to the fore of economic discussions the allocation of time on “household production” and hence the name household production function approach.

also reported a positive (negative) association between distance to the nearest school and work participation (school attendance).

Contrary to conventional thinking, Assefa (2002) reported a positive association between school-related expenditure and school attendance. The author then concluded, “Direct school costs do not necessarily marginalize poor children in rural Ethiopia” (Assefa, 2002:32). Using different physical assets as a proxy for family income, a negative (positive) association was found between ownership of large livestock and school attendance (likelihood of combining work with schooling). Identical with Rosenzweig-Evenson’s (1977) finding for Indian children, increase in land size was found to reduce (increase) the likelihood of children’s school attendance (work participation) by nearly 4 % (2%).

In an attempt to relax income constraints, it is not uncommon for poor families to participate in off-farm income generating employment activities. This, however, may increase or decrease children’s work participation depending on the nature of activities undertaken by parents involve. In connection with this, Assefa’s (2002) finding revealed the existence of a positive association between parents’ participation in off-farm income-generating activities and the likelihood of children’s school attendance (significant only at 13%). On the other hand, participation in off-farm employment activities tends to reduce the probability of specializing in work activities and of combining schooling with work with much stronger effect being observed for girls. Specifically, girls from households participating in off-farm employment activities were found to be 5% (7%) more (less) likely to attend school (to work).

According to the capital market explanation, lack of access to credit is one of the important factors that forces parents to rely on the use of child labour¹¹. Households with access to credit facilities, the argument continues, would be in a better position to relax income constraints by borrowing from the capital market and hence would be less likely to resort to child labour as a way out of poverty. Such parents would also be in a better position to make investment on their children, to meet basic needs by their own, and to handle income shocks and irregularities without necessitating support from their children either directly or indirectly. Such effect is also expected to work for households with support from outside in the form of, say, remittance or gifts.

In connection with this, Assefa (2002) reported that acquisition of gifts or other support from outside tends to increase (decrease) the likelihood of children's school attendance (work specialization) by about 4% (10%). Also, children from households with remittance were 6% more likely to combine work and school attendance than those children from households with no remittance.

Agriculture is known to harbor an estimated 70% of the total child workers worldwide. Per se, the type of agricultural technology employed could have immense impact on the allocation of children's time into alternative uses. In fact, apart from its impact on the number of child workers, the kind of agricultural technology could bring with it a health hazard, especially to those at a very young age.

¹¹ See for example Lahiri and Jaffrey (1999), and Ranjan (1999). In fact some studies - Ray (2001a; 2001b) - have found credit variables to have little impact on child labour as well as child schooling decisions.

According to Assefa (2002), households that employed herbicides and/or machine power (labour-saving technologies) for agricultural production were 10 % (9%) more likely (less likely) to send their children to school (to allow their children engage in work activities) than households without such technologies. Also, while engagement of families in improved land practices tend to reduce the likelihood of boys' school attendance by about 6%, participation in extension programs and in improved irrigation practices generally encouraged children's participation in work activities.

2.2.2 The Asian Experience

Being the world's most densely populated region, Asia is at the top in terms of the number of child workers it harbors. Early empirical studies in Asia identified child labour to have a close interaction with such decisions as fertility and investment on children. Rosenzweig et al. (1977), for example, analyzed the child labour force participation decision along with child investment and fertility decisions in a simultaneous equations system using data from rural India. Among others, they reported that one of the basic conditions motivating Indian families to bear relatively large number of children in the late 1950's was the high return to the use of raw labour power of children.

Ray (1998) undertook a comparative analysis of child labour in Pakistan and Peru using data from the 1994 Peruvian Living Standards Measurement Survey (PLSS) and the 1991 Pakistani Integrated Household Survey (PIHS). Results from multinomial logit analysis revealed that while child participation rate in the labour market did increase with age in both countries, the rate was found to be much higher for boys than for girls. Also, inverse

association was found between the level of females' education and the likelihood of work participation both in Pakistan and Peru lending support for the *women's agency hypothesis*¹².

On the other hand, while rising household affluence tend to significantly reduce the probability of child labour in Peru, it did not have any impact on Pakistani children's work participation decision lending no support for the well know "Luxury Axiom" in the latter case. Also, a high degree of complimentary was reported between child and adult female labour in Pakistan once again lending no support for the "Substitution Axiom" of Basu and Van (1998).

In connection with community level factors, Ray (1998) reported that while improved community infrastructure - improved sewerage disposal in Peru and improved water storage in Pakistan - and presence of electricity (in Pakistan) tend to reduce the likelihood of child labour, improved adult female education was found to increase the probability of children's school attendance. Unlike to what is the case for the labour force participation equation, the poverty variable was found to have a significant impact in the school participation equation for Pakistani children providing some support for the veracity of the "Luxury Axiom" in the context of schooling.

In an attempt to ensure the robustness of the above findings, Ray (1998) estimated two equations - hours of child labour supply and years of schooling experience - using the tobit method for Pakistan. The results confirmed the robustness of the rejection and non-rejection,

¹² What this hypothesis states is that the empowerment of women by allowing them have access to education and employment would benefit their children in terms of, for example, allowing their children have access to schools..

respectively, of the “Luxury Axiom” for hours of child labour and years of schooling experience. Also, female wage level was found to have a significant and positive association with Pakistani children’s labour hour suggesting the existence of complementarity between child labour and that of adult females.

Once again, raising female education was found to have an important role in reducing (increasing) child labour hours (schooling experience). As would be expected, the study uncovered the significant positive (negative) impact that raising child wage has on the child’s hours of labour supply (years of schooling experience). Similar findings were reported by Rosenzweig et al. (1977) for Indian children.

Ray’s (1998) findings, however, should be interpreted with some care since the study aggregates data on child labour for boys and girls, across different types of work activities, as well as for rural and urban areas on the implicit assumption of parameter stability across different units, which is unlikely to be the case.

Chaudhri et al. (1999) investigated the determinants of child labour in 15 major Indian states. Within the context of an overlapping generations model, Kmenta’s pool procedure was employed using data from four census points (1961 to 1991). Among others, the authors revealed the existence of a negative (positive) association between per capita state domestic product (fertility rate) and the incidence of child labour. On the other hand, female labour force participation rate was found to have a positive and significant impact on child labour incidence failing to provide support for the well-known “Substitution Axiom” in the Indian context.

Besides, the presence of nowhere children¹³ was found to add to the incidence of child labour with a significant elasticity coefficient of 1.02. The authors concluded that poverty manifested in the form of high total fertility rate, low per capita income, higher female labour force participation rate and increased number of 'inactive' children were important determinant of the high incidence of child labour in India over the period under investigation.

In an interesting departure from the literature, Bhalotra (2000) tested the poverty hypothesis by estimating the wage elasticity of labour supply using observations from the 1991 Pakistani Integrated Household Survey (PIHS). Unlike to many of the works on child labour, the endogeneity of household income was well taken care of. Also, a lifecycle model was adopted on the view that decisions regarding child work and school attendance were unlikely to be made myopically. Labour supply equations were estimated using data for 2400 households from rural Pakistan.

A significant (An insignificant) wage elasticity, -0.33 (-0.05) was observed for boys (girls). Also, household income was found to have a significant negative impact on child work hours, the elasticity for girls being twice as large as that for boys uncovering "the reason that [why] boys are in wage work is ... [because] their labour income supports subsistence expenditures of the household" (Bhalotra, 2000:21).

Though the results for girls did not reject the poverty hypothesis, that the estimated income elasticity coefficient (wage elasticity coefficient) was a large negative number (a small

¹³ Nowhere children are those children who are neither in school nor in the labour force.

negative number) for girls suggesting that “improving returns to school for girls will impact negatively on their engagement in labour and this impact will be larger than for boys for any given policy instrument” (Bhalotra, 2000: 22).

As an extension of his study in 1998, Ray (2000a) examined the key determinants of child labour hours and the share of child and adult earnings in households’ total earnings for Peru and Pakistan using the 1994 Peruvian Living Standards Measurement Survey (PLSS) and the 1991 Pakistani Integrated Household Survey (PIHS), respectively. A test was carried out for the “Luxury Axiom” so as to throw some light on the important question of whether poverty is the key determinant of child labour, as is widely believed to be. Estimation of the reduced form labour hours equation and child schooling equations was carried out using the Heckman two - step procedure.

Considering the narrow definition of child labour¹⁴, while the Peruvian data disproved the applicability of the “Luxury Axiom”, the Pakistani data confirmed the veracity of the axiom. Specifically, a Pakistani household that was previously not poor was found to increase the outside paid employment of its children substantially, by approximately 500 child labour hours annually, if it happened to fall below the poverty line.

A point of caution! In an attempt to minimize the endogeneity problem, Ray (2000a) deducted child income from total household income. This, however, might have introduced

¹⁴ The narrow definition of child labour refers only to those children who are engaged in full-time, paid employment and is in line with ILO’s definition of economically active child labour population.

simultaneity problem especially if parents' income (labour supply) and child labour supply are simultaneously chosen.

Both for Peru and Pakistan, adult education had a negative (positive) impact on children's work hours (schooling experience). Also, while increasing adult wages did reduce child labour hours in Peru, rising women's wages sharply increased (had insignificant impact) the labour hour of girls (on boys' labour hours) in Pakistan suggesting the existence of complementarity between women's labour supply and that of female children.

The inclusion of domestic work in the child work definition has weakened the impact of poverty on Pakistani girls' labour hours, which fall from 476 to 60 hours a year. Besides, the statistical significance of the estimated coefficient has disappeared with the inclusion of domestic hours of labour supply so much so that "the Pakistani girls fall in line with Peruvian children in failing to support the 'Luxury Axiom'" (Ray, 2000a: 358).

Ray (2001a) made a comparative investigation of the key determinants of child labour hours and schooling experience in Pakistan and Nepal paying special attention to the interaction between the two. So as take care of the joint endogeneity of the three crucial ingredients of child welfare - child labour hours, child schooling experience and the economic circumstances of the child, as measured by the poverty status of the household in which the child resides - a three stage least square (3SLS) estimation procedure was employed on data from the 1995 Nepalese Leaving Standard Survey (NLSS) and the 1991 Pakistani Integrated Household Survey (PIHS).

The results disclosed that current school attendance by a child did significantly and sharply reduce child labour hours by 390 and 506 hours annually for Nepalese and Pakistani children, respectively. Also, increase in child labour market activity was found to have an adverse impact on female children's schooling experience implying the existence of a trade-off between female children's employment and schooling. Besides, while male children were found to work for longer hours in market activities, female children experienced significantly less schooling in both countries suggesting the existence of gender bias against girls' schooling.

In relation with household characteristics, Ray's (2001a) study disclosed the existence of a positive association between the level of adult education and child schooling. On the other hand, adult education did not have a strong impact on hours of labour supply lending no support for the 'adult education-child labour nexus'¹⁵. Also, while household poverty did explain longer child work hours in Nepal and less child schooling in Pakistan, cluster poverty¹⁶ did not have any impact both on children's work hours and schooling experience.

Ray (2001b) employed the ILO's definition of child labour to estimate the impact on child labour and child schooling of child-, household-, and cluster level variables in Nepal, Pakistan and Bangladesh with especial emphasis on Nepal. Data from 1995 Nepalese Leaving Standard Survey (NLSS) was subjected to an intensive econometric investigation that involved estimation using the logit, the tobit as well as the 3SLS estimation methods.

¹⁵ A brief list of studies with negative association between the head's education and child work participation include: Cockburn (1999); Ray (1998) (mothers' education only); Muniz's (2001); Wahba (2001); Canagarajah et al. (1997) (fathers' education only); Ray (2000a).

¹⁶ Cluster poverty is a proxy for the economic environment that the child lives in.

While the logit specification was meant for analyzing the participation of children in economic activities and in schools, the tobit model was used to estimating the child labour hours and the years of schooling received by the child. In an attempt to take care of possible interdependence between child labour and schooling decisions, 3SLS estimation was used. The last exercise was of immense importance in that it helped identify the extent to which child work and school attendance are in a trade-off situation. What is common to all the three countries was the finding of a positive association between child work participation and age. The logit analysis for Nepal revealed that neither household poverty nor credit availability affects children's labour force participation. On the other hand increasing the household head's level of education as well as improved provision of community infrastructure, especially the presence of electricity, had a significant role in reducing labour hours, especially of girls.

In an attempt to capture the interaction between child and adult labour, adult wage was included in the logit specification. The result confirmed a positive association between adult female wages and the likelihood of child work participation suggesting a close complementarity between adult female labour and that of children. Unlike to what is the case for labour participation, both household and cluster poverty had strong impact on children's schooling enrollment.

The tobit analysis revealed that while household poverty had a small and insignificant effect on child labour hours, cluster level poverty did have a large and significant impact on child labour hours equation. Unlike to what was the case for the labour hour equation, schooling experience was found to be strongly and adversely affected by household poverty. In

connection with parental characteristics, Ray (2001b) reported a strong negative (positive) association between the level of adult education and child labour hours (schooling experience). On the other hand, community variables, namely, water and electricity did not have strong impact on Nepalese children's labour hours and schooling experience.

An important finding from the 3SLS estimation is the strong negative impact of 'current' school attendance on hours of labour supply implying the existence of a trade-off situation between the two. Specifically, a child who was attending school worked annually 511 hours less than a child who did not have the chance to visit schools. On the other hand, while adult education coefficients were insignificant in the child labour hours equation, they had a positive impact on the educational experience of children in the household. Also, school infrastructural variables were found to have a significant negative impact on Nepalese children labour hours.

2.2.3 Other Countries' Experience

In this subsection, empirical studies relevant to Latin America and other cross-country studies are reviewed. Being on of the less developing region in the world, Latin America is characterized by the high incidence of child labour.

Schuh et al. (1986), using a simple household model, tried to highlight on the economic factors that influence parents' fertility decision. Using data on 500 low income rural Brazilian households, the economic value of children to the household was identified to provide parents a strong incentive to increase child quantity or to substitute quality for quantity, the former measured by the amount of money parents are willing to invest on their

children's education. Also, parental education in general and that of fathers' in particular was found to have an important role increasing (decreasing) the quality (quantity) of children by Brazilian households.

Beyond the classical and micro investigation of the relationship between child labor, parental income and quality of education, Becchetti et al. (2002) explicitly focused on the controversial effect on globalization and trade openness on child labour. The authors employed cross-sectional and panel negative binomial estimation by using data for reasonably larger number of poor economies from the 1980 and 1990 World Bank database. The most important finding from the static binomial regression was the existence of a positive association between the share of trade openness and child labour suggesting a potential paradox.¹⁷ They argued that “beyond the expected negative relationship between GDP growth and child labour, the social indicator [child labour] is affected by many other factors such as household income, parental education, quality of child education, international aid and country permanence in the lowest part of the agricultural good value chain” (Becchetti et al., 2002: 21).

Muniz (2001) investigated the extent of child labour in Brazil using a country wide cross-sectional data collected in 1998. Child labour was defined to represent all economic activities undertaken by individuals under the age of 16. In an attempt explore the determinants of child labour supply in Brazil and to verify the validity of the “Luxury

¹⁷ According to the standard neoclassical trade models, trade openness raises wages of low skilled workers in countries in which this factor is abundant the implication of which is that trade liberalization increases household income in poor families thereby reducing reliance on child labour when the luxury axiom holds.

Axiom” in the Brazilian context, four probit models and three bivariate probit models were specified.

Important is the finding of some support for the poverty hypothesis. Moving from the lowest to the highest income deciles, the rates of school attendance increases while that of work participation did decrease. One manifestation of the poverty hypothesis identified by the study was the inverse (direct) relationship between household size and school enrollment (all kinds of child work activities). Contrary to expectations, female Brazilian children were found to have higher likelihood of school attendance (work participation) compared with their male counterparts.

Muniz’s (2001) study has revealed the existence of a positive (negative) association between child education and child wage work (non-wage work) decisions. As would be expected, the level of parental education had inverse (direct) relationship with the likelihood of work participation school attendance). Also, while the presence of younger siblings (below the age of 7 years) did not prevent children from joining the job market, it prevented them from attending school. Another interesting finding of Muniz’s (2001) study is the low (high) likelihood of school (wage work) participation by children from female headed households. Also, a child from a Brazilian household with electricity supply had a 10% higher probability of joining any kind of teaching institution suggesting the positive impact on school attendance of infrastructural development.

Saad-Lessler et al. (2001) conducted a cross - sectional study on child labour in 201 countries using time series data from the World Bank Indicator Survey conducted from 1960

to 1998. Among others, improvement in the availability of credit to the private sector, increases in the size of the industry and service sectors, and increases in the number of physicians per 1000 persons were identified to significantly reduce the child labour rate in the countries considered.

On the other hand, the cross-country study revealed the existence a direct association between child labour rate on the one hand and the size of the rural population, the number of dependents per working age adult and the size of the countries' GDP on the other. The last finding is of paramount importance in that "it refutes claims made in the literature that child labour is a symptom of the development process, which will disappear once countries accumulate enough GDP" Saad-Lessler et al. (2001:13). The use of time series data has also helped identify important determinants of the changes in the child labour rates from 1980 to 1990 - the size of the service sector, the number of dependents per working age adult, the relative size of the rural population and the number of physicians per 1000 persons.

In general, the empirical studies reviewed in this chapter provided a number of interesting results depending on how "child" and "labour" are defined and on the method of analysis employed. The findings do vary not only from region to region but from country to country within a region uncovering the complexity of the issue at hand. What is common to all the studies, however, is the consideration of a number of child-, household-, and community-level socio - economic factors that provide potential determinants of child labour.

The lion's share of the empirical studies used qualitative response (QR) models to analyze the work-school decision of children (Jenson et al., 1997; Canagarajah et al., 1998;

Cockburn, 1999; Cockburn, 2001; Muniz, 2001; Wahba, 2001; Assefa, 2002). On the other hand few of the studies used information on the actual hours of labour supply so as to better analyze the extent to which child work and school attendance are in a trade-off situation (Bhalotra, 2000; Ray, 2000a; Ray, 2001a; Saad-Lessler et al., 2001; Bhalotra et al., 2001). In fact some of the studies used information both about the participation of children in different work activities and in school as well as actual hours of labour supply and schooling experience in an attempt to view the child labour problem from different perspectives (Ray, 1998; Akabayashi et al., 1999; Ray, 2001b).

CHAPTER THREE

3. Methodology and Data Source

3.1 Data Source

This study uses secondary data from the 5th Round Ethiopian Rural Household Survey (ERHS) as well as the 4th Round Ethiopian Urban Household Survey (EUHS) conducted in 1999/2000. Information from the two data sets is used so as to allow a better understanding of the situation of child domestic work both in rural and urban Ethiopia. The ERHS was conducted by the Department of Economics of the Addis Ababa University in collaboration with the United States Agency for International Development (USAID) while the EUHS was the outcome of a collaborative effort between the Department of Economics of the Addis Ababa University and the Goteborg University of Sweden.

The ERHS covers 18 peasant associations (PAs) and 1681 households (see annex 6) while the EUHS includes seven major towns and 1423 households. The surveys include detailed information on the socio-economic characteristics of households as well as information on the participation of children in different work activities. Included in the data sets is also information on the actual hours of labour supply by children on different work activities. While the urban data set includes a total of 10345 individuals, 11933 individuals are included in the rural data set. Information on the different socio-economic variables was collected using structured questionnaires and by interviewing the heads of the respective households.

Ethiopian children often start participation in work activities as early as 4 years of age (see Tables 1 and 2). On the other hand, both the Ethiopian Labour Law and the 1973 ILO's

Minimum Age Convention set 15 years to be the minimum age for admission to 'employment'. Therefore, the focus of this study is on children between the ages of 4 and 14 years. The choice of the upper age limit is also influenced by the availability of data on hours of labour supply. While the urban data set includes 2173 children in the 4-14 age category, included in the rural data set are 3611 individuals in the 4-14 age category.

3.2 Method of Analysis

Previous studies on child labour in Ethiopia (Assefa, 2002; Cockburn, 1999, 2001) analyzed the school - work participation decision of children. As a result the studies employed qualitative response (QR) models to analyze the determinants of children's participation into different activities. Also, emphasis was mainly on rural child work. This study tries to analyze the situation of child domestic workers both in rural and urban Ethiopia. Furthermore, unlike to previous studies, it utilizes information on actual hours of domestic labour supply on the premise that *what matters most from policy perspective is not only the mere participation of children in work activities but also the extent of participation one measure of which is hours of labour supply*. The longer the hours of work, the argument continues, the greater will be the detrimental impact of child work both on private and social return from education (Psacharopoulos, 1997).

The use of information on actual hours of labour supply is also justifiable in situations where a lion's share of the children have been reported to participate in domestic work activities. Also, the existence of a wide variation in the hours of domestic labour supply, as shown in tables 3 and 4, necessitates the analysis of child work to be in terms of hours of labour supply.

The issue at hand is then to estimate labour hour equation on a sample of child domestic workers in the 4-14 age category. That is, on a sample of children with non-zero hours of domestic labour supply. However, the sample of children undertaking household chores is not a random sample of the total children in the relevant age group. Given this violation of a random-participation-in-the-labour force assumption, attempt to employ ordinary least square regression to estimate the labour hour equation would bias the estimated coefficients thereby creating selectivity bias (Johnston et al., 1997). In an attempt to provide a consistent estimate after correcting for selectivity bias and following Ray, 2000a; 2000b; and Bhalotra, 1998, the Heckman sample selection model is used to estimate the domestic labour hour equation for the selected sample of child domestic workers.

In the Heckman sample selection procedure, an underlying relationship is assumed to exist between the ‘selection’ (treatment) equation and the ‘regression’ (outcome) equation specified as follows, respectively:

$$Z_i^* = \gamma'w_i + u_i \dots \dots \dots (1)$$

$$H_i = \beta'x_i + \varepsilon_i \dots \dots \dots (2)$$

where Z_i^* is a dummy which takes the value 1 if the child performs domestic work activities; and 0 otherwise;

γ' is a 1x k vector of parameters associated with W_i a (k x1) vector of explanatory variables that predict whether or not a child participates in domestic work activities;

H_i is hours of domestic labour supply by the child;

β' is a 1x m vector of parameters that corresponds to the X_i an (mx1) vector

of explanatory variables that are believed to affect hours of domestic labour supply; and

u_i and ε_i are disturbance terms in the selection and regression equations, respectively, with $u_i \sim N(0,1)$ and $\varepsilon_i \sim N(0, \sigma_\varepsilon)$ having a bivariate normal distribution with zero means and correlation of ρ [i.e. $(u_i, \varepsilon_i) \sim$ bivariate normal $(0, 0, 1, \sigma_\varepsilon, \rho)$].

Given the two equations, hours of labour supply is observed only if the right hand side of the selection equation (1) is greater than zero. Least square regression of the hours of domestic labour supply for working children only is likely to produce inconsistent estimates of β since $E(\varepsilon_i | Z_i^* > 0)$ is no more zero (Johnston et al., 1997; Greene, 2000). Application of ordinary regression on truncated sample of working children overestimates the intercept and underestimates the slope coefficients (Long, 1997).

Hence, in an attempt to avoid possible selectivity bias, an estimated variable - the inverse of the Mills ratio (IMR) – is included in the regression equation for the selected sample of working children¹⁸. The selectivity correction term (λ) is defined as follows:

$$\lambda (\gamma'w_i/\sigma_u) = \Phi(\gamma'w_i/\sigma_u) / \Phi(\gamma'w_i/\sigma_u)$$

where $P(Z_i=1) = \Phi(\gamma'w_i/\sigma_u)$;

$$P(Z_i=0) = 1 - \Phi(\gamma'w_i/\sigma_u) = \Phi(\gamma'w_i/\sigma_u)$$

$\Phi(\cdot)$ is the standard normal density function;

$\Phi(\cdot)$ is its cumulative distribution function.

¹⁸ Least square regression of H on X without considering the estimated value of the inverse of the Mills ratio is tantamount to committing a specification error of an omitted variable (Green, 2000).

By bringing the selectivity correction term into the hours equation defined in equation 2 above, sample selectivity bias is well taken care of. Thus the final labour hour equation to be estimated in the second step of the ‘Heckit’ procedure would look like:

$$H_i | Z_i^* > 0 = \beta' x_i + \beta_\lambda \lambda_i(\alpha_u) + v_i \dots \dots \dots (3)$$

Where $\beta_\lambda (= \rho\sigma_\epsilon)$ is a measure of the bias due to non-random sample selection;

$\lambda (\gamma' w_i / \sigma_u) = \lambda(\alpha_u)$ is the selectivity correction term (IMR) constructed from a maximum likelihood estimation of the probit(selection) equation in the first step of the Heckman sample selection model;

v_i is the error term assumed to have a zero mean and constant variance.

Apart from serving as a selective correction term, $\lambda (\cdot)$ is said to cause heteroscedasticity problem when introduced in the equation of primary interest- the labour hour equation- as an additional regressor (Johnston et al., 1997). There is therefore a need to provide heteroscedasticity consistent estimates of the parameters of interest.

At the second step of the Heckman procedure, the parameters of the regression equation can be estimated using either ordinary least square method or maximum likelihood estimation technique (Green, 2000). In this paper, the latter technique is employed since it allows for heteroscedasticity consistent estimates of the parameters of the model.

3.3 Selection of Explanatory Variables

Child work in general and child domestic work in particular is the outcome of so many factors. Sometimes, children work because they or their families could not survive without the income, goods, services or other benefits generated by the working children either

directly or indirectly. In such instances, not having the children work risks the very existence of the family. In an attempt to identify the extent to which household poverty affects domestic work participation of children, proxy variables - real expenditure per capita per adult equivalent, total value of livestock owned by the household and total land size operated by the household - are considered in this study.

Household expenditure (and income) approximate household welfare position only when considered in terms of size of the households and hence the need to use real expenditure per capital per adult equivalent. In a rural context asset ownership is an important indicator of the poverty status of households. As such total value of livestock owned by the household and size of land holding operated by the household are considered in this study.

Important household characteristics that could affect the allocation of children's time into alternative activities are family size and composition. The larger the family size, the argument continues, the more intense will the competition be over resources thereby forcing at least some of the children to join the pool of child workers or to work for relatively longer time period to supplement overall household income either directly or indirectly (by freeing adult labour for paid work elsewhere). In fact, large family size could provide children with greater opportunity for school attendance and/or fewer hours of work especially when there exists specialization among family members making the net impact of family size on hours of child domestic labour supply indeterminate a priori. Total number of individuals in the household is considered in this study.

Family composition is another variable that is expected to affect hours of child domestic work. The larger the number of infants and the old aged, for example, the higher will the burden be on child domestic workers in general and on female child workers in particular, since they are more likely to be called up on to help with looking after younger siblings and the elderly. Also, the number and composition of adult household members could affect hours of child domestic work depending on the kind of relationship between adult and child labour market conditions (Chernichovsky, 1985). So as to capture this effect, a series of variables - the number of infants less than 4 years, the number of male and female children in the 4-14 age category, the number of female and male adults in the 15-59 age group, as well as the number of individuals 60 years and above - are considered in this study.

That education is beneficial to the individual child as well as to the society is universally accepted. However, school attendance becomes a viable alternative to children provided it is in their reach. In communities with no or limited schooling infrastructure, parents may perceive child (domestic) work as a viable alternative that could equip their children with skills necessary for their future. So as to capture the impact on child domestic work decision of the level of development of schooling infrastructure, distance to the near by school is included in the selection equation as one supply side determinant of the likelihood of children's participation in domestic work activities.

On the other hand, availability of schools only on exorbitant terms makes investment on children's education expensive especially for households in abject poverty. In spite of the 'free' education rhetoric, parents usually make payments on books and other school related supplies (see Tables 7 and 8). This, however, raises the direct cost of school attendance and

makes investment on child schooling a less preferred juncture thereby creating a conducive environment for involvement of children into different work activities. A schooling expenditure variable is included in the selection equation to identify the impact of household budget constraint on domestic work participation decision of children.

Apart from school related expenditure, the (perceived) quality of education does affect parents' decision on the use of children's time. The lower the (perceived) quality of education, holding other things constant, the less promising would investment on child schooling be. This in turn spurs parents to enter their children into other more 'profitable' pursuits. So as to capture the impact on the allocation of children's time of parents' attitude towards education quality, a dummy variable is used.

Why child labour has become a central issue in development economics is, among others, due to the possible impact it has on the educational performance of the working children in particular and on the development of human capital in general. This is especially the case the higher the extent to which child work and school attendance are in a trade-off situation. This in turn depends on, *inter alia*, the hours of labour supply. In an attempt to examine the extent to which child domestic work and school attendance are in a trade-off situation, a dummy variable for 'current' school attendance is included in the regression equation.

That there exists a relationship between parental education and child labour has already been indicated by some of the early writers.¹⁹ The higher the level of parental education and the

¹⁹ Marshall (1920, pp.468) wrote that "the less fully children's faculties are developed, the less will they realize the importance of the faculties of their children, and the less will be their power of doing so. And conversely

associated higher earning potential of parents, the lower will be the likelihood of work participation by their children so as to supplement family income. On the other hand, higher parental education could encourage (long hours of) child work especially if educated parents have greater employment opportunities thereby requiring at least some of the children to take up domestic work activities making the impact on domestic work hours of parental education a priori indeterminate. So as to capture such effect, a continuous variable is used for the highest grade of formal schooling attained by the head (for the rural data set). On the other hand, a categorical dummy is used for the level of education attained by the mother and the father (for the urban data set).

Apart from the level of education attained by parents, the occupational status of parents does affect the allocation of children's time into alternative uses. Parents involved in economic activities which do not provide enough resources so as to sustain the whole family may be forced to rely on child labour in one way or another so as to supplement total family income. In this regard, dummies are used for the occupational status of the urban household head.

Not all reasons for using child labour are economic. In this regard, child as well as parent specific sociological factors are worth mentioning. In connection with the former one, the age and gender of the child as well as the kind of relation the child has with the head of the household are important factors. Sex of the child is of immense importance especially for

any change that awards to the workers of one generation better earnings, together with better opportunities of developing their best qualities, will increase the material and moral advantages which they have the power to offer to their children.”

child domestic work since girls are usually the one to be called upon to assume domestic work responsibilities.

The kind of relationship the child has with the head of the household does affect the work-school decision of the child. The expectation in this regard is that children who do not have a biological relationship with the head are more likely to bear more work burden compared with children with biological relationship. Dummies are used to take care of such child-specific sociological factor.

The nature of headship is also another potential determinant of hours of domestic labour supply. That female headship is likely to have aspects of ill-being and/or insecurity could lead to increased work participation or long hours of child domestic work. In fact, some studies have reported a positive association between female headship and higher probability of school attendance (low probability of work participation), especially of girls (Canagarajah et al.1977). A dummy variable is used for the type of headship.

Apart from poverty of financial resources, poverty of opportunities could encourage the use of child labour. In connection with this, mention is often made about the access that parents have to alternative income sources in the form of, say, credit and/or remittance from outside (*the capital market explanation*). Families with alternative income sources, the argument continues, would be in a better position to handle income shocks and irregularities. They would also be in a better position to pay for 'free' education of their children. As a result of all these, families with access to alternative income sources are less likely to rely on child labour so as to make ends meet. So as to capture such effect, two variables - amount of

money received by the household in the form of credit and whether or not the household has received money in the form of remittance from outside - are considered in this study.

In a rural context it is not uncommon for families to engage in off-farm employment activities so as to supplement farm income. Such decision by parents, however, could affect the allocation of children's time. Families with off-farm employment activities, the argument continues, would be in a better position to sustain the whole family and as a result may rely less on the use of child labour. On the other hand, involvement of parents in off-farm activities may force children to participate especially in domestic work activities so as to fill the gap. So as to reproduce such effect, a dummy variable is used for whether or not the household has participated in off-farm activities in the reference year.

According to *the income insurance argument for child labour*, why parents use child labour is to overcome risks. As such, families that encounter various kinds of risks are more likely to rely on the use of child labour in an attempt to diversify risk. So as to capture the effect of family insecurity on domestic work participation decision of children, a dummy variable is included for whether or not the household has ever experienced food shortage.

Last but not least is the level of infrastructural development as affecting hours of domestic labour supply. Absence of tap water and/or electricity could impose a burden on child domestic workers since they will be expected to assist elders in fetching of wood/water from the vicinity. They may also be forced to spend longer time on such activities as cooking. Dummies for the availability of tap water and electricity are used in this study.

CHAPTER FOUR

4. Data Analysis

4.1 Descriptive Statistics

This chapter provides the analysis of the empirical findings from the two data sets. While section 4.1 provides results from the descriptive analysis, the results from the econometric analysis are provided in section 4.2.

One of the indicators of the extent of child labour is the work starting age of children. The younger the work starting age, the argument continues, the greater the risk the working children are exposed to. As can be seen from table 1, one out of three rural working children started participating in work activities at or below the age of 5.

Table 1 Work Starting Age of Rural Children

Age	Female		Male		Total	
	Percent	Cumulative	Percent	Cumulative	Percent	Cumulative
<4	1.9	1.9	1.6	1.6	1.7	1.7
4	10	11.9	11.2	12.8	10.6	12.3
5	19.7	31.6	22.7	35.5	21.3	33.6
6	22.5	54.1	20.8	56.3	21.6	55.2
7	23.9	78.0	20.6	76.9	22.2	77.4
8	14.5	92.5	14.1	91.0	14.3	91.7
9	2.9	95.4	2.4	93.4	2.6	94.3
10	3.9	99.3	4.8	98.2	4.4	98.7
11	0.3	99.6	0.7	98.9	0.5	99.3
12	0.2	99.8	0.9	99.8	0.5	99.8
13	0.1	99.9	0.1	99.9	0.1	99.9
14	0.1	100	0.1	100	0.1	100

Source: Own calculation from the 5th Round Rural Ethiopian Household Survey

The gender-disaggregated analysis shows that 32% and 36% of the rural female and male children, respectively, started undertaking farm and/or housekeeping activities before

celebrating their 6th birthday. On the other hand, 93% and 92% of the rural female and male children, respectively, have started work before they reach at the age of 9.

Table 2 below presents the work starting age for urban children. Like their rural counterparts, urban children start participation in work activities at a very young age. As can be seen from the table, one out of five working children started undertaking work activities at or younger than five years of age. The gender-disaggregated analysis shows that 40% and 46% of the urban female and male children, respectively, started participating in work activities younger than 7 years of age. On the other hand, 76% and 80% of the urban female and male children, respectively, started work before celebrating their 9th birthday. Though the work starting age is low both for urban and rural children, it is much lower for rural children.

Table 2 Work Starting Age of Urban Children

Age	Female		Male		Total	
	Percent	Cumulative	Percent	Cumulative	Percent	Cumulative
<4	1.8	1.8	0.7	0.7	1.3	1.3
4	4.8	6.6	8.8	9.5	6.6	7.9
5	14.5	21.1	15.2	24.7	14.8	22.7
6	18.6	39.7	21.0	45.7	19.7	42.4
7	18.5	58.2	20.1	65.8	19.2	61.6
8	17.9	76.1	14.0	79.8	16.1	77.7
9	6.8	82.9	5.7	85.5	6.1	83.8
10	10.6	93.5	9.7	95.2	10.2	94.0
11	1.7	95.2	1.4	96.6	1.6	95.6
12	2.1	97.3	2.0	98.6	2.1	97.7
13	0.9	98.2	0.7	99.3	0.8	98.5
14	0.8	99	0.2	99.5	0.5	99
DK	1	100	0.5	100	1	100

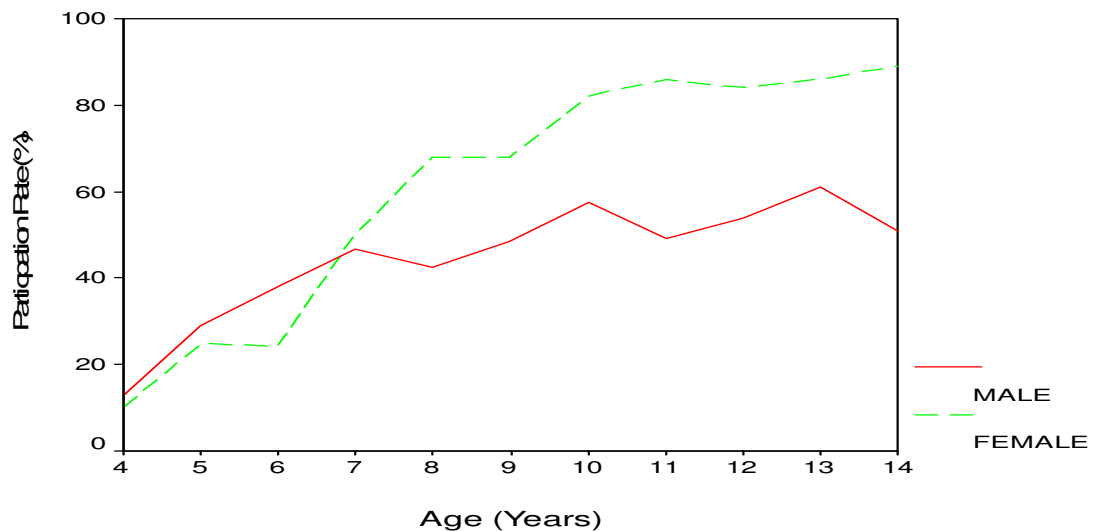
DK = Do Not Know

Source: Own calculation from the 4th Round Ethiopian Urban Household Survey

Apart from work starting age, the participation rate of children in work activities does provide a clue about the extent of child labour. Of the total rural children in the 4-14 age group, 53% have been reported to participate in domestic work activities. Gender wise, 43% and 63% of the rural male and female children, respectively, have participated in domestic work activities over the reference week. On the other hand 52% of the urban children did participate in domestic work activities over the reference week. Like their rural counterparts, urban female children have a higher domestic work participation rate. Specifically, the participation rate is found to be 55% and 46% for urban female and male children, respective. For both rural and urban areas, female children have higher domestic work participation rate than their male counterparts suggesting the existence of gender a bias.

The analysis of domestic participation rate of children at different age levels also revealed the existence of a positive association between participation rate and age.

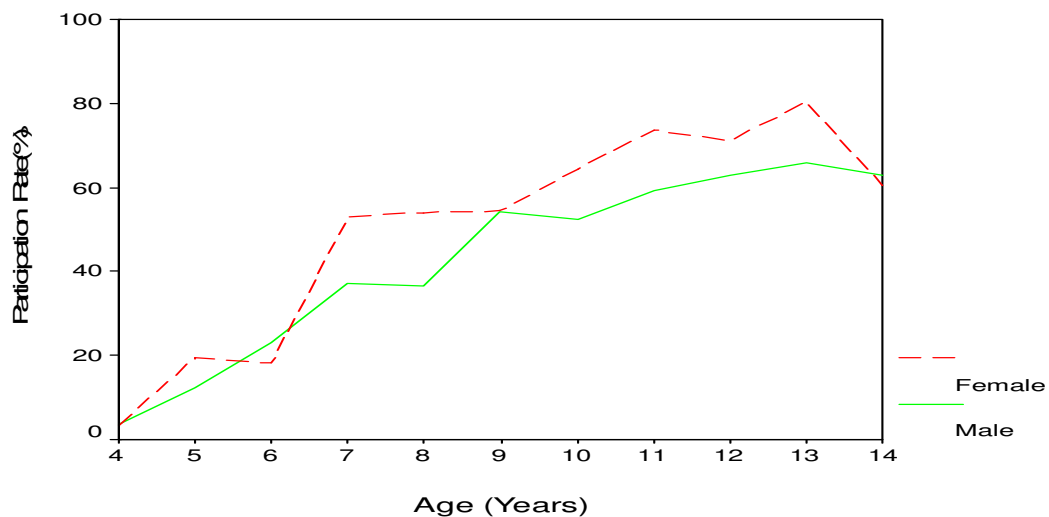
Figure 1 Domestic Work Participation Rate: Rural



Interesting is the finding that girls have a higher domestic work participation rate than their male counterparts starting from the age of 7. This should not be a surprise given that girls are usually the one to be called up on to assume domestic work responsibilities.

Identical with the finding for rural children, the domestic work participation rate of urban male and female children tends to increase with age. As can be seen from Figure 2, the domestic work participation rate of female urban children is higher than that of male children at almost all age levels once again suggesting the existence of gender bias.

Figure 2 Domestic Work Participation Rate: Urban



Comparison of the figures for urban and rural children reveals that while the domestic work participation rate of urban female children shows a downward trend starting from the age of 13, such downward tendency does not seem to extend to rural female children whose participation rate remained as high as 85% even after the age 13.

Besides work starting age and mere participation rate of children in domestic work activities, an important indicator of the extent to which child domestic work is in a trade-off situation

with the normal development of the working children is length of time spent on work activities. The longer the hours of labour supply, *ceteris paribus*, the smaller will be the time and energy left for undertaking activities that are deemed to of immense importance for children's development.

Table 3 Weekly Domestic Work Hours (Conditional on Wording): Rural

Activity	Region	Mean Hours of Domestic Work ^a		
		Female	Male	Total
Water/Wood Fetching (including travel time)	Tigray	11.65 (8)	11.78 (9)	11.72 (8)
	Amhara	9.04 (7)	9.09 (9)	9.06 (8)
	Oromia	12.00 (8)	10.41 (7)	11.42 (8)
	SNNP	10.49 (11)	9.89 (9)	10.20 (10)
	Total	10.89 (9)	10.10 (8)	10.56 (11)
Cooking/ Cleaning/ Shopping/ Etc.	Tigray	15.65 (11)	9.67 (7)	14.41 (10)
	Amhara	12.49 (9)	12.6 (13)	12.51 (12)
	Oromia	14.94 (11)	13.64 (14)	14.61 (11)
	SNNP	14.62 (11)	10.97 (11)	13.17 (11)
	Total	14.39 (11)	12.01 (12)	13.71 (11)
Child Care	Tigray	16.39 (9)	11.29 (10)	14.86 (10)
	Amhara	22.16 (15)	18.62 (16)	21.27 (15)
	Oromia	15.07 (12)	14.43 (14)	14.88 (12)
	SNNP	13.55 (11)	14.97 (15)	14.10 (13)
	Total	16.00 (13)	15.07 (14)	15.70 (13)
Domestic Work²⁰	Tigray	28.25 (22)	14.24 (11)	21.34 (19)
	Amhara	23.45 (18)	13.16 (13)	19.49 (17)
	Oromia	27.04 (20)	18.24 (16)	23.76 (19)
	SNNP	25.84 (21)	19.31 (18)	22.73 (20)
	Total	25.97 (20)	17.31 (16)	22.33 (19)

^a Figures in parenthesis are standard deviations

Source: Own calculation from the 5th Round Ethiopian Rural Household Survey

As can be seen from Table 3 above, rural children in the 4-14 age category spend, on average, 22 hours a week (3 hours a day) performing various domestic chores. As would be

²⁰ Where domestic work refers to wood/water fetching, childcare activities, cooking, cleaning, shopping and other work types that are domestic in nature.

expected, female rural children spend longer hours in domestic work activities (26 hours) compared with their male counterparts (17 hours). In terms of the specific work activity, minding of younger siblings is the most time-consuming work activity both for rural male and female children followed by cooking and cleaning. This finding is identical with the one by the CSA (2001) where at least three in four of the children in the 5-17 age category were identified to put 3 hours or more a day in housekeeping activities.

Like rural children, urban children tend to work longer hours on domestic work activities. As can be seen from table 4 urban children spend relatively fewer hours on domestic work activities. Specifically, they spend, on average, 10 hours a week. The gender-disaggregated analysis shows that like their rural counterparts, urban female children spend relatively longer hours on domestic work activities (12 hours) compared with male urban children (9 hours). Like rural children, minding of younger siblings seems to be the most time consuming domestic work type for urban children.

Table 4 Weekly Domestic Work Hours (Conditional on Wording): Urban

Activity	City	Mean Hours of Domestic Work ^a		
		Female	Male	Total
Water/Wood Fetching (including travel time)	Addis Ababa	3.97(8)	3.53(7)	3.77(7)
	Awassa	7.19(8)	5.40(5)	6.24(6)
	Bahir Dar	3.13(2)	2.44(2)	2.78(2)
	Dessie	4.00(3)	4.01(3)	4.01(3)
	Dire Dawa	9.15(10)	12.72(21)	11.13(17)
	Jimma	0.80(1)	3.50(4)	1.88(3)
	Mekelle	4.98(5)	3.53(5)	4.28(5)
	Total		4.57(7)	4.70(9)
Cooking/ Cleaning/ Shopping/ Etc.	Addis Ababa	8.23(10)	7.32(11)	7.80(10)
	Awassa	12.11(10)	5.92(6)	9.34(9)
	Bahir Dar	5.97(5)	4.90(6)	5.45(5)
	Dessie	4.55(4)	2.42(2)	3.70(3)
	Dire Dawa	10.38(13)	7.89(9)	9.25(11)
	Jimma	8.55(8)	7.90(8)	8.35(8)
	Mekelle	11.34(16)	5.05(4)	9.35(13)
	Total		8.60(10)	6.63(9)
Child Care	Addis Ababa	6.47(7)	5.96(5)	6.32(6)
	Awassa	8.63(6)	15.00(14)	12.00(11)
	Bahir Dar	14.33(18)	7.80(3)	11.36(13)
	Dessie	4.93(5)	1.50(1)	3.05(4)
	Dire Dawa	12.66(11)	10.50(13)	12.04(11)
	Jimma	8.50(6)	5.00(.)	7.80(6)
	Mekelle	15.57 (25)	14.25(9)	15.28(22)
	Total		8.82(12)	8.11(9)
Domestic Work	Addis Ababa	10.80(13)	8.27(13)	9.67(13)
	Awassa	16.78(15)	10.06(11)	13.32(13)
	Bahir Dar	9.87(11)	6.48(6)	8.06(9)
	Dessie	6.69(5)	4.68(3)	5.86(4)
	Dire Dawa	16.84(17)	17.78(24)	17.29(21)
	Jimma	9.10(8)	7.39(8)	8.48(8)
	Mekelle	17.8(30)	7.90(8)	13.86(24)
	Total		11.76(15)	8.75(13)

^a Figures in parenthesis are standard deviations

Source: Own calculation from the 4th Round Ethiopian Urban Household Survey

In general, child work and school attendance are not mutually exclusive. There are instances where children do accomplish both at a time. This, however, severely affects the working

children's educational performance especially the longer the time spent on work activities since long hours of work leaves the children with little time and stamina to concentrate on their education. Of the 3611 rural children included in the study, 848 (23%) have been reported to combine school attendance with farm and/or domestic work activities. On the other hand, work - school combination has been the characteristics of 1103 (51%) urban children. Given the long hours child domestic work, the argument continues, work-school combination could severely affect the educational performance of the working children.

That school attendance is beneficial to children is universally accepted. However, school attendance becomes an alternative provided it is in the reach of children. Parents may not consider school attendance as an alternative use of their children's time if schools are not accessible on reasonable terms and/or the education provide is not of a nature that allows an upward social mobility of the educated. In situations where expected returns from schooling are low, parents will be forced to put their children into other more 'profitable' lines of activities.

Among others, the quality of education provided is an important determinant of the rate of return to education and hence parents decision on the allocation of children's time. Parents' perceived quality of education could affect the allocation of children's time into alternative uses. The higher the perceived quality of education, *ceteris paribus*, the more (less) will the incentive be on the part of parents to send their children to school (work). On the other hand, if the perceived quality of education is low, parents may be reluctant to send their kids to school. This in turn creates a fertile ground for involvement of children into different work activities. In this regard the data set from rural Ethiopia revealed that while 39% of the heads

were not satisfied with the quality of education provide, the rest (61%) were satisfied with the quality of education provided in schools (See Table 5).

Table 5 Household Head’s Opinion about Education Quality: Rural

Response ^a			
Region	Satisfied	Unsatisfied	Total
Tigray	90 (75.6%)	29 (24.4%)	119
Amhara	222 (62.4%)	134 (37.6%)	356
Oromia	297 (56.5%)	229 (43.5%)	526
SNNP	219 (61.7%)	136 (38.3%)	355
Total	828 (61.1%)	528 (38.9%)	1356

^a Figures in parenthesis are percentages

Source: Own calculation from the 5th Round Rural Household Survey

On the other hand and as can be seen from table 6 below, 767 (54%) of the urban households included in the survey were not satisfied with the quality of education provided while 650 (46%) were satisfied with the quality of education.

Table 6 Household Head’s Opinion about Education Quality: Urban

Response ^a			
Town	Satisfied	Unsatisfied	Total
Addis Ababa	338 (40%)	511 (60%)	849
Awassa	31 (42%)	43 (58%)	74
Bahir Dar	37 (40%)	55 (60%)	92
Dessie	34 (37%)	59 (63%)	93
Dire Dawa	77 (67%)	38 (33%)	115
Jimma	61 (64%)	34 (36%)	95
Mekelle	72 (73%)	27 (27%)	99
Total	650 (46%)	767 (54%)	1417

^a Figures in parenthesis are percentages

Source: Own calculation from the 4th Round Urban Household Survey.

Comparison of Tables 5 and 6 reveals that while more than half of the urban household heads were not satisfied with the quality of education, a significant share of the rural household heads seem to be satisfied with the quality of education provide.

School attendance by children involves both direct and indirect costs. While the former refers to the payment made by parents for various services rendered by schools, the latter includes the money, goods, and services the children could have earned had they been involved in work activities - the opportunity cost of school attendance. High (direct as well as indirect) cost of school attendance, therefore, could discourage parents from sending their children to school and may encourage child work. This is especially the case for families with severe financial constraints.

As can be seen from Tables 7 and 8, and contrary to the 'free-education' rhetoric, Ethiopian parents make various school related payments. The argument is then that this high cost of schooling could discourage parents from making investment on their children thereby leaving the children with ample time to engage in various work activities. This is especially the case in households with large number of school-aged children. In fact there are times when children involve in work activities so as to cover their own school expenses and/or that of their brothers and sisters at school. As would be expected, investment on child education is more expensive in urban areas than in rural areas.

Table 7 School Expenditure²¹ (in Birr) Per School Child per Year: Rural

Region	Total No. Of School Children	Average ^a
Tigray	70	38.26 (44.7)
Amhara	180	23.65 (43.4)
Oromia	292	51.46 (111.9)
SNNP	217	22.93 (44.3)
Total	759	35.49 (78.6)

^a Figures in parenthesis are standard deviations

Source: Own calculation from 4th Round Rural Household Survey

Table 8 School Expenditure (in Birr) Per School Child per Year: Urban

City	Total No. Of School Children	Average ^a
Addis Ababa	1041	158 (312)
Awassa	148	137 (237)
Bahir Dar	149	59 (30)
Dessie	119	51 (96)
Dire Dawa	164	142 (132)
Jimma	141	55 (89)
Mekelle	142	54 (67)
Total	1906	125 (250)

^a Figures in parenthesis are standard deviations

Source: Own calculation from the 4th Round Urban Survey

Besides, the longer the distance children have to travel to get to school, holding other things constant, the more would the cost of schooling be once again making school attendance a less profitable venture. The empirical findings from rural and urban Ethiopia revealed that, on average, rural and urban children have to travel for 34 and 31 minutes, respectively, on their way to school, while urban children spend 31 minutes on their way to school.

²¹ School related expenditure includes: school registration fees; cost of uniform, sport cloths, books, and school supplies; transportation cost; club membership contribution; house rent (for school children renting a house); and other costs of living (for children living away from home).

Table 9 Distance to the near by School in Minutes (one way): Rural

Region	Average ^a
Tigray	48.75 (37.2)
Amhara	43.47 (38.2)
Oromia	31.65 (27.2)
SNNP	25.78 (18.8)
Total	34.38 (30.0)

^a Figures in parenthesis are standard deviations

Source: Own calculation from the 5th Round Rural Household Survey

Table 10 Distance to the near by School in Minutes (one way): Urban

Town	Average ^a
Addis Ababa	26.49 (36.6)
Awassa	46.81 (83.4)
Bahir Dar	26.90 (30.6)
Dessie	26.85 (53.7)
Dire Dawa	51.09 (84.0)
Jimma	36.39 (77.6)
Mekelle	24.02 (14.3)
Total	31.23 (52.3)

^a Figures in parenthesis are standard deviations

Source: Own calculation from 4th Round Urban Household Survey

In general, the following points are worth mentioning from the on going discussion. *First*, children both in rural and urban Ethiopia start participating in work activities at a very young age, the work starting age being much lower in the former case. *Second*, domestic work participation rate of children tends to increase with age both in urban and rural Ethiopia, female children having a consistently higher domestic work participation rate at almost all age levels. *Third*, children spend relatively longer hour on domestic work activities, the time being much longer for rural and female children. *Fourth* and contrary to the ‘free-education’ rhetoric, Ethiopian parents do make various school related payments. *Fifth*, Ethiopian

children travel for long hours to get to school implying the problem that the children have in getting access to schools in their vicinity.

4.2 Econometric Results

The method of analysis used in this study has been discussed in the third chapter. Accordingly, the Heckman sample selection model is used to estimate domestic labour equation for urban and rural child domestic workers. The estimation of the labour hour equation involves two steps. The first step is the estimation of the parameters of the probit (selection) equation that will allow the construction of the error correction term - the IMR. In the second step, hours of labour supply is regressed on a set of explanatory variables and on the IMR for the selected sample of working children. As such the following two models are specified for the data sets from rural and urban Ethiopia. Two models are specified due to the existence of some variables that are pertinent to each of the data set. Suppressing subscripts, the model for the rural data set is specified as follows:

Model 1: Rural

$$\begin{aligned} \text{Workpar} = & \alpha_0 + \alpha_1 \text{Age} + \alpha_2 \text{Ages} + \alpha_3 \text{Sex} + \alpha_4 \text{Bio} + \alpha_5 \text{Sexh} + \alpha_6 \text{Ageh} \\ & + \alpha_7 \text{Eduh} + \alpha_8 \text{Size} + \alpha_9 \text{Inf03} + \alpha_{10} \text{M1559} + \alpha_{11} \text{F1559} + \alpha_{12} \text{B414} \\ & + \alpha_{13} \text{G414} + \alpha_{14} \text{Eld60} + \alpha_{15} \text{Land} + \alpha_{16} \text{Live} + \alpha_{17} \text{Credit} \\ & + \alpha_{18} \text{Schexp} + \alpha_{19} \text{Remit} + \alpha_{20} \text{Offfarm} + \alpha_{21} \text{Dis} + \alpha_{22} \text{SchQ} + u_R \dots \dots \dots (4) \end{aligned}$$

$$\begin{aligned} \text{DomHr} = & \beta_0 + \beta_1 \text{Age} + \beta_2 \text{Ages} + \beta_3 \text{Sex} + \beta_4 \text{Bio} + \beta_5 \text{Cursch} + \beta_6 \text{Sexh} \\ & + \beta_7 \text{Ageh} + \beta_8 \text{Eduh} + \beta_9 \text{Size} + \beta_{10} \text{Inf03} + \beta_{11} \text{F1559} + \beta_{12} \text{M1559} \\ & + \beta_{13} \text{B414} + \beta_{14} \text{G414} + \beta_{15} \text{Eld60} + \beta_{16} \text{Land} + \beta_{17} \text{Live} \\ & + \beta_{18} \text{Credit} + \beta_{19} \text{Remit} + \beta_{20} \lambda(.) + \varepsilon_R \dots \dots \dots (5) \end{aligned}$$

Similarly, the model for the urban data set is specified as follows (suppressing subscripts)

Model 2: Urban

$$\begin{aligned}
 \text{Workpar} &= \alpha_0 + \alpha_1 \text{Age} + \alpha_2 \text{Ages} + \alpha_3 \text{Sex} + \alpha_4 \text{Bio} + \alpha_5 \text{Sexh} + \alpha_6 \text{Ageh} \\
 &+ \alpha_7 \text{EduM} + \alpha_8 \text{EduF} + \alpha_9 \text{Hbus} + \alpha_{10} \text{Hfarm} + \alpha_{11} \text{Hunem} \\
 &+ \alpha_{12} \text{Hpen} + \alpha_{13} \text{Size} + \alpha_{14} \text{Inf03} + \alpha_{15} \text{M1559} + \alpha_{16} \text{F1559} + \\
 &+ \alpha_{17} \text{B414} + \alpha_{18} \text{G414} + \alpha_{19} \text{Eld60} + \alpha_{20} \text{Exp} + \alpha_{21} \text{Credit} \\
 &+ \alpha_{22} \text{Schexp} + \alpha_{23} \text{FoodS} + \alpha_{24} \text{Tap} + \alpha_{25} \text{Ele} + \alpha_{26} \text{Dis} \\
 &+ \alpha_{27} \text{SchQ} + u_U \dots\dots\dots (6)
 \end{aligned}$$

$$\begin{aligned}
 \text{DomHr} &= \beta_0 + \beta_1 \text{Age} + \beta_2 \text{Ages} + \beta_3 \text{Sex} + \beta_4 \text{Bio} + \beta_5 \text{Cursch} + \beta_6 \text{Sexh} \\
 &+ \beta_7 \text{Ageh} + \beta_8 \text{EduM} + \beta_9 \text{EduF} + \beta_{10} \text{Hbus} + \beta_{11} \text{Hfarm} \\
 &+ \beta_{12} \text{HPen} + \beta_{13} \text{Hunem} + \beta_{14} \text{Size} + \beta_{15} \text{Inf03} + \beta_{16} \text{F1559} \\
 &+ \beta_{17} \text{M1559} + \beta_{18} \text{B414} + \beta_{19} \text{G414} + \beta_{20} \text{Eld60} + \beta_{21} \text{Exp} \\
 &+ \beta_{22} \text{Credit} + \beta_{23} \text{Tap} + \beta_{24} \text{Ele} + \beta_{25} \lambda(.) + \varepsilon_U \dots\dots\dots (7)
 \end{aligned}$$

Where the variables in the model are as defined in Table11 below;

u_R and ε_R are the disturbance terms of the selection (4) and regression (5) equations in the first model, respectively, and are assumed to have the following characteristics: $u_R \sim N(0,1)$; $\varepsilon_R \sim N(0,\sigma_R)$; and $\text{Corr}(u_R, \varepsilon_R) = \rho_R$;

u_U and ε_U are the disturbance terms of the selection (6) and regression (7) equations in the second model, respectively, and are assumed to have the following characteristics: $u_U \sim N(0,1)$; $\varepsilon_U \sim N(0,\sigma_U)$; and $\text{Corr}(u_U, \varepsilon_U) = \rho_U$; and

λ (.) in equations 5 and 7 represent the selectivity correction term constructed from maximum likelihood estimation of the parameters of the probit equation in the respective models.

In both models, the first expression represents the probit equation meant for identifying the factors that affect whether or not a child participates in domestic work activities. Maximum likelihood estimation is used to estimate the parameters of the probit equation. The second expression in both models is the selectivity correction term augmented regression (hours) equation for the sample of working children. Maximum likelihood or ordinary least square regression could be used to estimate the parameters of the hours equation (Green, 2000). In this study, maximum likelihood is used since it allows for heteroscedasticity consistent estimation of parameters of the model.

Table 11 Definition of Variables Used in the Heckman

<u>Dependent Variables</u>	
Workpar:	1 if the child participates in domestic work activities over the reference week; 0 otherwise
DomHr :	weekly hours of domestic labour supply (in natural logarithm)
<u>Child Characteristics</u>	
Age:	age in years
Ages:	age squared
Sex:	1 if male child; 0 otherwise
Bio:	1 if the child is biologically related with the head of the household; 0 otherwise
Cursch:	1 if the child has been attending formal schooling in the reference year; 0 otherwise
<u>Parent Characteristics</u>	
Sexh:	1 if male headship; 0 otherwise
Ageh:	age of the household head (in logarithm)
Eduh :	the highest grade of formal schooling attained by the rural head
EduM:	a categorical dummy for the level of education attained by the urban mother (0 if illiterate; 1 if adult literacy; 2 if primary school; 3 if junior secondary school; 4 if secondary school; 5 if university and above)
EduF:	a categorical dummy for the level of education attained by the urban father (0 if illiterate; 1 if adult literacy; 2 if primary school; 3 if junior secondary school; 4 if secondary school; 5 if university and above)
Hbus:	1 if head is a business person; 0 otherwise
Hfarm:	1 if head is a farm worker; 0 otherwise
HPen :	1 if head is a pensioner; 0 otherwise
Hunem:	1 if head is unemployed; 0 otherwise
Hemp:	1 if head is public servant; 0 otherwise (Reference Group)
<u>Household Characteristics</u>	
Size:	total number of individuals in the household (in natural logarithm)
Inf03:	number of infants in the 0-3 age group
M1559:	number of male adults aged between 15 and 59
F1559:	number of female adults aged between 15 and 59
B414:	number of boys aged between 4 and 14
G414:	number of girls aged between 4 and 14
Eld60:	number of elderly 60 years and above
Exp:	real expenditure per capita per adult equivalent (in logarithm)
Live:	value of livestock (in birr) owned by the household (in natural logarithm)
Land:	land size (in hectare) operated by the household
Offfarm:	1 if any member of the household worked off land against payment; 0 otherwise
Remit:	if the household has received income in the form of remittances, gifts, etc; 0 otherwise
Schexp:	household per capita school expenditure (in birr) (in natural logarithm)
FoodS:	1 if the household has ever experienced food shortage; 0 otherwise
Credit:	credit (in birr) received by the household (in natural logarithm)
Tap:	1 if source of drinking water is tap; 0 otherwise
Ele:	1 if source of lighting is electricity; 0 otherwise
<u>Community Characteristic</u>	
Dis:	distance (in minutes) to the nearest school (one way) (in natural logarithm)
SchQ:	1 if the household head is satisfied with the quality of education; 0 otherwise

Of the total 3611 rural children in the 4-14 age category, some observations were excluded due to the existence of missing values for some of the variables included in the model. As a result, only 3364 observations were used. For similar reasons, of the total 2173 urban children in the 4-14 age category, only 2073 observations were used in the regression analysis.

Before employing the Heckman sample selection, a preliminary univariate data analysis is carried out using the ladder-of-power variable transformation technique so as to uncover the kind of variable transformation that is likely to work best to get to normality (which precedes maximum likelihood estimation). Using the *gladder test* procedure provided in STATA, some of the count variables are found to have a symmetric distribution at their level forms (Age, Ages, Inf03, F1559 M1559, G414, B414, Eld60 and Land), while the normality of the other count variables (DomHr, Size, Dis, Exp, Schexp, Credit, Live, Ageh) is insured after transformation into their (natural) logarithm.

Attempt is also made to detect if the data sets encounter problem of multicollinearity and/or heteroscedasticity. In connection with the former one, the zero order correlation coefficient between the variables is constructed. As can be seen from annexes 3 and 4, the data sets do not suffer from severe multicollinearity since the pair-wise correlation coefficient for almost all the variables is less than 0.8 (See Gujarati, 1995).

As for the heteroscedasticity problem, the Cook-Weisberg test is carried out using fitted values for hours of domestic labour supply. For both data sets the fact that the calculated Chi-squared value is greater than the corresponding table even at 10% leads to the rejection

of the null hypothesis of constant variance (See Annex 5). So as to take care of the heteroscedasticity problem, therefore, a heteroscedasticity consistent estimation is carried out using the Huber/White/Sandwich procedure provided in STATA.

Initial estimation of parameters of the models was made on all the variables that are thought to affect the hours of domestic labour supply and the decision to or not to participate in domestic work activities. Then insignificant variables were dropped step by step based on the significance of the estimated parameter coefficients. In a way the general-to-specific modeling strategy was employed. Furthermore, whether elimination of the insignificant variables from the respective models has helped improve the overall significance of the model was tested by comparing the reported Wald chi-squared values of the successive models. Elimination of the insignificant variables was halted when it has become impossible to achieve improvement in the overall significance of the model.

Table 12 provides the results from the regression model with sample selection for total urban children. The results were obtained using STATA program that implements the Heckman procedure. The first column provides the results from the maximum likelihood estimation of hours equation for the selected child domestic workers, while the results from the probit model are provided in the second column. So as to aid identification, some household variables (Schexp and FoodS) and community variables (Dis and SchQ) appear in the selection equation but not in the labour hour equation.

Table 12 Regression Model with Sample Selection: Urban Total

Labour Hour Equation (DomHr)			Selection Equation (Workpar)		
Variable	Coefficient Estimate ^a		Variable	Coefficient Estimate	
Constant	-2.87*	(0.60)	Constant	-2.75*	(0.43)
Child Characteristics			Child Characteristics		
Age	0.67*	(0.09)	Age	0.56*	(0.07)
Ages	-0.02*	(0.00)	Ages	-0.02*	(0.00)
Sex	-0.47*	(0.06)	Sex	-0.03*	(0.00)
Bio	0.29*	(0.09)	Bio	0.27*	(0.06)
Cursch	-0.01	(0.05)			
Parental Characteristics			Parental Characteristics		
Sexh	0.05	(0.09)	Sexh	0.03	(0.07)
Hbus	0.05	(0.09)	Hbus	-0.08*	(0.07)
Hfarm	0.71*	(0.16)	Hfarm	-0.26***	(0.15)
Hpen	0.19***	(0.10)	Hpen	-0.03	(0.08)
Hunem	0.02	(0.07)	Hunem	0.21***	(0.12)
Hemp	Omitted		Hemp	Omitted	
EduM	-0.05**	(0.02)	EduM	-0.02	(0.01)
EduF	-0.04***	(0.02)	EduF	-0.03***	(0.02)
Household Characteristics			Household Characteristics		
Inf03	0.39*	(0.07)	Inf03	0.02*	(0.05)
F1559	-0.05	(0.03)	F1559	-0.02	(0.02)
Size	-0.08	(0.13)	Size	0.02	(0.01)
Credit	0.04*	(0.01)	Credit	0.03*	(0.00)
Exp	-0.05***	(0.03)	Exp	-0.11*	(0.02)
Tap	0.16	(0.17)	Tap	-0.06	(0.14)
Ele	0.04	(0.18)	Ele	0.16	(0.03)
			FoodS	-0.13*	(0.03)
			Schexp	-0.03*	(0.00)
			Community Characteristics		
			SchQ	-0.01	(0.14)
			Dis	-0.00	(0.00)
athrho	2.88*	(0.31)			
Insigma	0.28*	(0.03)			
lambda	1.32*	(0.04)			
Wald Test of independent equations (rho=0): Chi2 (1) = 84.53			Pro > Chi2 = 0.0000		
No. of Obs	=	2073			
Censored Obs.	=	1040			
Uncensored Obs.	=	1033			
Wald Chi2 (19)	=	379.04			
Prob> Chi2	=	0.0000			
Log likelihood	=	-2440.473			
Iteration Completed	=	8			

^a Robust standard errors are in parenthesis

*, **, and*** represent significance at 1%, 5%, and 10%, respectively.

Reported at the bottom of the table are the various tests for the adequacy of the model. The likelihood ratio test for the null hypothesis of ‘no correlation between the disturbance terms

of the regression and selection equations' is rejected since both the Chi-squared value of 84.53 and the coefficient of the variable 'athrho'²¹ are both significantly different from zero. This in turn justifies the use of Heckman selection since it provides consistent and asymptotically efficient estimates in the presence of underlying relationship between the selection and regression equations. Furthermore, the fact that the reported Wald test for all the coefficients in the regression equation (except the constant term) - Chi2 (19) = 379.04 - is significantly higher than the corresponding table value at 1% leads to the rejection of the null hypothesis that all the coefficients of the model are statistically zero. The above tests indicate the overall adequacy of the model. Given these results, the discussion that follows pertains to the labour hour equation.

As shown in the table, the high statistical significance of the 'Age' variable in the labour hour equation suggests that, *ceteris paribus*, older children work longer hours than the younger ones. However, the negative and statistically significant coefficient estimate of the 'Ages' variable implies that the positive effect of age on domestic work hours weakens in latter years suggesting a positive and non-linear relationship between age and domestic work hours by urban children. This finding is similar to that by Ray (2000b) where age is found to have a non-linear positive impact on hours of work by Ghanaian children.

The gender dimension and its implication on the allocation of children's time is one of the key areas of interest in the child labour literature. This is especially the case for child domestic work activities. So as to capture the impact of gender differential on hours of domestic labour supply, a dummy variable was included in the labour hour equation. The

²¹ Where $\text{athrho} = \frac{1}{2} \ln (1+\rho/1-\rho)$ (See StataCorp.1999)

high, statistically significant, and negative coefficient of the 'Sex' variable suggests that urban female children tend to work longer hours than their male counterparts suggesting gender bias. This should not be a surprise given that girls are usually the one to be called upon to assume domestic work responsibilities.

Unexpected is the finding that urban children with biological relationship with the head tend to work longer hours compared with children with no biological relationship with the head as confirmed via the statistically significant and positive coefficient of the 'Bio' variable. This suggests that when it comes to domestic work, parents do not discriminate among children residing in the household on the basis of their relationship with the head.

The trade-off between child work and school attendance is among the issues that generated considerable interest in the literature on the economics of child labour. The argument is that child work that leaves little time and stamina for attending schools (well) affects the educational performance of the working children with its long term implication on human capital development. In this regard a dummy variable was used for whether or not the child has been attending school in the reference year. Though the direction of the impact is as expected, the statistical insignificance of the 'Cursch' variable fails to lend a hand to the child work-school attendance trade-off often mentioned in the literature. What this finding implies is that making schooling compulsory may not be sufficient in reducing the work burden of urban domestic child workers. This is especially the case given the *shift* schooling system of the country. This finding is in sharp contrast with the one by Ray (2000b) for Ghanaian children where current school attendance is reported to have a labour hour reducing effect for Ghanaian working children.

More often than not, child labour is the outcome of not the child's decision but that of the household. As such parents' occupation type is of immense importance in explaining the allocation of children's time into competing activities. It also affects the extent to which the entire family relies on the use of child labour so as to make ends meet. As can be seen from Table 12, children from households with pensioner head and head engaged in farm activities tend to spend longer hours on domestic work activities compared with children in households with public servant head (the reference group). The effect is much stronger for children coming from farm households. Canagarajah et al. (1998) have reported similar finding for Ghana where children from households with parents engaged in agricultural activities tend to have a higher likelihood of work participation.

Closely related with the occupational status of parents is their level of education. The empirical evidence from urban Ethiopia confirmed the existence of a negative association between child domestic work hours and the level of education of both the mother and the father suggesting the important role that adult education could have in the attempt to reduce the work load of child domestic workers. The importance of adult education was confirmed by studies in other countries (Ray, 1998; 2000a, 2001b).

With regard to the impact of household characteristics on hours of domestic labour supply, a number of variables were considered in this study. Only one variable is found to have a significant impact, however. The strong, positive and statistically significant coefficient attached to the 'Inf03' variable suggests the existence of a positive association between number of infants less than 4 year and hours of domestic labour supply. This finding is

expected given that the definition of child domestic work encompasses childcare activities performed by children. This finding is consistent with the discussion in the summary statistics where minding of younger siblings was identified to be the most time consuming domestic work activity for children (See Table 4). It is to be recalled that an empirical study by Cockburn (1999) has reported a direct association between the likelihood of child work participation and the number of infants younger than 4 years of age using data from rural Ethiopia. Also, Wahba (2001) has reported similar finding for Egyptian children.

In the literature on child labour, household poverty is often mentioned as the main culprit behind the use of child labour. In an attempt to capture the impact of household poverty on child domestic work hours, a proxy variable - real expenditure per capita per adult equivalent - was considered in this study. Though weak, the negative coefficient attached to the 'Exp' variable lends some support to the 'household poverty - child labour' nexus implying shorter hour of domestic work by children from better off families. On the other hand, there appears to exist a positive association between domestic labour hours and amount of money received in the form of credit suggesting long hours of domestic work by children from households with credit access lending no support for the *capital market explanation* for the use of child labour.

In an attempt to examine the impact of infrastructural development on domestic work hours, dummy variables were used for the presence of electricity and access to tap water. Both the presence of electricity and tap water do not seem to affect the domestic work hour. This finding is surprising given that the definition of domestic work includes fetching of wood and water and the supply of both electricity and water is expected to reduce time spent on

water/wood fetching. However, as will be shown later, this finding could have resulted from aggregation problem.

Keeping in mind the possibility of parameter variation, separate Heckman estimation is performed for male and female children. Tables 13 and 14 present the gender-disaggregated result for female and male children, respectively. A close observation of the diagnostic tests once again suggests the adequacy of the models and need for using the Heckman sample selection model.

Identical with the finding for the total urban children, the gender-disaggregated analysis reveals the existence of a non- linear positive association between age and hours of domestic labour supply both for female and male children as confirmed by the statistical significance of the 'Age' and 'Ages' variables in the respective models. On the other hand, while female children with biological relationship with the head tend to work for longer hours, it is not the case for urban male children.

Table 13 Regression Model with Sample Selection: Urban Female

Labour Hour Equation (DomHr)			Selection Equation (Workpar)		
Variable	Coefficient Estimate ^a		Variable	Coefficient Estimate	
Constant	-1.8***	(0.90)	Constant	-2.8*	(0.01)
Child Characteristics			Child Characteristics		
Age	0.50*	(0.15)	Age	0.56*	(0.09)
Ages	-0.01**	(0.00)	Ages	-0.01*	(0.00)
Bio	0.37*	(0.12)	Bio	0.37*	(0.09)
Cursch	-0.03	(0.08)			
Parental Characteristics			Parental Characteristics		
Sexh	0.01	(0.12)	Sexh	0.02	(0.10)
Hbus	-0.01	(0.12)	Hbus	-0.25**	(0.10)
Hf	0.60**	(0.27)	Hfarm	-0.25	(0.29)
Hpen	0.26**	(0.13)	Hpen	-0.01	(0.12)
Hunem	0.35***	(0.07)	Hunem	0.36***	(0.18)
Hemp	Omitted		Hemp	Omitted	
EduM	-0.10*	(0.03)	EduM	-0.04***	(0.02)
EduF	-0.04	(0.03)	EduF	-0.03	(0.03)
Household Characteristics			Household Characteristics		
Inf03	0.42 *	(0.09)	Inf03	0.24*	(0.07)
F1559	-0.06	(0.04)	F1559	-0.02	(0.04)
Size	-0.09	(0.17)	Size	0.03	(0.15)
Credit	0.01	(0.01)	Credit	0.03***	(0.01)
Exp	-0.02	(0.04)	Exp	-0.10*	(0.03)
Tap	0.28	(0.20)	Tap	0.13	(0.18)
Ele	-0.50**	(0.22)	Ele	-0.13	(0.21)
			FoodS	-0.13*	(0.06)
			Schexp	-0.04*	(0.01)
			Community Characteristics		
			SchQ	-0.01	(0.05)
			Dis	-0.01	(0.01)
athrho	2.34*	(0.69)			
Insigma	0.22*	(0.06)			
lambda	1.25*	(0.09)			
Wald Test of independent equations (rho=0): Chi2 (1) = 17.31			Pro > Chi2 = 0.0000		
Number of obs.	= 1057				
Censored obs.	= 482				
Uncensored obs.	= 575				
Wald chi2 (18)	= 131.92				
Prob > chi2	= 0.0000				
Log likelihood	= -1295.712				
Iteration Completed	= 36				

^a Robust standard errors are in parenthesis

*, **, and *** represent significance at 1%, 5%, and 10%, respectively.

Table 14 Regression Model with Sample Selection: Urban Male

Labour Hour Equation (DomHr)			Selection Equation (Workpar)		
Variable	Coefficient Estimate ^a		Variable	Coefficient Estimate	
Constant	-0.85	(1.4)	Constant	-2.99*	(0.64)
Child Characteristics			Child Characteristics		
Age	0.85*	(0.20)	Age	0.55*	(0.10)
Ages	-0.03**	(0.00)	Ages	-0.02*	(0.00)
Bio	0.21	(0.16)	Bio	0.20***	(0.10)
Cursch	0.09	(0.12)			
Parental Characteristics			Parental Characteristics		
Sexh	-0.01	(0.17)	Sexh	0.05	(0.10)
Hbus	0.01	(0.16)	Hbus	-0.13	(0.10)
Hfarm	1.10*	(0.30)	Hfarm	-0.10	(0.37)
Hpen	0.08	(0.19)	Hpen	-0.09	(0.12)
Hunem	0.01	(0.07)	Hunem	0.06	(0.21)
Hemp	Omitted		Hemp	Omitted	
EduM	-0.01	(0.04)	EduM	0.01	(0.02)
EduF	-0.01	(0.04)	EduF	-0.05***	(0.03)
Household Characteristics			Household Characteristics		
Inf03	0.39 *	(0.13)	Inf03	0.12	(0.08)
F1559	-0.02	(0.06)	F1559	-0.05	(0.04)
Size	-0.09	(0.23)	Size	0.09	(0.15)
Credit	0.07*	(0.02)	Credit	0.03*	(0.01)
Exp	-0.09***	(0.05)	Exp	-0.13*	(0.03)
Tap	0.21	(0.37)	Tap	-0.23	(0.24)
Ele	0.32	(0.33)	Ele	0.40**	(0.19)
			FoodS	-0.16***	(0.06)
			Schexp	0.03*	(0.01)
			Community Characteristics		
			SchQ	-0.04	(0.07)
			Dis	-0.01	(0.01)
athrho	2.20**	(0.88)			
Insigma	0.44*	(0.12)			
lambda	1.50*	(0.25)			
Wald Test of independent equations (rho=0): Chi2 (1) = 6.24			Prob > chi2 = 0.0125		
Number of obs	=	1016			
Censored obs	=	558			
Uncensored obs	=	458			
Wald chi2 (18)	=	74.08			
Prob > chi2	=	0.0000			
Iteration Completed	=	6			
Log likelihood	=	-1239.836			

^a Robust standard errors are in parenthesis

*, **, and *** represent significance at 1%, 5%, and 10%, respectively.

Interesting from the gender-disaggregated analysis is the finding of a negative association between the level of mothers' education and domestic work hours by female children with no significant impact for urban male children. Also, that the coefficient of the 'Inf03' variable is statistically significant and positive in both models implies long hour of work by male and female urban children in households with large number of infants. The domestic work hour increasing effect of the number of infants is found to be much stronger for urban female children, however.

Another finding from the gender-disaggregated analysis is the statistical significance of the 'Ele' variable in the labour hour equation for female children. That the coefficient is negative suggests more hours of domestic work by female children in household with no provision of electricity supply compared with children from households with access to electricity. Akabayashi et al. (1999) have reported a similar finding where Tanzanian children were found to work for longer hour if there was no electricity. Ray (2000b) has reported a negative association between the presence of electricity and the likelihood of work participation by female Ghanaian children.

Important from the gender-disaggregated analysis is also the finding that while the poverty variable -'Exp'- has a significant negative impact on hour of domestic labour supply by male urban children, its impact is found to be insignificant for female children, though the direction of the impact is as expected. That is, while improvement in the standard of living of the household tends to reduce hour of domestic work by male children, the domestic work hour reducing effect of welfare improvement does not seem to extend to female urban

children. This in turn suggests that long domestic work hours by female children may not always be explained by poor welfare condition of households.

In an attempt to allow for a better understanding of the situation of the domestic child work in Ethiopia, the Heckman estimation is also performed on data set from rural Ethiopia. Table 15 presents the results from the regression model with sample selection for total rural children. The results from the maximum likelihood estimation of the regression and selection equations are provided in the first and second columns, respectively. Reported at the bottom of the table are the various tests for the adequacy of the model. That the likelihood ratio test for the correlation coefficient between the error terms of the selection and regression equations ($\rho = 0$) is significant justifies once again the use of the Heckman sample selection model. Also, the significance of the reported model Chi-squared test leads to the rejection of the null hypothesis that all the parameters of the model (except the constant term) are statistically insignificant.

Similar with the finding for urban children, domestic work hours tend to increase with age as depicted by the strong positive and statistical significance of the coefficient of the 'Age' variable. On the other hand and unlike to that of urban children, that the coefficient of the 'Ages' variable is zero implies a linear and positive association between age and hours of domestic work by rural children. Like their urban counterparts, female rural children tend to spend longer hours on domestic chores as confirmed by the strong and statistically significant coefficient attached the 'Sex' variable. This is consistent with the discussion in the summery statistics where female rural children were found to spend relatively longer hours on domestic chores compared with their male counterparts (Table 3).

Table 15 Regression Model with Sample Selection: Rural Total

Labour Hour Equation (DomHr)			Selection Equation (Workpar)		
Variable	Coefficient Estimate ^a		Variable	Coefficient Estimate	
Constant	1.70*	(0.13)	Constant	-2.80*	(0.26)
Child Characteristics			Child Characteristics		
Age	0.16*	(0.05)	Age	0.60*	(0.50)
Ages	-0.00	(0.00)	Ages	-0.02*	(0.00)
Sex	-0.42*	(0.04)	Sex	-0.58*	(0.04)
Bio	0.08***	(0.05)	Bio	0.17**	(0.06)
Cursch	-0.08**	(0.04)			
Parental Characteristics			Parental Characteristics		
Sexh	-0.04	(0.05)	Sexh	0.20*	(0.06)
Eduh	-0.01	(0.01)	Eduh	0.01	(0.00)
Household Characteristics			Household Characteristics		
Inf03	0.01	(0.03)	Inf03	0.09*	(0.03)
F1559	-0.07*	(0.02)	F1559	-0.13*	(0.02)
Size	0.08	(0.07)	Size	0.06	(0.09)
Credit	-0.01	(0.01)	Credit	0.01	(0.00)
Remit	-0.10**	(0.04)	Remit	0.05	(0.05)
Land	0.05	(0.04)	Offfarm	-0.04	(0.05)
			Land	-0.38*	(0.04)
			Community Characteristics		
			Dis	-0.01	(0.01)
			SchQ	0.06	(0.05)
athrho	0.14**	(0.06)			
Insigma	-0.19*	(0.01)			
lambda	0.12*	(0.05)			
Wald Test of independent equations (rho=0): Chi2 (1) = 5.47			Prob > chi2 = 0.0194		
Number of obs.	=	3364			
Censored obs.	=	1589			
Uncensored obs.	=	1775			
Wald chi2 (13)	=	178.02			
Prob > chi2	=	0.000			
Log likelihood	=	-4074.347			
Iteration Completed	=	5			

^a Robust standard errors are in parenthesis

*, **, and *** represent significance at 1%, 5%, and 10%, respectively.

On the other hand, that rural children with biological relationship with the head tend to spend longer domestic work hour is implied by the statistically significant and positive coefficient of the 'Bio' variable.

In an attempt to examine the relationship between domestic work hours and 'current' school attendance, a dummy variable was used. The empirical findings suggest a trade-off

relationship between domestic work and school attendance by rural children. Specifically, that the coefficient of the schooling variable 'Cursch' has a negative and significant coefficient suggests long hours of domestic work by rural children with no chance to attend school. A similar finding was reported by Ray (2001b) where a Nepalese child who was attending school spend fewer hours compared with children with no chance to attend schools.

One of the key issues in the child labour literature is the interaction between adult and child labour market conditions (Basu and Van, 1998; Basu 1999). Depending on the type of activity performed by children, child and adult labour could either be substitutes or compliments. In this study, the number of male and female adults in the 15-59 age group was included. Only the number of female adults has a significant impact on domestic work hours by rural children. That the coefficient is negative lends some support for the substitution theorem. This is in sharp contrast with the finding for by Cockburn (2001) rural Ethiopia where the number of female and male adults had insignificant impact on the probability of rural Ethiopian children's work participation.

According to the capital market explanation for the use of child labour, why children involve in work activities is due to the inability of their parents to borrow from the capital market especially in times of income shocks and irregularities. The implication of which is that parents with relatively better access to alternative sources of income may not rely much on child labour. In this study, two variables - amount of money received in the form of credit and whether or not the household has received money in the form of gifts or/and remittance from outside - were considered. Though the direction of the impact of both variables is as

expected, only the 'Remit' variable has a statistically significant impact on hours of domestic labour supply. The fact that its coefficient is negative suggest more hours of domestic work by children from households with no income received in the form of remittance from outside compared with children in households with income received from outside. Interestingly, Assefa (2002) has reported a case where acquisition of gifts or other support from outside tends to decrease the likelihood of children's work participation in rural Ethiopia.

In a rural context, ownership of productive assets is an important indicator of the poverty status of households. The extent and composition of productive assets could affect the allocation of children's time into alternative uses. Two variables- total land size operated by the household and value of livestock owned by the household- were considered in this study. None of them seem to affect the domestic hour of labour supply by rural children. As would be seen latter, the statistical insignificance of the land variable might have resulted from aggregation problem.

Considering the possibility of parameter variation for male and female children, separate labour hour equations were estimated for male and female rural children. Tables 16 and 17 present the results from the Heckman estimation for male and female rural children, respectively.

Table 16 Regression Model with Sample Selection: Rural Male

Labour Hour Equation (DomHr)		Selection Equation (Workpar)	
Variable	Coefficient Estimate ^a	Variable	Coefficient Estimate
Constant	1.50* (0.52)	Constant	-2.30* (0.35)
Child Characteristics		Child Characteristics	
Age	0.16* (0.08)	Age	0.44* (0.06)
Ages	-0.00 (0.00)	Ages	-0.02* (0.00)
Bio	0.07 (0.08)	Bio	0.18*** (0.09)
Cursch	-0.14** (0.06)		
Parental Characteristics		Parental Characteristics	
Eduh	-0.01 (0.00)	Eduh	0.02** (0.00)
Household Characteristics		Household Characteristics	
Inf03	-0.11** (0.04)	Inf03	0.04 (0.04)
F1559	-0.09** (0.04)	F1559	-0.12 (0.38)
Size	0.14 (0.11)	Size	0.13 (0.12)
Credit	0.01 (0.01)	Credit	0.01 (0.00)
Remit	-0.16** (0.06)	Remit	-0.01 (0.07)
Land	-0.14*** (0.08)	Offfarm	0.02 (0.08)
		Land	-0.50* (0.06)
		Community Characteristics	
		Dis	0.02 (0.02)
		SchQ	0.02 (0.07)
athrho	0.29 (0.19)		
Insigma	-0.17* (0.04)		
lambda	0.23 (0.15)		
Wald Test of independent equations (rho=0): Chi2 (1) = 2.25		Prob > chi2 = 0.1338	
Number of obs.	= 1724		
Censored obs.	= 978		
Uncensored obs.	= 746		
Wald chi2 (11)	= 32.30		
Prob > chi2	= 0.007		
Log likelihood	= -1962.105		
Iteration Completed	= 5		

^a Robust standard errors are in parenthesis

*, **, and *** represent significance at 1%, 5%, and 10%, respectively.

Table 17 Regression Model with Sample Selection: Rural Female

Labour Hour Equation (DomHr)			Selection Equation (Workpar)		
Variable	Coefficient Estimate ^a		Variable	Coefficient Estimate	
Constant	1.30*	(0.43)	Constant	-3.47*	(0.40)
Child Characteristics			Child Characteristics		
Age	0.21**	(0.08)	Age	0.71*	(0.07)
Ages	-0.00	(0.00)	Ages	-0.02*	(0.00)
Bio	0.09	(0.07)	Bio	0.25**	(0.10)
Cursch	-0.00	(0.00)			
Parental Characteristics			Parental Characteristics		
Eduh	-0.01	(0.01)	Eduh	0.00	(0.01)
Household Characteristics			Household Characteristics		
Inf03	-0.11*	(0.03)	Inf03	0.14*	(0.05)
F1559	-0.06***	(0.03)	F1559	-0.16*	(0.04)
Size	0.05	(0.10)	Size	0.14	(0.14)
Credit	-0.02*	(0.00)	Credit	0.01	(0.01)
Remit	-0.04	(0.06)	Remit	0.05	(0.08)
Land	0.14*	(0.05)	Offfarm	-0.14**	(0.08)
			Land	0.15*	(0.07)
			Community Characteristics		
			Dis	-0.04	(0.02)
			SchQ	0.15**	(0.07)
athrho	0.04	(0.07)			
Insigma	-0.19*	(0.02)			
lambda	0.03	(0.06)			
Wald Test of independent equations (rho=0): Chi2 (1) = 0.15 Prob > chi2 = 0.7024					
Number of obs.	=	1640			
Censored obs.	=	606			
Uncensored obs.	=	1034			
Wald chi2 (11)	=	74			
Prob > chi2	=	0.0000			
Log likelihood	=	-2072.942			
Iteration Completed	=	4			

^a Robust standard errors are in parenthesis

*, **, and *** represent significance at 1%, 5%, and 10%, respectively.

For both sexes, age tends to have a linear positive impact on domestic hours of labour supply. Important finding from the gender-disaggregated analysis is the statistical significance of the schooling variable ‘Cursch’ in the labour hour equation of male children suggesting the existence of trade-off between school attendance and domestic work for male children. This suggest that while current school participation by male children tends to reduce domestic work hours, the domestic work hour reducing effect of current school

participation does not seem to extend to female rural children suggesting the existence of gender bias.

In relation with the impact on hours of domestic labour supply of access to alternative sources of income, the gender-disaggregated analysis displays different result for rural male and female children. Specifically, while rural male children in households with money received in the form of remittance spend fewer hours on domestic chores, such effect does not seem to extend to female children. On the other hand, higher money received in the form of credit tends to reduce domestic work hours by rural female children with no significant impact on rural male children.

In connection with the age-gender composition of the household, the negative and statistically significant coefficient attached to the 'Inf03' variable for both male and female rural children suggests the labour hour reducing effect of large number of infants in the household. Similar to the finding for the total rural children, the number of adult females tends to have a negative impact on domestic work hour of both male and female children once again lending support to Basu and Van's (1998) 'Substitution Axiom'.

Another important aspect of the gender-disaggregated analysis is the negative (positive) and significant impact that land has on hours of labour supply by male (female) rural children. While increase in land size tends to reduce male children's domestic labour hour, it tends to increase that of female children. The negative association between male children's domestic labour hour and land size might have resulted from the movement of male children from the domestic economy to outside following the increase in land size in an attempt to make the

land productive. On the other hand, the positive association between female children's domestic work hours and land size might have resulted from the higher domestic work burden on female children following the movement of more adults and male children to outside.

In general, the following points are worth mentioning from the on going discussion. *First*, there exists a positive and non-linear (linear) association between domestic labour hours and age of urban (rural) children. It is to be recalled from the discussion in the descriptive analysis that participation rate of children in domestic work activities increase with age both for urban and rural children. *Second*, both in urban and rural Ethiopia, female child workers spend longer hours on domestic chores compared with their male counterparts. This coupled with the higher domestic work participation by female children both in urban and rural Ethiopia (see the discussion in the descriptive analysis) suggests the existence of gender bias in the participation of children in domestic work activities.

Third, while 'current' school attendance by rural children tends to reduce hours spent on domestic chores suggesting a trade-off situation between school attendance and domestic work participation, such effect does not seem to extend to urban child domestic workers. *Fourth*, real expenditure per capita per adult equivalent, a proxy for standard of living, is found to have a domestic labour hour reducing effect for urban children lending some support for the premise that 'long domestic work hours is the outcome of household poverty'. *Fifth*, the number of infants in the 0-3 age category has a positive association with domestic work hours by urban children while there seems to exist a negative association

between domestic work hours by rural children and the number of female adults in the 15-59 age category lending some support for Basu and Van's (1997) "Substitution Axiom".

Six, though the education of the head has insignificant impact on domestic work hours by rural children, the level of education attained by the mother as well as the father has a significant negative impact on domestic work hours by urban children implying the importance of adult education in the attempt to improve the welfare of domestic child workers. *Seven*, while increase in land size tends to decrease the domestic work hours by rural male children, it increases domestic work hours by rural female child domestic workers.

Eight, while rural children in households with money received in the form of remittance and/or gifts tend to spend fewer hours on domestic chores, higher credit tends to increase domestic work hours by urban children lending little support for the *capital market explanation* for the use of child labour. *Last*, urban female children in households with access to electricity tend to spend fewer hours on domestic work activities compared with female children in households with no electricity supply suggesting the importance of improved infrastructure in the attempt to relieve the domestic work burden especially of female domestic child workers.

CHAPTER FIVE

5. Conclusion and Policy Implications

International consensus seems to emerge on the detrimental impact that child labour has on the normal physical, mental and psychological development of the working children. There is lack of consensus on the factors that are deemed to be of immense importance in explaining the high incidence of child labour worldwide, however. Also, there seems to be a wide disagreement on how to tackle the problem (Ray, 2001a).

The fact that child work could interfere with children's ability to attend and do well in schools is an important factor that made child labour a cause for concern. This is especially the case, among others, the longer the time spent on work activities thereby leaving the children with little time and energy to concentrate on their education. This in turn affects both the working children's future and long-term economic growth and development thereby perpetuating intergenerational poverty.

The empirical evidences from rural as well as urban Ethiopia revealed the prevalence of child domestic work. Domestic work participation rate of rural male and female children is found to be, on average, 43% and 63%, respectively. On the other hand, the domestic work participation rate is found to be 46% and 55% for urban male and female children, respectively. In general, rural and female children tend to have higher domestic work participation rate. The age-disaggregated analysis has revealed the existence of a positive association between domestic work participation rate and age, girls having a consistently

higher domestic work participation rate both in rural and urban Ethiopian and at almost all age levels.

Apart from mere participation of children in work activities, the extent to which child work interferes with the normal development of the working children depends on the work starting age and on the length of time spent on work activities. The empirical findings in this study revealed that one out of three rural working children and one out of five urban working children started participating in work activities at or below the age of five. Also, 92% and 78% of the rural and urban working children, respectively, started participating in work activities before celebrating their 9th birthday. As would be expected, the work starting age of rural children is much lower than that of urban children.

In terms of hours worked, the findings revealed long hours of domestic work especially by rural and female children. Specifically, while rural children spend, on average, 22 hours a week on domestic chores, the corresponding figure for urban children is 10 hours. The gender-disaggregated analysis reveals the long hours of domestic work by female children both in rural and urban Ethiopia. Specifically, while rural female children spend, on average, 26 hours a week, their male counterparts spend 17 hours. On the other hand, urban female children work for 12 hours a week, while their male counterparts spend 9 hours.

The results from the econometric analysis uncovered the existence of a non-linear (linear) positive association between domestic work hours and age for urban (rural) children. Similar with the finding from the descriptive statistics, the results from the Heckman sample

selection analysis uncovered that female children spend longer hours on domestic work activities compared with their male counterparts both in rural and urban Ethiopia.

In an attempt to explore the extent to which child domestic work and school attendance are in a trade-off situation, a dummy variable was used for current school attendance. While 'current' school attendance does not seem to have a significant impact on domestic work hours by urban children, it tends to reduce the hours of domestic work by rural male children suggesting the existence of a trade-off situation in the latter case.

In relation to the age-gender composition of the household, a number of variables were considered in the study though many of the variables do not seem to affect domestic work hours. However, while the number of infants in the 0-3 age category tends to increase (decrease) domestic work hours by urban (rural) children, the number of female adults has a negative association with domestic work hours by rural children suggesting the existence of a substitution effect between rural child labour and that of adult females.

With regard to parental education, while the level of education of the head has no significant impact on hours worked by rural children, the level of education of both the mother and the father has inverse association with domestic work hours by urban children. The gender-disaggregated analysis uncovers the existence of inverse relationship between the level mothers' education and hours of domestic work by urban female children lending some support for the *women's agency hypothesis*. In connection with the occupational status of parents, urban children in households with pensioner head and head involved in farm

activities tend to work for longer hours compared with children in households with public servant head (the reference group).

In an attempt to examine the impact on hours of domestic work of the poverty status of the household, welfare indicator variables - land size, value of livestock owned by the household, and real expenditure per capita per adult equivalent - were included in the respective models. Land size tends to have a significant and opposite impact on domestic work hours by rural male and female children. Specifically, while increase in land size tends to reduce the domestic work hours by rural male children, it increases that by female children. The negative association between land size and hours of labour supply by rural male children might have resulted from the higher tendency on the part of male children (and adults) to move outside the domestic economy following the increase in land size so as to make the land productive. On the other hand, the labour hour increasing effect of land size for rural female children might have resulted from the higher work burden on female children following the movement of more adults and male children to outside.

Though weak, the expenditure variable used as a welfare indicator tend to have a labour hours reducing effect for urban children lending some support for the 'child labour-poverty' nexus. The gender-disaggregated analysis is of much interest in this regard. While higher welfare level tends to reduce male children's domestic work hours, the labour hour reducing effect of higher expenditure does not seem to extend to female urban children once again suggesting the existence of gender bias.

So as to capture the impact on domestic work hour of the level of infrastructural development, two dummy variables - the presence of tap water and electricity supply - were considered. While the presence of tap water has no significant impact on the domestic work hours, female urban children from households with access to electricity supply tend to spend fewer hours on domestic chores compared with female children in households with no provision of electricity.

Attempt was also made to check for the veracity of the *capital market explanation* for domestic child work. Though weak, credit tends to increase domestic work hours by urban children, while it has a labour hour reducing effect for rural female children. On the other hand, rural children in households with money received in the form of remittance and/or gifts from outside tend to spend fewer hours on domestic work activities compared with children in households with no such opportunity.

A number of important policy implications can be drawn from this study.

- Though weak, the expenditure variable used as a welfare indicator is found to have inverse association with hours of domestic labour by urban children. Also, urban children in households with unemployed and pensioner head and head engaged in farm activities tend to work for longer hours compared with children in households with public servant head. Both this findings suggest that activities directed towards improving the standard of living of the household might help reduce the domestic work burden of urban child domestic workers. In this regard, creation of employment opportunities might be an important policy tool.

- That the child schooling variable has insignificant impact on hours of domestic labour supply by urban children suggests that making schooling compulsory may not be enough to reduce the domestic work load of urban children, especially given the *shift* schooling system of the country where children are expected to attend schools for only four hours a day. On the other hand, a trade-off situation seems to exist between ‘current’ school attendance and domestic work hours for rural children. This suggests that education policy targeted towards increasing the supply of schooling facilities in rural areas could help reduce domestic work hours by rural child domestic workers. In this regard, the current education policy that targets at increasing primary school coverage should be encourage, especially in rural areas.
- The fact that parental education in general and that of mothers in particular has a significant negative impact on domestic work hours especially by urban female children points to the importance of adult education in the attempt to improve the welfare position of child domestic workers.
- That the electricity variable, used as indicator of the level of infrastructural development, has a significant negative impact on domestic work hours by urban female children suggesting the important role that improved provision of electricity could have in the attempt to reduce the domestic work load especially urban female children.
- For both data sets used in this study, female children spend longer hours compared with their male counterparts. Also, some of the variables considered in the study (land size

and amount of expenditure, remittance, and ‘current’ school attendance) do affect domestic work hours by male and female children differently suggesting the existence of gender bias. As such policies in the area of domestic child work should have a gender dimension. In this regard, attempts should be made to raise the public awareness through formal and informal means.

- For rural children, acquisition of income in the form of remittance and /or gifts from outside tends to reduce domestic work hours. Also, higher amount of money received in the form of credit tend to reduce domestic work hours by rural female children. This suggests that allowing rural families have access to alternative income sources might help improve the welfare of child domestic workers. In this regard, creation of *profitable* off-farm employment opportunities for families is one potential policy tool so as to mitigate the household budget constraint and hence reliance on the use child labour.
- Finally, further research in the area of child labour in general and that of child domestic work in particular should be carried out so as to allow empirical-evidence based policy making both at macro and micro level.

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ANNEXES

Annex 1 Summery Statistics of Variables: Rural

Variable	Mean	Sd	Min	Max
Age	9.0	3.1	4	14
Ages	90.7	56.9	16	196
Sex	0.5	0.5	0	1
Size	7.5	2.7	2	18
Inf03	0.8	0.8	0	3
F1559	1.7	1.1	0	8
M1559	1.6	1.1	0	7
B414	1.6	1.2	0	6
G414	1.6	1.1	0	6
Eld60	0.3	0.5	0	3
Ageh	47.6	13.2	20	95
Sexh	0.8	0.4	0	1
Dis	24.1	29.9	0	240
Schexp	25.3	69.0	0	1183
Remit	0.3	0.5	0	1
Credit	146.7	317.3	0	5000
Offfarm	0.2	0.4	0	1
Land	1.4	1.3	0	12
Live	1091.0	849.6	0	4925
Exp	794.8	777.9	124	16131
Bio	0.9	0.4	0	1
Cursch	0.3	0.5	0	1
DomHr	11.8	17.7	0	162
Workpar	0.5	0.5	0	1
SchQ	0.6	0.5	0	1
Eduh	1.3	2.7	0	14

Where

Sd = standard deviation

Min = Minimum

Max = Maximum

Annex 2 Summery Statistics of Variables: Urban

Variable	Mean	Sd	Min	Max
Age	9.7	3.0	4	14
Ages	102.5	56.9	16	196
Sex	0.5	0.5	0	1
Sexh	0.6	0.5	0	1
Ageh	46.9	11.4	17	97
Size	6.4	2.6	1	19
Schexp	103.7	238.1	0	5037
Inf03	0.3	0.5	0	3
F1559	2.3	1.3	0	7
M1559	1.9	1.4	0	8
B414	1.3	1.1	0	6
G414	1.3	1.0	0	5
Eld60	0.3	0.5	0	3
Hbus	0.2	0.4	0	1
Hfarm	0.1	0.1	0	1
Hpen	0.1	0.3	0	1
Hunemp	0.2	0.2	0	1
Credit	669.6	4601.4	0	100000
FoodS	0.2	0.4	0	1
Tap	0.8	0.2	0	1
Ele	0.8	0.2	0	1
Exp	2750.8	15258.0	150	566970
EduM	1.5	1.6	0	5
EduF	1.7	1.8	0	5
Bio	0.8	0.4	0	1
DomHr	5.4	11.4	0	200
Cursch	0.6	0.4	0	1
Workpar	0.5	0.5	0	1
Dis	24.7	47.0	0	300

Where

Sd = standard deviation

Min = Minimum

Max = Maximum

Annex 3 Correlation Table for Variables used in the Model: Urban
(Total Observation = 2073)

	Age	Ages	Sex	Sexh	Ageh	Inf03	F1559
Age	1.0000						
Ages	0.9888	1.0000					
Sex	0.0144	0.0124	1.0000				
Sexh	-0.0341	-0.0356	0.0041	1.0000			
Ageh	0.0765	0.0800	-0.0743	0.1506	1.0000		
Inf03	-0.0748	-0.0735	0.0128	0.0798	-0.0446	1.0000	
F1559	0.0465	0.0498	-0.0120	0.0324	0.2146	-0.0094	1.0000
M1559	0.0771	0.0754	-0.0117	0.2550	0.1361	0.0078	0.1942
B414	-0.0246	-0.0268	0.5050	0.1238	-0.0997	0.1420	-0.0285
G414	-0.0409	-0.0373	-0.4788	0.1108	0.0767	0.0684	0.0374
Eld60	0.0303	0.0315	-0.0318	0.0263	0.5313	-0.0220	0.0583
Hbus	0.0051	0.0027	-0.0110	0.2126	0.0091	0.1692	0.0200
Hfarm	-0.0007	-0.0001	0.0012	-0.0014	0.0166	0.0130	0.0044
Hpen	0.0227	0.0204	-0.0184	0.1059	0.2815	-0.0869	0.0581
Hunemp	-0.0247	-0.0248	-0.0308	-0.0097	-0.0794	-0.0069	0.0534
Tap	0.0295	0.0287	0.0177	-0.0138	-0.0509	-0.0173	0.0407
Ele	-0.0054	-0.0072	-0.0354	0.0166	0.0242	-0.0408	0.0603
FoodS	0.0235	0.0198	-0.0053	-0.1298	0.0152	-0.0175	-0.0498
EduM	-0.0876	-0.0854	0.0145	0.0950	-0.2703	-0.0059	-0.0044
EduF	-0.0638	-0.0642	0.0058	0.5719	-0.1222	0.0535	0.0167
Bio	0.0132	0.0072	0.0729	0.2306	-0.2000	-0.0027	-0.0827
Cursch	0.4487	0.4748	0.0208	-0.0484	0.0694	-0.0421	0.0416
Size	0.0321	0.0334	-0.0109	0.2714	0.2597	0.2529	0.5922
SchQ	0.0256	0.0128	0.0038	-0.0260	-0.0492	0.0370	-0.0192
Schexp	0.2974	0.2632	-0.0004	0.0453	0.0169	-0.0966	0.0529
Dis	-0.0293	-0.0274	0.0188	-0.0153	-0.0184	0.0084	-0.0228
Credit	0.0032	0.0017	0.0004	0.0093	-0.0096	-0.0091	0.0542
Exp	-0.0280	-0.0276	-0.0212	0.1456	-0.0328	-0.0171	-0.0365
Workpar	0.3857	-0.0932	-0.0136	0.0292	0.0266	0.0059	0.0300
	M1559	B414	G414	Eld60	Hbus	Hfarm	Hpen
M1559	1.0000						
B414	0.0399	1.0000					
G414	0.0646	-0.3041	1.0000				
Eld60	-0.0467	-0.0294	-0.0235	1.0000			
Hbus	0.1137	0.0917	0.1114	-0.0724	1.0000		
Hfarm	-0.0108	0.0541	0.0402	0.0456	-0.0289	1.0000	
Hpen	-0.0344	-0.0782	-0.0350	0.2348	-0.1593	-0.0213	1.0000
Hunemp	-0.0009	-0.0216	0.0654	-0.0436	-0.1068	-0.0143	-0.0788
Tap	0.0510	0.0013	0.0029	-0.0598	0.0379	0.0116	0.0467
Ele	0.0184	-0.0541	0.0412	0.0321	0.0091	0.0130	0.0247
FoodS	0.0025	0.0511	0.0459	0.0631	-0.0365	-0.0339	-0.0107
EduM	-0.0614	-0.0338	-0.0624	-0.1532	-0.0549	-0.0127	-0.0662
EduF	0.1528	0.0452	0.0149	-0.1208	0.0724	-0.0568	0.0936
Bio	0.0832	0.1385	0.0321	-0.2724	0.0850	0.0333	-0.1225
Cursch	0.0433	-0.0110	-0.0307	0.0350	-0.0263	-0.0120	0.0546
Size	0.6245	0.3005	0.3267	0.1367	0.1778	0.0476	-0.0114
SchQ	-0.0561	0.0119	0.0066	-0.0185	0.0668	-0.0231	-0.0313
Schexp	0.0569	-0.0273	-0.0485	-0.0240	0.0191	-0.0071	0.0330
Dis	-0.0335	0.0435	-0.0017	0.0144	-0.0041	-0.0047	0.0246
Credit	0.1015	0.0788	0.1069	-0.0128	0.0781	-0.0325	-0.0644
Exp	-0.0397	-0.0903	-0.0477	-0.1058	0.1659	-0.0562	0.0151
Workpar	-0.0130	0.0509	-0.0021	-0.0262	0.0313	0.0106	0.0229

Annex 3 Continued

	Hunemp	Tap	Ele	FoodS	EduM	EduF	Bio
Hunemp	1.0000						
Tap	0.0307	1.0000					
Ele	-0.0070	0.1473	1.0000				
FoodS	0.0906	-0.1144	-0.0808	1.0000			
EduM	0.0079	0.0889	0.0231	-0.2384	1.0000		
EduF	-0.0274	0.0663	0.0481	-0.2245	0.4150	1.0000	
Bio	0.0009	0.0154	-0.0312	0.0238	0.1233	0.1310	1.0000
Cursch	-0.0441	0.0209	0.0275	-0.0366	0.0079	-0.0259	0.0790
Size	0.0247	0.0262	0.0532	0.0097	-0.0798	0.1198	0.0382
SchQ	0.0172	-0.0369	0.0080	-0.0278	0.0164	-0.0071	0.0311
Schexp	-0.0399	0.0900	0.0032	-0.1316	0.1483	0.1605	0.1008
Dis	0.0270	0.0600	0.0283	-0.0246	0.0201	0.0312	0.0130
Credit	0.0205	0.0101	-0.0626	0.0216	0.0227	0.0125	0.0601
Exp	-0.0828	0.0833	0.0397	-0.2667	0.2982	0.2541	0.0109
Workpar	-0.0006	0.0113	0.0501	-0.0743	-0.0743	0.0677	0.1879
	Cursch	Size	SchQ	Schexp	Dis	Credit	Exp
Cursch	1.0000						
Size	0.0482	1.0000					
SchQ	0.0018	-0.0218	1.0000				
Schexp	0.1945	0.0041	0.0179	1.0000			
Dis	0.0336	0.0029	0.0662	-0.0013	1.0000		
Credit	-0.0364	0.1420	-0.0285	-0.0361	0.0146	1.0000	
Exp	0.0275	-0.0972	0.0059	0.2270	0.0091	0.0233	1.0000
Workpar	0.0346	0.0048	0.1308	-0.0213	0.0690	-0.0902	0.05241

Annex 4 Correlation Table for Variables used in the Model: Rural
(Total Observation = 3364)

	Age	Sex	Inf03	F1559	M1559	B414	G414
Age	1.0000						
Sex	-0.0007	1.0000					
Inf03	-0.1424	0.0040	1.0000				
F1559	0.0574	-0.0148	0.0524	1.0000			
M1559	0.0798	0.0169	-0.0158	0.2258	1.0000		
B414	0.0188	0.4025	0.1181	0.1256	0.1197	1.0000	
G414	0.0024	-0.4250	0.1116	0.1511	0.0316	-0.1290	1.0000
Eld60	0.0942	0.0235	-0.0980	0.0170	-0.1032	0.0464	-0.0740
Sexh	-0.0332	0.0096	0.1520	0.0804	0.2890	0.1572	0.1036
Remit	0.0060	0.0095	-0.0738	-0.0890	-0.0900	-0.0914	-0.1252
Offr	-0.0525	0.0028	0.0008	-0.0484	-0.1061	0.0214	0.0206
Bio	-0.0525	-0.0164	0.1169	0.0478	0.0719	0.0610	0.0738
Cursch	0.4025	0.0474	-0.0197	0.0637	0.0582	0.0344	0.0148
Exp	-0.0310	-0.0424	-0.1033	-0.0847	-0.0789	-0.1359	-0.0290
Dis	0.1395	0.0244	-0.0001	0.1731	0.2441	0.2162	0.1432
Credit	0.0082	0.0041	0.0888	0.0668	-0.0037	0.0891	0.0653
Schexp	0.1395	0.0244	-0.0001	0.1731	0.2441	0.2162	0.1432
DomHr	0.3743	-0.2485	0.0026	-0.0746	-0.0053	-0.0639	0.0898
Ageh	0.1918	-0.0092	-0.2838	0.1711	0.1228	0.0243	0.0024
Workpar	0.3642	-0.1950	0.0060	-0.0715	-0.0064	-0.0518	0.0632
SchQ	0.0493	0.0272	0.0299	0.0266	0.0618	0.1358	0.0245
Ages	0.9883	0.0014	-0.1431	0.0571	0.0824	0.0197	-0.0013
Eduh	-0.1023	-0.0045	0.2220	-0.0353	0.0272	0.0637	0.0858
Size	0.0388	-0.0056	0.3918	0.5620	0.5368	0.4914	0.4470
Land	0.0615	-0.0023	0.0243	0.1651	0.3076	0.0812	0.0606
Live	0.0234	-0.0257	0.0467	0.1471	0.1935	0.0581	0.0885
	Eld60	Sexh	Remit	Offr	Bio	Cursch	Exp
Eld60	1.0000						
Sexh	-0.0048	1.0000					
Remit	0.0476	-0.2109	1.0000				
Offr	-0.0491	-0.0879	0.2178	1.0000			
Bio	-0.2657	0.2098	-0.0837	0.0034	1.0000		
Cursch	-0.0067	0.0198	0.0043	-0.0314	0.0415	1.0000	
Exp	-0.0373	-0.0593	0.1253	0.0262	-0.0288	0.0289	1.0000
Dis	-0.0419	0.0775	-0.0324	-0.0597	0.0720	0.3501	0.0042
Credit	-0.0154	-0.0039	-0.0166	0.0215	0.0291	0.0564	-0.0116
Schexp	-0.0419	0.0775	-0.0324	-0.0597	0.0720	0.3501	0.0042
DomHr	0.0038	0.0056	-0.0138	-0.0044	0.0356	0.1936	-0.0584
Ageh	0.5778	0.0344	0.0489	-0.0168	-0.2304	0.0389	-0.0480
Workpar	0.0203	0.0088	0.0039	0.0040	0.0315	0.2166	-0.0471
SchQ	-0.0689	0.0268	0.0020	0.0629	0.0279	0.1155	-0.0143
Ages	0.0962	-0.0281	0.0040	-0.0536	-0.0537	0.3865	-0.0296
Eduh	-0.1742	0.1989	-0.1267	-0.0644	0.0911	0.0739	0.0230
Size	0.0877	0.3364	-0.1891	-0.0516	0.1144	0.0709	-0.1933
Land	-0.0150	0.2741	-0.0518	-0.2464	0.0521	0.0542	0.2074
Live	0.0317	0.1515	-0.0407	-0.1701	0.0165	0.0763	0.0982

Annex 4 Continued

	Dis	Credit	Schexp	DomHr	Ageh	Workpar	SchQ
Dis	1.0000						
Credit	0.0303	1.0000					
DomHr	0.0084	0.0178	0.0084	1.0000			
Ageh	0.0955	-0.0164	0.0955	0.0392	1.0000		
Workpar	0.0214	0.0280	0.0214	0.9144	0.0454	1.0000	
SchQ	0.2965	0.0480	0.2965	0.0163	0.0202	0.0324	1.0000
	Ages	Eduh	Size	Land	Live		
Ages	1.0000						
Eduh	-0.0990	1.0000					
Size	0.0383	0.0941	1.0000				
Land	0.0665	0.0463	0.2712	1.0000			
Live	0.0276	-0.0131	0.2367	0.5200	1.0000		

Annex 5 Tests for Heteroscedasticity

Cook-Weisberg test for heteroscedasticity using fitted values of DomHr: Rural

Ho: Constant variance

$$\text{chi2 (1)} = 18.40$$

$$\text{Prob} > \text{chi2} = 0.0000$$

Cook-Weisberg test for heteroscedasticity using fitted values of DomHr: Urban

Ho: Constant variance

$$\text{chi2 (1)} = 112.86$$

$$\text{Prob} > \text{chi2} = 0.0000$$

In both cases, the fact that the calculated chi-squared value at one degree of freedom is greater than the corresponding table value even at 10% leads to the rejection of the null hypothesis of constant variance thereby suggesting the presence of heteroscedasticity.

Annex 6 Characteristics of Sites Included in the Rural Household Survey

Peasant Associations (PAs)	Characteristics	Total No. of Households
Geblen and Dinki- Ankober	- vulnerable to famine - hilly and mountainous - ox plough technology - <i>Kolla</i> and <i>Woina dega</i>	152
Haressaw, Shumsha- Lalibela, Koro Degaga- Sodere, Gara Godo, and Domma	- vulnerable to famine - flat terrain - ox plow technology - <i>Woina dega</i> and <i>Kolla</i>	504
Yetmen, Deberezeit-Sirbana Goditi, Adele Tige, Turufe Kecheme, Eteya, Bako Tibe, Jimma-Somodo	- relatively rich - flat terrain - ox plow technology - <i>Woina dega</i>	577
Adado	- relatively rich - mountainous terrain - hoe culture - <i>Woina Dega</i>	134
Indibir, Aze Debo, Debere Birhan	- migrant-dependent - self- supporting - <i>Dega, Woina dega</i>	314
Total		1681

Source: Assefa, 2002

Annex 7 Adult Equivalent Scale used in the Computation of Real expenditure
Per Capita per Adult Equivalent *

Age	Male Weight	Female Weight
0	.33	.33
1	.46	.46
2	.54	.54
3-4	.62	.62
5-6	.74	.70
7-9	.84	.72
10-11	.88	.78
12-13	.96	.84
14-15	1.06	.86
16-17	1.14	.86
18-29	1.04	.80
30-59	1.00	.82
60+	.84	.74

* The equivalent scale is based on World Health Organization's equivalence scale quoted in McCulloch et al., 2000.