Primary School Enrollment and Dropout in Ethiopia: Household and School Factors

I. Introduction

Universal access to primary education was one of the Millennium Development Goals (MDGs) envisioned by the United Nations, to be reached by 2015. Ethiopia is one of the countries with the lowest primary school enrollment rates in the world, thus attaining universal primary education in the country requires greater efforts. Furthermore, low quality of school and a high dropout rate, as well as gender and rural-urban disparities remain the major challenges of the country. Theoretically, school enrollment and dropout are determined by household's demand for education and the supply of education services (Connelly and Zheng, 2003). Demand for education is determined by parents' decision on the amount of schooling for their children, which is based on assessments of the costs and benefits of education. The supply education is determined by the access to and quality of local schools.

In Ethiopia, like other developing countries, household poverty is a major factor keeping many children out of school. Poor households often cannot afford to send their children to school or are forced to withdraw children out of school at early ages. Although primary school is free in Ethiopia, hidden costs such as books, supplies, uniforms and food hinder poor households from sending their children to school. Household size and family structure are also important determinants of children's schooling because a household's income and expenses are partly related to its size and structure. In addition, many households of the country are affected by unexpected economic and demographic shocks such as drought, food shortage, job loss, illness or death of an adult family member. These household-specific negative shocks have a detrimental effect on children's school enrollment and dropout. While previous empirical studies on child schooling in Ethiopia focus on the

influences of household's socioeconomic status, few studies examine the impact of unexpected household shocks.

On the other hand, school characteristics such as distance and school quality are also important factors of school enrollment and completion probability. Distance to the nearest school from the homestead may negatively impact attendance and increase dropout rate, especially in rural areas and for girls. In addition to access, quality of school such as teachers' qualifications, availability of textbooks and classroom facilities are important factor because returns to schooling is dependent on child's acquisition of basic skills and knowledge. If the household perceives that school cannot provide children with such basic skills, they may decide that an investment in education is not worth the small return (World Bank, 2004). Poor school quality may thus discourage households from sending their children to school. For children who are in school, parents may withdraw their children from school and involve them in income generating activities or household's domestic works.

However, the combined effect of household and school factors, and their relative influence on school enrollment and dropout have not been investigated and documented for the Sub-Saharan African countries. In Ethiopia, although the country has experienced radical political and social changes and are carrying out education sector reforms over the past two decades, there is no nationally representative study on the effects of household and school characteristics on child schooling.

Using the most recent nationally representative data from the 2004 Ethiopia Welfare Monitoring Survey (WMS), this paper examines covariates on primary school enrollment and dropout among primary school age children age 7-14 in Ethiopia. Existing studies in Ethiopia are limited to small geographic locations, examine either household or school related factors,

and focus only on school enrollment or attainment. This paper draws on long term household human capital investment and transitory household shocks and consumption smoothing frameworks. Primary school enrollment and subsequent progression are mainly determined by factors related to household's long-term investment on children. On the other hand, school dropout related to short-term household shocks such as crop failure, illness or death of an adult household member. This approach helps not only to understand the low primary school enrollment and its covariates, but also factors related to school dropouts and delay in grade progression.

II. Literature

The theoretical approach on which most empirical studies of schooling based is the human capital model by Schulz (1960), Becker (1964) and Mencer (1974). In which households maximizes the joint utility function of all members to determine the quantity and quality of children, consumption of leisure and market goods. Individuals optimize their lifetime gain by evaluating the direct and indirect costs of education and compare such cost with the expected return to schooling. Direct costs include school fees, clothing, education supplies and transport costs, whereas indirect or opportunity costs include the forgoing income or home production from child's labor time. On the other hand, expected higher earning capacity and improved quality of life is considered as benefits of schooling. Parents would send a child to a school if and only if the discounted value of returns from additional schooling tomorrow is higher than the discounted value of the additional cost today (Pal, 2004). The demand for education is also shaped by the supply-side factors such as access to and quality of schools. In general, school enrollment and attainment choices are affected by

three main factors (Woldehanna, et al, 2006): household's demand for education; supply of education service; and government educational policies. Drawing on this theoretical framework and related literature on child schooling, the empirical analysis of this paper examine important determinates of child schooling in Ethiopia. In particular it focuses on the effects of household resources and school factors on child school enrollment and dropout.

Household Factors

One of the most consistent finding related to school enrollment and educational attainment in the developing countries is the effect of family resources. Income, assets, family size and structure as well as parental education are identified to be important correlates of school enrollment and attainment. Household wealth determines a household's ability to invest in education of the child. Studies conducted in developing countries show consistently that household wealth significantly improve children's chance of school enrollment (Rankin and Aytac, 2006; Al-Samarrai and Rose 2001; Oxaal 1997), education attainment (Pal 2004; Woldehanna et al. 2006) and lower school dropout (Sibanda 2001; Chaudhury et al. 2006). Most of these studies identified direct and indirect costs of schooling as important factors for school attendance and dropout. As to the direct cost, household poverty restrains parents from sending their children to school as they are not able to cover expenses of stationeries books, school uniform and transportation. The indirect costs of schooling include the forgoing child labor inputs for household's economic activities and domestic chores.

Theoretically, it is widely accepted that high fertility and large family size in most developing countries constrain limited resources of households on child investment such as

nutrition, health and education. However, empirical results of different studies indicate that a negative impact of large family size is neither universal nor inevitable (Eloundou-Enyegue, etal, 2006; Sudha, 1997). Findings on the effect of family size on schooling are mixed in sub-Sahara Africa. Montogomery and Kuame (1993) found the expected negative effect in urban Code d'Ivoire but a positive one in rural areas **(**Eloudou- Enyegue, 2006 **)**, Gomes (1984) in Kenya and Chernkovsky (1985) in rural Botswana found positive associations. The effect of family size is conditioned by the specific cultural, political and socioeconomic settings (Sudha, 1997**).** A child from a larger household might have a higher probability of attending school because work is spread over a large number of household members (Rose and Al-Samarrai, 2001). In general, there is no conclusion as to how family size affects child's schooling in sub-Saharan Africa countries.

School Factors

From the supply side of education government policy and school characteristics determine child schooling outcomes. The most important school characteristics include the cost, the distance from the child's home and the quality of the school. The distance of the nearest school from the homestead negatively affects enrollment completion probabilities (Chaudhury, et al.2006). Gitter and Barham (2007) reported a negative and significant effect on child educational attainment of travel time to the nearest school in rural Honduras. School availability and its distance determine child's age at starting schooling in Ethiopia (Abebaw, et al. 2007). In addition to access to school, availability and quality of textbooks and instructional materials, teachers and class size are also found to be important determinants of child schooling (Woldehanna, et al., 2006; Abebaw, et al., 2007; Chaudhury, et al., 2006).

III. Data and Methods

The data for this analysis come from the 2004 nationally representative Welfare Monitoring Survey (WMS) of Ethiopia. The survey was conducted by the Central Statistical Authority (CSA) of Ethiopia in collaboration with the World Bank to monitor the effect of economic reform on living standards of households and their access to basic social services. The survey sample design employed a three stage stratified random sampling. In the first stratum major towns, small towns and rural areas were selected. In the second stage enumeration areas (EAs) were selected and finally households were randomly selected. The survey covered all rural and urban area of the country except the non-sedentary areas in the Afar and Somali Regional States. In the rural part of the country it was planned to cover 2,016 EAs and 24,192 households. The response rate is highly satisfactory. Only two EAs and 39 households were not covered in this survey. The ultimate response rate in rural areas was about 99 percent for EAs and 98 percent for households. Regarding urban parts of the country all the planned 760 EAs and the 12,160 sample households were successfully covered in the survey (CSA, 2005). In general, the survey collected data from 36,202 households comprise of 38,566 primary school-age children aged 7-14 years and.

The survey provides data on school outcome variables such as current school enrollment, dropout, grade repetition, and highest grade completed. The survey also collected data on predictors of school outcomes related to individual, household, school, and community characteristics. In addition to basic demographic characteristics, the main strength of this dataset stems from its detail information on household living standard, asset possessions, parents' survival status, economic and demographic adverse shocks, as well as distance to and quality of school. Access to school was measured by asking respondents about the distance to the nearest primary and secondary schools from their homestead. With regard

to quality, in the absence of school-based data such as student-teacher ratio, classroom size and facilities, parents' perception about quality of school are used as proxy measures. In the survey, parents were asked to rate the school in which their children were attending in terms of school facilities, text books, shortage of teachers, and overcrowding of classes. The data is appropriate to estimate the impact of household wealth (computed based on assets ownerships), household's adverse shocks, and access to and quality of schools on child schooling outcomes and differential effects by gender and rural and urban residences.

The outcome variable *school enrollment* is a dummy indicator that takes 1 if a child was enrolled in school at the year of the survey and 0 otherwise. Similarly, *school dropout* is a dummy variable that takes 1 if a child drop out of school in the year of the survey and 0 if continue in school, conditional on being enrolled in school in the previous school year.

Independent variables such as household wealth, unexpected income and demographic shocks, household size and composition, socioeconomic status of household head, access to school, and perceived school quality are included in the analysis. Wealth index is constructed for each household using the statistical procedure of Principal Component Analysis (PCA) to determine the weights for an index of the asset ownership variables. Based on the distribution households by wealth quintiles, households are classified into three wealth status groups: bottom 40%, middle 40%, and top 20%, for rural and urban areas separately. In the survey each a household head or an adult respondent was asked whether his/her household experienced any adverse shock such as, illness or death of household member, food shortage, drought, loss of jobs, crop damage, and loss/death of livestock in the last 12 months before the survey time. The degree of vulnerability of each

household to adverse shocks will be determined based on the types and number of reported shocks by the household.

Household size refers the total number of household members as of the time of the survey. Three measures of age composition of a household are used: *number of children younger than age 5* years, *children age 7 to 14* years, and *adults household members age 18 and above.* These indicators help to measure a household's child care needs, competition for household resources among school-age children, and access to adult labor, respectively. In addition, dummy of sex of household head is used to capture the gender difference in allocating resource to child schooling. *Household head's education and employment status:* household head's education classified as: no education, primary education, secondary and above education. With regard to employment status a dummy variable on self-employment status is used. Individual characteristics of children such as age, gender, survival of parent(s), and relation to household head are also controlled for in the analysis. Access to school is measured by distance to the nearest school as reported by respondents. Quality of school is measured based on parent's perception about the quality of school in terms of shortage of teachers, text books, class crowdedness and school facilities. In addition, local food security is measured at district level by taking percentage of households experienced food shortage in the five years before the survey time. Definitions of descriptive statistics of the variables are given in table 1 and table 2 respectively.

The multivariate analyses on primary school enrollment and dropout are estimated using binomial logistic regression models. Stepwise logistic regression models are estimated by including a group of independent variables subsequently. In the first step of the analysis child characteristics and household variables are included. In the second and third models

school level variables and gender interaction terms are added respectively. Gender interaction terms are included to test whether the effect of selected determinants of school enrollment significantly differ for boys and girls. Separate models are estimated for urban and rural areas to examine whether major explanatory variables, such as household poverty, unexpected household shocks and distance to school have different effects on school enrollment and dropout in rural and urban areas. Some households may contribute multiple children to the sample and this violates assumption of independent observations. Robust standard error estimation is used to minimize the bias due to multiple children in a household.

Table 1: Definitions of variables for school enrollment and dropout analysis

Variables	Definitions
Dependent Variables	
School enrollment	Equals 1if child enrolled in school, 0 otherwise
School dropout	Equals if child drop out of school, 0 otherwise
Child characteristics	
age	Age of a child in single year
female	Equals 1 if child is female, 0 otherwise
paternal orphan	Father of child not alive
maternal orphan	Mother of child not alive
double orphan	Both parents of child not alive
Household characteristics	
female head	Equals 1 if head of hhd is female, 0 otherwise
heads educ. 4-8years	Equals 1 if head's educ. Grade 4-8, 0 otherwise
heads educ. 9+ years	Equals 1 if head's educ. Grade 9+, 0 otherwise
heads self employed	Equals 1 if HHd head is self employed, 0 otherwise
household size	Number of regular household members
sibsizage0-4	Number of siblings less than age 5
sibsizage7-14	Number of siblings age 7-14
adult hhd members	Number of hhd members age 18 and above
hhds wealth bottom 40%	Equals 1 if HHd is in the bottom 40% in the wealth index
hhds wealth middle 40%	Equals 1 if HHd is in the middle 40% in the wealth index
Hhd shocks in last 12 months	
hhds food insecure	Equals 1if HHd experienced food shortage, 0 otherwise
hhs with severe illness	Equals 1if HHd experienced severe illness, 0 otherwise
hhds with job loss	Equals 1if HHd experienced job loss, 0 otherwise
hhds with drought	Equals 1if HHd experienced drought, 0 otherwise
HHd shocks in last 5 years	
years food insecure	# of years HHD encountered food shortage in the 5 years
number of deaths	# of deaths HHD encountered in the 5 years before survey
number illness	# of illness HHD encountered in the 5 years before survey
School & community variable	
less than 30 minutes	Equals 1 if primary school < 30 min. walking , 0 otherwise
30-60 minutes	Equals 1 if primary school 30-60 min. walking , 0 otherwise
More than 60 minute	Equals 1 if primary school > 60 min. walking , 0 otherwise
Shortage of teachers	Equals 1 if parents perceived teacher shortage, 0 otherwise
poor teaching methods	Equals 1 if parents perceive poor teaching method, 0 otherwise
poor school facilities	Equals 1 if parents perceive poor school facilities, 0 otherwise
Local food security	Equals 1 if wereda/district is food insecure, 0 otherwise

Table 2: Descriptive statistics (mean/proportion) of variables on primary school enrollment and dropout among children age 7-14

Variables	Current enrollment		Dropout	
	Yes	No	Yes	No
Child characteristics				
age	10.90	9.70	11.0	11.35
female	0.47	0.52	0.45	0.47
paternal orphan	0.14	0.11	0.12	0.15
maternal orphan	0.06	0.06	0.06	0.07
double orphan	0.02	0.02	0.02	0.03
Household characteristics				
female headed households	0.27	0.19	0.24	0.28
heads educ. <4 years	0.68	0.90	0.84	0.65
heads educ. 4-8years	0.17	0.08	0.10	0.17
heads educ. 9+ years	0.15	0.02	0.06	0.17
heads self employed	0.60	0.83	0.76	0.57
household size	6.50	6.54	6.28	6.48
sibsizage0-4	0.71	0.98	0.93	0.65
sibsizage7-14	1.30	1.30	1.24	1.30
hhds wealth bottom 40%	0.29	0.36	0.34	0.28
hhds wealth top 20%	0.30	0.40	0.23	0.31
Household shocks in last 12 months				
hhds food insecure	0.49	0.84	0.71	0.45
hhs with severe illness	0.03	0.06	0.03	0.02
hhds with job loss	0.02	0.01	0.02	0.02
hhds with drought/crop failure	0.06	0.14	0.10	0.05
walking distance to primary school				
less than 30 minutes	0.52	0.25	0.38	0.55
30-60 minutes	0.35	0.40	0.41	0.34
More than 60 minute	0.13	0.34	0.41	0.10
School quality perception				
shortage of teachers	0.13	0.27	0.17	0.12
poor teaching methods	0.04	0.13	0.05	0.03
poor school facilities	0.21	0.35	0.29	0.19
Food insecure weredas	0.15	0.27	0.21	0.13
Rural	0.54	091	0.83	0.49
Number of cases	19244	19310	1099	14284

IV. Trends in School Enrollment and Dropout

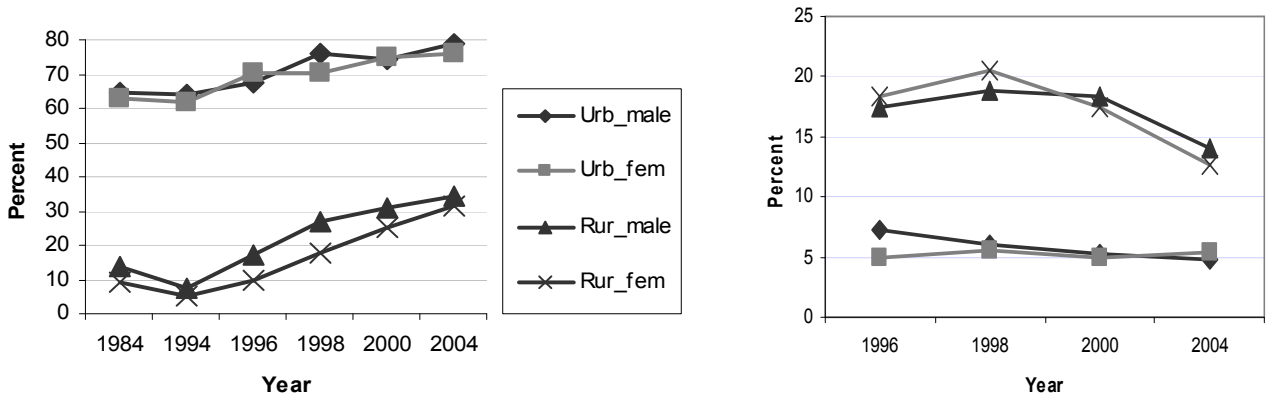
This section provides an overview of recent trends in primary school enrollment and dropout rates in Ethiopia. Figure1a presents trends in primary school enrollment rates over twenty years between 1984 and 2004, by place of residence and gender. The results demonstrate that the primary school enrollment rate in Ethiopia is generally very low, especially in rural areas. One of the most striking features of educational inequality in Ethiopia is the huge difference in school participation and attainment between urban and rural areas. The graph shows that primary school enrollment rate of urban areas is more than three times higher than that of the rural areas. Nevertheless, the graph also shows a narrowing trend of the gap in recent years as the enrollment rate increased more substantially in rural than in urban areas. Over the twenty years between 1984 and 2004, the enrollment rate has nearly tripled in rural areas while the corresponding gain was relatively small for urban children. This may attributed to the lower base of school enrollment in rural areas and an attention given by the government to improve the low school participation in rural areas. The enrollment rate of girls is about 10 percentage points lower than that of boys in rural areas, whereas the gender difference is not evident in urban areas.

Although a substantial progress over time, the trend shows that enrollment rate plummeted around the early-1990s in rural areas and rose thereafter. This reveals that school enrollment was significantly decreased due to the political and economic instabilities of country during this time period. Specifically, school enrollment was substantially declined because of the civil war and widespread political turmoil in the country in the late 1980s that led to the overthrow of the socialist regime in 1991.

Nevertheless, a recent increase in primary school enrollment is not accompanied with a shift in economic structure and incentives to formal education or as a result of improvement in households' socioeconomic standards. That is, the country's economy is still dominantly dependent on subsistence agriculture that requires minimum or no formal education. In the absence of expansion in the modern economic sector and availability of jobs to high school and college graduates, returns to educational investment are minimal for children as well as their households.

Figure 1: Trends in Primary School Enrollment and Dropout rates: 1984-2004

a. Net Enrollment **b. Dropout**



Note: the rates are computed based on the 1984 and 1994 Population Censuses National Welfare Monitoring Surveys in 1996, 1998, 2000, and 2004.

Figure 1b indicates trends in primary school dropout rates, by urban-rural residence and gender of the child. The graph shows that primary school dropout rate has been about three times higher in rural areas than in urban areas. This implies that in rural areas, not only is school enrollment very low, but a high proportion of children entering school will drop out before completing primary education. At the national level, the primary school dropout rate

has decreased from about 15 percent in 1996 to about 12 percent in 2004. During this time period, the decline was much higher in rural areas (from 19 to 14 percent) than in urban areas (6 to 5 percent). Despite the greater decline in recent years, primary school dropout rate still remains very high in rural areas and poses a major challenge to achieve universal primary school completion in the country. Though the gender disparity is less evident, the graphs depict that in early periods dropout rate was slightly higher among girls than for boys in rural areas. In the latter period, boys' dropout rates have exceeded that of girls. The decline in primary school dropout among rural girls reflects the result of particular attention given by the government to rural areas and girls' schooling in recent years. In general, unlike school enrollment there is no significant gender difference in terms of dropout rate both in urban and rural areas.

There is also significant variation in enrollment and dropout rates by household wealth status index. Graphs 2a and 2b depict the distributions of enrollment and dropout rates by household wealth quartiles. The graphs clearly indicate that wealth improve the chance of school enrollment and decreases the risk of dropout. For instance, enrollment rate among children from households in the bottom wealth quartile is only about 25 percent, compared to 80 percent for children from households in the top quartile. This implies that children from poorer households have a lower chance of school enrollment because parents are less likely to meet school related costs. Furthermore, children from the poor households may also engage in paid employment to supplement the income of their families. The graph indicates that boys have higher enrollment rates in the first and the second wealth quartiles, while the gender difference is negligible in the higher two quartiles. Given the lowest level of enrollment among children from the poorest quartile and the larger gender gap at this level, it

is clear that poverty and gender interact to produce educational disadvantages for girls in poor households.

School dropout rate is highest among children in the poorest household and it is lowest for children in the wealthiest quartile. Gender differentials by household wealth index suggest that boys have a higher dropout rate than girls in the poorest quartile. In the wealthiest quartile there is no difference in dropout rate between boys and girls. This may reflect that boys in poorer households are more likely to drop out of school because they are required to be involved in income-generating activities, particularly farming activities in rural areas. This also suggests the presence of an interaction effect between poverty and gender on school dropout, but here boys are more disadvantaged than girls. This indicates that while household poverty is more likely to lower school enrollment among girls than boys, poverty has a more negative effect on boys' school continuation. These poverty-gender interaction effects on school enrollment and dropout are explored further in the multivariate analysis while controlling for other potential determinants.

Figure 2a: Primary Enrollment Rate by household Wealth, 2004

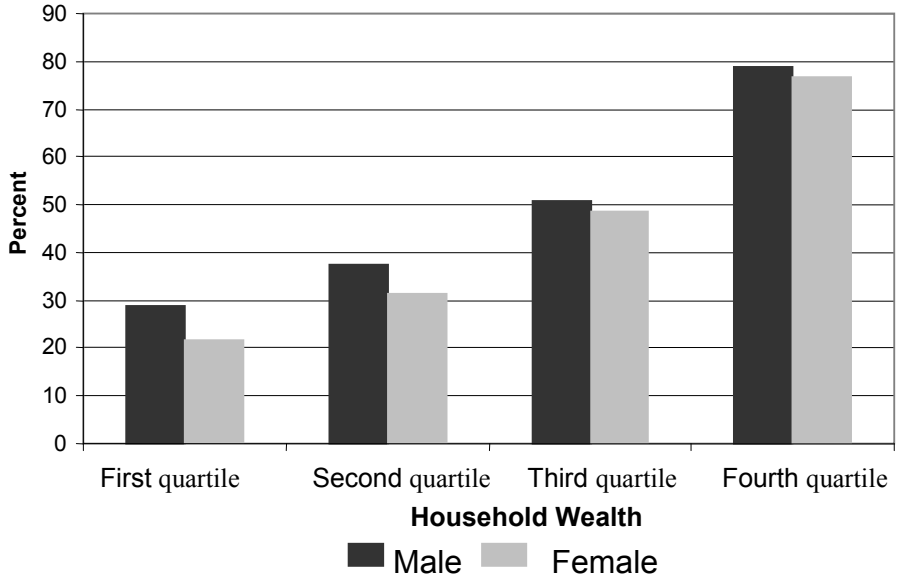
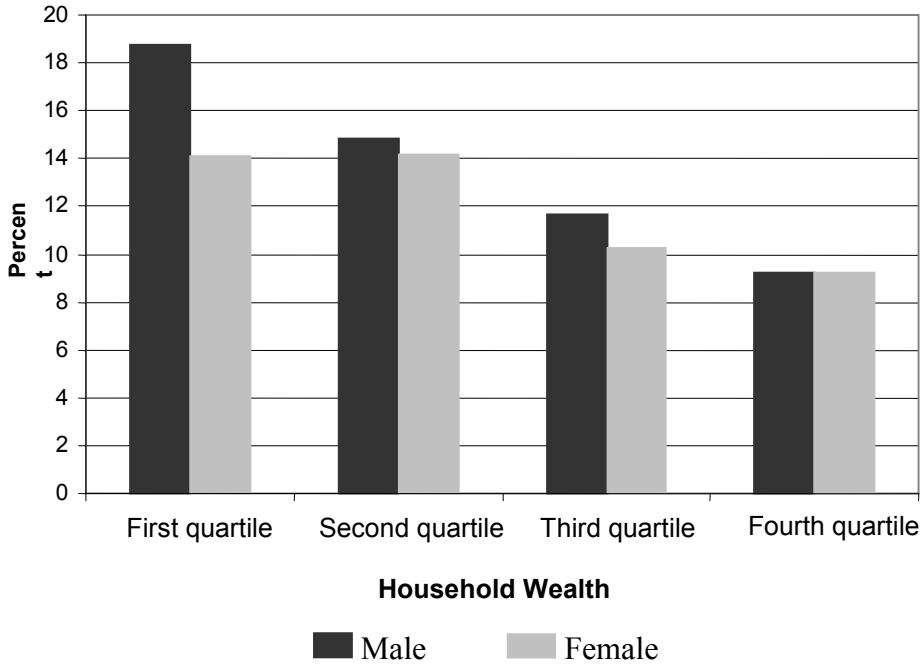


Figure 2b: Primary school dropout rate by household Wealth, 2004



VI. Regression results on enrollment

Table 1 presents odds-ratios of current school enrollment among children aged 7-14 by urban and rural residence. The probability of primary school enrollment substantially increases with the age of children. In rural areas, children aged 13-14 years are 5 times more likely to be enrolled in school than children aged 7-8 years. The increasing probability of school enrollment with age is also observed in urban areas, though, at a lower rate compared to rural areas. The positive and significant effect of age on school enrollment suggests children start schooling at older ages than the official age of school entry, particularly in rural areas. Delayed school entry among rural children may reflect the higher opportunity costs of children's domestic activities, such as caring for younger siblings, collecting fire woods and tending livestock animals, at early ages.

The comparison between boys and girls shows that the chance of school enrollment among girls is significantly lower than that of boys. In both urban and rural areas, girls are about 30 percent less likely than boys to enroll in primary school. The gender disparity in enrollment remains strong after controlling for key household and school factors. Despite the fact that one of the primary focuses of the education policy of Ethiopia is to narrow the gender gap in schooling, the persistence of lower enrollment among girls may reflect strong socio-cultural biases against girls' schooling. Parental decision to send girls to school is likely to relate to their perceptions of the returns to girls' schooling in the local labor market relative to the returns to boys' schooling. Resource-poor households are usually send some of their children to school while others remain out of school and participate in the household's domestic and economic activities. The choice is usually in favor of boys, because boys are expected to have better opportunities in the labor market and become breadwinners of their

households while girls are expected to be responsible for child care and other domestic chores.

Household Size and Structure

The result shows that children living in female-headed households are more likely to attend school than children from male-headed households. Urban and rural children in female-headed households are, respectively, about 58 and 46 percent more likely to be enrolled in school than children in male-headed households. The result is contrary to the general expectation, because households headed by women are expected to be poorer than those headed by men. One of the possible explanations could be the fact that female-headed households are less likely to own land; even if they own land, they are less likely to cultivate their land, and thus the opportunity cost of child schooling is lower in female-headed households in rural areas. In urban areas, it is not clear why children living in female-headed households would have higher chance of school enrollment than those living in male-headed households. Nevertheless, previous studies in other African countries also found similar results that children in female-headed households were consistently more likely to be enrolled in school than were children in households headed by men (Lloyd and Blanc, 1996; Fuller and Liang, 1999). They maintain that female household heads are more likely to invest resources, including time and emotional support, on the schooling of children living in their households.

Table 3: Odds-Ratios of current school enrollment for urban and rural samples, 2004

Variables	Urban			Rural		
	Model I	Model II	Model III	Model I	Model II	Model III
Child's Demographic Characters						
Age dummies (age7_8)						
Age9_10	3.50**	3.51**	3.54**	2.83**	2.84**	3.00**
Age11_12	4.11**	4.04**	4.10**	4.57**	4.59**	4.91**
Age13_14	3.87**	3.87**	3.91**	5.35**	5.42**	5.80**
Sex (Male)						
Female	0.71**	0.70**	0.70**	0.73**	0.73**	0.72**
Household Background						
Female headed	1.25**	1.25**	1.24**	1.45**	1.45**	1.38**
Self-employed head	0.06**	0.05**	0.05	0.60**	0.59**	0.60**
Head's education level (< 5)						
Grade5-8	1.52**	1.46**	1.42**	2.00**	1.99**	1.79**
Grade9+	1.98**	1.90**	1.89**	3.60**	3.53**	3.05**
Siblings age0_4 (no sibling)						
Onesib0_4	0.62**	0.63**	0.63**	0.92*	0.92**	0.91**
Twosibs0_4	0.35**	0.36**	0.37**	0.91*	0.91**	0.91**
Sibsize7_14	0.98	0.98	0.99	0.99	0.99	1.00
Working adult_age18+	2.31**	2.29**	2.25**	2.72**	2.64**	2.00**
Wealth Index (bottom 40%)						
Middle 40%	2.48**	2.33**	2.26**	1.16**	1.14**	1.19**
Top 20%	3.34**	3.20**	3.04**	1.80**	1.71**	1.67**
Household Shocks						
Parent survival (both parents alive)						
Paternal orphan	0.96	0.98	0.98	0.74**	0.75**	0.76**
Maternal orphan	0.52**	0.54**	0.54**	0.92	0.92	0.92
Double orphan	1.58*	1.55*	1.48*	0.92	0.91	0.87
Food shortage		0.91**	0.93*		0.96**	0.97*
Have seriously ill member		0.47	0.46		0.59**	0.56**
Death of adult member		1.01	1.02		0.91	0.90
Drought in the previous year		0.47**	0.58*		0.68**	0.73**
School & Community factors						
Primary sch. distance (<30min)						
30-60mins walking			0.79**			0.65**
More than 60mins walking			0.99			0.36**
Shortage of teachers			0.77			0.91*
Poor teaching methods			0.96			0.41**
Poor school facilities			0.78*			0.93*
Highly food insecure Wereda			0.82			0.87**
Number of Cases	10186	10186	10186	27534	27534	27534
Wald Chi-square	936	949	959	2697	2753	3468

**p<0.01 *p <0.05

The result indicates that self-employment status of a household head significantly decreases the probability of children's school enrollment. Children form households headed by self-employed person have a 64 percent lower chance of school enrollment than their counterparts living in households headed by non-self-employed person. This implies that when a household head is self-employed or the household runs a family business, children's participation in such family income-generating activities would compete with their schooling. Family-based small-scale businesses primarily depend on the labor of household members, including children. Thus, many children fail to enroll in school as they are expected to participate in family income-generating activities. The negative effect of self-employment of a household head is greater for children in urban areas than for their rural counterparts. Children of urban poor households are likely to participate in informal economic activities such as assisting in petty trades, selling fruits and vegetables by the sides of streets that require them to work for long hours, and these activities are in direct conflict with their school attendance. In rural areas, most families depend subsistence agriculture and farm own plot which is seasonal and mainly involves boys. According the 2004 welfare monitoring survey result, work related reasons are among the most important factors hindering school enrollment in Ethiopia.

Not surprisingly, household head's education exerts strong positive influence on the probability of school enrollment of children both in urban and rural areas. The magnitude of the effect is found to be larger in rural than in urban areas. In rural areas, children living in a household headed by a person having some secondary level education are 3.6 times more likely to be enrolled in school than children living from households with less than primary education. The corresponding odds-ratio for urban areas (1.9) is about half of the effect

observed for rural areas. Household head education is both an indicator of socioeconomic status and has important influence on parental perceptions of the benefits of child schooling. The result suggests that even where educational resources are constrained, relatively better educated parents anticipate greater rewards and benefits from educating children than less educated parents, and are willing to invest household resources on children's schooling.

Household age composition is also an important determinant of child schooling because access to labor and the dependency ratio is partly determined by the age structure of the household. Whether family resources are sufficient to provide for the education of children depends on family size and composition. To examine the effect of household demographic composition, three age groups are included in the analysis: the number of young siblings below age 5, the number of primary school-age children aged 7-14, and the number of adults aged 18 years and above. The presence of siblings below age 5 in a household negatively influence school enrollment of children. The regression result indicates that, compared to no sibling aged 0-4 years, one sibling in this age group decreases the odds of urban and rural children's school enrollment by 37 and 8 percent respectively. The presence of two or more young siblings further reduces the odds of school enrollment by 65 percent in urban areas. That is, presence of younger siblings in a household reduces school enrollment of older children. This implies that having a large number of young children, as a result of high fertility, has a negative effect on parents' investment in schooling of their children. Theoretically, it is widely accepted that high fertility and large family size in most developing countries overstretch scarce resources of households on child wellbeing investment such as nutrition, health and education. Although fertility rate is higher in rural than in urban areas, the negative effect of young siblings on schooling of older children is

found to be higher in urban areas. This may suggest the difference in relative access to extended family support with child care. Familial residential proximity and strong norms of reciprocity may facilitate child care arrangement among extended families in rural areas, while access to extended family child care support is less common in urban areas.

The number of primary school-age siblings (7-14 years) in the household has no significant effect on the probability of current school enrollment both in urban and rural areas. This is somewhat unexpected as a large number of school-age siblings are believed to compete for educational resources available in the household and lower the chance of school enrollment. While a large number of siblings of school-age children put pressure on material and financial resources and increases the direct cost of schooling, household labor demands spread over a large number of children may reduce the opportunity cost of children's schooling. Net of household wealth, a larger representation of working adults aged 18 and above significantly increases the probability of current school enrollment among children. This implies that the availability of adults' labor in a household reduces opportunity cost of children's schooling and increases the chance of their school enrollment.

The regression results show that, as could be expected, children from well-off households have a greater probability of school enrollment than those from poorer backgrounds. In urban areas, children living in households from the top wealth quintile have 3 times higher chance of school enrollment than children living in households from the bottom two quintiles. The corresponding increase for rural children is 1.8 times, much lower compared to the effect of wealth in urban areas. The more pronounced disparities by household wealth status in urban areas could be related to the wide income inequalities among urban households, while income inequality is likely to be smaller among rural

households. Previous studies conducted in developing countries show consistently that household wealth significantly improves children's chance of school enrollment (Rankin and Aytac, 2006; Al-Samarrai and Rose 2001; Oxaal 1997). Household wealth determines a household's ability to invest in a child's education. In Ethiopia, many children are growing up in resource poor households who cannot afford to send children to school. Despite the education policy of the country stating that schooling up to grade 10 is free; in practice it is not free. Parents are usually required to contribute money to fill shortfall in public school budgets in addition to paying registration fee and the expenses for uniforms and textbooks.

The opportunity cost of child schooling is also likely to be high among poor households because children are expected to start working at early ages. The use of child labor is a common feature among resource-poor households in Ethiopia to supplement the family's income. The human capital model states that parents would send a child to a school if and only if the long-term returns of schooling are higher than direct and indirect costs today. For poor households, immediate direct and indirect costs exceed that of the anticipated long-term returns from child schooling. In general, both direct and indirect costs of schooling are impediments to child schooling for poor households.

Household Shocks

Besides household poverty and resource constraints, adverse economic and demographic shocks also affect many households in Ethiopia. Vulnerability to recurrent drought, and household-specific shocks such as illness and death of household members, food shortage, and job losses have detrimental impacts on children's school enrollment. Like many other sub-Saharan African countries, one of the major family crises in Ethiopia over

the past two decades is the increased number of orphans mainly due to the rising adult mortality caused by AIDS. About 5 million children under age 18 have lost a parent, of which 1.5 million (30%) were orphaned as a result of AIDS epidemic (UNICEF, 2003). Controlling for household socioeconomic backgrounds, this analysis examined the impacts of being paternal, maternal or double orphan status on current school enrollment of children aged 7-14 years. Other major negative shocks reported by households include: the illness of a household member (37%), the death of an adult member (25%), drought (35%), and food shortage (25%). Dummy variables indicating whether or not a household experienced each of these shocks in the year before the survey are included in the analysis to understand immediate impacts of the shocks on children's schooling, and whether the magnitudes of the effects vary with different types of shocks.

The analyses of the impact of orphan status in urban and rural areas reveal quite different effects of paternal and maternal orphan status on school enrollment. In urban areas, maternal orphans are 46 percent less likely to be enrolled than non-orphan children, but being a parental orphan has no significant effect. In contrast, in rural areas paternal orphans have a 25 percent lower chance of school enrollment compared to non-orphan children, while being a maternal orphan has no significant effect on school enrollment. This may suggest differential roles of men and women in urban and rural areas in terms of decision making on household economy and child schooling. In rural areas, where adult male labor is crucial for farming activities, being paternal orphan has strong negative impact on children's schooling. However, being maternal orphan has a larger negative effect on child schooling in urban areas. This implies that urban women have more decision making role about schooling of

children than their counterparts in rural areas. In general, the results indicate that different orphan types

Surprisingly, in urban areas being a double orphan significantly increases the odds of enrollment by about 48 as compared to non-orphan children. This contradictory result may reflect that children being orphan to both parents are more likely to receive assistance from governmental and non-governmental organization because double-orphan status is assumed to be caused by deaths of parents from AIDS. Two-parent orphans are also more likely to receive supports from the traditional extended family system than are one-parent orphans. This result suggests that while orphan children have a lower chance of school enrollment, this may be off-set or even reversed by support received from the government, humanitarian organizations, or extended families. Nevertheless, it would be difficult to arrive at a conclusion in the absence of concrete data indicating whether orphan children received targeted financial assistance. Studies in other sub-Saharan African countries indicate that schooling assistance from organizations was more likely to be received by orphans, especially two-parent orphans (World Bank, 2002; Evans and Miguel, 2007). The studies also confirmed that orphan children receiving assistance are more likely to be enrolled in school than those not receiving assistance.

Children living in households with a chronically sick adult member have 44 percent less chance of school enrollment than their counterparts from households with no a sick adult member. The Illness of an adult member affects the schooling of children due to loss of household income and the economic burden of health care cost on the household. Furthermore, the presence of a chronically sick household member may increase the demand for child labor to provide an intensive care for the sick person. This suggests that the

opportunity cost of schooling increases when a child is required to care for a sick household member. As a result, children may either be delayed in their enrollment or never enroll at all as a result of direct and indirect cost of illness among adult members of the household. However, the regression results show that household member illness has a significant negative impact in rural areas, but it is not statistically significant in urban areas.

As expected, incidences of drought and household food insecurity have strong negative impacts on children's school enrollment. Both in urban and rural areas, net of household socioeconomic status, children living in households that experienced food shortage are less likely to be enrolled in school than children from households with no food shortage,. Similarly, incidence of drought reduces the odds of school enrollment. In Ethiopia, as in many other developing countries, formal credit and insurance institutions are not well developed to rely on them in times of household economic shocks. Furthermore, households that experience food shortage cannot be insured against the shock through the traditional extended family support system as most households are likely to be affected by the same economic or weather shock. Thus, in addition to household poverty, recurrent drought and household food insecurity is the major challenges of the country to achieve universal primary education. The magnitude of the negative effect of household food shortage on children's schooling is larger in urban than in rural areas. The relative larger negative impact of food shortage in urban areas may reflect high food price and high cost of living for urban poor households. In addition, rural households that are living in areas frequently affected by drought and food insecurity are likely to receive assistance through the safety net programs run by the government and non-governmental organizations. Nevertheless, such a welfare program is not common for urban food-insecure poor households.

School Factors

Availability and quality of school are important determinants of child school enrollment and continuation. The distance to the nearest primary school from the homestead is negatively associated with school enrollment in rural areas. The regression result indicates that children living in a village at a distance of 3 to 5 kilometers from the nearest primary school have 30 percent less chance of school enrollment than children residing within three kilometers. When a school located at more than five kilometers away, children are more than 60 percent less likely to be enrolled in school. Many households in rural areas live at substantial distances from primary schools and there is a great deal of variation between households. The larger effect in rural areas may also capture the higher opportunity cost of time spent in schooling, which will significantly increase as the child has to walk a long distance to and from school. Parents may also be reluctant to send their young children to schools far from home for fear of children's safety, particularly that of young girls. In areas where girls are victims of sexual harassment, families are afraid to permit daughters to travel long distances on unsafe roads. In general, these findings suggest that distance to primary school is more important in rural areas where many villages have no primary schools.

In addition to distance, the quality of school also affects parents' decision whether to send children to school as the returns of schooling depend on its quality. Since objective measures of school quality are not available, parents' perception about school quality in terms of shortage of teachers, quality of teaching materials, and the physical facilities of a school are employed as proxy indicators of school quality. The regression results indicate that parents' negative perceptions about school quality significantly decrease the odds of children's school enrollment. Separate analyses for urban and rural areas reveal that negative

perception of school quality is more important determinant in rural areas. The perceptions of poor teaching methods and shortage of teachers reduce the odds of child enrollment by about 59 and 10 percent in rural areas respectively, but these are not statistically significant in urban areas. Perception of poor physical facilities of school, however, has negative and significant effect both in rural and urban areas. In general, the perception of low school quality tends to discourage parents from sending their children to school. Instead they may prefer to involve boys in farming work and girls in domestic activities as a means of socializing them for their future careers.

Table 4: Result from gender interaction models on primary school enrollment

Variables	**Full Sample**	**Urban**	**Rural**
Female	0.79**	0.80	0.76**
Household variables			
Sibsize age 0_4	0.87**	0.68**	0.96
Sibsize age7_14	1.02	0.91	1.04*
Head had secondary educn	2.39**	2.17**	2.25**
Wealthiest quartile	1.67**	2.30**	1.49**
Food shortage	0.94*	0.88**	0.97*
School factors			
Distance more than 5 km.	0.38**	1.30	0.35**
Poor physical facilities	0.88**	0.88	0.93*
Interaction Terms			
Girl x sibs0_4	0.95**	0.97	0.92*
Girl x sibs7_14	1.12*	1.13*	0.90**
Girl x household head's education.	1.06**	0.97	1.07**
Girl x household wealth	1.25**	0.52**	1.35**
Girl x food insecurity	1.05	1.09	1.01
Girl x school distance	1.03	0.67	1.04
Girl x poor school facilities	0.91*	0.74*	0.97

Note: Controlled for all child's age and sex, and all other household level variables.

Interaction effects by gender

The effects of household structure and socioeconomic status on child schooling are expected to be different for boys and girls. Table 4 present results of the main effects and interaction terms between gender and selected independent variables for urban and rural areas separately. To evaluate how the effect of household structure varies by sex of a child, two interaction terms are specified: gender interaction with the presence of sibling under age 5, and gender interaction with the number of school-age siblings (ages 7-14). The interaction term on gender and sibling under age-five has a negative effect on older children's schooling both in urban and rural areas, but it is significant only in rural areas. For the rural model, the net effect on school enrollment of being a girl and living in a household with a sibling below age five is (0.67=0.76x0.96x0.92), estimated by multiplying the odds-ratios of the main effects and the interaction term in table 3. This shows that girls living in households having a young sibling have 33 percent lower chance of school enrollment than boys from households having no a child below age five. This suggests more gender-based division of labor in rural households than in urban households. In rural areas, girls' opportunity cost of schooling increases when there are younger siblings in the household because they are expected to help out their mothers in childcare activities while their mothers work in the farm or do other domestic work.

The interaction terms between gender and the number of primary school-age siblings in a household are negative and significant in rural areas (0.71=0.76x1.04x0.90) and in urban areas (0.82= 0.80x0.91x1.13). The negative gender interaction effect with school-age siblings reflects the preference of parents to invest in boys' schooling than in girls' when they cannot afford to send all children to school. Rose and Al-Samarrai (2001) indicated that in Ethiopia

parents prefer to educate sons because the return of boys' schooling is assumed to be tangible as they are likely to remain close to the parents' home when they marry, whereas girls move to their husbands' families when they get married.

The gender interaction terms with household wealth and with household head's education are positive and significant in rural areas. This suggests that increased household socioeconomic status– in terms of improved household wealth and education- is more beneficial to school enrollment of girls than that of boys. In other words, girls are more disadvantaged in poorer household and when the household head has lower level of education. In rural areas, the net effect of interaction between gender and household wealth is 1.53 (0.76x1.49x1.35), shows that girls from the wealthiest quintile households have 1.53 times higher odds of school enrollment than boys from the poorest 40 percent households. This confirms that when rural households face resource constraints and are forced to make trade-offs in the educational investment in their children, they prefer to invest in their sons rather than in their daughters. Similarly, the positive interaction with household head's education implies that more educated household heads are likely to invest in girls' schooling, while less educated parents are likely to be biased against schooling of girls. In contrast, in urban areas the gender-wealth interaction effect shows that girls from the relatively well-to-do households have lower probability of school enrollment (0.96=0.8x2.30x0.52). This unexpected interaction effect in urban areas may reflect the fact that relatively rich urban households tend to employ girls as domestic workers and they are less likely to send them to school. The interaction effect between gender and household head's education is not significant in the urban model. In spite of the expectation that household food insecurity would have more negative effect on girls' schooling than that of boys, the gender-food

insecurity interaction terms are insignificant for both urban and rural areas. That is, there is no evidence to support the hypothesis that household food insecurity disproportionately negatively effect girls' schooling as compared to that of boys.

To evaluate differential effects of school factors for boys and girls, gender interaction terms with school distance and quality of school are included in the models. Contrary to the expectation that long distance and poor quality of school would have larger negative effect on girls' schooling, the interaction terms for both school distance and quality are found to be insignificant. The absence of gender difference by school factors reflects an increased attention given to girls' schooling, previously disadvantage groups, so as to achieve universal primary school enrollment in the country. In rural Ethiopia, local administrators enforce compulsory primary school enrollment by depriving households of different social services if they refuse to send their school-age children to school, particularly girls (Woldehanna et al., 2006). For urban areas, while interaction with school distance is insignificant, interaction with poor school facility is found to have negative and significant effect. This implies poor school facilities such as overcrowded classrooms and lack of separate toilets for boys and girls have more detrimental effect on schooling of girls than that of boys.

Table 5: Odds-Ratios of primary school dropout by urban-rural places, Ethiopia 2004

Variables	Urban			Rural		
	Model I	Model II	Model III	Model I	Model II	Model III
Child Demographic Variables						
Grade level (Grade1)						
Grade2	0.39**	0.39**	0.39**	0.36**	0.36**	0.36**
Grade3	0.29**	0.27**	0.27**	0.35**	0.35**	0.35**
Grade4	0.27**	0.27**	0.27**	0.28**	0.28**	0.28**
Grade 5	0.28**	0.28**	0.29**	0.41**	0.41**	0.42**
Grade6	0.29**	0.27**	0.27**	0.45**	0.45**	0.46**
Grade7	0.29**	0.27**	0.27**	0.29*	0.29*	0.29*
Grade 8	0.49	0.46	0.45	0.85	0.85	0.85
Sex (Male)						
Female	0.99	0.95	0.94	1.00	1.00	1.02
Household Background						
Female headed	0.95	0.93	0.93	1.08	1.08	1.08
Head's education level (< 5)						
Grade5-8	0.60*	0.54**	0.54**	0.68*	0.68*	0.70*
Grade9+	0.55*	0.55**	0.55**	0.85	0.88	0.93
Self-employed head	1.40**	1.46**	3.65**	1.20	1.80**	1.78**
Number sibs <5 (none)						
Sibsizeage04	1.40**	1.33**	1.40	1.11*	1.22*	1.21*
Sibsizeage7_14	0.84*	0.83*	0.81*	0.92*	0.91*	0.91*
Working adult_age18+	0.82*	0.81*	0.59	0.85**	0.30**	0.31**
Wealth percentile (bottom40)						
Middle40	0.96	0.90	0.90	0.90	0.91	0.90
Top20	0.53**	0.45**	0.46**	0.64**	0.66**	0.66**
Household Shocks						
Parent survival (both alive)						
Paternal orphan		0.87	0.88		0.93	0.92
Maternal orphan		1.44	1.45		0.77	0.76
Double orphan		1.25	1.23		1.38	1.40
Previous year food shortage		0.96	0.97		1.06*	1.06*
Have seriously ill member		4.20**	4.0**		2.84**	2.81**
Adult member death		0.92	0.92		1.32*	1.33*
Job loss in the previous year		2.57**	2.51**		1.45	1.48
School & Community factors						
Primary sch. distance (<30min)						
30-60mins walking			0.80			1.05
More than 60mins walking			1.55			1.32**
Shortage of teachers			0.77			0.79*
Poor teaching method			1.24			0.96
Poor physical facilities			1.18			2.23*
Number of Cases	7375	7375	7373	7650	7633	7633
LR Chi-square	118	157	165	262	272	287

VII. School Dropout

In addition to the problem of low school enrollment, significant proportion of children drops out of school before completing the primary school. Table 5 presents odds-ratios of a logistic regression model on primary school dropout. The regression results show that the risk of dropout is significantly higher at first grade and the last grade of the primary cycle than other grades in between. Higher risk of dropout at first grade may be related to the problem of adjusting to a school environment by new school entrants. An increased dropout at the end of the primary level reflects to lack of access to a secondary school in a nearby location and the rising opportunity cost as age of the child increases, particularly in rural areas. While girls are less likely to enroll in school, there is no significant difference in primary school dropout between boys and girls both in urban and rural. Given the practice of early marriage of girls, especially in rural areas, it would be expected that girls are more likely to drop out of primary school than that of boys. The absence of the expected gender difference in school dropout reflects the recent government policy and increased commitment by school administrators and teachers to address gender disparity in schooling. Particularly, enforcement of a law banning the practice of premature marriage among girls may help to reduce girls' dropout as a result of early marriage.

With regard to the effect of household size and structure, the number of siblings under age five significantly increases the likelihood of school dropout of older children in the household, especially girls. For instance, presence of a child under age five in a household increases the odds of dropout by 40 percent in urban areas and by 20 percent in rural areas. This indicates that having a child under age five in a household increases the opportunity cost of schooling by older children and increases their likelihood of dropout. However, the number of siblings aged 7-14 decreases the risk of dropout both in urban and

rural areas. This may suggest the importance of sharing the work burden among siblings in assisting their household in economic and domestic activities. The number of adult household members aged 18 and above significantly decreases the odds of a child's school dropout in rural areas. Rural households that have better access to adult labor for farming activities demand less labor inputs from children, thus, less likely to withdraw children from school during the peak agricultural seasons.

Education level of a household head significantly and negatively affects the probability of a child's dropping out of school both in rural and urban areas. For instance, when the head of household has some elementary education the odds of school dropout by children decrease by 40 and 30 percent in urban and rural areas respectively. Living in a household headed by a person having secondary and above education substantially decreases the risk of school dropout. The regression results show that household wealth significantly decreases the risk of school dropout. Compared to the poorest 40 percent households, children living in households form the wealthiest quintile are 54 percent less likely to dropout in urban areas and 37 percent less likely in rural areas. As could be expected, household wealth and other socio-economic status of the household make a big difference for children's chances to stay in school. Self-employment status of the head of household increases the likelihood of school dropout, and the effect is greater in urban areas. This implies an increased demand for children's labor as they are required to participate in a small-scale business run by the household.

Negative shocks experienced by a household in the preceding year significantly increase school dropout of a child. Particularly, household shock due to serious illness of the household member has the largest impact on school dropout. In urban areas, children living

in households having chronically ill member are 4.2 times more likely to drop out of school than children from households having no illness among members. Similarly, in rural areas an incidence of illness a household member increases the risk of school dropout by about 3 times. In urban areas, children living in household experienced a job loss in the preceding twelve months are 2.5 times more likely to drop out of school than children in households without an employment shock. However, since most households in rural areas are engaged in subsistence agriculture, job loss is less common to have significant effect. An incidence of an adult household member death causes a 33 percent increase in the odds of school dropout among rural children, but has no significant effect for urban children. In contrast to the negative effect on school enrollment, there is no significant difference in the risk of school dropout between orphan and non-orphan children. One possible explanation is that once orphan children have access to school through supports from either extended family members or aid organizations they are more likely to stay in school.

The effect of school-level factors such as distance and quality of school are important determinants of school dropout in rural areas. Living in a village more than 5 kilometers away from the nearest school increases the risk of dropout by 32 percent as compared to living within three kilometers. Parents' negative perception about the quality of school also increases the risk of dropout of children in rural areas, but not in urban areas. For instance, parents' perception of poor physical facilities such as shortage of class room chairs and lack of drinking water and toilet increases the odds of dropout by about 2 times in rural areas. Contrary to the expectation, shortage of teachers significantly decreases school dropout of children. This result may reflect a severe shortage of teachers in rural schools and the supply is not responding to a high demand for teachers. However, none of the school factors are

significant for urban areas. This suggests that not only long distance to school is a problem in rural areas, but also the poor quality of schools contributes to higher drop out of school among rural children than their urban counterparts.

VIII. Conclusion and Policy Implications

In this paper, I estimated the effect of household socioeconomic status, household negative shocks, and school factors on primary school enrollment and dropout. The regression analyses show that primary school enrollment and dropout are determined by household and school factors. Girls have a lower chance of school enrollment than boys, but there is no gender difference in school dropout. This could be the result of the government policy and concerted efforts by school administrators and teachers to reduce girls' school dropout, particularly dropouts related to early marriage. Household wealth and household head's education are the two most important factors in children's education in terms of increasing the chance of enrollment and decreasing the risk of dropout. Girls are more disadvantaged than boys in the poorer households and if the household head has less education. Household poverty has more detrimental effect in urban areas than in rural, while household head's education has a greater positive effect in rural areas. The larger effect of poverty in urban areas could be related to the higher cost of living. It may also suggest higher wealth inequality in the urban areas than in rural.

Similar to findings in the previous studies in other sub-Saharan African countries, female heads of household are found to be beneficial to child school enrollment. One of the possible explanations, particularly for rural areas, is that female-headed households are less likely to own farmland or tend to lease out their land if they own it. This implies less demand

for children's labor and a lower opportunity cost of child schooling. The presence of younger siblings (under age 5) in a household reduces the probability of school enrollment and increases the risk of dropout of older children. This is particularly important for rural girls. In rural areas where the fertility rate is high, girls are more likely to be required to take care of younger siblings in the household while mothers work on the farm or do other domestic activities.

Besides a high level of poverty, many households are frequently affected by household shocks such as illness or death of a family member, drought and food shortage. Contrary to the expectation, in urban areas, children who lost both of their parents have a better chance of school enrollment than non-orphan children. This contradictory effect could be explained by the fact that orphans are more likely to receive support from extended family or aid organizations that should protect them against school dropout. Nevertheless, one-parent orphan children have a lower probability of school enrollment and the effect varies by orphan types in urban and rural areas. Maternal death is more detrimental in urban areas, while paternal death is more important in rural areas. As expected, recurrent drought and food shortage are also important constraints on schooling of children. Household food shortage has a slightly larger effect on school enrollment in urban areas than in rural. The relative importance of food shortage in urban areas implies that a high food price in urban areas has a more detrimental impact on urban poor households.

Long-term illness of an adult family member increases the risk of children's school dropout. This result suggests that when there is a sick household member, children are required to assist the patient and this increases the opportunity cost of their schooling time. Furthermore, the income lost by a sick person and high cost of health care could be

prohibitive to sending children to school. A job loss by an adult household member also increases the risk of school dropout in urban areas. These findings suggest that, in addition to household poverty, unexpected shocks are major constraints on households' investment in schooling of children.

Access to and quality of school is particularly important in rural areas where primary school is not available in many villages. The longer distance to the primary school decreases the probability of school enrollment and increases the risk of dropout. Furthermore, the quality of schools in terms of shortage of teachers and poor quality of physical facilities affects parents' decision to invest in their children's schooling. Parents are less likely to send children to school if they perceive that the school quality is poor and cannot provide children with basic knowledge and skills. Poor school facilities are more of a deterrent on school enrollment of girls than on that of boys.

In general, although access to primary education has improved in recent years, educational quality has declined in most respects over the same period due to overcrowded classrooms, poor school facilities, and shortages of teachers and textbooks. There is also high disparity in school participation by rural-urban residence, between boys and girls, and across regions. Policies and programs need to be directed not only towards quantitative targets of ensuring universal primary education, but also towards equity and quality of education by improving teachers' training, instructional quality, and educational facilities. In particular, there is a need to ensure proper qualifications and motivation of school teachers by providing appropriate training and incentives such as provision of housing and health services. Improving access to drinking water and toilets, and timely maintenance of school buildings

and educational equipment are also important measures to improve the quality of the school environment.

Primary schools are not found in some rural villages or schools are located at long distances from villages. Furthermore, the problem of school quality in terms of lack of teachers, poor physical facilities, and shortage of books is more severe in rural than urban areas. This indicates that in rural areas low school enrollment, high dropouts and low attainment are partly attributed to lack of access to school and poor quality of schools where available. This suggests that the government need to build new schools in rural areas where a school is not available and improve the quality of existing schools. Despite the progress that has been made in providing school opportunities for girls, the gender disparity has persisted particularly in rural areas and at the secondary and tertiary levels. There is a need to formulate policies and programs that would help to reduce opportunity costs of girls' schooling and gender bias in the school environment. Provisions of labor saving infrastructure, such as access to clean water, sanitation, electricity, and adequate health care, help to relieve the burden on girls and reduce the opportunity cost of schooling. Reducing the average walking distance to the nearest high school increases the probability of students' transition to the secondary level, particularly for young females in rural areas. Furthermore, increasing the number of female teachers and reducing gender bias in the school environment would help to improve girls' school participation.

The policies to improve availability and quality of schools would stimulate households' demand for education. However, the improvements in the supply-side alone will not ensure increased school enrollment as long as households remain poor and continue to face frequent economic and demographic shocks. In Ethiopia, high prevalence of household

poverty is one of the major factors constraining improvement in children's education. In addition, many households are vulnerable to adverse shocks particularly to drought and food shortage, and high incidence of illness. This implies that policy makers need also to consider appropriate measures to address the demand-side constraints. The policy measures should target to mitigate the cost of school attendance for poor households and providing a safety net protection against adverse household shocks. Poor households should be exempted from direct costs of child schooling, such as registration fees and financial contribution to local schools. Free supply of education materials, such as pens, exercise books, and school uniforms, to children from poor households will help to increase school participation. It is also important that the government and NGOs establish conditional cash transfer scheme targeting very poor households to encourage them to send their children to school and to reduce school dropouts. School feeding scheme is also required in rural areas which are affected by recurring drought and where there is high child malnutrition. In addition, child nutrition and health status monitoring and treatment program helps to increase school attendance, to decrease school dropout, and improve educational achievement of children.

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