WORKING PAPER NO.18

CHILDREN'S EDUCATIONAL COMPLETION RATES AND ACHIEVEMENT:

Implications for Ethiopia's Second Poverty Reduction Strategy (2006-10)

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An International Study of Childhood Poverty

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Preface

This paper is one of a series of Young Lives Project working papers, an innovative longitudinal study of childhood poverty in Ethiopia, India (Andhra Pradesh State), Peru and Vietnam. Between 2002 and 2015, some 2000 children in each country are being tracked and surveyed at 3-4 year intervals from when they are 1 until 14 years of age. In addition, 1000 older children in each country are being followed from when they are aged 8 years.

Young Lives is a joint research and policy initiative co-ordinated by an academic consortium and Save the Children UK, incorporating both inter-disciplinary and North-South collaboration. In Ethiopia the research component of the project is housed under the Ethiopian Development Research Institute, while the policy monitoring, engagement and advocacy components are led by Save the Children UK, Ethiopia.

Young Lives seeks to:

- produce long-term data on children and poverty in the four research countries
- draw on this data to develop a nuanced and comparative understanding of childhood poverty dynamics to inform national policy agendas
- trace associations between key macro policy trends and child outcomes and use these findings as a basis to advocate for policy choices at macro and meso levels that facilitate the reduction of childhood poverty
- actively engage with ongoing work on poverty alleviation and reduction, involving stakeholders who may use or be impacted by the research throughout the research design, data collection and analyses, and dissemination stages
- foster public concern about, and encourage political motivation to act on, childhood poverty issues through its advocacy and media work at both national and international levels.

In Ethiopia, the project has received financial support from the UK Department for International Development and Canada's International Development Research Centre. This support is gratefully acknowledged.

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Abstract

The major development objectives of the Ethiopian Government are to reduce poverty and improve primary school enrolment and educational achievement (SDPRP, 2002). However, education performance indicators show that only access-related targets have been achieved, while educational quality declined in most respects.

Drawing on a sample of 1,000 children aged 7.5 to 8.5 years old from twenty sentinel sites, the Young Lives project sought to understand the determinants of school completion and achievement at the household, community, regional and national levels across different regions of Ethiopia. The paper identifies the specific factors associated with primary school completion/dropout rates, and educational achievement and performance of children, and assesses the mechanisms through which these factors are influential.

With respect to school completion:

- Children from families with more household members over 15 years of age are less likely to drop out because there are more people to share the household labour burden.
- Boys are also less likely to drop out than girls, although recent legislative changes are likely to change this.
- School availability and quality, aggregate household wealth and indebtedness, and higher levels of parental education are all important determinants of children's education.

Regarding school achievement:

- Boys generally perform better overall in terms of aggregate test scores, although the performance of both boys and girls is adversely affected by the pressures on children to contribute to household labour.
- Children's positive assessment of school quality and growing community mobilisation efforts around children's education are reflected in their learning achievements.
- Parental commitment to, rather than parental levels of, education was more important.
- Household poverty functioned as a multi-dimensional barrier to children's achievement, while stunting significantly affected all indicators of scholastic attainment.

Implications from the research suggest that policy-makers should:

- introduce child-sensitive measures to combat the poverty effect
- incorporate gender-specific target indicators at all school levels during the second round of the SDPRP to contribute to gender equality
- address all aspects of school quality
- deal sensitively with community mobilisation as it can be burdensome by involving high financial, labour and time inputs from community members
- extend government efforts to initiate a student-centred education system
- pay particular attention to nutrition promotion programmes.

Contents

1. Introduction[1]

The major development objectives of the Ethiopian Government are to reduce poverty and improve primary school enrolment and educational achievement (SDPRP, 2002). Since the downfall of the Derge Regime in 1991, the Government of Ethiopia has developed a series of education polices. In 1997/98, the first phase of the Education Sector Development Programme (ESDP I) was launched, focusing on increasing access to educational opportunities with enhanced equity, quality and relevance, especially in primary education.[2] The second phase of this programme (ESDP II) was part of the Sustainable Development Poverty Reduction Programme (SDPRP) (2002-5) and maintained a similar focus. The ESDP II's policy strategies can be divided into five broad areas:

i. promoting community participation;

ii. devolving responsibilities for service delivery to the sub-national levels;

iii. developing low-cost alternatives;

iv. promoting programmes to promote education for disadvantaged groups;

v. encouraging private sector involvement in service provision and capacity-building for teachers and education sector civil servants.

As elaborated below, these strategies have both strengths and weaknesses in terms of promoting access, equity and equality.

- **Strengthening the participation of communities and NGOs in the financing and management of the education sector**: Broader community involvement and partnerships with NGOs can enhance educational access, and potentially enhance equity within communities. Quality may improve as service delivery may better reflect community needs and aspirations. However, equity across communities will not necessarily increase as communities differ in terms of resource capacities, social cohesion and motivation levels. Similarly, NGOs are unlikely to be working in all communities and thus some will benefit more than others.
- **Devolving responsibilities to *woredas* (districts) to manage primary and secondary education and give greater emphasis to staff qualifications and commitment to teaching:** While decentralised decision-making to local contexts is likely to improve the relevance of education and education management, equity and quality will be highly dependent upon the capacity and resources available to the *woredas.*
- **Implementing cost-efficient educational services through the development of low-cost schools, one-classroom schools and multi-grade schools at the first cycle primary school level (Grades 1-4)**: This approach will clearly improve access and equity but potentially at the expense of quality.

1 For further information about the Young Lives Project and to download all our publications, visit www.younglives.org.uk.

2 More specifically, it aimed to raise students' total enrolment from 3.1 million to 7 million; gross enrolment ratio from 30% to 50% and the number of schools from 9,690 to 12,595 at the primary (grades 1-8) levels between 1996/97 and 2001/02 (World Bank, 1998). At the national level, gross enrolment reached 61.6%, exceeding the overall target, but in some regions such as the Afar Region, the rate remained much lower (25%) (Asmaru, 2004). During the same period, net enrolment increased from 21.5% to 47.2% and from 32.2% to 60.2% for female and male students, respectively. In terms of the number of schools built, the government fell 4% short of the target.

- **Providing a larger role for non-formal education (a three-year programme to equip adults and out-of-school children with the equivalent of first cycle primary education (Grades 1-4)):** Similarly, non-formal education is important in terms of promoting access and equity, thereby helping achieve Millennium Development Goals 2 and 3, but not necessarily in respect of improving quality.
- **Providing targeted programmes for disadvantaged children, including girls,[3] children from pastoralist communities and under-served regions**: The Ministry of Education has made concerted efforts to increase access and equity for all children by, for example, encouraging targeted tutoring programmes for girls, constructing boarding schools in pastoralist areas and constructing more schools in remote areas.
- **Providing private primary education:** Involvement of the private sector will potentially improve quality for those who can afford it and may indirectly improve access as more public expenditure for education can be directed towards poorer students. The development of private schools will, however, reduce equity.
- **Building capacity through organisational development and provision of training for managers and teachers**: This strategy is aimed at improving the management quality of the education sector and improving teachers' capacities and motivation.

However, the educational sector reform component of the Ethiopian PRSP continues to suffer from a variety of performance problems. Education performance indicators show that, thus far, only access-related targets have been achieved. Gross and net primary enrolment rates increased from 45 and 21 per cent in 1995/96 to 61 and 34 per cent respectively in 1999/00, and to 74 and 38 per cent respectively in 2004 (Ministry of Finance and Economic Development, MoFED, 2005). However, educational quality declined in most respects over the same period, with particular shortfalls in the number of qualified primary school teachers and access to textbooks, as well as the continuing increase in class sizes. As a result, primary school dropout rates almost doubled from 8.9 per cent in 1999/00 to 19.2 per cent in 2003/04. Although this figure declined again to 12 per cent in 2004/05, it was still well above the 2004/5 target of 4.2 per cent. However, the repetition rate for Grades 4-8 was 5.6 per cent in 2003/04, meaning that the target rate of 6.4 per cent for 2004/5 had already been met.

Significance of the study

There is little information on the possible determinants of educational attainment outcomes in countries such as Ethiopia, which are carrying out education sector reforms. Yet, it is crucial to understand factors such as the problems related to completing primary education and poor achievement; the inefficiencies of repetition and dropout rates; inequality in terms of gender bias; urban/rural disparities; pastoralist communities and under-served regions if policy-making is to be effective. Such an understanding helps to evaluate the achievement, quality, efficiency and equitability of the educational system and the various determinants.

Theoretically, school completion is an individual/parental choice affected by three main factors (Connelly and Zheng, 2003): demand for education; supply of educational services; and government educational policies. Demand for education is shaped by a household's decision to send children to school (this may either be a parental and/or an individual child's decision) which is based on an assessment of the opportunity costs of education. Costs may be direct (school fees, clothing, transport

3 During ESDP I, the gender gap increased in both gross enrolment and net enrolment rates in Oromia, SNNP and Benshangul Gumuz regions.

costs) and indirect in terms of opportunity (including foregoing wage income or home production). Benefits, by contrast, include higher earning capacity and improved quality of life. Young people may also leave school for supply-side reasons, such as the limited availability of schools and shortcomings in quality (including teacher capacity and inadequate infrastructure). Government education policy may also affect the demand for, and supply of, education. Policy changes may include making education compulsory, education subsidies or funding, non-formal or low-cost education programmes, the age at which children start school and curriculum development. To our knowledge, however, there are no country-level studies that examine the determinants of dropouts or assess the impact of the new Ethiopian educational policy on grade promotion, dropouts, grade repetition or school achievement.

Objectives

The objectives of this paper are therefore to identify the factors associated with primary school completion/dropout rates, educational achievement, and performance of children currently in school in Ethiopia, and also to assess the mechanisms through which these factors influence school completion rates and achievement. Specifically, the following research questions are addressed:

1. What is the relative importance of school, family and individual child characteristics in determining grade completion and dropouts in primary school?[4]

2. What is the relative importance of investment in school quality in determining students' educational achievement?

3. To what extent are the components of the Education Sector Development Programme (SDPRP) consistent with the determinants of children's primary school completion rates and educational achievement scores identified in this paper? What policy implications are raised and are relevant to contributing to debates around the revised SDPRP (2006-10)?[5]

The paper uses both qualitative and quantitative techniques to identify the determinants of basic school completion/dropout rates and school achievement. The Young Lives survey of 1000 eight-year-old children is used to analyse both school achievement and dropout rates. In order to assess differences in terms of age and policy chronologies, from the same survey, we use data on family members between the ages of five and 30 to analyse the number of school dropouts. We use a Cox proportional hazard model to analyse children's school attainment and dropout rates (Cox and Oakes, 1984). The determinants of the school achievement model are estimated by regressing the test score (composed of numeracy and literacy, and based on writing and reading skills) on a set of explanatory variables.

The rest of the paper is organised as follows: Section 2 reviews the international and Ethiopian literature, and the methods and data used for the study are described in Section 3. The results and discussions are set out in Section 4 in two main sections, looking at the results of both the descriptive analyses and the multivariate analysis. The conclusion is presented in Section 5 and the policy implications for the second phase of the poverty reduction strategy paper are drawn in the final part, Section 6.

4 School quality will be measured by a series of indicators regarding the physical characteristics of the school, the education of the teachers and the quality of school management and supervision. (See Section 4.2 for a list of the variables considered).

5 Given that the SDPRP was initiated in 2002, the same year in which the first round of the Young Lives survey was undertaken, we are unable to directly assess the impact of the Education Sector Development Programme. Instead, we map the degree to which the determinants of children's dropout rates and educational achievement scores are factored into, or addressed by, the SDPRP.

2. Literature review

2.1 Primary completion rate and dropout rates

School completion plays a crucial role in shaping a child's future economic opportunities and social destiny. Moreover, it also has wider implications for a country's human capital development objectives (Vitaro *et al.*, 1999; Prevatt and Kelly, 2003). Grade repetition and school dropouts are major sources of inefficiency in any education sector (Hanushek and Lavy, 1994). This is of particular concern given that the literature from developing countries suggests that dropouts are generally higher in the first year of primary education because problems experienced during a child's preschool years will be reflected in the first grade (Bustillo, 1989; World Bank, 1998). Research strongly supports the view that dropping out is a dynamic developmental process that begins before children enter elementary school, and is linked at least in part to parental expectations about education (Jimerson *et al.*, 2000). Because of its wider implications, it is important to study the determinants of school dropouts at the household, community, regional and national levels in order to devise appropriate corrective measures.

2.1.1 Child characteristics

A child's age, gender, IQ and cognitive skills, popularity and peer relations, academic achievement, and nutritional and health status are the main characteristics highlighted in the empirical literature on primary completion and dropout rates (Hanushek and Lavy, 1994; Jimerson *et al.*, 2000; Farmer *et al.*, 2003).

Age is relevant because it is related to learning abilities, and whether or not a child starts his/her education on time or over-age. It is a good predictor of education attainment (Holmes, 2003).

The **gender** of a child is important for several reasons. Households commonly prefer to invest in boys' rather than girls' education. The main reason for this gender discrimination is the low perceived returns to schooling for girls because they usually leave their natal home when they marry. Parents' concerns for girls' safety at school – and while travelling between home and school – can also lead to the forced withdrawal of girls or to them dropping out voluntarily when they reach puberty (Oxaal, 1997).

The **innate learning abilities** of a child are also important because they increase the productivity of their investment in their offspring's education. For example, Jimerson *et al.* (2000) found that children with lower IQs and poor academic achievements were more likely to dropout of high school than their more academically gifted counterparts. Similarly, higher achievements and cognitive skill were found to reduce the likelihood of dropping out in Egypt (Hanushek and Lavy, 1994).

The **nutritional and health status** of children was also found to be a strong predictor of school attendance (and in turn school performance) (Silverstein *et al.*, 2001).[6] Jamison (1985) observed a strong negative relationship between a poor nutritional condition (measured by low height-for-age and weight-for-age) and children's grade completion rates in China. One standard deviation reduction in height-for-age of a child was associated with a retardation of one-third of a year of schooling, which could be due to delayed enrolment or grade repetition. Similarly, poor school attendance and low achievement of students were significantly associated with under-nutrition and hunger in

6 We do not include this variable in our regression model as these data were not available for all the children in the sample (7-17 years). However, nutritional concerns did emerge in some regions in the qualitative research.

the Philippines (Glewwe *et al.*, 2001, cited in Mukudi, 2003), Chile (Ivanovic *et al.*, 1996, cited in Mukudi, 2003), and Kenya (Mukudi, 2003).

2.1.2 Household characteristics

Income, assets and family structure are the main household characteristics identified in the literature that impact on school completion rates. Household **wealth** clearly determines a household's ability to invest in the education of the child. The likelihood of children dropping out of school depends on the level of opportunity costs incurred by parents by them being in school (Appleton, 1991, cited in Bredie and Beeharry, 1998). Children with greater opportunities to earn income are likely to be taken out of school and involved in work if parents need additional income (Hanushek and Lavy, 1994).

Household structure is important because household resources are needed to pay for the education of children. In the Ethiopian context, for example, Woldehanna *et al.* (2005) observed a negative relationship between birth order and schooling, suggesting that younger children may be paying for the education of the older ones. In addition, it has been observed that female-headed households, and households where mothers have more decision-making power, tend to make decisions in favour of child schooling. When female decision-making power is combined with higher maternal education levels, children are more likely to be enrolled (Holmes, 2003; Kabeer, 2003). The distribution of decision-making power within the household is, therefore, important in determining children's enrolment patterns.

The findings on **parental education** are mixed. First, children whose parents are educated are more likely to learn because they live in an environment which is usually more intellectually stimulating. Secondly, parents who are more educated, may value education more than less educated parents which, in turn, influences the chances of a child of being enrolled and progressing in school. However, in addition to parental education, other factors such as resource availability and high returns to schooling are also important in explaining children's school enrolment. For example, Hanushek and Lavy (1994) found that the impact of parental education on the probability of dropouts in developing countries was not significant (Hanushek and Lavy, 1994).

The **education of other household members**, besides the parents, also matters in determining final decisions about children's education. Charles *et al.* (2003) concluded that parental involvement in children's education has a powerful impact on their attainment and adjustment in education. Similarly, Escobal *et al.* (2005), in the case of Peru, found that the education levels of female adults in the family (not just the caregivers) was positively associated with children's educational outcomes. In addition, **parental aspirations** are important, because parents may want their children to achieve high levels of education, independent of any economic return. Parents may believe that education has a value in itself, as is the case for health (Alderman and King, 1998).

2.1.3 School characteristics

The most important school characteristics are the costs to households, the distance from a child's home and the quality of the school.

School fees and other schooling-related costs (like uniforms, books and stationery) are obviously crucial in determining the returns to schooling (Brown and Park, 2002).

Distance to school is also important because long distances increase the opportunity costs of attending school by reducing the potential number of hours of work a child might do; it also potentially reduces a child's ability to learn if s/he is tired after a long walk to school (Tilak, 1989; Glewwe, 1999).

The **quality of education** is important because returns to schooling depend on the child's acquisition of basic skills like reading, writing and arithmetic. If the household perceives that the school cannot provide children with such basic skills, it may decide that an investment in education is not worth the small return (World Bank, 2004). Very poor school quality may thus discourage households from educating their children, and encourage them to allow their children to work instead. School quality variables include: the number of schools available in the community, the level of education of the teachers, the pupil:teacher ratio, and the availability of books, desks, blackboards, water and toilets. For example, Hanushek and Lavy (1994) found that in Egypt, school quality had an important influence on students' dropout decisions. Students attending higher quality schools tend to stay in school longer and complete higher grades.

2.1.4 Policy-related factors

Government policies may affect completion rates by influencing both the demand for, and supply of, education. Key policies may include: starting age regulations, legislation to make school compulsory, education sector funding, curriculum development, school timetabling, grade promotion policies (Lillard and DeCicca, 2001) and teacher training (World Bank, 2004).

2.1.5 Community environment

Neighbourhood characteristics are an important element of the community context which affects dropouts (Crowder and South, 2003). Crowder and South found higher dropouts as the concentration of poverty and socio-economic distress in a neighbourhood increased, although these results were conditioned by such factors as duration of residence in the community, household features such as income level and individual characteristics such as age and gender.

Other key community environmental factors include the relative availability of job opportunities, dominant livelihood strategies (e.g. pastoralist versus agriculturalist) (Tilak, 1989), and urban/rural location. In the latter case, Hanushek and Lavy (1994) found that rural location in Egypt increases the probability of dropouts.

2.2 Children's scholastic achievement

A number of factors related to individual child, home, school, and community features, as well as policy and programme contexts, have been investigated in the empirical literature on determinants of achievement.[7] However, overall there was a greater emphasis on the role of school factors, with less attention to family and community factors. The relative importance of these variables also depends on the level of development of the society under consideration. For example, Bustillo (1989) observes the greater influence of family characteristics than school environment on attainment and achievement in developed societies.

7 Use of test scores for language reading and writing and mathematical skills are often insufficient indicators of 'learning achievement', especially in the context of developing countries (Ray and Lancaster, 2003). Another concern is in relation to the choice of an appropriate unit of analysis, i.e. at individual child, class or school levels (Heyneman and Jamison, 1980).

2.2.1 Child characteristics

In extant empirical research, gender, age, cognitive skills, participation in labour activities, school attendance and studying habits, and physical and health status of children were the major factors identified as having an important influence on school achievement (Holmes, 2003).

The findings on **gender differences** are mixed. In the African context, the gender of the child has been highlighted as important (Kutnick, 2000). Controlling for other factors, Mukudi (2003) found that boys achieved better than girls on the Kenyan Certificate of Primary Education exam. However, using a sample of 360 students from eight elementary schools with a balanced sex composition in Eastern Gojjam, Ethiopia, Sewnet (1995) found variable academic achievement by gender. Girls showed better results in Amharic reading, while boys scored better in mathematics and written Amharic.

Child schooling factors were also found to have an influence on scholastic performance. Ray and Lancaster (2003) found that school attendance, years of schooling completed, grade repetition, schooling for age, and time spent in studying at home were all significant predictors of child school achievement. However, Heady (2003) argues that measures such as grade repetition and age-grade distortion are not perfect indicators of learning achievement as schools may not apply uniform promotion standards.

Controlling for other factors, in a study in Vietnam, variations in test scores of children who completed the same number of grades were associated with differences in **cognitive skills** (Behrman and Knowles, 1999). **Student's attitudes** were also important. In Ethiopia, Sewnet (1995) found that the attitude of the student towards the school and teachers, measured by interest indicators, had a significant influence on the achievement (measured by tests for reading, writing and computing skills) of the student in the subject.

The literature also pays considerable attention to the impact of involvement in **child labour** on children's scholastic achievement. According to Ray and Lancaster (2003), when child labour (even in limited amounts) leads to a reduction in school attendance rates and in the number of years of schooling received, children's learning will be adversely affected. Hours spent at work reduces time available for study, tires the child and reduces learning productivity (Rosati and Rossi, 2003; Heady 2003). Mukudi (2003) found that children's scores in the Kenyan Certificate of Primary Education exam were positively associated with the rate of school attendance. Moreover, Heady (2003) in a case study on Ghana, found that the direct effects (physical and mental exhaustion and insufficient time to study) were of greater importance in shaping school achievement than the indirect effects (reduced school attendance) of involvement in child labour.

Lastly, the evidence on **preschool attendance** was mixed.[8] Bustillo (1989) found a child's participation in preschool had a positive effect on the age of enrolment and grade promotion. However, Olatunji (1990), focusing on Nigeria, argues that success at primary level is dependent on well-staffed and well-equipped schools, a supportive home environment and not necessarily, on preschool attendance.

8 Note we do not test for preschool attendance in our regression model, as the data were unavailable.

2.2.2 Household characteristics/home environment

Children's home background is also an important influence in school achievement (Olatunji, 1990). The study of determinants of attainment must account for experiences in the home such as the household's socio-economic status, demographic structure, parental education levels and parents' involvement in their children's education experience (Kutnick, 2000).

Behrman and Knowles (1999) in their research on Vietnam found a significant association between household **income**, the age the child started school and exam scores in the last completed grade. The impact of income was particularly significant in the case of boys (Brown and Park, 2002; Holmes, 2003).

In the case of **family composition**, being a member of a large family and belonging to a female-headed household were found to have a negative influence on child achievement. Based on a review of empirical studies, King (1987), quoted in Tilak (1989), found a persistently negative correlation between family size and children's school achievement. Children from smaller families tend to show better performance in school outcomes than those from larger families.

In terms of the gender of the household head, while Ray and Lancaster (2003) found the performance of children from female-headed households in the US to be significantly lower than that of children from other households on various schooling outcomes, Shareen (2004) found that in rural Bangladesh the impact of female-headed households on children's education depended on their socio-economic status and pre-marital circumstances. In a second stage regression, the study found that although children from households headed by widows were 93 per cent more likely to work (compared to children from male-headed households), there was no statistically significant effect of mother's widowhood on any measure of schooling outcomes. Children from households headed by married women, on the other hand, have significantly stronger schooling attainment than children from male-headed households: they are 19 per cent more likely to have ever attended school, 8 per cent more likely to be currently enrolled in school, and 41 per cent more likely to have finished at least two or more years of school.

Evidence of the importance of **parental education** in shaping children's school performance is mixed. In Egypt, Hanushek and Lavy (1994) found that student performance was marginally, but positively, influenced by the father's educational level but that mother's education did not play a significant role. However, in Ethiopia, Sewnet (1995) found that family educational background was not important in explaining differences in achievement, particularly in mathematical computing skills.

Parental involvement, however, was found to be important. Barnard (2004) studied the effects of parental involvement both in school and at home on the success indicators of children in school-based longitudinal data from Chicago. Controlling for other factors, Barnard found that greater reported involvement of parents in elementary school was significantly associated with increased on-time high school completion, and the highest grade completed by a student. Similarly, Sentayehu (1998) studied the performance of 560 students from Ethiopian junior secondary schools, based on their average records over four years, to investigate the impact of parenting style. He compared four models of parenting style, namely authoritative, authoritarian, indulgent and neglectful. Although the performance of students from homes with other styles of parenting was not significantly different, students with parents with an authoritarian style showed significantly higher academic achievements

than the others. Admasu (2004) also found that the performance of high school students in Addis Ababa was significantly associated with parents' involvement. The study showed a significant positive association between fathers' involvement and students' academic performance, regardless of the gender of students.

2.2.3 School factors

Textbooks and instructional materials, teacher characteristics and other school quality factors were found to be important determinants of school achievement (Glewwe and Jacoby, 1994, cited in Canagarajah and Nielsen, 1999). In terms of **teacher quality**, years of experience, motivation to teach and in-service training were linked to children's school performance (Bustillo, 1989). Teachers expectations also play a key role in children's scholastic achievement. An Ethiopian study found that teachers' expectations of their students, based on perceived ability differences, had a significant influence on students' performance (Sewnet, 1995).

Classroom resources have been found to have an impact on children's achievement levels (Kutnick, 2000). Factors such as class size, textbook availability and curricula were found to have a major impact on children's academic performance in Asia (Tilak, 1989), but with a greater impact on girls than boys. Similarly, in a Nigerian study, Olatunji (1990) found that the performance of public school students was lower than that of private school students due to poor school conditions such as higher pupil:teacher ratios, overcrowded classrooms, lack of sufficient teaching aids and textbooks, and poor teaching methods. Mukudi (2003), in a study in Kenya, found that achievement differentials across schools were likewise associated with differences in educational material availability. Differentiating by school subjects, a Zimbabwean study found that the achievements of Grade 7 students were associated with instructional time and the number of hours of teacher-supervised study time in the case of mathematics, and that both mathematics and English language skills were linked to the pupil:teacher ratio (Nyagura and Riddell, 1993).

School management factors were also linked to student performance. According to Vegas (2002), in Chile, student performance, measured by test scores, was associated with decentralised decision-making authority, teacher autonomy, strict enforcement of the school schedule, and the level of autonomy given to teaching staff in designing teaching plans and implementing projects. In the case of Chile, student outcomes is more strongly related to the way schools are managed than to observable teacher characteristics, such as education and experience.

2.2.4 Community factors

Children's scholastic performance may also be a partial reflection of community-level factors. In a review article, Crowder and South (2003) found that neighbourhood features have a strong impact on a child's cognitive abilities and academic performance. Youngsters from wealthier neighbourhoods, independent of household wealth levels, show higher achievement rates compared to those living in areas with high levels of poverty and distress. Differences in infrastructure such as electricity (Bredie and Beeharry, 1998) may also contribute to disparities in educational achievement between regions.

2.2.5 Nutritional factors

Nutrition can affect children's cognitive and social development and their learning abilities. Three widely prevalent nutritional deficiencies (of protein energy, iron and iodine) are recognised to have potentially permanent adverse effects on learning and behaviour (Scrimshaw, 1998). Adequate supplementation of protein improves the cognitive ability of children and also has a long-term effect. Iron deficiency is believed to have an irreversible impact on the cognitive ability of an individual. Scrimshaw (*ibid*) argues that investments in education and community development would be more effective if the physical and cognitive capacity of underprivileged populations were not impaired by malnutrition.

Stunting is the best summary measure of chronic exposure to poor diet, high rates of infection and inadequate care during early childhood (UNICEF, 1990). In a cross-sectional study with data from eighty-one primary schools in three districts of northern Vietnam, Hall *et al*. (2001) found that, controlling for other influencing factors, there is negative correlation between height-for-age and tests in mathematics and Vietnamese language. Moreover, test scores were negatively associated with weight-for-age and chronic under-nutrition, although there was no significant relationship with weight-for-height.

3. Methods and data

3.1 Data source

We used the Ethiopian survey data of eight-year-old children collected by the Young Lives Project. The survey covers 1000 children aged 7.5 to 8.5 years old. The data were collected from 20 sentinel sites in five regions: Addis Ababa, Oromia, Tigray, Amhara and SNNP. These regions were selected because they are inhabited by the majority of the Ethiopian population (96 per cent). Within regions, sentinel sites targeted poor areas based on the government's food insecurity designation. Three out of four sentinel sites in each region are in high food deficit *woredas* (districts), and one is from a lower food deficit *woreda*. Consequently, the sentinel sites over-sampled the poor, but included a degree of variation for comparative purposes. The sentinel sites were distributed over the five regions in such a way that Amhara, Oromia and Tigray comprised 20 per cent each of the sample, while SNNP comprised 25 per cent and Addis Ababa 15 per cent. Forty per cent of the children were from urban areas and the remaining 60 per cent from rural areas.

3.2 Methodology of analysis

The paper uses quantitative and qualitative techniques to analyse both school completion/dropout rates and educational achievement (measured by test scores). The results from quantitative and qualitative analyses are merged and discussed together.

3.2.1 Quantitative method of analysis

Both descriptive and multivariate analyses were used to explore the correlations between children's learning outcomes (school attainment and test scores) and variables such as household composition, poverty, the credit market, social capital and location. Data were initially captured in a Microsoft Access database and analysis was conducted using Stata version 9. The descriptive method of analysis includes cross tabulation of dropout rates and test scores with different variables that are likely to influence child-learning outcomes. We also conducted a univariate analysis using Pearson's chi-squared test (χ^2) to test the null hypothesis that the pairs of variables are independent of each other.

The techniques used to analyse the determinants of a child's learning outcomes depended on the learning outcomes analysed. This study analyses the determinants of child's school attainment (dropout or completion rate) and the test scores of the Young Lives children. Accordingly, the estimation method we used varies and is explained as follows: in analysing test scores, we used results of numeracy and literacy tests for eight-year-olds; for the analysis of school attainment, we used dropout and completion rates of household members between the ages of five and 30 years.

We could have used a censored ordered probit model devised by Lillard and King (quoted in Glewwe, 1999; Holmes, 2003; World Bank, 2004) to identify the determinants of school completion. However, the use of censored ordered probit models to analyse school attainment of children assumes that a child currently enrolled will achieve at least the grade level in which the child is currently. This is too restrictive an assumption, especially in a situation where there is a significant dropout rate. The alternative is to use a Cox proportional hazard model to analyse children's school attainment or dropouts (Cox and Oakes, 1984). Hazard models account for the dependence of current enrolment

on past enrolment decisions, and handle censored students (i.e. children enrolled at the time of the survey). The Cox hazard model does not require a parametric specification of the baseline hazard function and thus allows the baseline hazard rate for each community to vary (Cox and Oakes, 1984, cited in Brown and Park, 2002). Therefore, we used a Cox proportional hazard model to analyse the determinants of school attainment and completion rates. We estimated a hazard model for numbers dropping out of school, conditional on current enrolment of children in school. We analysed the determinants of school attainment using data on the 3074 eight-year-old children and their families included in our sample.

Similarly, given our data, estimating the determinants of test scores is not straightforward. The data we used consist of sample children who are either currently or were previously enrolled, and those who did not attend school at all. But test scores can be analysed for those children who are either currently or were previously enrolled and whose years of schooling are greater than zero. Therefore, our sample is not random since test scores can only be analysed for those children who are either currently or were previously enrolled in school. Consequently, we have children who are purposely selected or excluded from the sample. This selection can bias the regression results; whether this is the case can be tested by including a sample selection term in the test score regression. Accordingly, to correct for this selection bias, we used Heckman's two-step estimation method to run the regression. The dependent variable used in the regression is the child's test score index derived from the combination of the results from reading, writing and numeracy skill tests. The computation of the test scores, which is the dependent variable, is made in such a way that the literacy indicators (reading and writing skills) have 50 per cent weight, and numeracy skills are also weighted at 50 per cent.[9] Analyses of the determinants of test scores were conducted on the 1000 eight-year-old Young Lives sample children who participated in the tests.

3.2.2 Qualitative methods

Qualitative research was carried out in five of the twenty Young Lives sites in February and March 2005. One site from each of the five regions represented in the Young Lives sample was selected, four of which are rural and one urban. A combination of focus group discussions (with Young Lives parents and children), semi-structured in-depth interviews (with children, parents and young people who were in school before the 1996 introduction of the Education Sector Development Plan) and interviews with key informants (school directors and community development workers) were carried out in each site over a four-week period. Approximately forty people were interviewed in each site. Analyses were based on:

a) a debriefing workshop where the five research assistants and senior researchers presented their findings and discussed similarities and differences across the sites;

b) the transcripts of taped interviews (translated into both English and Amharic);

c) extensive field notes and field reports prepared by the research assistants.

The analysis sought to identify both common patterns and differences across all the sites, and the underlying reasons for these by looking at incentives and barriers to school completion and scholastic achievement at the child, household, school, community and policy levels. Particular attention was paid to gender dynamics at the household, school and community levels.

9 Here, we followed the World Bank Overseas Development Unit (2004) report on Ghana.

4. Results and discussion

This section presents the results of the descriptive and multivariate analyses of the determinants of school attainment and school performance. The results are discussed in two main sections: the first discusses the results of descriptive analyses; the second looks at the results of the multivariate analysis, focusing on determinants of school attainment and school performance.

Descriptive analyses

This section presents descriptive analyses of school attainment and test scores of children by poverty status, number of hours spent on household chores and school quality variables, such as school distance and perceptions of the child of the school environment. The section is divided into two sub-sections: the first describes the existing situation of children's school attainment; the second, children's school performance.

Completion/dropout rates

Out of the total sample of children, 66 per cent have, at some time, been enrolled in school. Of these children, about 61 per cent were still in school, and the rest were no longer enrolled because they had either graduated or dropped out before completion. Of those children who had been enrolled at some point, 17 per cent dropped out of school before completing. Girls' dropout rate (51 per cent) was marginally higher than boys' (49 per cent). Surprisingly, the dropout rate was lower in rural than urban areas (12 per cent compared to 25 per cent). Comparing regions, the greatest dropout rate was observed in Addis Ababa city (31.24 per cent), followed by SNNP (19.93 per cent), while the lowest dropout rate was in Tigray Region (7.08 per cent). There was a systematic relationship between dropout rates and the poverty status of a child's family. Surprisingly, the proportion of children who dropped out of school was lower for children from *very poor* households (12 per cent) than those from *poor* households (23 per cent) and *less poor* households (30 per cent). Tables 4.1 and 4.2 tabulate the number of dropouts by sex, location, regions and poverty status of households.

Table 4.1: Dropout rate by location, sex and poverty status of households (percentage)

		Location		Sex		Poverty		
		Rural	Urban	Girl	Boy	Very poor	Poor	Less poor
Still in school	82.85	88.49	74.8	82.01	83.65	87.8	77.39	70
Dropped out	17.15	11.51	25.2	17.99	16.35	12.2	22.61	30

Source: Young Lives study

Sample children were also asked when they first started school. Thirty-four per cent of children said they did not know when they started school. However, of those who did know, the largest proportion (40 per cent) said they started school at the age of seven, and 27.34 per cent started at the age of six. Only a very small proportion of children started school at the age of three (0.45 per cent) and 4.71 per cent at the age of four. The gender differences in school starting age are negligible. The proportion of rural children who started school at the age of eight (one year later than the official starting age of seven) is twice that of urban children. Only 5 per cent of rural children started school at the age of

five; the corresponding figure for urban children is 14.4 per cent. Table 4.3 describes school starting age by sex and location.

Table 4.2: Dropout by region (percentage)

	Addis Ababa	Amhara	Oromia	SNNP	Tigray	Total
Still in school	68.76	89.18	83.31	80.07	92.92	82.85
Dropped out	31.24	10.82	16.69	19.93	7.08	17.15

Source: Young Lives study

Table 4.3: School starting age by sex and location (percentage)

Age	Girl	Boys	Rural	Urban	Total
2	0	0.5	0.22	0.27	0.25
3	0.6	0.3	0	0.81	0.45
4	4.47	4.96	1.22	7.55	4.71
5	9.04	11.51	5.2	14.39	10.27
6	25.92	28.77	20.71	32.73	27.34
7	40.71	39.38	48.73	33	40.05
8	19.27	14.58	23.92	11.24	16.92
Total	100	100	100	100	100

Source: Young Lives study

Test scores

Test scores are computed from the literacy (reading and writing) and numeracy skills levels of children. The reading skills level was measured by giving students three cards containing three letters, one word and one sentence in his/her own language which they were then asked to read. In order to measure their writing skills, children were asked to write down a sentence in their local language. The numeracy test examined the children's ability to perform simple arithmetic. Four scores for reading and three for written skills were registered. The results are shown in Table 4.5.

The first column of Table 4.5 shows the test results of the reading, writing and numeracy skills of the children sampled in the Young Lives study. The majority of children (54 per cent) could not read at all, while about 21 per cent were able to read a sentence. The results for writing skills are not that different from those for reading. About 57 per cent of children could not write at all, while the rest could either write without any difficulty, or with some difficulty. The numeracy skills results show that less than half of the children (43 per cent) correctly calculated the given numeric question.

The table also shows the different skills levels of the children according to the main aspects of school which they do not like. Overall, beatings by teachers was the most frequently cited example of what children dislike about school: about 65 per cent of students who could not read at all and about 50

per cent of children who could only read a sentence did not like being beaten by their teacher. The results revealed that the proportion of children who disliked being beaten by their teacher decreased with increased reading skills. Similarly, about 61 per cent of those who could not write at all and 55 per cent of those who could write without any difficulty did not like being beaten by their teacher. Children were also asked about the main things they liked about school. The responses indicated that 40 per cent of children liked their teacher and friends, and 58 per cent liked learning. The rest responded that they liked nothing about school.

Table 4.4: Reading, writing and numeracy skill level by main things a child does not like about school

	Skill level (col. %)	Teacher beating	Noise	Being bullied	Dirty toilets	Nothing
Reading skill						
Can't read anything	54.1	65.38	24.36	1.28	8.97	0
Reads letters	19.51	66.67	17.59	1.85	12.96	0.93
Reads word	5.26	54.55	36.36	0	9.09	0
Reads sentence	21.13	49.63	25.19	0.74	22.96	1.48
	100					
Writing skill						
Can't write at all	56.9	60.58	27.88	0.96	10.58	0
Writes without difficult	23.12	55.17	23.45	0.69	18.62	2.07
Writes with difficulty	19.98	62.5	19.23	1.92	16.35	0
	100					
Numeracy skill						
Correct	43.37	59.69	20.92	1.02	16.84	1.53
Incorrect	56.63	58.09	25	0.74	16.18	0

Source: Young Lives study

The effect of poverty status on children's school performance is shown in Table 4.5. As can be seen, at least 71 per cent of children from *very poor* households could not read at all, while about 32 per cent from *poor* and 10 per cent from *less poor* households were unable to read at all, suggesting that reading ability increases with the level of wealth. In other words, while only 10 per cent of children from *very poor* households were able to read a sentence, a higher proportion of children from *poor* (35 per cent) and *less poor* households (54 per cent) were able to read sentences. Similarly, the vast majority of children from *very poor* households (73 per cent) could not write at all, while 35 per cent from *poor* and 16 per cent from *less poor* households were not able to write at all. The numeracy skills levels show that only 35 per cent of children from *very poor* and about 57 per cent from *less poor* households responded correctly to the numeracy test. Overall, the results indicated that a higher proportion of children from less poor households performed better in school tests as measured by reading, writing and numeracy skill levels than their poorer counterparts.

Table 4.5: Reading, writing and numeracy level of child by poverty status

Skill level	Very poor HH	Poor HH	Less poor HH	Total
Reading level				
Can't read anything	71.24	31.9	10.2	54.1
Reads letters	15.85	24.73	27.55	19.51
Reads word	3.27	8.6	8.16	5.26
Reads sentence	9.64	34.77	54.08	21.13
Total	100	100	100	100
Writing level				
Cannot write at all	73.32	35.14	16.16	56.9
Can write without difficult	13.09	37.68	44.44	23.12
Can write but with difficulty	13.58	27.17	39.39	19.98
Total	100	100	100	100
Numeracy level				
Correct	35.32	51.19	56.99	43.37
Incorrect	64.68	48.81	43.01	56.63
Total	100	100	100	100

Source: Young Lives study

The results in Table 4.5 are also reviewed using the wealth index of households, shown in Table 4.6. This table shows that reading and writing skills increased with wealth. Children of wealthier households also responded better in the numeracy tests, indicating that school performance is positively related to household wealth and to time spent doing chores. The table also reveals children's school performance in relation to distances from school and the number of hours spent doing household chores. A child who could not read at all spent more time doing household chores (1.83 hours per day) than those who were able to read a sentence (1.15). Moreover, those who could not write at all spent more time on household chores (1.79) than those who were able to write without any difficulty (1.17).

The results of the numeracy tests are similar. Distance to the nearest public or private school had similar effects on children's school test performances. Those who travelled the greatest distances to reach the nearest school had lower reading, writing and numeracy skills levels compared to those who travelled shorter distances. These results are shown in last column of Table 4.6 where we can see, for example, that children who could not read at all travelled an average distance of 3.11 kilometres to school, while those who could read sentences travelled 1.06 kilometres. Increased writing skill levels are also associated with reduced mean distances that children travelled to the nearest public or private school.

Table 4.6: Child's skill by mean of wealth, household chore and school distance

Description	Wealth index	HH chore time hours per day	School distance km
Reading skill			
Can't read anything	0.11	1.83	3.12
Reads letters	0.21	1.30	2.49
Reads word	0.25	1.13	1.89
Reads sentence	0.28	1.15	1.06
Writing skill			
Cannot write at all	0.12	1.79	3.14
Can write with difficulty	0.25	1.31	1.80
Can write without difficulty	0.26	1.17	1.63
Numeracy skill			
Correct	0.24	1.25	1.86
Incorrect	0.17	1.57	2.18

Source: Young Lives study

The results of the cross tabulations of children's test scores against variables that are expected to affect them are shown in Table 4.7. These variables can have a significant, positive relationship with children's test scores. They include urban location, wealth, fathers' and mothers' schooling, cognitive social capital, indexes for the main things children dislike and like about school, and the highest grade completed by a child. On the other hand, variables including social support, land ownership, livestock ownership, the occurrence of negative events (or shocks) that decrease household welfare, mean distance to school, birth order and number of children aged between 5 and 15, have a statistically significant, negative relationship with children's test scores. The other variables indicated in the table do not have a statistically significant correlation with children's test scores. We will not discuss the relationship of variables much at this stage, as the univariate analysis does not take the effects of other variables into consideration. However, it gives us an indication about the variables to consider for the multivariate analysis.

Table 4.7: Pearson's chi square test for determinants of test score

Variable	Sign	Pearson chi2	Degree of freedom	P-value
Location (1 if urban; 0 if rural)	Positive	233.7541	20	0.000***
Poverty status (wealth index)	Positive	264.3517	40	0.000***
Father's years of schooling	Positive	190.7203	100	0.000***
Mother's years of schooling	Positive	215.3769	100	0.000***
Sex of child (1 if male; 0 if female)	Positive	26.0226	20	0.165
Sex of head (1=male; 0=female)	Negative	17.8438	20	0.598
Cognitive social capital	Positive	130.4900	80	0.000***
Absolute structural social capital	Negative	156.6806	140	0.159
Social support	Negative	370.7228	240	0.000***
Citizenship	Positive	12.0162	20	0.916
Region		331.0058	80	0.000***
Index for main things a child does not like about school		452.4417	20	0.000***
Index for main things a child likes about school		444.5613	20	0.000***
Dummy for ownership of land	Negative	156.4737	20	0.000***
Dummy for livestock ownership	Negative	53.3471	20	0.000***
Dummy for health problems affecting schooling or work	Positive	18.5623	20	0.550
Highest grade completed	Positive	410.8504	80	0.000***
Mean distance to school	Negative	306.1461	120	0.000***
Number of hours a child spends on HH chores	Negative	222.0296	240	0.791
Dummy for bad events that decrease HH welfare	Negative	48.0113	20	0.000***
Birth order	Negative	253.2313	220	0.062*
Number of children over 15 years old	Positive	198.3070	220	0.850
Number of children between 1 and 5 years old	Negative	73.9271	80	0.670
Number of children between 5 and 15 years old	Negative	244.5165	140	0.000***

Source: Young Lives study

Determinants of school attainment and test scores

4.1 Determinants of school completion/dropout rates

As explained above, we used a Cox proportional hazard model to analyse the determinants of school attainment. In our analyses, we estimated different Cox regressions. The model estimates a hazard model for dropping out of school conditional on current enrolment among children from the

total sample (Brown and Park, 2002).[10] The Cox proportional hazard model provides estimates of hazard ratio which is interpreted as a risk multiplier. For example, a hazard ratio of 1.5 means that a child is 1.5 times more likely to drop out if the independent variable increases by one unit. Hence, hazard ratios greater than one correspond to positive coefficients and hazard ratios less than one, correspond to negative coefficients. The Cox model also, by definition, assumes that the hazard ratio is proportional over time. Hence, it is necessary to evaluate the validity of the assumptions.

We also estimated separate hazard models for rural and urban children, as well as for girls and boys. Prior to making these estimations, we conducted the following tests: first, we tested whether the survival function for both sexes is the same as for rural and urban children.[11] The Log-rank test for equality of survivor functions between the sexes cannot reject the null hypothesis, but it rejects the equality of the survival function between the rural and urban child. On the other hand, the test for whether the proportional hazard assumption holds for our model indicates that the global test rejects the proportional hazard assumption, but that the individual covariate test result does not reject the assumption. Moreover, our conditional index result shows that multicolinearity is not a problem in our dataset since we obtained a conditional index of 20 when we exclude age squared of a child. When a child's age squared is included, the conditional index was calculated to be 51, which indicates that the multicolinearity problem is very serious (Belsley *et al.*, 1980).

In addition to the Cox proportional hazard estimation, we also estimated an ordered probit model for years of schooling in order to compare the results. In the ordered probit model estimation, the outcome represents increasing years of completed schooling achieved by the child. Table 4.8 presents the results from the Cox proportional hazard models of the likelihood of a child dropping out from school at each level estimated from the total sample. The table shows hazard ratios and the estimated coefficients for the hazard model, as well as the estimated coefficients of the ordered probit model. The results of the Cox regressions for girls and boys, as well as for rural and urban children, are presented in Appendix A (Tables A2 to A3). The following discussion is based on the Cox regression estimation made on the total sample but, whenever necessary, we also include the results of the ordered probit and from separate Cox regression for both sexes and for urban and rural children. The descriptive statistics for the variables included in the regressions are shown in Appendix A (Table A1). In all regressions, we included dummies for regions to control for unobservable factors, including the cultural and geographical characteristics of each region and any variation in education policies, as regional governments are responsible for the organisation and support of the education system in their region.

10 Hazard models account for the dependence of current enrolment on past enrolment decisions and handle students currently enrolled at the time of the survey as 'right censored'. For example, if a student is currently enrolled, we do not know whether s/he will drop out in the future before completion of primary school. In econometrics, accounting for this uncertainty is termed 'right censored'.

11 The graphical assessment also shows that the assumption of the Cox proportional hazard model has not been violated.

Table 4.8: Determinants of dropouts using full sample (Censored Cox Regression of dropout)

	(1)	(2)
	Hazard ratio	Coefficient
Dummy for Amhara region	0.594***	-0.521***
	(3.71)	(3.71)
Dummy for Oromia region	1.009	0.009
	(0.08)	(0.08)
Dummy for SNNP region	1.020	0.019
	(0.20)	(0.20)
Dummy for Tigray region	0.699***	-0.357***
	(2.82)	(2.82)
Dummy for urban residence	0.874	-0.135
	(0.98)	(0.98)
Wealth index consumer durable	0.423***	-0.860***
	(2.70)	(2.70)
Male dummy 1 if male and 0 if female	0.847***	-0.166***
	(3.27)	(3.27)
Age of a child	1.016***	0.016***
	(5.34)	(5.34)
HH size under 5 years old	1.207***	0.188***
	(6.05)	(6.05)
HH size between the ages of 5 and 15	0.891***	-0.115***
	(5.11)	(5.11)
HH size over the age of 15	0.905***	-0.099***
	(4.64)	(4.64)
Grades completed by fathers	0.971***	-0.030***
	(3.38)	(3.38)
Grades completed by mothers	0.973***	-0.027***
	(2.75)	(2.75)
Dummy for male HH head	1.054	0.052
	(0.65)	(0.65)
Number of events that decrease the HH welfare	0.975*	-0.025*
	(1.83)	(1.83)
Cognitive social capital	1.014	0.014
	(0.42)	(0.42)
Absolute structural social capital	1.001	0.001
	(0.03)	(0.03)
Number of organisations providing social support	1.010	0.009
	(0.71)	(0.71)
Citizenship social capital	0.946*	-0.055*
	(1.71)	(1.71)
Dummy for debt	1.166***	0.154***
	(2.88)	(2.88)
Dummy for HH owns or rents land	1.168	0.156
	(1.43)	(1.43)
Dummy for ownership of livestock	1.059	0.057
	(0.83)	(0.83)
Mean distance (km) to public and private primary schools	1.042***	0.041***
	(2.66)	(2.66)
Policy dummy: 1 if child was in school before 1997	0.259***	-1.350***
	(24.30)	(24.30)
Observations = 3074 Wald Chi2(24) = 1369.13 Prob>Chi2 = 0.00		

*Robust z statistics in parentheses; * significant at 10%; ** significant at 5%; *** significant at 1%*

Rural/urban differences

The variable dummy for urban residency was found to have a significant and negative impact on dropout rates, indicating that urban children are less likely to drop out of school than rural children. However, there is only an impact on urban boys; it has no impact on girls' school attainment. One possible explanation for this is because, although girls' school attendance has increased significantly in recent years (from 17 per cent in 1995/96 to 63 per cent in 2004/05, MoE, 2005), there is still a marked gender gap in urban and rural areas. The Welfare Monitoring Survey (CSA, 2005) indicated that the net enrolment rate for girls is 33 per cent for rural areas and 77 per cent for urban areas.

Regional differences

The result of the Cox regression on the total sample indicated that children in the Amhara and Tigray regions were less likely to dropout of school. This result is consistent with the results obtained from the qualitative survey in the two regions which indicate that, in Amhara, the regional government uses enforcement mechanisms to encourage school attendance (for example, by depriving households of government social services if they do not send their school-age children to school). In Tigray, parents send their school-age children to school since they see schooling as an investment in their future livelihoods. However, dummies for all regions are significant in the rural regression but insignificant in the urban regression, indicating that much still needs to be done to decrease the probability of rural children dropping out of school.

4.1.1 Child characteristics

Only two child-specific characteristics emerged as important determinants of school attainment: age and gender.

Age

Children's age has a significant and positive effect on the probability of dropping out. Older children are more at risk of dropping out and are less likely to attain more years of schooling compared to their younger counterparts. Although age as a determining factor of dropouts was not discussed at length in the qualitative research, our findings suggested that if children attend school when they are relatively old (for their grade), it is because parents are less financially capable and/or willing to support their children's education. For example, a father in Tigray noted that older children in poor households typically have a responsibility to support their brothers' and sisters' school attendance. Moreover, even if they were attending school, their educational status was more precarious as they, rather than younger siblings, would be more likely to be withdrawn if there were economic pressures because of their greater ability to contribute to household economic production. One Young Lives mother from Wurib village, for instance, acknowledged that she had not sent her children to school at the appropriate age, but had only sent them after every child had "served the household" for several years. Moreover, she admitted that she would let them drop out of school again for the sake of economic gain.

Gender

Our Cox regression results found that the variable for the child's gender had a significant effect on primary school dropouts, with boys less likely to drop out than girls. Similarly, our qualitative results

strongly suggested that this gender difference is attributable to traditional distinctions in the way households and communities value girls' and boys' education. Because boys are viewed as future breadwinners, not only for their own children but also to support their parents in old age, boys' education is valued over that of girls' whose primary role in life is regarded as that of wife and mother, and to support their husband's family. For example, in Bilbala, one teacher described conventional views as follows:

> *Traditionally there has been an overriding attitude that there is nothing to be gained from sending girls to school. So there has been this tendency to prefer her for her services at home…. Besides, it's believed that sending girls to school means spoiling them culturally.*[12] *Also there have been no success stories of an educated girl* (2005).

Similarly, a female student noted that people's reactions to girls' education, especially when it involves travelling to, or staying in, a nearby town, is discouraging as educating females is often considered "*as a futile exercise or worthless*".

Nevertheless, it is important to point out that, while our quantitative data were collected in 2002, the qualitative data from 2005 suggest that important changes are happening largely as a result of new legal and policy developments designed to advance gender equality. Perhaps most significant among these is the Family Law reform of 2001 (implemented in 2002) which banned marriage under the age of 18. Traditionally, parents have been eager to marry off their female children early, not only for economic reasons but also for the sake of family pride associated with female chastity. Because girls are subject to sexual assault, abduction and rape in public spaces, parents preferred to have their daughters drop out of school early and get married, in order to protect the family honour. This is the case both in urban and rural areas:

> *We want our kids to go school and be safe at the same time. There are students who miss classes the whole day. They stay in the streets and harass others. Irresponsible boys who are out in the street do this kind of act. Girls are raped by these kinds and there is a lot of trouble* (Young Lives parent, Kirkos, 2005).

In rural areas, further education (especially the second primary cycle (Grades 5-8)) usually entails travelling outside the village.

> *It is hard to send girls very far for further education because we are scared of rape…if we cannot find any one to go with them, they won't go to school* (Women's Association head, 2005).

However, since 2002, the courts, government-affiliated women's associations and local authorities have been making concerted efforts to address this problem and enforce the early marriage ban. The following quotes from a Bilbala Women's Group Association member and a teacher, respectively, illustrate this well:

> *Girls were sexually harassed and assaulted and got pregnant. So parents wanted to protect their pride. Parents think their own parents would do the same. …. But now we believe we have a good start. We work alongside the courts; the regional courts have big responsibilities in this regard. So, whenever there is a problem concerning children, we work on that intensively. We charge the perpetrators in court, and it is only when there is evidence-- [that girls are 18 years or older] that they can make their daughters marry* (2005).

12 This refers to a belief that educating girls will make them less likely and capable of fulfilling traditional female roles.

> *Parents who marry off their children under-age have been brought before the law and are given education on the ill effects of early marriage. …I haven't seen any weddings this year. When I made inquiries I was told that is for fear of the law. Mostly, those betrothed are in the 9-12 age group and they cannot stage the weddings officially. So there is improvement. Besides, 12-year-old girls now speak up when they are given out in betrothal as they have better awareness. These girls also inform the school of the situation, which works in co-ordination with the police* (2005).

Moreover, in some regions, local authorities and women's associations have initiated so-called "Divorce Lobby Groups" to encourage the annulment of under-age marriages and return girls to school. If such efforts fail, the group lobbies for the child to be reinstated in school. Parents are called to the local authorities to explain why their child dropped out of school and the group makes appropriate negotiations so the child can resume her schooling.

All these measures have had a significant impact. For example, in Semha/Arato, the number of female students in the first primary cycle (Grades 1-4) as well as in Grades 7 and 8, now exceeds that of male students:

> *Earlier we had more dropout cases of girls from 7th and 8th grades. That was an effect of early marriage, which is no longer practiced, hence the rise in the number of female students* (School director, Semha, 2005).

Young Lives parents from Uduga, an area where marriage by abduction was commonly practised until recently, made a similar observation in order to avoid expensive dowry payments, suggesting that the impact of these changes has filtered down to average rural citizens:

> *The tradition of rape and abduction is now being abandoned due to the fact that people began to respect laws and are paying attention to the importance of education* (2005).

Similarly, it is worth noting that the increasing value placed on education means that some poor families now view marriage as a way for their daughters to receive further education, rather than as an end to their education. As an educated Young Lives mother from Wurib noted:

> *If the husband is rich and supports her until she finishes her education, then I have no choice but to give her away. Because I am poor, she may have to quit her education at any time if she stays with me* (2005).

While our Cox regression result and descriptive analysis (using Young Lives data collected in 2002) show that dropout rates are higher among girls than boys in primary education (see Table 4.1 and Table 4.8), our qualitative assessment (conducted in 2005) and national data[13] show that dropouts from primary school are higher among boys than among girls due to greater pressures to be involved in productive work to support the family economy. (The anomaly between the results from the qualitative and quantitative research might be due to the fact that the qualitative data was collected in 2005 after changes had already started filtering down.) Because of gender discriminatory labour markets, higher remuneration for boys, and a traditional gender division of labour where boys are more involved in agricultural than domestic work (although not exclusively), there are increasingly greater incentives for parents to take their sons, rather than daughters, out of school. As one school director observed:

13 These data were collected by CSA in 2004 and reported in 2005; see Table A6 in the Appendices.

> *In light of the rate of enrolment we have more girls than boys going to school as the latter are say tending to the cattle; the reason why we have more girls than boys going to school is that parents need help from boys with the work. Earlier we had more girls dropping out from 7th and 8th grades. That was an effect of early marriage, which is no longer practiced, hence the rise in the number of female students* (Semha School Director, 2005).

As discussed in Woldehanna *et al*. (2005), while girls are involved in time-consuming work, these household chores can be fitted in before and after school, rather than necessarily compelling them to drop out.

4.1.2 Family characteristics

Parental education, household composition, household wealth and exposure to shocks, as well as maternal social capital, all emerged as important family-level determinants of school attainment.

Parental education

The Cox regression results indicated that the variable "years of schooling" of both parents significantly and negatively affects the probability of their children dropping out of school. That is, children of educated parents are more likely to stay in school than their counterparts with less educated parents. However, if we disaggregate the estimation by children's gender and by rural/urban location, only higher levels of maternal education have an impact on rural children and on girls, whereas fathers' educational levels are important regardless of location and the sex of the child. Disaggregating the estimation by female- and male-headed households shows that children from both types of households are equally less likely to drop out from school when the mothers' education level increases.

Some respondents in our qualitative research noted that the correlation between parental education and lower dropout rates was due to educated parents being more supportive of education and giving children more time to study, as well as being due to the linkages between education and wealth. As one female student observed:

> *Educated families encourage their children to study. They give them more time. Rich people give more time. For example, I have several "Xs" in my exercise book because I missed class yesterday when my mother went to a funeral and I had to help her* (Wurib student, 2005).

Interestingly, however, overall our qualitative research suggested that parental commitment to their children's education was at least as significant as parental educational achievement in promoting school attainment. As a child from Kirkos (a site in Addis Ababa) noted in a focus group discussion, her mother's commitment to her schooling is a major factor behind the sustainability of her education:

> *If there is a power cut, my mother gets gas if she doesn't have any at home; she borrows from the neighbours and brings it to me. She has a saying: "A meal is good for today but not for tomorrow" and the same goes for schooling, she tells me that I have to study today as there will be nothing that else that I can carry over to tomorrow. She tells me to use my head and study* (2005).

Similarly, an illiterate father from Tigray was committed to helping his children with their homework wherever possible, even if it was only a matter of commenting on their art work:

> *They come ever to us, illiterate though we are, telling us that they were told to say draw something or other. And we see what they do and comment on their drawings. We also instruct them on the writing of numbers – from one to twenty, etc.* (2005).

There was widespread evidence of such parental commitment to education, but the reasons behind this support varied. They included a sense of economic necessity and security in old age, pressure from local authorities, a desire to provide their children with opportunities that they were denied, and a sense of moral responsibility. Not surprisingly, an important motivation for keeping children in school was the perceived economic gain from investing in children's education. As one Young Lives mother from Semha/Arato noted:

> *Parents are working hard to earn enough to educate their children, buying clothes, exercise books, etc. And once educated, the child will in return assist the parents, buying them clothes, shoes, their food, as well as supporting his brothers and sisters.*

For a number of parents, the value of education was not simply related to general economic gain, but was specifically about providing children with a route out of agriculture into more profitable occupations. As one focus group participant from Semha/Arato emphasised:

> *They tell us that it is due to lack of education that we are where we are; if we had attended school to the 6th, 7th grade, we could have gone in to some type of trade or business; but without it there was no choice but farming. They tell us that we should send our children to school, that even if we cannot read a letter ourselves, at least, there would be our children to read it for us, to tell us who it was from [and] what it was about. So we believe that to an extent we would be educated so long as we educate our children* (2005).

Ironically then, while the government's education policy is focused on producing more capable farmers in order to carry out its strategy of Agricultural Development-Led Industrialisation (ADLI), many parents are hoping that education will take children away from farm work and into non-farming occupations.

Pressure from local authorities also plays an important role. For example, a school director in Bilbala explained that when his school had canvassed parents about the reasons they support their children's education, some 40 per cent acknowledged that it was due to community- and school-level pressure. Similarly, a father from Tigray noted that he was sending his children to school due to government directives:

> *We believe in our government and the clear directives it gives us…instruction to send our children to school, not to create obstacles, not to give them away in early marriage, that they will learn to become of some value, which will make us happy; that if we stood as obstacles, they won't benefit as much, so it tells us to educate our children consistently and that's what we are doing* (2005).

Others, however, noted that this pressure was gradually becoming an internalised recognition of the value of education:

> *We do not need that much pushing to send kids to school nowadays; we have started to understand that the only thing we can give our children is education. For that reason nobody complains about the contributions [we have to give to the school]* (Young Lives father, Wurib, 2005).

Interestingly, though, what emerged from the qualitative interviews was that parental commitment to children's educational attainment was as much about providing their children with better future opportunities — both in terms of economic gain and leading a morally upright life — as current economic or local government pressures. For many parents, their children's education represented a chance to ensure that their children would not suffer the deprivations that stemmed from illiteracy and lack of schooling:

> *Education is very important for all things… We regret we failed to go to school. Even today we want to go to school. Since we cannot do that now, we are sending our children to school for we regret our illiteracy. We are saying let them not remain illiterate like us. An uneducated man cannot control even his own life. An educated person however knows what to do, how to lead his life, where to go. An educated person does not do inappropriate things, he analyses and abstains from bad things* (Young Lives mother, Uduga, 2005).

This mother's sentiments about the important linkages between education, morality and personal development were closely echoed by an educated Young Lives father from Wurib:

> *Education means a journey from illiteracy to freedom, from dirt to being clean; from ignorance to knowledge*.

A final source of commitment to education lies in a sense of moral responsibility: parents believe that allowing children to go to school is a parental duty and is the most valuable inheritance a child can receive. This may be mixed with hopes of economic gain, as expressed by a Young Lives father from Uduga:

> *First, we say it is our responsibility to educate them. Second, they may help us in the future. In the third place, they may be able to help themselves* (2005).

Family composition

The Cox regression (multivariate analysis) using full sample (general regression) results indicated that a child's likelihood of dropping out of school is significantly and negatively associated with the number of older siblings in the household, the number of siblings between 5 and 15 years, and the number of household members over 15 years of age. In other words, younger siblings are less likely to dropout.

In general, being part of a large family with a greater number of household members aged between 5 and 15 years, and also one with a larger number of adults, will put a child at less risk of dropping out than his/her counterparts. This suggests that older siblings and adult members substitute for each other's household labour or provide complementary support through cost savings. However, the effect of older siblings is not statistically significant for children from female-headed households and urban areas. A possible reason could be that female-headed households in urban areas do not require labour from older children because they generally do not own land, and if they do, they do not cultivate their land. A child's likelihood of dropping out of school is significantly and positively associated with the number of children younger than five years of age in the household, implying that older children may be required to take care of younger siblings. The presence of unproductive members in households may put pressure on older children to raise household income and, as a result, increases the likelihood of children dropping out of school.

These findings were only partially supported by the qualitative research. While the responsibilities of older children, especially sons, to support their parents and younger siblings was repeatedly observed, lending support to the so-called birth order effect, the positive impact of larger families on child enrolment did not emerge as a clear pattern. Parents talked about sending some children to work in order to meet household survival needs and to support the education of other siblings. Only in the case of large polygamous families in Wurib (Guraghe), was there a broad commitment to education for all siblings. This was because the children would not be able to rely on any significant inheritance because the property would be split between several households. Education was therefore the only means by which children would have future economic security.

Household wealth

Household wealth is included in our regression as a proxy for a household's poverty status. The results indicated that children from wealthier households were less likely to drop out of school. This suggests that, other factors being constant, households with greater wealth are more likely to invest in the education of their children.

Disaggregated estimates also showed that the wealth effect was significant for both boys and girls. The wealth of households had a similar positive effect in both rural and urban areas, showing that children from wealthier households in both rural and urban areas were less likely to drop out of school than their counterparts from poorer households.

In general, the qualitative findings were consistent with the quantitative results and support the "poverty hypothesis". That is, economic constraints emerged frequently as an important barrier to school attainment as parents struggle to pay for uniforms, books, registration fees, school construction fees and even food for their children. For example, one Young Lives parent from Bilbala lamented that:

> *I have no money to pay for the expense of her education. One of my children is attending school; another one was also in school but quit due to our financial problems. The rest could not get an opportunity due to a lack of money* (2005).

A child in urban Kirkos noted similar economic problems and underscored the myth of free education in Ethiopia: while there may be no registration fees, in some areas children were unable to remain in school if their family was unable to support shortfalls in government school construction budgets:

> *When the school asked for 100 Birr for construction, we could not pay; so they told me if I do not pay I can go to class until the end of the year; but I will not get my grades certificate so I quit. My mother has no income; she has to wash clothes in the neighbourhood to earn some money to feed us. So I do not think I will go back to school* (2002).

The impact of economic constraints is not always immediate, but may lead to a general undermining of a child's ability to participate fully in school, the cumulative impact of which is that the child eventually drops out. As one Kirkos parent noted:

> *We send our children to school and at the same time, we force them to work at home. They sell injera [Ethiopian bread] and we tell them they have to work in order to survive, while they do all that work;*

> *they cannot make it to school on time; when they are late, the school's door is closed so they do not want to go back home and stay in the street and involve themselves in undesirable activities* (2005).

Similarly, seasonal demands for child labour have an impact on school attendance. This is especially true during harvest time when there is a considerable spike in dropouts, particularly among boys, that may be either temporary or permanent.

Other variables linked to household wealth were also associated with school dropout rates. Dummies for land and animal ownership are found to have positive effects on school dropouts in all Cox regression results, but all are insignificant except for land ownership in rural areas and for female-headed households in rural and urban areas. In other words, the effect of land ownership had significant and positive effects on children's school dropout rates only for children from rural areas and female-headed households where there was a greater demand for child labour. In the case of land ownership, the discussion above suggests that this is linked to greater labour pressures on the household to complete the necessary agricultural work. The dummy for debt is significant and positive, indicating that there is a greater probability of a child from a credit-constrained household dropping out of school than their counterparts.

The number of negative shocks experienced by a household was found to have a surprisingly significant and negative effect on child dropouts. This appears counter-intuitive. One possible reason is that the occurrence of shocks is often linked to the receipt of food or other types of aid. However, this hypothesis would necessitate further research as it was not explored in-depth during the qualitative research. However, respondents in both Uduga and Wurib did note that children had been forced to drop out of school as a coping mechanism in the face of frequent droughts and economic shocks. For example, some of the children in Wurib worked on Thursdays and Fridays in petty trades to earn enough money to support their education. However, this was not sustainable and because they were falling behind in school, they eventually dropped out. In addition, some households were forced to migrate to ensure the family's economic survival; in the process, children were often forced to drop out of school.

Social capital

Social capital variables also emerged as having a significant effect on the duration of schooling in the regression analyses. While the impact of cognitive social capital (feelings of trust and belonging to one's community) and structural social capital (membership of social organisations) were found to be insignificant overall,[14] citizenship (involvement in collective action to address a social problem) was found to reduce the likelihood both overall and in urban sites of children dropping out of school.

The qualitative research results also supported this finding. Although led by government-affiliated women's and youth associations, as discussed above, many respondents emphasised community-wide efforts, including the involvement of parent-teacher associations, in the improvement of school attainment rates:

> *We try to contact and talk with parents whose children are not performing well and try to discuss the problem. At the end of the year, at general assembly, we discuss many issues for the last semester. We have two meetings with parents (this may be biannual) and sometimes when a student drops out, we*

14 Structural social capital had a statistically significant negative dropout effect in urban areas, but was associated with increased dropouts in rural areas. These results may be attributed to the generally more conservative nature of community groups in rural areas, and their less conservative nature in urban areas.

> *even go to their house to find some kind of solution.* (School Parent Committee Member, Kirkos, 2005).

As another parent from Uduga emphasised, civic initiatives to expand education are a new phenomenon but are having a far-reaching impact in terms of shifting the sense of responsibility for improved services to the community level:

> *We must not leave everything to the government. It is our children who are suffering from dust. We can contribute our own labour. But we did not do that before. Talking about problems is useless. If we contribute, the problems of lack of furniture in schools can be solved. It is not only a problem of poverty: some people are not interested in contributing; they expect everything from the government* (2005).

These positive views are not universal, however, and there is some resistance to the drive towards universal primary education. A focus group discussion in Bilbala revealed that some households were unwilling to participate in community initiatives to expand education as they viewed them as part of the ruling party's dominance, which they resented. This suggests that relying on social capital alone will only go part of the way towards addressing educational shortcomings in Ethiopia.

4.1.3 Community and school factors

The regression results found that school proximity and the educational policy changes since 1996 have had a significant impact on school completion rates, while the qualitative results suggest that the broad array of policy shifts incorporated in the SDPRP and ESDP II have also contributed.

School proximity

The probability of a child dropping out of school increases as the distance to the nearest private or public school increases. The qualitative research results suggest that parental fears about children's safety play a major role in this. The risks of sexual assault and violence *en route* to school were mentioned by a large number of respondents as a key reason for withdrawing their daughters from school after the first primary cycle. One parent from Lalibela described the danger not from the point of view of her child's potential suffering, but rather in terms of community shame and blame:

> *I could not tolerate the shame of having my daughter becoming pregnant by a passer-by. Should it happen, it would ridiculously result in community members pointing their fingers at me* (2005).

Another parent was not just concerned about sexual assault by strangers, but also about illicit sexual relations among unsupervised offspring:

> *I know several cases where girls that attended school in Lalibela (36 km away) … fell in love with their classmates and ended up dropping out because of their illegitimate pregnancy* (Bilbala parent, 2005).

In contrast, the recent construction of a school in Uduga Kebele (Grades 1-2) has seen a significant increase in village children's enrolment. Similarly, the upgrading of the Bilbala primary school from a first cycle to a second cycle primary school (until Grade 8), has encouraged many more parents to send their children, especially girls, to school.

4.1.4 Policy change

A dummy variable for policy change was included as an explanatory variable in the Cox and ordered regressions in order to ascertain the impact of the Education Sector Development Plan on reducing dropout rates and increasing the number of children completing their primary school education.

First, we found that children enrolled after 1996 were less likely to drop out than children enrolled before 1996. The same effect was found for boys and girls from the separate estimations made for boys and girls. When the effect is disaggregated by rural and urban residence, the 1996 policy change had a significant negative effect on rural children's dropout, but was insignificant for urban children.

The qualitative results confirmed this positive impact, and in addition captured more of the positive policy changes that had taken place since the introduction of the second ESDP in 2002. In particular, it highlighted the important impact of affirmative action measures to increase girls' enrolment and work towards Millennium Development Goal (MDG) 3 on gender equality and MDG 2 on universal education for all school children, as well as community mobilisation efforts to increase school enrolment and stem dropouts.

The qualitative findings underscored the fact that efforts to address gender equality in the education sector are not just a matter of political rhetoric but have been translated into comparatively successful and innovative programmes at the grassroots level. For example:

- girls are now appointed as classroom monitors to address an historical bias where boys were routinely chosen to fill this role;
- local authorities have initiated an affirmative action system where girls who complete primary education will be given preference for local government jobs, thereby acting as an important incentive for girls to remain in school;
- girls' clubs have been created in schools to encourage girls' education and address issues of sexual harassment and violence and are backed by the work of women's associations and parent-teacher associations; and
- women's departments have been created in regional and local education offices to ensure greater attention is paid to issues of gender equality.

Both teachers and students reported on these shifts in emphasis on girls' education:

> *In general, more attention has been given to girls than boys [since the ESDP II] especially after we started the Girls Association…. We also give them extra support* (Bilbala teacher, 2005).

> *These days girls are favoured. Early in the morning, the girls get special education…we do not know the answers to the questions but the girls usually answer them.* (Wurib student, 2005).

The second major policy shift has been the mobilisation of communities to support the education expansion drive. In addition to addressing parental concerns about children's safety from violence and working to ensure that the early marriage ban was effectively implemented, parents were also being encouraged to contribute cash, labour and materials for school construction, improvements to infrastructure and even supporting the salaries for additional teachers. For some parents, the opportunity to educate their children was sufficiently important for them to support these initiatives,

especially in cases where it meant their children were able to stay in their village and receive an education. As a Young Lives parent from Wurib noted:

> *As for me, I want to contribute because I have seen my children reading and writing and I want more, I am very poor but whenever they ask for contribution, I'll do everything to get that money. I am very happy* (2005).

A teacher similarly emphasised the importance of community contributions in improving educational facilities:

> *People have started to take notice of the school. What I mean is they contribute money and manual labour to build new schools. Even in this school, the people constructed the rooms you see over there. Our school is growing in every respect; we have recently opened a second cycle primary school [Grades 4-8]…. Regarding the contribution, we do not force them, they just give what they have, and even give more than they were asked* (Schoolteacher, Wurib, 2005).

However, given the very real economic challenge that these "contributions" represent for impoverished households, as village resentment grows over time, such initiatives may not be sustainable, as the following discontented parent suggests:

> *This school needs libraries and laboratories. Such things cannot all be provided for by the community. But I think the government should pay more attention to the schools and check if they are fully equipped or not. Most of our schools have no tables and chairs. The other issue is that it is not only contributing to the school that is hard for people. They also contribute to the Woreda office and the zone…but if the government helps in this respect it will be very good for the people. The people are very frustrated with the contribution system. They pay five different types of contribution* (Wurib, 2005).

4.2 Determinants of children's test scores

As mentioned above, the test score used in the multivariate regression analyses is a combination of a child's scores on tests designed to test basic reading, writing and numeracy levels. The reading skill levels are rated according to four possible outcomes in an increasing order of skill level: "cannot read at all", "can read letters", "can read words" and "can read sentences". Similarly, the writing skills test has three possible outcomes in increasing order of skill: "cannot write at all", "can write with difficulty" and "can write without any difficulty". The computation of the test score is made in a way that the literacy indicators (reading and writing skills) receive 50 per cent weighting, and the numeracy skill level was also assigned a 50 per cent weighting. We estimated a Heckman selectivity model to analyse the determinants of test scores. We also separately estimated ordered probit models for reading and writing skill levels as well as probit models for numeracy skill levels. The three regression results are reported in the appendix (Tables B2 to B4). A Heckman selectivity model was also separately analysed for test score for girls, boys, rural and urban regions. In our selection equation, we used the following variables that the literature identifies as being likely to affect the probability of a child being enrolled in school: gender of the child, gender of the household head, birth order, the wealth index, a dummy for debt, the occurrence of shocks, social capital and support, and regional dummies. In the main equation which determines the level of test scores, we considered the gender of the child and the household head, the wealth index, a child's maximum years of schooling, school factors, family assets, an urban

dummy, age of the child, parent education and age for height (stunting). The following discussion is based on the results of the Heckman selectivity model and, wherever necessary, we also discuss the results of the reading, writing and numeracy regression. Table 4.9 reports the results of the Heckman selection two-step model.[15]

4.2.1 Location

Taking Addis Ababa as a comparison group, dummies for the Tigray and Amhara regions were found to be negative and significant in test score regressions, and all the regional dummies were found to be significant and negative in the reading skill level regression. The dummy for urban residence was found to be statistically significant, and to negatively affect reading and writing levels, indicating that urban children can read and write better than rural children. This may not be surprising in that child labour is intensive in rural regions, and schools are generally of lower quality and under-equipped in terms of libraries, laboratories and other learning materials.

Similar reasons can also be given for the difference between the performance of rural and urban children. The dummy for urban residence is found to be significant and positive in the writing and reading skill level regressions, but not in the numeracy test score, indicating that urban children can read and write better than rural children.

4.2.2 Child characteristics

A child's gender, their highest grade completed, level of satisfaction with school and involvement in household chores were all found to have a significant impact on scholastic achievement.

Gender

As can be seen from Table 4.9, the dummy for male children is found to be significant and positive, indicating that boys perform better than girls. In rural areas, boys were found to have higher attainment than girls, as the separate estimation for determinants of test scores for rural areas indicate (see Table B7). Cultural factors, which may result in girls staying at home and engaging in household chores, could explain this result. This result was supported by the qualitative survey results, which found that many girls fared poorly in examinations because they have to contend with more arduous household tasks than boys. As a school teacher from Wurib explained:

> *Even though the number of females is greater, when we see the school record, male students have better results than their female counterparts. Maybe this is because girls are involved in the daily housekeeping process; they don't have time to read. We try to help them with a special tutorial programme every Saturday* (2005).

Child interviewees similarly noted that, while boys are usually more likely to be involved in cattle/goat herding and can find time during their routine to study, girls are often involved in domestic work or taking care of younger siblings which requires more intensive inputs and is not conducive to studying on the side.

15 We also tested for multi-colinearity and found a conditional index of 20.1 indicating that multi-collinearity is not a problem. In addition, we estimated robust estimations for the ordered probit and probit models. The marginal effect results for all the estimated models are shown in the respective tables for each regression. The descriptive statistics for the variables included in our regression analyses are shown in the appendix (Table B1). We see that the overall significance test (Wald test) of the Heckman selection model shows that the test statistics (Chi square- 772.03) indicate that our model fits the data very well. The selection variable, Mills lambda, is found to be significantly different from zero.

> *Boys have more time to study than girls. The only work they do is collect firewood and look after the cattle. But girls have a greater workload* (Girl student, Wurib, 2005).

Highest grade completed

The results indicated that test scores are positively and significantly affected by the highest year of schooling achieved by a child, indicating that schooling improves overall test scores, which is to be expected. The highest year of schooling is also found to be positive and significant in the other three regressions for writing, reading and numeracy skill levels. The maximum years of schooling of a child also positively affected all separate Heckman models estimated for boys, girls, urban and rural areas (see Tables B5-B8).

Children's perceptions of school

The variable representing a child's level of satisfaction with school life is found to be significant and positive in all regressions. The index used for this variable is the composite of a child's response to the main things s/he does not like about school, including violence by teachers, noise, being bullied and dirty toilets. Children's perceptions of school were also found to be a positive and significant determinant in all separate estimations of test scores of boys, girls, urban and rural areas.

Our qualitative findings suggest that positive evaluations may be partially explained by the Ministry of Education's concerted efforts over the last three years to democratise the school system by, for example, introducing mechanisms for students to evaluate teachers. Students are also now able to appeal to youth and women's associations if they have grievances concerning treatment by their teachers. This may help students to develop confidence, and in turn contribute to better school performance. In addition, innovations such as clubs and discussion groups on key social issues increase the relevance of school learning to children's daily lives:

> *I think [the thing that] most encourages students to go to school is the presence of clubs and associations. If they belong to clubs and associations like anti-HIV/AIDS clubs, anti-drug clubs, they will build interest in attending school. If we see things at kindergarten level, kids are happy to play around in a nice neat and beautiful garden or playground* (female student, 2005).

On the other hand, the relationship between children's level of school satisfaction and performance were also negatively linked to experiences of violence and discrimination. Without being specifically prompted about experiences of bullying or abuse, children across all five sites listed violence as one of the main reasons for disliking school. For example, in a focus group discussion with out-of-school children in Bilbala, one boy from Semha explained that:

> *Education is bad. I don't like to go to school; the grown-ups beat me. I like to be a shepherd* (2005).

A girl focused on bullying by other students:

> *When I was a small girl boys used to beat me. But now if it happened I would go to the police* (2005).

Discrimination of students based on family connections and wealth status was also mentioned as a problem. For example, a female student from Kirkos highlighted the unjust treatment of students by teachers:

> *If one is related to a teacher, whatever that student does in class they don't beat him. If I sleep in class the teacher beats me, but if her favourite student does the same she doesn't beat him* (2005).

A male student agreed that the differences are stark and equality elusive:

> *There is discrimination. Some students are treated well and some badly.*

Children's involvement in household chores

The number of hours a child spends doing household chores is found to be negative but insignificant in all regressions, implying that children perform worse when they spend more time on household chores and less time studying. This could be due to the fact that if a child divides her/his time between household chores and studying effectively, school performance may not be affected, especially at a young age (as in the case of our sample of eight-year-olds).In urban areas, however, children's involvement in household chores is a significant and negative determinant of test scores.

Our qualitative results also suggested that combining household chores and school takes a greater toll on children than the quantitative results would suggest. For example, students who were performing well explicitly emphasised that they were only able to juggle the two competing pressures on their time because they planned their time carefully. One female student, for example, explained that from 1-3pm, she does homework, from 3-4pm she fetches water, from 4-6pm she does household washing and cooking, and from 6-10pm she continues her studies. Another successful male student explained that:

> *People say I am a competent student. I have never been absent from school. I work and study by plan* (2005).

For other students, however, the balance is more taxing. For example, one child noted that his brother who is in the same grade struggles to do well in school because of household responsibilities:

> *My brother also works on farms because my father has died. He goes to school only three days a week. He encourages me to study hard and says 'you should score better than me' as he attends only three days* (student, Wurib, 2005).

Similarly, a female student noted that she was often late or absent because she had to take on her mother's household work if her mother was working outside the home:

> *Frequently I am absent from school because I have to do household tasks such as baby-sitting when my mother goes out to do wage labour or to the market place. For instance, I was absent from school for two days last week* (2005).

Height-for-age

As expected, height-for-age was positively associated with educational attainment tests and statistically significant in the case of test scores for numeracy, reading and writing levels. This is in keeping with the literature that argues that nutritional deficiencies affect the cognitive abilities of children and hinder their school performance. Z-value of height-for-age (a measure of good nourishment) was also found to be a significant and positive determinant for all separate Heckman estimations of determinants of children's test scores for girls, boys, rural and urban areas (see Tables B5-B8).

4.2.3 Household characteristics

Surprisingly, only a few of the household-level variables were found to have a significant effect on children's achievement. These variables are household composition, caregivers' level of social capital, and household wealth.

Household composition

Among the variables related to household composition, only the presence of older siblings contributed to a child's better performance and then only in the case of numeracy skills and test scores for the full sample. The dummy for a male household head negatively affected test scores for boys (see Table B5), while it was found to be insignificant in all other separate estimations. This could be because of greater work pressures on boys to assist their fathers in work activities. Other variables, including the number of family members under five, the number of members between 5 and 15 years of age, and the number of adults, were insignificant in all the regressions. Our qualitative research supported the finding that sibling support is an important factor in children's achievement. Sibling encouragement takes the form of rewarding good performance, providing direct support with homework and serving as positive role models. For example, one child in Wurib noted that: "*my brother helps me to study. He is now working and buys me presents when I score high*". Another child from the same site also said: "*My two brothers help me with my studies. Both are government employees*". Equally importantly, a student from Bilbala emphasised the importance of sibling success being a powerful motivating force: "*Education is good for me. I can be like Kebede* [an elder brother attending secondary school 30 kms away]".

Parental education

The variable for parents' years of schooling was not found to be significant in any of the regressions except for numeracy skills. However, paternal education was found to be a positive and significant determinant of test scores for girls and children living in urban areas (see Tables B6 and B8). This could be because higher education enables fathers to overcome cultural inhibitions against educating girls. Although the relatively weak relationship between parental education and children's scholastic achievement runs counter to the literature, the finding was also supported by the qualitative research which emphasised the importance of parental valuation of education over their own education level as an important determinant of child achievement. For example, one focus group participant in Bilbala stressed that:

> *In our locality, it is the poor that exert tremendous effort to educate their children. Those children who come from rich families are most of the time not encouraged to learn. They may get married or contemplate getting engaged. All these create problems for their education* (2005).

Social capital

Both cognitive social capital, proxied by a sense of trust in, and belonging to, the community, and absolute social capital, assessed in terms of membership of community associations and social support received, were found to be insignificant in explaining test scores. However, the number of organisations giving social support had a positive and significant effect on educational attainment test scores. This could be attributed to the fact that these organisations directly affect the material wellbeing of the family, thereby increasing the probability of a child being sent to school. The qualitative research also

suggested that greater school-community interaction fostered under the ESDP II has contributed to more positive feelings about, and greater commitment to, education. This has, in turn, impacted on children's performance. In all the rural sites, respondents reported that teacher-parent committee members had contacted and talked to parents of children who were under-performing academically.

Household wealth and assets

Household wealth was found to have a positive but insignificant influence in all regressions. This could be due to the presence of a supply-side problem where, unless the minimum educational facilities are provided, an increase in wealth might not enhance the probability of children being sent to school (de Janvry and Sadoulet, 2005). Land assets, on the other hand, were found to have a negative and statistically significant impact on test scores. This could be because families with land may perceive less value in educating their children and instead prefer to pass their land onto their offspring. This argument is supported by the finding in the separate estimations for the determinants of test scores in rural areas as well for girls and boys (see Table B8). For children in urban areas, however, land assets were not associated with differential test scores.

The qualitative research findings suggest that poverty does indeed have an important impact on school performance. A community leader in Kirkos emphasised that, because of economic pressures at home, children are frequently involved in time-consuming and physically intensive work that hinders their ability to do well in school:

> *Boys are involved in shoeshine after school, while girls could be engaged in selling chewing gum, Kollo (fried grains), baked potatoes and boiled eggs after school. They become physically and mentally weak when they go to school and because of this, they do not follow their studies well. They also do not succeed in their exams. Parents do not accept this problem and [do not] understand why they fail and they are beaten for it* (2005).

Similarly, a teacher from the same site emphasised the relationship between poverty and a child's school performance as follows:

> *Due to poverty and a low standard of living in this area, parents are forced to send their children as young as 14 years to work as servants during the day and make them attend school during evening sessions. This goes for boys and girls. During the day, children work at laborious and tedious jobs. This then affects their performance at school. For instance, teenage girls mostly work as house servants and work a full-day shift. They then go to school during the evening when they should be resting. On top of that, many girls are sexually harassed and assaulted on their way back home. The boys are also victims of aggressive delinquent juveniles. Most of them are shoe shiners or those carrying heavy loads during the day. To make matters worse, the boys often quarrel with people who then refuse to pay them* (2005).

4.2.4 Community/school characteristics

Although none of the community-level variables was found to be significant in the regression analysis, the qualitative research suggested that a number of school and policy changes, including the availability and quality of school resources/infrastructure, the shift system and the Grade 8 examination system, have had an important impact on children's performance.

School proximity and resources

As expected, distance to the nearest private or public school was found to have a negative impact on the test scores achieved by students. Although it was not statistically significant in the general regression, it was significant in the case of girls and rural children (see Tables B6 and B7). Both groups of children have relative difficulty in reaching school compared to their counterparts (parents are often reluctant to send girls to distant schools for fear of their vulnerability to attack).

In addition to physical proximity, observation of local schools in the five Young Lives sites where the qualitative research was carried out, and interviews with children, confirmed more general concerns about the dearth of resources in Ethiopian schools, especially as the focus of recent policy implementation has been on educational expansion, rather than on improvement of educational quality. Not only did most schools (with the exception of the Bilbala site school which was identified as a model school in the Amhara region) lack libraries, laboratories and pedagogical centres (with teaching instructional materials), they also suffered from excessively large class sizes, few desks and textbooks, poor sanitary facilities and a lack of drinking water. In the five Young Lives sites, student:teacher ratios per classroom ranged from 45 in Semha/Arato to 122 in Uduga, with many classes having 60-70 pupils. The scarcity of desks and chairs was widespread and many children had to fight for desks (with girls being the main losers) or sit on dusty floors. As one student explained:

> *There are no chairs in the school so we sit on stones. Sitting on stones brings us diseases – we hate them. This situation makes [us] unhappy here in school* (Ibeseta student, 2005).

Similarly, drinking water was often scarce: "*There is no water. There is water only at break time. But it is the older students who drink it; at other times it is locked*" (Wurib student, 2005). Children in Bilbala and Wurib also noted that toilets were often in a poor state: "*The little kids are afraid of the toilets*" and "*Most of the time the latrines are not clean*" (2005).

Textbooks also had to be shared among students. Sometimes, as one student from Wurib noted: "*There aren't enough books…8 or 10 students get just one book*" (2005). There are plans in some sites to rent books to children from 2006, which will inevitably disadvantage children from impoverished households.

Concerns have also been raised with regard to the move away from the system where schools operate two shifts (morning and afternoon) to a full day five-hour programme. While the shift system allowed children from impoverished households to combine both school and work, the new system is likely to lead to a significant increase in dropouts among poor children because child labour remains indispensable to household survival.

A third and equally troubling policy issue highlighted by respondents relates to the Grade 8 regional exams. Recently, regional education departments have introduced a system of standardised examinations at the end of Grade 8. Students who fail to attain an adequate score are unable to continue on to the next grade, and they are not even given a second chance to take the exam. Although efforts to introduce quality control mechanisms are clearly important, the proposed system is sparking widespread alarm and sending negative signals to children to drop out if they are under-performing. As the school director in Bilbala noted:

About 1000 were examined last year and only about 300 to 400 passed the test. The rest became idle after finishing Grade 8. So, this discouraged even the competent students. As a result many students started quitting school earlier. They often said, "it doesn't make a difference whether we finish Grade 8 or not.

Table 4.9: Determinants of test score (Heckman two step estimation)

	(1) (Main equation)	(2) (Selection equation)	Marginal effects (dY/dX)
	coef	coef	
Dummy for male child	0.050**	-0.014	0.04961**
	(2.53)	(0.12)	(2.73)
Dummy for male HH head	-0.049*	0.164	-0.0383*
	(1.69)	(1.13)	(-1.43)
Wealth index consumer durable	0.054	0.262	0.07071
	(0.52)	(0.41)	(0.74)
Maximum years of schooling of a child	0.160***		0.16012***
	(8.64)		(8.64)
Index for what a child does not like about school	0.259***		0.25941***
	(8.60)		(8.6)
Dummy for a child being involved in paid work	-0.044		-0.0439
	(1.33)		(-1.33)
Number of hours a child spent on HH chores	-0.002		-0.0019
	(0.39)		(-0.39)
Area of land owned by the HH	-0.041*	-0.140	-0.0498**
	(1.92)	(1.19)	(-2.63)
Dummy for the ownership of livestock	-0.001	-0.019	-0.0018
	(0.02)	(0.14)	(-0.08)
Dummy for urban residence	0.038	0.189	0.04995
	(1.05)	(0.92)	(1.49)
HH size over the age of 15	0.018**		0.01825**
	(2.43)		(2.43)
HH size under 5 yrs old	0.009		0.00905
	(0.80)		(0.8)
HH size between the ages of 5 and 15	-0.004		-0.0037
	(0.44)		(-0.44)
Mean distance (km) to public and private primary schools	-0.004	0.010	-0.0033
	(0.94)	(0.34)	(-0.84)
Years of schooling of father	0.015	-0.042	0.01242
	(1.48)	(0.70)	(1.31)
Years of schooling of mother	0.004	-0.029	0.00241
	(0.37)	(0.43)	(0.22)
Height-for-age	0.021***		0.02132***
	(2.83)		(2.83)
Dummy for Amhara region		-0.551**	-0.0424*
		(2.18)	(-1.95)

Continued overleaf

Table 4.9 Continued

	(1) (Main equation)	(2) (Selection equation)	Marginal effects (dY/dX)
	coef	coef	
Dummy for Oromia region		-0.381	-0.0278
		(1.58)	(-1.42)
Dummy for SNNP region		0.374*	0.02187*
		(1.67)	(1.81)
Dummy for Tigray region		-0.587***	-0.0457***
		(2.81)	(-2.44)
Absolute structural social capital		-0.051	-0.0033
		(0.96)	(-0.95)
Citizenship social capital		0.009	0.00059
		(0.14)	(0.14)
Number of organisations from which one gets social support		0.084**	0.54507**
		(2.56)	(2.63)
Dummy for debt		-0.103	-0.0068
		(0.92)	(-0.9)
Number of events that decrease the HH welfare		-0.009	-0.0006
		(0.31)	(-0.31)
Birth order		-0.007	-0.0005
		(0.21)	(-0.21)
Constant	0.088*	1.408***	
	(1.79)	(4.94)	
Descriptive statistics: Observations = 969; Wald Chi2(17) = 765.16; Prob>Chi2 = 0.00			

*Absolute value of z statistics in parentheses; * significant at 10%; ** significant at 5%; *** significant at 1%*

5. Conclusion

5.1 School completion

Our analysis produced both expected and surprising findings. That school completion rates were shaped by birth order, household wealth, assets and indebtedness, parental education, gender of the child, quality of school resources and children's work burden were to be expected.

First, as we hypothesised, the results indicated that if a child has older siblings, s/he will be less likely to drop out because there are more family members who can share the household labour burden. The qualitative results further suggested that older siblings also often serve as positive role models by encouraging younger children to continue with their education.

Second, while the gender bias towards males in the labour market identified in our qualitative research findings suggests that boys' labour is often in greater demand by both individual households and communities, our quantitative findings suggest that the effect of differential traditional gender roles is even greater and boys are therefore less likely to drop out. Girls have historically been more likely to be pressured to leave school prematurely due to a tradition of early marriage and the lower value placed on girls' education, combined with parental fears about vulnerability to rape and abduction. However, our qualitative findings strongly suggested an increasing likelihood of girls remaining in school as a result of recent legislative changes, including the 2001 Family Law which bans marriage below the age of 18, community initiatives to stem sexual violence, and concerted efforts by the Ministry of Education, local authorities and communities to increase girls' education since the Second Education Sector Development Plan of 2002.

Third, our results also confirmed the significance of household wealth as an explanatory variable for school completion rates, thereby confirming the "poverty hypothesis". The Education Sector Development Plan's focus on increasing educational access and the post-Derge government's emphasis on pro-poor policies notwithstanding, our results demonstrate that the wealth effect on educational access is still far from resolved. Even with significant improvements in the overall number and geographical distribution of schools, more resources being allocated to teacher and administrative capacity-building, and greater community-school interaction mechanisms, our findings indicate that aggregate household wealth and indebtedness are still important barriers to children's schooling. Moreover, our qualitative findings underscored the fact that the promise of free education in Ethiopia is not yet a reality. Not only are parents compelled to provide their labour and construction materials for school building, but in many areas they also need to make cash contributions in addition to covering expenses for uniforms and books.

However, our findings also revealed some surprising patterns in dropout rates and household composition. Whereas one might hypothesise that labour supply — i.e. the availability of able-bodied family members to contribute to agricultural work — would decrease the likelihood of a child having to drop out of school due to pressures to participate in household labour, our results go even further. While they indicate that children from families with more household members above 15 years of age were more likely to complete school, they also demonstrated that, despite higher education costs, children in large families were more likely to continue their education than children from families with

fewer children (aged five years and older). This suggests that the demands of traditional agricultural life in rural Ethiopia, combined with the relative absence of community childcare provision, mean that larger numbers of children are needed to carry out basic household (productive and reproductive) tasks. Indeed, our qualitative results suggested that only the most organised children were able to cope with the pressures of balancing household labour demands and regular school attendance. Moreover, the regression results also indicate that, given that many Ethiopian children are involved in various work activities from the age of five — a fact backed up by our qualitative research — the dependency burden in the family is primarily increased by the presence of very young children (under five years of age).

In the case of parental education, our findings are consistent with a broader national and international literature indicating that higher levels of parental education facilitate child educational attainment. However, whereas government policy emphasises that education will create more modern farmers and thereby improve agricultural productivity (ESDP II), our qualitative findings found that most parents were promoting their children's education in order to provide them with a means of escaping agricultural work and entering more lucrative non-farm occupations. This mismatch between parental aspirations and educational policy design will need to be reconciled over time to ensure consistency between the goals of the education sector and overall national development.

Our results also confirmed that school availability and school infrastructure quality are very important. Availability of schools was found to be highly significant (in terms of both cost and safety implications), suggesting that although the government has dramatically increased the number of schools (and the trend is continuing), it is still a major constraining factor for school completion.

However, both the quantitative and qualitative research findings underscored the fact that availability is only the first step to improve completion rates; in order to avoid school dropouts, many school quality issues need to be addressed. In keeping with the strong correlation between pupil satisfaction and school dropout in the quantitative research, our qualitative findings found that the following factors all served to undermine family and student confidence in the educational system and led to less importance being attached to school completion:

- excessively large teacher:pupil ratios (as high as 122 in one of our Young Lives sites in Uduga in Oromo);
- a lack of textbooks;
- a lack of segregated toilets for girls and boys;
- violence by students and teachers;
- discrimination by teachers based on children's wealth status and family connections;
- poorly trained and motivated teachers;
- the difficult Grade 8 examinations in some regions; and
- the policy that prevents poorly performing students from continuing to secondary school in some regional states.

Lastly, we found that, controlling for demand factors (household poverty, household composition, parental education), the likelihood of children dropping out of school was reduced after the 1996 introduction of the First Education Sector Development Programme, which aimed to increase educational access and quality. As we argue further below, the aggregate increase in dropouts in recent years is largely due to the stagnation of development in other sectors (particularly given the slow overall decline in the incidence of income poverty) even though the current education policy promotes school completion rates.

5.2 Achievement

The quantitative results indicated the importance of the gender of the child, the gender of the household head, the number of organisations giving social support, the area of land owned, and the child's level of school satisfaction in shaping children's scholastic achievement. The results, however, did not confirm our hypotheses about the relationship between child work, household wealth (except in the case of writing skills), parental education and children's scholastic achievement. Given the relative crudeness of the achievement tests used and the lack of quantitative data on school inputs (infrastructure, resources, teaching capacity, etc.), we believe that our qualitative findings should be given greater weight as they were able to capture a more holistic (albeit admittedly still limited) picture of school performance.

With respect to child characteristics, as predicted by the literature, boys performed better overall in terms of aggregate test scores, but when the test scores were disaggregated by skill area, there was only a significant difference in numeracy test results. This suggests that, in addition to targeted tutoring programmes for girls, concerted efforts have to be made to improve the acquisition of literacy skills for all children.

Contrary to expectations, involvement in child labour activities (both paid work and household chores) was also found to be insignificant. In addition to data constraints, one possible interpretation of this finding is that eight-year-old children are at an age where combining school and labour activities has a less detrimental impact on attainment than in more advanced grades. However, the qualitative findings did underscore the difficulties children face in managing their schoolwork effectively because of pressures to contribute to household labour. This is reflected in the difficulties so many children face when they reach the Grade 8 examinations. Moreover, in both rural and urban sites, the domestic work that is generally viewed as girls' responsibility was recognised as being particularly time-consuming.

Our findings also indicated that children's satisfaction with their school environment had a positive impact on their achievement scores. While the literature suggests that children are more likely to dropout if they are dissatisfied with school and the educational environment, our findings take us further and suggest that children's positive assessment of school quality will be reflected in their learning achievements.

Turning to social capital, we found in the quantitative estimation that neither cognitive nor absolute social capital had a significant impact on educational attainment test scores. But the presence of organisations giving social support positively affected scholastic attainment. Our qualitative findings further suggested that growing community mobilisation efforts around children's education may

provide additional support and motivation to their children, which is reflected in superior scholastic achievement.

While we had expected that parental education levels would have a positive spill-over effect on children's educational achievements, this was not the case. Instead, our qualitative research findings found that parental *commitment* (as well as that of siblings and neighbours) to children's education was a more decisive factor. Such commitment was manifested in efforts to provide material support, help with homework, and lessen children's household work burdens.

Similarly unexpected were the findings on household wealth. Although household wealth is highly correlated with school completion rates, it did not have a significant impact on children's writing skills or on their numeracy or reading abilities. Land ownership, on the other hand, had a negative and statistically significant impact on test scores. In the qualitative research, child respondents emphasised that children from wealthier households have more time to study and are also favoured by teachers, suggesting that poverty still functions as a multi-dimensional barrier to children's achievement.

Lastly, stunting was found to be a significant variable positively affecting all indicators of scholastic attainment and indicating that health factors are important in determining educational performance.

6. Policy implications for the Second Round of the SDPRP

1. Measures to combat the poverty effect

While the policy focus of the 1996-initiated ESDP and the SDPRP (2002-5) on increasing educational access for all has been broadly successful, children from poor and/or highly indebted families still face significant constraints because they have to contribute to household survival through paid and unpaid work. This suggests that, although the education sector budget was substantially increased, it has still been inadequate in terms of overcoming the "poverty effect" on schooling. An increased emphasis on policies to improve the livelihood options of the poor — including greater income-generation opportunities, particularly in rural areas and for women — is thus imperative, especially because poverty levels in Ethiopia have not shown a significant reduction over the last six years.

However, such strategies need to be child-sensitive. The question which needs to be asked is: do they exempt or propel children into labour activities? For instance, income-generating opportunities for women should simultaneously be accompanied by ***community childcare systems*** to prevent older children from shouldering their mother's childcare burdens. If ***credit programmes*** are encouraging the purchase of livestock, ***community cattle-keeping mechanisms*** need to be encouraged to reduce pressures on children to drop out of school to look after additional household livestock. Other policy solutions could include the introduction of ***targeted conditional cash transfer programmes*** that enable poor households to send their children to school by offsetting the costs involved.

Similarly, more attention needs to be paid to whether the EDSP sufficiently addresses the needs of poor children and families. Proposals to replace the shift system with a full-day school programme need to take account of the demands of seasonal agriculture. Moreover, given that distance to school remains a significant cause of dropout rates, there is still much scope for ***expanding the availability of schools*** (whether regular, low-cost or non-formal alternatives) to poor and isolated communities.

2. Gender equality

In keeping with the MDG goal of providing girls with equal access to primary school, the SDPRP recognises girls' disproportionately low enrolment rates as a problem in its poverty analysis. Moreover, as the 2004 Joint Donor Review of the ESDP II emphasised, a number of innovative programmes to address gender equality have been initiated across the country and have enjoyed relative success in narrowing the gender gap. Our Young Lives results found that boys are already performing better at eight years of age, suggesting that the current concern about girls' education is well-placed and that existing programmes need to be evaluated, and then expanded or intensified. Moreover, it should be noted that the SDPRP only explicitly mentions measures to address girls' low enrolment rates at the secondary rather than the primary school level, and does not include any specific gender equity targets in its poverty reduction target indicators. In order to ensure progress towards gender equality, it will be important for the second round of the ***SDPRP to incorporate gender-specific target indicators*** at all school levels.

It will also be important to ***ensure girls' safety*** especially if they have to attend additional classes or are involved in textbook sharing arrangements before or after school. In addition, given the widely reported positive impact of the Family Law ban on early marriage and initiatives to tighten the implementation of the anti-sexual violence regulations, these efforts should be continued and related laws rendered consistent.

3. Educational quality

In light of the rapid expansion of school access since ESDP I, it is not surprising that indicators of educational quality have struggled to keep pace. Given that both our qualitative and quantitative research found that school quality had an important impact on educational achievement, and on parents' and children's commitment to education, ***addressing shortcomings in school quality*** remains urgent. Particular concerns include: the quality of school facilities; teacher capacity; and safety issues (vulnerability to violence from teachers, students and strangers). Given that complaints about teacher beatings were identified as the leading complaint about school by children and were significantly associated with poorer school performance, this suggests that ***measures to address child abuse in schools*** need to be urgently implemented. In addition to establishing centres where children can report teacher (and other) violence, measures are needed to ***reduce teacher stress*** and ***improve teacher training curricula*** so that teachers are equipped with the skills they need to cope with often over-crowded classrooms.

4. Community mobilisation

Community mobilisation and attitudinal changes have played an important role in improving familial commitment to child education. A number of parent respondents emphasised that the new policy directives had made them realise the importance of educating their children for the sake of the household and the children themselves. These attitudinal changes translated into support from parents, siblings and neighbours for children's scholastic achievement. Our findings on social capital, however, suggest that assumptions about community empowerment have to be carefully contextualised within the realities of the composition and roles of community groups and networks. For example, while some groups may have a pro-development orientation (such as government-affiliated women's and youth associations that were found to have a positive influence on especially girls' education), other groups may be more tradition-bound and resistant to change (including some traditional religious groups).

Community involvement is often very burdensome in that it involves high financial, labour and time inputs. Thus, government and donors need to be cautious about romanticising the concept of "community empowerment and participation", especially when it is often used as a euphemism for monetary contributions, as it could lead to civic resentment towards education and increase dropout rates over time. While communities may be able to subsidise the cost of new school infrastructure by contributing their labour and local materials, funds needed for purchasing adequate quantities of books and other educational materials should be provided by government and donors. Moreover, if parents are to remain committed to their children's education, it is important that they are given a more substantive role in determining school policy issues.

5. Children's participation

Children's positive evaluations of school and the school environment were positively correlated with the acquisition of basic skills. This suggests that the government's current efforts to bring about a ***student-centred education system,*** involving active input from students, their families and communities, represents a positive development and should be extended.

6. Nutritional factors

Given the link between nutritional factors and children's cognitive abilities, there is clearly a need for policy-makers to ensure that efforts to improve educational performance are co-ordinated cross-sectorally and pay particularly attention to ***nutrition promotion programmes***.

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Appendices

Appendix A: Dropout/completion rate

Table A1: Summary statistics of variables included in Cox regression

Variables	No. of observations	Mean	Standard deviation	Minimum	Maximum
Age	3078	15.7755	6.83236	5	30
Age squared	3078	295.5325	244.3307	25	900
Wealth index	3074	0.183112	0.160973	0.005051	0.766234
Dummy for urban residence	3074	0.412817	0.492421	0	1
Mother's years of schooling	3074	0.562134	1.024692	0	5
Father's years of schooling	3074	0.814574	1.260466	0	5
Cognitive social capital	3074	1.897202	0.329441	0	2
Absolute structural social capital	3074	1.649967	1.235046	0	7
Number of organisations from which one gets social support	3074	2.373455	2.620185	0	12
Citizenship	3074	0.529928	0.499185	0	1
Dummy for debt	3078	0.361274	0.480448	0	1
Dummy for Amhara region	3074	0.159401	0.36611	0	1
Dummy for Oromia region	3074	0.200716	0.400601	0	1
Dummy for SNNP region	3074	0.292128	0.454815	0	1
Dummy for Tigray region	3074	0.190306	0.392606	0	1
Dummy for child work	3074	0.08946	0.285453	0	1
Dummy for bad events	3074	0.778139	0.415566	0	1
Dummy for male household head	3074	0.817176	0.386585	0	1
Dummy for land ownership	3074	0.590111	0.491893	0	1
Dummy for livestock ownership	3074	0.729994	0.444035	0	1
Distance to public or private school in km	3074	2.329234	2.794606	0.5	9.166667
Birth order	3078	3.877843	2.011671	1	12
Male HH members over 15 years old	3074	1.708198	1.122682	0	5
Female HH members over 15 years old	3074	1.72121	0.959661	0	6
Male HH members between 1 and 5 years old	3074	0.486988	0.659847	0	3
Male HH members between 5 and15 years old	3074	0.990241	0.918357	0	4
Female HH members between 1 and 5 years old	3074	0.440468	0.615878	0	3
Female HH members between 5 and 15 years old	3074	1.1311	0.968788	0	6
Dummy for male child	3074	0.510085	0.49998	0	1

Table A2: Determinants of dropout by sex of the child (censored Cox regression by sex)

	(1)	(2)	(3)	(4)
	Hazard ratio for boys	Coefficient for boys	Hazard ratio for girls	Coefficient for girls
Dummy for Amhara region	0.368***	-1.001***	0.766	-0.267
	(4.33)	(4.33)	(1.51)	(1.51)
Dummy for Oromia region	0.894	-0.112	1.075	0.072
	(0.65)	(0.65)	(0.51)	(0.51)
Dummy for SNNP region	0.919	-0.085	1.097	0.092
	(0.57)	(0.57)	(0.71)	(0.71)
Dummy for Tigray region	0.646**	-0.438**	0.718**	-0.332**
	(2.18)	(2.18)	(2.03)	(2.03)
Dummy for urban residence	0.797	-0.227	0.861	-0.149
	(0.99)	(0.99)	(0.89)	(0.89)
Wealth index	0.361**	-1.020**	0.495*	-0.702*
	(2.19)	(2.19)	(1.65)	(1.65)
Age of child	0.988**	-0.013**	1.034***	0.034***
	(2.26)	(2.26)	(7.96)	(7.96)
HH size under 5 years old	1.163***	0.151***	1.227***	0.204***
	(3.09)	(3.09)	(5.17)	(5.17)
HH size between the ages of 5 and 15 years	0.852***	-0.160***	0.917***	-0.087***
	(4.30)	(4.30)	(3.10)	(3.10)
HH size over the age of 15 years	0.962	-0.039	0.880***	-0.127***
	(1.22)	(1.22)	(4.23)	(4.23)
Grades completed by the father	0.974**	-0.027**	0.972***	-0.029***
	(2.06)	(2.06)	(2.65)	(2.65)
Grades completed by the mother	0.991	-0.009	0.951***	-0.051***
	(0.57)	(0.57)	(3.90)	(3.90)
Dummy for male HH head	1.012	0.012	1.055	0.054
	(0.09)	(0.09)	(0.53)	(0.53)
Number of events that decrease HH welfare	0.950**	-0.051**	0.995	-0.005
	(2.43)	(2.43)	(0.28)	(0.28)
Cognitive social capital	0.976	-0.025	1.022	0.021
	(0.47)	(0.47)	(0.53)	(0.53)
Absolute structural social capital	1.002	0.002	0.996	-0.004
	(0.06)	(0.06)	(0.12)	(0.12)
Number of organisations from which one gets social support	1.019	0.018	0.997	-0.003
	(0.91)	(0.91)	(0.16)	(0.16)
Citizenship	0.952	-0.049	0.958	-0.043
	(1.01)	(1.01)	(1.06)	(1.06)
Dummy for debt	1.319***	0.277***	1.049	0.048
	(3.35)	(3.35)	(0.70)	(0.70)
Dummy for HH owns or rents land	1.240	0.215	1.113	0.107
	(1.16)	(1.16)	(0.84)	(0.84)
Dummy for livestock ownership	0.998	-0.002	1.093	0.089
	(0.01)	(0.01)	(1.05)	(1.05)
Mean distance (km) to public and private primary schools	1.056**	0.054**	1.025	0.024
	(2.16)	(2.16)	(1.32)	(1.32)
Policy dummy: 1 if child was in school before 1997	0.246***	-1.401***	0.275***	-1.291***
	(15.95)	(15.95)	(17.62)	(17.62)
	Observations = 1397 Wald Chi2(23) = 550.59 Prob> Chi2 = 0.00		Observations = 1397 Wald Chi2(23) = 1071.00 Prob >Chi2 = 0.00	

*Robust z statistics in parentheses; * significant at 10%; ** significant at 5%; *** significant at 1%*

Table A3: Determinants of dropout (censored Cox regression) by rural/urban location

	(1)	(2)	(3)	(4)
	Hazard ratio for rural	Coefficient for rural	Hazard ratio for urban	Coefficient for urban
Dummy for Amhara region	0.611***	-0.492***	0.794	-0.230
	(3.06)	(3.06)	(1.01)	(1.01)
Dummy for Oromia region	1.003	0.003	1.158	0.147
	(0.03)	(0.03)	(0.97)	(0.97)
Dummy for Tigray region	0.677***	-0.391***		
	(3.03)	(3.03)		
Wealth index	0.405*	-0.905*	0.386***	-0.952***
	(1.79)	(1.79)	(2.64)	(2.64)
Male dummy (1 if male; 0 if female)	0.885**	-0.122**	0.803**	-0.220**
	(2.19)	(2.19)	(2.47)	(2.47)
Age of child	1.006**	0.006**	1.064***	0.062***
	(2.05)	(2.05)	(5.91)	(5.91)
HH size under 5 years old	1.094***	0.090***	1.394***	0.332***
	(2.77)	(2.77)	(5.97)	(5.97)
HH size between the ages of 5 and 15 years	0.933***	-0.069***	0.898***	-0.108***
	(2.74)	(2.74)	(2.73)	(2.73)
HH size over the age of 15 years	0.866***	-0.144***	0.971	-0.030
	(5.56)	(5.56)	(1.06)	(1.06)
Grades completed by the father	0.984	-0.016	0.950***	-0.051***
	(1.36)	(1.36)	(4.02)	(4.02)
Grades completed by the mother	0.961**	-0.040**	0.981	-0.020
	(2.40)	(2.40)	(1.49)	(1.49)
Dummy for male HH head	0.946	-0.056	1.201	0.183
	(0.60)	(0.60)	(1.50)	(1.50)
Number of events that decrease HH welfare	0.977	-0.023	0.996	-0.004
	(1.57)	(1.57)	(0.14)	(0.14)
Cognitive social capital	1.007	0.007	1.024	0.024
	(0.17)	(0.17)	(0.54)	(0.54)
Absolute structural social capital	1.076***	0.073***	0.862***	-0.149***
	(3.03)	(3.03)	(3.16)	(3.16)
Number of organisations from which one gets social support	0.983	-0.017	1.053*	0.052*
	(1.16)	(1.16)	(1.71)	(1.71)
Citizenship	0.988	-0.012	0.854***	-0.158***
	(0.35)	(0.35)	(2.67)	(2.67)
Dummy for debt	1.186***	0.170***	1.242**	0.217**
	(3.04)	(3.04)	(1.98)	(1.98)
Dummy for HH owns or rents land	1.264*	0.234*	1.097	0.092
	(1.93)	(1.93)	(0.43)	(0.43)
Dummy for livestock ownership	1.089	0.085	0.999	-0.001
	(0.89)	(0.89)	(0.02)	(0.02)
Mean distance (km) to public and private primary schools	1.031*	0.030*	0.820***	-0.199***
	(1.71)	(1.71)	(3.42)	(3.42)
Policy dummy: 1 if child was in school before 1997	0.125***	-2.078***	0.891	-0.115
	(28.13)	(28.13)	(0.89)	(0.89)
Dummy for SNNP region			0.986	-0.014
			(0.14)	(0.14)
	Observations = 1805 Wald Chi2 = 1414.65 Prob>Chi2 = 0.00		Observations = 1269 Wald Chi2 = 242.91 Prob>Chi2 = 0.00	

*Robust z statistics in parentheses; * significant at 10%; ** significant at 5%; *** significant at 1%*

Table A4: Determinants of dropout (censored Cox regression) by male- and female-headed households

	(1)	(2)	(3)	(4)
	Hazard ratio for male HHH	Coefficient for male HHH	Hazard ratio for female HHH	Coefficient for female HHH
Dummy for Amhara region	0.516***	-0.661***	0.675	-0.393
	(3.91)	(3.91)	(1.43)	(1.43)
Dummy for Oromia region	0.937	-0.065	0.915	-0.089
	(0.50)	(0.50)	(0.37)	(0.37)
Dummy for SNNP region	1.016	0.016	1.010	0.010
	(0.14)	(0.14)	(0.05)	(0.05)
Dummy for Tigray region	0.595***	-0.518***	0.756	-0.280
	(3.44)	(3.44)	(1.11)	(1.11)
Dummy for urban residence	0.814	-0.206	0.781	-0.247
	(1.22)	(1.22)	(1.12)	(1.12)
Wealth index	0.774	-0.257	0.110***	-2.210***
	(0.73)	(0.73)	(3.22)	(3.22)
Male dummy (1 if male; 0 if female)	0.861***	-0.150***	0.828	-0.189
	(2.72)	(2.72)	(1.46)	(1.46)
Age of child	1.014***	0.014***	1.037***	0.037***
	(4.32)	(4.32)	(3.96)	(3.96)
HH size under 5 years old	1.190***	0.174***	1.257**	0.229**
	(5.15)	(5.15)	(2.56)	(2.56)
HH size between the ages of 5 and 15 years	0.892***	-0.115***	0.921	-0.082
	(4.69)	(4.69)	(1.41)	(1.41)
HH size over the age of 15 years	0.884***	-0.123***	0.969	-0.032
	(5.09)	(5.09)	(0.70)	(0.70)
Grades completed by the father	0.963***	-0.038***		
	(3.95)	(3.95)		
Grades completed by the mother	0.971**	-0.030**	0.965*	-0.035*
	(2.52)	(2.52)	(1.66)	(1.66)
Number of events that decrease HH welfare	0.996	-0.004	0.916**	-0.087**
	(0.24)	(0.24)	(2.46)	(2.46)
Cognitive social capital	0.984	-0.016	1.074	0.071
	(0.42)	(0.42)	(0.96)	(0.96)
Absolute structural social capital	1.015	0.015	0.946	-0.055
	(0.58)	(0.58)	(0.91)	(0.91)
Number of organisations from which one gets social support	1.010	0.009	1.004	0.004
	(0.67)	(0.67)	(0.11)	(0.11)
Citizenship	0.942*	-0.060*	0.941	-0.061
	(1.67)	(1.67)	(0.80)	(0.80)
Dummy for debt	1.135**	0.127**	1.325**	0.281**
	(2.18)	(2.18)	(2.09)	(2.09)
Dummy for HH owns or rents land	1.140	0.131	1.363*	0.310*
	(0.99)	(0.99)	(1.73)	(1.73)
Dummy for livestock ownership	1.051	0.050	1.221	0.200
	(0.58)	(0.58)	(1.61)	(1.61)
Mean distance (km) to public and private primary schools	1.054***	0.052***	1.006	0.006
	(3.09)	(3.09)	(0.15)	(0.15)
Policy dummy: 1 if child was in school before 1997	0.230***	-1.469***	0.436***	-0.831***
	(24.04)	(24.04)	(5.82)	(5.82)
	Observations = 2512 Wald Chi2(23) = 1269.37 Prob>Chi2 = 0.00		Observations = 562 Wald Chi2(23) = 266.97 Prob>Chi2 = 0.00	

*Robust z statistics in parentheses; * significant at 10%; ** significant at 5%; *** significant at 1%*

Table A5: Determinants of dropout (censored Cox regression) to see the effect of birth order

	(1)	(2)
	Hazard ratio	Coefficient
Dummy for Amhara region	0.600***	-0.511***
	(3.65)	(3.65)
Dummy for Oromia region	1.016	0.015
	(0.14)	(0.14)
Dummy for SNNP region	1.041	0.040
	(0.40)	(0.40)
Dummy for Tigray region	0.708***	-0.345***
	(2.72)	(2.72)
Dummy for urban residence	0.897	-0.109
	(0.79)	(0.79)
Wealth index	0.407***	-0.900***
	(2.81)	(2.81)
Male dummy (1 if male; 0 if female)	0.860***	-0.150***
	(2.93)	(2.93)
Age of child	1.028***	0.027***
	(6.27)	(6.27)
Birth order	0.914***	-0.090***
	(3.11)	(3.11)
HH size under 5 years old	1.230***	0.207***
	(6.66)	(6.66)
HH size between the ages of 5 and 15 years	0.950*	-0.051*
	(1.81)	(1.81)
HH size over the age of 15 years	0.937***	-0.066***
	(2.85)	(2.85)
Grades completed by the father	0.972***	-0.029***
	(3.27)	(3.27)
Grades completed by the mother	0.971***	-0.030***
	(2.98)	(2.98)
Dummy for male HH head	1.033	0.032
	(0.40)	(0.40)
Number of events that decrease HH welfare	0.975*	-0.026*
	(1.89)	(1.89)
Cognitive social capital	1.017	0.017
	(0.52)	(0.52)
Absolute structural social capital	1.001	0.001
	(0.05)	(0.05)
Number of organisations from which one gets social support	1.008	0.008
	(0.62)	(0.62)
Citizenship	0.951	-0.050
	(1.56)	(1.56)
Dummy for debt	1.173***	0.159***
	(2.98)	(2.98)
Dummy for HH owns or rents land	1.159	0.148
	(1.37)	(1.37)
Dummy for livestock ownership	1.064	0.062
	(0.90)	(0.90)
Mean distance (km) to public and private primary schools	1.043***	0.042***
	(2.78)	(2.78)
Policy dummy: 1 if child was in school before 1997	0.257***	-1.359***
	(24.57)	(24.57)
Observations = 3074	Wald Chi2(25) = 1382.47	Prob>Chi2 = 0.00

*Robust z statistics in parentheses; * significant at 10%; ** significant at 5%; *** significant at 1%*

Table A6: Dropout from primary school by region and sex in 2004

Region	Male	Female	Total
Tigray	10	10	10
Afar	6	9	7
Amhara	12	10	11
Oromia	12	12	12
Somali	8	7	7
Benshangul Gumuz	11	11	11
SNNP	16	12	15
Harari	9	6	8
Addis Ababa	3	4	4
Dire Dawa	5	6	5
Total	12	11	12

Source: CSA (2005), 2004 Welfare Monitoring Survey

Appendix B: Child educational achievement

Table B1: Descriptive statistics of variables included in the regression of test scores

Variable	No. of observations	Mean	Standard deviation	Minimum	Maximum
Test score	909	0.335	0.376	0	1
Reading level	989	0.934	1.198	0	3
Writing level	986	0.662	0.829	0	2
Numeracy level	747	0.434	0.496	0	1
Dummy for male	1000	0.51	0.500	0	1
Sex of head of household	1000	0.76	0.427	0	1
Wealth	1000	0.175	0.156	0.005	0.766
Dummy for health problems affecting schooling or work	1000	0.046	0.209	0	1
Highest school level achieved	1000	0.476	0.773	0	4
Index for main things a child dislikes about school	1000	0.677	0.468	0	1
Number of hours a child spends on household chores	1000	1.545	1.996	0	12
Cognitive social capital	1000	3.494	0.794	0	4
Absolute structural social capital	1000	1.598	1.209	0	7
Dummy for citizenship	1000	0.524	0.499	0	1
Social support	1000	2.422	2.638	0	12
Dummy for land ownership	1000	0.593	0.491	0	1
Dummy for livestock ownership	1000	0.709	0.454	0	1
Dummy for bad events	1000	0.778	0.416	0	1
Dummy for Amhara region	1000	0.2	0.400	0	1
Dummy for Oromia region	1000	0.2	0.400	0	1
Dummy for SNNP region	1000	0.249	0.433	0	1
Dummy for Tigray region	1000	0.201	0.401	0	1
Dummy for urban region	1000	0.4	0.490	0	1
Birth order	1000	3.133	1.755	1	12
HH members aged over 15 years	1000	2.85	1.399	0	11
School distance in km	1000	2.524	2.869	0.5	9.167
Father's years of schooling	1000	0.755	1.252	0	5
Mother's years of schooling	1000	0.594	1.069	0	5
HH members aged between 1 and 5 years	1000	0.938	0.877	0	4
HH members aged between 5 and 15 years	1000	1.642	1.195	0	7
Height-for-age, stunting	964	-1.415653	1.332917	-5.377358	3.527273

Table B2: Determinants of child's reading skill level (ordered probit estimation)

	Coef
Dummy for male child	0.084
	(0.97)
Dummy for male HH head	-0.111
	(0.86)
Wealth index consumer durable	0.429
	(1.01)
Maximum years of schooling of a child	0.621***
	(8.01)
Index for what a child does not like about school	1.173***
	(7.78)
Dummy for a child being involved in paid work	-0.316*
	(1.77)
Number of hours a child spent on HH chores	-0.012
	(0.42)
Area of land owned by the HH	0.079
	(0.82)
Dummy for the ownership of livestock	-0.031
	(0.30)
Dummy for urban residence	0.360**
	(2.37)
HH size over the age of 15	0.051
	(1.45)
HH size under 5 yrs old	-0.039
	(0.72)
HH size between the ages of 5 and 15	-0.050
	(1.33)
Mean distance (km) to public and private primary schools	0.016
	(0.61)
Years of schooling of father	0.059
	(1.38)
Years of schooling of mother	0.034
	(0.71)
Height-for-age, stunting	0.080**
	(2.20)
Nonselection hazard	-3.372***
	(4.91)
Observations = 953 LR Chi2(18) = 608.32 Prob>Chi2 = 0.00 Pseudo R2 = 0.2805	

Absolute value of z statistics in parentheses
** significant at 10%; ** significant at 5%; *** significant at 1%*

Table B3: Determinants of child's writing skill level (ordered probit estimation)

	Coef
Dummy for male child	0.258***
	(2.99)
Dummy for male HH head	0.053
	(0.41)
Wealth index consumer durable	0.492
	(1.18)
Maximum years of schooling of a child	0.220***
	(3.03)
Index for what a child does not like about school	1.227***
	(8.37)
Dummy for a child being involved in paid work	-0.173
	(0.99)
Number of hours a child spent on HH chores	-0.010
	(0.38)
Area of land owned by the HH	-0.139
	(1.31)
Dummy for the ownership of livestock	-0.019
	(0.20)
Dummy for urban residence	0.347**
	(2.27)
HH size over the age of 15	-0.003
	(0.08)
HH size under 5 yrs old	-0.024
	(0.44)
HH size between the ages of 5 and 15	0.046
	(1.21)
Mean distance (km) to public and private primary schools	-0.002
	(0.07)
Years of schooling of father	-0.013
	(0.31)
Years of schooling of mother	0.011
	(0.25)
Height-for-age, stunting	0.156***
	(4.28)
Nonselection hazard	-1.318*
	(1.96)
Observations = 950 LR Chi2(18) = 409.1 Prob>Chi2 = 0.00 Pseudo R2 = 0.21	

Absolute value of z statistics in parentheses

** significant at 10%; ** sig*nificant at 5%; *** significant at 1%

Table B4: Determinants of child's numeracy skill level (probit estimation)

	Coef
Dummy for male child	0.381***
	(3.67)
Dummy for male HH head	-0.447***
	(2.87)
Wealth index consumer durable	-0.217
	(0.44)
Maximum years of schooling of a child	0.408***
	(4.40)
Index for what a child does not like about school	0.800***
	(4.50)
Dummy for a child being involved in paid work	-0.218
	(1.07)
Number of hours a child spent on HH chores	-0.029
	(0.91)
Area of land owned by the HH	-0.119
	(0.94)
Dummy for the ownership of livestock	0.040
	(0.33)
Dummy for urban residence	-0.077
	(0.42)
HH size over the age of 15	0.113***
	(2.72)
HH size under 5 yrs old	0.099
	(1.51)
HH size between the ages of 5 and 15	0.034
	(0.72)
Mean distance (km) to public and private primary schools	0.042
	(1.35)
Years of schooling of father	0.098**
	(1.97)
Years of schooling of mother	0.056
	(1.01)
Height-for-age, stunting	0.104**
	(2.41)
Nonselection hazard	-2.051**
	(2.47)
Constant	-1.102***
	(3.55)
Observations = 725 LR Chi2 (18) = 164.25 Prob>Chi2 = 0.00	

Absolute value of z statistics in parentheses
** significant at 10%; ** significant at 5%; *** significant at 1%*

Table B5: Determinants of test scores for boys

	(1) (Main equation)	(2) (Selection equation)
	Coef	Coef
Dummy for male HH head	-0.106**	0.280
	(2.46)	(1.30)
Wealth index consumer durable	0.237	-0.055
	(1.64)	(0.07)
Maximum years of schooling of a child	0.136***	
	(5.44)	
Index for what a child does not like about school	0.277***	
	(6.89)	
Dummy for a child being involved in paid work	-0.036	
	(0.80)	
Number of hours a child spent on HH chores	-0.001	
	(0.10)	
Area of land owned by the HH	-0.001	-0.084
	(0.02)	(0.44)
Dummy for the ownership of livestock	0.012	-0.022
	(0.36)	(0.12)
Dummy for urban residence	0.008	0.094
	(0.15)	(0.33)
HH size over the age of 15	0.016	
	(1.46)	
HH size under 5 yrs old	0.018	
	(1.11)	
HH size between the ages of 5 and 15	-0.003	
	(0.27)	
Mean distance (km) to public and private primary schools	-0.004	-0.015
	(0.60)	(0.35)
Years of schooling of father	0.017	-0.073
	(1.20)	(0.92)
Years of schooling of mother	0.002	0.033
	(0.15)	(0.35)
Height-for-age, stunting	0.024**	
	(2.34)	
Dummy for Amhara region		-0.308
		(0.91)
Dummy for Oromia region		-0.383
		(1.19)
Dummy for SNNP region		0.291
		(1.04)
Dummy for Tigray region		-0.339
		(1.16)
Absolute structural social capital		-0.016
		(0.22)
Citizenship social capital		0.103
		(1.09)
Number of organisations from which one gets social support		0.046
		(1.03)
Dummy for debt		-0.294*
		(1.86)
Number of events that decrease the HH welfare		0.017
		(0.40)
Birth order		-0.011
		(0.23)
Mills Lambda	-0.267	
Constant	0.143**	1.309***
	(2.07)	(3.42)
Observations = 496	Wald Chi2 (16) = 398.45	Prob>Chi2 = 0.00

Absolute value of z statistics in parentheses

** significant at 10%; ** significant at 5%; *** significant at 1%*

Table B6: Determinants of test scores for girls

	(1) (Main equation)	(2) (Selection equation)
	Coef	Coef
Dummy for male HH head	0.000	-0.027
	(0.00)	(0.12)
Wealth index consumer durable	-0.202	0.163
	(1.38)	(0.15)
Maximum years of schooling of a child	0.188***	
	(6.73)	
Index for what a child does not like about school	0.198***	
	(5.11)	
Dummy for a child being involved in paid work	-0.029	
	(0.55)	
Number of hours a child spent on HH chores	-0.004	
	(0.52)	
Area of land owned by the HH	-0.112***	-0.151
	(3.63)	(0.84)
Dummy for the ownership of livestock	-0.024	-0.071
	(0.73)	(0.31)
Dummy for urban residence	0.079	0.288
	(1.60)	(0.88)
HH size over the age of 15	0.025**	
	(2.44)	
HH size under 5 yrs old	-0.002	
	(0.11)	
HH size between the ages of 5 and 15	-0.000	
	(0.04)	
Mean distance (km) to public and private primary schools	-0.012**	0.056
	(2.06)	(1.16)
Years of schooling of father	0.026*	0.049
	(1.75)	(0.46)
Years of schooling of mother	0.004	-0.070
	(0.23)	(0.65)
Height-for-age, stunting	0.024**	
	(2.07)	
Dummy for Amhara region		-0.638
		(1.48)
Dummy for Oromia region		0.001
		(0.00)
Dummy for SNNP region		0.382
		(0.95)
Dummy for Tigray region		-0.705*
		(1.89)
Absolute structural social capital		0.113
		(1.18)
Not recoded citizenship social capital		-0.149
		(1.29)
Number of organisations from which one gets social support		0.091
		(1.58)
Dummy for debt		0.272
		(1.34)
Number of events that decrease the HH welfare		-0.094*
		(1.87)
Birth order		0.026
		(0.48)
Mills Lambda	0.209	
Constant	0.064	1.244**
	(0.93)	(2.46)
Observations = 473	Wald Chi2 (24) = 401.57	Prob>Chi2 = 0.00

Absolute value of z statistics in parentheses
** significant at 10%; ** significant at 5%; *** significant at 1%*

Table B7: Determinants of test scores for rural

	(1) (Main equation)	(2) (Selection equation)
	Coef	Coef
Dummy for male child	0.055**	0.025
	(2.36)	(0.17)
Dummy for male HH head	-0.024	0.189
	(0.63)	(0.93)
Wealth index consumer durable	0.063	1.058
	(0.37)	(0.87)
Maximum years of schooling of a child	0.184***	
	(6.84)	
Index for what a child does not like about school	0.208***	
	(5.80)	
Dummy for a child being involved in paid work	-0.048	
	(1.47)	
Number of hours a child spent on HH chores	0.003	
	(0.60)	
Area of land owned by the HH	-0.038*	-0.075
	(1.79)	(0.55)
Dummy for the ownership of livestock	0.022	-0.078
	(0.63)	(0.36)
HH size over the age of 15	0.018*	
	(1.74)	
HH size under 5 yrs old	-0.010	
	(0.75)	
HH size between the ages of 5 and 15	-0.009	
	(0.83)	
Mean distance (km) to public and private primary schools	-0.009**	0.021
	(2.26)	(0.61)
Years of schooling of father	0.018	-0.311***
	(1.18)	(3.32)
Years of schooling of mother	-0.014	0.040
	(0.68)	(0.34)
Height-for-age, stunting	0.023***	
	(2.61)	
Dummy for Amhara region		-1.176***
		(3.68)
Dummy for Oromia region		-1.111***
		(4.13)
Dummy for Tigray region		-1.534***
		(4.76)
Absolute structural social capital		0.012
		(0.16)
Not recoded citizenship social capital		0.135
		(1.51)
Number of organisations from which one gets social support		0.108**
		(2.51)
Dummy for debt		0.017
		(0.12)
Number of events that decrease the HH welfare		-0.021
		(0.55)
Birth order		0.022
		(0.49)
Mills Lambda	-0.2	
Constant	0.094*	1.805***
	(1.66)	(5.17)
Observations = 576	Wald Chi2(16) = 367.67	Prob>Chi2 = 0.00

Absolute value of z statistics in parentheses
*significant at 10%; ** significant at 5%; *** significant at 1%*

Table B8: Determinants of test scores for urban

	(1) (Main equation)	(2) (Selection equation)
	Coef	Coef
Dummy for male child	0.014	-0.197
	(0.45)	(0.89)
Dummy for male HH head	-0.065	0.068
	(1.49)	(0.26)
Wealth index consumer durable	0.014	-0.702
	(0.11)	(0.77)
Maximum years of schooling of a child	0.157***	
	(6.08)	
Index for what a child does not like about school	0.279***	
	(4.87)	
Dummy for a child being involved in paid work	0.019	
	(0.17)	
Number of hours a child spent on HH chores	-0.033***	
	(2.60)	
Area of land owned by the HH	-0.068	-0.267
	(1.33)	(0.42)
Dummy for the ownership of livestock	-0.005	0.065
	(0.15)	(0.23)
HH size over the age of 15	0.018	
	(1.60)	
HH size under 5 yrs old	0.033	
	(1.50)	
HH size between the ages of 5 and 15	-0.003	
	(0.24)	
Mean distance (km) to public and private primary schools	0.011	-0.056
	(0.72)	(0.63)
Years of schooling of father	0.029*	0.261**
	(1.93)	(1.97)
Years of schooling of mother	0.005	-0.006
	(0.32)	(0.07)
Height-for-age, stunting	0.025*	
	(1.83)	
Dummy for Amhara region		-0.379
		(0.68)
Dummy for Oromia region		6.097
		(0.00)
Dummy for SNNP region		0.316
		(0.93)
Absolute structural social capital		-0.033
		(0.26)
Not recoded citizenship social capital		-0.319**
		(1.99)
Number of organisations from which one gets social support		0.066
		(0.66)
Dummy for debt		-0.169
		(0.66)
Number of events that decrease the HH welfare		-0.021
		(0.30)
Birth order		-0.045
		(0.72)
Mills Lambda	0.123	
Constant	0.085	2.012***
	(1.13)	(4.31)
Observations = 393	Wald Chi2 (16) = 185.26	Prob>Chi2 = 0.00

Absolute value of z statistics in parentheses
** significant at 10%; ** significant at 5%; *** significant at 1%*

Appendix C: Young Lives' definition of social capital

Four types of social capital were measured, namely, absolute structural social capital, social support, cognitive social capital and citizenship. Each of these is described below.

Absolute structural social capital (ASSC) is based on the number of groups to which the caregiver belongs. ASSC is categorised as high if the number of groups to which the caregiver belongs is three or more; medium if the number of groups is one to two; and low if the caregiver is not a member of any group.

Social support (SS) is based on whether the caregiver has received support (emotional, economic or other) from either groups or individuals, in the year before the survey. It is considered high if a caregiver gets help from five or more sources and medium if the caregiver gets help from one to four sources.

Cognitive social capital (CSC) is based on the caregiver's perceptions of the local community. The index of CSC is a combination of the responses to the following questions: whether the caregiver feels s/he is part of the community; whether s/he feels people in general can be trusted; whether s/he feels people would try and take advantage of her/him if they could; and whether s/he feels people generally get along with each other. If the caregiver's response is positive to at least three of these they have high cognitive social capital, medium if they give one or two positive answers, and if all questions are answered negatively we categorised them as having no cognitive social capital.

Citizenship (CIT) is based on whether the caregiver has worked with others in the community to address a common issue. The citizenship index incorporates questions about joining together to address common issues and/or talks with the local authority on problems of the community. This index is a dichotomous (0 or 1) variable. It is given a value '1' if the caregiver either joins together with others to address common issues or talks with the local authority about problems in the community. A value of '0' was given in other cases.

Appendix D: Young Lives' definition of household wealth

An important variable in Young Lives data is the wealth index which attempts to measure the relative poverty status of households. The wealth index was constructed based on the following variables:

1. The number of rooms per person as a continuous variable;
2. A set of eleven dummy consumer durable variables, each equal to one if a household member owned a radio, fridge, bicycle, TV, motorbike/scooter, motor vehicle, mobile phone, landline phone, modern bed, table or chair, and sofa;
3. A set of three dummy variables equal to one if the house had electricity, brick or plastered wall, or a sturdy roof (such as corrugated iron, tiles or concrete);
4. A dummy variable equal to one if the dwelling floor was made of a finished material (such as cement, tile or a laminated material);
5. A dummy variable equal to one if the household's source of drinking water was piped into the dwelling or yard;
6. A dummy variable equal to one if the household had a flush toilet or pit latrine;
7. A dummy variable equal to one if the household used electricity, gas or kerosene.

The wealth index captures variables that are broader than production assets, such as home ownership and the durability of that home, plus access to infrastructure such as water and sanitation. The construction of the wealth index is summarised in the following table.

Construction of the wealth index

Components of index and score	Contributing variables
H = Housing quality (/4)	Rooms/person, wall, roof, floor durability.
CD = Consumer Durables (/11)	Radio, fridge, bicycle, TV, motorbike/scooter, motor vehicle, mobile phone, landline phone, modern bed, table or chair and sofa.
S = Services (/4)	Electricity, water, sanitation, cooking fuel.
Wealth Index = (H+CD+S)/3 Range = 0.0 – 1.0	

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Young Lives is an international longitudinal study of childhood poverty, taking place in Ethiopia, India, Peru and Vietnam, and funded by DFID. The project aims to improve our understanding of the causes and consequences of childhood poverty in the developing world by following the lives of a group of 8,000 children and their families over a 15-year period. Through the involvement of academic, government and NGO partners in the aforementioned countries, South Africa and the UK, the Young Lives project will highlight ways in which policy can be improved to more effectively tackle child poverty.

This paper focuses on the major development objectives of the Ethiopian Government, which are to reduce poverty and improve primary school enrolment and educational achievement (SDPRP, 2002). However, education performance indicators show that only access-related targets have been achieved, while educational quality declined in most respects.

Drawing on a sample of 1,000 children aged 7.5 to 8.5 years old from twenty sentinel sites, the Young Lives project sought to understand the determinants of school completion and achievement at the household, community, regional and national levels across different regions of Ethiopia. The paper identifies the specific factors associated with primary school completion/dropout rates, and educational achievement and performance of children, and assesses the mechanisms through which these factors are influential.

With respect to school completion:

- Children from families with more household members over 15 years of age are less likely to drop out because there are more people to share the household labour burden.
- Boys are also less likely to drop out than girls, although recent legislative changes are likely to change this.
- School availability and quality, aggregate household wealth and indebtedness, and higher levels of parental education are all important determinants of children's education.

Regarding school achievement:

- Boys generally perform better overall in terms of aggregate test scores, although the performance of both boys and girls is adversely affected by the pressures on children to contribute to household labour.
- Children's positive assessment of school quality and growing community mobilisation efforts around children's education are reflected in their learning achievements.
- Parental commitment to, rather than parental levels of, education was more important.
- Household poverty functioned as a multi-dimensional barrier to children's achievement, while stunting significantly affected all indicators of scholastic attainment.

Implications from the research suggest that policy-makers should:

- introduce child-sensitive measures to combat the poverty effect
- incorporate gender-specific target indicators at all school levels during the second round of the SDPRP to contribute to gender equality
- address all aspects of school quality
- deal sensitively with community mobilisation as it can be burdensome by involving high financial, labour and time inputs from community members
- extend government efforts to initiate a student-centred education system
- pay particular attention to nutrition promotion programmes.

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