Consortium for Research on Educational Access, Transitions and Equity

‘If God wills…next year I will send her back to school’: The Effects of Child and Parental Illness on School Participation in Rural Ethiopia

Kate Orkin

CREATE PATHWAYS TO ACCESS
Research Monograph No. 60

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University of Sussex
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Consortium for Research on
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The Consortium for Educational Access, Transitions and Equity (CREATE) is a Research Programme Consortium supported by the UK Department for International Development (DFID). Its purpose is to undertake research designed to improve access to basic education in developing countries. It seeks to achieve this through generating new knowledge and encouraging its application through effective communication and dissemination to national and international development agencies, national governments, education and development professionals, non-government organisations and other interested stakeholders.

Access to basic education lies at the heart of development. Lack of educational access, and securely acquired knowledge and skill, is both a part of the definition of poverty, and a means for its diminution. Sustained access to meaningful learning that has value is critical to long term improvements in productivity, the reduction of inter-generational cycles of poverty, demographic transition, preventive health care, the empowerment of women, and reductions in inequality.

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List of Acronyms

BMI	Body Mass Index
CREATE	Consortium for Research on Educational Access, Transitions and Equity
DFID	Department for International Development
EDRI	Ethiopian Development Research Unit
EFA	Education For All
GER	Gross Enrolment Rates
NER	Net Enrolment Rates
NGO	Non-Governmental Organisation
REB	Regional Education Bureau
SNNPR	Southern Nations, Nationalities and Peoples Region
UIS	UNESCO Institute for Statistics
UNICEF	United Nations Children's Fund
WHO	World Health Organisation

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Preface

I am very pleased that Kate Orkin has agreed to share her research on the effects of child and parental illness on school participation in Ethiopia through the CREATE network. She frames her analysis using the CREATE model of 'zones of exclusion', demonstrates the value of a mixed-methods approach and situates her research in relation to a broader and burgeoning literature on the impact of health on education access. The empirical research, based on the *Young Live*s research programme, employs a qualitative study in a particular village to generate a series of hypotheses about how child and household illness and parental death impact time children's allocation of time spent on work and in school participation. These hypotheses are explored through a quantitative analysis of a longitudinal data set of 633 children in two ways - though a descriptive quantitative analysis to understand patterns of enrolment, attendance and progression among primary-school-aged children and regression analysis to highlight the possible causal role of illness in these patterns. Among many valuable findings, Orkin reports that child and parental illness are closely associated with poor attendance at school and slow progression through the first four grades of school, while teacher behaviours towards sick children vary greatly, with some pursuing all means possible to keep sick children in schools and paying for treatment and others encouraging deferred enrolment to the following school year. The full set of findings provides extremely valuable food for thought for policymakers and education practitioners. More generally this monograph has demonstrated the depth of insight that can be achieved through the creative and careful synthesis of the CREATE model of zones of exclusion and the Young Lives longitudinal data sets.

Professor Angela W Little
Institute of Education,
University of London
CREATE Partner Institute Convenor

Summary

Rural Ethiopian children, and members of their households, often suffer from common and preventable but debilitating illnesses, such as malaria, parasite infection and worms. Enrolment rates in Ethiopia are high, but school attendance is patchy, children often drop out of school (although they sometimes return), and grade repetition is common. This paper argues that the two phenomena are related: serious illness of children or in children's households is a major, under-analysed and avoidable barrier to children's schooling participation. This was demonstrated both in quantitative research, which analysed a 633-child longitudinal sample across 13 rural sites in Ethiopia, and qualitative research, a village case study, including interviews with 24 children and ten caregivers.

In relation to child illness, qualitative analysis found that health care was expensive and difficult to access. When children suffered from common illnesses, such as malaria, worms and diarrhoea, they were often absent for long periods. When they recovered, their schools often stated they had missed too much work to return to school, and they dropped out. They then usually returned to school the following year. Quantitative analysis only demonstrates associations between variables, rather than causal relationships. It found that there was no association between illness and the probability that a child enrolled at all or on whether a child dropped out. However, illness increased the likelihood that children progressed slowly through school. The size of the effect of serious illness was similar to the size of effect of being stunted, so it is surprising that the literature has focused so much more on the effects of stunting than on the effects of current sickness.

Analysis also considered children's time allocation to activities other than schooling. Sick children were less likely to do household chores, possibly because they were not strong enough, and were more likely to care for other household members, perhaps because they were at home and unable to do any other activities.

The paper also considers the effects of illness in children's households. Qualitative analysis found that children who had a sick adult in their households took on caring duties, chores and paid work. They were often late for or absent from school, but did not tend to drop out. If they dropped out, they often only 'paused' schooling for a year and then returned to school afterwards. They thus progressed more slowly through school. The effect of a household member's illness on children's schooling participation was more serious if children were involved in paid work to earn income for buying medicine and general household expenses. Children often missed school to perform paid tasks or dropped out altogether to work. . Quantitative work found that if a higher proportion of members of the child's household were sick for more than 30 days in the year, this increased the probability that children did paid work. It also made children more likely to have dropped out or to have missed more than 15 days of school.

Qualitative research found that parental death had similar effects to illness in the household on children's time allocation and schooling participation. In particular, children often 'paused' school for a year after parents died. Quantitative research found that parental death did not affect children's time allocation, but this may be because of the way parental death was measured in the survey. The survey only measured if a death had occurred in the last four years, a relatively long time period,, so the effects of parental death on children's schooling participation may have passed by the time children were surveyed.

In relation to all three types of shocks, qualitative evidence suggested that inflexible teachers or school policies worsened the effects of illness on children's schooling participation. Some teachers were very proactive in attempting to keep sick children in school: they raised money for children or parents of children who were sick and needed to pay for treatment. But some teachers shut children out of class when they were late because of caring for sick parents. Others did not allow children who were absent for long periods (because of their own illness or caring for others) to return to school. Instead, teachers required children to wait until the next academic year, when they could resume school at the point in the year when they stopped attending. This could discourage them from returning to school altogether. If they were allowed to return to school in the same academic year, teachers rarely provided assistance, so children struggled to catch up the work they had missed. Children thus often had to repeat the year.

Quantitative data did not capture enough information to examine the effects of school responses to illness, although a recently collected round of data on schools will allow such analysis. The paper argues for further research into how schools can most effectively respond to illness. It also argues that local policy-makers and principals should urgently rethink how schools can be restructured to support children affected by illness.

‘If God wills…next year I will send her back to school’: The Effects of Child and Parental Illness on School Participation in Rural Ethiopia

1. Introduction

Ethiopia is one of the success stories of the global movement to achieve Education For All (EFA). In 1992, after the end of the civil war, nearly four out of five children were out of school. By 2009, the number of children out of school had dropped to one in five, after major efforts by government and donors. These included the abolition of fees, a 140 percent increase in the number of primary schools, training of new teachers, local government campaigns to get children enrolled, and large-scale donor contributions (Engle, 2010: 3).

The Ethiopian government is one of many in Africa racing to achieve the Millennium Development Goal of giving all children access to a full course of primary education by 2015. The necessary first step is achieving universal enrolment, andmassive progress has been made. CREATE’s research emphasises that it remains important to reach out to populations that have no access to schooling (Lewin, 2007: 6). However, in numerical terms the current challenge for many countries has shifted from ensuring children can access schooling at all to keeping them enrolled and attending once they have begun school, so that they complete the full course of primary education. In many African countries:

> …the majority of children who are not enrolled in school have attended school at some point but have dropped out. Many more are enrolled but not attending regularly. Amongst those enrolled and attending many may be learning little and are silently excluded (Lewin, 2007: 28).

Patterns of enrolment, attendance and progression in Ethiopia are similar to other African countries which have improved enrolment very quickly. The Gross Enrolment Rate (GER) has improved greatly since the early 1990s.[1] More importantly, the primary school Net Enrolment Rate (NER) has more than doubled since 1999, going from 22.5 percent in 1992 to 75 percent in 2007/8 and 83 percent in 2008/9 (Ministry of Education, 2010). This indicates that the primary school age structure is approaching one where children are enrolled at the appropriate age.

However, the dropout rate in primary school is high. Dropout was an average of 14.6 percent across Grades One to Eight in 2007/08 (UIS Statistics in Brief, 2010). Longitudinal surveys such as Young Lives, used for the analysis in this paper, find that children drop out most frequently after the first or second grade, before they are able to read or write properly (Woldehanna *et al*., 2005). Many children who enrol do not finish primary school. The gross intake to the last grade of primary – a proxy for primary completion – has been growing in recent years, from 21 percent in 1999 to 52 percent in 2008 (UIS Statistics in Brief, 2010),

[1] The GER is the ‘total enrolment in a specific level of education, regardless of age, as a percentage of the eligible official school-age population corresponding to the same level of education in a given school year. It therefore can exceed 100 percent due to the inclusion of overage and underage children and grade repetition.’ The NER is the ‘enrolment of the official age group for a given level of education, expressed as a percentage of the corresponding population, with a high NER denoting a high degree of coverage for the official school-age population. It excludes overage students to more accurately capture the system’s coverage and internal efficiency’ (UNESCO, 2009).

but it remains low.[2] Survival rates have stayed constant, but at relatively low levels, although Lister (2007) argues:

> …to have maintained survival rates, albeit at the admittedly modest rates of 60 percent to Grade 4 and 38 percent to Grade 8, in the face of the system's massive expansion is indeed a remarkable achievement.

CREATE's research has analysed patterns of access and exclusion in contexts of near-universal enrolment but low rates of primary completion. It is vital to understand these patterns to formulate effective policy to address barriers to children's schooling participation. Among a wide range of research questions answered by CREATE (Lewin, 2007: 28), the following are relevant to this paper:

- Which children are currently excluded from basic education at different stages, and why are they excluded?
- What processes result in children crossing thresholds into exclusion once they have entered some form of primary education?
- What options are available to improve progression, completion and transition rates? How can dropout before primary completion be reduced?

In relation to health and nutrition in particular, CREATE asks:

- What are the health- and nutrition-related issues that shape participation and attendance? To what extent do schools act to identify and resolve health- and nutrition-related problems?
- What patterns of attendance exist over time? What are the reasons for irregular and chronic non-attendance and what mechanisms might reduce the problem?

The CREATE conceptual model (Lewin, 2007) guides CREATE's programme of work. This framework distinguishes seven zones or spaces where school-aged children are at risk of exclusion. Zone zero refers to children who do not have access to pre-primary school. Girls and boys in zone one have never been enrolled. In zone two are girls and boys who drop out below the legal age for formal employment without completing primary school. Zone three covers girls and boys who are at risk of exclusion from primary education. In zone four are girls and boys who have completed primary school but are excluded from secondary education. Zones five and six refer to children who drop out from or are at risk of exclusion from secondary education.

In this paper, I use descriptive analysis to examine patterns of enrolment, attendance and progression among children of primary school age in rural Ethiopia. I then use regression to understand how episodes of illness suffered by children and their households correlate with

[2] The gross intake rate to the last grade of primary is a proxy measure of primary completion and is calculated by taking the total number of new entrants in the last grade of primary education, regardless of age, expressed as a percentage of the population at the theoretical entrance age to the last grade of primary. It is indicative of the capacity of the education system to provide primary completion for the theoretical entrance age population to the last grade of primary. The survival rate measures the retention capacity and internal efficiency of an education system and is defined as 'the percentage of a cohort of students in the first grade of a given level or cycle of education in a given school year who are expected to reach successive grades' (UNESCO, 2009)..

particular patterns of schooling participation. I ask whether, on average and controlling for other factors, episodes of ill health suffered by children themselves or by their households are correlated with children falling into one of the zones of exclusion.

The quantitative data set used in this paper does not enable examination of the processes through which illness results in children's exclusion, or the strategies schools adopt to prevent illness having major effects on children's schooling participation. The paper therefore presents qualitative case studies of the schooling experiences of children who are ill or have ill household members. The children interviewed in qualitative research were also respondents for the survey.

These case studies informed the design of a quantitative survey of the schools attended by Young Lives children conducted in 2010, which includes information on school and teacher responses to children's illness. More details can be found at www.younglives.org.uk.

2. Literature review

2.1 Focus on Schooling Participation, Not Educational Attainment

Studies which examine how children's health affects their schooling examine a number of outcome variables: age of first enrolment, enrolment, attendance, progression through grades, dropout and development of literacy and numeracy. I group these outcomes into two groups.

I use *schooling participation* to refer to the decision about whether children enrol in school, attend school, attend all of the school day and/or study outside school. In the literature in economics, on which the quantitative analysis in this paper draws, schooling participation is usually modelled as a household decision. In choosing the child's mix of activities, families trade off between the child's current income or production and future income if the child is educated (Baland and Robinson, 2000; Basu and Van, 1998; Cigno and Rosati, 2005).

Educational attainment refers to accumulation of human capital (Cunha and Heckman, 2006): the grades children pass at school and the levels of competence they attain in literacy and mathematics.[3] Educational attainment, usually measured using completed years of schooling or literacy and numeracy scores, has consequences for other outcomes of interest, such as a child's expected future health and income. In economics, educational attainment is usually modelled using a production function, where inputs (such as a child's motivation and ability, school facilities, teacher quality, household monetary support for schooling and household members helping with children's homework) combine to produce an output: human capital. Adequate time spent in school is necessary for educational attainment, but not sufficient: if children participate in school but have poor instruction,inadequate facilities or insufficient family support they are unlikely to pass grades.

In this paper, I focus on schooling participation and not on educational attainment. I consider progression through the first four grades as one aspect of schooling participation rather than as a measure of educational attainment. This paper considers children aged eight in 2002/2003 and twelve in 2006/2007 in Ethiopia.[4] The official age of enrolment is seven, so almost all children in the sample are participating in the first cycle of primary education, Grades One to Four. Since 1994, Ethiopia has used a 'self-contained system' in the first four grades of primary school. According to former federal government officials, this policy means that one teacher teaches all subjects to a class. Promotion is based on continuous assessment. Children can be required to repeat the year if teachers believe they have not achieved enough of the learning goals for the year. However, if teachers are supporting students properly, all students should be able to complete each grade.

However, officials at regional level acknowledge that in many schools, the self-contained system was implemented without adequate training for school directors and teachers.[5] There is a widespread perception among principals and teachers that government policy requires

[3] I recognise that learning occurs through informal channels, including work (Levinson and Holland, 1996; Rival, 2000), but focus on learning through participation in formal schooling.

[4] Ethiopia uses its own calendar. The year begins in September and the Ethiopian year is seven or eight years behind the Gregorian year, depending on the time of year. Throughout this paper, when years are used they refer to the Gregorian calendar. For example, 2002/2003 refers to the year beginning in September 2002 and ending in September 2003.

[5] Interviews with directors for planning in Addis Ababa, Tigray, Amhara, Southern Nations, Nationalities and Peoples Region (SNNPR)and Oromia Regional Education Bureaux (REBs), April to May 2010.

promotion to be automatic and thatchildren should only repeat a grade if they have not attended school regularly enough. But if children attend regularly and complete their work, many teachers and principals believe they should be promoted, whether or not they have learned the skills required.Progression from grade to grade in the first four grades is thus more a measure of schooling participation than of educational attainment.

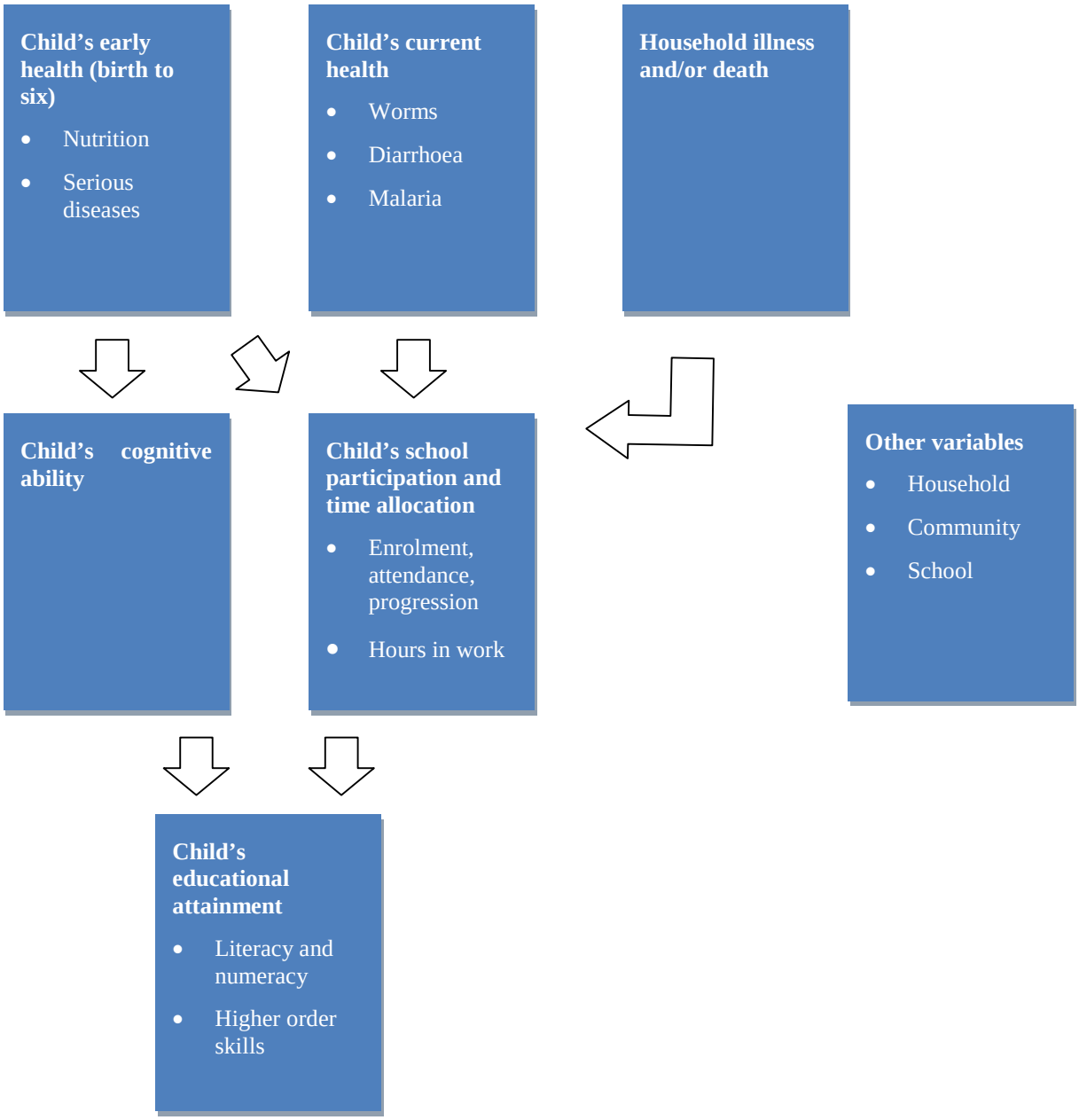
Glewwe (2005) outlines a simple framework to analyse relationships between health and education outcomes, which can be used to understand the distinction between schooling participation and educational attainment. He describes a production function for educational attainment that captures the direct effect of all variables that influence children's academic skills. Figure 1 represents this production function. Educational attainment is influenced by household, community and school variables. These include school and teacher quality and parents' provision of education inputs (e.g. school supplies, books, and time spent by parents with children that is of pedagogic value). These variables are on the rightmost side of the figure and influence all the relationships in the figure. I account for the effects of these variables, but they are not the focus of the paper.

There is a wide range of literature from economics, psychology and public health that examines the range of ways in which children's nutrition and health, particularly before they turn six, directly affects their cognitive development. Cognitive development then influences children's attainment of literacy, numeracy and higher order cognitive skills (Pridmore, 2007).[6] The link between early nutrition and health and cognitive development is the leftmost two boxes in the figure.[7] I do not examine this relationship in this paper. However, nutrition and health in the early years does influence parental decisions about children's school participation, in particular when children first enrol in school. I examine these effects using variables that capture whether children are stunted and whether children were seriously ill before they were eight.

[6] Poor nutrition affects cognitive development. A study in Jamaica found that severe malnutrition when children are between six and 24 months resulted in children scoring lower on cognitive tests (Walker *et al.*, 2000) and arithmetic, spelling and reading tests (Chang *et al.*, 2002) when they were eleven and twelve. Deficiencies of particular nutrients also affect cognitive development. A review by Grantham-McGregor and Baker-Henningham (2005: S114) concludes that there is evidence for a link between iron deficiency anaemia and poor cognitive development, behaviour and academic attainment later in childhood. Finally, certain illnesses in the early years have long term cognitive effects. Children hospitalised with cerebral malaria in Kenya were 4.6 times more likely to suffer cognitive impairment three to four years after hospitalisation than children from the same communities hospitalised for other reasons (Holding *et al*., 1999).

[7] Glewwe (2005) refers to cognition as 'innate ability.' Elements of cognition are innate, but it is to some extent influenced by early childhood development.

Figure 1: The Role of Children's Health When They are of Primary School Age in the Education Production Function



There is another literature on the relationship between the middle two boxes and the lowest box: the effect of children's schooling participation on their educational achievement. This is part of a literature in the economics of education which examines the production function of educational achievement or human capital (Hanushek, 1995; Hoenack, 1996). Glewwe and Kremer's (2006) simplified framework summarises this approach. They analyse years of schooling (which proxies for schooling participation and time allocation in the diagram) as an input into children learning literacy, numeracy and other skills, not an outcome. Children's current health is another input. I do not examine the effects of changes in schooling participation due to health on educational attainment, although this is an important area for further study.

But literature examining the relationship between the top two boxes in the middle column – the effect of child or household illness or parental death on child time allocation and schooling participation – is more limited. There is extensive theoretical and empirical literature on child time allocation to work (for example Baland and Robinson, 2000; Basu and Van, 1998; Beegle *et al*., 2006; Fafchamps and Wahba, 2006). There is a similarly considerable literature on the determinants of schooling participation (for example Behrman *et al*., 2005; de Janvry *et al*., 2006; Ravallion and Wodon, 2000), which considers the effects of parental illness and death.

However, large-sample quantitative studies largely neglect illness of children attending school as a cause of poor schooling participation. This is despite the fact that many qualitative studies, also detailed below, highlight the importance of children's illness as a cause of reduced schooling participation. The exception is some randomised control trial studies of the effects of reduction in particular illnesses on children's schooling participation, detailed below.

The quantitative analysis in this paper therefore extends current research in three ways. Firstly, analysis has tended to focus on children's participation in school. This paper considers the effect of children's illness, household illness and parental death on an additional outcome, children's time allocation to work. Secondly, unlike research based on randomised trials, the paper is able to examine the effects of ill health in general rather than the effects of specific illnesses. Randomised trials examine the effect on outcomes of variation in levels of illness which occurs when some (randomly chosen) respondents are treated for particular illnesses.Interventions will only offer two or three treatments, sorandomised trials are only able to evaluate the effects of the illnesses being treated on children's schooling participation and time allocation, but not the effects of all illnesses suffered by children or household members. Finally, the paper is able to compare the effects of children's earlier health status (measured by whether they are stunted), children's current illness, parental illness and death on time allocation and schooling participation.

2.2 Literature on Children's Illness and Schooling Participation

Studies that examine links between children's health and their participation in school consider a range of health-related variables. This brief literature review expands on the distinction drawn above between children's health measured at the same time as they make decisions about time allocation and schooling participation, and children's health and nutrition at earlier points in their childhoods. I draw heavily on reviews by Pridmore (2007), Glewwe (2005) and Bundy (2005).

Pridmore's (2007)review found a number of qualitative studies or studies based on descriptive survey data in which children highlight the effect of their own illness on their schooling participation. However, none of the quantitative studies mentioned control for other factors which may influence outcomes.

Colclough, Rose and Tembon (2000) studied barriers to enrolment and causes of dropout in Guinea and Ethiopia, focusing on the direct and opportunity costs of schooling. In each country, they collected survey data in two regions, which were selected because they had high rates of dropout, and in sites within regions selected to reflect the region's characteristics. They found that common illnesses constrained schooling participation, with five percent of boys and 15 percent of girls in Ethiopia and eleven percent of boys and 18 percent of girls in Guinea listing illness as the main cause of dropout. The most common illnesses were malaria, stomach problems, headaches, colds/flu, wounds and diarrhoea.

Furthermore, inadequate school facilities often caused additional health problems. In Ethiopia, none of the schools in the sample had their own water source and students fetched water from streams. Water was rarely properly stored and drinking it could result in diarrhoea. In Guinea, in one school visited in qualitative work, each school had a bucket of water at the front of the classroom, but buckets had no lids and all students used the same cup. In Ethiopia, poor health was an impediment to school attendance and, in addition, a barrier to enrolment, because some parents were reluctant to send children to school because they were afraid of their children would catch contagious diseases (Colclough *et al*., 2000: 22).

In qualitative work with girls in Ghana, Fentiman (1998) found that under-achievement, lack of concentration, hunger, and malaria were the main causes of absenteeism and dropping out. Three of these four reasons are health-related. Girls also mentioned health-related issues not addressed in this paper, such as lack of water and sanitation facilities at school during menstruation and schools reacting to pregnancy by forcing girls to drop out and not permitting them to return. In quantitative work in the same area, Fentiman, Hall and Bundy (1999) also demonstrated that when children were matched by age and sex, the health status of non-enrolled children was significantly worse than for enrolled children.
Porteus *et al*. (2000) conducted in-depth case studies with 67 children who had dropped out in three communities in Gauteng, South Africa. In seven out of 67 cases, illness and the inability of parents to access health services were the primary cause of children dropping out.

The PROBE report (1999: 33), a study of school quality in India, highlighted difficulties among children who returned to school after long absences. Children struggled to catch up the work they missed and often dropped out.

More recently, in Bangladesh, Hossain and Zeitlyn (2010) analysed the 2007 and 2009 rounds of the CREATE community and school survey (ComSS), which included 6,696 households and 36 schools in six locations, one in each administrative location in Bangladesh. Among children six to 15 years old who suffered from health problems, 74.3 percent were enrolled and 25.7 percent were out of school (11.4 percent had dropped out and 14.3 percent had never enrolled). Among children without health problems in the same age group, only 12.2 percent of children were out of school. Children suffering from health problems were twice as likely as others to be in zones of exclusion one (children who had never enrolled) and two (children who had dropped out of primary school). A higher proportion of children with poor health were also present in zone three (children at risk of

dropping out who were often absent)compared to children with good health (the difference is significant at $p<0.000$).

Ahmed and Nath (2005) find a similar picture in Bangladesh using qualitative data. They note that children who were absent because of ill health found it very difficult to catch up work unless their families paid for private tuition. Without any intervention from teachers, children often lagged further behind after returning to school because they had missed so much work. They became demotivated, were absent more often, and eventually dropped out.

Randomised evaluations have been used to establish causal links between children having particular illnesses and schooling participation. Assignment of children to treatment and control groups is done randomly, so if there are differences in outcomes between treatment and control groups, researchers can be relatively certain that the intervention causes these differences. Randomised evaluations are widely used in public health, but public health studies have tended to assess the effectiveness of treatment on health outcomes and not on schooling participation.

Miguel and Kremer's (2004) examination of the effects of school-wide deworming programmes on children's attendance was one of the first papers in development economics to use randomised evaluation to assess relationships between children's health and their schooling participation. All children in a school were offered free deworming tablets, although in practice only roughly 70 percent of children in treatment schools were treated.

The authors found a 7.5 percentage point average gain in primary school participation in treatment schools, which translated into a reduction in overall school absenteeism by at least one quarter. Schooling participation was measured by whether children were present during random school visits by NGO fieldworkers. Deworming also improved health and schooling participation of children in untreated schools because there were lower rates of infection and transmission in communities. However, deworming had no effect on test scores.

Their study had three improvements on previous studies: they evaluated schooling participation as well as cognitive scores; they measured school participation using observation, rather than register analysis; and they were able to evaluate whether the programme had externalities(effects on those not treated).

Bobonis *et al*. (2006) examined the impact of a health intervention delivering iron supplementation and deworming drugs in preschools in Delhi. Pre-school participation rates rose by 5.8 percentage points – a reduction of one fifth in school absenteeism – in the first five months of the programme.

Randomised trials have two shortcomings when used to examine the effect of children's health on their schooling participation. Firstly, they evaluate treatments of specific illnesses. Although two or three different treatments could be evaluated in one trial, studies cannot examine the effect in sum of various illnesses. Secondly, it would be much more difficult to compare the effects of short-term ill-health and long term poor health and nutrition from when children were younger. These shortcomings are undoubtedly trumped by the ability of randomised trials to draw causal links, but retrospective studies such as this one remain useful because they can examine these issues.

2.2.1 Focus on Illness, Not Stunting

Low height-for-age, or stunting, 'indicates long term, cumulative inadequacies of health or nutrition' (WHO Expert Committee on Physical Status, 1995: 164) and is the most commonly used measure of poor early nutrition. This paper does not focus on the well known negative effects of stunting in early childhood on schooling participation when children are older, although regressions do control for children's early nutrition.

Glewwe and Jacoby (1995) analysed differences between siblings in Ghana and showed that families delayed the enrolment of stunted children compared to their less stunted siblings. They compared children in the same family, so they discounted alternative explanations for the relationship,such as family income, borrowing constraints or the rationing of places in school. Glewwe *et al*. (2001) used a similar technique in the Philippines and found the same results, which they attributed to parents thinking that stunted children are not ready for school. Daniels and Adair (2004) used the Philippines data to show that less stunted boys and girls are more likely to enrol on time.

In rural Pakistan, Alderman *et al* (2001) used a different estimation technique to control for unobservable behaviours or attitudes of parents which may be correlated with both children's nutrition and outcomes. This technique used food price shocks as an instrument for child nutrition. Better nutrition when children were five, proxied for by greater height-for-age, increased the probability that children would be enrolled by age seven, especially for girls.

Glewwe *et al*. (2001) also found that malnourished children progress more slowly through school, possibly because they enter later and have less time to learn. Similarly, Daniels and Adair (2004) found that taller boys and girls are less likely to repeat grades and less likely to drop out during grade school. Unlike this research, however, these studies examined education systems where progression was conditional on good performance.

2.2.2 Focus on Illness, Not Current Poor Nutrition

Studies examining the effect of nutrition at the time when children are attending school draw two main conclusison. Firstly, children who are better nourished are more likely to be enrolled in school. Rose and Al Samarrai (2001) examined Body Mass Index (BMI) as a measure of current undernourishment.[8] They used the same sample as Colclough *et al*. (2000) in Ethiopia. In both communities, a much higher proportion of boys than girls were undernourished. In East Gojjam, one of three districts in the study, they found that BMI among children who were attending school was higher than among children who had dropped out: better nourished children were more likely to be enrolled.

In Jimma, in contrast, there was no difference in BMI between children in and out of school: the likelihood of children being enrolled was independent of health status. In fact, particularly high proportions of undernourished boys – 61 percent – were attending school. Focus groups in Jimma explained this counter-intuitive finding:

[8] BMI is calculated by dividing weight in kilograms by the square of the height in metres. In adults it is used with age-independent cut-offs to define whether people are overweight or thin. It has been used with older children and adolescents. It tends not to be widely used for young children because of its variation with age (WHO Expert Committee on Physical Status, 1995: 175).

> …the opportunities for boys to earn income by working on farms where coffee is grown are high. As a result, those who are not healthy enough to undertake such physical work are, in some cases, attending school, which is perceived by some parents in the area as being a recreational facility, despite the fact that many of these boys are unable to complete their studies due to poor health (Rose and Al Samarrai, 2001: 50).

The second finding from studies of nutrition at school-going age is that children who are poorly nourished but nonetheless enrolled tend to have worse schooling participation than better nourished children. In Rose and Al Samarrai's work, once children with low BMI were enrolled, they were much more likely than their healthy school-attending peers to drop out. Other studies find that children who report suffering from hunger, have protein-energy malnutrition or lack iron, iodine or vitamin A in their diet attend school less frequently and are more likely to repeat grades, drop out early and fail to learn adequately (Grantham-McGregor and Walker, 1998; Pollitt, 1990; Rosso and Marek, 1996). Authors hypothesise that this occurs because hungry children are demotivated and battle to concentrate, although there is no statistical support for this. The effect may also occur because children with poor nutrition are also more likely to get sick. For example, iron-deficiency anaemia(caused by poor diet and loss of blood due to worm infestations) causes a compromised immune system, which decreases the ability to fight infections (Pridmore, 2007).

2.3 Literature on Parental Illness or Death and Schooling Participation

Parental death may cause school leaving among enrolled children as a result of emotional distress, or by tightening household budget constraints and increasing the opportunity cost to families of children's time. A number of studies examine enrolment without examining simultaneous decisions about children's time allocation to work. In the Philippines, Gertler et al. (2004) used a propensity score matching approach. They found that parental death significantly decreased the likelihood that children were enrolled, with little differentiation by parent or child gender. Case et al. (2004) and Bicego et al. (2003) also found lower school enrolment for children who had lost mothers or both parents. Case and Ardington (2006) examined panel data in rural KwaZulu/Natal, South Africa and found that maternal orphans were significantly less likely to be enrolled in school at the time of follow-up and had had less money spent on their education than whose mothers were still alive. Children whose fathers had died were on average poorer than children whose fathers were alive, and poverty reduced the likelihood that children were enrolled, but parental death did not explain reduced school enrolment once income was controlled for. Effects were similar for boys and girls. In a panel study in Kenya, Evans and Miguel (2007) examined schooling participation, measured as the percentage of unannounced visits to the school when a child was present, in one of the few studies to examine participation rather than enrolment. Their findings were similar to Case and Ardington: maternal deaths resulted in lower participation after the death and one to two years before, while paternal deaths had no effect.

Children who have lost parents may return to school, but in the longer term complete fewer years of education. Operario et al. (2008) examine primary school completion among 16–24-year-olds in a nationally representative cross-sectional South African household survey. These young adults were older than the age at which they would have been expected to complete the compulsory nine years of schooling. In multivariate analyses controlling for household poverty, girls who lost either parent were less likely to have completed school, but being an orphan was not independently associated with males' school completion.

In a panel study in Tanzania, Beegle *et al*. (2007) found that adults who had been maternally orphaned between the ages of seven and 15 lost an average of one year's school attainment. Case and Ardington (2006) found that maternal orphans had completed significantly fewer years of schooling than children whose mothers were alive. They examined the timing of mothers' deaths – a methodology also followed by Beegle *et al*. (2007) – to demonstrate that impacts are probably causal. Paternal death did not directly influence years of schooling completed. Losing a father was correlated with completing fewer years of school, but only because households in which paternal deaths occurred tended to be poorer both before and after the death.

Children are often expected to care for ill household members. In Guatemala, qualitative research showed that illness in the household resulted in children, particularly girls, missing or dropping out of school (Chesterfield and Enge, 2000). However, research in South Africa found children do not drop out of school to look after ill mothers (Case *et al*., 2004). Even if children manage to stay enrolled, their schooling may suffer. In Kenya, Akunga *et al*. (2000) found that children with ill household members reported battling to concentrate. And even after ill household members recovered, households were poorer and more vulnerable, which affected children's educational participation (Hunter and May, 2003: 8).

2.4 Using the Zones of Exclusion as Measures of Schooling Participation

In this paper, I describe schooling participation using the zones of exclusion defined in the CREATE conceptual model (Lewin, 2007). I then examine factors which make it more or less likely that children will fall into particular zones.

Children who fall into zone one are children who have never been to school and are unlikely to attend school.[9] Lewin (2007: 25) presents statistics from African countries to show that, above the age of eleven, it is likely that those who are out of school will remain excluded. Children considered in this paper were twelve years old when the most recent data on them was captured in 2006, so any children not yet in school are unlikely to enrol and are therefore assumed to fall into zone one.

In the CREATE framework, zone two includes children who enter primary schooling, but who drop out before completing the primary cycle. Children usually become permanently excluded with no way to re-enter (Lewin, 2007: 25). In this paper, it is not possible to assess conclusively whether children who have been enrolled at some point but are currently not enrolled have dropped out entirely, as they may yet return to school. Indeed, case study children in the qualitative research did return to school after dropping out for periods of a year or more. So in this paper, children are assumed to be in zone two if they have enrolled in the past but were not enrolled at the time of the survey.

Children in zone three have entered primary schooling and are enrolled but are at risk of dropping out:

[9] CREATE includes nomadic groups (Aikman and el Haj, 2005); those in low population density areas (Little, 2006); and those in extreme poverty (Kabeer *et al*., 2003) in this group. Although there are pastoralist communities in Ethiopia, none of the Young Lives sites cover these communities. Similarly, although there are areas of low population density, none of the Young Lives sites falls into these areas.

> These children might be low attenders, repeaters and low-achievers. Children who remain formally enrolled in school may be silently excluded if their attendance is sporadic, their achievement so low that they cannot follow the curriculum, or if they are discriminated against for socio-cultural reasons (Lewin, 2007: 25).

Because of data constraints, I can only consider two groups of children who fall into zone three:

- Children who were enrolled in 2006/2007 but reported by caregivers to have missed more than 15 days of school in the 2005/6 school year. Lewin (2007: 24) suggests that children who attend school for less than an 'arbitrary threshold' of 90 percent of the school year have lost substantial time on task. The Ethiopian school year is 200 days, but the number of children whose caregivers reported that they had missed more than 20 days of school was too small for analysis using a probit regression, so 15 days was used as the threshold instead.

- Children who were enrolled in 2006/2007 but only progressed zero, one or two grades in the four years between 2002/2003 and 2006/2007. If these children had had smooth school trajectories, they would have progressed four grades in this period. Slow progression could be because children dropped out for one or more years of school and then returned, or because children had to repeat grades because they missed too much school to be promoted. Lewin (2007: 24) notes that those who drop out are not always low achievers when they drop out, but once they have dropped out or repeated grades it becomes more likely that they will be excluded.

3. Methodology

3.1 Survey and Qualitative Data Collection

My quantitative analysis draws upon survey data collected by Young Lives, a collaborative study by Oxford University and the Ethiopian Development Research Institute (EDRI). One thousand children and their caregivers were interviewed using structured questionnaires in 2002/2003, when children were approximately eight years old, and four years later, in 2006/2007 (Woldehanna *et al*., 2008). Village-level data was collected from teachers, elders and officials.[10] I used data on 633 respondents across 13 rural sites andlargely use data from the second round. The survey is particularly useful for this research question because few studies with detailed information on children's education have carried out interviews with children in school and children who have dropped out (Hunt, 2008: 4).

For qualitative data, I conducted a village case study in Leki, one of the 13 rural sites in Young Lives. Leki is on the shores of one of the Rift Valley lakes. It is an hour's walk from Ziway, a town three hours south by bus from Addis Ababa. Working with research assistants, I conducted eight focus groups with 24 Young Lives children. Each group participated in two child activity-based sessions, one per day. One activity was from Woodhead *et al*. (1998), asking children to draw all the activities they did and rank them on various criteria. The second drew on the wellbeing exercise in the Young Lives Qualitative Protocol (Camfield *et al*., 2009; Crivello *et al*., 2009): children drew and discussed who did well at school, badly at school or dropped out.

Following this, we conducted semi-structured interviews with seventeen children. We interviewed outside, usually under a large tree near the village health centre. Children were away from people hearing them at home but in a relaxed setting (Hershfield *et al*., 1983: 250). Others could see them, giving a sense of some privacy but also that they could leave easily at any time. With 10 of the children, we did follow-up interviews, home observations and caregiver interviews. Caregiver interviews were conducted at people's homes, so both parents usually participated. Informal participant observation was undertaken in children's homes and where children worked. At village level, we interviewed teachers, community leaders, managers of farms and the local irrigation NGO, and the community health worker – 14 in all. Recordings were transcribed into English by three Ethiopian transcribers.

3.2 How Methods Were Mixed

To describe how methods were mixed in the research process, I use Greene *et al*.'s (1989: 259) typology of the purposes served by mixed-methods research. The purposes of development, initiation and expansion were served particularly by this research.

Data collection using the different methods was done sequentially. I did some quantitative analysis before fieldwork, which suggested a focus on rural areas, where dropout from school was more frequent, and some interview themes. I used quantitative data in qualitative fieldwork. I had contact and background information for 50 children in Leki, so I could choose children who fitted specific criteria and did not pre-interview children. I used quantitative data on each child to prepare questions with my fieldworker before each

[10] The boundaries of survey sites were defined using the boundaries of the *Kebele*, the lowest level of local authority, in 2002. I use 'village' to denote a survey site. Village boundaries are government-defined.

interview. Here, mixed-methods were used for **development** purposes: one type of data is used to collect another type.

Data analysis was sequential, but also iterative. I conducted data analysis in stages. As above, basic quantitative analysis informed qualitative data collection. During data collection, I summarised interviews each evening with fieldworkers for preliminary qualitative analysis. Initial qualitative analysis generated research questions for the third stage, detailed quantitative work. The fourth stage was detailed qualitative analysis of transcripts, after coding data using Atlas, and the selection of four case-study children as exemplars.

In this iterative process, mixed-methods were used for **initiation**: findings from one method of analysis suggested issues for investigation or test by the alternative method in the next stage. The major focus of the research was on the relationship between children's paid and unpaid work and their schooling participation. However, discussion of children's schooling trajectories revealed that recurring illnesses were a major factor affecting schooling participation, leading to the analysis in this paper.

The two methods also **expand** upon each other. Quantitative work furnishes descriptions, but qualitative data gives richer and more contextually revealing description, highlighting heterogeneity within measured variables that was not – or not yet, or not adequately – captured by surveys. In turn, quantitative data gives a broader aggregate picture than qualitative data.

I did not use mixed methods extensively for **triangulation**, where one type of data is used to check findings of another type of data. As explained above, qualitative and quantitative data collection tended to have different strengths as data collection methods, and to reveal different types of information.

3.3 Qualitative Case Studies and Generalisation

It is a common misconception among quantitative researchers that conclusions from a non-random sample are not generalisable (Bryman, 1988: 77). In fact, qualitative findings can be symbolically representative and theoretically generalised, so evidence from one child can be illuminating in particular ways about a broader population of children.

The major purpose of qualitative work is generalisation to theoretical propositions. Analytic induction and grounded theory, two major schools of thought in qualitative research, both develop theory from qualitative data (Bryman, 1988; Spencer *et al*., 2007). Both use case studies (among other methods): the main difference is where theory enters into research. Analytic induction begins with theory, used to formulate a hypothesis, which is tested against cases and modified until all cases fit (Yin, 2003: 114). Grounded theory begins with data, from which categories and relationships between categories are generated. Sampling of cases continues until saturation, where new cases do not add to categorisation or knowledge of the relationships between categories (Glaser and Strauss, 1967; Layder, 1993; Strauss and Corbin, 1998).

Both those who support analytic induction, such as Ragin (1992), Yin (2003) and Flyvberg (2006), and grounded theorists, such as Glaser and Strauss (1967) and Layder (1993), argue that it is possible to make a theoretical argument from a single case when a particular logic can be applied. The initial purpose of research was to analyse the relationship between

children's work and their schooling. I used two such arguments to choose Leki as a case study site, using Young Lives village and household data (Yin, 2003).

Firstly, Leki is an extreme case of child work. It has the highest percentage of children doing paid work and the highest average number of total work hours in the Young Lives sample. Atypicality makes it a vivid example of a phenomenon. Secondly, Leki is a critical case for examining school flexibility to child work. In a critical case, one argues that if a theory holds true for that case, it holds true for all cases. I assumed that schools would be more flexible to child work if more children in the community worked. If the school in Leki did not demonstrate flexibility, no school in the 13 villages would. However, although Leki School was flexible to some extent to different types of work, it was not flexible to children's illness, as argued in this paper.

The logic behind selection of multiple child case studies is somewhat different. I did not choose individual children in advance to make a particular argument. Rather, I used a number of case studies together to, in the words of Lewis and Ritchie (2007: 269) provide 'a 'map' of the range of views, experiences or outcomes and the factors that shape them' for a particular sample. The map can be inferred to the parent population if the sample is inclusive of the types found in the parent population. To capture the range of working and schooling experiences in the sample, I selected 24 children for focus groups from the 50 children in Leki in the Young Lives sample. I selected children so that I would have a mix of boys and girls, of children in Grades 5-7, Grades 1-4 and who had dropped out, and of children who did only chores and who combined paid or subsistence work and chores. There were no children in the Leki sample who had never enrolled, although there are children who have never enrolled in other Young Lives sites.

Once I had a 'map' of the different experiences of children in the sample, I then chose case study children from the 17 I had interviewed who particularly strongly represented a circumstance or a characteristic that had salience to the research question (Ritchie *et al*., 2007: 83). The experience of a particular case study child achieved 'symbolic representation.' Each child was similar to a real-life 'ideal type' (Weber in Runciman, 1978) or exemplar (Brannen, 1992). I thus refer to case study children as exemplars. Each individual case study of a child can also be used to develop theory, in the same way as the case study of a village. In Yin's words, the experiences of exemplar children 'are generalisable to theoretical propositions and not to populations' (Yin, 2003: 10). The following sections describe the case study site and the case study children. I compare findings from these case studies to descriptive data from the broader Young Lives rural sample of 13 villages. The case study children described here are those who experienced illness, household illness or parental death. Other children are described in Orkin (2010; forthcoming)

4. Qualitative Case Studies of Schooling Participation in Leki

This section examines schooling participation and children's time allocation in the case study site. I compare findings to the broader Young Lives rural sample of 633 children in 13 villages. Within data limitations, I conclude that trends in enrolment, attendance and progression are similar in Leki and the broader sample.

Leki[11] is in the Rift Valley on the shores of a lake, so there is plentiful water and soil is fertile. Most of the population is involved in fishing, animal husbandry and crop production. Roughly one third of households have land close to the lake and participate in an irrigation scheme, which enables them to produce crops twice or three times a year and to grow cash crops such as tomatoes and onions. Vegetable farming is labour-intensive. Children, particularly girls and the children of poorer families, are observed working as wage workers for other families and for commercial farms in the area from the age of ten. Many respondents said that involvement in vegetable farming caused children to be absent from school (Orkin, forthcoming). However, the money children from this work helps children to buy materials for school and personal items and to subsidise their households during times of economic hardship.

Leki is about an hour and a half walk from the nearest town, and thus is not as remote as other rural sites in Young Lives. However, Leki residents sometimes struggle to get to the town. A few months before qualitative fieldwork was conducted, the road that connected the community to the local town was washed over by the lake. To get to the town,people had to pay to cross the lake using boats. The community attempted to build a bridge, but this was washed away and the price of boat transport was increased.

The village has services not available in many more remote rural sites. At the time of fieldwork, the local government had constructed four water points and some households had electricity (although many residents have requested electricity and not been allocated it). The village was part of the Productive Safety Net Programme. In this programme, eligiblee families sign up a number of members based on the poverty of the household.Each member then gets work on public works programmes in exchange for food (Devereux *et al.*, 2006).

4.1 Enrolment

The primary school in Leki was built in 1973 and in 2008 taught Grades One to Seven. In 2008, most children in Leki were enrolled. Dawit, a female teacher in her thirties with two children, was born in Leki and left to qualify as a teacher. After teaching in another community for five years, she had taught in Leki for eight years when we interviewed her in 2008. She described large increases in the proportion of children of both genders attending school:

> In earlier times people used to make children work guarding the herds and on farmyards, but now they have become aware of the benefit of sending children to school.

[11] Pseudonyms are used for children and place names throughout to protect children's anonymity.

However, she said that many children started school after the age of seven, the compulsory age of enrolment, because of schooling costs or because children were needed for work. Dasse, for example, enrolled late. His family was one of the wealthier ones in the village: on entering their compound, one noticed the three separate buildings, electricity cables and two television aerials. The family owned a large herd of cattle and six *qarxii* (one-and-a-half hectares) of land, some of it irrigated, so they could easily cover schooling costs. However, Dasse was only about to begin Grade Three in 2008. This was because he was already 'a little grown-up' by the time he started school at nine. He said, 'There was no one to look after the herd, and I was doing that.' He is one of six children, so when his younger sisters were old enough to herd cattle he went to school.

Teachers reported high rates of dropout of enrolled children during the school year. The teachers estimated enrolment changes from first to second semester. Enrolment decreased by roughly a third in Grade One and Two by halfway through the year. In Grade One it dropped from 200 to 130 and in Grade Two from 160 to 100. In each of the later grades, teachers estimated that ten percent of the class dropped out during the year.

Table 1: School Enrolment in Leki During the 2007/2008 School Year

Grade	No. of children enrolled in September at the start of the school year (after harvest of maize and *teff*, an indigenous grain)	No. of children enrolled in January at the start of second semester (during vegetable harvest)	Proportion of children who had dropped out
1	200	130	35.0
2	160	100	37.5
3	96	86	10.4
4	73	66	9.6
5	46	40	13.0
6	56	53	5.4
7	50	47	6.0

Source: Dawit and Felekech, two teachers in Leki, August 2008.

Teachers highlighted a variety of causes of dropout. Socio-economic constraints were importhant. Children said that many children become involved in paid work because 'they want money and like money' (Girls Group One, 13 August 2008). Dawit, one of the teachers interviewed, agreed:

> The children do paid jobs to get money; they become very money enthusiast and their parents do not push them to go to school as they value the daily money the children earn. There could be lack of food, exercise books, and clothing.

Even if children could afford to enrol, teachers highlighted that they dropped out in the second half of the year because of seasonal fluctuations in income. Felekech is a younger female teacher who has taught in Leki for three years. This is her first teaching position. She was posted to Leki by the government. She said:

> Produce of last year gradually depletes in the second semester. Sometimes students come without eating their breakfast; this makes them weak and hopeless; and they quit.

A second factor which respondents mentioned as contributing to dropout was that children become disheartened: 'Children say we are poor and we have to earn money. Moreover, they say, even those who have been to school changed nothing.' (Girls Group One, 13 August 2008). From children's reports, achievement and underachievement were very public experiences, which contributed to demotivation. Children's results were in the form of their rank in class compared to peers. Teachers also differentiated between weaker and stronger students in their teaching strategies, and students could recognise easily which students were weaker and stronger. Senayit (introduced in the section on parental illness) said her teacher sat weak students with intelligent students so that they could help one another. When asked how teachers could help struggling students, girls highlighted that students needed encouragement. One girl said that teachers should:

> …ask children questions and if they fail discuss with them…and give children easy activities and when they do that give them a harder one. By doing this it is possible to show them that they can (Girls Group Two, 14 August 2008).

Felekech mentioned that children who start school very late are particularly likely to become demotivated. Tatek, one of the boys interviewed, said that if children are noticeably older than their classmates, 'they are intimidated by attending Grade One as a big boy or girl. In those conditions, they simply quit school.' Dawit added that older children may 'get registered year after year but quit each year they get registered.' Overage children are often frustrated by learning with younger children. Dawit said:

> When they are taught in the same class, the big ones disdain the small kids and feel dishonoured for learning in the same class with the small children. They may even hit them.

Table 2: Enrolment Status Between October 2002 and October 2006 by Gender

Variable	In 2002 (n=633)			In 2006 (n=633)		
	Girls	**Boys**	**Total**	**Girls**	**Boys**	**Total**
Currently enrolled in school	54.25	49.54	51.82	94.44	90.83	92.58
Never enrolled (Zone One)	44.77	48.02	46.29	3.27	4.89	4.10
Dropped out* (Zone Two)	0.98	2.75	1.90	2.29	4.28	3.32
	100.00	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**

*Children are not currently enrolled but have been enrolled in the past
Source: Young Lives older cohort rural sample, 2006

Table 2 shows that the pattern seen in Leki of late starting but almost complete enrolment occurs in the survey data collected across 13 Young Lives villages. In both rounds, data is on 306 girls and 327 boys, 633 children in total. In 2002, when children were roughly eight, only 52 percent of children were currently enrolled. However, when children were roughly 12, 92 percent were enrolled. Differences in enrolment between boys and girls are not statistically significant. Differences in dropout are statistically significant at the ten percent level (the p value on the chi-squared statistic to test association between variables was 0.094). Being a boy is weakly associated with dropping out.

4.2 Grade Progression

Many children interviewed started school at seven, but were in grades much lower than they could be at age 12. The pattern of slow progression between grades in Leki is representative

of the broader sample. I examined the number of grades a child progressed between the first round, between October and December 2002, and the second round, between October and December 2006. If they had been in school continuously and passed all grades, children would have progressed four grades in the period. As shown in Table 3, only 23 percent of children achieved this. At the other extreme, ten percent of children in the sample were in school for some period between 2002 and 2006 but did not pass a year. Teachers and students gave four reasons for slow progression: dropout because of socio-economic constraints (mentioned above), children failing grades, children falling ill and parents falling ill and needing care. The latter two are described more fully in later sections.

Table 3: Grades Progressed Between October 2002 and October 2006 by Gender

Variable		**In 2006 (n=633)**		
		Girls	**Boys**	**Total**
percent who have never enrolled (Zone One)		3.27	4.89	4.11
percent who have been enrolled but dropped out by 2006 (Zone Two)		2.29	4.28	3.32
percent who were enrolled in 2002 and 2006 and progressed 0 grades (Zone Three)		9.80	9.17	9.48
percent who progressed 1 grade		12.09	18.35	15.32
	2 grades	17.65	17.13	17.38
	3 grades	29.74	25.38	27.49
	4 grades	25.16	20.80	22.91
		100.00	**100.00**	**100.00**

Source: Young Lives older cohort rural sample, 2006.

As expected from interviews with national officials, teachers stated that government had a policy that students from Grade One to Four should progress automatically to the next grade if they attended regularly. However, Dawit said, 'for a student who hasn't grasped the necessary knowledge, we make a separate evaluation and force him/her to repeat the grade s/he failed.' Thus children could progress slowly because they failed grades. Possibly because of teachers' reluctance to pass children automatically, Dawit mentioned that the government had recently implemented a policy where teachers were evaluated based on their students' results, giving more incentive to teachers to pass students.

4.3 Attendance

In 2006 the federal government issued a guideline which suggested that schools move from teaching in shifts or for half a day to teaching for a full school day, from roughly 8:00 until 15:00. However, according to interviews with regional education bureau officials, *Woreda* (district) officials in many areas encountered resistance when they suggested this to schools. Resistance came both from teachers and from parents, who wanted the school day to remain half the day so children can work during the other part of the day. Thus national government allowed the length of the school day to be determined by each *Woreda* and school in consultation with parents and the *Kebele* (village) education committee.

According to the 2006 survey, the length of the day varied across Young Lives sites: in some sites rural schools taught three shifts of three hours, while in others schools taught one shift of six hours. The average child in the sample across 13 villages spent 5.08 hours at school. If only the time school takes is considered, schooling in most villages is compatible with work and other activities, because children spend a substantial amount of time out of school. In

Leki, the school day is in only one shift, from 8:00 until 12:15, which is unusually short compared to other Young Lives villages.

Despite the short school day, attendance at Leki school was poor. Felekech said that students often left after the 10:00 break: 'because the school compound is not well fenced.' Absence often had the consent of the teacher. A girls' focus group described teachers allowing children to leave school early to go to paid work (Girls Group One, 12 August 2008). Quubsaa, one of the boys, said paid work on vegetable farms was difficult to get. As a result::

> If we get one [a job], we work. We ask teachers for permission and go to work. The teachers may ask us to bring them some onions and we do accordingly.

Sometimes, parents asked permission for children to miss school to work on family farms. Ramato, another boy interviewed, does not have any brothers, so his father often needed him to help on the farm. His father told him to go to school to get permission to miss school. However, he says his father told him:

> 'In case the teacher denies you permission, go with your books so that you can continue with your learning.'

Ramato did not like missing school:

> …if I miss a class and friends tell me that they learned many things and took some homework, I really feel upset since I lose marks.

Absence is probably underreported in quantitative data. As shown in Table4, eighty-nine percent of 12-year-old children in the 13 villages were enrolled in school in 2006 and missed less than 15 days of school in 2005/6, while five percent were enrolled but reported missing more than 15 days.
It is not possible to measure teacher absenteeism across the sample. However, in Leki this was a major reason for children's irregular attendance. Many respondents, including teachers, said part of the reason for poor attendance of students in Leki in 2007/8 was a severe teacher shortage: the school was missing three teachers of the ten it needed at the start of the year and lost four teachers during the year for health reasons. Even when teachers attended school, they were often late. Kurabachew complained his teacher 'kills our time' by not coming to school on time. None of the children interviewed mentioned dropping out for this reason, but it became clearer why students might not view missing a day very seriously.

4.4 Children's Illness

As shown in Table 4, across the sample children miss school or 'pause' schooling due to their own illness. A higher proportion of children who had had serious illnesses in the last four years had dropped out of school or were enrolled but absent for more than 15 days. The p value on the chi-squared statistic to test association between variables was 0.048, so illness and enrolment and attendance are associated.

Table 4: Schooling Enrolment and Attendance in 2006 by Child Illness

	Serious illness in the last four years (n=633)		
	Yes	No	Total
Never enrolled (Zone One)	3.87	2.43	2.66
Enrolled and dropped out (Zone Two)	5.16	2.06	2.55
Enrolled in 2006 and missed more than 15 days of school in 2005/6 (Zone Three)	10.32	4.37	5.31
Enrolled in 2006 and missed less than 15 days of school in 2005/6	80.65	91.14	89.48
Total	**100.00**	**100.00**	**100.00**

Source: Young Lives older cohort rural sample, 2006.

In Leki, teachers and children mentioned child illness as one major reason for slow grade progression. We interviewed all three children listed as having dropped out of school in the Young Lives sample of 50 children in Leki. All three had fallen ill and been absent from school for long periods, and had not been allowed to return until the following year. While waiting to return to school, all three were well enough to do work for pay and subsistence work.

Shonah's schooling trajectory was interrupted by her own and her mother's illness. She began basic education classes, run in Leki School over the summer to teach children the alphabet, when she was seven years old. After basic education, Shonah began Grade One, but her mother fell ill and Shonah dropped out of school to take on domestic duties. Her mother died later on in the year, and Shonah and her siblings moved to live with her stepmother, her father's senior wife, who is childless. Her father subsequently died.

Shonah enrolled in Grade One again the year after her mother died. However, she became very ill with *ascaris* (roundworm), which can cause malnutrition, fever and stomach pain (Kazura, 2007). By the time Shonah was well, she had missed the mid-year examinations. She was told by the school that she had to start Grade One again at the beginning of the following year. She did and passed to Grade Two, ranked thirteenth in the class. However, she fellill with malaria in the second semester of Grade Two and dropped out again. The school again denied her permission to return. When we met her in mid-2008, she was strong enough to engage in paid work on irrigated land and in household chores. She hoped to return to school in 2008/9, but would repeat the first semester. Shonah was well enough to attend school for substantial portions of the time she was not enrolled, but was not permitted to participate.

Shonah was a highly motivated student. She spoke happily of schooling, saying 'Everything the teacher used to say was interesting.' She said that education 'gets you to the light from the darkness.' She enjoyed being asked to read her homework to the class and sat reading her books during break. She also gained status from being able to read: her neighbours sent their children to her so that she could help with their homework. Her stepmother said that if she ever told Shonah she did not have money to get her a pen, Shonah urged her to do so, saying that she would look after her stepmother when she completed her education.

Although Shonah worked for pay when she was not at school, this does not seem to be the reason she dropped out. She reported that when she was at school, she rarely did paid work in the afternoons because she also had to do chores and would have been too tired. In the 2006 survey, she was enrolled in school and did not report doing any paid work or subsistence

work. She said that she prioritised her education because she thought it was more useful to her than work.

Her stepmother greatly supported Shonah's education, describing how Shonah's success encouraged her to send other children to school. With regard to Shonah's illness, her stepmother said, 'I will send her back to school the coming year if God wills. I won't give up.'

Other children also reported that they had dropped out repeatedly due to illness. Quubsaa failed Grade One twice before being promoted to Grade Two because he was sick and often missed school days. He then dropped out of Grade Two because of illness, but hoped to return to school in 2008/9.

Ramato had also dropped out of school several times. The children with whom he began school are now in sixth or seventh grade, while he is in Grade Three. He said'I haven't ever failed a class, but I usually quit doing the cold sickness. I quit whenever I feel cold, I get sick and quit.' He was sick in Grade One, Two and Three: 'I usually get sick.' He has visited the doctor, but 'it didn't help me much, they give me only injections. I have cold sickness and malaria also.'

One girls' focus group raised illness as a reason the child in their drawing dropped out of school. They highlighted that:

> If they are sick for a long time they will be forced to quit classes. If they have no interest they may stop. They may not know the significance of education. If they are interested, they can still continue after they recover (Girls Group Two, 14 August 2008).

4.5 School Responses to Children's Illness

Shonah had difficulties in persuading the Leki school to allow her to come back to school once she had got better because she had been absent for a long period. She was therefore excluded from school even though she was well enough to attend.

Tigist had a similar experience when she caught yellow fever for two months. She went to the hospital in the nearby town, for which her father paid. She dropped out of school because 'My teachers didn't let me continue; as I had interrupted for two months, they told me that I wouldn't make it up with other children.' Her father tried to negotiate with teachers, but they refused to allow her to return until the following year.

The school does not prevent all students from returning. In Grade Five, when he was ten, Kurabachew fell out of a tree and broke his arm and was absent for about two months. His parents explained this to the school and the school let him return. He passed Grade Five and went into Grade Six. He did not get good grades and his teachers recommended that he repeat Grade Six, which he did the following year.

Chaltu was at another school in the nearby town. She became sick in 2007 with *giardia*, a protozoan parasite causing diarrhoea, abdominal pain, fever and headache, found where water is contaminated with sewage (Hill, 2005). She was absent from school for two months. She

was given tablets which gave her temporary relief, although she was still unwell at the time of fieldwork. She had a rank of 37 in the class, which she attributed to her illness.

Although school policy on absence was generally inflexible, some teachers were highly proactive in assisting sick children by fundraising among themselves and other students to pay for the medical expenses of children who are ill. Kuftu, one of the girls interviewed, said:

> My classmates have the habit to contribute money for the students who felt sick to help the student get treated; when I have no money to contribute I feel unhappy.

4.6 Parental Illness

The first time Shonah dropped out was to care for her sick mother, who subsequently died. Shonah then returned to school the following year. Senayit, the seventh child of nine, had similar experiences during her mother's illness. In 2007, her father had typhoid, gastritis and yellow feverand her mother has tuberculosis. Senayit stopped school in Grade Three when her mother first became ill. Her mother said:

> Her father and I could not afford to support her in her education. We are not physically capable to work and support our children … She used up pens, books and clothes and we did not afford to buy her those materials. Thus she was forced to quit. We hardly afford her meals. She continues her education struggling with the challenges. A daughter of poor family always suffers from many problems.

Senayit returned to school in 2008. However, her parents' illness affected how she allocated her time. Senayit said other students do not do as many hours of household chores as she does. She said of her mother:

> When she was healthy she did all household tasks and cooked my meal. I used to come from school and eat my meal. But now I work all chores without anyone's assistance. I collect firewood, clean the house, make coffee, fetch water, go to market and bake bread for the household.

Senayit had completed Grade Four and was due to start Grade Five in 2008/9. She did chores before she went to school and after school for two to four hours a day. She did paid work on vegetable farms on most weekends for seven hours per day, and after school from two to four in the afternoon when she could get work. She studied from eight to eleven in the evening before going to bed. If she was not doing paid work, she could also study from two to four, which she liked because she could study in the shade outside and was not disturbed. On average, she studied three hours a day.

Senayit's parents said performing chores before and after school did not affect her schooling. However, Senayit said that she did more chores than other children: her chores took two to four hours a day. She felt the responsibility placed on her was greater than on other children. She was ambivalent about the effect of chores on her schooling. They 'consume the time at which I do assignments and read my books' but 'I study and do assignments while or after I carry on the indoor works.' She said her mother and sisters assisted her with chores when she was doing homework.

She had also begun involvement in paid work. In contrast to chores, she said paid work 'consumes my time. It casts shadow on my success.' She was sometimes late for school because she had not completed her work:

> Teachers close the gate against us so that we cannot disturb the class. We kill two or more periods just wandering in the fields. Sometimes teachers beat us…order us to collect rubbish and clean the compound.

She 'was absent many days. I cannot tell you how many days.' This affected her results: 'If we support ourselves by working as daily labourers, we may lose the lessons the other students have been taught ... and score less on tests.'

She needed her paid work to buy pens and books with her wages, but felt that 'such works kill the time at which I read my books and work assignments and completely exhausts me.' When asked how parents should support their children's education, she said, 'Parents should give ample time to their children to read books and prepare themselves for the next class.' Parents need to recognise their children's study time because 'If they order me to work, I work. I cannot disobey them.'

Senayit's parents said she did only a few days' work in the previous year to pay for her pens and books. However, they also said Senayit bought coffee and food for the family. It appeared she did more paid work than her parents claimed.

In focus groups, only girls were described as looking after sick parents. A girls' group described a girl doing badly at school:

> They do engage in paid work. When their mothers are sick they say, 'I have to work and with the money I got I have to buy medicine' (Girls Group Two, 14 August 2008).

Boys said of girls:

> There are girls who quit school due to lack of parental support. They drop out of school because their mothers are sick. In that case, she has to focus on the work quitting her education (Boys Group Two, 24 August 2008).

As shown in Table 5, in the Young Lives sample in 13 villages, illness of children and their household members is a common experience. Of children between ages eight and 12, 17 percent had had a serious illness or injury between 2002 and 2006. ; On average, 19 percent of household members in the child's household were sick for more than 30 days in 2005/6; and 14 percent of households experienced the death of the Young Lives child's parent in the last four years in 2006. Percentages were not significantly different across genders.

Table 5: Child and Household Illness in 2002 and 2006

	In 2002 (n=633)	**In 2006 (n=633)**
Percentage of households where a parental death had occurred in the last four years*	12.01	6.64
Percentage of households where a household member was sick in the last four years	18.64	30.96
Mean percentage of household members who had been sick for more than 30 days in the last year	Data not available	19.07
Mean number of days when the child was unable to do his/her ordinary activities because of illness in the last year	Data not available	13.69
Percentage of children who had had a serious illness or injury in the last four years where their caregiver thought they might die**	21.01	16.59

*In Round 1, this question asked if there had been a death in the household.
**In Round 1, this question asked if children had had an illness where parents thought the child might die.
Source: Young Lives older cohort rural sample, 2006.

4.7 Children's Work

Child work in Leki is described in more detail in Orkin (forthcoming) and Orkin (2010). Descriptive statistics are presented here because children's participation in various types of work is considered in quantitative analysis.

In the 2002 and 2006 Young Lives samples, slightly different questions were asked about time use, shown in Table 6.

Table 6: Questions Used to Measure Child Time Use in 2002 and 2006

	2006 question	**2002 question**
Category of time allocation	I want you to tell me how much time you spent on the following activities during a typical day:	
Paid work	Activities for pay outside of household or for someone not in the household*	Did you do anything in the last year to earn money?
Subsistence work	Tasks on family farm, cattle herding, other family business, shepherding (not just farming)	Not asked
Chores	Domestic tasks (fetching water, firewood, cleaning, cooking, washing, shopping)	Does the child regularly do household chores?
Care	Care for others (younger siblings, ill household members)	Not asked

*32 children were also coded as doing paid work if they had done paid work in the last twelve months but did not say they did any hours of paid work on a typical day.
Source: Young Lives older cohort rural sample, 2002 and 2006.

Table 7 shows the percentage of children who spend any time on a typical day in each of a series of activities. Children can do more than one activity.

A large proportion of children are expected to do chores, with this proportion growing as the children get older. By the time they are 12, almost all girls do chores. When children were eight, in 2002, time allocation for boys and girls was relatively similar. A higher percentage of girls than boys did some chores, but 33 percent of both boys and girls did more than two hours of chores on a typical day, and similar proportions of girls and boys – around ten percent – did paid work.

Four years later, the total proportion of children doing particular activities had not changed very much. However, strong gender differentiation in the types of work children did becomes apparent. T-tests on comparisons of means for all comparisons mentioned are significant at the five percent level. Much higher proportions of 12-year-old girls than boys cared for others and did more than two hours of chores. Much higher proportions of boys than girls did paid and subsistence work, although nearly half of girls did subsistence work.

Table 7: Tasks on a Typical Day by Gender in 2002 and 2006

Variable	**In 2002 (n=633)**			**In 2006 (n=633)**		
In a typical day, % of children who spend some time on	**Girls**	**Boys**	**Total**	**Girls**	**Boys**	**Total**
Caring for others				45.42	29.05	36.97
Chores	75.16	64.11	69.46	96.08	77.68	86.57
Chores (of more than two hours)	33.01	33.03	33.02	62.09	26.30	43.60
Paid work	10.46	11.01	10.74	6.86	14.07	10.58
Subsistence work				44.12	77.98	61.61

Source: Young Lives older cohort rural sample, 2002 and 2006

Table 8 shows that the average twelve-year-old boy did three-and-a-half hours of chores compared to two-and-a-half for the average girl.Means for paid work are biased downwards because many children do not do paid work. Examining only children who did paid work, girls did an average of 2.523 hours and boys an average of 2.025 hours on a typical day.

Table 8: Sample Means of Hours Spent on Tasks in a Typical Day by Gender in 2002 and 2006

	In 2002 (n=633)			**In 2006 (n=633)**		
Variable	**Girls**	**Boys**	**Total**	**Girls**	**Boys**	**Total**
Mean hours spent in a typical day						
Caring for others				0.847	0.462	0.648
On domestic tasks	1.905	1.801	1.852	3.073	1.689	2.358
On paid activities outside home				0.157	0.224	0.191
Working on family farm or business				1.264	2.791	2.052

Source: Young Lives older cohort data Round One and Two, rural sample 2002 and 2006

Table 9 shows children's combination of activities when they were 12, in 2006. Roughly seven percent of children, like Shonah, were not in school. Only five percent of children in the sample go to school and do less than two hours of chores or caring. Dasse and Senayit fell into the nine percent who were at school and did paid work. However, neither said they did any paid work on a "typical day", possiblythey did paid workmainly on weekends, during holidays and some days after school. Figures of children involved in paid work may be underestimates.

The combination of activities that children do varies highly significantly (p=0.000) by gender, on a chi-squared test. As seen in previous tables, girls tended to combine chores or chores and subsistence work with school; whereas boys tended to combine subsistence work with school. This gender differentiation appears only as children get older: the association at age eight is not significant.

Table 9: Children's Combination of Activities in 2006, when they are 12

Variable		**In 2006 (n=633)**		
		Girls	**Boys**	**Total**
% not in school		5.56	9.17	7.42
% in school				
	and doing paid work*	6.86	11.31	9.16
	and doing subsistence work and more than two hours of chores/care	25.82	18.35	21.96
	and doing subsistence work	12.42	43.73	28.59
	and doing more than two hours of chores/care	45.75	10.40	27.49
	and doing no other activities	3.59	7.03	5.37
		100.00	**100.00**	**100.00**

*They may also spend time on other types of tasks.

Source: Young Lives older cohort rural sample, 2002 and 2006

5. Time Allocation to Work and School in Quantitative Data

I undertake econometric analysis on survey data on all 633 rural children to explore the effects of children's illness,the burden of illness in the household and parental death on schooling participation. I use two relatively similar specifications to examine two groups of outcomes.

5.1 Econometric Specification: Children's Time Allocation to Work

The first group of outcomes is whether children are engaged in different types of work. Here, the specification is based on Cigno and Rosati's (2005) theoretical model of the determinants of child time allocation. Similar specifications are used by Dillon (2008) to examine the effects of parental illness and income shocks on child time allocation, Beegle *et al*. (2006) to examine crop loss shocks, Duryea *et al*. (2007) to examine household income shocks, and Fafchamps and Wahba (2006) to examine household composition. The specification is a standard latent variable model which predicts the probability of a dichotomous outcome (Wooldridge, 2002).

Outcome variables are dummies equal to one if a child allocated some time (more than an hour) on a typical day to the activity.

$$Task_{ij}^{*} = \beta X_i + \gamma H_i + \phi shock_i + v_i \text{ where } v_i = c_j + \varepsilon_{ij}$$
$$Task_{ij} = 1 \text{ if } Task_{ij}^{*} > 0$$
$$Task_{ij} = 0 \text{ otherwise.}$$

X_i is a vector of child characteristics and H_i is a vector of household characteristics. $shock_i$ is a shock or event in the household, in this case illness or death. v_i is a composite error term made up of c_j, a village or cluster effect on each child, and ε_{ij}, a child/household unobservable, which is assumed to have a standard normal distribution.[13]

Probit equations are run independently for four outcomes: whether children are engaged in paid work, subsistence work, chores, and caring for a household member on the average day. So, $Task_{ij}^{*}$ above may represent $Paid_{ij}$, $Subsistence_{ij}$ etc.

All coefficients on independent variables are reported as marginal effects. In the equation $Paid_{ij} = \beta X_i + \gamma H_i + \phi shock_i + c_j + \varepsilon_{ij}$, the outcome variable is the probability that a child is involved in paid work. The marginal effect of a household variable H_i, for example, the number of adults in the household, is the partial change in the probability of a child doing paid work if the child lives in a household with seven adult members compared to six, conditional on all the independent variables.[14] All other variables are held constant at

[13] Cluster and village are used interchangeably.
[14] More technically, the marginal effect is the partial derivative of the predicted probability with respect to the particular independent variable (Long, 1997: 69-72).

their mean in the sample. The discrete change for binary independent variables is calculated. The significance and sign of the marginal effects is considered.[15]

5.2 Econometric Specification: Exclusion from School

The first specification is used to derive the probability that a child with a particular characteristic will participate in particular types of work. The second specification is used to derive the probability that a child with a particular characteristic will fall into one of the three CREATE zones of exclusion. Outcome variables are dummies equal to one if a child falls into the particular zone of exclusion.

$$Excluded_{ij}^{*} = \beta X_i + \gamma H_i + \phi shock_i + v_i \text{ where } v_i = c_j + \varepsilon_{ij}$$
$$Excluded_{ij} = 1 \text{ if } Excluded_{ij}^{*} > 0$$
$$Excluded_{ij} = 0 \text{ otherwise.}$$

So, $Excluded_{ij}^{*}$ above may represent $Zone\_1_{ij}$, $Zone\_2_{ij}$ etc. The specification assumes it is not possible to distinguish factors that influence the decision to do different types of work from the decision to enrol and remain in school. The same regressors are therefore used in regressions for different outcomes. However, because the equations are independent, it is assumed that error terms do not correlate across equations.

For all specifications, like Fafchamps and Wahba (2006), I use cluster-level fixed effects, taking advantage of the clustered sampling design (Deaton, 1997: 73-74). Effectively, children are compared to other children in the same cluster or village. The specification thus controls for all observed and unobserved factors at the cluster level which influence outcomes. Examples of cluster-level variables which might affect outcomes include:

- Distance to facilities, such as health centres, other forms of medical treatment or schools (children within each village live relatively close together);
- Costs of school materials such as uniforms and books – all children in a village are likely to use the same market; and
- Availability of amenities in the cluster, such as roads.

Ideally, a school fixed effect would be used to account for differences in quality of schools, which might affect household decisions about children's time allocation.[16] This was not possible with the data available. However, because all sites are rural, the majority of the 50 enrolled children in each site attended the nearest village primary school. Even if children attended more than one school, schools were probably to be of roughly similar quality. No children in the rural Young Lives sample attended private schools.

[15] Magnitude of marginal effects cannot be compared across different specifications of a regression because it depends on the values of other regression coefficients and the mean value of the other independent variables. One can compare the magnitude of marginal effects within the tables which follow, but not between tables.

[16] Reviews of studies on the impact of school inputs on school enrolment and participation generally find the impact of individual inputs to be insignificant, but also that the impact of being in particular schools (as measured by school dummies) is significant (Glewwe and Kremer, 2006; Hanushek, 1995; Hoenack, 1996). This may be due to unobservable factors such as teacher and management motivation or incentives.

White's (1980) standard error calculation accounts for loss of precision due to clustering. Non-response and attrition between rounds are minimal. The sample is not representative, so data are not suitable for calculating representative indicators for Ethiopia as a whole. Nonetheless, I can draw conclusions about the sample villages and those similar to them, because the sample was random within villages (Ward, 1983). Additionally, data are suitable for within-sample descriptive and exploratory analysis, and particularly for examining child and household behaviour over time (Woldehanna *et al*., 2008).

Table 10: Control Variables

	Variable name	Notes
Child variables		
Standardised height-for-age	Height-for-age	The Z-scores calculated by Young Lives are used. A child's Z-score is the number of standard deviations the child's height-for-age is below or above the mean value of height-for-age (WHO Expert Committee on Physical Status, 1995: 176).
Child is not of the same ethnic group as the dominant group in the survey site	Minority ethnic group	
Gender (=1 if male)	Male	
Household variables		
Child is the grandchild, sibling, stepchild or other relative of the household head, not the biological child	Not biological child	
Number of children under five in the household	Children under five	
Number of children between five and sixteen in the household	Children six to sixteen	
Number of adults in the household	Adults	
Birth order	Eldest child (base category), middle child, youngest child	
Mother's education (=0 if mother not present or dead)	Mother's education	Adult literacy classes are counted as one year of education.
Father's education (=0 if mother not present or dead)	Father's education	
Household asset controls		
Log durables per capita	Log durables p/c	
Log herd value per capita	Log herd value p/c	
Household access to irrigation (=0 if household has no land or non-irrigated land)	Household irrigation	
Household plot size (hectares) (=0 if no land)	Land size	Land is measured in local units in the survey. Conversion ratios to hectares from the Ethiopian Rural Household Survey were used (Dercon, 1996).
Illness variables		
Death of parent between 2002 and 2006	Parental death between 2002 and 2006	Values of 0, 1 or 2. 1 is allocated if father dies and 1 if mother dies.
Percentage of household members sick for more than 30 days in 2005/6	Percentage ill household members in 2005/6	Ethiopia uses a different calendar, so when questions ask about 'the last year' this refers to September 2005-September 2006.
Household member was seriously ill in between 2002 and 2006	Household illness between 2002 and 2006	Values of 0, 1, 2 or 3. 1 is allocated if father is sick, if mother is sick or if one (or more) household members is sick.
Days of child illness in 2005/6	Days of child illness in 2005/6	The question asks for the number of days when the child was unable to do his/her ordinary activities because of illness.
Child had a serious illness between 2002 and 2006	Child illness between 2002 and 2006	The question asks whether the child had had an illness where the caregiver thought they might die.

Source: Young Lives older cohort rural sample, 2006

Table 11: Descriptive Statistics for Control Variables in 2002 and 2006

Variable	In 2002 (n=633)	In 2006 (n=633)
Mean of standardised height-for-age score	-1.62	-1.49
% girls		48.43
% children who are from a minority ethnic group in the cluster	7.05	7.84
% children who are not biological child of household head	6.95	11.37
% children who are the eldest child		22.43
% children who are a middle child		60.98
% children who are the youngest child		16.59
Mean number of children in the household under five	0.894	0.678
Mean number of children in household between five and sixteen	2.040	2.894
Mean number of adults in the household	2.780	3.204
Mean household size	5.68	6.77
Mean of mother's education		1.245
Mean of father's education		2.385
Mean of household durables per capita (2006 prices)	43.94	691.64
Mean of log household durables per capita (2006 prices)	2.750	4.179
Mean of household herd value per capita (2006 prices)	665.92	635.22
Mean of log household herd value per capita (2006 prices)	5.068	4.764
% of households owning some land	85.31	100.00
Mean size of household plot (hectares)	1.001	1.443
% of households with access to irrigation	6.00	28.571

Source: Young Lives older cohort rural sample, 2002 and 2006

5.3 Causal Interpretations

The time allocation model is usually estimated in reduced form, which shows that there is a relationship between two variables, which, if independent variables can be assumed to be exogenous, is said to be causal. Within a positivist framework, there are three conditions to establish a causal relationship (Davis, 1985). The first positivist condition, a relationship between the variables (characteristics and time allocation), will be demonstrated for my purposes through regression. The second condition is that the possible cause is prior in time to an effect. This need not require longitudinal data: for instance, within a given round of data-gathering, children's gender and their parents' education clearly occur prior to child time allocation decisions. The third condition is that relationships between variables are not spurious.

For household assets variables, only the first condition for causality can be satisfied. For some child and household characteristics and for child and parental illness and parental death, the first and second conditions are satisfied because the relevant control variables are conceptually prior to the outcomes (Halfpenny, 1982: 79). For example, children's gender or parental education is conceptually prior to decisions about children's time allocation. Questions about illness and death ask about the year or four years before the survey was conducted.

However, omitted variable bias due to time-invariant household unobservables is highly likely, so the third condition for causality is not met. I controlled for omitted variables at a village level (Dillon, 2008; Fafchamps and Wahba, 2006). However, I could not use household fixed effects (as in Beegle *et al*., 2006) or child fixed effects, which would have

provided stronger causal evidence.[17] So for most variables, I merely note correlation is present.

Omitted variable bias due to time-invariant household unobservables would arise if children or households that suffer child ill health, household ill health or death are systematically different from children or households that do not. It is impossible to test whether health shocks are exogenous, because it is always possible that suffering shocks is correlated with unobservable characteristics. However, following Beegle *et al.* (2006: 84), in Appendix 1, I examine whether shocks can be predicted by observables and whether shocks are persistent. Health shocks may be correlated with certain household or child characteristics. Poorer households may be less likely to have tap water or adequate sanitation and thus more susceptible to diseases caused by poor sanitation, for example. Testing whether shocks are predictable – highly correlated with observable variables – is useful for two reasons. Firstly, one can ensure to control for determinants of shocks in time allocation regressions to better isolate the effects of shocks. Secondly, if shocks are highly correlated with observable characteristics this might suggest that shocks are not idiosyncratic but are also related to unobservable characteristics. This would raise concerns about omitted variable bias.

Table 15 examines shocks as outcome variables using probit regressions to derive the probability that a child or household will suffer a particular health shock. Time-invariant characteristics include child's early health and nutrition (measured by height-for-age), the child's gender and parental education. Household assets are the only time-variant variables. I use the lagged value of household assets as these would plausibly be prior to shocks.

$$Shock_{i.2006} = \propto X_i + \delta H_i + \varphi assets_{i.2002} + v_i \; where \; v_i = c_j + \varepsilon_{ij}$$

There are few significant predictors of shocks. Children from households with larger landholdings, one measure of longer-term household wealth, are less likely to have been ill for longer than 30 days. Such households are also less likely to have more than 30 percent of their members sick for more than 30 days. This may reflect that wealthier households are more able to afford treatment for illnesses, so that even if members fall ill they are sick for less long. Landholding remains relatively stable over time, so in regressions it is not necessary to control for both landholding in 2006 and landholding in 2002. But once landholding is controlled for, the explanatory power of the characteristics considered is low. I do not conclude that shocks are exogenous, but merely that they are relatively idiosyncratic.

The second consideration is whether shocks are transitory. If households which experienced a shock are more likely to experience future shocks, they might anticipate and attempt to compensate for permanent reductions in income (Beegle *et al*., 2006: 84). Table 16 examines whether health shocks are predicted by health shocks in the preceding period. The analysis is limited because variables measuring days of illness of children or household members in the last year were not available in Round One of the survey. Three of the variables considered in Round Two were available in Round One and are examined: whether there had been household illness, a serious child illness or a parental death in the last four years.

[17] There was no data on time allocation in the first round of data collection. In addition, there are only two rounds of data, so independent variables change for very few households and children. Coefficients from fixed effects estimation would be consistent, but standard errors on coefficients would be inflated, making inference difficult.

$$Shock_{t,2006} = \propto X_t + \delta X_t + + \varphi assets_{t,2002} + \vartheta shock_{t,2002} + v_t$$

The only shock to show persistence is death: households which experienced a death between 2002 and 2006 were more likely to have experienced a death between 1998 and 2002. Otherwise, shocks are transitory over a four year period. They may persist over a shorter period, but it is not possible to test this with the data available.

5.4 Children's Time Allocation to Work

In all tables, each column represents a separate equation with a different dependent variable. The first number in each cell is the marginal effect. The number in brackets is the p-value. Cluster fixed effects are significant in all specifications but not shown.

In regressions considering children's time allocation to work, I used measures of illness which captured whether children or household members had been ill in the last year (2005/6), because I assumed that recent illness was more likely to influence time allocation at the time of the survey (2006/2007). Results are shown in Table 12.

Children in households where a higher percentage of household members had been ill for more than 30 days were more likely to do paid work, possibly to substitute for sick household members or to cover the costs of payment for medicine. This result shows that Senayit's experiences are prevalent more broadly.

If children had often been ill in the previous year to the extent that they were unable to do their ordinary activities, they were less likely to do household chores, probably because they were not strong enough. They were more likely to care for other household members, perhaps because they were at home and unable to do any other activities, and caring tends not to be very strenuous.

If a parent had died in the last four years, this did not affect children's time allocation at the time of the survey in 2006/2007. It would be unwise to conclude from this result that parental death does not affect child time allocation.The result may arise because of the long time period during which the death could have occurred. In this paper, if children whose parents died four years ago have now returned to their previous patterns of time allocation, this would cancel out any effect of death on children whose parents had died more recently.[19]

[19] Alternatively, results in the Appendix suggest that households which suffer death during one survey period are likely to suffer death again in the following period. This may be because parents are of similar age or have similar illnesses, for example. Households may anticipate the loss of income that arises from death and not need to alter child time allocation.

Table 12: Probit Regressions:Children's Involvement in Different Activities in 2006

Marginal effects calculated at the mean of independent variables with standard errors corrected for clustering

	Paid	Subsistence	Chores (>2 hours)	Care
Height-for-age	0.00323	0.00365	0.0235	0.00960
	(0.472)	(0.880)	(0.169)	(0.685)
Male	0.0285***	0.501***	-0.414***	-0.188***
	(0.00679)	(0)	(0)	(0.00462)
Minority ethnic group	-0.00912	0.0160	0.0479	0.0200
	(0.217)	(0.912)	(0.529)	(0.815)
Not biological child	0.0335	0.161*	0.0257	-0.00224
	(0.215)	(0.0634)	(0.740)	(0.976)
Middle child	0.0180	0.107	0.0134	-0.0137
	(0.136)	(0.200)	(0.879)	(0.796)
Youngest child	0.00712	0.116	-0.0594	-0.108
	(0.675)	(0.282)	(0.455)	(0.212)
Children under five	-0.00901	0.0232	-0.0576	0.246***
	(0.131)	(0.554)	(0.246)	(1.96e-08)
Children six to sixteen	-0.00327	0.0274	-0.0356	0.0154
	(0.553)	(0.267)	(0.244)	(0.493)
Adults	0.00317	-0.0394	-0.00407	-0.00385
	(0.465)	(0.170)	(0.794)	(0.869)
Mother's education	-0.00482***	-0.0341**	0.00146	-0.00719
	(0.000168)	(0.0332)	(0.921)	(0.470)
Father's education	-0.00171	-0.00212	0.00969	-0.000289
	(0.233)	(0.801)	(0.320)	(0.970)
Log durables p/c	-0.00536*	0.0208	-0.0428***	-0.0250
	(0.0911)	(0.415)	(0.00298)	(0.194)
Log herd value p/c	0.000283	0.108***	-0.0206*	-0.0116
	(0.867)	(0)	(0.0692)	(0.198)
Land size	0.000169	-0.107***	0.0495	0.00402
	(0.981)	(0.000549)	(0.142)	(0.826)
Household irrigation	0.00357	-0.0105	-0.0234	0.0543
	(0.752)	(0.880)	(0.737)	(0.114)
Parental death between 2002 and 2006	0.00890	0.0561	0.0330	-0.00878
	(0.354)	(0.511)	(0.557)	(0.900)
Percentage ill household members in 2005/6	0.0554**	-0.162	0.134	0.155
	(0.0484)	(0.477)	(0.255)	(0.348)
Days of child illness in 2005/6	1.70e-05	-0.000183	-0.00158***	0.00135**
	(0.876)	(0.667)	(0.00151)	(0.0182)
Cluster fixed effects are included but not displayed				
Observations	625	625	625	625
Pseudo R-squared	0.299	0.422	0.299	0.226
Percent correctly predicted	89.92	81.92	89.92	75.68

Robust p-values in parentheses: *** p<0.01, ** p<0.05, * p<0.1

Source: Young Lives older cohort rural sample, 2006

5.5 Exclusion from School

In the regressions which follow, children in zone one have never enrolled. Children in zone two had enrolled at some stage but had dropped out when the survey was conducted in 2006. Children in zone three are those assumed to be at risk of dropping out for one of two reasons: they missed more than 15 days of school in the 2005/6 school year (considered as one

outcome variable)) or they have repeated grades or progressed slowly (considered as a second outcome variable).

I use two different definitions of child and household illness. To consider whether children are in zone one (never enrolled) or in zone three (currently enrolled but progressed slowly), I consider whether the child was ill or a member of the household was ill in the last four years. Enrolment decisions were made each year since the child turned seven and was allowed to enter school. Whether a child is in zone one (never enrolled) could have been influenced by illness in any of the years between when the child was seven and twelve. I cannot capture illness when children were seven, but can capture illness in the following four years. In 2006, when children were roughly twelve, families are asked about whether children or household members were ill since the last survey in 2002, when children were roughly eight. Similarly, whether a child is in zone three – at risk of dropping out because they have repeated grades or progressed slowly – could have been influenced by illness in any of the years between 2002 and 2006.

The second definition of child and household illness captures illness in the 2005/6 calendar year, the same period in which the child's school attendance is captured. I use this definition when analysing factors influencing the probability that children have dropped out (children are in zone two) or that they have missed more than 15 days of school (children are in zone three).

The child illness variable captures the number of days when the child was unable to do his/her ordinary activities because of any type of illness. The household illness variable captures the percentage of household members sick for more than 30 days in the 2005/6 calendar year.[20]

Information is only available on whether a child's father or mother died between 2002/2003 and 2006/2007, but not on whether they died in the year immediately preceding the survey round, 2005/6. I therefore use the same variable to measure the effect of parental death for all four outcome variables, although ideally I would examine the immediate effects of parental death.

Results are shown in Table 13. Whether a child had a serious illness in the last four years has no effect on the probability that children did not enrol at all (children fall into zone one). In contrast, not being stunted had a small but significant negative effect on the probability that children were never enrolled, so being stunted increased the likelihood of exclusion. Illness is unlikely to deter children from enrolling at any point: they can just wait until they are better. But stunting may reflect early, serious health problems that mean children cannot attend school. Alternatively, they may have been assessed by teachers as not being school-ready because they were very small, and have lost interest in school by the time they are twelve.

Illness in 2005/6 had no effect on whether children were in zone two: they had dropped out in 2006/7. Children may have dropped out in 2005/6 due to illness and returned to school by 2006/7. More surprisingly, illness in 2005/6 did not affect attendance in 2005/6. This is unexpected: qualitative data showed that children who were ill often missed large amounts of

[20] This definition of the variable ensures that households of different sizes facing similar burdens of illness are treated the same.

school because they did not get treatment quickly. This may occur because missing school is underreported.

Serious illness in the last four years increases the likelihood that children will be in zone three and have progressed zero, one or two grades in the last four years. This finding echoes the experiences of numerous children in the qualitative sample, who dropped out in the year they were ill because they had missed large amounts of school, returned to school the next year and had to repeat a grade. In Kurabachew and Shonah's case this happened more than once, so they were behind a number of years. It may also pick up the effects of children dropping out in the year they were sick and returning to school the following year. The size of the effect of serious illness was similar to the size of effect of being stunted, but the effect of stunting has been much more widely captured in the literature.

If a higher proportion of household members were ill the previous year, children were more likely to have dropped out or missed more than 15 days of school. This concurs with findings from qualitative work, which finds that children are absent when they have to take on the increased workload of paid and unpaid work, which results from many household members being ill.[21]

The death of a parent in the last four years did not appear to affect school enrolment, attendance or progression. The literature predicts that children who have lost parents are less likely to be enrolled and to attend regularly. Qualitative evidence explains this discrepancy for enrolment: it shows that children 'paused' school for a year after parents were sick or died, but often returned the following year. The only measurement of parental death in the survey is whether parents died in the last four years, so the effect of death on children's enrolment may have passed. For attendance, this result may arise because missing school is underreported by households, or because of the long period over which the survey measures whether parental death has occurred.

However, it is puzzling that on average a parental death does not affect children's progression. Progression is not examined in other studies, although studies do find that children who lost parents are likely to complete fewer years of schooling in total. Qualitative work found that children tended to drop out the year their parent died and return the following year, so there should be some effect on progression.

The other variables considered are also of some interest. I discuss results across both tables. Boys are more likely to engage in paid and subsistence work and less likely to engage in chores and caring work than girls. This concurs with qualitative work, where children mentioned the same type of work for the younger boys and girls – herding smaller animals, fetching water and wood and looking after siblings – but clearly differentiated tasks between genders when children were 12. There is no difference in the probability of being in any of the zones of exclusion across genders. In qualitative work, neither teachers nor children highlighted major gender differences in children's schooling participation.

Height-for-age does not have any impact on children's allocation of time to different tasks. However, as expected from the literature, having a greater height-for-age z score (being less

[21] This is not because of collinearity between household illness and parental death leading to the household illness variable picking up the effects of the death variable. The two variables only have a correlation coefficient of 0.02.

stunted) decreases the likelihood that children never enrol and decreases the likelihood that they will progress slowly through school. As other literature predicts, children who have a higher height for age score are less likely never to enrol and less likely to progress slowly through school.

Table 13: Probit Regressions:Children's Exclusion from School in 2006

Marginal effects calculated at the mean of independent variables with standard errors corrected for clustering

	Zone One (never enrolled)	**Zone Two (enrolled at some stage but dropped out)**	**Zone Three (currently enrolled but missed more than 15 days)**	**Zone Three (currently enrolled but progressed 0, 1 or 2 grades in 4 years)**
Height-for-age	-7.41e-05**	-4.83e-06	0.000422	-0.331***
	(0.0140)	(0.112)	(0.116)	(2.34e-06)
Male	9.46e-05	6.50e-06	0.000287	0.225
	(0.340)	(0.203)	(0.798)	(0.120)
Minority ethnic group	0.00278**	-4.02e-06	-0.000337	0.0288
	(0.0111)	(0.293)	(0.490)	(0.947)
Not biological child	0.00119***	0.000220*	0.00201	0.542*
	(0.00164)	(0.0544)	(0.274)	(0.0827)
Middle child	0.000138	9.15e-06	0.00169	0.340**
	(0.125)	(0.158)	(0.143)	(0.0447)
Youngest child	3.30e-05	8.68e-07	0.00150	-0.0538
	(0.715)	(0.939)	(0.247)	(0.702)
Children under five	4.96e-05	1.27e-06	0.000504	0.115*
	(0.211)	(0.656)	(0.472)	(0.0790)
Children six to sixteen	-4.98e-05	-2.78e-06	-0.000195	-0.178***
	(0.194)	(0.217)	(0.596)	(6.15e-05)
Adults	3.21e-05	2.01e-06	0.000238	-0.000803
	(0.412)	(0.388)	(0.496)	(0.979)
Mother's education	-1.27e-05	-4.40e-06***	-9.57e-05	-0.0691***
	(0.350)	(0.00737)	(0.665)	(0.00400)
Father's education	1.41e-06	-2.39e-08	-1.57e-05	-0.0363
	(0.936)	(0.980)	(0.940)	(0.188)
Log durables p/c	4.50e-06	-4.60e-06**	3.62e-05	0.0393
	(0.845)	(0.0250)	(0.825)	(0.231)
Log herd value p/c	-2.31e-05**	7.68e-07	0.000131	-0.0262
	(0.0430)	(0.495)	(0.594)	(0.329)
Land size	4.67e-06	5.10e-07	-0.00152**	0.00389
	(0.924)	(0.842)	(0.0115)	(0.963)
Household irrigation	-0.000126***	-1.72e-05*	0.000521	-0.176
	(0.00409)	(0.0503)	(0.762)	(0.161)
Parental death between 2002 and 2006	-3.92e-06	-3.53e-06	-0.000233	0.116
	(0.931)	(0.157)	(0.811)	(0.428)
Percentage ill household members in 2005/6		3.35e-05**	0.00575**	
		(0.0397)	(0.0209)	
Household illness between 2002 and 2006	-3.81e-05			0.0475
	(0.221)			(0.494)
Days of child illness in 2005/6		1.78e-08	-1.21e-05	
		(0.669)	(0.193)	
Child illness between 2002 and 2006	0.000190			0.262**
	(0.170)			(0.0190)
Observations	625	625	625	625
Adjusted R-squared				0.355
Pseudo R-squared	0.279	0.464	0.189	
Percent correctly predicted	96.16	97.60	94.56	

Robust p-values in parentheses: *** p<0.01, ** p<0.05, * p<0.1
Source: Young Lives older cohort rural sample, 2006

I do not control directly for poor nutrition at the time of the survey using BMI or weight-for-age, the equivalent index used for younger children. Firstly, these indices are sensitive enough to short-term changes in nutrition that they vary seasonally. Data in the Young Lives survey were collected over an eight month period, so children in some sites will have worse nutritional indicators than others purely because of the season in which data were collected. Secondly, current nutrition is also one measure of current consumption. Other time allocation studies tend not to include measures of current consumption because they worry that this will generate a reverse causality problem (households whose children work may have higher consumption if one measures both variables in the same period) (Beegle *et al*., 2006; Cockburn and Dostie, 2007; Dillon, 2008). Studies prefer to use measures of longer-term household socio-economic status, such as household assets, as these are less likely to change over short periods of time. Finally, in this data, current nutrition correlates strongly with household assets (Woldehanna *et al*., 2008), to the extent that including both variables in a regression would generate collinearity problems. I thus prioritise avoiding reverse causality by using longer term asset measures. The data is not collected over a short enough time period to enable me to examine the effects of shorter term fluctuations in income and thus in nutrition on school attendance.

As in other studies (Beegle *et al*., 2006; Cockburn and Dostie, 2007; Dillon, 2008) outlined above, assets and durables are used instead of measures of household income. Children from families with more durable goods were less likely to do paid work and chores, probably reflecting that richer families did not need children to earn income and could hire workers to do chores. Children from families with larger herds were more likely to do subsistence work, probably capturing that they did more herding. However, this did not appear to affect schooling: children whose families had larger herds or had irrigation (also a reflection of wealth) were less likely never to enrol or to enrol and drop out. This provides some support for the argument that high schooling costs make children less likely to enrol or cause them to drop out.

If children have educated mothers, they were less likely to do paid or subsistence work, perhaps reflecting that parents who are educated try to prevent children from doing activities which they worry will conflict with schooling. They were also less likely to progress slowly through school. This could reflect that educated mothers prioritise children's schooling and do not ask them to 'pause' school when families are short of resources or in need of children's labour. It could also reflect that educated mothers are more able to help children with their schoolwork.

If there are more children between six and sixteen in the child's household, they are less likely to progress slowly through school. There may be more siblings to share the burdens of caring and work that may cause children to 'pause' school, or siblings may help children with their schoolwork.

Children from minority ethnic groups and children who are not the biological child of the household head (step-children, children of extended relatives or foster children) are more likely never to enrol or to enrol and drop out. Children who are not the biological child of the household are also more likely to progress slowly through school.

6. Conclusion

This paper used qualitative descriptions from a particular village to develop theoretical propositions about how children's illness, illness in the household and parental death affect children's time allocation to work and participation in school. The paper then tested these theoretical propositions using quantitative analysis on a larger dataset. The paper focuses on schooling participation, including progression through the first four grades, and not on educational attainment.

6.1 Qualitative Analysis

Qualitative analysis largely concurs with the results of previous qualitative studies. In Ethiopia, as in many other African countries, there is nearly complete enrolment, although children often enrol late. Children were often absent, and many children progressed slowly from grade to grade. Child and parental illness and death were major reasons for patchy attendance and slow progression. Health care was expensive and difficult to access, so when children suffered from common illnesses, such as malaria, worms and diarrhoea, they were often absent or dropped out.

When considering **the effects of children's own illness**, one new finding of qualitative research was that the extent to which children were excluded because of their own illness was often dependent on the individual responses of teachers to children in difficult circumstances. On one end of the spectrum, some teachers were very proactive in attempting to keep sick children in school: they raised money for children who were sick and needed to pay for treatment. On the other end of the spectrum, some teachers did not allow children who had missed substantial amounts of school to return to school at all that year and required them to wait until the following year. This seemed to depend on the particular teacher concerned, as schools didn't have a uniform policy on how teachers should respond to children's illness. A boy in the village studied and one girl at school in another village were allowed to return to school, while other children had to repeat the grade the following years. The two children who returned to school in the year when they had missed a lot of school struggled academically, and one had to repeat the year, partly because they received no assistance from teachers to catch up missed work.

Previous research about **the effects of household illness and death** on children's time allocation and schooling participation has found that children, particularly girls, often had an increased workload of chores and caring when household members were sick or when parents died. Some research found that such children would attend less regularly and were more likely to drop out, although this was not always the case. Qualitative research agreed with these findings. All the children whose parents were ill or had died were girls, so it is difficult to tell if the increase in workloads affected girls more.

Qualitative research added two new findings. Firstly, if children dropped out because of a household member's illness or a parent's death, they often only 'paused' schooling for a year and then returned to school afterwards. They thus progressed more slowly through school. Secondly, the change in schooling participation related to sick household members depended on the type of work which children were doing. When family members were sick, children had increased workloads at home, which might make them late for or absent from school, but rarely meant they dropped out. But children with sick family members were more likely to do

paid work to earn income for buying medicine and general household consumption. They would miss school often to perform paid tasks, and tended to drop out.

6.2 Quantitative Analysis

The quantitative analysis in this paper extends current research in three ways. Firstly, it considers the effect of children's illness, household illness and parental death on children's time allocation to work as well as their participation in school, which is a new area for quantitative research. Secondly, unlike research based on randomised trials, the paper is able to examine the effects of ill health in general rather than the effects of specific illnesses. Finally, the paper is able to compare the effects of children's earlier health status (measured by whether they are stunted), children's current illness, parental illness and death on time allocation and schooling participation.

Although qualitative work has highlighted **the effect of children's own illness** on their schooling participation, this has been covered to a limited extent in quantitative work. Randomised trials find that reductions in worm infection and anaemia improve school participation. Retrospective studies have examined the effects of children's health and nutrition in early childhood, and find that if children are stunted (a proxy for poor early health and nutrition), they will enrol late and progress more slowly through school. The effects of child illness in general and the effects of illness on time allocation rather than school participation have not been examined.

This paper finds that sick children were less likely to do household chores, probably because they were not strong enough, and more likely to care for other household members, perhaps because they were at home and unable to do any other activities.

Illness had no effect on the probability that the child enrolled at all or on whether children had dropped out. The latter may be because dropout was measured in the year after illness, not in the year of illness.. In contrast, not being stunted had a small but significant negative effect on the probability that children were never enrolled, so being stunted increased the likelihood of exclusion. Illness also had no effect on attendance, which is unexpected given qualitative data. This may occur because missing school is underreported.

As expected, illness increased the likelihood that children progressed slowly through school. In these estimates, the size of the effect of serious illness was similar to the size of effect of being stunted, although the effect of stunting was slightly larger. Given the size of this effect in this data, it is surprising that the literature has focused so much more on the effects of stunting than on the effects of current sickness.

When considering **the effects of parental death**, other quantitative studies find that children whose parents have died are less likely to enrol and to attend one to two years before the death and afterwards. They are likely to complete fewer years of school in total.

I have somewhat less accurate findings because I cannot pinpoint the exact year of the parent's death within a four-year period. I find parental death does not affect children's time allocation, but this may be because of the long time period during which the death could have occurred. Death also does not appear to affect school enrolment, attendance or progression. Qualitative research showed that children paused school for a year after parents were sick or died, but usually returned the following year, so they would have returned by the time data

were captured. The result on progression is puzzling given qualitative evidence that children tended to drop out in the year when their parent died and return the following year.

The literature has varying findings on **the effects of illness in the household**. Some studies find that children miss school and drop out to care for household members, while others find they are not absent more often and do not drop out. Unlike for death, I find that a higher proportion of household members being sick for more than 30 days strongly affects children's time allocation. It increases the probability that children are involved in paid work, possibly to substitute for sick household members or to cover the costs of payment for medicine. It also makes children more likely to have dropped out or to have missed more than 15 days of school. I tentatively conclude that the burden of illness in a household may have a greater effect on children's time allocation and school participation than the death of a parent. I qualify this finding because the effect of illness may be stronger because this variable is measured more recently. In addition, data does not capture the emotional effects on children of losing a parent.

6.3 Implications for Policy and Future Research

CREATE's research questions, outlined at the start of the paper, focus on identifying groups of children who are excluded or at risk of exclusion. Stunting has been identified as a key reason children do not enrol, enrol and drop out or progress slowly through school. While concurring with these findings, this research identifies illness in school-aged children as an equally serious factor affecting progression through school. Orphans have been identified as a key vulnerable group, but the paper demonstrates that children whose households have a number of sick members are equally, if not more, at risk of drop out and absence.

CREATE also asks why children are excluded and what processes result in them crossing thresholds into exclusion. This research highlights two mechanisms through which exclusion occurs. Firstly, children whose households face a high burden of illness participate more in paid work, and have to take on more responsibility for domestic chores. This often leads to lateness, absence and drop out, although children often return when sick household members either die or get better.

Secondly, inflexibility of schools and teachers may unnecessarily exclude the large numbers of children dealing with their own illness or the illness or death of parents. Some relatively simple restructuring of school rules might reduce exclusion. For example, if children are taking on additional work because of parental illness, teachers could make exceptions when they are late, which would prevent them missing class.

Given the prevalence of child and parental illness and the difficulties of improving health care, schooling should be structured differently to accommodate long absences. When children need to 'pause' school for some time, schools should formalise their absence as a 'leave of absence', where teachers maintain lists of such children and encourage them to return. Children could also be allowed to keep textbooks while not enrolled to enable them to do some studying.

More broadly, the curriculum and method of teaching require that all children progress at the same pace. Teachers then worry, justifiably, that children who have missed a lot of work will struggle to keep up, so they prevent them from starting school again and require them to wait until the following year and repeat the grade. At best, children will return and progress more

slowly through school. At worst, they will become demotivated. They may not return the following year. If they do return, they may be more likely to drop out as they are now behind their friends.

Instead, schools could allow children to return and provide extra tutorials for children. With more difficulty, schools could structure curricula in modules rather than years. They could also use multi-grade methods of assessment, where a number of grades are taught in one classroom at one time with an emphasis on group-work and children teaching other children. In this system, children in the same classroom can be at different levels in different subjects in the same year. This would accommodate children who had missed a lot of school and might be able to pass some subjects while repeating others.

The paper also highlights directions for future research. One obvious area is to analyse the effects of the changes in schooling participation outlined above on educational attainment. Another area is to collect and analyse more detailed data on household shocks, such as death and illness, and on children's schooling trajectories. This would ensure that studies could identify the time order of shocks and dropouts or poor attendance more accurately.

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Appendix 1: Determinants of Health Shocks

Table 14: Definitions of Variables for Examination of Determinants of Health Shocks

	Variable name	Notes
Outcome variables		
Death of parent between 2002 and 2006	Parental death between 2002 and 2006	=1 if either parent had died.
Percentage of household members sick for more than 30 days in 2005/6	Percentage ill household members in 2005/6	=1 if the percentage of household members sick for more than 30 days was greater than 25 percent.
Household member was seriously ill between 2002 and 2006	Household illness between 2002 and 2006	=1 if any household member was seriously ill.
Days of child illness in 2005/6	Days of child illness in 2005/6	=1 if the child was sick for more than 30 days.
Child had a serious illness between 2002 and 2006	Child illness between 2002 and 2006	=1 if the child had had an illness where the caregiver thought they might die.
Lagged health shocks		
Death of parent between 1998 and 2002	Parent death between 1998 and 2002	
Household member was seriously ill between 1998 and 2002	Household illness between 1998 and 2002	
Child had a serious illness since birth	Child illness between 1994 and 2002	=1 if the child had had an illness where the caregiver thought they might die.

Source: Young Lives older cohort rural sample, 2006

Table 15: Probit Regressions: Health Shocks with Controls for Household Characteristics and Assets

Marginal effects calculated at the mean of independent variables with standard errors corrected for clustering

	Parental death between 2002 and 2006	Percentage ill household members in 2005/6	Household illness between 2002 and 2006	Days of child illness in 2005/6	Child illness between 2002 and 2006
Height-for-age	0.00162	-0.0111	0.00189	-0.0111	0.00189
	(0.882)	(0.530)	(0.923)	(0.530)	(0.923)
Male	-0.0177	-0.0737*	0.0246	-0.0737*	0.0246
	(0.385)	(0.0592)	(0.749)	(0.0592)	(0.749)
Mother's education	-0.0157	0.000693	-0.000976	0.000693	-0.000976
	(0.120)	(0.958)	(0.904)	(0.958)	(0.904)
Father's education	0.000956	-0.00129	0.00479	-0.00129	0.00479
	(0.865)	(0.888)	(0.425)	(0.888)	(0.425)
Log durables p/c	0.0125	0.0181	-0.0164*	0.0181	-0.0164*
	(0.104)	(0.411)	(0.0966)	(0.411)	(0.0966)
Log herd value p/c	-0.00949	0.00938	0.00145	0.00938	0.00145
	(0.183)	(0.356)	(0.879)	(0.356)	(0.879)
Land size	-0.0421	-0.0674**	0.0151	-0.0674**	0.0151
	(0.162)	(0.0168)	(0.671)	(0.0168)	(0.671)
Household irrigation	0.00371	0.0294	-0.00739	0.0294	-0.00739
	(0.955)	(0.669)	(0.951)	(0.669)	(0.951)
Observations	625	625	625	625	625
Pseudo R-squared	0.0748	0.0730	0.118	0.0730	0.118
Percent correctly predicted	86.56	67.20	68.16	67.20	68.16

Robust p-values in parentheses: *** p<0.01, ** p<0.05, * p<0.1
Source: Young Lives older cohort rural sample, 2006

Table 16: Probit Regressions: Health Shocks with Controls for Household Characteristics, Assets and Lagged Health Shocks

Marginal effects calculated at the mean of independent variables with standard errors corrected for clustering

	Parental death between 2002 and 2006	**Percentage ill household members in 2005/6**	**Household illness between 2002 and 2006**	**Days of child illness in 2005/6**	**Child illness between 2002 and 2006**
Height-for-age	0.00196	-0.0112	0.00178	0.00502	0.000150
	(0.855)	(0.537)	(0.926)	(0.714)	(0.978)
Male	-0.0192	-0.0748*	0.0252	-0.0317	0.00207
	(0.350)	(0.0537)	(0.743)	(0.174)	(0.899)
Mother's education	-0.0175*	0.000396	-0.000855	-0.00927	-0.000482
	(0.0567)	(0.976)	(0.919)	(0.259)	(0.833)
Father's education	0.00327	-0.000637	0.00459	-0.00329	-0.00170
	(0.551)	(0.944)	(0.454)	(0.538)	(0.461)
Log durables p/c	0.0126*	0.0181	-0.0163	-0.00158	0.00243
	(0.0748)	(0.414)	(0.107)	(0.903)	(0.572)
Log herd value p/c	-0.00639	0.0103	0.00165	0.0152*	0.000824
	(0.379)	(0.314)	(0.856)	(0.0677)	(0.650)
Land size	-0.0472*	-0.0686**	0.0147	-0.0394	-0.00409
	(0.0877)	(0.0168)	(0.677)	(0.216)	(0.484)
Household irrigation	0.00651	0.0314	-0.00699	-0.0660**	-0.0152
	(0.917)	(0.652)	(0.953)	(0.0172)	(0.151)
Parental death between 1998 and 2002	0.142***	0.0399	0.00324	0.0163	-4.98e-05
	(1.83e-05)	(0.434)	(0.960)	(0.665)	(0.998)
Household illness between 1998 and 2002	0.0226	0.0139	-0.0174	-0.0612**	-0.00512
	(0.509)	(0.765)	(0.675)	(0.0462)	(0.826)
Child illness between 1994 and 2002	0.0202	0.0350	-0.00791	0.0171	0.0104
	(0.583)	(0.378)	(0.900)	(0.602)	(0.546)
Observations	625	625	625	625	625
Pseudo R-squared	0.0971	0.0743	0.118	0.0497	0.109
Percent correctly predicted	86.72	67.20	67.68	84.96	83.68

Robust p-values in parentheses: *** p<0.01, ** p<0.05, * p<0.1
Source: Young Lives older cohort rural sample, 2006

Consortium for Research on
Educational Access, Transitions & Equity

Funded by DFID

Report summary:
Rural Ethiopian children, and members of their households, often suffer from common and preventable but debilitating illnesses, such as malaria, parasite infection and worms. Enrolment rates in Ethiopia are high, but school attendance is patchy, children often drop out of school (although they sometimes return), and grade repetition is common. This paper argues that the two phenomena are related: serious illness of children or in children's households constitutes a major, under-analysed and preventable barrier to children's schooling participation. This was demonstrated both in quantitative research, which analysed a 633-child longitudinal sample across 13 rural sites in Ethiopia, and qualitative research, a village case study, including interviews with 24 children and ten caregivers.

Author notes:
Kate Orkin is a DPhil candidate in the Department of International Development, University of Oxford, supervised by Professor Stefan Dercon and Dr Laura Camfield. Her DPhil uses qualitative and econometric methods to analyse home and school factors which affect the schooling participation and achievement of rural Ethiopian children. She is a Research Associate at Young Lives (www.younglives.org.uk) and worked on the first survey of schools attended by Young Lives children, conducted in Ethiopia in 2010. She is a South-Africa-at-large Rhodes Scholar and holds an MPhil (dist) in Development Studies from Oxford and a BSocSci (Hons) (cum laude) in Economics from the University of Cape Town.

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