Working Paper 88

Young Lives

An International Study of Childhood Poverty

Shocks and Primary School Drop-out Rates:

A Study of 20 Sentinel Sites in Ethiopia

Tassew Woldehanna and Adiam Hagos

www.younglives.org.uk

DECEMBER 2012

88

Working Paper

Young Lives

An International Study of Childhood Poverty

Shocks and Primary School Drop-out Rates

A Study of 20 Sentinel Sites in Ethiopia

Tassew Woldehanna and Adiam Hagos

Shocks and Primary School Drop-out Rates:
A Study of 20 Sentinel Sites in Ethiopia

Tassew Woldehanna and Adiam Hagos

First published by Young Lives in December 2012

ISBN: 978-1-909403-01-7

A catalogue record for this publication is available from the British Library.

Printed on FSC-certified paper from traceable and sustainable sources.

Funded by

UKaid
from the British people

Ministry of Foreign Affairs of the Netherlands

Young Lives, Oxford Department of International Development (ODID), University of Oxford, Queen Elizabeth House, 3 Mansfield Road, Oxford OX1 3TB, UK

Tel: +44 (0)1865 281751 • E-mail: younglives@younglives.org.uk

Contents

Abstract

This paper investigates the impact of idiosyncratic and covariate economic shocks and the resulting work burden on children on the likelihood of children completing primary education or dropping out of primary school. In this endeavour, censored Cox proportional hazards model was estimated using data from the Young Lives study of childhood poverty. The estimated results indicate that both idiosyncratic shocks and covariate shocks have a statistically significant effect on the risk of children dropping out of primary school. Moreover, the amount of time children allocate to domestic activities, unpaid activities and paid labour were each found to have a positive effect on the probability of children dropping out of school. Separate Weibull accelerated failure time models for boys and girls and for rural and urban children were estimated to check the robustness of the results and the relative importance of the economic shocks to different groups of children. It was observed that the statistical significance and the sign of the coefficients remained the same. Considering the fact that both idiosyncratic and area-wide economic shocks are experienced at the household level, the study concludes that it is vital to take education into account when designing social protection programmes so as reduce the vulnerability of households to the shocks and keep children from dropping out from school. One way of doing this would be to introduce a conditional cash transfer programme that would provide families with incentives to keep their children enrolled in school.

Acknowledgements

We wish to thank the external reviewers and Caine Rolleston for their helpful comments and Isabel Tucker for copy-editing the report. However, responsibility for errors is ours.

The Authors

Tassew Woldehanna is Associate Professor at the Department of Economics, Addis Ababa University and Principal Investigator of Young Lives Ethiopia at the Ethiopian Development Research Institute (EDRI).

Adiam Hagos is an Assistant Researcher at Young Lives Ethiopia, Ethiopian Development Research Institute(EDRI).

About Young Lives

Young Lives is an international study of childhood poverty, following the lives of 12,000 children in 4 countries (Ethiopia, India, Peru and Vietnam) over 15 years. **www.younglives.org.uk**

Young Lives is funded from 2001 to 2017 by UK aid from the Department for International Development (DFID), and co-funded by the Netherlands Ministry of Foreign Affairs from 2010 to 2014.

1. Introduction

Families in Ethiopia are subject to a variety of covariate shocks (for example, drought, crop failure and pests and diseases) and idiosyncratic shocks (the death or illness of a household member and the death of livestock) (MOFED 2008). The sources of many of these shocks are different, as are the ways in which they can be mitigated. It is, therefore, important to know what types of shocks have a debilitating effect on a household's accumulation of human capital, how households cope with such shocks and whether they can prevent their children from dropping out of school, and if so, how. This paper discusses the incidence and intensity of idiosyncratic and covariate economic shocks and explores their impact on primary school drop-out rates, given the increased burden of work on children.

Children's enrolment in school is one of the vital indicators of social and economic development, which is why it is used to set the targets of the second Millennium Development Goal (MDG). Virtually all the countries in the world pledged to achieve universal primary education by 2015, and ensure that children everywhere, of both genders, complete a full course of primary schooling (United Nations 2011).

In evaluating Ethiopia's progress towards this goal, we observe that the gross enrolment rate in primary education increased from 91 per cent in 2006/7 to 96.4 per cent in 2010/11 (MOE 2011). However, the country's ability to achieve the targets also depends on its ability to keep children in school. The target set by the Ethiopian Government for drop-out rates of children from primary school was 8 per cent for the year 2010/11. The actual drop-out rate in this same year, however, was 13 per cent, and the difference in rates between boys and girls was almost zero. One must note here that although the rates were almost the same, the target rate was higher for boys (9.2 per cent) than for girls (8.0 per cent). In addition, even though the target drop-out rates were not achieved, a significant decline in drop-out rates was observed in 2010/11 compared to the previous year, when the rate was 18.6 per cent (MOE 2011).

According to the Ethiopian education system, children are expected to start school at the age of 7. However, it is common to find children who enrol in school at a later age. There is also the possibility that children may enrol early. Primary school education has two cycles. The first cycle covers Grades 1 to 4 while the second cycle covers Grades 5 to 8. Children in the second cycle of primary education are not promoted to the next grade unless they manage to achieve a certain standard, which explains the relatively large number of older children in lower grades of the second cycle. Secondary school covers Grades 9 and 10. Students will then take a national examination to determine whether they will join technical and vocational school or college preparatory school. Those who score marks higher than the threshold set out by the Ministry of Education will join the college preparatory schools, which take two years, while those who score below the threshold go to technical and vocational schools. Under normal circumstances children are expected to leave secondary school at the age of 16. Both primary and secondary education are provided for free in government (public) schools.

According to the Ministry of Finance and Economic Development (MOFED), Ethiopian households are commonly hit by a variety of shocks, mainly the illness of family members, and in rural areas, drought (MOFED 2008). The same source also indicates that, in order to cope with shocks, households in Ethiopia sold their animals (40 per cent of them), borrow from relatives (18 per cent) or sold their crop output (14 per cent) (MOFED 2008: 67–9). The use of social protection to cope with shocks is not common. Although there exist a few social protection programmes, such as the Productive Safety Net Programme (PSNP), access is limited to particular groups of the poor population living in rural areas (Woldehanna 2012). Given the absence of a more comprehensive social protection programme, economic shocks may result in the deterioration of physical, human and social capital, which can cause households to fall into a poverty trap in the situation where they do not possess enough resources to mitigate the effect of these shocks. Even after households have already recovered from the immediate effects of the economic shocks, they may not be able to recover from the poverty caused by them as their production capacity may have been depleted. Children may be forced to drop out of school or may be unable to attend classes regularly because of the need to either cover for labour requirements at home or to generate the additional or alternative income required to mitigate the effects of the shock. Children may also be forced to leave school as a result of a shock because it may be too expensive for households to cover for the indirect costs of their education (such as materials, uniform, etc.).

The main objective of the paper is to analyse the impact of economic shocks on primary school drop-out rates, with respect to shocks such as drought, crop failure and pest infestation, the death of livestock and the death or illness of members of a household. All these affect the intensity of children's involvement in paid and unpaid domestic and business activities, and therefore the time they have available to attend school and the energy they can devote to learning. Specifically the objectives of this study are:

1. to explore the extent of the effect of shocks on primary education completion and drop-out rates;
2. to assess the effect of children's increased work burden on primary school completion and drop-out rates;
3. to identify the relative impact of economic shocks on primary school drop-out rates for boys and girls and for rural and urban households.

In this endeavour, the paper adopts an accelerated failure time (AFT) model in order to estimate the associates of primary school completion or drop-out. In addition to the estimation of the full model, different regressions were run to check for the robustness of the results of the full model and to identify the relative importance of the determinants of school drop-out rates among different types of households. Both descriptive and multivariate analyses were made using *Stata* Version 12. The data used to make these analyses was the Older Cohort data from the last two survey rounds (Rounds 2 and 3) of the Young Lives study.[1] Moreover, we have used contextual information from the qualitative survey conducted by Young Lives after the Round 3 quantitative survey. More information about these data is given in Section 4.

The remainder of the paper is organised as follows. Section 2 reviews studies of school drop-out in Ethiopia. The theoretical framework is briefly discussed in Section 3. In Section 4, methodology adopted for the study and the type of data used is described. The descriptive and econometric results of the study are discussed in Section 5. Section 6 provides concluding remarks.

1 Young Lives is a 15-year study of childhood poverty in four developing countries (Ethiopia, India (in the state of Andhra Pradesh), Peru and Vietnam. It is tracking two cohorts of children in each country until 2016.

2. School drop-out in Ethiopia

In this section, different studies that have investigated the determinants of primary school drop-out in Ethiopia are reviewed.

Admassu (2011) examined the covariates of primary school enrolment and drop-out among primary-school-age children in Ethiopia using the 2004 Welfare Monitoring Survey. He found that, for girls, the likelihood of being enrolled in school was significantly lower than for boys. Children in female-headed households, on the other hand, were found to be more likely to be sent to school than children in male-headed households. Similarly, the household head's educational level was found to be positively related to the probability of a child being enrolled in school. In contrast, the presence of younger children was found to have a negative impact on the odds of older children being enrolled in school, while a larger number of working-age adults, net of household wealth, was found to increase the probability of children being enrolled in primary school. In addition, children from relatively well-off households were found to be more likely to be enrolled.

Furthermore, the author found that the presence of a chronically sick adult in the household reduced the likelihood of children attending primary school. The same was found to be true for maternal or paternal death. Likewise, children from households that had experienced drought and food insecurity were found to be less likely to be enrolled in primary school.

Asadullah et al. (2006) examined the relationship between supply of schooling and household demand for it, using several rounds of nationally representative household and school census data from Ethiopia. The authors examined the effect of induced income shocks on gender-differentiated child schooling outcomes. They found that girls were less likely to attend primary school than boys. The probability of girls completing primary education was also found to be smaller than for boys. Moreover, the probability of children being enrolled in primary school was found to increase with the presence of better-educated adults in the household. Female adult literacy was found to have a strong positive effect on the probability of primary school completion by girls. In the event of a harvest failure, girls were less likely to complete primary school but this had no significant effect on boys. However, crop damage on half of a household's plot had a negative effect on the enrolment of school-age children.

Andinet and Degenet (2008) aimed to estimate the impact of individual, parental, household and community factors on child educational progress. The results of the study show that girls received fewer schooling opportunities and, therefore, were more likely to be enrolled in lower grades. Moreover, girls were found to face a greater risk of drop-out or grade repetition as they got older. Having a greater number of school-age children in a household was found to have a negative effect on a child's progress through school. The presence of a head of household with a low level of education had a negative effect on boys' progress through school.

Woldehanna et al. (2005a) investigated the relative importance of school, family and individual child characteristics in determining grade completion and primary school drop-out in Ethiopia. For this purpose, the authors adopted a Cox proportional hazards model and found that boys faced a smaller risk of dropping out of school than girls. Older children were found to face more risk of dropping out of school, and this risk increased with the number of children under 5 in their households. On the other hand, having more children between the ages of 5 and 15 in a household and more household members above the age of 15 were found to have a negative relationship with the probability of drop-out. In addition the presence of mothers and fathers with more education was found to reduce the risk of children dropping out of school.

Woldehanna et al. (2005a) also investigated the relative importance of factors associated with primary school completion in Ethiopia using the Cox proportional hazard model. The authors found that the more hours a child spent on household chores, the lower the rate of completion of primary education.

Admassie (2002) examined the impact of household assets and modern agricultural practices on child work and school attendance in Ethiopia using a multinomial logit model. The presence of a better-educated household head was found to have a positive relationship with the probability of a child attending school, especially for girls. The same was found to be true for female-headed households.

This literature review helps us to form a hypothesis with respect to economic shocks, children's resulting work burden and the risk of them dropping out of primary school versus the likelihood of them completing it. We expect that parental education and wealth will have a negative association with primary school drop-out and a positive association with primary school completion. Both idiosyncratic and covariate shocks will affect children's primary education completion negatively and hence increase drop-out rates. The effect of household composition on completion rates is complex; in some cases it can help children complete primary education by enabling siblings to substitute for labour requirements. But when education is costly, having a larger family means that households will be unable to afford to keep children in school. Child work is one of the variables that is expected to be negatively associated with primary education completion and positively associated with primary school drop-out rates.

3. Theoretical framework and empirical model

The decision of parents to take children out of school is triggered by a number of factors. The rule parents follow when deciding to continue sending their children to school is that the benefits of attending school, in general, and future productivity gain in particular, must outweigh both the direct costs of sending a child to school and the opportunity cost of the child's time (Glewwe and Jacoby 1994).

In a perfect capital market, household economic characteristics would not affect a household's decision to send children to school as there would be no economic motive to delay the investment as long as it was worthwhile, i.e., if the choice between life cycle consumption and human capital investment was made independently. Moreover, children's school attendance would not be affected by the need for child labour as parents could borrow to finance their consumption instead of relying on their children's earnings. The decision to take children out of school under this case, therefore, is based on the fact that the marginal rate of return to schooling equals the interest rate (Glewwe and Jacoby 1994).

However, perfect capital markets do not exist and in developing countries like Ethiopia, they are underdeveloped. Household economic factors, as a result, affect a household's decision to send child to school. Household economic variables may have an effect on educational investments by affecting the ability to buy goods that support learning when credit constraints are binding (Brown and Park 2001).

Different variables that represent the characteristics of the household may affect households' decision to send a child to school. The educational level of parents may affect the child's optimal level of education by increasing the returns to the child's education. Moreover, the returns of schooling may differ depending on the gender of the child, as a result of labour market conditions, differential treatment in school or different support for educational attainment at home (Glewwe et al. 1995).

Moreover, a household's experience of economic shocks may have a long term-effect on its accumulation of productive assets, one of which is educated children (Sun and Yao 2009).

Different variables were identified in different studies as having an effect on the probability of children dropping out of school. The relationship of those variables with primary school drop-out rates in these studies is discussed below.

Parents' education: Different studies have found a relationship between children dropping out of school and their parents' level of education. Sun and Yao (2009) found that the father's educational attainment affects the probability of a household sending a child to school significantly. Similarly, Brown and Park (2001) found that the probability of a child dropping out of school fell as the number of years of the father's education increased. Moreover, both the father's and the mother's level of schooling were found to have a positive relationship with children's probability of advancing through grades in Dureyea (1998). Handa and Simler (2000) also found that living in a household with a literate head increases the probability of ever attending school.

Gender: In Hunter and May (2002) girls were found to be more likely to drop out of school than boys. Woldehanna et al. (2005a) also found that girls had increased probability of facing a hazard or shock, which in turn caused the probability of staying in school to decline. Furthermore, the results of Lincove (2008) showed that investment in primary school was more income-elastic for girls than boys. Bjorkman (2005) showed that girls were affected more than boys by rainfall shocks, at all grades. Similarly, Brown and Park (2001) found that the drop-out rates for girls relative to boys were higher in the first three years of schooling.

Household composition: The results of Woldehanna et al. (2005a) showed that the likelihood of dropping out of school is negatively affected by the number of household members between the age of 5 and 15 and the number of household members above the age of 15. Brown and Park (2001) also found that the likelihood of dropping out was negatively related to the number of siblings, which may be a result of siblings substituting for each other's household labour requirements. This result could also be explained by the complementary nature of children's education, which results in cost savings as children share school materials and improvement in learning as they help each other out with lessons.

Illness shocks: Glick et al. (2011) found that the probability of children dropping out of school increased with both maternal and paternal illness. Similarly, In Bratti and Mendola (2011) the probability of children being enrolled in school is negatively affected by deterioration of maternal health.

Death of parents: The results obtained by Glick et al. (2011) were that the probability of children dropping out of school increased with both maternal and paternal death. In addition, death was found to have lagged effects on the probability of a child dropping out of school.

Similarly, Gingoux and Mendez (2011) found that death that occurred when children were of secondary school age was found to reduce educational attainment.

Natural disaster and market shocks: Krutikova (2010) found that crop shocks had negative effects on school attendance and positive effects on the amount of time spent working. Moreover, Gingoux and Mendez (2011) found that at both primary school and secondary school age, the educational attainments of children were negatively affected by natural disasters. In addition, market shocks that occurred when children were of secondary school age were found to reduce educational attainment. Furthermore, crop losses were found to reduce the educational attainment of primary-school-age children in rural areas.

Child work: Gunnarson (2004) found that the effect of child labour on test scores was negative. The authors noted that their result did not depend on whether child labour was treated as endogenous or not.

Taking these arguments and empirical evidence into account, a model is built to identify the determinants of primary school drop-out.

The child's characteristics such as gender and attendance at pre-school are included, along with household characteristics such as age group and gender of the other children, educational level of the father and gender of the head of the household, to see how they affect primary school drop-out. The wealth index was also included to control for its effect on school drop-out, as it affects households' investment in human capital under conditions where there aren't perfect capital markets.

Moreover, the model tries to capture the effect of the opportunity cost of schooling to the household by incorporating the number of hours the child spends on domestic activities (household chores and caring for younger siblings), unpaid activities (e.g. cattle herding for their own household) and paid labour.

Most importantly, idiosyncratic and covariate shocks were incorporated to explore their effect on children's risk of dropping out of primary school. The death or illness of household members, the death of livestock and household's experience of drought, crop failure and pest infestation are the economic shock variables taken account of. The lagged values of these variables were also incorporated in the model to see whether such shocks had long-term effects.

Accordingly, the following model is adopted to identify the determinants of primary school drop-out:

$$D_{it} = \beta_0 + \beta_1 C_{it} + \beta_2 H_{it} + \beta_3 W_{it} + \beta_5 O_{it} + \beta_5 S_{it} + \beta_6 S_{it-1} + \beta_7 U_{it} + e_i \qquad 1$$

where D is the drop-out of children from school, C is a vector of child characteristic variables, H is a vector of household characteristics, W is wealth index, O is the vector of variables that represent the opportunity cost of sending children to school, S is the vector of dummy variables for experience of economic shock, U is the dummy variable for households being located in urban areas, A is school start age and e represents the error term. The subscript i represents the observations under consideration while t represents the survey round.

Different models could be adopted to analyse children's drop-out from school. One of these is a censored ordered probit model devised by Lillard and King (discussed in Glewwe 1999; Holmes 2003; World Bank 2004) to identify the determinants of school completion. However, the use of censored ordered probit models to analyse school attainment assumes that a child currently enrolled will achieve at least the grade level in which the child is currently. This is too restrictive an assumption, especially in a situation where there is a significant drop-out rate. An alternative is to use a Cox proportional hazard model to analyse school attainment or drop-out (Cox and Oakes 1984). Hazard models account for the dependence of current enrolment on past enrolment decisions, and handle censored students (i.e. children enrolled at the time of the survey).

The Cox hazard model does not require a parametric specification of the baseline hazard function and thus allows the baseline hazard rate for each community to vary (Cox and Oakes 1984; Brown and Park 2002). However, the use of this model requires that the variables under consideration must pass a proportionality test (Bhattacharjee and Das 2002). Since withdrawing the variables reduces the explanatory power of the model, an AFT model was used as in Lavado and Gallegos (2005) although with a Weibull distribution. This distribution was selected because the risk of drop-out was found to be monotonically increasing.

The other advantage of using AFT models is that they provide a way to make sequential estimations, based on a density function that is built from empirical information without the need to eliminate it (Lavado and Gallegos 2005). When one has a reason to believe that the hazard function follows a certain shape, imposing a hazard function improves the efficiency of the estimates (Cleves et al. 2004).

To incorporate the effects of the time-varying nature of the economic shock variables, the data were split at each time period (t) using the *stsplit* command of Stata, which automatically fills in the time and failure of variables appropriately (Cleves et al. 2004). The economic shock variables were interacted with the time variable and included in the regression to capture the effect of time.

4. Data and estimation method

This study utilised the Older Cohort data from the survey undertaken by Young Lives in Ethiopia, in which the same children are followed over the course of the study. The children were 12 years old in Round 2 (2006) and 15 years old in Round 3 (2009). This study did not utilise data from the Younger Cohort because they were only 5 years old in Round 2 and 8 years old in Round 3 and many of them may not have been enrolled.

The sample contains 970 children, who live in 20 sentinel sites located in five of the regions in the country, namely Addis Ababa, Oromia, Amhara, SNNPR and Tigray. These regions were selected because 96 per cent of the population of the country lives there. The selection criteria adopted to choose the sentinel sites was that they had to be located in poor areas based on the country’s food insecurity designations. Seventy-five per cent of the sentinel sites in each region were selected from high food deficit *woredas* (districts) while 25 per cent were selected from a lower food deficit *woreda*. The children in rural areas comprise 60 per cent of the sample while 40 per cent are from urban areas. Each region comprised 20 per cent of the total sample, except for Addis Ababa which contained 15 per cent of the sample and SNNPR from which 25 per cent of the sample was selected.

The selection of sentinel sites within regions was made based on data on population density and prevalence of critical food deficits (dependence on food aid). Moreover, consultations were made with regional policymakers and other stakeholders to guide the selection of sentinel sites. Within each sentinel site, a simple random sample of 100 households was taken.

In addition, we have used contextual information from the qualitative survey conducted by Young Lives after the Round 3 quantitative survey, to give more insight on how economic shocks affect children's education.

The estimation of equation (1) was made for the number of children dropping out of primary school conditional upon the child's current enrolment to primary school. The dependent variable is generated from the highest grade the children have reached. The children who are attending school are censored in contrast to the children who are not enrolled in school in Round 3. Our failure cases for the Weibull regression are, therefore, the uncensored observations, i.e., the children who are not attending school. Eighteen per cent of the children in the sample have completed primary education. These children are considered as those that have survived throughout primary school regardless of being subjected to the effects of economic shocks.

In addition to the estimation of the full model with the data from the full sample, several regressions were run to check for the robustness of the results and the relative importance of the determinants for different groups. To evaluate whether the direction of relationships changes and the extent to which the statistical significance of the estimated coefficients change with different specifications, two models in which the economic shocks of each round are incorporated separately were estimated. In addition, the full model was estimated using disaggregated data based on the location of households (rural/urban) and gender of the child, to explore the relative importance of those determinants in the risk of children dropping out of primary school.

5. Results and discussion

5.1. Descriptive statistics

5.1.1. *Wealth index, schooling and economic shocks*

Table 1 presents the average wealth index of rural and urban households classified based on survey round and its rate of change over the rounds. The average wealth indices of both the rural and the urban areas have increased in Round 3. However, the rate of change was observed to be much larger (32.39 per cent) for the rural areas than for the urban areas (6.8 per cent).

Table 1. *Wealth index in Round 2 (2006) and Round 3 (2009) and change between rounds, by household location*

	Average level of wealth index		Change in wealth index (%)	Number of observations
	Round 2	Round 3		
Rural	0.201	0.266	32.39	580
Urban	0.445	0.476	6.80	390
Total	**0.299**	**0.3507**	**17.14**	**970**

Source: Own computation based on Young Lives Older Cohort data.

Table 2 shows the relationship between wealth index quintiles and economic shocks classified based on round of survey. The percentages of households that have experienced death or illness of household members in Round 2 are almost equally distributed among the quintiles except for quintile 1 (the poorest), which has the largest share of households that have experienced such shocks. The distribution of households that have experienced the death of livestock is not as even as that of those experiencing the death or illness of a household member. The largest proportion of households that have experienced such shocks are in the first wealth index quintile. The smallest proportions of households that have experienced such shocks are in the wealthiest quintile. A similar trend can be observed for those households that have experienced drought, crop failure, pests and diseases. The proportion of households that have experienced death of livestock consistently declined in Round 3 between quintiles 1 and 5. The same was true for households that had experienced drought, crop failure, pests and diseases. The decline was also witnessed for households that had experienced the death or illness of household members, except for wealth quintile 4 in which the percentage rose.

Table 2. *Percentage of households in each wealth quintile experiencing shocks, by type of shock*

Wealth index quintiles	Death or illness of household members		Death of livestock		Drought, crop failure, pests and diseases	
	Round 2	Round 3	Round 2	Round 3	Round 2	Round 3
1	21.25	23.36	30.28	29.14	31.48	30.75
2	19.24	20.52	26.69	26.98	27.62	29.59
3	19.69	17.69	19.52	21.58	23.77	20.31
4	19.91	19.43	17.53	14.75	12.21	12.77
5	19.91	19	5.98	7.55	4.93	6.58
No. of observations	447	458	251	278	467	517

Source: Own computation based on Young Lives Older Cohort data.

As can be observed from Table 2, the distribution of households that faced the death or illness of their members in Round 3 also showed a smoother distribution compared to the distribution of households that have faced other types of shocks, although it is not as smooth as the distribution of the same shock in Round 2. The share of households that have experienced death of livestock in Round 3 was found to be the largest in the poorest wealth quintile followed by the second-poorest. The same was found to be true for those households that have experienced drought, crop failure, pests and diseases.

Except for those households that have experienced the death or illness of household members, the largest share of those households that have experienced other types of shocks are in the poorest wealth index quintile while in the smallest proportion are in the richest wealth index quintile, regardless of the survey round. This is an indication that the richer households are less exposed to economic shocks. An important observation one needs to make here is that the percentage of those households that have faced such shocks is larger in the fifth quintile for Round 3, indicating perhaps that richer households are increasingly exposed to shocks.

5.1.2. Economic shocks and years of schooling

Table 3 presents the distribution of economic shocks between the rural and urban households. As the table shows, the majority of the shocks were experienced in rural areas, regardless of the type of economic shock or the round of the survey.

Table 3. *Distribution of shocks by location*

Type of shock	Round 2		Round 3	
	Rural	Urban	Rural	Urban
Death or illness of household members	59.51	40.49	60.04	39.96
Death of livestock	87.25	12.75	85.25	14.75
Drought, crop failure, pests and diseases	89.94	10.06	85.30	14.70
No. of observations	580	390	580	390

Source: Own computation based on Young Lives Older Cohort data.

Table 4 shows the relationship between years of schooling in Round 3 and economic shocks experienced in Round 2 and Round 3. The percentage of children that have experienced the death or illness of household members in Round 2 increased with years of schooling for the children between two and six years of schooling, followed with a decline in the remaining four years of schooling. The same trend was observed for Round 3. The percentage of children in households that had experienced the death of livestock in Round 2 increased with the number of years of schooling in the initial seven years. However, the percentage declined continuously for the remaining years. The trend was less direct for Round 3. The percentage of children who had experienced death of livestock in their households increased between two and five years of schooling. A decline was experienced between five and six years of schooling, followed with a rise for seven years of schooling. However, a continuous decline was observed for the remaining years of schooling. The percentage of children whose households have experienced drought, crop failure, pests and diseases in Round 2 increased between two years of schooling and six years of schooling, followed with a decline between seven years of schooling and ten years of schooling. A similar trend was observed for Round 3, except the largest percentage was for seven years of schooling rather than six years as was the case for Round 2.

The fact that the largest number of all types of shocks are experienced by families with children who have had between 5 and 6 years of schooling may be an indication that most children are at school at that stage and the shocks may drive the children out of school afterwards.

Compared to other shocks, death and illness shocks are experienced by households with children at later stages of schooling. This may indicate that the children whose families suffer livestock deaths and agricultural shocks are more likely to have left school earlier, given that (as Table 2 shows) poorer families are worst affected by these shocks. It seems to provide further evidence that children from better-off households stay at school for longer because their households are less vulnerable to shocks.

Table 4. *Percentage of households experiencing certain economic shocks, by number of years of schooling of children*

Years of schooling	Death or illness of household members		Death of livestock		Drought, crop failure, pests and diseases	
	Round 2	Round 3	Round 2	Round 3	Round 2	Round 3
1	2.68	2.62	1.99	2.88	3.00	2.90
2	2.46	2.18	2.39	2.52	2.14	2.51
3	6.94	5.90	6.37	7.19	8.78	8.12
4	9.62	8.30	7.97	10.07	9.42	9.86
5	10.74	12.66	13.55	17.63	15.42	15.67
6	17.45	17.47	18.33	16.55	18.20	16.63
7	16.78	17.47	19.52	17.63	17.13	17.99
8	16.55	17.25	18.73	15.83	15.85	16.63
9	11.63	12.01	9.56	7.19	7.71	8.12
10	5.15	4.15	1.59	2.52	2.36	1.55
No. of observations	447	458	251	278	467	517

Source: Own computation based on Young Lives Older Cohort data.

5.1.3. *Description of variables used in the regression*

Table 5 (below) presents the descriptive statistics of variables used in the regression.

Economic shocks: Among the economic shocks experienced in Round 2, the incidence of drought, crop failure, pests and diseases was the highest, followed by households' experience of illness or death of household members (Table 5). The smallest incidence among the economic shocks under consideration was accounted for by the death of livestock. The prevalence of shocks, however, was found to be different in urban areas, where the death or illness of household members had the highest incidence, followed by households' experience of drought, crop failure, pests and diseases, although a large gap (46 per cent compared to 12 per cent) was observed between the incidences of these shocks. As with the whole sample, the smallest incidence was for death of livestock.

As in Round 2, the mostly commonly experienced economic shock in Round 3 was drought, crop failure, pests and diseases, followed by the death or illness of household members. The least commonly experienced shock was the death of livestock. The prevalence of drought, crop failure, pests and diseases was much smaller for the urban areas than the rural areas. This indicates that the reason behind the drought, crop failure, pests and diseases shock having the largest occurrence (53.3 per cent of households) while it has a relatively small incidence in urban areas (19.5 per cent) is that the incidence of such shocks is very strong (76 per cent) in the rural areas. Similarly, the prevalence of death of livestock is much smaller in urban areas compared to the rural areas (10.5 per cent compared to 40.9 per cent). On the other hand, the incidence of death or illness of household members was found to be almost the same between the rural and the urban areas.

The relationship between the incidence of the economic shocks in the rural areas and the urban areas remained almost the same between Round 2 and Round 3. However, one can observe that the incidences of all the economic shocks rose when one looks at the overall trend.

The allocation of children's time: We computed the average hours children spent on a typical day on domestic activities, unpaid activities and paid work. The most time-consuming of these was found to be domestic activities, followed by unpaid activities. The least time-consuming was paid labour. The order of the activities children spent most time on was the same for both the urban and rural households, as well as the overall sample. However, the average number of hours spent on each of the activities was found to be smaller among the households in urban areas.

Household composition: We analysed households according to the number of male and female members in the following age groups: below 7, between 7 and 17, between 17 and 65, and above 65. The group with the highest average number of members was females between 17 and 65. The second highest average was for male family members between the ages of 17 and 65. The smallest average was for male family members above the age of 65. Although the difference was minute, with the average number of female family members above the age of 65 years was found to be greater in urban areas than in rural areas. The reverse was found to be true for the average number of male household members in the same age group. The average number of female members between the ages of 17 and 65 was found to be greater for urban households, while the average number of male family members between the ages of 17 and 65 was larger for the rural households. The average number of male family members above the age of 65 was found to be larger for rural households than urban households. The overall average number of boys between the ages of 7 and 17 was slightly higher than the average number of girls in the same age group. The average number of children in this age group was larger in the rural areas regardless of the gender of the child.

Table 5. *Descriptive statistics of variables used in the regression*

	Mean		
Variable	**Urban**	**Rural**	**Total**
Child and household characteristics			
Dummy for a boy	0.5	0.516	0.509
Dummy for male-headed households	0.644	0.809	0.742
Dummy for literate father of child	0.713	0.653	0.675
Dummy for attending pre-school	0.256	0.062	0.14
Age of starting school	8.381	9.777	9.209
Number of boys less than or equal to 7 years old	0.333	0.512	0.44
Number of boys between age 7 and 17	1.2	1.517	1.39
Number of male family members between the age of 17 and 65	1.979	2.017	2.002
Number of male family members aged 65 years or older	0.085	0.114	0.102
Number of girls less than or equal to 7 years old	0.349	0.572	0.482
Number of girls between age 7 and 17	1.282	1.417	1.363
Number of female family members between the age of 17 and 65	2.482	2.064	2.232
Number of female family members aged 65 years or older	0.128	0.086	0.103
Wealth Index	0.476	0.267	0.351
Shocks in Round 2			
Dummy for death or illness of household members	0.464	0.459	0.461
Dummy for death of livestock	0.082	0.378	0.259
Dummy for drought, crop failure, pests and diseases	0.121	0.724	0.481
Shocks in Round 3			
Dummy for death or illness of household members	0.469	0.474	0.472
Dummy for death of livestock	0.105	0.409	0.287
Dummy for drought, crop failure, pests and diseases	0.195	0.76	0.533
Child's time allocation			
Hours spent per typical day on domestic activities	2.938	3.547	3.302
Hours spent per typical day on unpaid activities	0.492	1.91	1.34
Hours spent per typical day on paid labour	0.364	0.448	0.414
Number of observations	390	580	970

Source: Own computation based on Young Lives Older Cohort data.

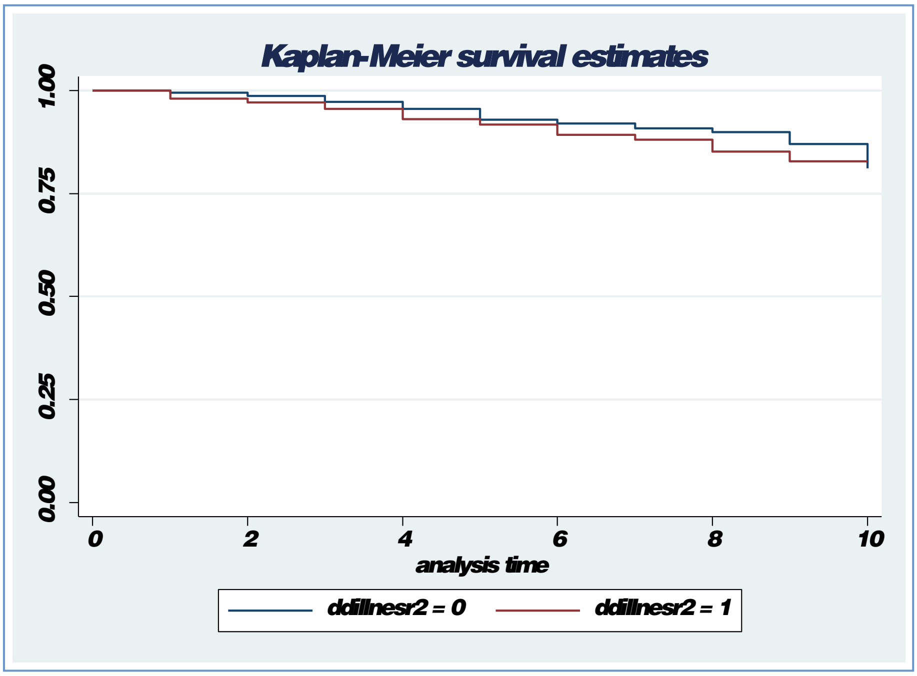
Location: The percentage of boys was almost equal in both the rural and urban areas. But the prevalence of male-headed households was found to be greater in rural areas than urban areas, while the percentage of literate fathers was higher among urban households than rural households. Moreover, the proportion of children that have attended pre-school was larger among urban households than rural ones. Similarly, the average wealth index of the households was larger for households located in urban areas than in rural areas. The average age children started school was also found to be higher for children in rural areas than children living in urban areas

5.1.4. Kaplan–Meier estimates of survivor function

Prior to the discussion of the results of the Weibull estimates, a non-parametric estimation of the survivor function was conducted to understand the general nature of the survivor function and shed some light on how it is affected by households' experience of shocks, the location of the household and the gender of the child. The Kaplan–Meier estimates were used to graph the non-parametric survivor functions. The Kaplan–Meier estimate is a non-parametric estimate of the survivor function which the probability of survival past a certain time *t*, which in this case is the number of years of schooling. In other words, it is the probability of failing after time *t*. (Cleves et al. 2004)

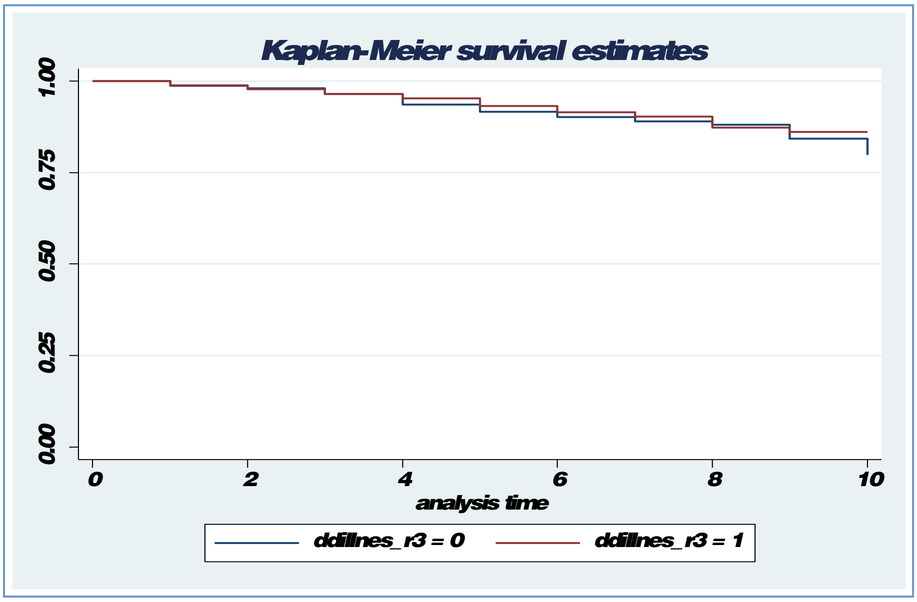
Households' experience of death or illness of members: Figures 1 and 2 illustrate the survivor functions of the children based on household's experience of death and illness shocks. As Figure 2 shows, the probability of survival past each point of years of schooling (the analysis time), i.e. the probability of a child going to the next grade without dropping out, in Round 3 is smaller for children who come from households that have experienced the death or illness of a member than those that did not have a member die or become ill. It must be noted here, however, that the gap between the survivor functions of the two groups of households is small. The same estimates were generated for those households that have experienced such shocks in Round 3 and those that have not. Unlike in Round 2, the survivor functions of the two groups of households in Round 3 overlapped in many parts over the analysis time. In the remaining part of the analysis time children from the households that have experienced these shocks were found to have a higher probability of remaining in school than those that did not attend school. This result is unexpected as death of household members, under normal circumstances, is likely to drive children out of school, either by increasing their workload or by reducing the income of their household.

Figure 1. *Kaplan–Meier survival estimates based on death or illness of family members in Round 2*



Note: ddillnesr2 is dummy variable for households being affected by the death and illness of a family member between 2002 and 2006

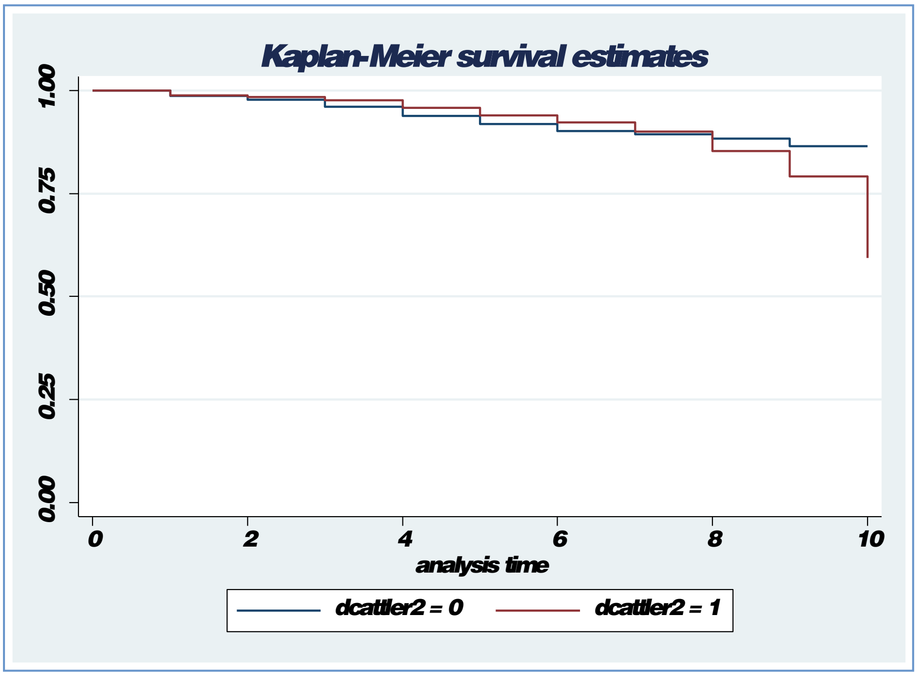
Figure 2. *Kaplan–Meier survival estimates based on death or illness of family members in Round 3*



Note: ddillnesr3 is dummy variable for household being affected by death and illness of family member between 2006 and 2009

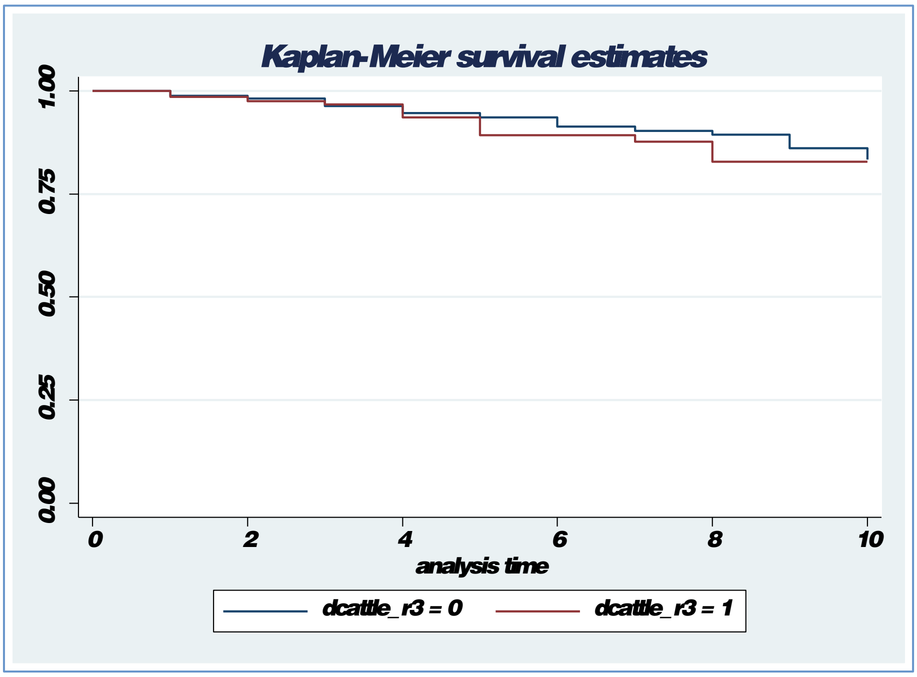
Households' experience of death of livestock: Children who belong to a household that has experienced the death of livestock in Round 2 were found to continue to attend school more than the children that do not belong to such households for the initial 80 per cent of the analysis time (8 years of schooling). However, the survivor function of those children fell below that of children who weren't affected by this. Moreover, the gap in the survivor functions of the two groups of households was bigger in the last two periods of the analysis time compared to previous periods. This indicates that children that are from a household that has experienced the death of livestock are less likely to survive in school after eight years of schooling. The Kaplan–Meier estimates of the two groups of households that have experienced the same shock in Round 3 show that children who scome from a household that has experienced death of livestock are more likely to survive in school than children from a household that did not have any livestock die. This result may seem surprising at first. However, one of the activities children often undertake for their household is cattle keeping. So the death of livestock allows for more time to be allocated to school and hence increases the chances of the child continuing to attend school.

Figure 3. *Kaplan–Meier survival estimates based on death of livestock shock in Round 2*



Note: dcattler2 is dummy variable for household being affected by death livestock between 2002 and 2006.

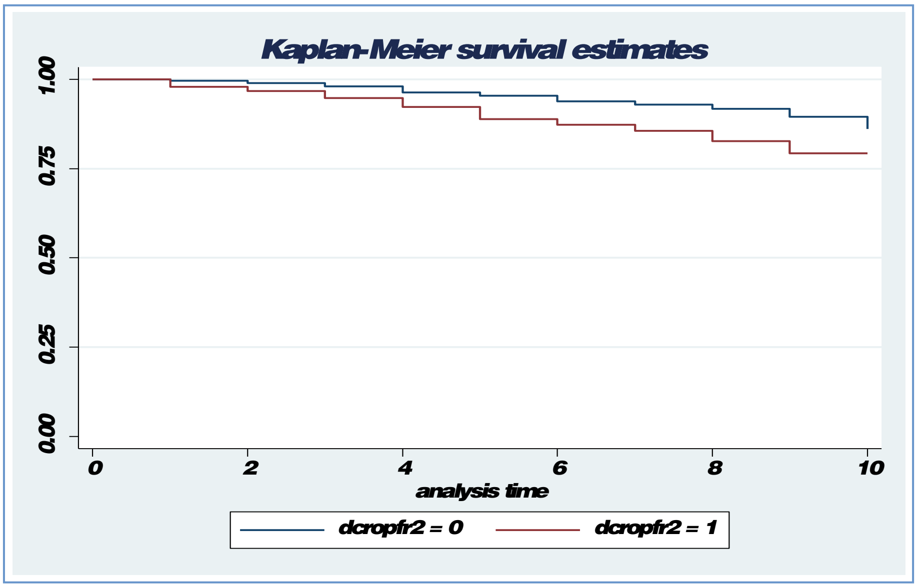
Figure 4. *Kaplan–Meier survival estimates based on death of livestock shock in Round 3*



Note: dcattler3 is dummy variable for household being affected by death livestock between 2006 and 2009.

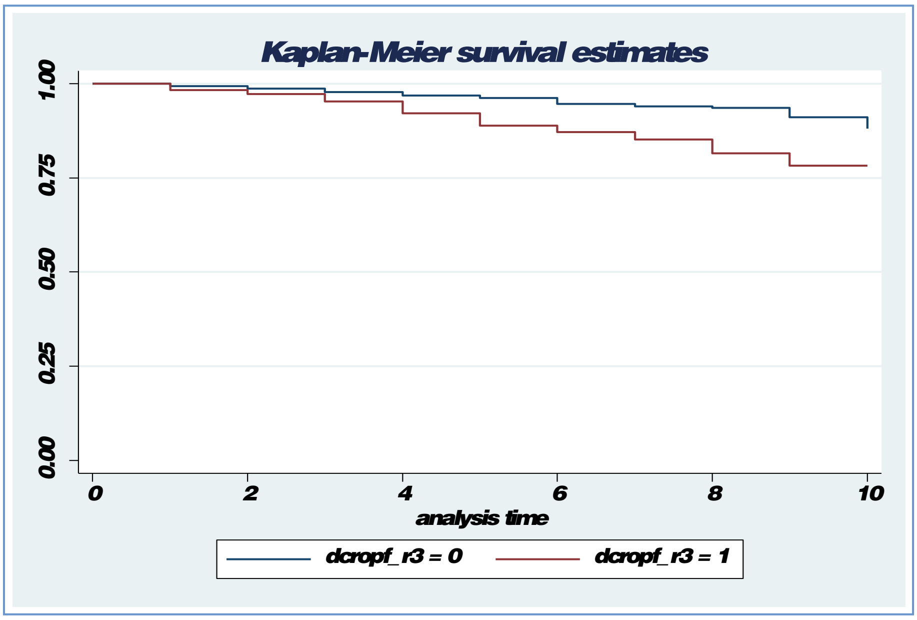
Household's experience of drought, crop failure, pest infestation and diseases: As one can observe from Figure 5, children from a household that has experienced drought, crop failure, pest infestation or diseases in Round 2 are less likely to remain in school than children who come from households that have not. A similar trend was observed among households that experienced the same shock in Round 3, as is illustrated in Figure 6.

Figure 5. *Drought, crop failure, pest infestation and diseases in Round 2*



Note: dcropfr2 is dummy variable for household being affected by crop failure between 2002 and 2006

Figure 6. *Drought, crop failure, pest infestation and diseases Round 3*



Note: dcropfr3 is dummy variable for household being affected by crop failure between 2006 and 2009

Survivor functions based on gender and location of households: Kaplan–Meier estimations were also made to look into the relationship between gender of children and their continuation in school. The survivor function of boys lay below the survivor function of girls, except for the last period where they almost overlapped. This indicates that boys are less likely to stay in school compared to girls.

Moreover, the survivor functions of rural and urban households were also estimated separately. Rural households exhibited a steeper survivor function than urban households, which indicates that children who come from rural households have a smaller probability of remaining in school for each period of analysis (year of schooling) than children from urban households. Figure 7 and Figure 8 illustrate these results.

Figure 7. *Kaplan–Meier survival estimates classified based on gender*

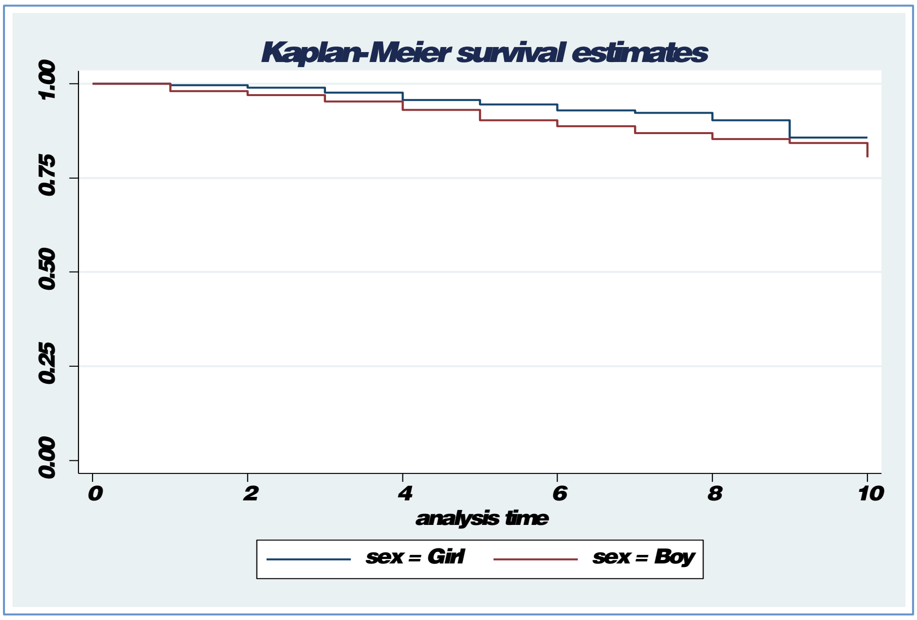
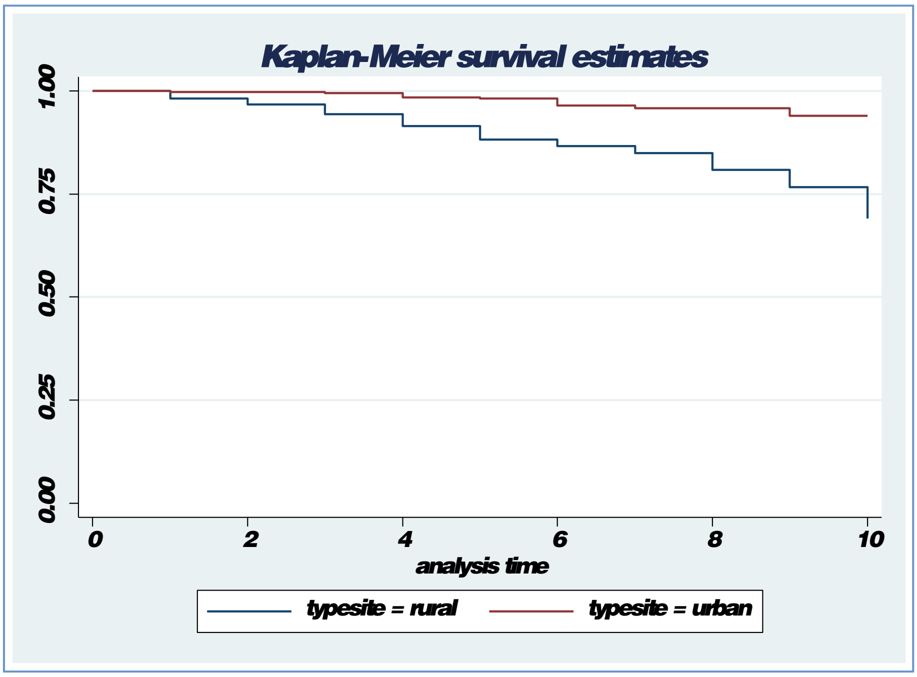


Figure 8. *Kaplan–Meier survival estimates classified based on location of household (urban/rural)*



5.2. Econometric results and discussion

As was discussed in Section 3, an AFT model with Weibull distribution is adopted to investigate the impact of economic shocks on the risk of children dropping out of primary school. An AFT model that estimates the dropping out of school conditional upon current enrolment among children is estimated with this model (Lavado and Gallegos 2005). The dependent variable is the number of years of schooling conditional upon the current enrolment of children in primary school.

Separate AFT models were estimated for boys and girls as well as urban and rural households. Before generating these estimates, however, a log rank test was conducted to test whether the specification assumptions of Cox proportional hazard are valid: the survival function is the same for both rural and urban children and for boys and girls. The null hypothesis for the first was that the survivor functions of the two gender categories are the same while the null hypothesis for the second log rank test we conducted was that the survivor functions of the urban and rural households are the same. We rejected the null hypothesis that the survivor functions of the two gender categories are the same at 5 per cent significance level. The null hypothesis that the survivor functions of the rural and urban children are the same was rejected at 1 per cent significance level.

In the following sub-sections, the results of the various Weibull regressions are discussed. In addition to the results from the full model, the results of the estimations made by incorporating economic shocks from Round 2 and Round 3 separately are discussed to see how the results change with differences in the specification of the model. The results of the Weibull estimation using data disaggregated by location of household and gender of the child are also discussed.

5.2.1. Full model

The results of the AFT model with a Weibull distribution showed that none of the household and child characteristics variables were found to have a statistically significant effect on the probability of children dropping out of school. However, all of the economic shock variables of Round 2 were found to have a statistically significant impact on the probability of children dropping out of school. Similarly, the interaction of dummy variables of economic shocks in Round 2 and time were found to have a statistically significant relationship with the chances of children dropping out of school. Moreover, the variables that accounted for the number of hours that the children spent on different activities were found to have a statistically significant effect. Household wealth and the age the children started school were also found a statistically significant effect.

The age the children started school was found to have a statistically significant effect on the probability of children completing primary school. A unit increase in the age of a child when he/she started school was found to reduce the chance of a child completing school by 9.6 per cent. This indicates that the longer a child's enrolment in school is delayed, the higher the chances are of the child not finishing primary school.

Table 6. *Determinants of primary school drop-out (Weibull estimates)*

Child and household characteristics	Coefficient
Dummy for boy	−0.097 (−1.49)
Dummy for male-headed household	0.044 (0.69)
Dummy for literate father	0.001 (0.03)
Dummy for attending preschool	−0.073 (−0.86)
Dummy for urban households	0.134 (1.63)
Age of starting school	−0.096*** (−5.39)
Number of boys aged 7 years or below	−0.025 (−0.66)
Number of boys between the age of 7 and 17	0.026 (0.91)
Number of male family members between the age of 17 and 65	0.001 (0.06)
Number of male family members aged 65 years or more	−0.046 (−0.66)
Number girls less than or equal to 7 years old	−0.038 (−1.15)
Number of girls between the age of 7 and 17	−0.019 (−0.69)
Number of female family members between the age of 17 and 65	−0.031 (−1.47)
Number of female family members aged 65 years or more	−0.037 (−0.5)
Wealth	0.376* (1.84)
Child's time allocation	
Hours spent per typical day on domestic activities	−0.114*** (−6.46)
Hours spent per typical day on unpaid activities	−0.117*** (−7.28)
Hours spent per typical day on paid labour	−0.105*** (−7.6)
Shocks in Round 3	
Dummy for death or illness of household members	−0.096 (−0.69)
Dummy for death of livestock	−0.034 (−0.23)
Dummy for drought, crop failure, pests and diseases	−0.091 (−0.52)
Shocks in Round 2	
Dummy for death or illness of household members	−0.276** (−2.08)
Dummy for death of livestock	0.549*** (3.09)
Dummy for drought, crop failure, pests and diseases	−0.321** (−2.05)

Child and household characteristics	Coefficient
Economic shocks interacted with time	
Interaction dummy for death or illness of household members in Round 2 and time	0.034 (1.35)
Interaction dummy for death of livestock in Round 2 and time	−0.074** (−2.52)
Interaction dummy for drought, crop failure, pests and diseases in Round 2 and time	0.087*** (3.14)
Interaction dummy for death or illness of household members in Round 3 and time	0.01 (0.39)
Interaction dummy for death of livestock in Round 3 and time	0.028 (0.95)
Interaction dummy for drought, crop failure, pests and diseases in Round 3 and time	0.024 (0419)
Constant	3.879 (0.000)
ln_p	1.644 (0.000)
P	5.177
1/p	0.193

Source: Own computation based on Young Lives Older Cohort data.

A household's wealth level swas found to have a decreasing effect on the probability of the child dropping out. A unit increase in the wealth index was found to increase the child's chances of completing primary school by 37.6 per cent. This indicates that children who come from a well-off family are less likely to drop out of primary school, which is in line with Admassu (2011).

Among the economic shocks incorporated in this model, all the ones experienced in Round 2 were found to have a statistically significant effect on the chances of children dropping out of school. Households' experience of death or illness of a member in Round 2 was found to have a negative effect on the probability of a child staying in school. A child from a household that has faced such a shock is 27.6 per cent less likely to complete primary school than a child whose household didn't have a member die and/or get ill. This result is expected as children may need to drop out of school to raise income after the death of a breadwinner. The illness of household members may also cause the probability of drop-out to be more likely as children are required to spend more time at home looking after the ill household member or substituting for the labour requirements of that household member. The following example is from the Young Lives 2009 qualitative survey and sheds some light on how children's ability to stay at school is affected by a death shock.

> Mulatuwa is 15-year-old girl whose father died when she was 9 years old. She lives with her mother and her siblings and goes to school in a nearby village. She is a Grade 8 student. Her free time is used for paid work, mainly picking haricot beans. She works alongside her sisters and her mother.
>
> If there is no extra class after her scheduled classes, she attends from 1pm to 6pm, i.e. five hours daily. In addition she works five hours per day and ten hours per day at the weekends.
>
> She says that picking the haricot beans is impeding her performance at school; it is also causing her health problems because the place they work is not set up to help the workers be comfortable and healthy. They sit bent over all the time. Her father died six

> years ago and his death affected her life negatively. If her father were alive she would not be picking crops. The amount she gets is very little despite the hard work. She gets 16 birr [US$0.88] for picking a quintal of haricot beans, which takes her four days.
>
> (Source: Woldehanna et al. 2011)

Another example of how the death or illness of household members affects children's completion of primary school is the experience of Feven, a girl from a village in Tigray.

> Feven is 15 years old. She lives in a rural part of the Tigray region. Farming is her household's primary economic activity. She started school at the age of 8 but dropped out when she was 13, and in Grade 5, because of her mother's illness. She had to work to earn some money to pay for her mother's medical treatment. She has been working in the stone-crusher plant since she dropped out of school, and s is paid 15 birr per day. She says she has no plan to return to school unless her mother is cured of her chronic illness. When asked how she felt when she left school, she answered, "I was very sad because I would not have left school if we had someone to support us [the family]. My elder sister told me that she could stop going to school in order to support the family, but I said I had to work so that she could complete her [secondary] education.
>
> (Source: Young Lives Qualitative School Survey, 2010)

Children whose households experienced drought, crop failure, pests and/or diseases in Round 2 were also more likely to have dropped out of primary school. A child from a household that had experienced these shocks was found to be less likely to complete primary education by 32.2 per cent than a child whose household had not experienced any such shocks.

On the other hand, children who come from a household that experienced death of livestock in Round 2 were found to have a higher likelihood of staying in primary school than children whose households did not have their livestock die. A child from a household that experienced the death of livestock was found to be 54.8 per cent more likely to complete primary education than the children whose households did not experience such a shock. This may look counter-intuitive at a first glance. However, there is a plausible explanation for this result. The death of livestock leads to a reduction in the number of cattle that children are expected to herd, leading to a reduction in the time the child spends on cattle-keeping, and allows more time to be allocated to school, hence there is a higher probability of the child spending time at school.

To account for the time-varying nature of the shock variables, each of the shock variables was interacted with time and included in the regression as additional covariates. The results showed that two of the interaction variables had a statistically significant effect on the probability of a child dropping out of school. If the household the child is from has experienced drought, crop failure or pests and diseases, the probability of the child staying in school increases by 8.7 per cent. On the other hand, a unit increase in the time increases reduces the probability of a child staying in school by 7 per cent if the household the child is from has had livestock die.

In contrast, none of the economic shocks that households experienced in Round 3 were found to have a significant relationship with the probability of children completing primary school. This may be an indication that economic shocks take a certain amount of time before they affect children's completion of primary education.

The likelihood of children remaining in school is also affected by other shocks, such as parents' imprisonment and payment of fines. These variables were not incorporated in our survival model because they do not exhibit enough variation. However, there is evidence from Young Lives qualitative research that such shocks can drive children out of school. The experience of a 15-year-old boy from Oromia is a good example of this.

> My father was imprisoned twice for allegedly being responsible for the lost water pump from the place where he was working as a guard. He also had to pay a fine of 500 birr [US$27.65]. There was nobody to help my family and my mother told me to drop out of school and work to earn some income. I was engaged in fishing, farming activities and wage labour. I catch fish from the nearby lake for sale at market. I also work as a wage labourer on private irrigated land, which involves hoeing, weeding and watering.
>
> (Source: Woldehanna et al. 2011)

All of the variables that were included to capture the impact of the opportunity cost of a child's time on the probability of completing primary school were found to have a highly statistically significant effect. All of these variables were found to have an impact at the 1 per cent significance level. A unit increase in the number of hours spent by a child on domestic activities was found to reduce the probability of completing primary school by 11.4 per cent. Similarly, a unit increase in the number of hours spent on unpaid activities was found to reduce the probability of a child completing primary school by 11.7 per cent while a unit increase in the number of hours a child allocates to paid labour reduces the probability of completing primary school by 10.4 per cent.

This result is supported by what parents had to say about child labour. During group interviews in 2007, parents of the Older Cohort children in Leki, a rural area in the Oromia region, told Young Lives how the daily labour affected the education of their children:

> Both daily labour and family work affect the education of the children. Many of the daily labourers have discontinued their education; most of them are young girls. These girls are mainly from the poor families – they help their families by engaging in daily work. During the summer season opportunities for daily labour are reduced because the irrigated plots are used for cereal production but the cash crop production starts during the spring, which directly coincides with the time of education and as a result many of them stop going to school.
>
> (Source: Young Lives Qualitative School Survey, 2010)

These results are in line with our theory as there is a trade-off between the time allocated to non-school activities and school. The more time a child spends on domestic activities, unpaid activities and paid labour, the less time they have available for school-related activities and, therefore, the higher the likelihood them of dropping out of school.

5.2.2. Estimation results using the disaggregated datasets

With the aim of identifying the determinants of drop-out, similar Weibull regressions were run using the disaggregated data based on the location of the household (rural/ urban) and the gender of the child. We first conducted log rank tests for the equality of survivor function for boys and girls and for rural and urban children. Under the null hypothesis that the survival functions of boys and girls (or rural and urban children) are the same, the test statistics have a Chi-squared distribution with one degree of freedom. The test result suggested that we reject the null hypothesis at 5 per cent indicating the survival functions of boys and girls are not the same. Similarly we reject the null hypothesis that the survival function for rural and urban children is the same at 1 per cent, indicating the survival functions of rural and urban children are not the same (detailed results are provided in Table A1 in the Appendix). Therefore, we estimated separate Accelerated Failure Time (AFT) model using Weibull regressions for boys and girls and for rural and urban children (detailed results are provided in Tables A1 and A2 in the Appendix, respectively).

Most of the results were found to be statistically insignificant as disaggregating the data further reduces the number of observations. However, the results provide some insight into how the various factors under consideration affect children living in rural areas relative to those living in urban areas, and girls relative to boys.

Classification based on location: The household composition variables were found to have a statistically significant effect on the probability of children completing primary school in the urban areas. The number of boys in the household below the age of 7 was found to have a negative effect on the probability of a child completing primary school. The same was found to be true for the number of male household members who are 65 years and older. This could be the result of children being given responsibility to care for young children and elderly people at home. On the other hand, the number of boys between the age of 7 and 17 was found to have a positive effect on the likelihood of children completing primary school. One explanation for this could be that the children in the household help each other with school activities. These variables, however, were not found to have a statistically significant in the rural areas.

The wealth level of households was found to have a statistically significant effect on the probability of children completing primary school only in urban areas. An increase in the wealth of a household was found to improve the child's probability of completing primary school.

The child's age when he/she started school was found to have a negative and statistically significant effect on the probability of a child completing primary school in both the rural and urban areas. The impact was, however, found to be much greater for the rural areas than the urban areas. A rise in the age of children by one unit was found to reduce the probability of staying at school by 10.1 per cent in rural areas but by only 5.2 per cent in urban areas. This indicates that late enrolment is more likely to lead to rural children dropping out from primary school, not the urban ones .

The significance of the economic shock variables also differed based on the location of the households. Households' experience of drought, crop failure, pests and/or diseases in Round 2 was found to have a negative and statistically significant effect on the probability of a child completing primary school in rural areas. Similar to the case in the full model, children from a household that had had livestock die in the rural areas were found to have a higher probability of completing primary school than the children who did not. The death or illness of a household member was found to have a negative effect on the probability of completing primary school in both the rural and urban areas.

In addition, the effects of children's time allocation to domestic activities, unpaid activities and paid labour were all found to have a statistically significant effect on the risk of children dropping out of school regardless of the location of the household. An increase in the number of hours spent on each of these categories of activity was found to have a declining effect on the likelihood of a child completing primary school.

Classification based on gender of child: The number of boy household members below the age of 7 was found to have a negative effect on the probability of a girls finishing primary school. Similarly, the number of female household members between the ages of 17 and 65 was also found to have a negative effect on the probability of boys completing primary school.

Children's age when they started school was found to have a negative effect on the probability of completing primary school for both boys and girls. The effect was, however, found to have a much bigger impact on girls than on boys. A unit increase in the age children started school reduce the chance of girls completing primary school by 13 per cent, but only by 7 per cent for boys.

The wealth level of households exhibited a positive relationship with the probability of children completing primary school, for both boys and girls. The effect of a unit increase in this variable was slightly greater for boys (52.4 per cent) than for girls (48.7 per cent)

Although the death or illness of household members did not have a statistically significant effect on the probability of children completing primary school, for either boys or girls, both households' experience of the death of cattle and their experience of crop failure were found to have a statistically significant effect on the probability of boys and girls dropping out of school. Boys and girls from a household that has experienced drought, crop failure, pests and/or diseases were found to be less likely to complete primary education than children from households that have not. The probability of completing primary school was affected more negatively for girls (40.3 per cent) than for boys (31.9 per cent).

Similar to the case with the full model and the disaggregated regressions, the death of livestock was found to have a positive relationship with the probability of completing primary school for both boys and girls. The effect was bigger for boys (49.2 per cent) than for girls (38.9 per cent). This could be because boys, rather than girls, tend to be the ones sent out to keep cattle.

All of the variables representing a child's time allocation are found to have a statistically significant effect on the risk of drop-out faced by children, regardless of the child's gender. One should recall here that the same result was obtained in the full regression and the regression on the disaggregated data based on location.

5.2.3. Estimation results from models incorporating economic shocks in different survey rounds

To check for the robustness of the results of the initial regression, two other models were regressed which incorporate the economic shock variables of Round 2 and Round 3, separately. The statistical significance and the direction of relationship of the variables with the risk of dropping out of school remained the same in both the models, although the extent of the effects were found to be different.

In the model incorporating economic shocks from Round 2, the wealth index variable was found to have a statistically significant relationship with the probability of completing primary school. This was also found to be true for the model with Round 3 shocks only. However, the effect was greater in the model containing Round 2 shocks (43.4 per cent) than in the model with Round 3 shocks (38.9 per cent).

All of the variables that were incorporated to capture the effect of children's time allocation to different activities were found to affect the probability of completing primary school in both models. The effects of all of these variables was higher in the model containing Round 2 shock variables than in the model incorporating Round 3 variables.

The age children started school was also found to have a negative and statistically significant relationship with the probability of a child completing primary education in both of the models. The effect was also almost equal for both models.

In the regression of the model that contains shock variables from Round 2 only, all of the economic shock variables were found to have a statistically significant relationship with the probability of completing primary school. In the model that contains shock variables from Round 3 only, the death or illness or of household members was found to have a statistically significant effect on the probability that the child completes primary school. It is only in this regression that a shock from Round 3 is found to have a statistically significant effect on the likelihood of children completing primary school.

Table 7. *Estimation results from models with economic shocks of separate rounds*

	Coefficient	
	Round 2 shocks	Round 3 shocks
Child and household characteristics		
Dummy for male-headed household	0.051	0.03
	(0.74)	0.4
Dummy for literate father	0.006	−0.026
	(0.11)	−0.49
Dummy for attending preschool	−0.084	0.008
	(−0.94)	0.08
Age of starting school	−0.109***	−0.110***
	(−5.8)	−5.4
Number of boys aged 7 years or below	−0.034	−0.022
	(−0.82)	−0.51
Number of boys between the age 7 and 17	0.015	0.031
	(0.54)	1.03
Number of male family members between the age of 17 and 65	0.004	0.008
	(0.16)	0.34
Number of male family members aged 65 years and more	−0.093	−0.123
	(−1.26)	−1.57
Number girls less than or equal to 7 years old	−0.046	−0.044
	(−1.25)	−1.16
Number of girls between age 7 and 17	−0.006	0.015
	(−0.2)	0.48
Number of female family members between the age of 17 and 65	−0.026	−0.027
	(−1.12)	−1.1
Number of female family members aged 65 years or older	−0.022	−0.042
	(−0.27)	−0.5
Wealth index	0.434**	0.389***
	(2.21)	1.88
Child's time allocation		
Hours spent per typical day on domestic activities	−0.121***	−0.119***
	(−6.62)	−6.21
Hours spent per typical day on unpaid activities	−0.137***	−0.127***
	(−8.05)	−7.01
Hours spent per typical day on paid labour	−0.117***	−0.114***
	(−7.86)	−7.01

	Coefficient	
	Round 2 shocks	Round 3 shocks
Shocks in Round 2		
Dummy for death or illness of household members	−0.315** (−2.25)	
Dummy for death of livestock	0.607*** (3.26)	
Dummy for drought, crop failure, pests and diseases	−0.393** (−2.56)	
Shocks in Round 3		
Dummy for death or illness of household members		−0.286* (−1.92)
Dummy for death of livestock		0.055 (0.31)
Dummy for drought, crop failure, pests and diseases		−0.201 (−1.08)
Economic shocks interacted with time		
Interaction dummy for death or illness of household members in Round 2 and time	0.039 (1.45)	
Interaction dummy for death of livestock in Round 2 and time	−0.082*** (−2.59)	
Interaction dummy for drought, crop failure, pests and diseases in Round 2 and time	0.099*** (3.75)	
Interaction dummy for death or illness of household members in Round 3 and time		0.042 (1.5)
Interaction dummy for death of livestock in Round 3 and time		0.004 (0.11)
Interaction dummy for drought, crop failure, pests and diseases in Round 3 and time		0.052* (1.78)
Constant	4.156 (14.72)	4.117 (12.66)
ln_p	1.512*** (13.76)	1.492*** (11.55)
p	4.534	4.446
1/p	0.221	0.225

Note: *** p<0.01, ** p<0.05, * p<0.1; Number of observations 970
Source: Own computation based on Young Lives Older Cohort data.

6. Summary and conclusion

Using data from the Older Cohort of the Young Lives sample in Ethiopia, this paper explores the associates of idiosyncratic and covariate economic shocks, the resulting work burden on children and the effect of these on primary education completion and primary school drop-out rates. The paper uses an AFT model with Weibull distribution to analyse the relationship between economic shock and the likelihood of children completing primary education or dropping out.

In addition to the estimation of the full model, separate regressions for boys and girls and for rural and urban children were run to check for the robustness of the results and to identify the relative importance of associates of primary school drop-out rates among different groups of households.

The results of the regression showed that children who belong to a household that experienced the death or illness of a household member in Round 2 faced more risk of dropping out of primary school in Round 3, compared to children whose households did not face such shocks. The results also show that the same shock has a statistically significant effect on the risk of children from urban households and girls dropping out of school.

Furthermore, children from a household that has experienced death of livestock were found to face less risk of dropping out primary school than children who belong to households that have not faced the death of livestock. At first glance, this result seems unexpected as an economic shock is thought to affect children's schooling negatively. However, the death of livestock reduces the workload on children and allows more time to be allocated to school and therefore reduces their chance of dropping out. This result remained the same in the alternative estimations as well. Moreover, the separate estimations made for boys and girls and for rural and urban children showed that this economic shock has a statistically significant effect on the risk of children dropping out of primary school ins rural areas and among boys.

Children's allocation of time to domestic activities, unpaid activities and paid labour were all found to be highly statistically significant in all of the estimations regardless of the type of model or the data used. All of these variables had an increasing effect on the risk of children dropping out of primary school. Households' wealth, measured by the wealth index, was also found to be statistically significant in almost all of the estimations. Wealth was found to have a negative relationship with the risk of children dropping out of school, indicating that a reduction in poverty is crucial to improve completion and reduce drop-out of children from school.

The fact that these shocks are experienced at the household level shows that social assistance programmes should include not only covariate shocks but also idiosyncratic shocks, which households experience on their own, if the desired result is to strengthen the country's accumulation of human capital. Moreover, it is important to link primary education to social protection by recognising that shocks affect households' ability to send their children to school. Social protection should help households cope with the various kinds of shock. In addition, providing households with incentives to make their children attend school instead of having them spend their time on paid and unpaid work would also contribute to a reduction in the probability of children dropping out primary school. This could be done by introducing a cash transfer programme conditional on children's attendance at school or on reshaping the existing social protection programme, the PSNP, so as to incorporate a cash transfer component conditional on school attendance.

A good model for this is *Progresa*, which is a conditional cash transfer programme operating in Mexico. De Janvry et al. (2006) investigated whether children whose families are recipients of conditional transfers are insulated from the impacts of shocks on school enrolment and work. The results of the study showed that conditional cash transfer programmes contributed positively to the protection of children's enrolment in school, which indicates that conditional cash transfer programmes can act as safety nets that enable poor children to attend school.

In this regard, reducing school drop-out rates and improving primary education completion rates is not just a question of changing education policy, but also of addressing other social and economic issues and hence these questions should concern not only that the Ministry of Education, but also policymakers and officials in other sectors.

References

Admassie, Assefa (2002) *Allocation of Children's Time Endowment between Schooling and Work in Rural Ethiopia,* Discussion Papers on Development Policy No. 44, Bonn: Centre for Development Research

Admassu, Kassahun A. (2011) 'Primary School Enrolment and Dropout in Ethiopia: Household and School Factors', paper presented to the Population Association of America, Annual Meeting Program, 31 March – 1 April 2011, Washington DC

Andinet, D. and A. Degenet (2008) *Gender Differences in Primary Educational Performance of Primary School Age Children in Rural Ethiopia*, New Delhi: Global Development Network

Asadullah, Mohammad N., Nazmul Chaudhury and Luc Christiaensen (2006) *Schools, Household Risk and Gender: Determinants of Child Schooling in Ethiopia,* CSAE Working Paper 2006-6, Oxford: Centre for the Study of African Economies, University of Oxford

Bhattacharjee, A. and S. Das (2002) *Testing Proportionality in Duration Models with Respect to Continuous Covariates*, Cambridge Working Paper in Economics No. 220, Cambridge: University of Cambridge

Bijorkman, Martina (2005) *Income Shocks and Gender Gaps in education: Evidence from Uganda,* Seminar Paper No. 744, Stockholm: Institute for International Economic Studies, Stockholm University

Bratti, Massimiliano and Mariapia Mendola (2011*) Parental Health and Child Schooling,* IZA Discussion Paper No. 5870, Bonn, Institute for the Study of Labor (IZA)

Brown, Philip H. and Albert Park (2002) 'Education and Poverty in Rural China', *Economics of Education Review* 21.6: 523–41

Cleves, Mario A., William W. Gould and Roberto G. Gutierrez (2004) *An Introduction to Survival Analysis Using Stata* (revised edition), College Station, TA: Stata Press

Cox, D.R. 'Regression Models on Life – Tables (With Discussion)' in Mario A. Cleves, William W. Gould and Roberto G. Gutierrez (2004) *An Introduction to Survival Analysis Using Stata* (revised edition), College Station, TA: Stata Press

Cox, D.R. and D. Oakes (1984) *Analysis of Survival Data*, London: Chapman and Hall

de Janvry, Alain, Fredirico Finan, Elisabeth Sadoulet and Renos Vakis (2006) 'Can Conditional Cash Transfer Programmes Serve as Safety Nets in Keeping Children at School and from Working When Exposed to Shocks?', *Journal of Development Economics* 79: 349–73

Dureyea, Suzanne (1998) *Children's Advancement Through School in Brazil: The Role of Transitory Shocks to Household Income*, Working Paper No. 376, Washington DC: Inter-American Development Bank

Dureyea, Suzanne, David Lam and Deborah Levison (2003) *Effects of Economic Shocks on Children's Employment and Schooling in Brazil*, PSC Research Report, Report No. 03-541, Ann Arbor, MI: Population Studies Center

Gingoux, Jérémie and Marta Mendez (2011) 'Critical Periods and the Long-run Effects of Income Shocks on Education: Evidence from Indonesia', paper presented to the

Développement, Institutions et Mondialisation (DIAL) Development Conference, 30 June – 1 July 2011, Paris

Glewwe, Paul and Hanan Jacoby (1994) 'Student Achievement and Schooling Choice in Low-income Countries: Evidence from Ghana', *Journal of Human Resources*, 29.3: 843–64

Glewwe, Paul, Margaret Grosh, Hanan Jacoby and Marline Lockheed (1995) 'An Eclectic Approach to Estimating the Determinants of Achievement in Jamaican Primary Education', *Oxford Journals* 9.2: 231–58

Glick, Peter J., David E. Sahn and Thomas F. Walker (2011) *Household Shocks and Education Investment in Madagascar*, Working Paper No. 240, New York, NY: Cornell Food and Nutrition Policy Program, Cornell University

Gunnarson, Victoria, Peter F. Orazem and Mario A. Sanchez (2004) 'Child Labor and School Achievement in Latin America', *World Bank Economic Review* 20.1: 31–54

Handa, Sudhanshu and Kenneth R. Simler (2000) *Quality or Quantity? The Supply-Side Determinants of Primary Schooling in Rural Mozambique*, FCND Discussion Paper No. 83, Washington, DC: International Food Policy Research Institute

Holmes, J. (2003) 'Measuring the Determinants of School Completion in Pakistan: Analysis of Censoring and Selection Bias', *Economics of Education Review* 22.3: 249–64

Hunter, Nina and Julian May (2002) *Poverty, Shocks and School Disruptions Episodes among Adolescents in South Africa*, CSDS Working Paper No. 35, Durban: School of Development Studies, University of Natal

Kim, Namsuk and Martha Serra-Garcia (2010) *Economic Crises, Health and Education in Jamaica*, UNDP/ODS Working Paper, New York: United Nations Development Programme

Krutikova, Sofya (2010) Who *Gets to Stay in School? Long-run Impact of Income Shocks on Schooling in Rural Tanzania*, CSAE Working Paper 2010-36, Oxford: Centre for the Study of African Economies, University of Oxford

Lavado, Pablo and Gallegos Jose (2005) *The Dynamics of the Schooling Drop-out in Peru: A Framework Using Duration Models,* Lima: Centro de Investigacion de la Universidad del Pacifico

Lincove, Jane A. (2009) 'Determinants of Schooling for Boys and Girls in Nigeria Under a Policy of Free Primary Education', *Economics of Education Review* 28.4: 474–84

MOE (2011) *Education Statistics Annual Abstract 2003 E.C. / 2010-11 G.C.*, Addis Ababa: Ministry of Education

MOFED (2008) *Dynamics of Growth and Poverty in Ethiopia: 1995/96–2004/05*, Addis Ababa: Ministry of Finance and Economic Development

Sun, Ang and Yang Yao (2010) 'Health Shocks and Children's School Attainments in Rural China', *Economics of Education Review* 29.3: 375–82

Woldehanna, Tassew (2012) 'Do Economic Shocks Have a Sustained Effect on the Height of Five-year-old Children? Evidence from Rural and Urban Ethiopia' in Jo Boyden and Michael Bourdillon (eds) *Children Growing Up in Poverty: Multidisciplinary Approaches*, Basingstoke: Palgrave Macmillan

Woldehanna, T., Retta Gudisa, Yisak Tafere and Alula Pankhurst (2011) *Understanding Changes in the Lives of Poor Children: Initial Findings from Ethiopia*, Round 3 Survey Report, Oxford: Young Lives

Woldehanna, T., N. Jones and B. Tefera (2008) 'The Invisibility of Children's Paid and Unpaid Work: Implications for Ethiopia's National Poverty Reduction Policy', *Childhood* 15: 177–201

Woldehanna, T., Nicola Jones and Bekele Tefera (2005a) *Children's Educational Completion Rates and Achievement: Implications for Ethiopia's Second Poverty Reduction Strategy (2006–10)*, Young Lives Working Paper 18, Oxford: Young Lives

Woldehanna, Tassew, Alemu Mekonnen, Nicola Jones, Bekele Tefera, John Seager, Tekie Alemu and Getachew Asgedom (2005b) *Education Choices in Ethiopia: What Determines Whether Poor Households Send Their Children to School?*, Young Lives Working Paper 15, Oxford: Young Lives

World Bank (2004) *Books, Buildings, and Learning Outcomes: An Impact Evaluation of World Bank Support to Basic Education in Ghana*, Report No. 28779, Washington, DC: World Bank

United Nations (2011) *The Millennium Development Goals Report*, New York, NY: United Nations

Appendix

Table A1. *AFT model – Weibull regression by location (rural/ urban)*

	Coefficients	
	Urban	Rural
Child and household characteristics		
Dummy for boy index child	−0.041 (−0.39)	−0.076 (−1.000)
Dummy for male-headed household	−0.091 (−1.07)	0.099 (1.23)
Dummy for literate father	0.006 (0.09)	−0.023 (−0.4)
Dummy for attending preschool	0.005 (0.06)	−0.051 (−0.41)
Age of starting school	−0.053*** (−2.72)	−0.101*** (−4.62)
Number of boys aged 7 years or below	−0.108** (−2.23)	−0.012 (−0.26)
Number of boys between the age 7 and 17	0.112** (2.38)	−0.012 (−0.36)
Number of male family members between the age of 17 and 65	0.004 (0.12)	0.022 (0.87)
Number of male family members age 65 years and more	−0.176** (−1.99)	−0.008 (−0.09)
Number girls less than or equal to 7 years old	−0.081 (−1.54)	−0.021 (−0.51)
Number of girls between age 7 and 17	0.061 (1.2)	−0.034 (−1.07)
Number of female family members between the age of 17 and 65	−0.002 (−0.08)	−0.031 (−1.18)
Number of female family members aged 65 years or older	0.311 (1.33)	−0.102 (−1.22)
Wealth index	0.606** (2.06)	0.246 (1.01)
Child's time allocation		
Hours spent per typical day on domestic activities	−0.059** (−2.99)	−0.129*** (−5.89)
Hours spent per typical day on unpaid activities	−0.069*** (−3.28)	−0.131*** (−6.58)
Hours spent per typical day on paid labour	−0.077*** (−4.02)	−0.107*** (−6.38)
Shocks in Round 3		
Dummy for death or illness of household members	−0.386* (−1.74)	−0.356** (−2.2)
Dummy for death of livestock	−0.170 (−0.5)	0.571** (2.97)
Dummy for drought, crop failure, pests and diseases	1.491 (0.000)	−0.430*** (−2.3)

	Coefficients	
	Urban	Rural
Shocks in Round 2		
Dummy for death or illness of household members	−0.363	−0.100
	(−1.56)	(−0.6)
Dummy for death of livestock	−0.551	−0.035
	(−1.49)	(−0.22)
Dummy for drought, crop failure, pests and diseases	−0.157	0.060
	(−0.6)	(0.3)
Economic shocks interacted with time		
Interaction dummy for death or illness of household members in Round 2 and time	0.046	0.054*
	(1.44)	(1.68)
Interaction dummy for death of livestock in Round 2 and time	0.031	−0.080**
	(0.63)	(−2.43)
Interaction dummy for drought, crop failure, pests and diseases in Round 2 and time	−0.068	0.102***
	(0.000)	(3.18)
Interaction dummy for death or illness of household members in Round 3 and time	0.053	0.005
	(1.52)	(0.16)
Interaction dummy for death of livestock in Round 3 and time	0.095	0.023
	(1.32)	(0.72)
Interaction dummy for drought, crop failure, pests and diseases in Round 3 and time	0.038	−0.001
	(0.89)	(−0.02)
Constant	2.772	4.075
	(12.73)	(11.36)
ln_p	2.825	1.587
	(13.38)	(11.55)
p	16.863	4.888
1/p	0.059	0.205
Number of observations		970

Note: *** p<0.01, ** p<0.05, * p<0.1
Source: Own computation based on Young Lives Older Cohort data.

Table A2. *AFT model – Weibull regression for boys and girls*

	Coefficients	
	Boys	Girls
Child and household characteristics		
Dummy for male-headed household	−0.002 (−0.03)	0.070 (0.93)
Dummy for literate father	−0.008 (−0.08)	−0.031 (−0.56)
Dummy for attending pre-school	−0.190* (−1.8)	0.065 (0.7)
Age of starting school	−0.073*** (−3.26)	−0.131*** (−6.78)
Number of boys aged 7 years or below	0.023 (0.5)	−0.076* (−1.69)
Number of boys between the ages of 7 and 17	0.056 (1.31)	−0.001 (−0.04)
Number of male family members between the ages of 17 and 65	0.039 (1.48)	−0.006 (−0.22)
Number of male family members aged 65 years and more	0.038 (0.35)	−0.044 (−0.6)
Number girls less than or equal to 7 years old	−0.034 (−0.8)	−0.001 (−0.03)
Number of girls between the ages of 7 and 17	−0.027 (−0.68)	0.010 (0.37)
Number of female family members between the ages of 17 and 65	−0.056** (−2.43)	0.008 (0.3)
Number of female family members aged 65 years or older	0.002 (0.02)	−0.066 (−0.91)
Wealth index	0.524** (2.14)	0.487** (2.39)
Child's time allocation		
Hours spent per typical day on domestic activities	−0.062*** (−2.97)	−0.121*** (−5.93)
Hours spent per typical day on unpaid activities	−0.118*** (−5.86)	−0.100*** (−5.22)
Hours spent per typical day on paid labour	−0.113*** (−6.17)	−0.083*** (−5.48)
Shocks in Round 2		
Dummy for death or illness of household members	−0.208 (−1.12)	−0.187 (−1.24)
Dummy for death of livestock	0.493** (2.3)	0.389* (1.9)
Dummy for drought, crop failure, pests and diseases	−0.319* (−1.7)	−0.403** (−2.2)
Shocks in Round 3		
Dummy for death or illness of household members	−0.276 (−1.58)	0.024 (0.13)
Dummy for death of livestock	−0.223 (−1.2)	−0.057 (−0.27)
Dummy for drought, crop failure, pests and diseases	−0.342 (−1.59)	0.190 (0.81)

	Coefficients	
	Boys	Girls
Economic shocks interacted with time		
Interaction dummy for death or illness of household members in Round 2 and time	0.047	0.005
	(1.26)	(0.19)
Interaction dummy for death of livestock in Round 2 and time	−0.059	−0.065**
	(−1.58)	(−2)
Interaction dummy for drought, crop failure, pests and diseases in Round 2 and time	0.081**	0.081***
	(2.27)	(2.65)
Interaction dummy for death or illness of household members in Round 3 and time	0.037	−0.007
	(1.08)	(−0.24)
Interaction dummy for death of livestock in Round 3 and time	0.051	0.028
	(1.33)	(0.79)
Interaction dummy for drought, crop failure, pests and diseases in Round 3 and time	0.066*	−0.007
	(1.7)	(−0.22)
Constant	3.376	4.029
	(11.37)	(13.47)
ln_p	1.7***	2.217***
	(11.82)	(14.02)
p	5.474	9.178
1/p	0.183	0.109
Number of observations		970

Note: *** p<0.01, ** p<0.05, * p<0.1
Source: Own computation based on Young Lives Older Cohort data.

Table A3. *Log rank test for equality of baseline survival function between boys and girls*

	Events observed	Events expected	
Gender			
Girl	41	51.37	
Boy	61	50.63	
Total	**102**	**102**	
$Chi^2(1)$			4.29
$P>Chi^2$			0.0383

The null hypothesis: the survival functions of boys and girls are the same.

Table A4. *Log rank test for equality of baseline survival function between urban and rural households*

	Events observed	Events expected	
Type of site			
Rural	85	54.25	
Urban	17	47.75	
Total	**102**	**102**	
$Chi^2(1)$			38.61
$P>Chi^2$			0

The null hypothesis: The survival functions of rural and urban children are the same.

Shocks and Primary School Drop-out Rates: A Study of 20 Sentinel Sites in Ethiopia

This paper investigates the impact of idiosyncratic and covariate economic shocks and the resulting work burden on children on the likelihood of children completing primary education or dropping out of primary school. In this endeavour, censored Cox proportional hazards model was estimated using data from the Young Lives study of childhood poverty. The estimated results indicate that both idiosyncratic shocks and covariate shocks have a statistically significant effect on the risk of children dropping out of primary school. Moreover, the amount of time children allocate to domestic activities, unpaid activities and paid labour were each found to have a positive effect on the probability of children dropping out of school. Separate Weibull accelerated failure time models for boys and girls and for rural and urban children were estimated to check the robustness of the results and the relative importance of the economic shocks to different groups of children. It was observed that the statistical significance and the sign of the coefficients remained the same. Considering the fact that both idiosyncratic and area-wide economic shocks are experienced at the household level, the study concludes that it is vital to take education into account when designing social protection programmes so as reduce the vulnerability of households to the shocks and keep children from dropping out from school. One way of doing this would be to introduce a conditional cash transfer programme that would provide families with incentives to keep their children enrolled in school.

Young Lives
An International Study of Childhood Poverty

About Young Lives

Young Lives is an international study of childhood poverty, involving 12,000 children in 4 countries over 15 years. It is led by a team in the Department of International Development at the University of Oxford in association with research and policy partners in the 4 study countries: Ethiopia, India, Peru and Vietnam.

Through researching different aspects of children's lives, we seek to improve policies and programmes for children.

Young Lives Partners

Young Lives is coordinated by a small team based at the University of Oxford, led by Professor Jo Boyden.

- *Ethiopian Development Research Institute, Ethiopia*
- *Centre for Economic and Social Sciences, Andhra Pradesh, India*
- *Sri Padmavathi Mahila Visvavidyalayam (Women's University), Andhra Pradesh, India*
- *Grupo de Análisis para el Desarollo (Group for the Analysis of Development), Peru*
- *Instituto de Investigación Nutricional (Institute for Nutrition Research), Peru*
- *Center for Analysis and Forecasting, Vietnamese Academy of Social Sciences, Vietnam*
- *General Statistics Office, Vietnam*
- *Child and Youth Studies Group (CREET), The Open University, UK*
- *Oxford Department of International Development (ODID), University of Oxford, UK*
- *Save the Children*

Contact:
Young Lives
Oxford Department of International Development (ODID), University of Oxford, Queen Elizabeth House, 3 Mansfield Road, Oxford OX1 3TB, UK
Tel: +44 (0)1865 281751
Email: younglives@younglives.org.uk
Website: www.younglives.org.uk

Young Lives
An International Study of Childhood Poverty