PARENTAL DEATH AND CHILDREN'S SCHOOLING IN A SAHELIAN COUNTRY (BURKINA FASO): What's Wrong with the Extended Family System?[*]

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First draft

Abstract

There has been increasing attention to the study of schooling impacts of orphanhood in sub-Saharan Africa. But results are mitigated and data sources limited. This research uses an original data set, event history data collected in Burkina Faso in 2000 and which concerned 8 644 individuals aged 15-64 years at the time of the survey. We found that becoming orphaned is detrimental in terms of entering school, especially for double orphans in rural areas as well as at the country level. Analysis of the impact of orphan status on school ending reveals a paradox: while they are less likely to enter school, when parental death occurs during studies, orphans, particularly double orphans, perform better than nonorphans. The extended family system might react differently depending on whether parental death occurred before or during schooling. In terms of policy implications the government and the civil society might implement specific targeted programs for orphans, mostly for access to school.

[*] Paper presented at the 2005 Annual Meeting of the Population Association of America session on *Health and Education in Developing Countries* to be held in Philadelphia, Pennsylvania, March 31-April 2.
This study is part of postdoctoral research supported by a grant from the Andrew W. Mellon Foundation.
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Introduction

In recent years, there has been increasing attention to the study of orphanhood in sub-Saharan Africa, both in term of prevalence and in term of orphans' wellbeing. This sudden focus on orphanhood is no doubt linked to the AIDS pandemic, which has led to an increased number of orphans in many parts of the continent. Recent Demographic and Health Surveys have revealed that the highest levels of orphanhood in Africa are observed in countries like Uganda, Malawi, Mozambique, Zambia, and Zimbabwe, which are all located in Eastern or Southern Africa, the most afflicted areas of the continent regarding HIV prevalence (Bicego et al. 2003; Case et al. 2004)[1]. Indeed, most of the current literature on the orphan topic "*...largely tied to the progression of the AIDS pandemic*" (Marcoux et al. 2003) concerns these countries. But regarding the specific context of Sahelian countries characterized by low levels of HIV prevalence, there is little research on the topic of orphanhood despite high levels of mortality.

Furthermore, without denying the importance of the AIDS pandemic, one should not systematically link the interest for the study of orphans to AIDS solely. The general declining living standards of the African population (the phenomena of *impoverishment*), which is one of the main consequences of the drastic economic policies undertaken in the two past decades, is another justification of the importance of studying orphans' wellbeing. As it has been emphasized by Bradshaw et al. (1993) "*Directly or indirectly, foreign debt and structural adjustment influence mortality, economic growth, immunization, health care, urbanization, and nutrition*", to which we can add children's educational outcomes. In such a context where resources are becoming less and less available and where households are constrained to make choices, one can actually wonder what the schooling of the most vulnerable children is, particularly orphans. As stated by Gertler et al. (2004) "*The international community has become increasingly concerned about the effect of adult mortality on children's schooling (Copson, 2002; World Bank, 1999). Many programs, especially in Africa have been launched or proposed to support the school fees, uniforms and other schooling-related cost of orphaned children (Hunter and Williamson, 2000; Reid, 1993). However, the empirical evidence to support these policies is weak*". Obviously there is a need for more research to better understand the consequences of adult mortality, and particularly parental mortality, on children's schooling.

One of the six goals of the "Framework for Action" adopted by the World Education Forum in Dakar in 2000 is "*expanding and improving comprehensive early childhood care and education, especially for the most vulnerable and disadvantaged children*" (UNESCO 2000). So understanding the risk faced by orphans in terms of schooling and how the extended family system takes care of these orphans has an important policy implication: "*if extended families insure each other, then governmental policies may not need to target orphans specifically*.[…] *On the other hand, if holding all else equal, orphans are at risk, then governments may be well advised to target orphans specifically when they design policies to improve such outcomes as school enrollment"* (Case et al. 2004).

As it has been underlined by many authors, sub-Saharan Africa is well known for its traditional solidarity network especially through the extended family system, which allows support to the most vulnerable members of the group (Antoine and Guillaume 1986; Desai 1992; Lloyd and

[1] In these countries nearly 15% of children under age 15 are orphans.

Gage-Brandon 1994; Lloyd and Blanc 1996; Bushmann 2000). "*In an extended family system, parenting is a shared responsibility and children grow up with more than one "mother" and/or more than one "father"*". […] "*This larger circle of relationships brings children both benefits (in terms of additional support and protection from loss in case of the death of either or both parents) and cost (in terms of additional future responsibilities)*"(Lloyd and Blanc 1996:268). That implies that the lost of one parent or both might not disturb a child's schooling. Is this statement verified by empirical evidence?

Parental Death and Children's Schooling: a Brief Review

Bushmann and Hannum (2001) underlined that "*there is significant evidence that family factors are important for educational outcomes in the developing world*". Indeed, in Sub-Saharan Africa, numerous studies in this field have analyzed the effects of some family factors on children's schooling namely socio-economic status, family structure and size, the head of household's gender… (Gomes 1984; Chernichovsky 1985; Lloyd and Gage-Brandon 1994; Bushmann 2000). Therefore, regarding the effect of parental death, most of the studies are recent.

One of the difficulties in studying early orphanhood, as mentioned by Gertler et al. (2004), "*...is finding data sets large enough to capture sufficient cases of prime-age adult mortality linked to socio-economic status of the household*".

Studies using huge large data sets such as census or data sets from surveys like Demographic and Health Surveys (DHS) highlighted some common results about the link between the death of parents and children's educational outcomes. Wakam (2002), using Cameroon 1987 Census data, found that double orphans present the worst situation in terms of schooling. Then, maternal orphans are less likely to be enrolled relative to paternal orphans. In order to assess the effect of the economic crisis he compared the 1987 results to those from Cameroon 1998 DHS and he found out that the situation has become worse, particularly for children who have lost both parents. Using the Niger and Senegal 1988 census data, Marcoux et al. (2003) also observed the same result: the worst situation in terms of school enrollment is the one observed for double orphans. Paternal or maternal death presents an intermediate situation. In a recent study concerning thirteen African and Caribbean countries using DHS and MICS (Multiple Indicator Cluster Surveys), Nyangara (2004) found similar results: in Ethiopia, Kenya, Mozambique, and Tanzania, double orphans were less likely to be enrolled in school than nonorphans. Maternal orphans in Ethiopia, Haiti, and Rwanda, and paternal orphans in Ethiopia, Haiti, Kenya, and Nigeria were less likely to enroll in school than nonorphans. Based on these first results emphasizing that orphans are less likely to be enrolled in school compared to nonorphans, one can legitimately wonder what is wrong with the effectiveness of the so called African solidarity network.

But some contrasting results were also observed: in the same study from Nyangara (2004): "*paternal orphans in Namibia and maternal orphans in Mozambique and Nigeria were more likely to enroll in school than non-orphans*". In a study of Northwestern Tanzania using a longitudinal survey conducted from 1991 to 1994, Ainsworth et al. (2002) observed that maternal orphans have the lowest enrollment rate. Even after controlling for other factors, in particular an index of the household's economic status, they observed that maternal orphan status has an

independent effect on delayed schooling of the youngest children. They also observed that the schooling of the older orphans (11-14 years) is not affected by the recent adult death and they concluded that "*...Tanzanian household are coping with adult deaths by delaying enrollment of young children (7-10), while maintaining enrollment of older children (11-14)*" (22).

Setting

Burkina Faso is one of the poorest countries in the world located in the part of the African continent characterized by Antonioli (1993) as the "*Sudano-Sahelian illiteracy zone*". Most of the countries located in this area (Burkina Faso, Ethiopia, Mali, Niger, Sudan, Chad…) are generally ranked last according to the Human Development Index. Indeed, the educational level in Burkina Faso is among the lowest in the world. Educational statistics from the Ministry of Education give a Gross Enrollment Rate (GER) for primary school of 41 % in 2000 for children aged 7-12. This low level of overall schooling is also characterized by an important spatial and gender gap. For the same year, the GER was respectively 48 % and 35 % for boys and girls. Thus, the main goal of the educational policy (PDDEB) is to reach a GER of about 75 % by the year 2010. Finally, one of the main goals of the government as it is stated in the 2000 Poverty Reduction Strategy Paper is to "*guarantee that the poor have access to basic social services*" (Burkina Faso, 2003:4). Since 1991, Burkina Faso has undertaken a Structural Adjustment Program (SAP), which not only limited the social investments, but also contributed to increasing the level of poverty. In addition, in January 1994, countries of the Economic and Monetary Union of West Africa experienced a 50 % devaluation of their currency. A recent report mentioned that the incidence of poverty in urban area increased from 10.4 % in 1994 to 19.9 % in 2003 (Burkina/MED/SG/INSD 2003).

Regarding what are called vulnerable children or "Children in Particularly Difficult Circumstances", meaning children in the poorest families, handicapped children, orphans…, there have been an increasing number of Non-Governmental Organizations working in this field to give assistance to these children and their families. More recently, the government has even implemented a national policy paper in order to better target these disadvantaged groups. Results from the current research could contribute to the definition and the implementation of such policy.

Methodology

Hypothesis

When studying orphans' educational outcomes, most of the authors assume that the school enrollment may be lower for orphans than for nonorphans. As summarized by Case et al. (2004), there are some reasons which are consistent with this assumption: one is poverty because orphans may be more likely to reside in poor household after parental death; a second reason may be lower returns to education for orphans relative to nonorphans and another one is that there may be intrahousehold discrimination against orphans. But given the well known and well documented social solidarity network in sub-Sahara Africa, one could state the expected orphans-schooling relation differently. In a study carried on in a peri-urban community in Zimbabwe, Foster et al. (1995) observed that "*The majority of orphaned children were being cared for*

satisfactorily within extended families, often under difficult circumstances" and that "*There was little evidence of discrimination or exploitation of orphaned children by the extended family caregivers*". Thus, if the extended family solidarities work well, parental death may not highly affect the child's chances of being enrolled in school and then there may be at least just a slight difference between orphans and nonorphans.

Data

With the exception of some studies such as the ones from Ainsworth et al. (2002) and Evans and Miguel (2004) using panel data, most of the current literature assessing how orphan status affect schooling, as we mentioned formerly, are based on cross-sectional data (census and comparable data sets like DHS and MICS). The advantage of census is their huge scope concerning all the population in a country and gathering enough cases of childhood orphans. DHS and MICS allow for comparisons between countries, which can help draw regional or constant patterns. But there are two main limits to these sources of data: one is *endogeneity* because some omitted variables could be correlated with both orphan status and enrollment. The other one is *anteriority*: in cross-sectional data we know at the time of the survey if the child is orphaned or not and if he is attending school or not. But for those who are orphans, we neither know when (at which age) they became orphaned, nor when they have left school (for those who have already been in school but are not attending school at the time of the survey). Probably some of the orphaned children not attending school became orphans after they have left school. The *time order* is an important issue in causal explanation: if the parental death occurred before school entry, we can assess if this *exgoneous* event had an impact on the child's chances of entering school.

The data used in the current research allow taking into account the *time* dimension since there are event history data, collected in a 2000 national representative survey called EMIUB[2]. Questionnaires collecting information on all the activities, all the residences of more than three months from the 6th birthday (and also questionnaires on other topics) were addressed to 8 644 individuals aged 15-64 in 2000. The episodes of activities include periods of schooling, so for those who entered school we know their age at school entry and for those who have left school, we know their age when leaving. The survey also asked for all the individuals their parents' survival status and for fatherless and/or motherless, their age at the parents' death. So it is also possible to know for those who have stopped school if the father's and/or mother's death has occurred before dropping out of school.

To document how the prevalence of orphanhood and its effect on schooling changed over the course of time in Burkina Faso, we compare the experience of contemporary youth, those aged 15 to 24 years old at the time of the survey, with the experience of older cohorts at the same age, leading to the same period of observation for all the 5 birth cohorts (6-24 years). So respondents from the 1965-74 birth cohort were observed until 1990, those of 1955-64 cohort were observed until 1980, then 1970 and 1960 respectively for the 1945-54 and 1935-1944 cohorts; thereby simulating five surveys conducted among the different cohorts at five different points in time.

[2] Enquête Migration et Insertion Urbaine au Burkina. For more details on this survey, refer to Poirier, J., V. Piché, G.L. Jeune, B. Dabiré, and H.R. Wane. 2001. "Projet d'étude des stratégies de repro-duction des populations sahéliennes à partir de l'enquête "Dynamique migratoire, insertion urbaine et environnement au Burkina Faso "." *Cahiers québécois de démographie* 30(2):289-310.

Since the survey was conducted nationally and includes full migration histories, we are able to account for urban to rural migration in our analyses. In other words, for those who have entered school we know where (urban or rural areas); and for those who haven't entered school, we also know where they were at the time of censoring. In order to ensure homogeneity of the population at risk at the starting point of the observation, we are considering only those who were living in Burkina Faso at age 6. Among the 8 644 respondents, 8 012 (92.7 %) where living in Burkina Faso at age 6. This is our sample for school entry. Among these 8 012 respondents, 2 774 (34.6 %) entered school: this is our analysis sample for school interruption.

Method

There are a lot of statistical methods suitable for the analysis of event history data (Allison 1984; Blossfeld and Rohwer 2002). One of the widely used methods is the proportional hazard model proposed by Cox (1972) named in the literature as the *Cox model*. One of the reasons for using this model is when the researcher is "*only interested in the magnitude and direction of the effects of observed covariates, controlling for time-dependence*" (Blossfeld and Rohwer, 2002:229). The specification of the Cox model is the following:

$$r(t) = h(t)\exp(A(t)\alpha ,$$

where the transition rate, $r(t)$ is the product of an unspecified baseline rate, $h(t)$, and a second term specifying the influence of a covariate $A(t)$ on the transition rate **(**Blossfeld and Rohwer, 2002:228).

Variables

We are analysing two dependent variables: the first one is *school entry* (entered school=1 or not=0) and the duration variable associated with it is *age at school entry*. The second one (concerning those who entered school) is school stopping (stopped school=1 or not=0) and the duration variable associated with this is the *duration of study* (age at interruption – age at entry).

One of the advantages of event history analysis methods is that they allow accounting for time-varying covariates. In the analysis of school entry there are three time-varying covariates: orphan status, our focus covariate, wealth index and the kinship with the supports. For each period of residence where the respondent has lived, we have data on the characteristics of the household's dwelling (at the beginning and at the end of the period of residence): wall material, roof material, floor material, main energy source for light, main energy source for cooking, main source of drinking water, type of toilet, way of garbage evacuation. For each housing characteristic, after ordering all the items from the worst to the best, we applied a Principal Components Analysis (PCA) to summarize the information in a few components or factors. Since the first component in a PCA generally account for the most important variance of the data, this is generally considered as the proxy (Montgomery et al. 2000; Filmer and Pritchett 2001). By contrast to the classical relative approach to poverty using the quintiles, here we follow the approach adopted by Filmer and Pritchett (2001) considering as poor the 40 % lowest index, the middle class, the 40 % intermediate and the rich the 20 % highest. At each period of activity the survey asked the

question regarding the respondent's kinship to those who were the main supports. We then constructed a new variable based on the occurrences of the different items.

Fixed covariates are gender, birth-cohort, birth order with father and birth order with mother. For the analysis of school interruption, we added two covariates to the former: whether or not the respondent has worked when studying and the orphan status at school entry, which is a fixed characteristic.

Results

This section regarding the results is divided in three main parts: in the first part we examine the probabilities of being orphaned at different ages in childhood. The second part is devoted to school entry impact of parental death. And the last part analyses the effect of losing a parent on the risk of interrupting school.

Becoming orphan in childhood: general trends

Despite the general progress sub-Saharan Africa has made since the end of the 1950s in terms of increasing life expectancy, some observers have argued that because of poverty and mainly the AIDS epidemic, there might probably be a recent increase in general mortality, leading to growing orphanhood prevalence. Bicego et al. (2003) found a strong correlation between orphanhood prevalence and national adult HIV prevalence estimates. Thus, the trend of the proportions of orphans at different ages in childhood and across different cohorts can reveal changes in adult mortality.

The results from table 1 below[3] show that the proportions of orphans (whether considering paternal, maternal or double orphans) at each specific age of childhood (5, 10 and 15 years) have declined in Burkina Faso in the course of time reflecting the general decreasing trend of mortality. For instance, more than one child in ten (12.8 %) are paternal orphans at age 5 in the oldest cohort whereas this figure is 3.2 % in the youngest one (Table 1). Because men have a lower life expectancy at birth compared to women, added to gender differences in age at marriage, the proportion of paternal orphans at each age is higher than the proportion of maternal orphans which itself is higher than the proportion of double orphans (Table 1).

Even if the risk of being orphaned has declined, regarding the high levels of adult morality and the evolution of the social and economic context of Burkina Faso there is increasing attention given by the government to the vulnerable children's wellbeing. Thus studying the risk faced by orphans in terms of access to social needs as health and education remain an important research issue. What are the orphans' chances of entering school and once they succeed in entering school, how long do they stay?

[3] For the probability of being orphaned we consider all the 8644 respondents. But for school entry as we mentioned before, we consider those who were present in Burkina Faso at age 6 (8012 individuals).

Table 1: Cumulative Probabilities of Being Orphaned at Different Ages of Childhood by Birth-cohort (Kaplan-Meyer Failure Function Estimates)

	Birth-Cohorts				
	1935-44	1945-54	1955-64	1965-74	1975-85
Ages			*Paternal orphans*		
5	0.128	0.094	0.085	0.058	0.032
10	0.223	0.203	0.158	0.107	0.080
15	0.312	0.289	0.207	0.157	0.131
			$p = 0.000$		
			Maternal orphans		
5	0.092	0.056	0.032	0.027	0.013
10	0.124	0.122	0.059	0.057	0.034
15	0.176	0.180	0.084	0.086	0.053
			$p = 0.000$		
			Double orphans		
5	0.039	0.009	0.007	0.002	0.004
10	0.055	0.042	0.014	0.006	0.009
15	0.088	0.071	0.022	0.015	0.014
			$p = 0.000$		
n =	679	1165	1870	2594	2336

Data source: EMIUB

Parental Death and School Entry

Some general results on schooling trends in Burkina Faso

Figures 1a and 1b below confirm two general well known results regarding schooling trends in most of the Sahelian countries and particularly in Burkina Faso: firstly, although educational levels are among the lowest in the world, access to school is increasing over the course of time since the youngest cohorts are more likely to enter school than the oldest ones. At age 7, the official age for entering school, in Burkina Faso, 23 % of individuals from the youngest cohort have already entered school compared to 4 % and 5 % respectively in the 1935-44 cohort (the oldest) and the 1945-54 cohort (Figure 1a). One can also notice that the "push" in school access occurred from the 1965-74 cohort. This is closer to policies undertaken in the early years after the country gained independence in 1960 to improve human capital like most African countries as stated during the Educational Ministries Meeting in Addis Ababa (in Ethiopia) in 1961. The second result showed by figure 1b is that the gender gap (male/female ratio) also dropped over the course of time even if girls are still less enrolled in school than boys: in the oldest cohort the male/female ratios of the probabilities of entering school varied between 4 and 6. In the middle cohorts these ratios varied from 2.5 to 4 whereas in the two youngest cohorts they dropped in interval 1 to 2.

Another general result important to mention is the huge gap between urban and rural areas. In sub-Saharan Africa, particularly in the Sahelian countries, schooling is mostly urban-related. One can note that in urban Burkina Faso (figure 2), about 45 % of children are enrolled in school at age 8 (delayed entry is something common in these countries) and the gender gap is very low. At the same age, in rural areas, only 20 % of boys and 10 % of girls are enrolled in school.

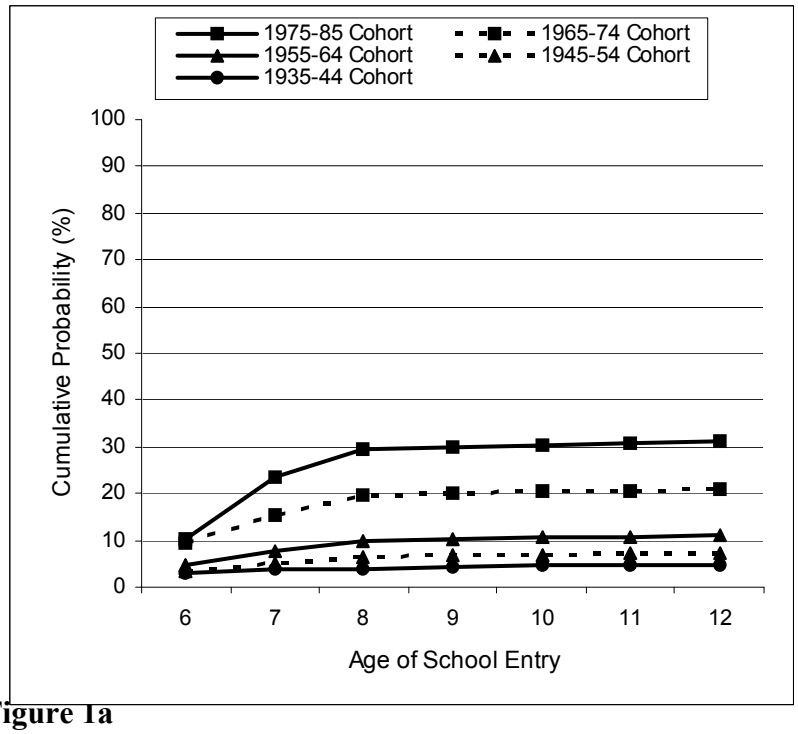

Figure 1a

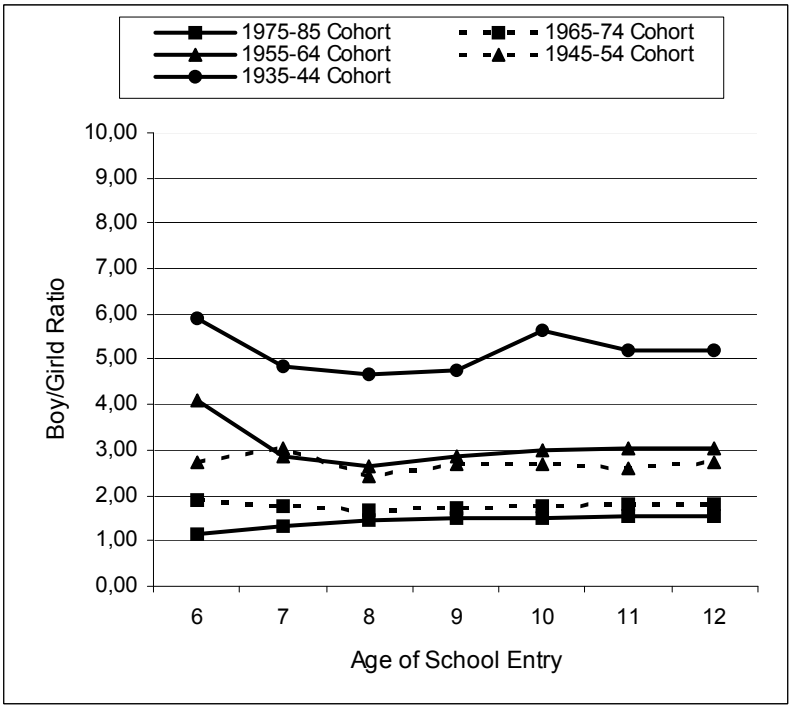

Figure 1b

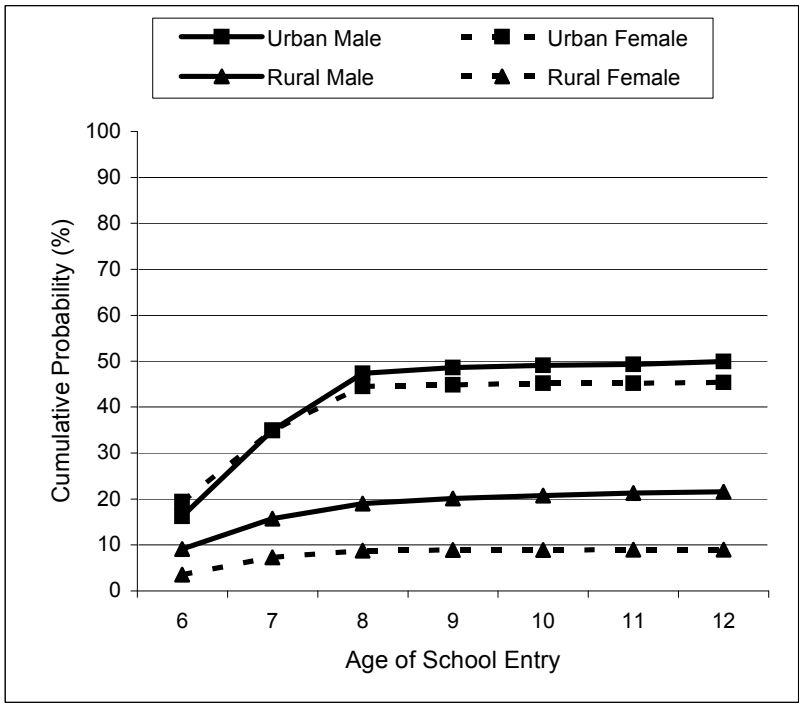

Figure 2

Parental death and access to school: a descriptive insight

In order to give an insight into the difference between children according to their orphan status, our main variable of concern, this first descriptive part considers orphan status as a stratum distinguishing children regarding their status before entering school or at censoring (for those who haven't entered school). This allows us to produce the Kaplan-Meier's survivor's estimates. In the following section devoted to the multivariate analysis, we'll then consider this variable as time-varying covariate, which is more meaningful.

Results from table 2 are consistent with previous research: orphans are less likely to enter school relative to nonorphans, contrary to what one could expect from the extended family system. Results at the country level and particularly for urban areas clearly highlight differences in the probabilities of entering school depending on the gender of the dead parent: paternal orphans are more likely to enter school relative to maternal orphans. The result that paternal orphans are less affected than maternal orphans can be explained by the fact that Burkinabe society is mostly patrilineal and thus most of the caring for orphans is done within the paternal extended family system. Losing both parents is the worst situation in terms of school investments. At age 7, which is the official age for school entry, 36.3 % of nonorphans in urban areas are enrolled in school compared to 21.5 % for paternal orphans, 17.9 % for maternal orphans and 15.1 % for double orphans. In rural areas, where schooling levels are generally very low, there is just a slight difference between paternal and maternal orphans (even if the probabilities for paternal orphans are a bit higher than those for maternal orphans). For double orphans, the probability of entering school in rural areas is nearly equal to zero. One can also note that double orphans in urban areas are more likely to get into school (20.4 % at age 8) compared to nonorphans in rural areas (15.6 %) reflecting here again the fact that schooling is mostly urban-related.

Table 2: Cumulative Probabilities (%) of Entering School at Different Ages Regarding Orphan Status before School Entry (Kaplan-Mayer Failure Function Estimates)

	Orphans Status			
	Nonorphans	Paternal Orphans	Maternal Orphans	Double Orphans
Ages	*All Burkina*			
6	8.19	2.88	2.41	1.98
7	16.18	5.67	4.87	2.54
8	20.59	6.71	5.58	2.80
9	21.32	6.74	5.91	2.85
10	21.68	6.87	5.99	2.85
	$p = 0.000$			
	Urban			
6	18.28	10.25	14.01	0.00
7	36.29	21.49	17.92	15.10
8	47.97	29.63	21.81	20.35
9	48.81	29.88	22.66	20.35
10	49.19	30.12	23.40	20.35
	$p = 0.000$			
	Rural			
6	7.91	0.91	0.67	0.43
7	13.40	3.01	2.64	0.43
8	15.62	3.35	2.97	0.43
9	15.78	3.35	3.04	0.43
10	15.79	3.35	3.04	0.43
	$p = 0.000$			
$n =$	5902	1299	470	341

Data source: EMIUB

Multivariate analysis of school entering impacts of orphan status

In this section we control the effect of orphan status by other covariates. We consider three models. Model 1 is a bivariate model in which we assess the impact of each covariate solely on school entry. Model 2 controls the effect of orphan status using two common variables generally used in the literature which are the household's economic status and the relatedness of the child to his main supports. In model 3 we consider all the covariates. We recall that three of these covariates are time-varying: the orphan status, the wealth index, and the kinship ties with the support(s). Results are given for all Burkina and also for urban and rural areas. As we showed and mentioned it formerly, access to school is more important in urban areas than it is in rural areas. The factors affecting schooling are also sometimes very different according to the place of residence as found in previous research on Burkina Faso (Kobiané 2002). Therefore omitting this urban-rural stratification in the analysis of schooling factors can sometimes lead to misleading interpretations.

The bivariate results for all Burkina Faso and for rural areas reveal that even considering orphan status as a time-varying covariate, orphanhood is detrimental to children's schooling (Table 3). According to the type of orphanage, we see again that double orphans are the least likely to enter school while paternal orphans are better off compared to maternal orphans: for instance, at the country level, a paternal orphan is 38 % less likely to enter school relative to a nonorphan. This figure is respectively 49 % and 72 % for maternal and double orphans. The bivariate results for urban areas, when we consider paternal and maternal orphans, are also consistent with the disadvantaged situation of orphans even if the coefficients are not significant. But the coefficient for double orphans in urban areas is surprising: they are two times more likely to enter school

relative to nonorphans. We'll come back to this amazing result which remains even after controlling for all the covariates.

Given previous research that highlights the disadvantaged situation of orphans as being mostly a consequence of poverty and/or kinship ties with caregivers, results from model 2 are also, at first glance, surprising: even after controlling for the wealth index and the relatedness to the main supports, the effect of orphan status remain strong in both the country as a whole and rural areas (even though the coefficient for maternal orphans in rural areas is no longer significant). But when taking into account all the covariates (model 3) all the coefficients for orphan status become non significant in rural as well as in all of Burkina Faso. These changes in the effects of orphan status occurred in an intermediate model (not presented here) when we add birth-cohort to the four first covariates of table 3 (which are orphan status, wealth index, kinship with supports and gender). There might be some interaction effects between orphan status and the above covariates, namely birth-cohort. We don't assess these interactions effects in this paper but we will consider them in further analysis.

The coefficients for paternal and maternal orphans in urban areas are not significant in the bivariate model as well as in the models with many covariates (models 2 and 3). Thus, as observed in rural areas, there are no significant differences between those who lost one parent relative to those whose parents are alive. For urban areas, this result isn't what we expected because we assumed that given the general process of modernisation the social ties are less likely to function in urban areas and consequently because of limited resources the extended family will be less likely to help an orphan. More amazing is the result showing that double orphans are vastly more likely (3 times in model 3) to enter school compared to nonorphans! One of the explanations is that some of these double orphans became orphaned in rural areas and then were sent to urban areas for schooling. We can't currently control for the place where people became orphaned if parental death occurred in early years, i.e. before age 6. Indeed, in the survey only all the residences starting from the sixth birthday were considered. Another explanation could be the structure of the age at double-orphanage: we saw formerly in table 1 that the risk of being a double orphan in very early childhood is something rare even in the oldest cohort (3.9 % of children in the 1935-44 cohort are double orphans at age 5, while this probability is 0.4 % in the 1975-74 cohort). Being double orphan at such an early age is definitely a big shock not only for the child but also for the extended family system, which probably will make big efforts to gather all necessary resources (social, economic and so on…) to improve the child's education, for instance sending him to urban areas where schools are available.

Some results according to the other covariates are interesting to highlight: the wealthier the household the more likely the child is to enter school even though in urban areas there is an unexpected result: the difference between the rich and the poor is not significant and children from the middle class are those who are better off. Another interesting result to mention is the effects of the kinship with the supports: in rural as well as in urban areas being supported by the father/mother plus another parent is more advantageous than being supported solely by a father/mother. Likewise those who are supported by a brother/sister or by an uncle/aunt are more likely to enter school relative to those supported only by parents (but the effect is not significant in urban areas). When supported by more distant relatives, the chances of entering school are less relative to those supported by father/mother.

Table 3: Cox proportional Hazards Estimates (Odds ratios) of the Effect of Orphan Status on School Entry

	All Burkina			Urban			Rural		
Variable	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3
Orphan status[a]									
Nonorphan	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Paternal orphan	0.62**	0.66**	0.77	0.85	0.95	0.91	0.66	0.69*	0.78
Maternal orphan	0.51**	0.58**	0.78	0.57	0.78	0.81	0.55*	0.66	0.85
Double orphan	0.28***	0.34**	0.57	2.00*	3.09**	3.19**	0.30**	0.34*	0.53
Wealth index[a]									
Poor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Middle class	1.73***	1.75***	1.54***	1.55***	1.56***	1.53***	1.96***	2.07***	1.76***
Rich	3.89***	3.58***	3.00***	1.27	1.31	1.28	6.06***	5.59***	4.61***
Kinship with support[a]									
Father/Mother	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Father/Mother & other relative	11.82***	9.72***	8.90***	4.80***	4.27***	4.34***	13.36***	9.42***	8.95***
Brother/Sister or uncle/aunt	2.77***	2.99***	3.00***	1.27	1.07	1.11	3.40***	3.90***	3.84***
Spouse & other relative	0.83	0.80	0.97	0.52*	0.49**	0.52*	0.65	0.58	0.86
Other relative	0.20***	0.20***	0.19***	0.14***	0.13***	0.13***	0.20***	0.20***	0.23***
No kinship	4.02***	2.99***	3.11***	0.60	0.47	0.47	6.00***	3.85***	4.13***
Others	19.44***	16.60***	16.31***	2.39***	1.87*	2.05*	36.98***	29.49***	22,28**
Gender									
Female	1.00		1.00	1.00		1.00	1.00		1.00
Male	1.86***		1.55***	1.11		1.13	2.53***		2.03***
Birth cohort									
1975-1985 (15-24 years)	1.00		1.00	1.00		1.00	1.00		1.00
1965-1974 (25-34 years)	0.77***		0.79***	0.96		0.86	0.88		0.89
1955-1964 (35-44 years)	0.39***		0.47***	0.91		0.93	0.44***		0.55***
1945-1954 (45-54 years)	0.26***		0.32***	0.80		0.85	0.30***		0.41***
1935-1944 (55-54 years)	0.20***		0.27***	0.51*		0.57*	0.25***		0.40**
Birth order (with father)									
Eldest	1.00		1.00	1.00		1.00	1.00		1.00
Second	1.05		1.06	0.82		1.29	1.13		1.00
Third	1.92		0.88	0.69		1.02	1.02		0.89
Fourth	1.05		0.68	0.78		1.03	1.04		0.54*
Fifth/Sixth	0.93		0.65	0.65		0.71	0.99		0.62
Seventh or over	1.28**		0.84	0.79		0.77	1.65**		0.88
Birth order (with mother)									
Eldest	1.00		1.00	1.00		1.00	1.00		1.00
Second	0.98		0.92	0.71		0.59	1.11		1.09
Third	0.95		0.91	0.66		0.66	1.05		0.95
Fourth	1.50**		1.38	0.66		0.62	1.92**		1.85*
Fifth/Sixth	1.09		1.26	0.90		0.98	1.19		1.46
Seventh or over	1.47**		1.26	1.30		1.48	1.43		1.19

Notes: [a]: Time varying covariates; ***: p≤ .001; **: p≤ .01; *:p≤ .05. Data source: EMIUB

The results for "no kinship" are surprising: when the child is supported by people not related to him, he is more likely to enter school compared to the one supported by father/mother. But we re-emphasize here that the person who is supporting is not systematically the one with whom the child lives. For instance an orphan can still continue to live with the remaining parent and receive support from someone else. Results for gender and birth-cohort are consistent with what we saw formerly in the descriptive section: males are better off compared to females (even if the difference is not significant in urban areas). The youngest generation are more likely to enter school relative to the oldest and this is mostly true in rural areas where schooling improvement remains low.

Success in entering school is one thing but how long a study lasts is another thing: the duration of study or the number of schooling years is a key variable in the theories of human capital (Becker 1975, 1991). The more one studies, the more one is likely to get a better job and increase earnings. Although in sub-Saharan Africa, as it is the case elsewhere in developing countries, the number of years spent in school is not the only factor accounting for the chances of getting a job, this is an important educational indicator to examine. According to UNICEF, the risk of becoming illiterate again is high if one doesn't at least attain the fourth level of primary school. So in the following section we address the risk of interrupting school according to orphan status. Once in school what is the probability of stopping school when losing one parent or both? If the extended family solidarity works well, losing a parent might not be a deterrent to orphans' studies.

Parental Death and School Interruption

Descriptive results of school interruption according to place of residence, gender, and birth-cohort are consistent with what we expected: pupils in urban areas are less likely to stop school compared to rural pupils; male are less likely to stop school (mostly for social and cultural explanations), and the youngest cohorts are less likely to stop school relative to the oldest.

Multivariate results

As in the analysis of school entry, we also consider three models here; (the bivariate one, an intermediate model and the final model controlling for all the covariates). For school interruption, we are considering two others covariates: whether or not the child has worked when studying, and the orphan status at school entry. This latter variable is important to take into account because we suppose that already having lost one parent upon entering school and losing the other after entering school might not have the same effect as becoming orphaned upon entering school. Results are also stratified according to the place where the child has stopped (or was studying at censoring).

In this section we will put more emphasis on urban-rural comparisons, since given the weight of the rural areas, results for all Burkina Faso are somewhat influenced by what it observed in rural areas. According to our hypothesis, the results are beyond what we expected: note that in rural areas, orphans are less likely to stop school than nonorphans (therefore the coefficient for paternal orphans is not significant) (table 4). This is at first glance a paradox: for school entry we saw formerly (table 3) that orphans (mostly double orphans) were less likely to enter school in rural areas. But here we see that once in school, they are likely to stay longer. Further discussions

on this issue will be provided later. But this result is consistent with what Ainsworth et al. (2002) observed for Tanzania: they observed that recent adult death doesn't affect the schooling of the oldest, those already in school but delay enrolment of the youngest. The estimates for paternal orphans and double orphans in urban areas are not significant. But we can note that maternal orphans in urban areas are more likely to stop school relative to nonorphans (in models 1 and 3).

The results regarding the other covariates are somewhat consistent with what we expected: even if in rural areas the household wealth is not significant, in urban areas we can note that wealth is negatively associated with the risk of stopping school. Results for gender (in rural areas) and birth-cohort (in urban areas) show that males are less likely to interrupt school than females and that the oldest cohort (particularly 1945-1954 and 1955-1964) were more likely to stop than the youngest. The kinship ties with the support doesn't play the same role whether it is school entry or school interruption: we saw that the relatedness with the support was an important factor for school entry but for school stopping this variable is not significant (table 4).

Another interesting result to mention is the effect of birth order in urban areas. Birth order was not significant for school entry. But for school interruption, we can note that in urban areas, the effect of birth cohort which is not significant at the bivariate level becomes significant in model 3 and its direction depends on which type of order is considered (with father or mother). When considering the birth order with father, results show that children of third rank and over are more likely to stop school than the eldest. We can even note that from rank four, the higher your birth order the more likely you are to stop. We expected the opposite since the youngest in the family can generally benefit from the support of the eldest. The results for birth order with mother are closer to what one could expect from the intra-family solidarity: among children from the same mother the youngest are less likely to interrupt school compared to the eldest. But these results regarding birth order need further research because they are not depicting only the intra-family solidarity, they probably also reflect the phenomena of competition in polygamous families. One of the reasons for having different birth order according to father and mother is due to polygamy (remarrying is also another reason). Polygamy is a widespread social phenomenon, particularly in Sahelian countries.

The effect of economic activity during the study is consistent with what we expected: working during the schooling period could make the child repeat more classes and then stay longer in school. Thus, those who have worked when they were in school are less likely to stop.

We also considered the orphan status at school entry and we can see (table 4) that the results are closer to those of orphan status during studies. Even after controlling for other covariates (model 3), the coefficient for paternal orphan remains significant whatever the place of residence (the coefficient for maternal orphans is also significant in urban areas).

Table 4: Cox proportional Hazards Estimates (Odds ratios) of the Effect of Orphan Status on School Interruption

	All Burkina			Urban			Rural		
Variable	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3
Orphan status during studies[a]									
Nonorphan	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Paternal orphan	0.85	0.84	1.35	0.91	0.91	1.35	0.78	0.81	1.58
Maternal orphan	0.85	0.85	1.04	1.61***	0.56***	1.76**	0.67**	0.67*	0.79
Double orphan	0.45***	0.45***	0.66	0.83	0.73	1.05	0.25***	0.27***	0.33***
Wealth index[a]									
Poor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Middle class	0.95	0.95	0.93	0.80**	0.80**	0.81*	1.07	1.06	1.04
Rich	1.14	1.12	1.11	0.66**	0.63***	0.66**	1.30*	1.26	1.16
Kinship with support[a]									
Father/Mother	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Father/Mother & other relative	0.86	0.87	0.86	0.80	0.79	0.85	0.92	0.90	0.86
Brother/Sister or uncle/aunt	0.98	1.12	1.11	1.28	1.37	1.36	0.83	1.00	0.96
Spouse & other relative	0.81	0.82	0.75	0.69	0.69	0.71	2.39	2.12	1.47
Other relative	0,66	0,70	0.78	0.87	0.88	1.16	0.59	0.62	0.75
No kinship	0.68*	0.74	0.84	0.89	0.92	0.90	0.57*	0.66	0.82
Others	0.74	0.78	0.92	0.59***	0.64**	0.47***	1.94	1.97	2.11
Gender									
Female	1.00		1.00	1.00		1.00	1.00		1.00
Male	0.85*		0.86*	0.94		0.90	0.72**		0.79
Birth cohort									
1975-1985 (15-24 years)	1.00		1.00	1.00		1.00	1.00		1.00
1965-1974 (25-34 years)	1.08		1.09	1.15		1.10	1.03		1.04
1955-1964 (35-44 years)	1.31**		1.37***	2.08***		1.95***	0.98		0.99
1945-1954 (45-54 years)	1.41		1.60*	3.29***		3.29***	0.98		1.14
1935-1944 (55-54 years)	0.86		0.97	1.03		0.80	0.73		0.77
Birth order (with father)									
Eldest	1.00		1.00	1.00		1.00	1.00		1.00
Second	1.16		1.45*	1.04		1.41	1.20		1.49
Third	1.00		1.06	1.24		1.71**	0.82		0.78
Fourth	1.08		1.03	1.18		1.98*	1.02		0.69
Fifth/Sixth	0.99		0.92	1.14		1.76**	0.88		0.67
Seventh or over	1.05		1.15	0.99		1.68**	0.99		0.81
Birth order (with mother)									
Eldest	1.00		1.00	1.00		1.00	1.00		1.00
Second	0.98		0.84	0.90		0.72*	1.01		0.89
Third	1.05		1.05	0.96		0.65*	1.08		1.41
Fourth	1.08		1.07	0.89		0.53**	1.15		1.59
Fifth/Sixth	1.00		1.08	0.86		0.57**	1.06		1.41
Seventh or over	1.02		0.94	0.71		0.49**	1.41		1.75*

Notes: [a]: Time varying covariates; ***: p≤ .001; **: p≤ .01; *:p≤ .05. Data source: EMIUB

(Table 4, Continued)

Variable	All Burkina			Urban			Rural		
	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3
Economic act. When studying[a]									
No	1.00		1.00	1.00		1.00	1.00		1.00
Yes	0.59***		0.59***	0.64**		0.60***	0.53***		0.52***
Orphan status at school entry									
Nonorphan	1.00		1.00	1.00		1.00	1.00		1.00
Paternal orphan	0.62***		0.51***	0.68*		0.53*	0.57***		0.42***
Maternal orphan	0.52***		0.61	1.32*		0.58*	0.39***		0.56
Double orphan	0.43*		0.64	0.57**		0.50	0.34		1.09

Notes: [a]: Time varying covariates; ***: p≤ .001; **: p≤ .01; *:p≤ .05. Data source: EMIUB

The orphans-paradox: statistical artefact or not

One explanation of this result could be the data due for instance to a selection bias. Since orphanage is something rare, maybe those orphans who were surveyed constitute a specific group of orphans in terms of schooling abilities for example. An indirect way to assess the grade repetition effect is to assess if orphans achieve the same educational levels as nonorphans. But before assessing this difference between orphans and nonorphans in terms of grade attainment, it is interesting to look at the pupils' distribution according to their status at school entry. Table 5 gives this information for all Burkina Faso: among those who are paternal orphans at school interruption (261), 46 % became paternally orphaned during their studies and 54 % were already paternal orphans at school entry. The pattern is somewhat the same for maternal orphans: among those who were maternal orphans at school interruption or at the end of observation (104), 53 % became maternally orphaned during their studies and 47 % were already orphans. Among the double orphans (117), 69 % were nonorphans at school entry while 31 % were already orphans at school entry (14 % were paternal orphans, 6 % maternal orphans and 11 % were already double orphans at school entry).

Table 5: Distribution of those who Entered School According to their Orphan Status when Stopping (or at Censoring) and at School Entry

	Status at school interruption (or at censoring)			
Status at school entry	Nonorphans	Paternal Orphans	Maternal Orphans	Double Orphans
Nonorphans	100.0	46.4	52.9	69.2
Paternal Orphans	00.0	53.6	00.0	13.7
Maternal Orphans	00.0	00.0	47.1	6.0
Double Orphans	00.0	00.0	00.0	11.1
	100.0	100.0	100.0	100.0
n=	*2292*	*261*	*104*	*117*

Data source: EMIUB

So now it is interesting to compare grade attainment according to orphan status at school interruption and school entry and that could help us understand somewhat why orphans are more likely to stay longer in school than nonorphans. Consider only the proportion in each group who have attained the first cycle or the second cycle of secondary school (figures in bold, table 6). Let consider first those who are single-parent orphans at school interruption (or at the end of the observation): 38.7 % of those who became orphaned during their studies have attained the first or second cycle of secondary school compared to 29.1 % for those who were already single-parent orphans at school entry. In the same way when we consider the group of double orphans at school interruption, 66.7 % of those who became double orphaned during their studies have attained the first or second cycle of secondary school compared to 30.6 % for those who were already double orphans at school entry. The comment coming of these results is that becoming orphaned during schooling or before entering school doesn't have the same impact in terms of school performance. Those who became orphaned during their studies perform better than those who where already orphans at school entry.

Furthermore, when we compare those who remained nonorphans (first column) to those who became double orphaned during their studies (last column), the difference is very clear: only 37.0 % of those who are nonorphans at school interruption attained the first or second cycle of

secondary school relatively to 66.7 % for those who became double orphaned during their schooling. These results clearly highlight the fact that there is a very important support to those who have lost both parents once in school, which is closer to what we saw for school entry in urban areas where double orphans are more likely to enter school. When the child becomes only one parentless during his studies the support seems to be lower: maybe the extended family assumes that the remaining parent can take care of the orphan and it is more ready to assist double orphans. This result could also have been explained by special incentive programs for orphans and especially for double orphans when this drama occurred during studies. But such a program if it exists might be recent.

Finally we can state that the result we found revealing that orphans (mostly double orphans) perform better than nonorphans is not a selection bias. We can note that the number of observations is reasonable (even if for double orphans already orphans at school entry, we have only 36 individuals). There is a specific pattern, which, according to us, is the expression of a specific assistance to vulnerable children, when they are already in school (mostly when they are double orphans), and probably from the extended family system.

Table 6: Comparing grade attainment according to orphan status at school interruption (or at observation) and orphan status at school entry

Grade attained	Orphans status at school interruption (or at the end of observation)				
	Nonorphans	Single-parent orphans		Double orphans	
		Orphans at entry	Non orphan at entry	Orphans at entry	Non orphan at entry
Primary	54.8	64.5	54.5	61.1	28.4
Second. 1st	**26.2**	**20.1**	**29.0**	**16.7**	**61.7**
Second. 2nd	**10.8**	**9.0**	**9.7**	**13.9**	**5.0**
Higher	5.1	2.7	4.0	0.0	1.2
Second. pro.	3.1	3.7	2.8	8.3	3.7
Total	100.0	100.0	100.0	100.0	100.0
n=	*2292*	*189*	*176*	*36*	*81*

Data source: EMIUB. Second. pro. = professional secondary school

Conclusion

The main objective of this paper was to assess the effect of orphan status on children's schooling. There has recently been a lot of research on this topic, mostly in areas highly affected by the AIDS epidemic, as in Eastern and Southern Africa. However, little research focuses on Sahelian countries, even though there are more and more institutions paying attention to the issue of vulnerable children. In addition, there is still a lack of adequate data to empirically verify the effect of orphan status on children's wellbeing. The data used in this study are in this sense original since they allow accounting for some methodological bias due to the cross-sectional aspect of most of the current data sets. The research also brings some lessons in term of policies targeting orphans.

One of the main results is that, contrary to what was observed in previous research, we found that even after controlling for household's economic status and the kinship ties with the supports, orphan status remains a big deterrent to children's schooling. There is an effect of orphan status on children's schooling independent of wealth and kinship. In terms of policy design this means

that the government in Burkina Faso has to target orphans specifically in order to allow them to enter school.

We found after controlling for other covariates that the birth-cohort contributes to reducing the effect of orphan status. In the youngest cohorts the effect of orphan status becomes non significant while it remains significant for the oldest cohorts (results not presented here). This result can reflect a period effect in the sense that the increasing number of institutions interested in supporting orphans in Burkina Faso added to the general context of expanding the supply of school allow for support to orphans nowadays.

We also found a result that seems a paradox: if orphans are less likely to enter school, once they succeed in entering school or when parental death occurred during schooling, they are less likely to stop. After addressing the grade attainment we really found that orphans, mostly double orphans perform better than nonorphans and this is obvious when we compared only those who entered school as nonorphans. One explanation could be that the extended family system is reluctant to send orphans to school, but when a nonorphan at school entry becomes orphaned during schooling, they are ready to support him to go far in his studies. Another explanation could be that there are specific school incentive programs for pupils who became orphaned in order to support them. This is something consistent with what is happening currently: the increasing number of institutions assisting orphans, due mostly to the AIDS issue. But we saw that this support from the extended family and probably other institutions is more of a benefit to double orphans. It is not sure that in the case of a single-parent orphan, the remaining parent can afford the children's needs. So here again, in terms of policy, there is a need to consider assistance to orphans according to the type of orphan (single-parent orphan versus double orphan but also paternal orphan versus maternal orphan, as we saw for school entry). But the remaining challenge is how to improve orphans' access to the educational system.

We are considering going further in our analysis: for example considering not only schooling but also child work as a competitive activity to schooling; considering also other covariates such as ethnic group and religion. Another interesting issue to take into account is community variables as school availability.

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