

Orphaned Children in Sub-Saharan Africa: What Can We Learn from Census Data?

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1 Introduction

The fate of orphans in sub-Saharan Africa (SSA) has received increasing attention in recent years, mainly as a result of the HIV-TB epidemic. According to the latest estimates from UNICEF (2010), as many as 56 million children under the age of 18 had lost one or both parents in 2009; this represents 14 percent of the population aged 0–17 years in the region. About 26 percent of these orphans had lost one or both parents to AIDS (UNICEF 2010).

Research that document this “orphan crisis” are typically based on longitudinal case studies (Hosegood et al. 2007; Zaba et al. 2005) or data from sample surveys (see, among others, Bicego, Rutstein, and Johnson 2003; Monasch and Boerma 2004; Case, Paxson, and Ableidinger 2004; Beegle et al. 2010). Census data on orphanhood have been hardly exploited. This is unfortunate, because about 80 censuses conducted in SSA have included questions on parental survival. For many of them, basic tabulations of orphanhood status are available by age, regions, or place of residence in the published reports. In addition, a growing number of samples of census microdata are being distributed in the public domain, through the IPUMS–International database (Minnesota Population Center 2011). At the time of writing this chapter, this database contains seventeen samples of African censuses in which respondents were asked about their orphan status: Kenya (1989 and 1999, with 5 percent of persons recorded); Mali (1987 and 1998, 10 percent); Malawi (1998 and 2008, 10 percent); Uganda (1991 and 2002, 10 percent); Rwanda (1991 and 2002, 10 percent); Tanzania (1988 and 2002, 10 percent); Senegal (1988, 10 percent); Sierra Leone (2004, 10 percent); and South Africa (2 percent of persons recorded in 2007 and 10 percent of records of the 1996 and 2001 censuses).

Drawing on these IPUMS samples and on additional tabulations gathered mainly from published reports, this chapter provides three illustrations of the relevance of censuses to research on orphanhood. Firstly, we examine trends in orphanhood prevalence. We show that in some countries these trends differ substantially from those modeled by the Joint United Nations Program on HIV/AIDS (UNAIDS) and UNICEF. We argue that census estimates, along with those derived from household surveys, should be used to refine model-based estimates because some discrepancies cannot entirely be explained by misreporting of orphanhood status. Secondly, to stress the usefulness of censuses in providing statistics for small areas, we model and map the spatial distribution of orphans at the district or provincial level for five countries of the Great Lakes region (Kenya, Uganda, Rwanda, Tanzania, and Malawi). Lastly, we show that census data can complement what is learned about the vulnerability of orphans from household surveys,

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particularly as regards their school attendance, living arrangements, and participation in the labor market. Before presenting these illustrations, the ensuing section introduces how parental survival status is collected in African censuses. It also discusses some of the issues regarding the quality of data on orphanhood.

Orphans are usually defined as children under 18 years of age whose mother, father or both parents have died from any cause (UNICEF and UNAIDS 2004), but we will use various age ranges in the course of this chapter. In Section 3, we present orphanhood rates among 5- to 9-year-old children, because we supplement estimates derived from the IPUMS database with proportions computed from census reports, which are only available by five-year age-groups. In the last section, which deals with the vulnerability of orphans, we analyze individual-level data for 7- to 17-year-old children, because we focus on characteristics which refer to older children (such as school attainment, union formation, and labor force participation).

Unless otherwise stated, we use the UNAIDS categorization of orphans in this chapter, defining maternal/paternal orphans as children whose mother/father has died, irrespective of the survival status of the other parent (dual orphans are children who have lost both parents).

2 Data Collection and Quality

In SSA, questions about parental survival first appeared in retrospective surveys in the late 1960s. Originally, they were aimed at allowing for the indirect estimation of adult mortality, taking advantage of the close relation that exists between the proportion of surviving parents and the probability of dying during the adult ages (Brass and Hill 1973; Timaeus 1992). In the 1990s, these questions were included in the household questionnaires of Demographic and Health Surveys (DHS) and UNICEF's Multiple Indicator Cluster Surveys (MICS). They were then restricted to children under 18, which indicates that the focus had shifted to the situation of orphans and vulnerable children (OVCs). To date, more than 135 large-scale surveys have collected information on the survival status of biological parents (Masquelier 2010).

Numerous census schedules have also included questions on orphanhood. Their primary purpose was also to allow for the estimation of adult mortality, but the HIV-TB epidemic has sparked a renewed interest in the situation of orphans. After reviewing questionnaires or reports from more than two hundred African censuses, we can point to seventy-nine censuses that include questions on parental loss (at least for mothers). Regrettably, some reports are never published and others do not systematically tabulate orphan prevalence by age. About six censuses out of ten in the 2000 round asked respondents about the survival of their parents. Some countries have collected orphanhood data at each round (e.g., Gambia since 1973, Kenya since 1969), whereas others have never done so until now (e.g., Guinea or Nigeria). Overall, questions on orphanhood are a little more frequent in Eastern Africa and Southern Africa; more sporadic in Central Africa (Masquelier 2010).

Censuses share some limitations with DHS-type surveys to study orphanhood. Firstly, the causes of death of parents are not recorded through verbal autopsies; therefore, it is not possible to distinguish between AIDS- and non-AIDS orphans, for instance. Secondly, neither the number of years that elapsed since the deaths of parents nor their ages at death are collected. Another limitation of census data, not present in surveys, is that it is seldom possible to identify

vulnerable children who are not orphans, such as those living in households with an HIV-infected adult or with a chronically ill parent. In addition, censuses typically collect less information than household surveys on the characteristics of children (e.g., no information on nutritional status, immunizations, or parental residence). However, for some dimensions of child development, such as child labor, census schedules may contain questions that are not regularly asked in surveys. Another advantage of census microdata is that the sample sizes are large enough to allow for the comparison of subcategories of orphans and to obtain estimates for small areas.

In censuses and surveys, there is a general consensus that the orphanhood status is poorly reported, chiefly because of the adoption effect. This term refers to misreports of foster parents as biological parents, resulting in underestimates of proportions of orphaned children. Young orphans are particularly at risk of being reported as nonorphans. According to Blacker (1984, 85), in the presence of adults noted as parents in questions about the relationship to the household head, “enumerators rarely bother to probe whether the children are the true offspring of these so-called parents and automatically record the fathers and mothers as being alive without asking the questions.” Foster parents may also deliberately or inadvertently claim adopted orphans as their own offspring. In addition, many children in SSA do not cohabit with their parents but are fostered in the extended family (Renata 2009). This practice may be detrimental to the quality of data on orphanhood status. The adoption effect is less pronounced in reports relative to older children, partly because at older ages both biological and foster parents are more likely to be deceased.

Robertson et al. (2008) evaluated the extent of the adoption effect in a cohort study conducted in Manicaland (Zimbabwe). They found that, of 198 children reported as maternal orphans in the first round of the study and followed up to the third round, as many as one-third were reported as nonorphans at least once in the next two rounds. Interestingly, the reports on parental survival were more consistent, because only 13 percent of paternal orphans were later reported as having a living father. As suggested later in this chapter, the higher consistency of reports on paternal orphanhood status could be explained by a higher likelihood of paternal orphans to live with their surviving mother (as compared with maternal orphans with their surviving father); surviving partners will provide more accurate information than more distant relatives. Likewise, higher remarriage rates among widowers can play a role here. It is, however, difficult to assess the extent of the biases in the orphanhood prevalence, as there might be compensating errors; a certain percentage of nonorphans could also be misreported as orphans (and nonorphans are much more numerous).

In addition to the adoption effect, proportions of orphans are usually biased by the absence of data. For this chapter, we discarded data with missing values and ‘don’t know,’ with the assumption that ignorance of parental survival is unrelated to the likelihood of being orphan. Ages reported in censuses are also characterized by inaccuracies and the attraction of round digits (i.e., age heaping). Age exaggeration will result in a downward bias, because orphan rates rise with age (Ewbank 1981).

3 Assessing Trends in Orphanhood Rates with Census Data

The right-hand panel of Figure 1 presents, for twenty-five countries in SSA, proportions of maternal orphans among 5- to 9-year-olds for both sexes, as observed in fifty-three censuses conducted between 1966 and 2009, for which we had access to tabulations by age. These proportions range from 1.4 percent (Kenya 1989) to 8.7 percent (Lesotho 2006). The left-hand panel displays proportions of paternal orphans, ranging from 3 percent (Niger 2001) to 23 percent (Rwanda 2002). More children are reported as fatherless because fathers are in general older than mothers and males experience higher mortality rates. Some declines are apparent in the 1970s and 1980s (e.g., in Gambia and Sierra Leone) but the most notable change is the upsurge in the proportions of orphaned children in recent decades. Only a handful of countries have experienced declines in these proportions during the 1990s and 2000s (Mali, Niger). The highest proportions of orphans are observed in Eastern and Southern Africa, the two regions that have been hardest hit by the HIV/AIDS epidemic. Proportions of maternal orphans among 5- to 9-year-olds exceeded 5 percent in several censuses; apart from Sierra Leone in 1974 and Rwanda in 2002, all were conducted after 2000 on the southern tip of the continent. More than one out of ten children aged 5–9 had lost their father in Botswana (2001), Lesotho (1986 and 2006), South Africa (2001 and 2007), Zimbabwe (2002), Swaziland (2007), and Rwanda (2002). Also salient is the considerable variation between countries since 2000. Even in Western Africa, where the prevalence of orphanhood has been the lowest in recent years, the proportion of motherless children aged 5 to 9 in recent years has varied from 1.7 percent in Gambia (2003) to 4.2 percent in Sierra Leone (2004).

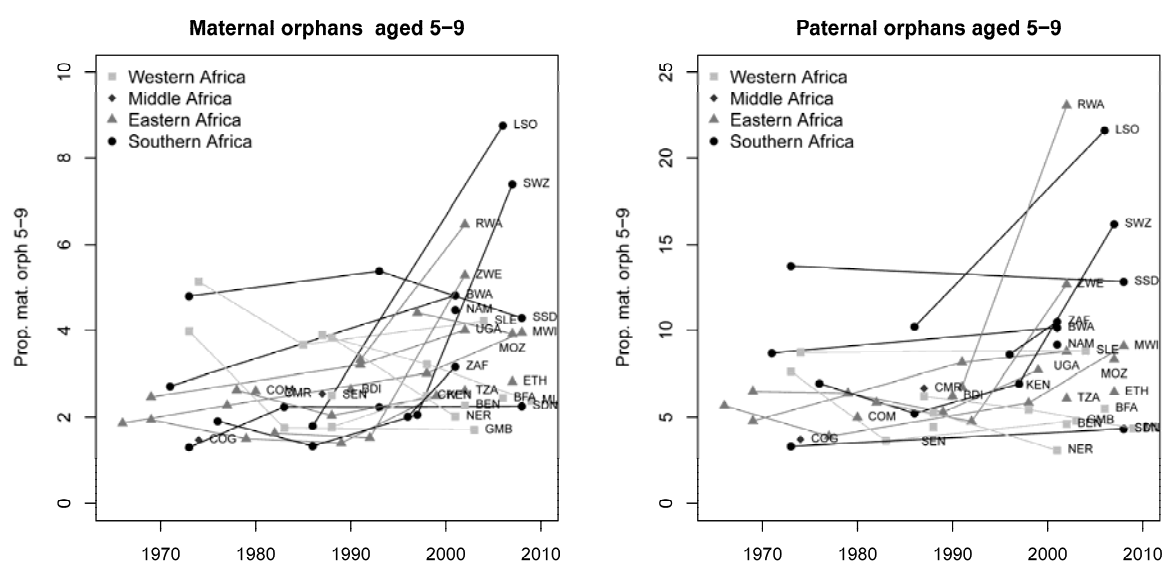


Figure 1: Percentage of children aged 5-9 who have lost their mother or father ; West, Middle, East and Southern Africa, 1970-2010.

As mentioned earlier, census and survey data are deemed to underestimate the orphanhood prevalence. In addition, they do not provide the time series needed to reconstruct past trends over long periods (consider, for instance, the only two point estimates for Botswana, indicated as BWA in Figure 1). For these two reasons, UNICEF and UNAIDS estimate the number of orphans from mathematical models relying on fertility and mortality rates. The estimation

method, developed by Grassly and Timaeus (2005), starts with the distribution of adult deaths by age and calendar year, and consists in estimating how many children were born to those adults, and whether these children are still alive at the time of interest. To calculate the number of maternal orphans attributable to AIDS, the method accounts for the vertical transmission of the virus, the lower fertility of infected mothers, and the additional risks of dying faced by orphans (Zaba et al. 2005). The estimation of paternal orphans is further complicated by the need to account for the effect on child survival of HIV transmission between parents, as well as the reduced fertility of partners of infected men.

To date, neither surveys nor census data have been used to calibrate model-based estimates of orphan numbers. However, there are striking discrepancies between the two types of estimates. For this analysis, we extracted the trends in the proportions of maternal and paternal orphans among 5- to 9-year-olds from the latest version of Spectrum (2011), the software used by UNICEF and UNAIDS (Stover et al. 2010). Ideally, these estimates should be either in agreement with proportions observed in the censuses, or higher in cases of a pervasive adoption effect. However, Figure 2 shows that this is not as clear-cut.

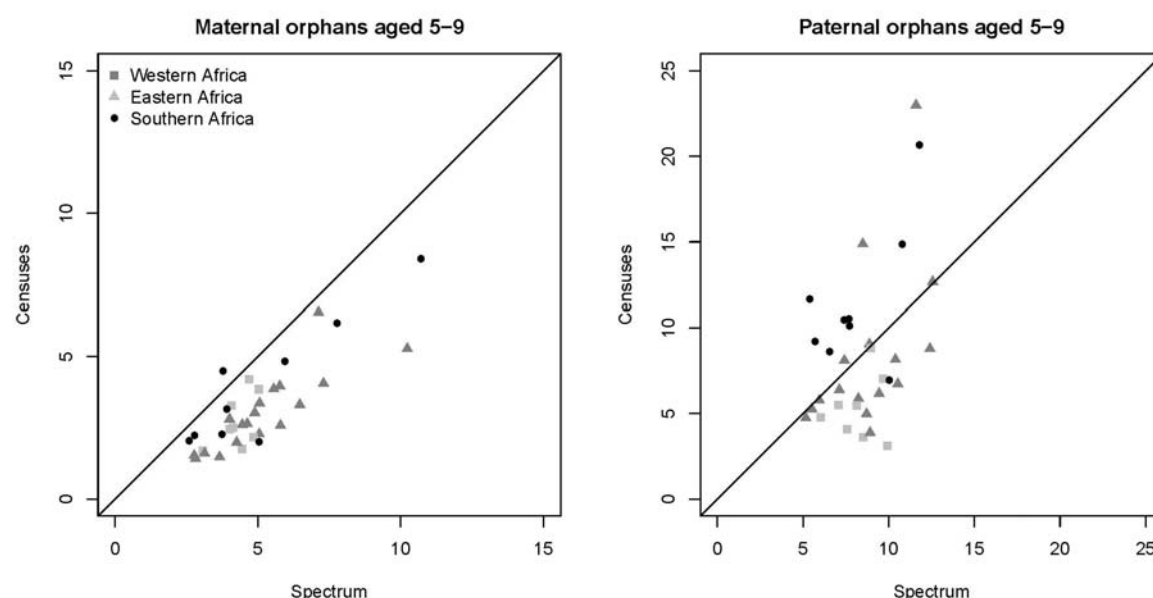


Figure 2: Comparison of the percentage of children aged 5-9 who have lost their mother or father, as estimated by Spectrum and reported in censuses.

The agreement between estimates varies by sex and by subregion. With the exception of the Namibian census of 2001, census-based estimates of the fraction of maternal orphans are consistently lower than Spectrum outputs. The correlation coefficient between both series of proportions is 0.88. This is consistent with similar comparisons made by Grassly et al. (2004) with survey estimates. They concluded that the background adult mortality of the United Nations, which is underpinning model-based proportions of orphans, could be too high, although part of the discrepancies can be ascribed to the adoption effect. However, Grassly et al. (2004) also noted that paternal orphanhood prevalence was more in agreement with model outputs, with a closer congruence in countries with a high HIV prevalence. This is not what we observe here. Many estimates lie above the equivalence straight line, especially in Eastern and Southern Africa. In Lesotho (1996 and 2006), Mozambique (2007), Namibia (2001), and

Rwanda (2002), census-based estimates are more than 50 percent higher than estimates obtained from Spectrum. Pinning down the reasons behind such discrepancies is beyond the scope of this chapter and requires further analysis. However, this comparison suggests that, combined with survey estimates, census data could help refine model outputs.

4 Mapping the Geographic Variation of Orphan Prevalence

Household surveys can, at best, yield acceptable estimates for broad regions. Consequently, little is known about the within-country distribution of orphans at smaller geographical scales. This distribution is mainly shaped by geographical inequalities in adult mortality, but the latter are themselves poorly documented in sub-Saharan Africa, even at the basic level of disaggregation by type of residence.

In the late 1970s and 1980s, according to estimates assembled by Timaeus (1993), adult mortality was lower in urban areas than in rural areas, and the differential was larger in countries with a low life expectancy, suggesting that the survival advantage of urban areas could decrease as mortality rates decline. This trend has undoubtedly been disrupted by the advent of HIV-AIDS, as HIV prevalence is considerably higher in urban areas (Mishra et al. 2009). Consequently, it is difficult to hypothesize whether the orphanhood rates will be higher or lower in rural areas. Empirical research on this issue remains scarce and equivocal (Monasch and Boerma 2004). In addition, the within-country distribution of orphans is not reducible to the distribution of adult deaths. It is also altered by the migration of orphans and widows, who are typically highly mobile (Ford and Hosegood 2005). Orphans are sometimes cared for by members of their extended family residing far away, necessitating traveling long distances across the country (Ansell and Young 2004). Adult deaths also result in the dissolution and reformation of new households elsewhere (Urassa et al. 2001). Even before the death, children can move with their terminally ill parents to seek a better support in their communities of origin, resulting in “returning home to die” migrations, mostly to rural areas (Clark et al. 2007). Conversely, rural-to-urban migrations can be prompted by the need to find employment for orphans and widows (Foster and Williamson 2000).

Urban–rural differentials can be studied with household surveys, but census data are needed to work at smaller geographical scales. As an illustrative exercise, we model and map the orphanhood prevalence in subnational divisions from five censuses: Malawi 1998, Kenya 1999, Rwanda 2002, Uganda 2002, and Tanzania 2002. We retain these censuses because they refer to contiguous countries in the Great Lakes region and provide a snapshot of the orphanhood prevalence around the year 2000. The scale of geographical breakdown available in the IPUMS database varies from counties (in Uganda) to provinces (in Rwanda), and districts are identified in Malawi, Kenya, and Tanzania. Because changes in administrative boundaries have occurred over time, the units identified here do not necessarily represent the most up-to-date geographical divisions. Administrative boundaries were obtained from the GADM database (www.gadm.org).

We use a mixed-effects Poisson regression model, controlling only for age (and age squared), with a varying intercept by district, county, or province. The advantage of this model is that it shrinks the estimates toward the overall mean when the number of children is sparse. We

assume that the age pattern of orphanhood is similar across administrative divisions within each country, and include only children up to age 17 in the model.

We present here predicted proportions of maternal orphans at age 7, in order to control for differences in the age distribution of children (Figure 3). Within this subregion of the Great Lakes, maternal orphanhood prevalence is the highest in all provinces in Rwanda, as well as around the borders of Lake Victoria, both on its western shore in Uganda (Masaka, Kampala), and on its eastern shore in Tanzania (Kagera) and Kenya (Nyanza). Other pockets of high maternal orphanhood are apparent in the north central region of Uganda, around the northern tip of Lake Malawi, in the Iringa region in Tanzania, as well as in the southern region of Malawi. By contrast, an area stretching from the Rift Valley Province of Kenya to the northeastern districts of Tanzania had a small burden of orphans around 2000.

Although some areas with high orphan burden are also those with the highest HIV prevalence (such as the Nyanza province in Kenya or Kagera and Iringa in Tanzania), this map is not exactly a reflection of the spatial variation of HIV prevalence. For instance, using the geographical coordinates of the communities sampled in the DHS conducted in Kenya in 2003, Montana, Neuman, and Mishra (2007) modeled the HIV prevalence and they did not observe the gradient from west to east that is apparent in Kenya for maternal orphans (Nyanza stands out as an exception). However, this pattern should be considered with caution as the northeastern province and the northern part of the eastern province in Kenya are the most sparsely populated (hence a higher degree of shrinkage toward the overall mean).

There is room for improvement in the modeling of orphanhood prevalence, but this first exploratory analysis shows that census data can generate valuable insights into the subnational variations of orphanhood.

5 Analyzing the Vulnerability of Orphaned Children

An extensive literature has been devoted to the educational outcomes of orphans, their living arrangements, and their health, including their sexual and reproductive behaviors or nutritional status (Palermo and Peterman 2009; Beegle et al. 2010). To date, this literature has made almost no use of census data (Marcoux, Noubissi, and Zuberi 2010). In this section, we seek to determine whether census data provide results that are consistent with sample surveys, and we insist on the value added by censuses. We use the latest censuses available in the IPUMS database with information on parental loss: Malawi (2008), Mali (1998), Kenya (1999), Uganda (2002), Rwanda (2002), Tanzania (2002), and Sierra Leone (2004). We did not retain the census conducted in Niger in 1988, because the data is somewhat outdated. We also discarded the large-scale survey conducted in 2007 in South Africa because the social and economic development of this country and its large-scale social grants system render cross-national comparisons problematic.

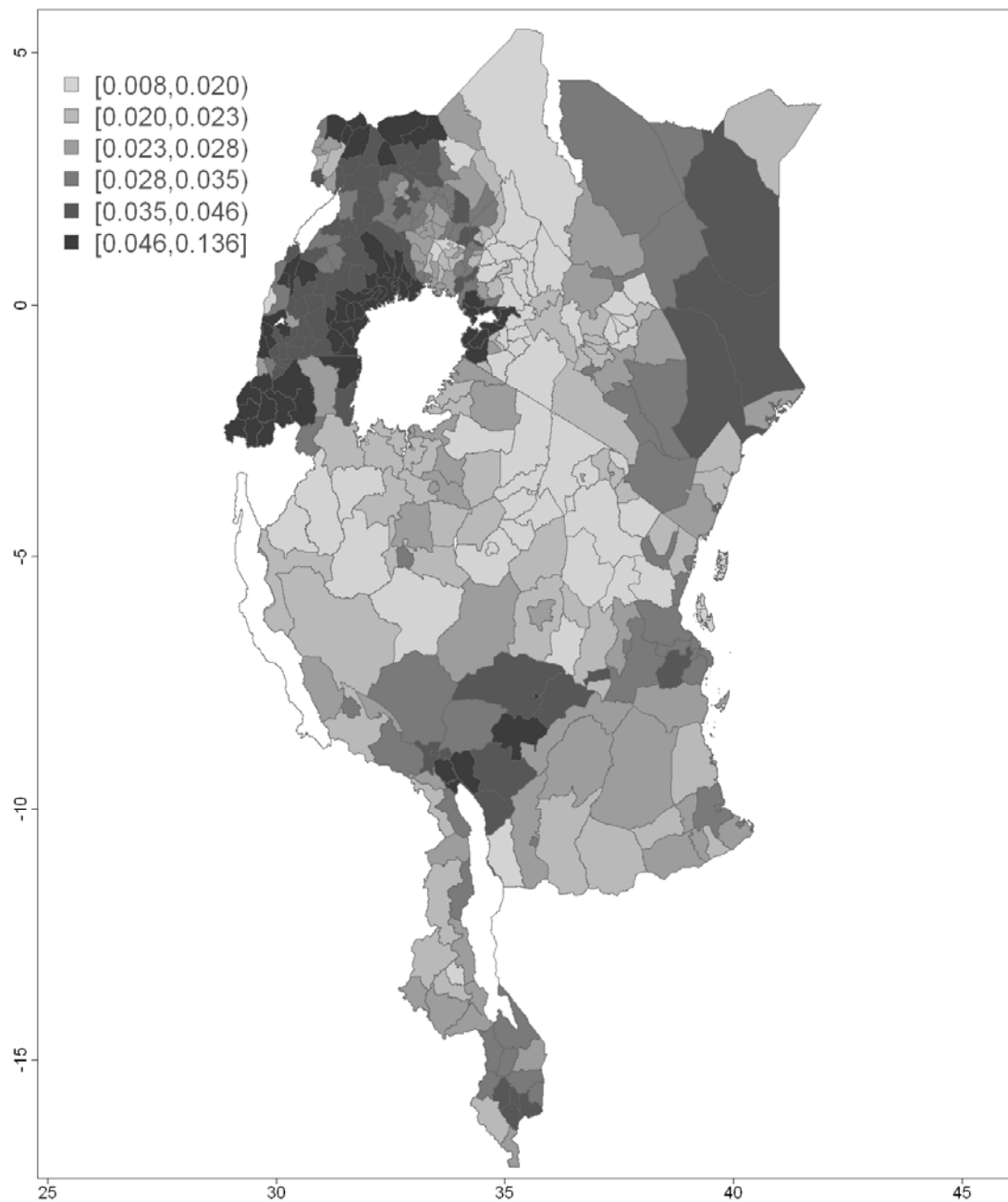


Figure 3 Proportions of maternal orphans at age 7 estimated from mixed-effects Poisson regression models from IPUMS data (Kenya 1999, Uganda 2002, Tanzania 2002, Rwanda 2002, and Malawi 1998).

We first examine the orphanhood status of children according to the relationship to the household head, his sex and educational level, as well as the wealth index of households. This index is obtained by combining the flooring, wall, and roof materials of dwellings. Households are considered poor when they have a beaten earth floor (or similar types of flooring such as stones or bricks), walls made of mud bricks (or clay), and roof in thatch (or cane, wood, or straw). These characteristics were retained because they were available in all censuses and easily comparable across countries. Secondly, we analyze the school attendance of orphans aged

7 to 17 years and the educational attainment of children aged 15 to 17 years. We also focus on the employment status of orphans and on the types of work they perform.

Logistic regression models combine all children and include the parental survival status as an independent variable. Then, separate models are run for each category of orphans, controlling for age, sex, living standards, relationship with household heads, and their educational attainment. Unlike in previous sections, children are now classified in four mutually exclusive categories:

1. Mother dead and father alive (henceforth defined as maternal orphans)
2. Father dead and mother alive (paternal orphans)
3. Both dead (dual orphans)
4. Both alive

5.1 Living Arrangements

Based on censuses, the living arrangements of orphans can often be analyzed solely from their relationship to the household head. In some cases (e.g., Malawi 2008), questions about parental survival are supplemented by questions about parental residence, but this is not true in most censuses. Table 1 presents row percentages of children by parental survival status according to the relationship to household heads (for children aged 7 to 17). These percentages confirm that single orphans, especially paternal orphans, mostly co-reside with the surviving biological parent (Monasch and Boerma 2004). Between 39 percent and 76.4 percent of fatherless children are reported as children of the household head, probably their mother (or her new partner) in most cases. However, some of them could also be children fostered or adopted by the household head and not residing with their mother. Apart from Mali (1998) and Sierra Leone (2004), proportions of maternal orphans reported as children of the household head are much lower; below 50 percent in Tanzania, Kenya, Malawi, and Uganda. The exceptions of Mali and Sierra Leone (where maternal orphans are more likely to live with their surviving father) could reflect a more systematic enforcement of rules related to the patrilocal residence.

Maternal orphans reported as children of the household head are most often observed in blended families, because the household heads are (re)married in a majority of cases. Conversely, paternal orphans reported as children of the household head are more frequently observed in single-parent families, because these household heads are more often widowed or separated.

The proportion of orphans who are household heads, albeit marginal (less than 4 percent), indicates a certain vulnerability, because most of them are required to enter the job market earlier. An early entry into union may also be a consequence of parental loss, as evidenced by the proportions of orphans who are a spouse or partner of the household head. In Mali (1998), as many as 9 percent of dual orphans were either a spouse or partner of the household head. They were girls in more than 85 percent of cases. In the Malian census, 36 percent of girls aged 17 who had lost both parents were already in a union, as against 20 percent for nonorphans (Table 2). This pattern is apparent in every census, but it could be less pronounced after controlling for individual- and household-level characteristics (Palermo and Peterman 2009). Finally, a third category of potentially vulnerable children represents orphans living in sibling-headed households. This situation concerns a large percentage of dual orphans, from 13.5 percent in Kenya (1999) to 27.2 percent in Rwanda (2002).

Country	Type	Head	Sibling	Spouse partner	Child	Grand child	Other relative	Non relative	Unknown
Mali 1998	Both alive	0.2	1.1	2.7	83.3		9.8	2.9	0.2
	Mother dead	0.6	3.0	5.7	68.4		17.8	4.4	0.1
	Father dead	0.7	17.5	6.4	39.2		30.3	5.8	0.1
	Both dead	2.5	15.7	9.1	26.9		38.6	7.1	0.1
Kenya 1999	Both alive	0.6	2.2	0.5	76.2		17.3	3.2	0.0
	Mother dead	1.6	6.9	1.3	40.9		43.1	6.1	0.0
	Father dead	1.2	4.9	1.0	62.8		25.2	4.8	
	Both dead	2.5	13.5	1.8	9.3		63.6	9.4	
Rwanda 2002	Both alive	0.2	0.8	0.3	88.8	4.9	2.1	2.0	0.9
	Mother dead	1.9	11.4	0.6	55.9	11.4	10.7	5.9	2.1
	Father dead	0.3	1.4	0.4	76.4	9.7	7.1	3.8	0.9
	Both dead	3.9	27.2	0.5	5.5	25.3	26.7	9.7	1.2
	Missing							100.0	
Uganda 2002	Both alive	0.4	2.8	0.9	81.2		12.9	1.0	0.9
	Mother dead	1.2	8.2	2.3	47.4		36.7	2.9	1.5
	Father dead	1.0	6.4	1.8	58.2		29.1	2.1	1.3
	Both dead	2.3	14.9	2.1	14.0		60.4	4.3	1.9
UR Tanzania 2002	Both alive	0.6		0.7	74.3	9.0	9.6	5.7	
	Mother dead	1.5		1.5	39.4	19.9	25.8	12.0	
	Father dead	1.3		1.4	52.0	13.0	21.3	11.0	
	Both dead	3.2		2.1		29.5	46.1	19.1	
	Missing							100.0	
Sierra Leone 2004	Both alive	0.4	3.9	0.7	64.9	10.8	17.0	2.4	
	Mother dead	0.5	8.2	1.8	44.4	12.7	28.7	3.6	
	Father dead	0.5	9.6	1.8	40.3	12.9	31.4	3.4	
	Both dead	0.6	18.9	3.1	22.1	13.2	37.2	4.9	
Malawi 2008	Both alive	0.2		1.0	82.5		15.4	1.0	
	Mother dead	0.6		1.8	33.2		62.1	2.3	
	Father dead	0.5		1.6	63.7		32.5	1.7	
	Both dead	1.0		1.9	14.4		79.4	3.3	
	Missing	1.3		0.1	10.7		41.2	46.8	

Table 1: Relationship to the household head by parental survival status (7- to 17- year-olds, row percentages)

In censuses conducted in Tanzania, Sierra Leone, and Rwanda, children living with a grandparent are explicitly identified. Although the proportions of children in this configuration do not vary much with parental survival status in Sierra Leone (between 11 and 13 percent), in Rwanda and Tanzania orphans are disproportionately found in such households, especially motherless children and dual orphans (up to 30 percent of dual orphans in Tanzania).

	Percentage of girls in union at age 17			
	Mother dead	Father dead	Both dead	Both alive
Mali 1998	27	28	36	20
Kenya 1999	13	11	19	8
Rwanda 2002	4	2	3	2
Uganda 2002	19	17	16	14
Tanzania 2002	14	12	14	10
Sierra Leone 2004	23	22	25	15
Malawi 2008	15	13	14	12

	Percentage of children living in female-headed households (7-17)			
	Mother dead	Father dead	Both dead	Both alive
Mali 1998	6	36	12	6
Kenya 1999	36	81	50	35
Rwanda 2002	24	84	50	20
Uganda 2002	27	67	41	15
Tanzania 2002	26	71	43	31
Sierra Leone 2004	25	46	30	24
Malawi 2008	33	67	42	21

	Percentage of children living with a household head who has not completed primary education (7-17)			
	Mother dead	Father dead	Both dead	Both alive
Mali 1998	91	90	92	89
Kenya 1999	56	61	56	45
Rwanda 2002	75	81	70	72
Uganda 2002	55	64	56	51
Tanzania 2002	50	56	51	44
Sierra Leone 2004	76	79	79	75
Malawi 2008	68	75	68	66

	Percentage of children living in poor households (7- to 17- year-olds)			
	Mother dead	Father dead	Both dead	Both alive
Mali 1998	66	63	66	64
Kenya 1999	35	35	28	34
Rwanda 2002	10	11	7	10
Uganda 2002	33	40	29	42
Tanzania 2002	38	43	32	44
Sierra Leone 2004	29	29	31	29
Malawi 2008	43	51	42	52

Table 2: Percentage of girls in union at age 17 according to parental survival status, and percentage of children (aged 7-17) according to parental survival status and selected characteristics of households

As observed from DHS (Monasch and Boerma 2004; Bicego, Rutstein, and Johnson 2003), orphans are also more likely to be found in female-headed households (FHHs), as well as in households whose head has not completed primary education (Table 2). By contrast, when considering the standards of living, there are no obvious differences between households with

orphans and other households. In some cases (Uganda 2002, Tanzania 2002), the percentage of nonorphans living in poor households is even higher than the corresponding percentage for orphans. This is not unexpected. Data from DHS and other in-depth surveys indicate that orphans are not necessarily found in the most economically disadvantaged households (Bicego, Rutstein, and Johnson 2003; Mishra and Bignami-Van Assche 2008). Households caring for orphans could be positively selected for certain characteristics correlated with household wealth. It is also possible that our indicator of standard of living is too crude. A composite index based on more household assets would be more appropriate.

5.1.1 School Attendance and Educational Attainment

Table 3 indicates that among all countries that were considered, Mali has the lowest school attendance rates. These rates are lower than 35 percent irrespective of the survival status of parents. This underenrollment is well documented in the Sahelian region, with a more conspicuous disadvantage for young girls (Marcoux, Noubissi, and Zuberi 2010).

Orphans tend to attend school less frequently than children whose parents survive, except in Malawi. In other censuses, differences in school attendance rates range from 7 to 20 percentage points between nonorphans and dual orphans. Single orphans occupy an intermediate position in almost all censuses considered. Differentials are also observed in terms of school attainment, assessed here as the proportion of children aged 15 to 17 who had already completed primary school. Orphaned children are worse off than nonorphans, except for Malawi, as well as Rwanda and Uganda in the case of dual orphans.

Broad comparisons of school attendance by parental survival status tend to underestimate the disadvantages of orphans, because orphans are on average older than nonorphans, and school attendance is generally slightly higher after age 10. Therefore, we estimated odds ratios for current school attendance from a regression model controlling for sex, age, relationship to the household head and his educational attainment, wealth index, and parental survival. Compared with nonorphans, the odds for single orphans of being currently in school are significantly lower than 1 in every census except for Malawi in 2008. The loss of a mother is particularly detrimental (Bicego, Rutstein, and Johnson 2003). The unexpected result in Malawi has already been observed and it has been ascribed to a pattern of fostering in which orphans are relocated to reside with relatives that are more able to take care of them (Government of Malawi and UNICEF 2007). But it is unclear why this is only the case in Malawi. Another counterintuitive observation concerns a higher attendance of dual orphans in Rwanda, compared with nonorphans. Again, this has been observed in survey data (World Bank 2003). This result could reflect a targeting of dual orphans by NGOs, as well as the effect of the tax-funded Genocide Fund (FARG).

Percentage of children attending school (7-17 y)				
	Mother dead	Father dead	Both dead	Both alive
Mali 1998	23	25	16	31
Kenya 1999	68	71	67	79
Rwanda 2002	52	60	57	64
Uganda 2002	77	78	75	83
Tanzania 2002	62	63	60	68
Sierra Leone 2004	61	62	50	70
Malawi 2008	61	60	61	54

Percentage of children who achieved primary school (15-17 y)				
	Mother dead	Father dead	Both dead	Both alive
Mali 1998	9	10	6	12
Kenya 1999	50	53	52	58
Rwanda 2002	19	21	26	25
Uganda 2002	53	54	55	53
Tanzania 2002	63	64	63	67
Sierra Leone 2004	28	28	23	34
Malawi 2008	32	33	36	30

Percentage of children in employment by parental survival status (7-17 years olds)				
	Mother dead	Father dead	Both dead	Both alive
Mali 1998	45.6		44.5	47.2
Kenya 1999	6.1		5.4	6.7
Rwanda 2002	22.1		16.8	21.1
Uganda 2002	11.7		10.9	12.4
Tanzania 2002	21.4		21.6	23.9
Sierra Leone 2004	30.7		30.2	37.7
Malawi 2008	14.3		13.4	14.6

Table 3: School attendance of 7- to 17-year-olds, school attainment of 15- to 17 year-olds, and percentage of children (7-17 years olds) in employment, by parental survival status

Similar models were run for each orphanhood status, to assess if the effects on school attendance of the various covariates differ depending on this status. Again, the coefficients are not presented here for the sake of conciseness; we only summarize the main conclusions.

Firstly, census data tend to support the conclusions of Case, Paxson, and Ableidinger (2004), who found that children living with distant relatives or unrelated caregivers are less likely to attend school. Compared with orphans *reported as child of the household head* (either a biological child or fostered child), the odds of attending schools for maternal or paternal orphans are significantly lower than 1 for almost all other types of relationships to the household head. They are particularly low for orphans who have no relationship to the household head. Unsurprisingly, when children are heads of household or partners, the chances to attend school are also very low.

The positive association between the educational attainment of the household head and the school attendance of children holds true, irrespective of the parental survival status. Compared with those living with a household head who has not completed primary school, the odds ratio are much larger than 1 for other children.

Also evident is the fact that poor families have difficulties sending their children to school. Both orphans and nonorphans are indeed less likely to go to school when they live in poor housing conditions. With regard to the sex of children, with the exceptions of Rwanda and Malawi, census data highlight the disadvantage of girls, regardless of the parental survival status. However, these broad patterns observed among orphans are also observed among nonorphans. The lower school attendance of orphans is therefore mostly explained by their tendency to live with caregivers that are more distantly related, and in families with poorer educational outcomes.

5.2 Work Involvement

With the death of a primary caregiver, the household budget can plummet because of reduced income and increases in dependency ratios. Before the death, a substantial fraction of the family budget can also be allocated to health care. To compensate, children may have to take a more active role in household chores, caring for siblings, or income-generating activities. Measuring the effect of orphanhood on the work involvement of children is tricky, partly because of the lack of standard operational definition of child labor. A variety of measures and terms are used and understood differently. That may bias cross-national comparisons based on census data. In addition, the same category of activities can fall into different codes in different censuses, especially activities performed in family agricultural holdings.

With these caveats in mind, we focus here on children's employment, as defined by the ILO (2010). This concerns children performing economic activities, for pay or profit, or performing domestic work outside the child's own household for an employer. This term is more restrictive than other definitions of child labor that include nonmarket household activities. For instance, using DHS and MICS data, Monasch and Boerma (2004) compared the proportion of orphans and nonorphans aged 10–14 years who worked more than twenty and forty hours per week (including household chores), and found no significant difference between the two groups. Because censuses contain no information on the time spent on housework, it is not possible to identify unpaid family workers who work for excessive hours. Therefore we focus here only on paid employment and self-employment among children aged 7 to 17 (see the bottom panel of Table 3).

Descriptive statistics indicate that the census carried out in Mali in 1998 is the one in which child employment was by far the most common: about four nonorphans out of ten, and nearly five out of ten orphans were working. This is simply the counterpart of their low school attendance. The lowest rates are observed in Kenya. However, care should be exercised when interpreting these results, because the reference period for the questions about employment status varies across censuses.

The disadvantage of orphans in terms of work involvement is apparent in almost every census, the census conducted in Malawi in 2008 again being a noticeable exception. This penalty persists when controlling for the same household characteristics we used previously for school attendance. In several countries (Uganda, Rwanda, Sierra Leone), motherless children are more likely to participate in the job market than fatherless children, although we anticipated that the loss of a father would force more children to search for alternative sources of earnings. Quite surprisingly, according to the regression outputs, dual orphans in Kenya and Rwanda appear to have an advantage over nonorphans, and once again we hypothesize that this results from assistance from NGOs or government structures. If this assistance aims to increase the school enrollment of dual orphans (as observed in Rwanda), it will also limit their participation in the labor market.

Orphans in employment are mostly agricultural and fishery workers, especially in Mali (90 percent of the orphans aged 7 to 17). In Sierra Leone, the elementary occupations (street sales, cleaners, etc.) also concern a significant share of orphans (40 percent of the orphans aged 7 to 17). About two out of ten orphans are employed in such activities in Rwanda and Tanzania, and one out of ten orphans in Uganda.

As expected, age is positively associated with participation in the labor market, irrespective of the parental survival status and the country. Girls are also less involved in the labor market, except in Rwanda and Sierra Leone. As regards the relationship to the household head, regression results show that children who are themselves household heads (and their wives) participate much more frequently in the labor market, other things being equal. Spouses in Mali are the only exception to this rule; this probably results from the dominance of Islam in this country.

As was the case for school attendance, children who are unrelated to the household head, both among orphans and nonorphans, are more likely to be in employment. Also noticeable is the inverse relationship between the employment of children and educational attainment of their household heads in all countries but Kenya. This Kenyan exception is observed in terms of living standards too. It is possible that some of these children are domestic workers working and residing in richer and more educated households, but why this is observed only in Kenya remains unclear.

6 Conclusion

In the last fifty years, many African countries have collected data on orphanhood through their censuses. Given their increasing availability, thanks to databases such as IPUMS, it is surprising that such data remain scarcely exploited. To demonstrate their usefulness, we presented three illustrations in this chapter.

Firstly, we showed that censuses can help estimate the numbers of orphans more precisely. These numbers are regularly produced by UNAIDS and UNICEF to track progress in the fight against HIV/AIDS, and estimate the funding required to meet the needs of OVCs. However, orphanhood rates derived from census data sometimes differ from estimates obtained by demographic modeling, and these discrepancies cannot entirely be explained by misreportings attributable to the adoption effect. Ideally, censuses should therefore be used to calibrate

model-based estimates of orphanhood rates in combination with DHS and MICS surveys, even if only to obtain lower bounds.

Secondly, censuses constitute the only source of information allowing researchers to document spatial inequalities in orphanhood on small geographical scales. Identifying areas receiving numerous OVCs is crucial to properly allocating funds and designing policies. To date, at least fifteen African governments have developed and implemented national plans of action for OVCs to strengthen families and communities caring for OVCs and improve access to services, policy and legislation (Engle 2008). Numerous nongovernmental organizations are also involved in developing community outreach, peer support, financial assistance, and access to health or childhood development activities. The identification of priority areas where orphans are clustered may greatly increase the effectiveness of these actions.

Thirdly, census data can complement the analysis of the vulnerability of orphans. To a large extent, results from our exploratory analysis are consistent with previous research based on surveys and longitudinal case studies, even when they are apparently counterintuitive (as is the case in Rwanda and Malawi). Further analysis could take better advantage of the potential of censuses by focusing on specific categories of orphans that are poorly understood with survey data because of small sample sizes (such as sibling-headed and child-headed households).

In sum, all African countries should strive to collect data on orphanhood more systematically. In their recommendations for the content of population censuses, the United Nations (2008, p.143) states that the questions on orphanhood are to be given lower priority. It is timely to raise this priority level.

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