Consistency of reports on orphanhood status: Insights from a linkage of individual records between successive censuses in southeastern Mali

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Abstract

Due to the widespread lack of civil registration data in sub-Saharan Africa, reports on the survival of parents collected in censuses and demographic surveys continue to play an important role in the estimation of adult mortality. Data on parental loss also serve to monitor trends in orphanhood prevalence, and allow the study of health outcomes, schooling attainments and living arrangements of orphans. However, in many countries, as is the case in Mali, genuine measures of orphan prevalence differ substantially from model-based estimates. These discrepancies have been ascribed to the "adoption effect", which refers to the fact that a sizeable fraction of fostered orphans are misclassified as non-orphans. In this paper, we use a unique linkage of individual records between successive censuses in southeastern Mali to investigate the consistency of reports on orphanhood status. In light of this analysis, we review the plausibility of model-based estimates of orphan prevalence and adult mortality in Mali.

BACKGROUND

In the early 1970's, Brass and Hill (1973) developed the orphanhood method, which aims to convert proportions of non-orphans into survival probabilities in adulthood. This method has since undergone considerable refinements (Palloni and Heligman 1985, Timaeus 1991a;b;c; 1992) and is frequently employed in sub-Saharan Africa to compensate for the lack of registration-type data (Feeney 2001, Dorrington et al. 2004, Timaeus and Jasseh 2004, Lesotho 2009, Hosegood et al. 2004, Nhacolo et al. 2006). Reports on parental loss also serve to analyze the vulnerability of orphans, which has received increasing attention in recent years as a result of the HIV-TB epidemic (Case et al. 2004, Beegle et al. 2010). However, several studies have shown that data on parental survival can underestimate by a large extent the true orphan prevalence. As a result, to predict the number of orphans,

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UN agencies do not rely on censuses and surveys but rather on mathematical models based on mortality and fertility rates (UNICEF 2006). Likewise, mortality levels derived from orphanhood data are often discarded because they are deemed implausibly low (United Nations 2006).

The most pervasive problem in census and survey data is the "adoption effect", namely the fact that some fostered orphans are misclassified as non-orphans. In the presence of adults, interviewers may not probe whether they are the biological parents of children observed in households (Blacker 1984). Foster parents may also deliberately or inadvertently claim adopted orphans as their own offspring (Robertson et al. 2008). Often cited as a source of confusion is the usage of terms pertaining to biological parents to refer to larger circles of kins or to show respect to elders. In addition, many children in sub-Saharan Africa do not cohabit with their parents but are fostered in the extended family, and this practice may be detrimental to the quality of data on orphanhood status.

Although this "adoption effect" is widely acknowledged as the main source of error in orphanhood data (Blacker and Mukiza-Gapere 1988, Timaeus 1986; 1991b;a, Grassly et al. 2004, Rutstein 2008), we remain remarkably ignorant about its extent, its variation among geographic subregions and its sociocultural determinants. In this paper, we take advantage of a unique linkage of individual census records in Mali to investigate the consistency of reports on parental survival status between three successive censuses. Mali is a interesting case study, because it is a particularly egregious example of the discrepancies between observed and model-based proportions of orphaned children.

In this extended abstract, we do not present preliminary results (because analysis is in progress), but rather place this research into context. We begin by introducing how data on parental survival status have been collected in sub-Saharan Africa and Mali since the 1960s. We continue with a cursory review of previous research on the adoption bias. Finally, we detail the study design and some of the expected results.

THE COLLECTION OF ORPHANHOOD DATA IN AFRICA AND MALI

Questions about orphanhood were first included in retrospective surveys organized in Chad, West Cameroon and Mauritania in 1964-65, as well as in the mortality module administered in some of the World Fertility Surveys (Cameroon, Lesotho, Mauritania, Malawi and Northern Sudan). They were aimed at allowing the indirect estimation of adult mortality through the orphanhood technique (Blacker 1977). It is only from the early 1990s that questions on orphanhood appeared in the DHS and MICS rosters of household members[1]. However, these questions were restricted to children under 15 (or 18), which suggests the focus had shifted to the vulnerability of orphans. In Mali, questions about parental survival

[1]In some of the first Demographic and Health Surveys (DHS), eligible women were also asked about the survival of their parents and parents-in-law, but it was rather to establish if they lived with their parents after marriage, in order to analyze the effects of residential patterns on fertility and contraceptive use (Timaeus 1991b).

status have been included in DHS conducted in 1996, 2001 and 2006.

In their recommendations for the content of population censuses, the United Nations continue to give "lower priority" to questions on orphanhood (UN 2008). But many African countries have included questions on orphanhood in their census schedule. Some countries have collected data on parental loss at each census round (e.g. Gambia, Kenya, Sierra Leone), while other countries have never done so (e.g. Zambia or Guinea). In Mali, the questions "Is the father of ... still alive?" and "Is the mother of ... still alive?" were asked to all individuals in 1987, 1998 and 2009.

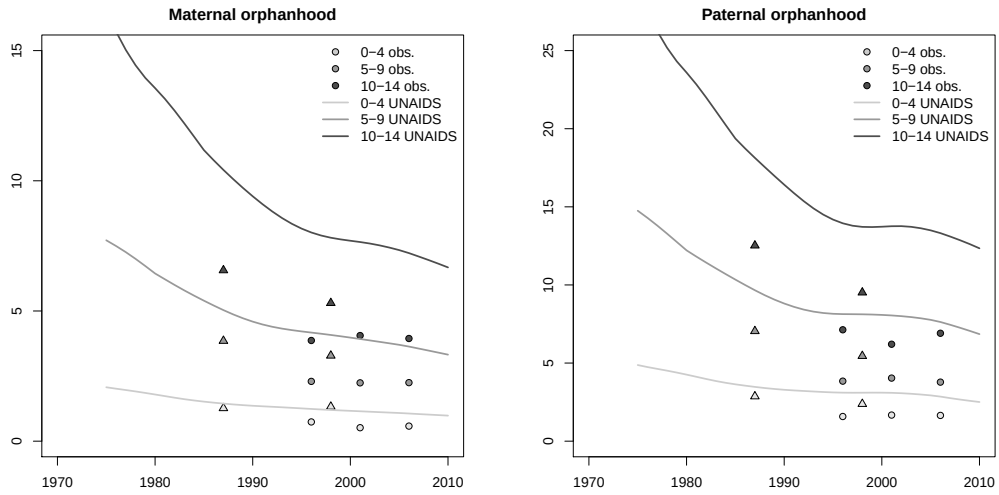

Figure 1. Trends in the prevalence of orphanhood among children as reported in censuses and surveys cinducted in Mali and as estimated by Spectrum (2011).

The proportions of orphaned children obtained in these censuses and surveys differ markedly from those predicted by UNAIDS. This is illustrated in Fig.1, in which model-based estimates are derived from the Spectrum software. The estimation method used in Spectrum was developed by Grassly and Timaeus (2005). It 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 and aged less than 18 years at the time of interest. The method accounts for the vertical transmission of HIV, the lower fertility of infected mothers, and the excess risks of mortality faced by orphans[2]. In Mali, the HIV prevalence has remained low (below 2%), and estimates will thus be mostly sensitive to the accuracy of adult mortality rates. Unsurprisingly, if we compute adult mortality rates from orphanhood data (Timaeus 1992), we obtain probabilities of dying that are well below the United Nations estimates. This is illustrated in Fig.2, for which we converted conditional probabilities of survival derived from orphanhood in a life

[2]The estimation of the number of paternal orphans is further complicated by the need to account for the effect on child survival of HIV transmission (from mother to child and between parents), as well as the reduced fertility of partners of infected men.

table probability ${}_{45}q_{15}$ (through the Brass General Standard). Direct and indirect estimates obtained from sibling survival data collected in 3 DHS in Mali are plotted as well (Reniers et al. 2011)[3]. Trends in mortality derived from parental and sibling survival are in good agreement, but they differ substantially from those estimated by the UN and WHO. One objective of this paper is to investigate to what extent these discrepancies can be explained by reporting errors such as the adoption effect.

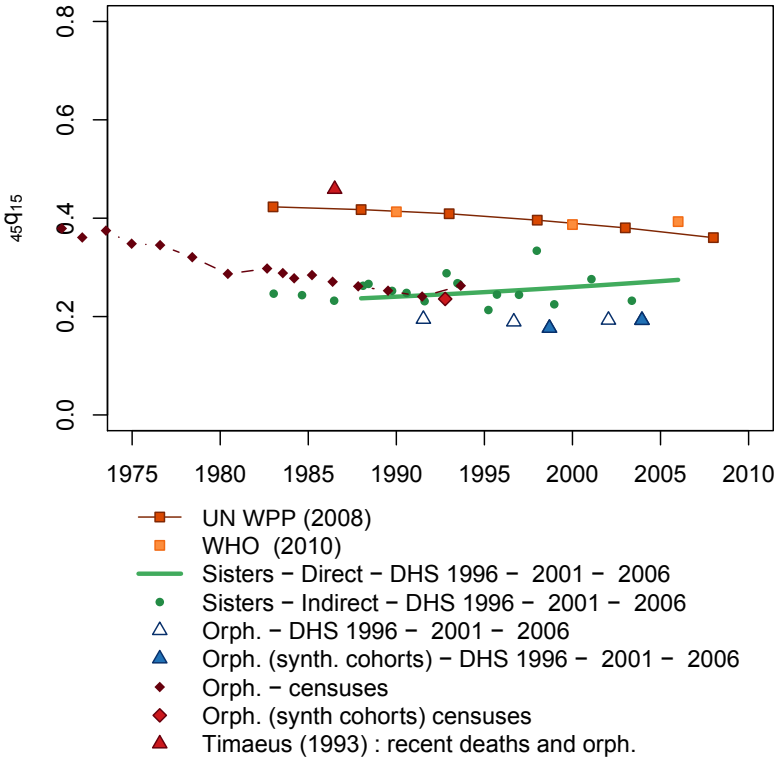

Figure 2. Trends in the life table probability of dying between ages 15 and 60 for females in Mali according to various sources (own calculations from parental and sibling survival, and estimates from the United Nations (2009) and the WHO.

PREVIOUS RESEARCH ON THE ADOPTION EFFECT

A systematic comparison between Spectrum-based and observed orphan prevalence was conducted by Grassly et al. (2004). The proportions of maternal orphans in MICS and DHS were consistently lower than model predictions (by 40% on average), irrespective of the prevalence of HIV. This suggests that discrepancies were not due to the modelling of AIDS mortality. Paternal orphan prevalence was more in agreement with model outputs, with a closer congruence in countries with high HIV prevalence. Grassly et al. (2004)

[3]For estimates derived from censuses, the proportions of orphans by age and mean ages at childbearing are obtained from the IPUMS database - Integrated Public Use Microdata Series, International: Version 6.1 [Machine-readable database]. Minneapolis: University of Minnesota, 2011.

ascribed these discrepancies to a combination of (1) overestimation of background adult mortality by the United Nations and (2) underestimation of orphan prevalence in surveys because of the adoption effect. This comparison was updated with the 2006 revision of the WPP. Robertson et al. (2008) presented ratios of Spectrum over DHS orphan prevalence, for various countries of sub-Saharan Africa. Important discrepancies were again noted, albeit less pronounced than with the 2000 revision. The proportions of children who lost their father accorded quite closely with Spectrum outputs.

In addition to these assessments at the aggregate level, two studies analyzed the consistency of reports on orphanhood in successive inquiries. Pison and Langaney (1988) compared the reports collected during a census of the Fula Bande in Bandafassi (Eastern Senegal) in 1975 with a genealogical survey conducted subsequently. As much as 32% of fatherless children under age 15 were reported in the census as having their father alive. Quite surprisingly, Pison and Langaney (1985) noted that maternal orphans identified in the census were not mis-reported as having their mother alive. More recently, Robertson et al. (2008) analyzed the consistency of reporting on orphanhood across successive rounds of a cohort study in Manicaland (Zimbabwe). They found that, out of 198 children reported as maternal orphans in the first round (and followed up to the third round), 33% were reported as non-orphans at least once in the next two rounds (with 95% confidence intervals ranging from 26.7 to 39.9). In contrast with what was observed in Senegal, the reports on parental survival appeared to be more consistent, since only 13.4% (10.9 - 15.9) of paternal orphans were later reported as having a living father.

Besides the adoption effect, orphan prevalences can be biased by non-responses and age misreporting. Although the proportions of missing data on orphanhood are usually rather low, they are of the same order of magnitude as the proportions of orphans. Ages reported in censuses and surveys are also plagued with inaccuracies, such as age exaggeration and attraction on round digits (Ewbank 1981, Hertrich 1993). Since round ages are located at the lower age limit of the 5-years age groups, age heaping is likely to result in net downward transfers. This will lead to further underestimating the proportions of orphans when these proportions are tabulated by 5-years age groups.

LINKING INDIVIDUAL RECORDS IN SOUTH-EASTERN MALI, AMONG THE BWA ETHNIC GROUP

Since 1988, INED has supported the follow-up of a rural community in southeastern Mali in the Bwa territory, about 450 km from Bamako[4]. This follow-up covers 7 villages with a population of 4200 individuals in 2009. The nominal records retrieved from national censuses conducted in 1976, 1987, 1998 and 2009 are linked together and integrated with a multi-round survey conducted every 5 years since 1988. The main advantage of this study design is that we have access to responses given to census enumerators, rather than working

[4]Slam Project ("Suivi longitudinal au Mali "), under the scientific responsibility of Véronique Hertrich (Ined, Paris, France).

with data specifically collected for the purpose of the analysis. Thus there is little chance that the consistency of reports has been biased upward by the follow-up. In addition, unlike the study in Manicaland (Zimbabwe), parental survival questions are not limited to children under age 18. We can extend the analysis to orphanhood in adulthood, which is thought to provide more reliable estimates of mortality (Timaeus 1991a;b). The main shortcomings of this study is the small size of the population, and the fact that this rural community is not representative of the entire country.

Following Robertson et al. (2008), we identify individuals who are reported as orphans in one national census and as non-orphans in one of the ensuing censuses. Inconsistencies are also detected when a parental death captured by the multi-round survey is not mentioned in the census reports of the surviving children. We analyze the profile of unreported orphans by age, sex, and education level. We also document missing and unknown responses, as well as substantial age misreporting (Hertrich 1993). We focus on relationships with the household head, characteristics of the respondents, and living arrangements of individuals with inconsistent reports.

In addition to the multiround survey in 7 villages, a biographical survey is conducted every 5 years in two villages (Sirao and Kwara, with a total population of 1750 individuals in the last update in 2009). This survey covers all residents, and collects birth, matrimonial and migratory histories. This allows for an in-depth analysis of the characteristics of unreported orphans. Since questions on parental survival and dates of parental deaths were asked in 1988-9, we can also identify unreported orphans in the first census of 1987.

The adoption effect is expected to be more pronounced in reports relative to children (as compared to adults), because they are less likely to know that they have been adopted, and because at older ages, both biological and foster parents are more likely to be dead. But we also anticipate that the adoption bias will be particularly pervasive among the elderly. We hypothesize that the consistency of reports will be higher for fathers, owing to a higher likelihood of paternal orphans to live with their surviving mother (as compared with maternal orphans with their surviving father), and higher remarriage rates among widowers.

Overall, this study will provide valuable insights on the adoption bais and its impact on estimates of mortality and orphan prevalence in countries without adequate registration systems.

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