

# **Does Timing of Orphanhood and HIV Prevalence Matter? A Look at Orphans' Transitions to Sexual Debut and Marriage in Four Sub-Saharan African Countries**

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## **Abstract**

Debate exists as to whether orphaned adolescents are more vulnerable than their non-orphaned peers to early sexual debut and marriage. I revisit this question by using data from the National Survey of Adolescents 2004, which targets adolescents, 12-19 years, in Burkina Faso, Ghana, Malawi, and Uganda. Contrary to previous studies, I explore whether timing of orphanhood and HIV prevalence matters. I also hypothesize that educational differences may explain orphans' greater risk of these outcomes. Results indicate that female double orphans are vulnerable to early sexual debut; however, male orphans, of any type, are not at increased risk. Education explains very little, if any, of female double orphans' greater vulnerability. While female orphans are not more likely to marry early in three out of four countries, those who became paternal and double orphans before age 10 are more likely to marry in Uganda. Education explains some portion of this increased risk.

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## Introduction

Sub-Saharan Africa possesses the world's highest rates of HIV/AIDS. In some countries, more than 20% of adults are infected with HIV (UNAIDS 2010), resulting in large numbers of children losing one or both parents to AIDS. UNAIDS estimates that the number of AIDS orphans has increased by more than 166%, from 8.9 million in 2001 to 14.8 million in 2009. The vast majority of orphaned children are of school age and more than half are adolescents (UNICEF et al. 2004).

During the transition to adulthood, adolescents, both orphans and non-orphans, experience important life events such as sexual debut, marriage, and childbearing. These events, not always under the control of adolescents themselves, can place them at increased risk of low educational attainment, HIV/STD infection, early childbearing, as well as poor maternal and child health outcomes (Clark 2004, Nour 2006, Cooper et al. 2007, Pettifor et al. 2004, Drain et al. 2004). Debate now exists as to whether orphaned adolescents are more vulnerable than their non-orphaned peers to these outcomes. If orphans are found to have worse outcomes, this is especially troublesome as the number of orphans is expected to increase. Adults who are currently infected with HIV will eventually die of AIDS<sup>2</sup>, even though HIV incidence is now declining in most Sub-Saharan African countries (UNAIDS 2010).

The rapid increase in the number of adolescent AIDS orphans living in Sub-Saharan Africa has been accompanied by growing interest in understanding whether orphans are at increased risk of early sexual debut and marriage. In South Africa, Thurman et al. (2006) and Operario et al. (2007) found that male and female orphans are more likely than their non-orphan counterparts to have engaged in sexual activity. While these studies did not conduct analyses by type of orphan<sup>3</sup>, other studies have made this distinction. Studying orphans in different parts of Zimbabwe, Gregson et al. (2005) and Birdthistle et al. (2008) reached the same conclusion: female maternal orphans are at greater risk of sexual debut than non-orphans. Nyamukapa et al. (2008), also focusing on Zimbabwe, obtained slightly different results. In their study, both paternal and maternal orphans, regardless of gender, are more likely than non-orphans to have initiated sexual activity.

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<sup>2</sup> Despite recent advances in access to antiretroviral treatment (ARV), only 37 percent of HIV-infected adults in need of ARVs are on treatment (UNAIDS 2010).

<sup>3</sup> A paternal orphan is a respondent whose father has died but mother is still alive, a maternal orphan is a respondent whose mother has died but father is still alive, and a double orphan is a respondent whose father and mother have both died.

Researchers have also examined the relationship between early marriage and orphanhood. In addition to concluding that female maternal orphans are more likely to engage in sexual activity, Gregson et al. (2005) found that they are at risk of early marriage. In a longitudinal study of children interviewed in the Kagera region of Tanzania in the early 1990s and re-interviewed in 2004, Beegle and Krutikova (2008) found that female paternal orphans, especially those from poorer households, households whose primary source of income is farming, and those who were not in school when orphaned, were more likely to marry at younger ages than non-orphans.

Up until recently, all published studies examining the relationship between orphanhood, sexual behavior, and marriage have been country-specific, often focusing on particular populations, such as urban, rural, or regional. Only one study, Operario et al. (2007) used a nationally representative sample. Moreover, most studies have taken place in high-prevalence AIDS countries. Palermo and Peterman (2009) is the first study to use population-level data from several Sub-Saharan African countries to examine the relationship between orphanhood and marriage, sexual debut, and teen pregnancy. Using Demographic and Health Surveys from ten Sub-Saharan African countries, they found little association between orphanhood and early marriage or teen pregnancy. However, they did find a positive association between orphanhood and early sexual debut in seven countries.

Similar to previous studies, this paper aims to examine whether orphans are more likely than non-orphans to experience early sexual debut and marriage. This paper, however, differs from earlier studies on several dimensions. First, rather than focusing on a specific country, I use population-level data of adolescents in four Sub-Saharan African countries: Burkina Faso, Ghana, Malawi, and Uganda. Similar to Palermo and Peterman (2009), I include both high and low HIV prevalence countries, allowing me to examine whether outcomes for orphans differ by HIV prevalence. Findings can have policy and programmatic implications in determining whether orphans are a vulnerable group, both in high and low prevalence AIDS countries. Historically, African societies, especially those in West Africa, have had a strong tradition of fostering children whose parents have died (Isiugo-Abanihe 1985). The AIDS epidemic, however, may have weakened this system as more and more households are directly affected by AIDS (Foster 2000, Hunter 1990). Consequently, extended families may no longer possess

adequate emotional and financial resources to cope with such large numbers of orphans , possibly leading to declines in their quality of care.

Second, I examine a rarely explored aspect of orphanhood, the timing of parental death and its relationship to sexual debut and marriage. Not only understanding whether certain types of orphans are more vulnerable to these outcomes, but also knowing whether becoming an orphan during childhood or adolescence matters will allow policymakers and program designers to better target policies and interventions to the most vulnerable groups of orphans. In particular, I explore whether losing a parent before age 10 or experiencing a loss during adolescence has a greater association with early sexual debut and marriage. Losing a parent during childhood may have a bigger effect on adolescents than experiencing such a loss during adolescence. First, younger children, more dependent than adolescents on their parents, lack the support of friends and other adult figures, such as teachers. Rather than expressing their grief, they may internalize it or exhibit problematic behaviors, such as aggressive behavior or poor school performance. Second, parental loss may not be an isolated event. Rather, it can mark the beginning of a series of exposures to economic and emotional hardships where children are forced to adjust accordingly. For example, a parental death may result in new living situations (Van Blerk and Ansell 2006), declines in household income, and remarriage by the surviving parent. Constant adjustment to new situations may increase levels of psychosocial distress among children, which may continue through adolescence. On the contrary, experiencing a parental death during adolescence may have a greater effect on early sexual debut and marriage than undergoing such a loss before age 10. Adolescence is a difficult period where children transition from childhood to adulthood, undergoing many changes, including physical, hormonal, emotional, and psychological. Due to these changes, adolescents may have more difficulty coping with a parent's death than younger children. Some adolescents may even use sexual activity as an emotional outlet. Additionally, adolescents who experienced the loss of a parent before age 10 have had more time to grieve and to adjust to life without this parent, which is not the case for those suffering a recent loss.

Third, I examine sexual debut separately by gender and type of orphan, which has rarely been done in previous studies. With the exception of Operario et al. (2007), most studies have either examined females exclusively (Gregson et al. 2005, Birdthistle et al. 2008, Palermo and Peterman 2009) or combined males and females in their analysis (Thurman et al. 2006,

Nyamukapa et al. 2008). When analyzed according to gender, Operario et al. (2007) reached the conclusion that both female and male orphans are more likely than their non-orphan counterparts to engage in sexual activity. Odds ratios were of a similar magnitude for both females and males, indicating that one gender is not more adversely affected by parental death than the other. This is in contrast to studies conducted in developed countries where males have generally been found to be more adversely affected than females by hardships, such as parental death and divorce, as evidenced by greater instances of problematic behavior (Block et al. 1986, Shaw et al. 1993, Kalter et al. 2002). Furthermore, Operario et al. (2007) did not conduct their analysis by orphan type. It is possible that the effect of losing one's mother or father on sexual activity differs by gender.

Fourth, unlike previous studies, I examine the role of education in orphans' greater risk of early sexual initiation and marriage. Only one other published study, Nyamukapa et al. (2008), attempted to explain this risk. They found that psychosocial distress explained a small portion of the increased risk experienced by double orphans but not among paternal or maternal orphans. While previous studies have found that orphans fare worse on educational outcomes than non-orphans (Case and Ardington 2006, Case et al. 2004, Evans and Miguel 2007, Nyamukapa and Gregson 2005, Timaeus and Boler 2007), the literature is less clear about the relationship between education and early sexual debut. Some studies have found that more schooling protects adolescents from engaging in early sexual intercourse (Gupta and Mahy 2003, Magnani et al. 2002), while other studies have found that less schooling delays sexual initiation (Karim et al. 2003, Meekers and Ahmed 2000). Hence, lower levels of education can either increase or decrease orphans' risk of early sexual debut depending on the relationship between education and sexual activity in these populations. The expected impact of educational differentials on marriage is much clearer. Higher levels of education usually lead to delays in marriage (Gyimah 2009, Ikamari 2005, Manda and Meyer 2005, Singh and Samara 1996).

Lastly, I use a more precise methodological approach in examining the relationship between orphanhood, sexual debut, and marriage. Unlike prior studies, I take into account the ordering of events, in particular the respondent's age at parental death, sexual debut, and marriage, through discrete-time event history analysis. Previous studies may have overestimated the association between orphanhood and sexual and marital outcomes by failing to exclude respondents who became orphans after the outcome of interest occurred (Operario et al. 2007,

Gregson et al. 2005, Thurman et al. 2006, Nyamukapa et al. 2008, Palermo and Peterman 2009). In a similar fashion, I exclude married respondents in my analyses of sexual debut. Several studies combined both married and unmarried respondents when measuring this outcome, resulting in possible overestimates of this relationship (Palermo and Peterman 2009, Gregson et al. 2005). Since it is reasonable to assume that married respondents are having sexual intercourse, including them in such an analysis will result in overestimates, especially if orphans are more likely to be married than non-orphans.

In the next section, I present my theoretical framework. Specifically, I summarize the possible pathways for orphans' vulnerability to early sexual debut and marriage; elucidate how education can affect orphans' risk of these outcomes; and review studies examining the relationship between orphanhood and education. In the sections that follow, I discuss the data used in the study and then present my model specifications, results, and a discussion of my findings.

## **Theoretical Framework**

### *Orphans' vulnerability to early sexual debut and marriage*

In Sub-Saharan Africa, not all children live with their biological parents, even if both parents are alive. Child fostering, taking care of non-biological children, is common, despite some geographical and ethnic variation in its prevalence (Isiugo-Abanihe 1985, Monasch and Boerma 2004). For various reasons, considerable numbers of children are sent to live with grandparents, aunts or uncles, or even unrelated individuals. In some cases, biological parents lack the financial capacities to take care of them, preferring that their children live with a family member who has adequate monetary resources. In other cases, children provide services, such as emotional support or companionship to an elderly grandparent or domestic labor to their caretakers (Isiugo-Abanihe 1985). Most commonly, children are fostered by families who can provide educational assistance, either through paying school fees or providing lodging due to their close proximity to schools (Isiugo-Abanihe 1985). Similar to fostered children, many orphans do not live with a biological parent (Monasch and Boerma 2004). Orphans, however, are more likely to live in less favorable living conditions, in particular, female-headed households, larger households with less favorable dependency ratios, and households where the household head is much older (Monasch and Boerma 2004). Compared to fostered children, these

conditions may increase orphans' vulnerability to higher levels of poverty as well as lower levels of monitoring by caretakers, which can lead to increased risk of early sexual initiation and marriage.

Orphaned adolescents may be especially vulnerable to early sexual debut through several mechanisms. For instance, orphans' living arrangements may increase their susceptibility to early sexual activity. Compared to non-orphans, single orphans, those who have lost only one parent, are less likely to live with their surviving parent, especially if they are maternal orphans (Monasch and Boerma 2004). Those not living with their surviving parent may be sent to live with extended family members, such as aunts, uncles, or grandparents (Monasch and Boerma 2004). Of orphans not living with their surviving parent, approximately half live with grandparents while the remaining half live with other relatives, such as aunts or uncles (Monasch and Boerma 2004). While orphans living with a grandparent are more likely to receive needed love and affection than those living with other relatives, they are often less likely to be disciplined by their grandparents (Abebe and Aase 2007). Grandparents are often more lenient with their grandchildren than aunts and uncles, allowing orphans greater freedom and unrestricted movement. Lack of close adult supervision may lead to more opportunities to engage in sexual activity.

Orphans not living with a surviving parent may also lack needed affection from their new family, especially if they are treated differently from the caretakers' biological children (Abebe and Aase 2007). Feeling neglected, some orphaned adolescents may use sexual activity as a way to gain love and affection that is not provided at home (Juma et al. 2007). In Kenya, Longfield et al. (2004) found that some orphans find this affection by seeking older sexual partners in hopes that they would provide them with emotional support, affection, and attention. In addition to emotional needs, orphans often lack money and material goods such as food, clothing, and shelter, as well as education (Oleke et al. 2007, Makame et al. 2002). Caretakers may not always provide such necessities, forcing orphans to use transactional sex as a means of survival (Juma et al. 2007, Thurman et al. 2006). Some orphans become sexually involved with older men or "sugar daddies" in exchange for school fees or other expenses (Oleke et al. 2007).

Psychosocial distress, as measured by depression, anxiety, and low self-esteem, is another mechanism through which orphans may engage in early sexual activity. Studies have shown that orphaned adolescents suffer greater psychosocial distress than non-orphans (Makame

et al. 2002, Nyamukapa et al. 2008, Atwine et al. 2005, Cluver and Orkin 2009). While a large proportion of this distress is directly caused by the traumatic experience of losing a parent, this stress can be exacerbated by changes occurring in an orphan's life, such as moving to a new household, adjusting to a new community, leaving behind friends, and being separated from siblings (Van Blerk and Ansell 2006). Nyamukapa et al. (2008) found that increased psychosocial distress explained some of the increased risk of early sexual debut and HIV infection experienced by orphans in Zimbabwe.

Female orphans may also be at greater risk of early marriage. The death of an adult household member can lead to income shocks. To ensure that enough resources exist, household heads may decide to marry off adolescents girls. This may be the case where a female orphan is not closely related to the household head or primary decisionmaker of the family. Furthermore, households may actually have a financial incentive to arrange marriages for female orphans, especially among ethnic groups where bridewealth is commonly practiced. The husband's family provides bridewealth, in the form of money or livestock, to the bride's family in exchange for her future agricultural productivity and reproductive capacity (Anderson 2007, Caldwell and Caldwell 1987, Tambiah et al. 1989). If households can benefit from bridewealth, then all females would be at risk of early marriage. While this is certainly true, female orphans may face an increased risk. In most cases, the price of bridewealth is not fixed, but is instead negotiated between families. Hence, caretakers may agree to lower sums of bridewealth for orphans than their own daughters, placing orphans at greater risk of early marriage. Lastly, the motivation for early marriage can actually come from the female orphans themselves. They may view marriage as a way of building a new life for themselves (Oleke et al. 2006).

#### *Education, early sexual initiation, and marriage*

Educational differences are another pathway that may affect orphans' vulnerability to early sexual debut and marriage. The role of education in early sexual debut among adolescents in Sub-Saharan Africa has been researched extensively. Despite numerous studies, the literature examining this relationship remains inconclusive. Two measures of education, current school attendance and educational attainment, are frequently used to assess this relationship.

In studies conducted in Ghana and South Africa, Karim et al. (2003) and McGrath et al. (2009) found that current school attendance decreases the odds of sexual debut among males and



females. Meekers and Ahmed (2000) and Magnani et al. (2002) also reached the same conclusion for females; however, no relationship was found for males.

The relationship between educational attainment and sexual initiation is less clear. In Lusaka, Zambia, male and female adolescents with some secondary education were less likely to have ever had sex (Magnani et al. 2002). While the same relationship was observed for both genders, this is often not the case. Most studies indicate that the effects of education on sexual initiation differ by gender. More than one study has found that males with some secondary education in Nigeria, Ghana, and urban Botswana are more likely than those with less education to have engaged in premarital sex (Karim et al. 2003, Meekers and Ahmed 2000, Fatusi and Blum 2008). One possible explanation is that females view these males as attractive sexual partners. The opposite relationship has been found for females where secondary educational attainment is negatively associated with premarital sex (Gupta and Mahy 2003). These females may delay premarital sex because of fears of becoming pregnant out of wedlock, which can lead to dropping out of school.

Other studies have reached different conclusions, especially among females. For example, females with only primary education are more likely to have had sex than those with no education or more than primary education (Karim et al. 2003). Furthermore, some studies have found no association between education and premarital sex among female respondents (Meekers and Ahmed 2000, Fatusi and Blum 2008). Thus, the relationship between education and sexual activity appears to be more ambiguous for females than for males. While some females delay sexual activity due to fears of pregnancy, others engage in premarital sex with sugar-daddies in order to finance their education (Longfield et al. 2004, Oleke et al. 2007). In addition, attending school increases the likelihood of interacting with the opposite sex, which may increase the probability of forming sexual relationships.

The relationship between educational attainment and marriage has been the focus of many studies. These studies have generally reached the same conclusion: women with higher levels of educational attainment are more likely than those with lower levels to transition to marriage at older ages (Gyimah 2009, Ikamari 2005, Singh and Samara 1996, Manda and Meyer 2005). As education has become more widespread in Sub-Saharan Africa, the effect of education on age at marriage has increasingly grown, especially among younger cohorts of women (Gyimah 2009). Education's impact on the transition to marriage has been shown to work

through several mechanisms. First, education generates human capital which increases the span of economic opportunities available to women. Such careers may entail even more education, making them incompatible with early marriage. Second, women with higher levels of educational attainment are more likely than their less educated counterparts to use modern contraception (Nichols et al. 1987), leading to a decrease in unplanned pregnancies, which lowers their risk of early marriage. Due to social unacceptability of premarital births in many African societies, it is not uncommon for female adolescents to marry when they become pregnant out of wedlock.

### *Orphanhood and education*

In the previous section, I described several possible mechanisms to orphans' vulnerability to early sexual debut and marriage. In this paper, I focus on the role of education. The alarming rise in the number of AIDS orphans has led researchers to examine whether orphans are more vulnerable than non-orphans to worse educational outcomes, as measured by school dropout, number of years of schooling, and highest level of education completed (Ainsworth et al. 2005, Case and Ardington 2006, Case et al. 2004, Yamano and Jayne 2005, Timaeus and Boler 2007, Evans and Miguel 2007, Kasirye and Hisali 2010, Nyamukapa and Gregson 2005). In most studies, researchers have found that orphans, or at least some types of orphans, are disadvantaged with respect to education when compared to non-orphans. Disagreement appears to exist on whether particular types of orphans are more vulnerable to adverse educational outcomes. None of these studies, however, have explored how timing of orphanhood impacts these outcomes.

In a cross-national analysis of ten Sub-Saharan African countries, orphans were significantly less likely to be in school than non-orphans (Case et al. 2004). Even within households containing both biological children of parents and non-biological children, orphans were less likely to be attending school, largely due to the tendency for orphans to live with distant relatives or unrelated caregivers. In KwaZulu-Natal, South Africa, Case et al. (2006), analyzing longitudinal data from a demographic surveillance site, found that maternal orphans are significantly less likely to be enrolled in school than children whose mothers are alive. Moreover, maternal orphans who live with non-orphaned children are disadvantaged in education compared to them. Paternal orphans, however, are not found to be disadvantaged with respect to children whose fathers are still alive. In contrast, Ainsworth et al. (2005), using a panel

household survey in north-western Tanzania, did not find evidence that children, ages 7-14, were more likely to drop out of school after a parent's death or adult death in the household.

Ainsworth et al. (2005) examined school attendance in the months surrounding the death of a parent. In the months leading up to the death, children already attending school completed fewer hours of schooling. After the death, the number of hours of schooling returned to previous levels; however, for girls, the number of hours decreased greatly after a parent's death. Evans and Miguel (2007) also found that primary school participation declines slightly before a parental death but that it decreases substantially after the death in a panel dataset of over 20,000 Kenyan children. While effects were found for both paternal and maternal deaths, they reached the conclusion that the effects of parental death on decreased primary school participation were greatest for maternal orphans as well as for those with low baseline academic performance.

Not only do orphans and non-orphans differ in current school enrollment, but also in progress at school. In KwaZulu-Natal, South Africa, paternal orphans as well as non-orphans living in households without their father were more likely to be two or more years behind in school than children living in the same household as their father (Timaues and Boler 2007). Using fixed-effects models, Timaues and Boler (2007) found that maternal orphans or children living apart from their mother were not disadvantaged on these measures. Case et al. (2006), using similar study populations, obtained conflicting results. Rather than paternal orphans being at a disadvantage, they found that maternal orphans completed significantly fewer years of schooling than children whose mothers are alive. In regards to primary school completion rates, Nyamukapa et al. (2005) found that maternal orphans in rural Zimbabwe had lower completion rates than non-orphans; however, this was not the case among paternal or double orphans. Paternal and double orphans were not disadvantaged in finishing primary school because they were more likely to reside in female-headed households, which increased their access to external resources, such as welfare assistance.

## **Data**

I use data from the National Survey of Adolescents 2004, a set of four nationally representative surveys of 12-19 year olds in four Sub-Saharan African countries (Burkina Faso,

Ghana, Malawi, and Uganda<sup>4</sup>). These surveys were collected as part of a research project known as *Protecting the Next Generation: Understanding HIV Risk Among Youth*, a project designed by the Guttmacher Institute (United States) in collaboration with the University of Cape Coast (Ghana,) Institut Supérieur des Sciences de la Population (Burkina Faso), Makerere Institute of Social Research (Uganda), Centre for Social Research (Malawi), and the African Population and Health Research Center (Kenya) (Biddlecom et al. 2007). *Protecting the Next Generation* seeks to understand adolescents as they transition into adulthood in a context where unintended pregnancies and HIV/AIDS are everyday realities. Similar in design to the Demographic and Health Surveys, these surveys exclusively targeted adolescents, including young adolescents aged 12-14 years who are often left out of survey research. These four countries, chosen to represent different sub-regions of Sub-Saharan Africa (West, East, and Southern), also vary in HIV prevalence. In 2001, HIV prevalence was relatively low in Burkina Faso and Ghana, 2.1 percent and 2.3 percent, respectively, while it was higher in Malawi and Uganda, 13.8 percent and 7.0 percent, respectively (UNAIDS 2010).

All four surveys utilized a two-stage cluster sampling design. In the first stage, enumeration areas were randomly selected. In the second-stage, households were randomly selected from these enumeration areas by using available household listings. Within each household, interviewers surveyed household heads to determine whether eligible adolescents resided in the household. All adolescents aged 12 to 19 years living in these households were eligible to be interviewed. Within eligible households, interviewers obtained informed consent from parents or caretakers to interview adolescents aged 12 to 17 years. Adolescents who were 18-19 years old gave their own consent. Interviews were completed with 5,955 adolescents in Burkina Faso, 4,430 in Ghana, 4,031 in Malawi, and 5,112 in Uganda. Descriptive statistics of all interviewed respondents by gender and country are found in Appendix Table A1. Response rates were high, ranging from 87% in Uganda to 95% in Burkina Faso. This survey used a standard face-to-face interview mode. Due to the sensitive nature of some of the questionnaire topics, effort was made to ensure that interviewers surveyed respondents of the same sex. More detailed information about the methodology of each survey is published elsewhere (Awusabo-Asare et al. 2006, Guiella and Woog 2006, Munthali et al. 2006, Neema et al. 2006).

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<sup>4</sup> Due to security reasons, enumeration areas in four districts, comprising 7 percent of all enumeration areas, in the northern region of Uganda were dropped from the survey. Despite dropping these predominantly Luo-speaking districts, the survey team was able to collect data from two neighboring Luo-speaking districts. See Neema et al. (2006).

This dataset is particularly well-suited for an analysis of the link between orphanhood and sexual debut and marriage because (a) it contains detailed information of the age of respondents at parental death, sexual debut, marriage, school entry, and school dropout; (b) relatively large samples sizes were obtained with high response rates and (c) minimal reporting or recall bias is expected since outcomes of interest occurred in the recent past.

My primary variable of interest is orphan status. According to international guidelines, an orphan is defined as a child under age 18 whose mother or father (or both) have died (UNICEF et al. 2004). I extend this definition to include respondents up to age 19 since the United Nations' definition of adolescents includes individuals aged 10-19 years. Respondents who reported that their mothers or fathers, or both, are no longer alive were classified as orphans.<sup>5</sup> In Table 1, I present the distribution of respondents by timing of orphanhood for both sexes combined.<sup>6</sup> In Burkina Faso and Ghana, both low prevalence HIV countries, the percentage of respondents who are orphans at the time of the survey is less than 17 percent. In Malawi and Uganda, however, this figure is much higher. Approximately 30 percent of respondents in both countries have lost one or both parents. In all four countries, paternal orphans make up more than half of all orphans. Maternal orphans are the second most common type of orphan, followed by double orphans, except in the case of Uganda, where double orphans outnumber maternal orphans.<sup>7</sup>

The middle panel of Table 1 displays the distribution of respondents by orphan status before age 10. A similar pattern is observed to that of orphan status at the time of the survey. The only exception is found in Uganda, where the percentage of maternal orphans is now greater than that of double orphans before age 10. At the time of the survey, however, the proportion of

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<sup>5</sup> Orphan status was determined according to the following question: "Where does your natural mother (or father) live or is she (or he) no longer alive?" If respondents answered "No longer alive", I classified them as orphans. If they live with or reported the location of their parents, I classified them as non-orphans. A small fraction of respondents reported "Don't know" or had missing data when asked about the status of their father (0.24% in Burkina Faso, 1.17% in Ghana, 0.42% in Malawi, 1.32% in Uganda) or mother (0.42% in Burkina Faso, 0.41% in Ghana, 0.15% in Malawi, 0.79% in Uganda). It is not entirely clear what respondents meant when they responded "Don't know" to this question. Two possibilities exist: 1) their mother or father is alive, but they don't know their location and 2) they don't know whether their mother or father is alive. Due to this uncertainty, I dropped these respondents as well as those with missing data on parent's status from the analysis. Since their orphanhood status is unclear, they would also lack data on the timing of orphanhood, which would exclude them from this analysis.

<sup>6</sup> I conducted chi-squared tests to examine if timing of orphanhood differs by gender. Because no statistically significant differences were found, I combined both genders in this table.

<sup>7</sup> Unlike the other three countries, Uganda's AIDS epidemic peaked earlier and was more severe. In Sub-Saharan Africa, where the primary mode of HIV transmission is through heterosexual intercourse, if one parent dies of AIDS, it is highly likely that the other parent is also HIV-infected (Carpenter et al. 1999), which increases the probability that he or she will also die of AIDS. Though the proportion of double orphans is very small, this scenario likely explains Uganda's greater proportion of double orphans than maternal orphans. In all likelihood, Malawi's prevalence of double orphans will also surpass that of maternal orphans in the future.

double orphans is actually greater than that of maternal orphans. Expectedly, overall levels of orphanhood are lower before age 10 than at the time of the survey in all four countries.

The last panel of Table 1 demonstrates changes in orphan status during adolescence, specifically, between ages 10-19. In Burkina Faso and Ghana, approximately 7-8 percent of respondents reported a parental death during adolescence. The proportions are much higher in Malawi and Uganda, where close to 15 percent suffered the death of at least one parent. In all four countries, the vast majority of non-orphans who experienced the death of a parent became single orphans. Only a small proportion became double orphans. While 5-7 percent of single orphans in Burkina Faso and Ghana became double orphans during adolescence, these percentages are much higher in Malawi and Uganda, where 16-20 percent became double orphans.<sup>8</sup>

In this analysis, I focus on two outcomes: reported age of sexual debut and marriage. In Table 2, I present the age-standardized distribution of respondents by outcome and country, according to orphan status at the time of the survey.<sup>9</sup> I examine transitions to sexual debut among never married adolescents, both female and male. Descriptive statistics indicate that not all types of orphans are more likely than non-orphans to have reported engaging in premarital sex. Among never married females, the percentage of double orphans who have reported ever having sex is roughly twice the proportion of non-orphans in all countries except Uganda. This may be due to the fact that Uganda is also the only country where double orphans are more likely to ever be married. Interestingly, a significantly lower proportion of maternal orphans in Burkina Faso have had sex compared to non-orphans.

In the middle panel of Table 2, I present the distribution of never married males who reported ever having sex by orphan status at the time of the survey. While significant variation in reported sexual activity exists by type of orphan among never married females, this is not the case among males. In fact, the proportion of male orphans and non-orphans who have reported initiating sexual activity are not significantly different. The only exception is in Malawi where a higher percentage of maternal orphans have reported engaging in premarital sex.

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<sup>8</sup> This figure is higher in Malawi, probably due to a later peak in their AIDS epidemic.

<sup>9</sup> Because orphans are, on average, older than non-orphans, I standardized the data so that the age distribution of paternal, maternal, and double orphans matches that of non-orphans. I calculated the percentage of orphans who have experienced the outcomes of interest, sexual debut and marriage, using the following equation:  $P^j = \sum_{i=12}^{19} R_i^j * C_i^s$  where  $P^j$  equals the age-standardized proportion of orphans (paternal, maternal, or double) who have experienced sexual debut or marriage;  $R_i^j$  is the proportion of orphans at age  $i$  who have experienced sexual debut or marriage; and  $C_i^s$  is proportion of non-orphans at age  $i$ .

Finally, in the bottom panel of Table 2, I examine the transition to marriage among females. Males are not included because marriage among adolescent males is a relatively rare event in all four countries.<sup>10</sup> In low HIV prevalence countries, Burkina Faso and Ghana, no difference exists in the percentage of respondents married by orphan status. In contrast, maternal orphans in Malawi and Uganda as well as double orphans in Uganda are significantly more likely to be married than non-orphans. Of the four countries, the prevalence of marriage is lowest in Ghana, which is most likely due to their higher levels of female educational attainment. More than 40 percent of female respondents in Ghana have completed at least some secondary schooling.

## Methods

In this analysis, I examine whether orphans are more likely than non-orphans to experience early sexual debut and marriage. As stated earlier, I hypothesize that any differences in these outcomes are due to differences in education. Thus, in the first part of my analysis, I tested whether orphans are more likely than non-orphans to have poorer educational outcomes, as measured by number of years of schooling and current school attendance, using ordinary least squares regression and logistic regression, respectively. Specifically, I examined whether differences in educational outcomes, as measured at the time of the survey, exist by timing of orphanhood: orphan status before age 10, became single orphan during adolescence, and became double orphan during adolescence. Separate analyses are conducted for males and females. I included controls for age, age squared, childhood urban residence, religion, and ethnicity.<sup>11</sup> I also used survey weights when estimating models.

In the second part of my analysis, I use discrete-time event history analysis to examine whether timing of orphanhood is associated with early sexual initiation and marriage. This method is appropriate because it can handle censored data, time-varying covariates, and a substantial number of ties in the age of sexual debut and marriage. Censoring occurs at the time of the survey if the respondent did not experience the outcome of interest, sexual debut or

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<sup>10</sup> In Burkina Faso and Ghana, the percentage of ever married adolescent males is 0.88% and 0.80%, respectively. In Malawi and Uganda, these percentages are slightly higher, 2.26% and 1.58%, respectively.

<sup>11</sup> Ethnic groups were categorized in the following manner: Burkina Faso (Mossi, Dioula/Bobo/Lobi/Dagara/Gouin/Senoufo, Peul/Tuareg/Bella, Other), Ghana (Akan, Ewe, Other), Malawi (Chewa, Yao, Tumbuka, Lomwe, Other), and Uganda (Muganda, Munyankore, Other). With the exception of Burkina Faso, I chose these categories on the basis of a previous study that had used this data (Biddlecom et al. 2008) This study had categorized ethnic groups in Burkina Faso into two categories: Mossi and Other. Due to my own familiarity with Burkina Faso, I recoded this variable to allow for more variation by region and culture.

marriage. Of my predictor variables, three variables, became single orphan during adolescence, became double orphan during adolescence, and currently in school, are time-varying, where time varies by age as expressed in years. Since sexual debut and marriage are events that often occur during the adolescent years, a substantial number of ties exist in the age at which these events occur, making other estimation methods, including Cox proportional hazard models, inappropriate for handling this information.

I organized the data into units of time, which correspond to a year at a given age for each individual. For sexual debut, male and female respondents enter the risk set at age 10. I chose this age on the basis that a non-negligible proportion of female and male respondents reported initiating sexual activity at age 10.<sup>12</sup> While a small proportion of respondents reported sexual intercourse before age 10, some respondents may have exaggerated their age at first sex, especially among males. Moreover, sexual activity at such young ages may not have been consensual. Therefore, I eliminated these respondents from the analysis. For marriage, female respondents enter the risk set at age 12.<sup>13</sup> Upon entering the risk set, respondents contribute yearly observations until they experience the event of interest or are censored.

I focus on two sets of primary independent variables: timing of orphanhood and education. Timing of orphanhood is measured by three variables: orphan status before age 10, became single orphan during adolescence, and became double orphan during adolescence.<sup>14</sup> While orphan status before age 10 is time-invariant, the latter two variables are time-varying. I constructed these variables using information collected on the age of respondents at the time of parental death. The majority of respondents recalled their age at the time of this event; however, a substantial fraction failed to remember their age when their mother or father died.<sup>15</sup> Rather than create a separate category or drop them from the analysis, I assumed that respondents must have been young, under age 10, when this occurred.<sup>16</sup> Due to the traumatizing nature of a parent's

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<sup>12</sup> In each country, the following proportion of events (sexual debut) occurred at age 10 among never married females and males, respectively: Burkina Faso (0.24% and 3.01%), Ghana (1.28% and 3.40%), Malawi (2.49% and 5.95%), and Uganda (2.06% and 4.97%).

<sup>13</sup> In each country, the following proportion of events (marriage) occurred at age 12 among females: Burkina Faso (1.27%), Ghana (0.57%), Malawi (6.24%), and Uganda (0.70%).

<sup>14</sup> As stated earlier, adolescence is defined as ages 10-19.

<sup>15</sup> The percentage of respondents who did not know their age when their father died: Burkina Faso (16.54%), Ghana (19.71%), Malawi (18.48%), Uganda (24.60%). The percentage of respondents who did not know their age when their mother died: Burkina Faso (21.76%), Ghana (19.64%), Malawi (17.06%), Uganda (19.21%).

<sup>16</sup> In most cases, I obtained similar results when I excluded respondents who did not know their age when their parents died. While the magnitude of coefficients changed slightly, the direction of coefficients remained the same. In a few cases, coefficients were no longer statistically significant. I included respondents who did not know their age when their father or mother died



death, respondents who experienced a parental death during adolescence would most likely remember their age at the time of death. In contrast, respondents whose parents died when they were young may not recall their age.

Education is measured by two variables: ever attended school and currently attending school.<sup>17</sup> While ever attended school is time-invariant, currently attending school is time-varying. I constructed the variable, currently attending school, from a series of questions concerning education. For respondents who have ever attended school, interviewers asked for their age when they began school. For respondents who have dropped out or finished school, interviewers asked for their age when they left school. Respondents also reported the number of years of schooling they had completed. Combining this information with reports of the age when they started and stopped schooling, I determined whether or not a respondent was in school at age 10 until the time of the survey for the majority of respondents. For the remaining respondents, not enough information existed to clearly determine this, due mostly to lack of data on the age when they started schooling. Thus, I made a few assumptions in order to determine current school attendance for each person-year. First, I assumed that these respondents began schooling at the legal age (age 7 for Burkina Faso, age 6 for Ghana, Malawi, and Uganda). To determine whether or not they were in school at a particular age, I added the number of years of schooling to the legal age of school entry. Second, I assumed that respondents did not repeat any grades and did not withdraw temporarily from school at any time.

In addition to timing of orphanhood and education variables, I included the following control variables: age, age squared, religion, and ethnicity. To examine sexual debut, I also incorporated wealth<sup>18</sup> and urban residence as control variables. For marriage, however, I did not

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because excluding them would result in a biased sample, especially since this affects 15-25 percent of all orphans in each country.

<sup>17</sup> While surveys collected data on number of years of schooling completed and educational attainment, it is not possible to code these variables at every age that respondents are in the risk set. For example, respondent "A" from Burkina Faso reported starting school at age 7 and completing 7 years of schooling. At the time of the survey, she is 16 years old and currently attending school. Since primary school lasts 6 years, she should now be in secondary school. From her reported education measures, it is clear that she did not progress steadily through school. Rather, she must have either repeated one or two grades or left school temporarily. Thus, not enough information exists to know her grade level at each age she is in the risk set or at what age she transitioned from primary to secondary school. As a result, I do not use these two measures, number of years of schooling completed and educational attainment, when examining early sexual debut and marriage.

<sup>18</sup> For each country, I generated wealth quintiles using a similar methodology to that utilized by Demographic and Health Surveys (Filmer and Pritchett 1999). Interviewers asked household heads whether their household possessed certain durable goods. The following assets were used to calculate wealth scores: water source, type of toilet, electricity, radio, television, phone, refrigerator, type of cooking fuel, type of floor, number of rooms, ox/donkey cart, bike, motorcycle, and car. With this information, I used principal components analysis to create wealth scores for each household. Then, I constructed wealth quintiles based on the weighted distribution of the household population rather than the distribution of households. This distribution represents the national household population. Everyone is ordered by their scores and the distribution is divided

use urban residence or wealth as controls because some respondents are already married and these variables would reflect the household they married into rather than the household where they grew up. Rather, I used childhood place of residence before age 12 in place of current residence and childhood food shortages before age 10 as a proxy for household wealth. All control variables except age and age squared are time-invariant.

For each country, I pooled all person-year observations and estimated a logistic regression model by maximum likelihood using the following specification:

$$\log \left[ \frac{P_{it}}{1 - P_{it}} \right] = \alpha + \beta \mathbf{x}_{it}$$

where  $P_{it}$  represents the probability that an event occurs at time  $t$ , given that it has not already occurred, and  $\mathbf{x}_{it}$  represents a vector of explanatory variables observed for individual  $i$  at time  $t$ . Since individuals contribute multiple person-years, I adjusted for clustering at the individual level. I also used survey weights when estimating models.

For each outcome, I built two sets of models. Model 1 includes timing of orphanhood and socioeconomic control variables (urban residence/childhood urban residence, religion, ethnicity, and wealth/childhood food shortages). In Model 2, I added education variables (currently attending school and ever attended school) to examine whether education explains the association between timing of orphanhood and sexual debut and marriage.

This analysis contains two limitations. First, I use cross-sectional data, which precludes the ability to go beyond associations and make causal inferences. Additionally, I am unable to control for unobserved heterogeneity, which may affect both orphan status and outcomes of interest, sexual debut and marriage. Second, the survey's sampling frame is limited to households, excluding children at boarding schools and orphanages as well as street children. Orphaned adolescents not living within households, especially those in orphanages or living on the street, may be at greater risk of early sexual debut and marriage.

## Results

### *Orphanhood and education*

In the upper panel of Table 3, I display coefficients for the number of years of schooling completed by females at the time of the survey. In Burkina Faso, respondents who were orphans

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equally into five sections, representing wealth quintiles. Finally, each adolescent is placed into a wealth quintile that is the same as the household's wealth quintile.

before age 10 completed, on average, fewer years of schooling than non-orphans. In contrast, this relationship is statistically insignificant in the other three countries, with the exception of maternal orphans in Ghana and Uganda where a negative association exists. Rather, becoming a single or double orphan during adolescence appears to matter more in Malawi and Uganda. For instance, becoming a single orphan during adolescence is negatively associated with years of schooling, while becoming a double orphan is positively associated.

In the bottom panel of Table 3, I display coefficients for the number of years of schooling completed by males at the time of the survey. In most cases, being an orphan before age 10 is associated with fewer years of schooling in all four countries. The statistical significance of this relationship, however, depends largely on the type of orphan. For example, being a paternal orphan before age 10 is associated with number of years of schooling completed in Burkina Faso and Ghana, but not in Malawi and Uganda. Rather, in the latter two countries, becoming a maternal orphan before age 10 is associated with fewer years of schooling. In all countries, except Uganda, a negative relationship exists between being a double orphan before age 10 and years of schooling completed. In contrast to their female counterparts, males who became single or double orphans during adolescence appear neither to suffer nor gain any advantage in the number of years of schooling completed.

Two observations can be made about gender differences in the number of years of schooling completed. First, with the exception of Burkina Faso, female orphans before age 10 appear to suffer less than their male counterparts in the number of years of schooling. It is generally the case that at least some types of male orphans before age 10 are found to be disadvantaged in all four countries. One possible explanation is related to gender differentials in coping with parental death. Male orphans may have more difficulties than females in adjusting after the loss of a parent (Kalter et al. 2002), resulting in poorer school performance and higher rates of grade repetition. Second, males who became single or double orphans during adolescence are not significantly disadvantaged in the number of years of schooling completed in any of the four countries. In contrast, females who became single but not double orphans during adolescence were found to be at a greater disadvantage in Malawi and Uganda, both high prevalence AIDS countries. Adolescent females may be more vulnerable to dropping out of school after the death of a parent, which would result in fewer years of schooling completed.

Caretakers may view female adolescent orphans as valuable sources of labor, especially for domestic duties such as cleaning, cooking, and taking care of young children.

In the upper panel of Table 4, I present odds ratios for currently attending school by timing of orphanhood for females. In all countries, except Burkina Faso, respondents who were paternal orphans before age 10 are less likely to currently attend school than those classified as non-orphans before age 10. A similar result is found for maternal orphans; however, it is not significant in Malawi. In addition, double orphans before age 10 have, on average, 50 percent lower odds of current school attendance than non-orphans before age 10, but this is only statistically significant for females in Uganda. While becoming a single orphan during adolescence is negatively associated with current school attendance in Malawi and Uganda, this is not the case in Burkina Faso and Ghana. Lastly, becoming a double orphan during adolescence appears not to be associated with current school attendance in all countries, with the exception of Ghana, where the odds ratio indicates that this relationship is very strong. This estimate, however, may be skewed by the small number of respondents who became double orphans during adolescence.<sup>19</sup>

In the bottom panel of Table 4, I display odds ratios for current school attendance for males at the time of the survey. Similar to years of schooling, being an orphan before age 10 is negatively associated with currently attending school. In a similar fashion, the strength of this relationship largely depends on the type of orphan. In Burkina Faso and Uganda, paternal orphans before age 10 are less likely to be in school than non-orphans. Being a maternal orphan before age 10, on the other hand, is only statistically significant in Malawi. Furthermore, double orphans before age 10 are less likely to be in school in Ghana, Malawi, and Uganda, but not in Burkina Faso. With the exception of Burkina Faso, becoming a single orphan during adolescence is negatively associated with current school attendance. A different pattern emerges for those becoming double orphans during adolescence. In Burkina Faso and Ghana, odds ratios are greater than two, indicating that double orphans are more likely to be in school; however, they are not statistically significant, probably due to lack of statistical power. In contrast, the odds of current school attendance are less than one in Malawi and Uganda, but are only statistically significant in Uganda. Compared to years of schooling completed, no striking gender differences exist for current school attendance.

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<sup>19</sup> Of 11 female respondents who became double orphans during adolescence, 10 respondents were currently in school at the time of the survey.

In summary, the relationship between timing of orphanhood and educational outcomes differ greatly by country and gender. Despite these differences, results indicate that orphans complete fewer years of schooling and are less likely to attend school at the time of the survey in all four countries. The strength of this relationship differs largely by type of orphan and timing of orphanhood. Becoming an orphan before age 10 is generally associated with lower levels of schooling and current school attendance, which is not always the case among those who became single or double orphans during adolescence.

### *Orphanhood and sexual debut*

The top panel of Table 5 displays odds ratios using discrete-time event history analysis to identify the association between timing of orphanhood and sexual debut among never married females. In Model 1, where I control for all socioeconomic characteristics except education, females who became double orphans before age 10 in Burkina Faso, Ghana, and Malawi have higher odds of sexual intercourse than those who were non-orphans. Becoming a single orphan during adolescence is also positively associated with sexual initiation in Burkina Faso, but not in the other three countries. Statistically significant relationships are not found between becoming a double orphan during adolescence and sexual debut in Model 1, although odds ratios are greater than one in Burkina Faso, Ghana, and Malawi. After controlling for education, however, I find that the strength of the relationship between being a double orphan before age 10 and premarital sex increases in Burkina Faso, suggesting that education fails to explain double orphans' higher risk (Model 2). This is also the case for becoming a single orphan during adolescence. In contrast, I find a different result in Ghana and Malawi, where the odds ratio declines slightly, indicating that education may explain a small portion of double orphans' higher risk. Surprisingly, after controlling for education, a statistically significant relationship appears between those becoming double orphans during adolescence and early sexual debut in Ghana. While the odds ratio for double orphans before age 10 is greater than one, Uganda is the only country where orphans, of any type, are not found to be at significantly higher risk of early sexual debut.

In the bottom panel of Table 5, I present odds ratios using discrete-time event history analysis of sexual debut among never married males. While a clear pattern is observed for females, this is not the case for males (Model 1). Furthermore, any relationship found between

orphanhood and early sexual debut are only marginally significant at the 10 percent level. Males who became double orphans during adolescence in Ghana are more likely to have ever had sex. In Malawi, being a paternal orphan before age 10 is positively associated with early sexual debut. In Model 2, where I control for education, odds ratios for being a paternal orphan before age 10 in Malawi remain virtually unchanged. In contrast, the odds ratio for becoming a double orphan during adolescence in Ghana actually increases in magnitude, indicating that education fails to explain their higher risk. Similar to females in Uganda, male orphans, of any type, are not at increased risk of ever having sex.

Overall, female double orphans appear to be at increased risk of early sexual debut. Education explains at most only a small proportion of this risk. In contrast, studies in Zimbabwe reached a different conclusion: maternal orphans, but not paternal or double orphans, are at greater risk of sexual activity (Birdthistle et al. 2008, Gregson et al. 2005). Palermo and Peterman (2009), using population-level data from ten countries, also analyzed data for two of the four countries in my sample, Malawi and Uganda. Though they concluded that double orphans are at higher risk in Malawi, they found that maternal orphans were more likely to have had sex in Uganda, which I did not find in my analysis. In their analysis, however, they failed to exclude married females, increasing the likelihood that they overestimated these risks. Taking a closer look at their results, I find that double orphans in Malawi and maternal orphans in Uganda are also significantly more likely to ever be married. This is also the case for Gregson et al. (2005), which found that maternal orphans are more likely to have ever had sex and ever be married. Furthermore, both studies failed to exclude respondents who became orphaned after having had premarital sex, which can lead to overestimates of orphans' risk of early sexual debut. Thus, my results may be closer to the actual risks faced by never married adolescents in these countries.

In general, no pattern is observed between timing of orphanhood and sexual debut among males in these four countries. Rather, some types of orphans, in particular, becoming a double orphan during adolescence in Ghana and being a paternal orphan before age 10 in Malawi, are at higher risk of premarital sex. In both situations, educational differences do not appear to explain their greater risk. It is not possible to compare this result with that of other studies. While only one study has examined sexual debut separately for males (Operario et al. 2007), they did not conduct their analysis by type of orphan. Although Operario et al. (2007) reached the conclusion

that male orphans are at greater risk of early sexual debut than non-orphans, they failed to exclude respondents who became orphans after sexual onset. Hence, their results may have overestimated the association between orphanhood and sexual initiation among males.

### *Orphanhood and marriage*

Table 6 displays odds ratios from discrete-time event history analysis of marriage among females. In Model 1, Uganda is the only country that appears to have a strong relationship between timing of orphanhood and marriage. Both paternal and double orphans before age 10 are more likely to be married than non-orphans. While some types of orphans are associated with marriage in other countries, these relationships are weak and a pattern is not evident. For instance, in Burkina Faso and Malawi, maternal orphans before age 10 are found to have greater odds of being married than non-orphans, but this relationship is only significant at the 10% level. In addition, those who became single orphans during adolescence in Malawi are also at increased risk of early marriage. When I control for education, in Model 2, the odds ratios for being a paternal and double orphan before age 10 in Uganda declines from 1.98 to 1.44 and 2.15 to 1.58, respectively, indicating that education explains a portion of their higher risk. In Burkina Faso and Malawi, the odds ratios also decline; however, they are no longer statistically significant. Furthermore, the odds ratio for becoming a double orphan during adolescence in Ghana increases dramatically and becomes significant. This result, however, may be skewed by the small number of respondents in this category.

These results indicate, with the exception of Uganda, that orphans are not necessarily at higher risk of early marriage. Studies in Zimbabwe and Tanzania, however, reached different conclusions. Gregson et al. (2005) found that maternal orphans in Zimbabwe were at greater risk while Beegle and Krutikova (2008) found that paternal orphans in Tanzania were more vulnerable to early marriage. On the contrary, an analysis of ten Sub-Saharan African countries suggests that orphans, regardless of type, are not a high-risk group (Palermo and Peterman 2009). While my general results correspond to conclusions reached in Palermo and Peterman (2009), they conflict with their country-specific results for Malawi and Uganda. In particular, Palermo and Peterman (2009) found that double orphans in Malawi and paternal and maternal orphans in Uganda are more likely to be married than non-orphans. While I found the same result for paternal orphans in Uganda, I did not obtain the same result for maternal orphans. This

discrepancy may be due to two reasons. First, they failed to exclude respondents who became orphaned after marriage, leading to overestimates of the risk faced by orphans. Second, they limited their analysis to adolescent girls aged 15-17 years, while I included a wider age range, 12-19 years.

## **Discussion and Conclusion**

In summary, in all countries except Uganda, never married female double orphans are at increased risk of early sexual debut. Specifically, becoming a double orphan before age 10 in Burkina Faso, Ghana, and Malawi, and becoming a double orphan during adolescence in Ghana are associated with ever having sex. While female double orphans are vulnerable to early sexual debut, this is not the case for male orphans. Overall, male orphans appear to have similar odds of engaging in sexual intercourse as their non-orphan counterparts. Regarding early marriage, female orphans are not at greater risk except for those who became paternal and double orphans before age 10 in Uganda. While education appears to explain very little, if any, of the increased risk of early sexual debut, it does explain at least some portion of the increased risk of early marriage faced by some types of orphans.

Despite concluding that female double orphans are at higher risk of early sexual debut, I find that education explains very little of this increased risk. Rather, other causal mechanisms may be working. Low levels of parental monitoring have been found to be associated with an elevated risk of sexual activity (Biddlecom et al. 2009). Hence, lack of parental monitoring may be another channel putting double orphans at higher risk of early sexual debut. In contrast to double orphans, single orphans may still be under the direct supervision of their surviving parent. Even if this is not the case, caretakers may do a better job of closely supervising them, especially if they had been entrusted into their care by the orphans' surviving parents. Moreover, surviving parents may continue to provide money and food to caretakers in exchange for taking care of their children. Due to lack of self-interest and motivation, caretakers may provide less supervision to double orphans. Poverty is another factor that could explain female double orphans' greater risk of engaging in sexual activity. Female double orphans may lack material goods, such as food and clothing. They may feel that they have no choice but to use transactional sex as a way of acquiring these material goods (Juma et al. 2007, Thurman et al. 2006). Single



orphans, on the other hand, may continue to receive financial and material support from their living parent.

On the contrary, male orphans do not appear to be at greater risk of early sexual initiation. This may be due to several factors. While male orphans may seek sexual activity, they may be less able to find female partners, especially if they lack money. Potential female partners may not view male orphans as desirable sexual partners. It is not uncommon for sexual transactions to involve gift-giving, typically from males to females (Poulin 2007, Moore et al. 2007, Swidler and Watkins 2007). Because orphans are more likely to come from poorer households (Case et al. 2004), male orphans may lack the financial means to provide gifts in exchange for sex. Furthermore, many adolescent girls seek romantic and sexual relationships with aspirations that they will eventually lead to marriage (Clark et al. 2009). In many cultures, where payment of bridewealth is commonly practiced, females may not desire to enter into relationships with males who lack the potential to provide bridewealth. Even in areas where this is not practiced, females may believe that orphans lack the financial means to provide for them once they are married. Lastly, rather than seeking sexual activity as a means of coping with parental death, male orphans may instead adapt behaviors such as smoking and drinking (Van Blerk and Ansell 2006), which are not as common among female adolescents in Sub-Saharan Africa (Magnani et al. 2002).

Despite expectations that orphans are more vulnerable to early marriage than non-orphans, this does not appear to be the case, except in Uganda. In areas where brideprice is traditionally practiced, marriage may actually take place before any exchange of money or livestock occurs (Foster 2000). In some, but not in all cases, it could be years before the bride's family receives payment, if ever at all. Without any guarantee of bridewealth, caretakers may lack a financial incentive to arrange these marriages. Rather, caretakers may prefer to profit from their free labor in the meantime. For instance, female orphans can conduct household chores, such as cleaning and cooking, take care of younger children, sell goods in the market, and perform agricultural labor (Ansell and van Blerk 2004). Alternatively, they can be hired out as domestic servants in other households, providing a source of income to their caretakers. Furthermore, families taking care of orphans may receive financial, food, and material benefits from the government or local NGOs (Chirwa 2002, Oleke et al. 2007, Abebe and Aase 2007),

which may act as an incentive to delay orphans' early marriage. However, it is likely that most orphans do not receive such support.

Uganda's female orphans do not exhibit the same pattern as that of orphans in the other three countries. While a positive association exists between double orphans and early sexual initiation in Burkina Faso, Ghana, and Malawi, a far weaker and statistically insignificant relationship is found in Uganda. Double orphans before age 10 and those who become double orphans during adolescence have 1.32 and 0.85 odds of early sexual debut, respectively (Table 5, upper panel, Model 2). The different pattern found for Ugandan females may be due to several factors. First, Uganda's AIDS epidemic began earlier and became more severe than in the other three countries. In the early 1990s, Uganda had the highest prevalence of HIV in the world, reaching 12-16 percent of the adult population (World Bank 2010). In response, Uganda's president, Yoweri Museveni, mobilized the country to increase AIDS awareness, spread prevention messages, and reduce stigma among people living with HIV (Putzel 2004, Okware et al. 2001). In addition, many non-governmental organizations provided assistance to the rapidly increasing number of orphans, including building orphanages, placing orphans with families, paying school fees, and providing clothing and other necessities (Ntozi and Mukiza-Gapere 1995). Solidarity in the fight against AIDS may have strengthened Uganda's extended family system. Rather than becoming overburdened by the number of orphans in need of care, extended families may have developed new strategies for taking care of orphans without comprising quality of care (Chirwa 2002), ensuring that orphans' emotional and financial needs are met. Consequently, orphans may not have felt the need to seek sexual activity to satisfy these needs. Additionally, HIV-infected parents, knowing that their death was imminent, may have pre-arranged their children's care with relatives with whom they have close relationships (Abebe and Aase 2007). The strength of the bond between deceased parents and orphans' caretakers has been shown to indicate the quality of care that orphans receive (Abebe and Aase 2007). Lastly, in Uganda, arranged marriages are not uncommon, especially among younger adolescents. It is possible that double orphans are married before they get a chance to engage in premarital sex.

Of the four countries, Uganda is the only country where a positive association is observed between orphanhood and marriage. This relationship may be due to Uganda's traditional practice of bridewealth. While the exchange of bridewealth is practiced to some extent in all four countries, this tradition appears to be more widespread and ingrained in Uganda's culture

(Mukiza-Gapere and Ntozi 1995).<sup>20</sup> Moreover, the magnitude of the AIDS epidemic in Uganda may have left caretakers feeling financially burdened by the costs associated with orphan care. They may view marriage not only as a way of profiting from bridewealth, but also as a means of reducing future costs associated with the care of orphans.

Surprisingly, in this analysis, where orphanhood is associated with negative outcomes, such as lower levels of schooling, early sexual debut, and marriage, this relationship is almost always observed, with a few exceptions, among those who became orphans before age 10. Although losing a parent during adolescence is certainly difficult, adolescents may be more likely than young children to remain in the same household or at least in the same village after a parent's death. This difference may be due to the fact that adolescents are more self-sufficient than young children, needing less adult supervision and care. Also, families may not want to interrupt their schooling, especially if they are already attending secondary school.<sup>21</sup> By remaining in a familiar environment, grieving adolescents would maintain the support of their family and friends, which has been shown to decrease psychosocial distress (Gray 1987). In contrast, younger children who lose a parent may be forced to migrate to a different village, giving them no choice but to grieve the loss of a parent in an unfamiliar environment, often being separated from their siblings (Van Blerk and Ansell 2006). In many cases, due to changes in household's economic circumstances, these moves are not permanent, causing a substantial proportion of orphans to undergo several moves throughout childhood (Van Blerk and Ansell 2006, Ansell and van Blerk 2004). Those living with a grandparent may be increasingly vulnerable to multiple migrations because the elderly have a higher probability of dying, due to conditions associated with old age. Consequently, children in these living situations may have to relocate to new households with other relatives, such as aunts or uncles, forcing them once again to acclimate to new living situations and unfamiliar environments.

This analysis examined orphans in both high and low HIV prevalence countries. In both sets of countries, female double orphans were more likely than non-orphans to engage in

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<sup>20</sup> In Burkina Faso, payment of bridewealth has been illegal since 1990. While it is still practiced, the amount of payment is minimal (Platteau et al. 2005). It is also becoming increasingly common for payment to be made after the wedding when the groom or his family has raised enough money. In Ghana and Malawi, the practice of bridewealth is less common, and differs greatly by ethnic group (Anarfi 1993, Bracher et al. 2003). In Ghana, Akan people, making up 60% of Ghana's population, do not practice bridewealth. Other ethnic groups, primarily in the North, do exchange bridewealth. In Malawi, ethnic groups in the Northern region practice bridewealth, while ethnic groups in the Central and Southern region exchange token gifts.

<sup>21</sup> Due to limited funds and teachers, in many African countries, secondary schools cannot always guarantee students placement in public secondary schools, even if they have passed the necessary qualifying exams to enroll (World Bank 2008). As a result, many students must pay higher fees to enroll in private schools.

premarital sex. Only in Uganda, where the AIDS epidemic was most severe, were female orphans, specifically paternal and double orphans, more likely than non-orphans to undergo early marriage. Thus, these results indicate that double orphans, especially those who became orphaned before age 10, may be a vulnerable, high-risk group, regardless of the magnitude of a country's AIDS epidemic. The percentage of double orphans, however, is small in low prevalence HIV countries, less than 2 percent, and will, in most likelihood, decline as adult mortality improves, unless HIV prevalence increases unexpectedly. While they also make up a relatively small proportion of adolescents in high prevalence HIV countries, less than 8 percent, the prevalence of double orphans will most likely increase (Monasch and Boerma 2004), mostly due to the fact that only 37 percent of all HIV-infected adults in need of ARVS are actually receiving treatment (UNAIDS 2010).

In contrast to previous studies, this analysis demonstrates that, at least in the four countries studied, orphans are not necessarily a high-risk group. While female double orphans are found to be at increased risk of early sexual debut, they make up less than 10 and 25 percent of orphans in low and high prevalence HIV countries, respectively. More importantly, they make up only a small fraction of all adolescents, making it difficult to specifically target them through policy and programming. Rather, further research, possibly looking at other dimensions of orphan care, is needed to pinpoint the causal mechanism working to increase double orphans' vulnerability to early sexual activity.

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Table 1. Percentage distribution of respondents aged 12-19 years by timing of orphanhood for both sexes combined, according to country, National Survey of Adolescents, 2004

Variable	Burkina Faso	Ghana	Malawi	Uganda
<b>Orphan status at the time of the survey</b>				
Non-orphan	83.1	86.8	71.2	70.5
Paternal orphan	10.8	9.8	15.2	16.3
Maternal orphan	4.2	2.6	7.1	5.7
Double orphan	1.9	0.8	6.4	7.5
<b>Orphan status before age 10</b>				
Non-orphan	90.6	93.5	84.7	80.1
Paternal orphan	5.9	4.6	8.5	12.3
Maternal orphan	2.8	1.5	4.6	4.2
Double orphan	0.8	0.3	2.2	3.5
<b>Changes in orphan status during adolescence<sup>a</sup></b>				
Experienced any change in orphan status	8.1	7.0	16.0	12.2
Progressed from non-orphan to single orphan <sup>b</sup>	7.0	6.6	11.8	8.2
Progressed from non-orphan to double orphan <sup>c</sup>	0.4	0.2	1.7	1.3
Progressed from single orphan to double orphan <sup>d</sup>	7.4	4.6	19.7	16.2
<b>Adult HIV Prevalence in 2001<sup>e</sup> (%)</b>	2.1	2.3	13.8	7.0
<b>Total</b>	<b>5955</b>	<b>4430</b>	<b>4031</b>	<b>5112</b>

Note: Samples are weighted according to survey weights.

<sup>a</sup> Adolescence is defined as ages 10-19

<sup>b</sup> Percentage of non-orphans before age 10 who became single orphans during adolescence

<sup>c</sup> Percentage of non-orphans before age 10 who became double orphans during adolescence

<sup>d</sup> Percentage of single orphans before age 10 who became double orphans during adolescence

<sup>e</sup> Source: UNAIDS 2010

Table 2. Age-standardized percent distribution of respondents aged 12-19 who ever had sex and were ever married, according to country and orphan status at the time of the survey, National Survey of Adolescents,

Outcome variable	Non-orphan	Paternal orphan	Maternal orphan	Double orphan
<i>Ever had sex<sup>a</sup> (females)</i>				
Burkina Faso	13.7	14.5	8.3*	26.2*
Ghana	12.8	15.7	9.5	20.1*
Malawi	11.5	14.4	10.7	25.9**
Uganda	18.8	20.0	19.0	18.5
<i>Ever had sex<sup>a</sup> (males)</i>				
Burkina Faso	19.9	22.0	22.8	23.3
Ghana	8.8	6.8	10.9	7.9
Malawi	38.5	42.2	47.6*	43.9
Uganda	30.6	32.1	29.0	32.5
<i>Ever married (females)</i>				
Burkina Faso	13.4	11.9	16.2	19.4
Ghana	4.8	6.6	4.5	1.7
Malawi	7.7	9.9	15.6*	11.4
Uganda	9.9	11.6	13.1+	14.1+

+ significant at  $p \leq 0.10$ ; \*  $p \leq 0.05$ ; \*\*  $p \leq 0.01$ .

<sup>a</sup> Among never married respondents

**Note:** Samples are weighted according to survey weights. Age-standardization is based on age distribution of non-orphans. Statistical significance is relative to non-orphans.

Table 3. Coefficients (ordinary least squares regression) for number of years of schooling completed, at the time of the survey, according to country, National Survey of Adolescents 2004

	Females (12-19 years)			
Timing of orphanhood	Burkina Faso	Ghana	Malawi	Uganda
Orphan status before age 10				
Non-orphan (r)	1.00	1.00	1.00	1.00
Paternal orphan	-0.47+	-0.44	-0.27	-0.09
Maternal orphan	-0.40+	-1.02*	-0.27	-0.50*
Double orphan	-0.98*	-2.53	0.07	-0.15
Became single orphan during adolescence	0.26	0.09	-0.44*	-0.31+
Became double orphan during adolescence	0.78	0.18	0.69*	0.36
Number of observations	2924	2154	1961	2534
	Males (12-19 years)			
Timing of orphanhood	Burkina Faso	Ghana	Malawi	Uganda
Orphan status before age 10				
Non-orphan (r)	1.00	1.00	1.00	1.00
Paternal orphan	-0.70**	-0.52*	-0.19	-0.05
Maternal orphan	0.38	-0.54	-0.79*	-0.45*
Double orphan	-0.86+	-1.41+	-0.84***	-0.32
Became single orphan during adolescence	0.07	-0.13	-0.02	0.1
Became double orphan during adolescence	0.04	-0.22	0.3	-0.08
Number of observations	2987	2195	2040	2468

+ significant at  $p \leq 0.10$ ; \* $p \leq 0.05$ ; \*\* $p \leq 0.01$ ; \*\*\* $p \leq 0.001$ .

Note: All models control for age, age squared, childhood urban residence, religion, and ethnicity.

Table 4. Odds ratios (logistic regression) for currently attending school, at the time of the survey, according to country, National Survey of Adolescents 2004

Timing of orphanhood	Females (12-19 years)			
	Burkina Faso	Ghana	Malawi	Uganda
Orphan status before age 10				
Non-orphan (r)	1.00	1.00	1.00	1.00
Paternal orphan	0.72	0.55*	0.50***	0.51***
Maternal orphan	0.47+	0.20***	0.59	0.52*
Double orphan	0.53	0.57	0.57	0.46**
Became single orphan during adolescence	1.01	0.67	0.50***	0.65*
Became double orphan during adolescence	0.97	31.63***	0.77	0.88
Number of observations	2924	2154	1961	2534
Timing of orphanhood	Males (12-19 years)			
	Burkina Faso	Ghana	Malawi	Uganda
Orphan status before age 10				
Non-orphan (r)	1.00	1.00	1.00	1.00
Paternal orphan	0.55*	0.98	0.64	0.58***
Maternal orphan	1.05	0.81	0.39***	0.67
Double orphan	0.97	0.21*	0.26***	0.50*
Became single orphan during adolescence	1.05	0.67+	0.63*	0.57**
Became double orphan during adolescence	2.19	2.16	0.72	0.61*
Number of observations	2987	2193	2039	2468

+ significant at  $p \leq 0.10$ ; \* $p \leq 0.05$ ; \*\* $p \leq 0.01$ ; \*\*\* $p \leq 0.001$ .

Note: All models control for age, age squared, childhood urban residence, religion, and ethnicity.

Table 5. Odds ratios from discrete-time event history analysis identifying associations between timing of orphanhood and sexual debut among never married adolescents, according to country, National Survey of Adolescents, 2004

Variables	Females (12-19 years)							
	Model 1				Model 2			
	Burkina Faso	Ghana	Malawi	Uganda	Burkina Faso	Ghana	Malawi	Uganda
Orphan status before age 10								
Non-orphan (r)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Paternal orphan	1.05	1.22	0.80	1.00	1.08	1.19	0.69	0.90
Maternal orphan	0.48	1.37	1.32	0.92	0.45+	1.15	1.25	0.93
Double orphan	2.85+	2.65**	2.64**	1.33	3.12*	2.44***	2.09+	1.32
Became single orphan during adolescence	1.58+	1.17	0.93	1.03	1.64+	1.19	0.85	1.03
Became double orphan during adolescence	1.70	2.78	1.51	0.90	1.81	4.65*	1.35	0.85
Number of person-year observations	13704	11738	9458	11613	13704	11738	9458	11613
Pseudo R2	0.2234	0.1912	0.1899	0.1243	0.2308	0.2124	0.2067	0.1420
LL	-1349.51	-1007.08	-848.85	-1532.03	-1336.66	-980.75	-831.26	-1501.00
Variables	Males (12-19 years)							
	Model 1				Model 2			
	Burkina Faso	Ghana	Malawi	Uganda	Burkina Faso	Ghana	Malawi	Uganda
Orphan status before age 10								
Non-orphan (r)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Paternal orphan	1.26	0.78	1.35+	1.23	1.27	0.83	1.37+	1.21
Maternal orphan	0.93	1.47	1.39	0.88	0.94	1.51	1.39	0.86
Double orphan	0.42	a	0.76	1.38	0.44	a	0.80	1.35
Became single orphan during adolescence	1.26	1.09	0.94	1.23	1.26	1.06	0.93	1.22
Became double orphan during adolescence	1.25	4.19+	0.92	1.04	1.28	4.96+	0.88	1.00
Number of person-year observations	16710	12717	10133	12481	16710	12717	10133	12481
Pseudo R2	0.1169	0.1060	0.0961	0.0804	0.1200	0.1209	0.0974	0.0819
LL	-2253.99	-844.68	-2414.41	-2481.45	-2246.09	-830.62	-2410.87	-2477.31

+significant at  $p \leq 0.10$ ; \* $p \leq 0.05$ ; \*\* $p \leq 0.01$ ; \*\*\* $p \leq 0.001$ .

<sup>a</sup>The category "Became double orphan during adolescence" predicts failure perfectly and is dropped from the model. None of the double orphans before age 10 experienced sexual debut.

Note: Model 1 includes controls for age, age squared, urban residence, wealth, religion, and ethnicity. Model 2 includes controls from Model 1 + ever attended school and currently attending school.

Table 6. Odds ratios from discrete-time event history analysis identifying associations between timing of orphanhood and marriage among female adolescents aged 12-19 years, according to country, National Survey of Adolescents, 2004

Variable	Model 1				Model 2			
	Burkina Faso	Ghana	Malawi	Uganda	Burkina Faso	Ghana	Malawi	Uganda
Orphan status before age 10								
Non-orphan (r)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Paternal orphan	1.31	0.54	1.22	1.98***	1.15	0.48	0.84	1.44*
Maternal orphan	1.73+	0.35	2.10+	1.24	1.54	0.20*	1.74	1.10
Double orphan	2.48	a	0.52	2.15**	2.17	a	0.42	1.58+
Became single orphan during adolescence	1.15	1.70+	1.56*	0.97	1.33	1.59	1.24	0.94
Became double orphan during adolescence	1.33	1.25	0.98	0.88	1.55	12.52*	0.91	0.90
Number of person-year observations	11240	8747	7327	9344	11240	8747	7327	9344
Pseudo R2	0.2138	0.1398	0.1436	0.1963	0.2427	0.2349	0.2683	0.3147
LL	-1467.26	-513.83	-730.69	-1028.64	-1413.23	-457.04	-624.32	-877.14

+significant at  $p \leq 0.10$ ; \* $p \leq 0.05$ ; \*\* $p \leq 0.01$ ; \*\*\* $p \leq 0.001$ .

<sup>a</sup> The category "Orphan status before age 10 - Don't know" predicts failure perfectly for respondents in Ghana and is dropped from the model. None of the respondents in this category were ever married.

Note: Model 1 includes controls for age, age squared, urban residence, wealth, religion, and ethnicity. Model 2 includes controls from Model 1 + ever attended school and currently attending school.

## Appendix

Table A1. Descriptive statistics of all interviewed respondents aged 12-19 years, by selected background characteristics at the time of the survey, according to gender and country, National Survey of Adolescents, 2004

Variable	Burkina Faso		Ghana		Malawi		Uganda	
	Females	Males	Females	Males	Females	Males	Females	Males
Highest education completed (%)								
None	63.0	50.8	8.8	6.2	3.2	2.2	4.3	2.2
Incomplete Primary	19.9	27.7	34.6	39.5	80.0	81.7	82.4	83.6
Complete Primary	8.5	10.6	14.9	15.0	5.3	6.2	4.4	4.7
Secondary	8.7	10.8	41.7	39.3	11.5	10.0	8.9	9.5
Average number of years of schooling completed	1.9	2.5	5.7	5.6	4.9	4.8	5.0	5.1
Currently in school (%)	21.6	30.3	70.4	76.7	71.2	78.3	70.9	79.7
Urban Residence (%)	26.1	21.2	48.8	44.6	22.7	23.2	11.8	9.7
Religion (%)								
Catholic	22.3	18.9	17.7	16.7	26.4	25.1	42.5	43.3
Protestant	4.5	3.7	61.5	56.2	57.0	58.1	45.1	41.4
Muslim	61.1	63.6	15.8	19.8	12.1	12.4	11.7	13.3
Other	12.0	13.8	5.0	7.3	4.5	4.5	0.7	2.0
Average age at first sexual intercourse <sup>a</sup>	15.4	14.8	15.4	15.0	15.3	13.9	14.6	14.0
Average age at first marriage <sup>b</sup>	15.9	-	16.1	-	15.7	-	16.0	-
Total	2939	3016	2201	2229	1979	2052	2602	2510

Note: Samples are weighted according to survey weights.

<sup>a</sup> Among never married adolescents who have experienced sexual debut.

<sup>b</sup> Among ever married female adolescents.