Parental Absence and Child Mortality in Tanzania

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Abstract

This paper examines the influence of the family on child mortality through four components: the cause of parental absence, the resulting family structure in which the child lives, the instability the child faces, and the complexity of the family. The existing research tends to focus on the negative consequences of particular family structures resulting from specific causes of parental absence. This paper improves upon the existing scholarship by broadening our view of the family and parental absence through a consideration of three causes of parental absence – death, labor migration, and marriage related migration – exploring the potential positive along with negative effects of parental absence. Using demographic surveillance data from Tanzania, this paper estimates the influence of these four components on child mortality. Preliminary findings demonstrate important differences in the effect of parental absence depending on cause.

Introduction

Child fosterage in rural Tanzania is widespread; 38% of children do not reside in two-parent households (National Bureau of Statistics and MACRO 2011). Yet we know surprisingly little about this consequential social arrangement, its history, its current status, and its impact on children's welfare. Meanwhile, parental absence due to migration, divorce, remarriage and death is increasingly common. Existing studies, while illuminating, focus almost exclusively on the phenomenon of AIDS orphanhood. Differentiating among types of parental absence, this paper examines how children's mortality is influenced by various causes of parental absence and resulting family structures.

Background

While research in developed countries, primarily the United States, has a long history of engagement with the first two components, the latter two are part of an emerging body of work. In contrast, all four components are relatively new to the developing world research agenda. Therefore, I begin the paper with an overview of the literature on each of these components first from the developed world, and then the developing world.

The American Family

In the face of declining rates of marriage, increasing rates of divorce, cohabitation and single parenthood, scholarship on the American family has endeavored to document and understand the consequences of these social changes and reasons for parental absence on children (Cherlin et al. 1991; Cherlin et al. 1998). There is substantial evidence from the United States that children of divorced parents fare worse than children of a deceased parent (Amato and Keith 1991; Amato 2001). Children of single mothers are also particularly disadvantaged (McLanahan and Booth 1989). Children of migrant parents who are left behind in sending countries often fare better than other children in the community due partly to access to remittances (Parrenas 2005; Dreby 2006).

Aside from the cause of parental absence, living arrangements influence children's outcomes. With some exceptions, the literature demonstrates that children in married, two biological parent families are advantaged over children in alternative family configurations

(Amato and Keith 1991; McLanahan and Booth 1989; McLanahan and Sandefur 1994; Amato 2001; Carlson and Corcoran 2001; Hofferth 2006). While there is a large literature on the mental health of children in various family structures, there has been little attention paid to physical health, and even less to child mortality (Dawson 1991; Bramlett and Blumberg 2007).

Beyond cause of absence and family structure, recent scholarship emphasizes family instability and complexity as important in determining children' outcomes, emphasizing the stress caused by changes in family structure and uncertainty around parenting roles in blended families (Wu and Martinson 1993; Ram and Hou 2003). Indeed, research supports the theory that family instability is deleterious, but that the effect depends on the timing of the transitions, the type of transition, and the type of outcome (Fomby and Cherlin 2007; Osborne et al. 2012). Regarding education, mother's relationship instability is negatively associated with children's school readiness (Cooper et al. 2011). Again, there is little research on the influence of family instability on children's physical health.

The literature on family complexity is still developing. Ginther and Pollak find that children residing in blended families have lower educational attainment than children in traditional nuclear families (2004). Gennetian finds that children in blended families have lower cognitive test scores than children in simple two-parent families (2005). Similarly, Halpern-Meekin and Tach find that shared biological children in blended families have lower academic performance than shared biological children in traditional two-parent families (2008). These studies suggest that there may be something distinct about blended families, beyond the commonly cited mechanisms of biology, family environment, family instability and selection. Again, the literature on family complexity has yet to examine children's physical health outcomes.

The African Family

While there has been robust activity around how these factors influence child health in the United States and other Western countries, there has been far less research in developing country settings. The existing literature on cause of parental absence and children's health in sub-Saharan Africa, where prime-age adult mortality is vastly higher than in the United States, focuses primarily on the experiences of orphans. Parental death has been associated with higher morbidity for orphaned children, although the results are inconclusive (Gregson et al. 1999; Crampin et al. 2003; Nakiyingi et al. 2003). There are several studies from biological anthropology that document an increased mortality risk for children with deceased mothers, with some attributing the increase to the loss of the breastfeeding mother (Hill and Hurtado 1996). A recent paper by Clark et al. in South Africa found that children experience an elevated mortality risk 2 months before and after their mother's death (2013). While there is a literature on parental absence in the region, it focuses primarily on mothers absent through death. There is considerably less research on the health of children with parents absent for other reasons in developing country contexts. There is a large literature on parenthood and migration, particularly from Asia and Latin America, emphasizing the positive role of remittances and changing conceptions of parenthood, but not addressing directly the effects on children's health (Levitt, 1998; Menjivar et al. 1998; Menjívar 2002; Hildebrandt et al. 2005).

There is an important related literature from evolutionary anthropology on cooperative breeding that examines the influence of family structure on children's mortality. Surviving maternal grandmother and sister tend to have a positive effect of survival, whereas living male relatives have no effect (Sear et al. 2002; Gibson and Mace 2005). There is a long history of research on the "grandmother hypothesis", which suggests that women terminate reproduction

well before the end of their lives because the risk of maternal mortality increases greatly by age; therefore, the hypothesis suggests, it benefits women to divert their investment towards their children (Hamilton 1966; Williams 1957; Wilson 1986). There is also evidence that older sisters are protective because they assist in childcare (Weisner et al. 1977). There is also some recent evidence that children's health is positively associated with residence in laterally extended households (with co-resident prime-aged adults) in comparison to nuclear and three-generational families (Gage, Sommerfelt and Piani 1997).

The research on how African family structures influence child mortality also includes an examination of polygyny. Here, the evidence is inconclusive. Some find that child mortality is higher, but only at older ages or that the relationship is due to selection of higher risk women into polygynous marriages (Omariba and Boyle 2007). Research on single parenthood is part of a recently emerging literature in the region. In Nigeria, Mberu finds significantly worse living conditions in both single male and single female headed household (2007). In a cross-national study, Clark and Hamplova find that children of single mothers are more likely to die, with children of divorced mothers experiencing the worst mortality outcomes (2013).

The recent activity around family structures and child mortality is encouraging. Yet there is still virtually no research on family instability and complexity in sub-Saharan Africa. The literature on orphanhood considers non-orphaned children living in households with orphans, and finds that these children are also worse off than children living in households with no orphans (Case and Ardington 2008).

This body of literature has three major limitations. First, the studies focus on parental absence as a result of parental death, largely ignoring children who experience parental separation or migration. Second, the literatures are disjointed and the literature on orphanhood is not in dialogue with the family structure literature regarding fostering. Third, the literature does not consider the importance of family instability and complexity. Using longitudinal data on households from a demographic surveillance site in Tanzania, this paper aims to address these gaps in the literature.

This paper aims to answer five related research questions derived from the theoretical and empirical lessons of US-centered scholarship. First, how is parental absence related to child mortality, and does this relationship vary depending on the cause of absence? Second, given a particular experience of parental absence, which resulting family structures are associated with the best outcomes for children, and which with the worst? Third, how does family instability, or the number of changes between family structures, affect child survival and wellbeing? The stress caused by frequent changes in family structure and caregivers may result in inconsistent parenting and be associated with higher child mortality. Fourth, how does the complexity of family structures affect child mortality? Fifth and finally, to what extent are these relationships mediated by economic resources and the availability of extended kin support?

Data and Methods

Research Setting

Established in 1998 by the Ifakara Health Institute (IHI), the Rufiji HDSS is located in the northeast of Rufiji District, approximately 180 km from Dar es Salaam, Tanzania's largest city. Rufiji is mainly rural, with subsistence farming the primary occupation. The area's population is largely Muslim and comprised of three dominant ethnic groups – the Ndengereko, Makonde and Sukuma. The population is characterized by high fertility and high mortality. While both demographic processes are declining, the population is young, with 46% of the population under

age 15, and life expectancy remains modest, approximately 65 years in 2011. Malaria, AIDS, and tuberculosis are among the leading causes of death. For under-five mortality, malaria accounts for over half of all deaths. Neonatal conditions, such as birth trauma and asphyxia, low birth weight and neonatal infections account for another 22% of child deaths.

The Rufiji HDSS follows a dynamic cohort of approximately 85,000 residents in 33 villages in a catchment area of 1,813 square kilometers. Individuals are enrolled in the cohort through initial census enumeration, birth or in-migration, and exit through death or out-migration. Every four months, field teams visit each registered household to check on the status of every registered household member in what is referred to as a round of data collection. At each round surveyors record births, deaths, in and out migrations, and marital status changes that have occurred since the previous visit. Migrations are defined as non-residence in the registered household for two consecutive rounds. At the round following the first report of absence, if the individual is still absent an out-migration form is completed, indicating the date, reason for, and destination of out-migration. In the event of a death, a verbal autopsy is conducted with another member of the household or neighbor to gather information on symptoms and circumstances surrounding the death. The verbal autopsies are then coded by two physicians to assign cause of death. Additional socioeconomic variables, including education and income, are collected annually. More detailed information is documented elsewhere (Mwageni et al.).

Analytic Sample

Using individual level data on dates of birth, entry and exit for children and parents, I am able to construct exposure episodes and covariates for parental co-residence and cause of absence. The sample of children under study must meet four eligibility requirements: 1) born in the DSS catchment area between 1998 and 2012, 2) be a single birth, 3) be aged 0 to 10, and 4) have an identifiable mother or father[1]. This results in an analytic sample of 30,474 children.

Data on fathers are incomplete, with father identification numbers likely to be missing because of paternal non-residence. If the father is not a resident of the catchment area, he does not have an identification number in the data and cannot be linked to the child. Approximately one quarter of children born in the DSS have an unknown father identification number. We may assume, then, that the father is non-resident at birth, but we cannot identify the reason for absence or subsequent return migrations following birth. Such difficulties with data regarding fathers in sub-Saharan Africa have been discussed elsewhere, and should not preclude our analysis (Hosegood and Madhavan 2010). While children must have an identifiable father to be included in the analyses, where appropriate I also present estimates including children with unknown father identification numbers under the assumption that they are absent from the child at birth.

Methodology

For all analyses, child exposure begins at birth and ends with an event or right-censoring. An event is defined as death between the ages of 0 and 10. A child is considered right-censored in three circumstances: when the child no longer meets the eligibility criteria due to, 1) the child turning 10, or 2) the child moving out of the site; and 3) at the end of observation, which is defined as December 31, 2012. In the situation where a child is right censored due to moving out of the site, multiple exposure episodes are permitted if he/she reenters, but the intervening time out of observation is excluded from the exposure contribution.

For the predictor variables of interest, parental absence is determined from dates of death and in and out migration of parents. Figure 1 and Table 1 demonstrate the time-varying nature of

[1] Parent must be in the DSS database and have an id number in order to be identifiable and linked to the child.

this covariate through a depiction of the overlapping exposure timelines of child, mother and father and the corresponding data structure. Cause of absence can be determined from the mortality and migration data; the three causes considered are death, labor migration, and marriage related migration, including union formation and dissolution. For resulting family structure, following parental absence a child is followed to a new home as long as it is within the catchment area, and his/her relationship to the head of the household and the composition of the household is recorded. I classify children's living arrangements into family structure using data from household residence, as well as parental death and migration. To measure family instability I compile a count of the number transitions of parental co-residence (also in Table 1). Finally, for family complexity I use the household roster to determine the child's relatedness to other children residing in the household, and create an indicator for co-residence with a non-full sibling child.

To consider the mediating influence of material and social resources, I include several variables in a mediation analysis. First, I include parental education, occupation and household assets as a measure of socio-economic status. Education is categorized into no education, only primary education, and some secondary education or more. Occupation is dichotomized between farming and all other occupations. Finally, household assets are measured using an index of item ownership. To quantify social resources, I include a count measure of the number of related adult kin residing in the household.

The Cox regression models for child mortality include other covariates that have been demonstrated to significantly influence survival. I include a covariate for child sex, birth order, length of preceding and succeeding birth interval, and mother's age at birth. Importantly, there is correlation in the mortality risks for children of the same mother. There has been extensive work on how to accommodate this correlation; I include a random effect for the mother (Guo and Rodriguez 1992). Finally, as there is geographic clustering in child mortality, I include a random effect for the village of birth.

With the availability of precise dates of birth, death and other important covariate events, I use a continuous time scale in my analysis. I first explore the influence of predictors through non-parametric Kaplan-Meier survival analyses (Kaplan and Meier 1958). I then move to a semi-parametric estimation strategy using Cox proportional hazards models to estimate the relationship between child mortality and parental absence, cause, family structure, instability and complexity.

Preliminary Results

The analysis for this project is not yet complete. I present here preliminary results regarding the influence of maternal and paternal absence and how this influence varies by cause of absence. I also present preliminary results on instability. Figure 2 presents child survival curves by sex; the advantage of females over males characteristic of infant mortality is apparent.

Figures 3 and 4 begin to investigate parental absence using descriptive Kaplan-Meier survival analysis. Apparent from Figure 3 is the advantage of children with co-resident mothers over those with absent mothers. Contrary to other research that finds no influence of the father, Figure 4 demonstrates a difference between absence and presence similar to that found for maternal co-residence, although of a smaller magnitude and a shorter duration. The effect of paternal absence seems to dissipate in mid-childhood, while the effect of maternal absence remains throughout childhood.

Importantly, the measure of parental absence collapses absence due to multiple causes, which might be operating in different directions. Figure 5 decomposes all cause maternal absence into different reasons – death, labor related migration and marriage related migration. Figure 5 suggests that maternal absence due to death and marriage related migration is much more detrimental than no absence. On the contrary, absence through labor related migration is associated with better survival than for children with no maternal absence. Coding for paternal absence by cause has not yet been completed but will be explored in the next iteration of the paper.

Finally, I explore the influence of instability on child mortality. Contrary to what the theory would predict, instability seems to be associated with lower mortality among children. This may be due to the possibility that multiple changes in parental co-residence are more common among parents who migrate for labor, and that this type of absence is actually beneficial for children. This is a possibility that will be explored further.

Figure 1. Exposure Timeline

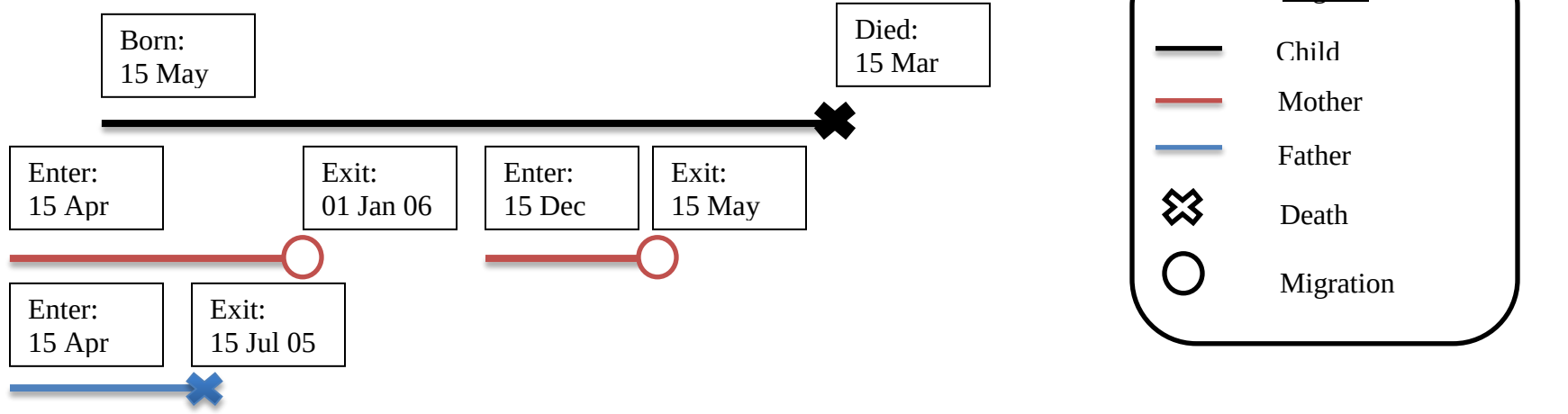

Figure 2. Child Survival by Sex

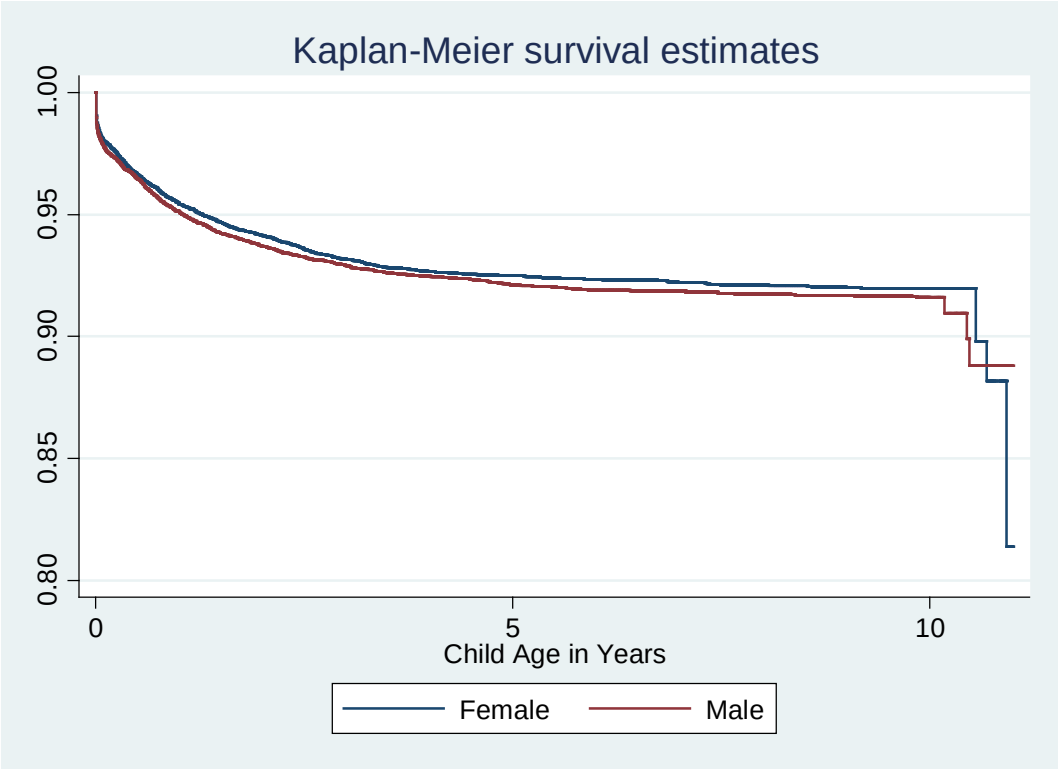

Figure 3. Child Survival by Maternal Co-residence

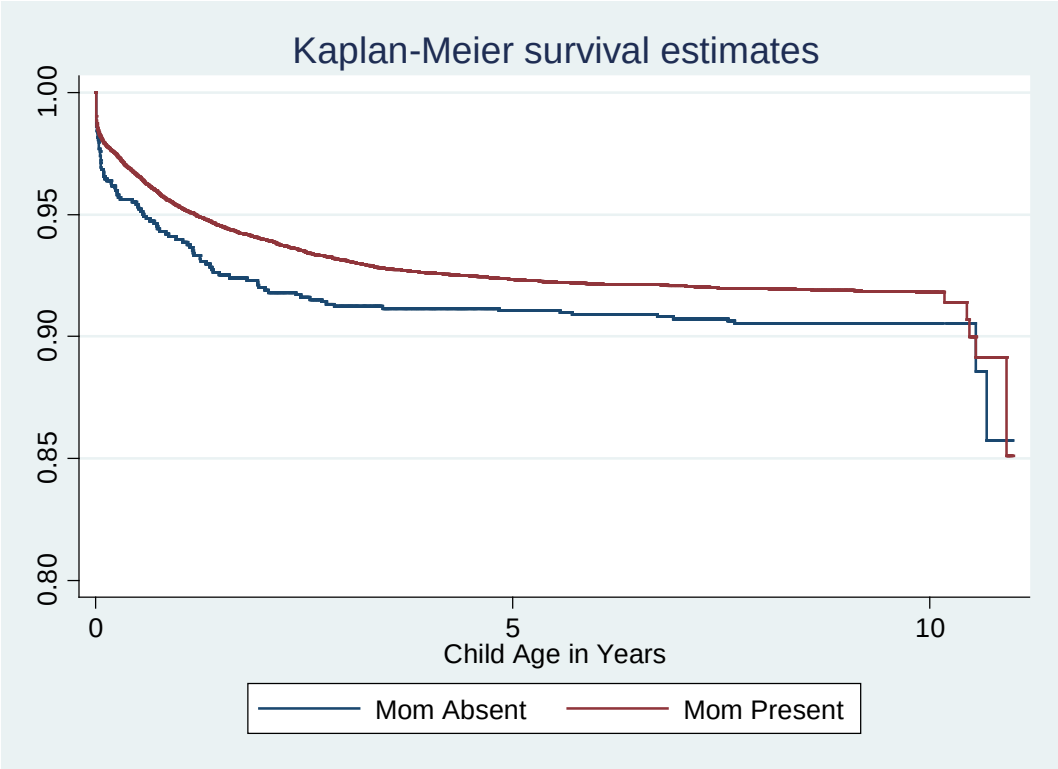

Figure 4. Child Survival by Paternal Co-residence

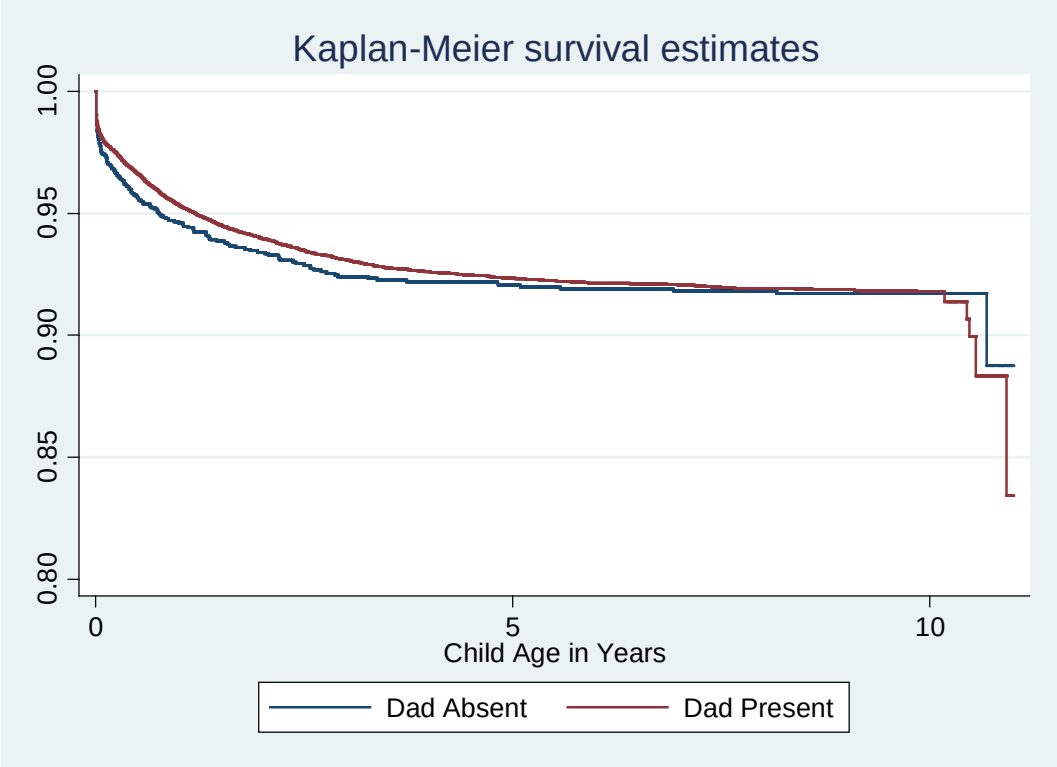

Figure 5. Child Survival and Maternal Absence by Cause

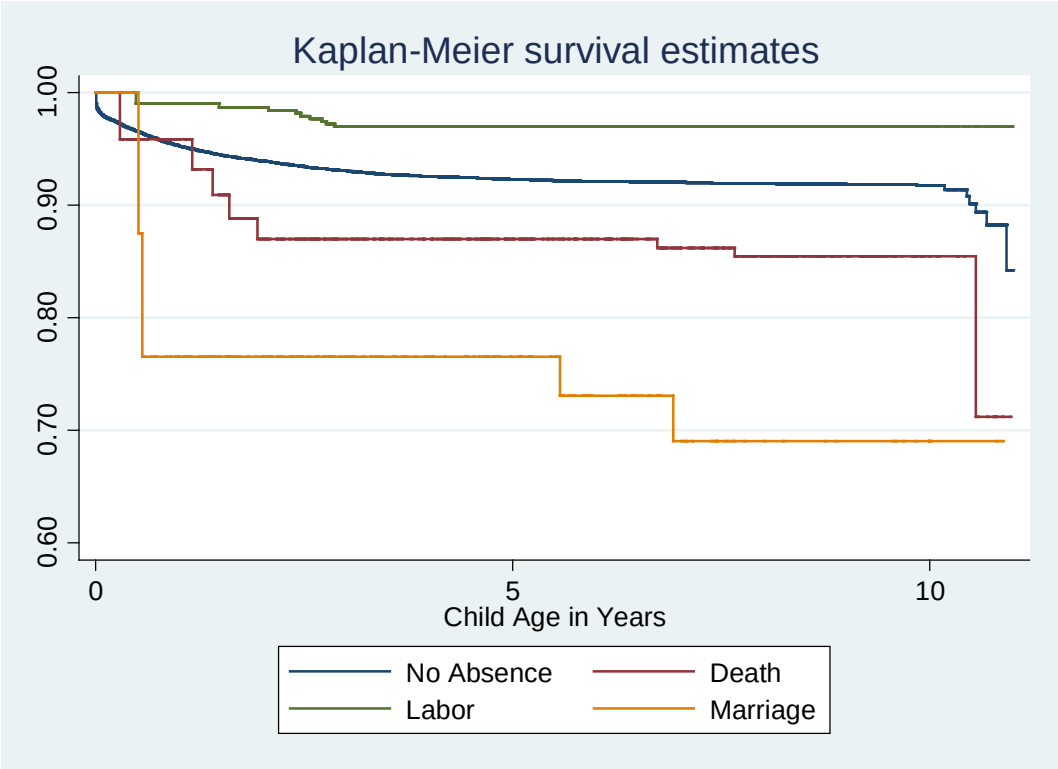

Figure 6. Child Survival and Family Instability

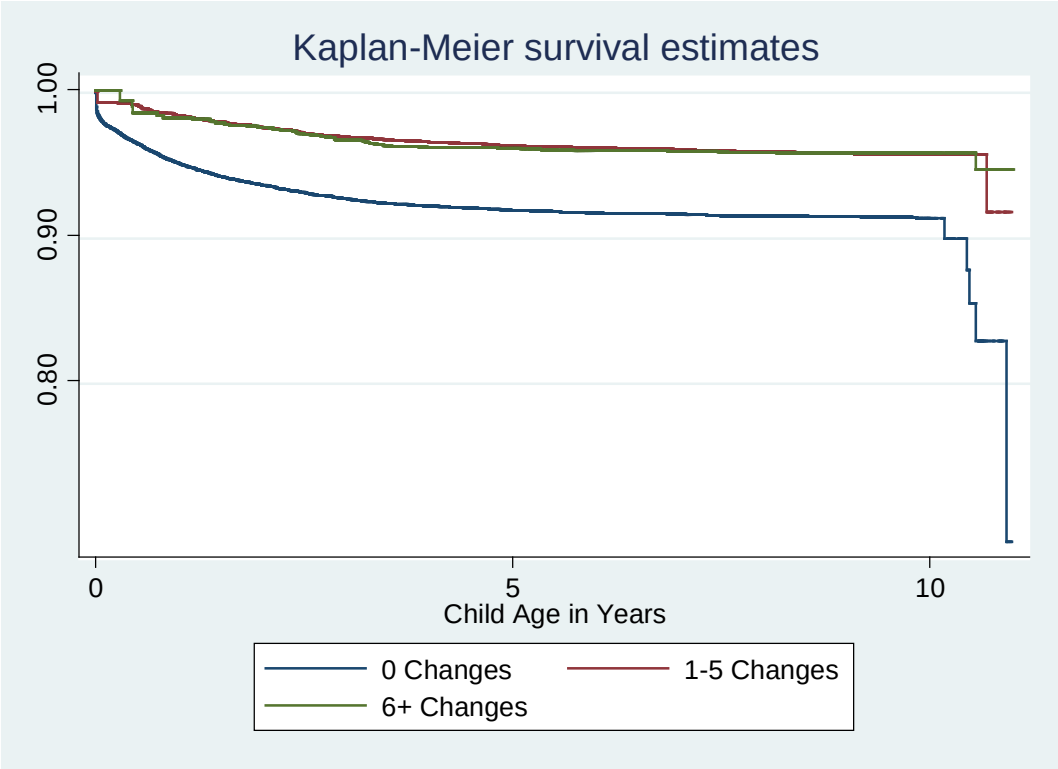

Table 1. Exposure Episodes and Time Varying Covariates Data Structure

Start	End	Co-resident Mother	Co-resident Father	Instability
15 May 05	15 Jul 05	1	1	0
15 Jul 05	01 Jan 06	1	0	1
01 Jan 06	15 Dec 07	0	0	2
15 Dec 07	15 May 07	1	0	3
15 May 07	15 Mar 08	0	0	4

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