Parental divorce and child health in sub-Saharan Africa: Analyzing the role of stigma

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Abstract

This study estimates multilevel discrete-time hazard models using Demographic and Health Survey data from 31 African countries to examine whether the relationship between child mortality and parental divorce varies across low versus high divorce settings. We hypothesize that the widespread social disapproval of divorce in settings where it remains rare will lead divorced women in these contexts to experience significant stigma, thereby amplifying their children's risk of mortality compared to their peers with divorced mothers in settings where divorce is more prevalent and socially acceptable. We leverage diversity in the prevalence of currently divorced women across 290 of Africa's subnational regions—ranging from less than one percent to eighteen percent—to approximate variation in the social acceptability of divorce in Africa. Although divorce is associated with higher risk of child mortality across all settings, African children with divorced mothers in settings where divorce is rare have significantly greater risk of dying before age five than their peers with divorced mothers in settings where divorce is more common. Neither contextual-level socioeconomic factors nor differences in children's access to socioeconomic resources at the family-level explain this finding, suggesting that the stigmatization of divorce in low divorce settings works to further disadvantage an already vulnerable population.

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The negative implications of divorce for both adults and children in Westernized countries have been the subject of much academic research (Amato 2010). A vast body of research shows divorced adults are more likely to experience economic hardship (Holden and Smock 1991, Waite and Gallagher 2002), psychological issues (Menaghan and Lieberman 1986), physical health risks (Hughes and Waite 2009, Waite 1995), and social isolation (Thoits 1983) compared to their non-divorced peers. The consequences of divorce also extend intergenerationally (Seltzer 1994). Children with divorced parents experience lower academic achievement and cognitive development (Astone and McLanahan 1991), poorer psychological, social, and behavioral adjustment (Amato and Sobolewski 2001, Doherty and Needle 1991, Forehand et al. 1994, Magnuson and Berger 2009, Ross and Mirowsky 1999), and long-term health disadvantages (Cherlin, Chase-Lansdale and McRae 1998, Tucker et al. 1997) compared to their peers whose parents remain married.[1]

The magnitude of the disadvantage associated with parental divorce for children has been shown to vary significantly across contexts (Amato 1994, Lacey et al. 2012). Taking a historical perspective, Amato and Keith's (1991) meta-analysis shows that the effects of parental divorce across several domains—psychological, social, economic, educational, and relational—have weakened over time. A prime explanation for the heterogeneous effects of parental divorce on children is variation in the social acceptability of divorce, and as a result, the stigma associated with it (Amato and Keith 1991, Amato 1994, Lacey et al. 2012).

There is consensus among family sociologists that the level of diffusion of a particular family form is closely tied to its level of social acceptance and institutionalization (Cherlin 2004). Considerable work has documented that the rise in divorce in America over the twentieth century was accompanied by a parallel increase in its social acceptability (Thornton 1985). Family sociologists agree that there is presently little stigma associated with divorce in

[1] There is some evidence that divorce can have positive consequences for the small minority of children who experience exceptionally high levels of pre-divorce conflict (Arditti 1999; Amato and Booth 1997).

the United States (Spanier and Thompson 1987), or other highly-individualized societies that culturally value individual's preferences and quest for self-authenticity. In more collectivist societies wherein sacrificing personal desires for the larger good of the family or community is expected, however, divorce continues to be rare, socially disapproved, and stigmatized (Lester 1995, Toth and Kemmelmeier 2009).

The social stigma attached to divorce in settings where it remains uncommon may amplify its negative consequences for children compared to their peers in settings where divorce is more prevalent and socially accepted, and bears little or no stigma. Some empirical evidence supports this supposition: leveraging cross-contextual differences in the social acceptability of divorce across Europe, research shows that its social and psychological consequences for adults are more severe in settings where it is socially disapproved and bears greater stigma (Diener et al. 2000, Kalmijn 2007). It remains unknown whether the heightened social and psychological costs of divorce in settings where it is disapproved and stigmatized can produce intergenerational disadvantage, thereby exacerbating the health challenges for children with divorced parents.

In this paper, we extend the vast literature on parental divorce and child wellbeing to provide a systematic assessment of whether the child health disadvantage associated with divorce is heightened in settings where it remains an uncommon and stigmatizing experience. We focus our empirical analysis on the African context, where emerging evidence shows that parental divorce has significant childhood health consequences, including a higher risk of death before age five (Clark and Hamplová 2013). We leverage variation in the prevalence of divorce across 290 of Africa's culturally diverse subnational regions to approximate cross-contextual differences in the social acceptability of divorce, and in turn, the stigmatization of it. The tremendous matrimonial diversity across Africa's subnational regions allows us to capture a nearly twenty point percentage difference in the presence of women who are

currently divorced—a range that is comparable to the change in divorce rates that unfolded in the United States over an entire century (Cruz 2013). Using Demographic and Health Survey data for 545,351 children in 290 subnational regions in 31 African countries, we estimate a series of multilevel discrete-time hazard models to assess whether—net of familial and contextual access to socioeconomic resources—the child mortality risk associated with having a divorced mother is amplified in settings where it remains a rare, stigmatizing experience.

BACKGROUND

PARENTAL DIVORCE AND CHILD WELLBEING IN AFRICA

A rich literature spanning multiple decades demonstrates that parental divorce has an enduring impact on children across their life course (see Amato 2010 for review). With few exceptions, the vast majority of research on the consequences of parental divorce has focused on North American and European populations. As a result, little is known about the influence of divorce on children in other world regions, including Africa.

The handful of studies that have investigated the consequences of divorce for African children produce even more dire findings than those documented in high-income countries. For instance, Kenyan children of formerly married mothers are significantly more likely to be malnourished and to miss out on key vaccinations compared to their peers with married mothers (Gage 1997). Results from research in Burkina Faso corroborate these findings, demonstrating that children of divorced mothers have higher risk of under-five mortality compared to their peers with married mothers (Thiombiano, LeGrand and Kobiané 2013). Supplementing these country-specific studies, a recent multinational study further confirms that African children with divorced parents face substantially higher mortality risk, although the impact of divorce varies across countries: the effect is non-significant in Ghana and Zambia, but is associated with a 36 percent increase in the risk of dying in the Democratic

Republic of the Congo, 52 percent in Liberia, 57 percent in Nigeria, and an almost two-fold increase in Sierra Leone (Clark and Hamplová 2013). Further evidence shows that African children with divorced mothers who survive childhood face educational setbacks, including delayed school entry (Thiombiano, LeGrand and Kobiané 2013) and lower educational attainment compared to their peers with married parents (Chae 2013).

Together, literature on parental divorce and child wellbeing in Africa, matched with the literature on North American and European societies, confirms that divorce disadvantages children in a wide range of countries; however, the *magnitude* of its childhood disadvantages appears to be greater in historical periods and cultural contexts where it is rare and lessened in those where it is more prevalent (Amato and Keith 1991, Amato 1994, Lacey et al. 2012). In the following sections, we outline two possible explanations for the difference in the size of the divorce penalty across high versus low divorce contexts. First, we describe the most prominent explanation, which is that variability in the social acceptability of divorce, and in turn, the amount of stigma that divorcees endure leads children with divorced parents to have distinct outcomes in settings where divorce is uncommon compared to those where it is more prevalent and normative. Second, recognizing that a society's prevalence of divorce is closely associated with its socioeconomic profile, and in turn the socioeconomic resources among divorced women therein, we describe how socioeconomic factors could drive disparate experiences across settings.

CROSS-CONTEXTUAL VARIATION IN THE RELATIONSHIP BETWEEN PARENTAL DIVORCE AND CHILD WELLBEING: SOCIAL ACCEPTIBILITY AND STIGMA

Family sociologists widely agree that the social acceptability of divorce has a close, positive association with its prevalence. Taking a historical perspective, research shows that in both American and Europe there has been a corresponding rise in the social acceptability of divorce with its increasing prevalence (DiFonzo 1997, Spanier and Thompson 1987,

Thornton and Young-DeMarco 2001, White and Booth 1991). Despite attitudinal differences between social groups (e.g., age, class, race, religion), as divorce rates rose, its approval increased across all groups, fueling a large aggregate shift towards greater acceptability (Thornton 1985). The increasing approval of divorce in America was particularly rapid between the 1960s and 1970s, the precise time when divorce rates increased dramatically (McRae 1978). In more recent decades, aligning with the stabilization in the divorce rate, the level of social approval has plateaued at generally high levels of acceptance (Thornton and Young-DeMarco 2001).

Although we are not aware of any research linking the prevalence of divorce to its social acceptability in Africa, collating evidence from various ethnographies of African settings supports the conclusion that the social acceptability of divorce is closely associated with its prevalence. For instance, in African settings where unions commonly dissolve, such as among the Hausa in Nigeria (Solivetti 1994) and matrilineal groups in Malawi (Kaler 2001), divorce is generally perceived to be a socially acceptable outcome. For instance, in Malawi, even religious leaders, who are community's authority on moral issues, support divorce as a response to particular marital issues, such as sexual infidelity (Trinitapoli 2011). Conversely, in African societies where divorce remains rare, it is widely viewed as socially unacceptable. For instance, Smith (2009) reports that in southeastern Nigeria divorce is highly-taboo and is perceived as immoral, regardless of the circumstances surrounding it.

In cultural contexts where there continues to be widespread social disapproval of divorce, ethnographic work shows that divorcees, particularly women, experience intense stigma (Al-Krenawi and Graham 1998).[2] For instance, a qualitative study of Arab women in Israel demonstrates that divorced women are perceived as being distrustful, sexually

[2] Although the increased prevalence of divorce has resulted in an overall decline in the amount of stigma it provokes, Gerstel (1987) points out that divorce can still be a stigmatizing experience even in contexts where divorce is normative depending on the specifics of the separation and the divorcee's immediate social surroundings.

seductive, and as a mortal threat to family life in the community (Al-Krenawi and Graham 1998). Qualitative evidence from Nairobi, Kenya similarly reveals that community members often characterize divorced women as being of low moral standing; refusing to even let their children play with children of divorced mothers (Clark, Beguy, Boco, and Cotton 2013). Divorced women internalize these processes, with one stating: "I am disrespected because I don't have a husband. The women around here feel that since I am not married then I am not a good member of the community." (Clark, Beguy, Boco, and Cotton 2013).

The stigmatization of divorce in settings where it is rare and socially unacceptable is likely to lead divorced women to experience discrimination, which could operate to disadvantage them and their children through a number of mechanisms. For example, divorce often precipitates major life changes, including residential moves and women seeking employment outside of the home. In settings where divorce is rare, potential landlords or employers may discriminate against women upon finding out that they are a divorced woman, thereby making it more difficult for them to achieve financial stability, which will interfere with children's access to adequate nutrition and medical care. Even within healthcare settings, divorced mothers may face discrimination from healthcare workers, further lessening the quality of care that her children receive.

Related to the discrimination that divorced women are likely to endure from fellow community members, divorce is also likely to disrupt women's immediate social networks and relationships. Especially in rural Africa, where ethnographers have noted that gossip abounds, particularly when it comes to topics like relationships, sex, and infidelity (Swidler and Watkins 2007), divorced women are likely to be the topic of considerable conversation. Although family ties remain strong even in the wake of stigmatizing experiences like HIV/AIDS, friends and extended relatives may distance themselves from divorced mothers in order to avoid the risk of "stigma by association" (Pontikes, Negro and Rao 2010). Because

of the contagious nature of stigma (Goffman 1963), in line with evidence from research on HIV/AIDS in Africa (Simbayi et al. 2007), divorced women are likely to have smaller, weaker social networks, placing them at greater risk of being socially isolated.[3] Because African children's health is closely associated with the size and strength of their mother's social network (Adams, Madhavan and Simon 2002), social isolation among divorced mothers will further increase their children's risk of mortality.

The negative reactions of community members, neighbors, and friends are likely to lead divorcees to internalize the negative encounters that they experience in their community (Yang et al. 2007). Divorced women may internalize feelings of guilt and shame, which will ultimately interfere with their self-perceptions and psychological wellbeing (Simbayi et al. 2007). Building on evidence that maternal psychological wellbeing is directly associated with children's physical health (Engle et al. 2007, Patel et al. 2004), internalization processes are likely to directly lead to poorer child health outcomes. Divorced women's internationalization and her anticipation of negative interactions may also discourage her from frequenting public spheres, including health centers, thereby further interfering with her children's health.

CROSS-CONTEXTUAL VARIATION IN THE RELATIONSHIP BETWEEN PARENTAL DIVORCE AND CHILD WELLBEING: SOCIOECONOMIC CONSIDERATIONS

Apart from stigma, it is possible that variation in the disadvantage associated with parental divorce for children across high versus low divorce settings could be attributable to the socioeconomic correlates of a society's level of divorce, and in turn the economic circumstances of its divorced mothers. A society's level of divorce is positively associated

[3] It is important to recognize that even in African settings where divorce is relatively common and socially acceptable, divorced women are likely to experience some social losses after the dissolution of their marriage. To cope with these losses, ethnographic work shows that divorcees often turn to other divorced persons as experienced "veterans" (see Gerstel, Naomi. 1987. "Divorce and Stigma." *Social problems*:172-86.). This suggests that in settings where divorce is more prevalent, divorcees will have a naturally larger support system of other divorced women available in their community. Access to other women who have experienced divorce is likely to buffer the psychological and social costs of divorce in these settings, thereby further leading to divergent experiences for children of divorced women in low versus high divorce contexts.

with a wide range of socioeconomic factors including women's economic independence, education, and their status and liberalization more generally (Trent and South 1989). For instance,, Ruggles (1997) shows that the level of divorce is more closely tied to the availability of employment for women. Research shows that divorce is more prevalent in more urbanized parts of Northern America (Sander 1985) and Africa (Takyi 2001), wherein women have greater educational and economic opportunities. Following from the fact that women's economic and educational opportunities are greater in high divorce settings, and that these socioeconomic features, including urbanization, are known to benefit child health, it is possible that children of divorced mothers experience lower mortality in high divorce settings simply due to these other contextual factors—not necessarily due to the greater social acceptability of divorce in their community.

Related to the contextual correlates of divorce, divorce women may themselves have greater economic resources in high divorce contexts compared to their divorced peers in settings where divorce is rare, which could further drive cross-contextual differences in their children's health. Although divorced women are likely to experience financial hardship compared to their married peers no matter where they live (Biblarz and Raftery 1993, Peterson 1996, Smock, Manning and Gupta 1999), the fact that contexts where divorce is more common tend to be more urbanized places with greater economic and educational opportunities for women could mean that the financial fallout associated with divorce is dampened in these settings. That is, in line with evidence that employment and educational opportunities reduced the economic loss associated with divorce (Peterson 1989), the economic shock of divorce may be minimal in high divorce settings, thereby boosting the survival of children with divorced mothers. Conversely, if settings where divorce is rare generally offer fewer socioeconomic opportunities to women, divorced mothers are likely to

face particularly steep financial challenges thereby threatening their children's health and survival.

Taken together, the socioeconomic correlates of a society's prevalence of divorce, and potential variability in divorced mothers' access to economic resources across high versus low divorce contexts, could drive heterogeneous effects in children's survival across contexts. It is imperative to account for these factors in order to confirm whether stigmatization processes—not simply socioeconomic selection at the contextual or household level—are driving differential levels of survival among children with divorced mothers in high versus low divorce settings.

STUDY CONTEXT

Researchers have long observed that marriage is characterized by high levels of separation and divorce in much of Africa (Caldwell, Caldwell and Quiggin 1989, Therborn 2004). However, due to the absence of data—vital registration systems are not common in Africa and matrimonial histories are rarely covered in population-based surveys—there has been little systematic quantification of the prevalence of divorce in the region (Reniers 2003). To remedy this, a recent study has produced the first systematic estimates of divorce among women in multiple African countries (Clark and Brauner-Otto 2014). The study shows that the level of divorce varies substantially across the subcontinent, ranging from less than 6.5 percent of women divorcing (by age 50) in the southern African country of Lesotho to nearly 40 percent in the west African country of Liberia (Clark and Brauner-Otto 2014).

These country-level statistics, however, mask the tremendous heterogeneity in the prevalence of divorce *within* African countries. Marital practices, including the dissolution of unions, are strongly patterned by ethnicity and kinship systems (Radcliffe-Brown 1962), which, alongside community's socioeconomic context, leads to tremendous within-country variability in the prevalence of divorce across Africa's subnational regions. For instance, in

Malawi, women are more than twice as likely to have their first marriage end in divorce in the country's southern district compared to women in both the central and northern districts (Reniers 2003, Reniers 2008). Furthermore, ethnographic work from Nigeria shows that rates of divorce are extraordinarily high in the northern Hausa region (Solivetti 1994), but virtually unheard of in the country's southeastern region (Smith 2009). Given the sizeable differences in divorce rates within countries, in this study, our aggregate unit of focus are subnational regions, which have been used to approximate ethnic, geographic, and political boundaries across the continent {Smith-Greenaway, 2014 #133;Smith-Greenaway, 2013 #155}.

DATA

Data for this study come from 31 Demographic and Health Surveys (DHS) in the sub-Saharan African countries where a survey has been administered since 2000. We make use of the most recent survey (with one exception, see footnote 4) for the following countries: Burkina Faso, Benin, Burundi, Cameroon, Chad, Congo (Brazzaville), Democratic Republic of the Congo, Ethiopia, Gabon, Ghana, Guinea, Ivory Coast, Kenya, Liberia, Lesotho, Madagascar, Malawi, Mali, Mozambique, Namibia, Niger, Nigeria, Rwanda, Sao Tome Principe, Sierra Leone, Senegal, Swaziland, Tanzania, Uganda, Zambia, and Zimbabwe.[4]

The DHS program is a nationally-representative, cross-sectional survey that is typically fielded in participating countries every five years. The DHS uses a stratified random sampling approach, with clusters providing the primary sampling unit. Within each selected cluster, the DHS randomly samples families. Household heads complete a full roster of members, from which the DHS identifies eligible men and women. Women are asked whether they have children and, if so, to provide detailed information on each live birth (e.g.,

[4] In ancillary analyses, we made use of the preceding round of each survey to ensure the stability of our findings both in terms of the levels of divorce and multivariate results. In all instances our results were consistent regardless of the year of survey, with the exception of Mozambique. In Mozambique, women's reports of divorce/separation are significantly lower in 2011 versus 2003/04 and 1997. Because southern African countries contiguous to Mozambique show no downward trends in the prevalence of women who are currently divorced/separated, we make use of the 2003/04 DHS survey in Mozambique.

date of birth, whether the child is alive at present, and the month and year of death for all deceased children) from which the DHS generates the child-level datasets that we use here.

ANALYTIC SAMPLE

We focus our analysis on births that occurred within ten years of the survey. This restriction helps to reduce recall error, ensures that current family characteristics correspond reasonably well with children's environment since birth, and that children of older women are not disproportionately over-represented. We exclude approximately one percent of children from our analyses due to missing data. Our final analytic sample consists of 545,351 births. Appendix A shows the survey years and sample sizes for children in each of the 31 countries.

Because the DHS does not specifically collect contextual data, in order to characterize the 290 subnational regions in our study, we aggregate data from interviews with household heads and reproductive-age women. In some instances, the household head or mother of the children in our study are included in the samples from which we create our aggregate measures. However, because there are 1,894 children in each subnational region on average, and because sensitivity analyses confirm that excluding them does not alter our results, we include the index-family when creating the region-level measures.

Key variables

Child mortality

The outcome variable is the hazard of mortality before age five. Children born less than five years prior to the survey are censored at the time of the survey, which we appropriately address in our discrete-time hazard modeling approach.

Mother's marital status

The DHS asks all mothers their marital status at the time of the survey. Using these data, in addition to information on the presence of co-wives, mother's age at first marriage, and mother's number of previous unions, we create a five-categorical indicator: never married,

married (or cohabiting) in a monogamous union, married (or cohabiting) in a polygynous union, widowed, and divorced/separated.[5] Using data on the timing of women's first marriage, in addition to timing of the child's birth, we classify women who were married seven or more months after their child's birth as "never married" given their status at the time of conception. We also include a binary indicator for women who are remarried (including those in polygynous and monogamous unions) at the time of the survey.

Some women in our sample who are not *currently* divorced or widowed report having been in more than one union. However, we are not aware of whether their prior marriage ended due to divorce/separation or death. Thus, we include a binary indicator of whether the mother has been in more than one union, and focus our analysis specifically on those children whose mothers are *currently* divorced.

Prevalence of divorce

We create a continuous measure of the prevalence of currently divorced women in each subnational region to approximate its social acceptability in the local community, and in turn, the degree of stigma attached to it. We make use of data from all reproductive-age women interviewed—including those without children—in each subnational region to calculate the percentage of women who are currently divorced or separated.

We focus on the prevalence of reproductive age women who are *currently* divorced versus the prevalence of women who have ever been divorced for both methodological and theoretical reasons. In terms of methodological motivation, as noted in the previous section, in the vast majority of countries the DHS does not directly ask women who are not currently divorced/separated if they have ever been divorced/separated, making it impossible to accurately estimate the number of women who have ever been divorced/separated. Furthermore, because marital and relationship transitions are closely associated with African

[5] In line with existing research, given the high number of informal and unregistered unions in sub-Saharan Africa, we use the term "married" to refer to both married and cohabiting unions and "divorce" to refer to both divorce and separation.

women's migration (Clark and Cotton 2013), focusing on women's *current* marital status ensures that, in the instance a woman remarried and migrated, we do not attribute divorces that occurred in another subnational region to the woman's current subnational region. In terms of theoretical justification, focusing on the prevalence of currently divorced women in a subnational region provides a valuable snapshot of the marital landscape, which offers some sense of the extent to which divorced women remain single versus remarry. Because stigma often acts as a powerful motivation for divorced women to quickly remarry (Grover 2011), which would thereby keeping the prevalence of divorce low, focusing on the prevalence of women who are divorced/separated at a particularly historical moment helps us to further approximate the amount of stigma it bears in each subnational region.

Because our argument hinges on the validity of the assumption that the prevalence of currently divorced women is an approximation of its social acceptability across Africa's subnational regions, as has been reported in North America (Thornton 1985), in ancillary analyses we tested this assumption using World Values Survey (WVS) data.[6] Among other attitudinal measures, the WVS asks respondents to report their view on the justifiability of divorce using a ten-point scale, ranging from never justifiable (=0) to always justifiable (=10). Starting in wave 5, the WVS's inclusion of an indicator for the subnational region in which respondents lived at the time of the survey, enabled us to create subnational, region-level aggregate measures of the prevalence of adults who express that divorce is "always justifiable". In Zambia, where both the WVS surveys and DHS were collected in the same year (2007), we created aggregate indices and correlated the prevalence of WVS respondents in each subnational region that reported divorce is "always justifiable" with the prevalence of adult female DHS respondents who report that they are currently divorced. The results show that the two aggregate-level measures are highly correlated ($r=0.73$; $p<.05$) across Zambia's

[6] The WVS is a nationally-representative survey that tracks socio-cultural and political trends. The WVS interviews all adults aged 16 years and older. Data and further documentation are available at: http://www.worldvaluessurvey.org/wvs.jsp.

nine subnational provinces. This evidence, matched with research on the close association between social acceptability of divorce and its prevalence in other contexts (Thornton 1985, Thornton and Young-DeMarco 2001), bolsters the validity of our use of the prevalence of currently divorced women across Africa's 290 subnational regions as a proxy measure of its social acceptability.

Cross-level interaction

We interact the subnational region-level prevalence of currently divorced women with the marital status of individual children's mothers in order to create a continuous by categorical cross-level interaction. The coefficient for this interaction will allow us to assess whether children of divorced mothers are particularly at risk in settings where divorce is rare.

Socioeconomic factors

Building on evidence that a society's level of divorce is closely associated with women's economic and educational opportunities, which are known to influence child health, we control for these factors to ensure that they are not driving observed cross-contextual variability in the health experiences of children with divorced mothers. We use data from reproductive-age women (15 to 49 years old) to create an aggregate measure of the (1) percentage of women who have been formally employed outside of the home in the twelve months preceding the survey and (2) the average years of formal schooling among reproductive age women in the setting. Furthermore, building on evidence that the level of urbanization is associated with both the prevalence of divorce and child wellbeing, we make use of the DHS's classification of households as "rural" versus "urban" in order to generate a (3) continuous measure of the percentage of households in each province that are classified as rural.

Because cross-contextual differences in region's socioeconomic profiles are also likely to drive diversity in socioeconomic resources across families, which have additional

bearing on child wellbeing, we control for a host of indicators at the family-level. We create a binary indicator for whether the child's mother has been formally employed outside of the home in the twelve months preceding the survey. We also include a measure of her highest level of formal schooling. To further account for socioeconomic status, we make use of the DHS-constructed wealth index that classifies houses into five quintiles based on material goods and ownership of common household resources (i.e., poorest [reference group], poor, average, rich, richest).

Controls

In all models, we include a set of social and demographic variables known to influence child survival: sex, twin status, maternal age at the time of the child's birth (less than 20 years old, 20 to 34 years old, 35 or older), birth order, birth spacing (first born, fewer than 36 months, 36 months or more), and whether their mother identifies as Muslim. To accommodate our modeling strategy, our data are time-based data, not individual-based, in which observations refer to time (i.e., months) and each birth contributes the number of months that the child was observed. In addition to explicitly handling time in our modeling approach, in all models, we control for the child's age (0-11 months, 12-23 months, 24-35 months, 36+ months).

Because a country's political, cultural, and economic climate is likely associated with both the level of divorce and child mortality across its subnational regions, to address the possible confounding nature of these factors in our multinational study design, we take a country-level fixed-effects approach by including a set of dummy variables representing each of the 31 countries in our sample. This modeling strategy enables us to conservatively account for constant, unobserved country-level factors that could confound the associations of interest in our analyses.

ANALYTIC PLAN

We begin the results with a descriptive overview to characterize the children in our sample, and the subnational regions in which they live. Next, we show bivariate analyses to (1) compare the contextual-level socioeconomic correlates of the prevalence of divorce across the 290 subnational regions, and to (2) examine whether children with divorced mothers have variable access to socioeconomic resources in low versus high divorce settings. These descriptive analyses will provide a clearer sense of whether socioeconomic factors at the contextual- or familial- levels could drive the variable association between child mortality and parental divorce across low versus high divorce settings.

We then estimate a series of multilevel discrete-time hazard models to test whether the mortality risk of having a divorced mother is heightened in contexts where divorce remains rare versus those where divorce is more prevalent. This modeling strategy allows us to handle two complexities of our data: censoring and its hierarchical structure. In terms of the former, our hazard modeling approach addresses the fact that children who are still alive at the time of the observation period (i.e., survey), or who have not yet reached their fifth birthday, are right-censored. The multilevel nature of our models appropriately estimates standard errors to address the fact that children (level-1) are clustered within subnational regions (level-2) and countries (level-3).[7]

We present a series of three multilevel hazard models:

(1) $\text{logit}(h_{tijk}) = \alpha_t + \mathbf{ß}_1\text{FamilyStructure}_{ijk} + \mathbf{ß}_4\boldsymbol{X}_{ijk} + \mathbf{ß}_5\boldsymbol{C}_k + u_j$

(2) $\text{logit}(h_{tijk}) = \alpha_t + \mathbf{ß}_1\text{FamilyStructure}_{ijk} + \mathbf{ß}_2\text{SubnationalRegion-levelPrevalenceDivorce}_{jk} + \mathbf{ß}_3(\text{SubnationalRegion-levelPrevalenceDivorce}_{jk}*\text{FamilyStructure}_{ijk}) + \mathbf{ß}_4\boldsymbol{X}_{ijk} + \mathbf{ß}_5\boldsymbol{C}_k + u_j$

(3) $\text{logit}(h_{tijk}) = \alpha_t + \mathbf{ß}_1\text{FamilyStructure}_{ijk} + \mathbf{ß}_2\text{SubnationalRegion-levelPrevalenceDivorce}_{jk} + \mathbf{ß}_3(\text{SubnationalRegion-levelPrevalenceDivorce}_{jk}*\text{FamilyStructure}_{ijk}) +$

[7] We also use the clustering feature in Stata to account for the fact that some children share the same mothers in our sample. In supplementary analyses, we randomly sampled one child from each mother among those with multiple children in the dataset and re-estimated each model. The results from these analyses confirmed that the findings are consistent with those shown here, suggesting the presence of siblings are not driving the findings.

$$\text{ß}_4\text{SubnationalRegion-levelEconomicContext}_{jk} + \text{ß}_5\text{Family-levelEconomicResources}_{ijk} + \text{ß}_6\boldsymbol{X}_{ijk} + \text{ß}_5\boldsymbol{C}_k + u_j$$

To confirm that African children with divorced mothers experience a higher risk of mortality, as previous research demonstrates (Clark and Hamplová 2013), model (1) estimates the association between family structure and child mortality. In this model, and all subsequent models, we include controls for child *i* in subnational region *j* in country *k*; where $\boldsymbol{X}_{ijk}$ is a vector of standard demographic controls that are known to influence child survival, and $\boldsymbol{C}_k$ are country dummy variables; and u_j is the subnational region-level random effect; and the **ß**s represent the corresponding coefficients. In model (2) we interact the prevalence of divorce at the subnational region-level with family structure to test our central hypothesis: whether the child survival disadvantage associated with divorce is heightened in settings where divorce is rare versus contexts where it is more widespread. Model (3) includes socioeconomic controls at the subnational region and family-levels to test whether they account for potential cross-contextual disparities in child mortality among children with divorced mothers.

RESULTS

Table 1 shows descriptive statistics to characterize our sample of children and the subnational regions in which they live. As shown, the average child in our sample lives in a subnational region where approximately six percent of women are currently divorced. The standard deviation shows, however, that the prevalence of divorce varies significantly across countries (ranging from 0.17 percent to 18.31 percent). Building on the strong correlation between the prevalence of divorced women and its social acceptability in ancillary analyses (see discussion in Measures section), we leverage this diversity to approximate variation in the social acceptability of divorce across Africa's subnational regions.

In addition to diverse marital climates, children in our sample also experience disparate socioeconomic contexts. On average, children live in subnational regions where

approximately 65 percent of women are currently employed, with a standard deviation of 17 percent. Average schooling among African women is generally low across all subnational regions, standing at just over four years. However, it varies tremendously across contexts: women have, on average, less than one year of school in some subnational regions and over eleven years in others. The majority of children live in rural areas.

At the individual-level, the results show that most children (74 percent) have monogamously married mothers; however, just over five percent have mothers who are currently divorced while six percent have mothers who have never been married. Approximately one in ten children's mother has been married multiple times, either due to divorce or widowhood. In terms of socioeconomic factors, nearly three-fourths of children have mothers who are currently employed and have been to approximately three years of school.

Because the prevalence of divorce is likely correlated with socioeconomic factors across Africa's regions, in Table 2 we present descriptive statistics for the 290 subnational regions in our sample according to the region's prevalence of divorce. For the purposes of these analyses, we classify subnational regions that fall more than one standard deviation below the mean prevalence of divorce as "low divorce" contexts, those that are less than one standard deviation below or above the mean as "average divorce" settings, and contexts that are more than one standard deviation above the mean as "high divorce" settings. Although results do not support a clear association between the prevalence of divorce and degree of urbanization, the findings show that African contexts where divorce is higher also have higher levels of female employment (67 percent in low divorce settings versus 73 percent in high divorce settings) and education (2.66 years of schooling in low divorce settings versus 4.80 years in high divorce settings). These results highlight the importance of assessing

whether these factors drive potential variability in child mortality risk across low versus high divorce settings.

In Table 3 we assess whether children's socioeconomic resources at the family-level also varies meaningfully according to the contextual prevalence of divorce. Because we are interested in possible differences *between* divorced mothers across low versus high divorce contexts, in these descriptive analyses we focus only on children with divorced mothers. In some regards, the results demonstrate that children with divorced mothers are better off in settings where divorce is more common versus less so. For example, children with divorced mothers are more likely to have a more highly-educated, working mother in settings where divorce is higher, suggesting that these children may benefit from their mothers' greater access to disposable income. However the results clearly show that children of divorced mothers in settings where divorce is rare live in wealthier households than their counterparts in settings where divorce is more common. In fact, children with divorced mothers in low divorce contexts are almost twice as likely to live in a household with above average wealth compared to their peers in high divorce settings. In light of these descriptive findings, if multivariate results show that children of divorced mothers have elevated mortality risk where divorce is rare *despite* greater household wealth, this will provide particularly strong support for the notion that social processes, namely stigmatization, may be at play.

Table 4 shows estimates from multilevel discrete-time hazard models analyzing the interrelationships between the prevalence of divorce, family structure, and children's likelihood of dying before age five. Results in Model 1 confirms that there is a strong association between parental divorce and children's likelihood of dying in Africa: children whose mothers are currently divorce experience a 44 percent higher likelihood of dying before their fifth birthday compared to their peers with monogamously married mothers. Corroborating other work, the results further show that children with never married or

widowed mothers, and those with polygynously married mothers, also experience substantially elevated mortality risk compared to their peers with monogamously married mothers.

Turning to Model 2, we include an indicator for the prevalence of divorce in children's subnational region and a cross-level interaction with individual children's family structure in order to assess whether the magnitude of the disadvantage associated with having a divorced mother varies systematically across settings depending on the prevalence of divorce. As shown, the significant, negative interaction supports our central hypothesis: the disadvantage associated with divorce is suppressed in settings where divorce is more prevalent. Said another way, the already high risk of mortality associated with having a divorced mother is larger in settings where divorce is rare compared to those regions where divorce is more prevalent.

Because the prevalence of divorce is associated with socioeconomic factors at both the contextual and family levels that are known to influence child survival (see Table 2 and 3), the higher risk of mortality associated with divorce in settings where divorce is rare could simply be driven by these confounding factors. To test whether this is the case, model 3 includes socioeconomic correlates at the contextual and family levels to assess the robustness of the findings shown in model 2. As shown, the divergent health experiences of children with divorced mothers across distinct divorce contexts is not attenuated, confirming that socioeconomic factors alone are not driving the findings.

To better depict our central finding that the mortality risk associated with divorce is heightened in African settings where divorce remains rare versus those where it is more prevalent, Figure 1 shows Kaplan-Meier survival estimates of child survival. These estimates hold all covariates in model 3 (Table 4) at the mean value. For parsimony, we graph results for children with divorced mothers and their peers whose mothers are monogamously

married. Similar to our approach in tables 2 and 3, for the purposes of these analyses, we group children according to whether they live in a "low" (prevalence is more than one standard deviation below mean), "average" (prevalence is within one standard deviation of the mean), or "high" divorce (prevalence more than one standard deviation above the mean) setting.

The figure illustrates three important findings. First, across all contexts, children with divorced mothers experience higher risk of mortality compared to their peers with married mothers. In other words, regardless of the prevalence of divorce, children with divorced mothers are more likely to die than their peers whose mothers are monogamously married living in similar contexts. Although the negative health implications of divorce are present across all of Africa's martial contexts, the second major finding is that there is systematic cross-contextual variation in the size of this disadvantage. In low divorce settings the risk of death that children with divorced parents experience compared to their married peers is significantly larger than the difference in settings where divorce is more common. The third major finding is that that there is also significant differences in the likelihood of survival between children with divorced mothers: children with divorced mothers living in settings where divorce is rare have significantly lower survival over the course of childhood compared to their peers with divorced mothers living in settings where it is more highly prevalent and normative (log rank test 27.54 $p<.001$). This finding is particularly striking in light of the fact that, among all African children with divorced mothers, those in settings where it is rare are the most likely to live in wealthier households (Table 3).

Before discussing these findings, it is important to point out that, in addition to the unequal risk associated with having a divorced mother in low versus high divorce settings, the results in Table 4 show that the child mortality risk associated with having a widowed mother also varies systematically. Why do African children with widowed mothers have a

higher likelihood of dying in settings where divorce is more prevalent? Delineating from the fact that both divorce (Table 2) and HIV/AIDS are more common in urban Africa (Fortson 2008), the prevalence of divorce and HIV/AIDS are likely to be positively correlated across subnational regions. In settings where HIV/AIDS is more prevalent—and by extension divorce is more common—widowhood will be driven by AIDS-related deaths. Because of death clustering within families infected with HIV/AIDS, it is unsurprising that widow's children are likely to have higher mortality due to the household's infectious disease burden. Ideally, to fully confirm that the HIV/AIDS is driving what we speculate to be a spurious association between the prevalence of divorce and elevated risk of mortality among widows, we would control for HIV-prevalence across the 290 subnational regions. However, HIV-prevalence data are only available for a small subset of the subnational regions in our sample. Thus, to indirectly test whether HIV prevalence is driving elevated child mortality among widows in high divorce settings, in supplementary analyses (not shown) we omitted its confounding effect by excluding countries where HIV prevalence exceeds 10 percent in one or more subnational region (i.e., Cameroon, Namibia, Kenya, Malawi, Mozambique, Swaziland, Tanzania, Zambia, Zimbabwe). Upon doing so, the multilevel discrete-time hazard model results confirm that the elevated mortality risk associated with having a widowed mother in settings where divorce is more prevalent becomes non-significant. This indirect test provides at least preliminary support that the variable effect of having a widowed mother by divorce context is spuriously driven by high levels of HIV/AIDS in these settings.

DISCUSSION

Ample research shows that children with divorced parents have poorer health and developmental outcomes across their life course compared to their peers with married parents (Amato 2010); however, the magnitude of the divorce penalty varies in size across historical periods and cultural contexts {Amato, 1991 #4;Lacey, 2012 #15;Amato, 1994 #153}. In this

paper, we whether the prevalence of divorce, and the corresponding level of stigma it bears, drives variability in the child health risks associated with parental divorce. Focusing our empirical analysis on the African context, where there is substantial cross-contextual variability in the prevalence of divorce, and in turn its social acceptability, we analyze whether the child mortality risk associated with having a divorced mother is elevated in African settings where it is rare, perceived as socially unacceptable, and bears greater stigma versus those where it is more common and socially accepted.

Results from our multilevel discrete-time hazard models provide unequivocal evidence that child mortality risk associated with having a divorced mother is substantially elevated in settings where it is remains rare and stigmatized compared to those where it is more common. Although our data do not allow us to directly confirm that heightened social disapproval and stigma is the prime mechanism driving the elevated mortality risk of divorce where it is rare, we find no evidence that differential access to socioeconomic resources at either the contextual or household levels account for this finding. In fact, descriptive statistics confirm that of all African children with divorced mothers, those living in settings where it is rare are the most likely to live in wealthy households, making their substantially elevated risk of mortality *despite* these advantages particularly striking.

Although considerable research has focused on the stigmatizing experience of particular health concerns, such as mental illness (Rosenfield 1997) or HIV/AIDS (Simbayi et al. 2007), sociologists have given less attention to how the stigma associated with other labels—such as divorce—may create persistent health problems for individuals. Even less work has assessed if these processes operate intergenerationally, spilling over to disadvantage children of the stigmatized. Evidence that the prevalence of divorce, and in turn its social and cultural acceptability, can powerfully moderate its implications for children suggests that this is a fruitful area for future research. Efforts to fully understand how the social and cultural

context imprints the experiences of individual families will require that research on values and attitudes pertaining to family forms be theoretically linked to work on the consequences of family experiences for individuals. There has been a strong research tradition studying the intersection of attitudes, values, and family forms; however, the vast literature on the implications of family for individuals and their children has given little consideration to the broader attitudinal context. The lack of cross-fertilization between these two streams of research is closely related to the (in) availability of data with measures of attitudes, family experiences, and health. Efforts—both theoretical and empirical—to draw interconnections between the social and attitudinal climate, family dynamics, and individuals' experiences will help to sharpen our understanding of how the broader context patterns family experiences, and in turn their implications for individuals.

Such research is particularly important given that structural conditions known to increase divorce, including increased opportunities for women to participate in formalized employment and education, are likely to shift cultural and marital practices in Africa and other world regions in the decades to come. Our findings suggest that the children of women who are at the forefront of this social and cultural change are particularly vulnerable to stigma, discrimination, social isolation, and in turn, health problems. Further research on whether particular resources can buffer some of the social push back that divorced women face where it is rare could inform programmatic efforts to assist them. Of course, higher levels of divorce are not going to undo its negative implications for children—instead, the health disadvantages children with divorced mothers experience remain strikingly large even in places where divorce is common. Thus, research that identifies ways to provide a greater safety net for all children with divorced parents—regardless of the marital context—is also of continued importance.

Although this multinational study innovatively demonstrates that the prevalence of divorce, and in turn its social acceptability, can shift its implications for children, the limitations of our data constrain our study in important ways. For instance, we have only crude information on children's family structure, with no information on related matters such as the pre-divorce quality of the marriage or paternal involvement during the post-divorce period. These factors are likely to influence the wellbeing of children whose parents divorce and could operate differently across high versus low divorce settings, and thus could drive some of the observed differences across contexts. Because we are limited in our specification of family experiences, we are left with little understanding of the particular circumstances surrounding divorce that are known to buffer/exacerbate its consequences for children.

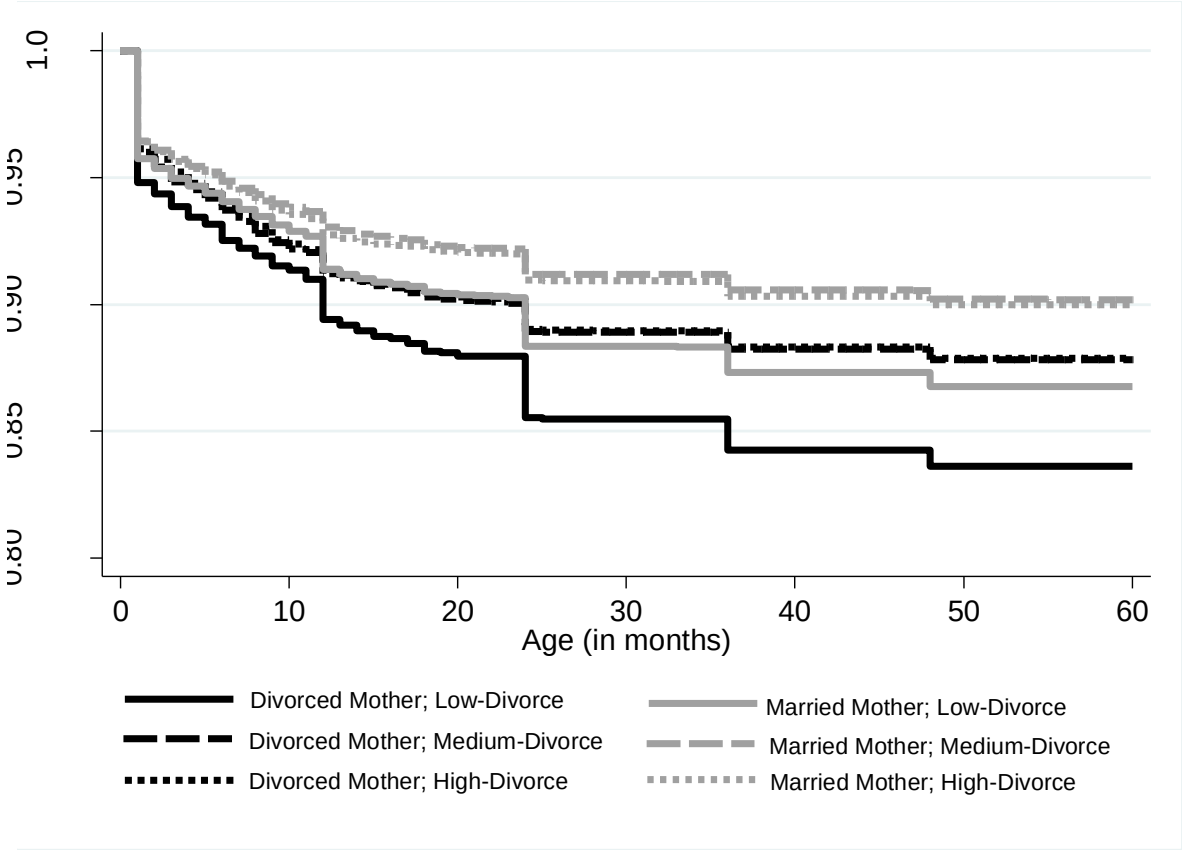
In terms of our interest in the social and attitudinal context , while our effort to approximate the attitudinal environment in which women spend their day-to-day lives using the prevalence of divorce advances the literature in valuable ways, we are unable to capture potential heterogeneity in the acceptability of divorce between social groups or individuals within contexts. Gertstel's (1987) ethnographic work shows that even in contemporary America where divorce is prevalent and bears little stigma some individuals encounter disdain from particular friends or family members. We are unable to capture these potential nuances with the data. The fact that we find significant differences even in spite of these admittedly crude measures supports future efforts to gain a deeper understanding of the heightened challenges divorced women face where it is uncommon.

While future research is needed, this study clearly demonstrates that linking familial processes to child outcomes should be anchored in an understanding of the broader marital and cultural context. Our results demonstrate that having a divorced mother in a setting where it is a more common experience is a markedly different experience than having a divorced mother in a context where it is rare. Our study provides at least preliminary evidence that

stigmatization processes—not merely differential access to socioeconomic resources—are driving the disparate experiences of children with divorced mothers in low versus high divorce settings. Our findings suggest that incorporating stigma and social psychological perspectives more generally into research on family and health holds promise for developing a more nuanced understanding of the dynamic, contextually-dependent relationships.

Figures

Figure 1. Kaplan-meier estimates of child survival by mother's marital status and subnational region-level prevalence of divorce



Source: Demographic and Health Survey

Tables

Table 1. Descriptive Statistics

	Mean	S.D.
Contextual		
Prevalence of divorced women (%)	5.72	3.85
Socioeconomic controls		
Adult female employment (%)	64.99	17.38
Average years of schooling among women	4.13	2.49
Rural (%)	70.26	21.96
Individual		
Family structure		
Mother divorced/separated	5.19	
Mother never married	6.24	
Mother widowed	2.15	
Mother polygynously married	25.94	
Mother married (ref)	60.48	
Mother married more than once	11.01	
Economic and familial resources		
Mother employed	71.25	
Mothers' years of formal schooling	3.33	3.98
Household wealth		
poorest	25.09	
poor	21.58	
average	19.75	
rich	18.12	
richest	15.46	
Additional controls		
Maternal age at birth		
Young mother	18.03	
Average age mother	68.43	
Older mother	13.54	
Birth order	3.68	2.43
Length of preceding birth interval		
First born	21.36	
Short interval	46.63	
Long interval	32.01	
Female	49.34	
Twin status	3.39	
Mother is Muslim	42.15	

N= 545,351 children in 290 subnational regions in 31 African countries

Table 2. Socioeconomic characteristics of subnational regions, by level of divorce

	Low Divorce	Medium Divorce	High Divorce
Contextual			
Socioeconomic factors			
Adult female employment (%)	66.93 (16.61)	61.97 (18.2)	73.35 (11.03)
Years of schooling among women (average)	2.66 (2.53)	4.39 (2.47)	4.80 (1.88)
Rural (%)	73.84 (9.75)	68.33 (23.79)	73.02 (24.04)

N=290 subnational regions in 31 African countries

Table 3. Characteristics of children with divorced mothers, by subnational region-level of divorce

	Low Divorce	Medium Divorce	High Divorce
Economic and familial resources			
Mother employed	73.07	76.82	85.55
Mothers' years of formal schooling	3.45 (4.52)	4.33 (3.95)	4.21 (3.46)
Household wealth			
poorest	17.52	24.72	34.13
poor	17.52	20.12	22.01
average	23.12	18.62	15.38
rich	26.13	18.43	15.76
richest	15.72	18.11	12.72

N=28,832 children with divorced mothers in 290 subnational regions in 31 African countries

Table 4. Multilevel discrete-time hazard models estimating the interrelationships between the prevalence of divorce, family structure, and child mortality in sub-Saharan Africa

	Model 1				Model 2				Model 3			
	OR	Coeff	S.E.	Sig	OR	Coeff	S.E.	Sig	OR	Coeff	S.E.	Sig
Cross-level Interaction												
% Divorced women *Mother divorced/separated					0.990	-0.010	0.005	*	0.990	-0.010	0.005	*
% Divorced women *Mother never married					1.007	0.007	0.005		1.007	0.007	0.005	
% Divorced women *Mother widowed					1.016	0.016	0.008	*	1.017	0.017	0.008	*
% Divorced women *Mother polygynously married					0.997	-0.003	0.003		0.998	-0.002	0.003	
% Divorced women *Mother married (ref)					--				--			
Prevalence of divorced women (%)					0.976	-0.024	0.008	**	0.990	-0.010	0.008	
Family structure												
Mother divorced/separated	1.444	0.283	0.019	***	1.445	0.368	0.043	***	1.490	0.399	0.043	***
Mother never married	1.170	0.157	0.020	***	1.157	0.146	0.037	***	1.211	0.192	0.038	***
Mother widowed	1.332	0.287	0.027	***	1.219	0.198	0.052	***	1.234	0.210	0.052	***
Mother polygnously married	1.203	0.185	0.010	***	1.177	0.163	0.016	***	1.151	0.140	0.016	***
Mother married (ref)	--				--				--			
Mother married more than once	1.345	0.296	0.012	***	1.300	0.263	0.012	***	1.281	0.248	0.012	***
Socioeconomic Factors												
Contextual level												
Female Employment (%)									1.633	0.491	0.131	***
Average years of schooling among women									0.969	-0.031	0.015	*
Rurality									0.913	-0.091	0.100	
Household level												
Mother employed									1.051	0.050	0.010	***
Mothers' years of formal schooling									0.969	-0.031	0.002	***
Household wealth												
poorest									--			
poor									1.011	0.011	0.012	
average									0.944	-0.058	0.013	***
rich									0.896	-0.110	0.014	***
richest									0.771	-0.260	0.018	***
Additional controls												

Maternal age at birth												
Young mother	1.410	0.344	0.013	***	1.353	0.302	0.013	***	0.262	0.013	***
Average age mother (ref)	--				--				--		
Older mother	0.946	-0.055	0.015	***	0.979	-0.022	0.015		-0.017	0.015	
Birth order	1.065	0.063	0.002	***	1.052	0.051	0.002	***	0.042	0.003	***
Length of preceding birth interval											
First born (ref)	--				--				--		
Short interval	1.034	0.034	0.014	*	1.026	0.026	0.014	†	-0.005	0.014	
Long interval	0.573	-0.557	0.016	***	0.579	-0.547	0.016	***	-0.566	0.016	***
Female	0.862	-0.148	0.008	***	0.861	-0.149	0.008	***	-0.149	0.008	***
Twin status	3.660	1.298	0.015	***	3.737	1.318	0.015	***	1.330	0.015	***
Mother is muslim	1.000	0.000	0.001		1.000	0.000	0.001		0.000	0.001	

†p<.1 ; *p<.05 ; **p<.01 ; ***p<.001

Source: Demographic and Health Survey

Models include dummy variables for age and country dummy variables (not shown in the table)

Appendix

Appendix A. List of Countries, Survey Year, and Sample Size

	Survey year	*N*
Benin	2011/12	26,066
Burkina Faso	2010	29,399
Burundi	2010/2011	13,868
Cameroon	2011	22,050
Chad	2004	11,038
Congo (Brazzaville)	2011/12	16,974
Democratic Republic of the Congo	2007	16,384
Ethiopia	2003	23,711
Gabon	2012	11,105
Ghana	2008	5,846
Guinea	2012	13,992
Ivory Coast	2011/12	14,851
Kenya	2008/09	11,600
Lesotho	2009/10	7,224
Liberia	2006/07	11,109
Madagascar	2008/09	25,224
Malawi	2010	38,323
Mali	2006	27,713
Mozambique	2003	16,278
Namibia	2006/07	9,872
Niger	2012	25,015
Nigeria	2008	54,830
Rwanda	2010/11	17,349
Sao Tome Principe	2008/09	3,686
Sierra Leone	2008	23,172
Senegal	2010/11	11,434
Swaziland	2006/07	5,202
Tanzania	2009/10	15,130
Uganda	2011	15,107
Zambia	2007	11,795
Zimbabwe	2010/11	10,004

Source: Demographic and Health Survey

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