Firstborn Daughters and Family Structure in sub-Saharan Africa

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Does the absence of missing baby girls in sub-Saharan Africa imply a lack of son preference in the region? This paper uncovers systematic gendered effects on family structure and fertility in sub-Saharan Africa. Using data from Demographic and Health Surveys, we show that having a firstborn daughter, rather than a son, significantly influences women's family dynamics. Women with a female firstborn experience higher long-term marriage rates but are less likely to marry the child's father when the birth occurs prior to formal union. They also face higher divorce rates and greater likelihood of entering polygamous unions. Despite these marital transitions, they tend to have more children. Our analysis further reveals that having a firstborn daughter is associated with poorer living standards and adverse health outcomes for mothers. To examine the mechanisms driving these patterns, we employ a geographic regression discontinuity design along ancestral ethnic borders separating matrilineal and patrilineal traditions. This approach highlights patrilineality as a key driver, shaping both marriage dynamics and fertility.

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1 Introduction

Son preference is prevalent in the majority of societies worldwide (Williamson, 1976). Biased sex ratios at birth–particularly in South and East Asia–have raised global concerns. Extensive research has explored the roots and consequences of son preference in these regions, highlighting its impact on fertility decisions (Jayachandran and Kuziemko, 2011), sex-selective abortions (Anukriti, Bhalotra, and Tam, 2016), and disparities in parental investments in time, healthcare, and nutrition (Rose, 1999; Jayachandran and Kuziemko, 2011; Jayachandran and Pande, 2017).

In contrast, sub-Saharan Africa presents a different picture. Evidence of missing girls at birth is scarce, with sex ratios at birth largely balanced. Does this imply an absence of son preference? Not necessarily. Anderson and Ray (2017) document excess female mortality across much of the continent (excluding Southern Africa) rather than at birth, while Bongaarts (2013) highlight significantly skewed desired sex ratios in North, West, and Central Africa. Inspired by studies in South and East Asia, scholars have also considered fertility patterns to infer gender preferences. For instance, Rossi and Rouanet (2015) finds a pronounced son preference in North Africa based on birth spacing but detects no such pattern elsewhere in the continent. Meanwhile, Norling (2018) and Cassan, Baland, and Woitrin (2023) find evidence of the "stopping rule" in some sub-Saharan countries, where parents continue having children until they reach a desired number of boys or girls.

Inferring son preference from fertility patterns is relatively straightforward in contexts like India, where childbirth is closely tied to marital stability. However, in sub-Saharan Africa, births to unmarried mothers, polygamy, divorce and remarriage are more frequent.[1] Because a child's sex can influence both the formation and dissolution of marital unions, which in turn affects fertility patterns, studying the impact of son preference in the African context requires analyzing each of these effects jointly.

A number of studies in high-income countries have linked a child's gender to family dynamics such as marriage, divorce, and custody arrangements (Lundberg and Rose, 2003; Lundberg, McLanahan, and Rose, 2007; Dahl and Moretti, 2008; Ichino, Lindstrom, and

[1] In our sample, 20% of first childbirths are to unmarried mothers, 22% of the mothers are in a polygamous union, 3% are currently divorced, and 16% have remarried at least once.

Viviano, 2014; Blau et al., 2020; Kabatek and Ribar, 2020). However, little is known about how son preference shapes family structures in sub-Saharan Africa. Notable exceptions include Dahl and Moretti (2004) on Kenya (in their working paper) and Milazzo (2014) on Nigeria, who show that women with a female firstborn tend to have more children, face higher separation rates, and are more likely to enter polygamous unions. Also related, Lambert, de Walle, and Villar (2017) notes that in Senegal, divorced women with a son from a previous union are less likely to remarry.

This paper investigates how a child's gender influences family structure in sub-Saharan Africa, examining its effects on both mothers' marital status and their fertility. Using data from over 100 DHS surveys across more than 30 countries, we document systematic gender-based disparities in family dynamics pointing to son preference.

When gender preferences affect fertility choices, families with girls may differ significantly from those with boys (Sheps, 1963; Yamaguchi, 1989; Cassan, Baland, and Woitrin, 2023). Hence, our identification strategy assumes that the sex of the firstborn child is exogenous, given that sex-selective abortion is generally not practiced in sub-Saharan Africa (Anderson and Ray, 2017; Chao et al., 2019).

First, we analyze the likelihood of marriage among women whose first childbirth occurred before their first union. Interestingly, women with a firstborn daughter are 1 to 2% more likely to marry in the long run. However, this trend is not driven primarily by immediate marriages. In fact, unmarried mothers with a firstborn daughter appear less likely to marry the child's father.

Next, we explore marital stability and fertility patterns among women whose firstborn was born after their first union. We find that women with a firstborn daughter are 5.1% more likely to be divorced and 1.3% more likely to be in a polygamous union. Despite these effects on polygamy and marital dissolution, women with a firstborn daughter also tend to have more children overall.

Since most couples in our sample desire and have more than one child, using the sex of the firstborn likely provides a lower bound on the effect of a child's sex on family dynamics. Moreover, the patterns we uncover are economically significant. Given that half of all mothers have a firstborn daughter, even small individual effects can translate into large aggregate consequences. We also find that women with a female firstborn tend to live in poorer households, reinforcing evidence on the role of family structure in shaping women's economic well-being (Anderson and Ray, 2019; Brown and Van de Walle, 2021; Djuikom and van de Walle, 2022).

Furthermore, women with a firstborn daughter may face additional challenges, as they appear to have a stronger need to secure a male partner and weaker intra-household bargaining power due to poorer marital outside options and social norms that devalue the absence of a son. These constraints can lead to worse welfare outcomes, including greater exposure to intimate partner violence (IPV) (Aizer, 2010; Anderberg et al., 2016; Baranov et al., 2021; Sanin, 2021; Ansah et al., 2023; Weitzman, 2020) and increased susceptibility to sexually transmitted diseases like HIV (Anderson, 2018).

Consistently, we find that women who had a child outside a union are more likely to contract HIV if their firstborn is a daughter. Similarly, both women and men with a firstborn daughter conceived within a union are more likely to justify IPV, further suggesting weakened bargaining power and heightened vulnerability.

Behind these average effects on marriage patterns, divorce rates, polygamy, and fertility lies substantial heterogeneity across countries. To investigate this, we combine the DHS data with information on ancestral cultural practices to examine how traditional norms interacts with the gender of the first child shape family structure.

A growing literature examines the role of patrilineality, patrilocality, and dowry customs in shaping gender preferences and perpetuating discrimination against daughters (Gupta et al., 2003; Sundaram and Vanneman, 2008; Rossi and Rouanet, 2015; Jayachandran, 2015; Rammohan and Vu, 2018). Practices that elevate the relative value of sons are consistent with most of the female firstborn effects that we observe, but not the higher likelihood of marriage for women with a daughter in the long run. In contrast, patrilineal versus matrilineal inheritance rules is likely to exert a pronounced influence on family structure and result in female firstborn effects aligned with our findings. This is because women in patrilineal societies face more significant setbacks in the event of separation, typically forfeiting land or custody of their children, in contrast to their matrilineal counterparts (Clignet, 1970; Poewe, 1978; Holden, Sear, and Mace, 2003). For these reasons, we hypothesize that patrilineality would be an important driver of the female firstborn effects that we uncovered.

To test this hypothesis, we leverage geographic variation in patrilineal and matrilineal traditions. Since traditional practices can be endogenous to geographic and agricultural factors (Tene, 2023; Alesina, Giuliano, and Nunn, 2013; Alesina, Brioschi, and Ferrara, 2021; Becker, Enke, and Falk, 2020; Alsan, 2015), we supplement OLS estimates with a geographic regression discontinuity design along ethnic borders. This analysis indeed reveal substantial heterogeneity. For women who had a child before marriage, a firstborn daughter reduces short-term marriage prospects by 10% in patrilineal areas but increases them by 10% in matrilineal areas. Furthermore, the increase in fertility following the birth of a firstborn daughter is entirely coming from the patrilineal side of the ethnic border. The effect of a firtstborn daughter is reversed on the maternal side of the border.

Beyond these findings, our paper makes a broader methodological contribution. Studies on birth order and sibling effects (Maynard 2002; Maynard and Tovote 2010; Lancy 2014; Jakiela et al. 2020) must account for family structure selection bias when estimating causal relationships. Similarly, research on parental responses to child gender (Washington, 2008; Shafer and Malhotra, 2011; Glynn and Sen, 2015; Cronqvist and Yu, 2017) must consider potential endogeneity in household composition that potentially affect inclusion in the study.[2]

The paper is organized as follows. Section 2 describes the data and main identification strategy. The effects of a female firstborn on family structure are shown in Section 3. Section 4 investigates some welfare consequences for women who have a female firstborn. Section 5 presents the heterogeneity results by traditional ethnic practice, including the

[2]For instance, researchers finding a positive correlation between having a female eldest sister and the educational attainment of younger siblings might be tempted to attribute a causal interpretation to this effect, assuming the exogeneity of the firstborn's gender. However, if having a female firstborn child increases the likelihood of divorce or polygamy, resulting in more children living with mothers, and if the survey of interest primarily registers sons and daughters living with the head of the household (who are typically male), then any ordinary least squares (OLS) model would yield biased estimates if parental characteristics associated with divorce or polygamy are also correlated with the educational outcomes of younger siblings (e.g., parental time allocation, gender attitudes, etc.). Similar concerns arise in studying the impact of children's gender on parental outcomes (e.g., among judges or politicians) if their marital status is affected by the gender of their children and affect their career.

regression discontinuity results. Finally, Section 6 concludes.

2 Data and Descriptive Statistics

2.1 Demographic and Health Surveys Data

To study women's outcomes, we utilize data from the Demographic and Health Surveys (DHS) conducted by USAID in sub-Saharan Africa post-1994. These nationally-representative household surveys provide data for a wide range of household- and individual-level outcomes. We specifically use surveys for which geo-located cluster data is available, totaling 106 DHS surveys from 34 countries. For more information on the DHS surveys and the waves included in this paper's analysis, see Appendix A.

The main analytical sample comes from the DHS Woman's Questionnaire, which is administered to women aged 15-49, collecting data on a large variety of outcomes, including women's complete birth history. This information is used to list all children that the respondent has given birth to, with information on the child's sex, date of birth, survival status, and whether the child (if alive) resides in the same household as the mother.

The DHS surveys provide geographic coordinates for each DHS sampling unit (DHS cluster), with random displacements of 0 to 2 km for urban clusters and 0 to 5 km for rural clusters. To match households' locations to specific geographic areas, we utilize the Stata function *geoinpoly* (Picard 2015). We perform this matching process with both the Murdock ethnic boundary map (Murdock 1959) and with current administrative boundaries.[3]

2.2 Customs Variables

The matching of the DHS surveys with Murdock's ethnic group boundary map allows us to assign traditional practices, such as kinship, to each respondent based on their geographic location. In addition, we match individuals to traditional practices using self-reported eth-

[3] The information on subnational administrative areas comes from the DHS geographic data and GIS data available at DIVA-GIS.

nicities at the respondent level, employing the University of Zurich's Atlas of Pre-colonial Societies data. This dataset is an update of Murdock's *Ethnographic Atlas* with ethnographic information for 1,267 ethnic groups and includes over one hundred ethnographic variables from societies prior to industrialization (see Appendix A for details).[4]

2.3 Sample and Descriptive Statistics

Our analytical sample includes all women who have ever given birth and for whom birth records, age, and years of education information are available, totaling 927,809 women. Table 1 presents summary statistics for the full sample (columns (1)-(2)). On average, women in the sample are 31 years old and have 4.26 years of education. Twenty percent of women had their first child before entering their first marriage or cohabitation, if any. In terms of geographic location, 67% of the women live in rural areas and ancestral patrilineal ethnic regions. For a subset of surveys, additional information is available on the duration of residence in their current location and their religious affiliation. Among women with migration history data, 43% have always lived in their current residence. Among women with religious affiliation data, 59% report being Christian, while 35% identify as Muslim.

3 Firstborn Girls and Family Structure

The intricate interplay between family structure and the number and gender composition of children complicates efforts to isolate the specific impact of a child's gender on family structure. When gender preferences affect fertility choices, families with girls may differ significantly from those with boys (Sheps 1963; Yamaguchi 1989; Cassan, Baland, and Woitrin 2023). However, by conditioning on the birth of a child, the sex of the firstborn can be treated as a quasi-random event. This allows for an examination of the impact of the child's sex on family dynamics.

[4] https://www.worlddevelopment.uzh.ch/en/atlas.html. We are grateful to Alessandra Voena for sharing with us a merge file between the ethnic groups in the DHS and the University of Zurich's Atlas of Pre-Colonial Societies, and to Sara Lowes for sharing an updated version.

Table 1: Women's Descriptive Statistics and Balance Test

	(1) Mean/St.dev.	(2) Obs.	(3)	(4)	(5) Female firstborn = 1	(6)	(7)
15–20	0.09	927,809					
	[0.29]						
21–30	0.40	927,809	0.001	0.001	0.001	0.002	0.002
	[0.49]		(0.608)	(0.553)	(0.770)	(0.481)	(0.461)
31–40	0.33	927,809	–0.003	–0.003	–0.008	–0.003	–0.003
	[0.47]		(0.397)	(0.377)	(0.117)	(0.388)	(0.417)
+40	0.18	927,809	–0.007	–0.007	–0.011		–0.007
	[0.39]		(0.211)	(0.170)	(0.103)		(0.196)
First child born before union	0.20	927,809	0.002	0.001	0.001	0.001	–0.000
	[0.40]		(0.220)	(0.418)	(0.687)	(0.408)	(0.850)
Firstborn alive	0.85	927,809	0.048***	0.049***	0.048***	0.053***	0.050***
	[0.35]		(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Years of education	4.26	927,809	–0.000	–0.000*	–0.000	–0.000**	–0.000**
	[4.53]		(0.803)	(0.056)	(0.122)	(0.012)	(0.033)
Rural	0.67	927,809	–0.001	–0.002	–0.000	–0.001	
	[0.47]		(0.451)	(0.220)	(0.908)	(0.576)	
Patrilineal area	0.67	927,809	0.000				
	[0.47]		(0.979)				
Matrilineal area	0.13	927,809	0.001				
	[0.34]		(0.606)				
Always in current residence	0.43	606,117			0.000		
	[0.50]				(0.746)		
Christian	0.59	863,523					0.002
	[0.49]						(0.421)
Muslim	0.35	863,523					–0.004
	[0.48]						(0.267)
Other religion	0.06	863,523					
	[0.24]						
Outcome mean			0.488	0.488	0.489	0.489	0.488
Country FE			Yes	Yes	Yes	Yes	
Woman's year of birth FE			Yes	Yes	Yes	Yes	Yes
Survey year FE			Yes	Yes	Yes	Yes	Yes
Ethnic area FE				Yes	Yes	Yes	
Exclude 40+						Yes	
DHS cluster FE							Yes
Observations			927,809	927,809	606,117	757,104	863,507

Notes: This table presents summary statistics of all women included in this paper's analytical sample. Column (1) present sample mean and standard deviation. Column (2) presents number of observations with non-missing values. Columns (3) to (6) present the coefficient and correspondent p-value, respectively, of an OLS regression of an indicator variable equal to one of the woman's firstborn child was female regressed on women's observable characteristics. Standard errors are clustered at the DHS sampling unit.

3.1 Identification Strategy

Our identification strategy treats the sex of the firstborn child as a random event, assuming that in the absence of selective fetal or maternal mortality, natural male-to-female birth ratios should range between 1.03 and 1.06 (Anderson and Ray 2010).

Sex-selective abortion is not a common practice in sub-Saharan Africa. As of 2019, 92% of the region's women of reproductive age lived in countries with highly or moderately restrictive abortion laws, which either prohibit abortion altogether or restrict it to cases where a woman's life or health is at risk. Moreover, most women in the region still experience pregnancy without a single ultrasound examination (Sippel et al. 2011), further limiting the scope for prenatal sex selection.

Consistent with this and prior research in sub-Saharan Africa (Anderson and Ray 2017; Chao et al. 2019), we find no abnormal birth sex ratios among firstborn children in our sample. The average male-to-female birth ratio is 1.04, with minimal geographic or cohort heterogeneity. We considered the possibility of regional differences driven by genetic or environmental factors (Anderson and Ray 2010; Pavic 2015) and cohort variations due to extreme events such as famines or natural disasters (Tan et al. 2009; Song 2012; Nandi, Mazumdar, and Behrman 2018). However, in our sample, geographic-cohort effects explain at most 3% of the variation in rural areas and 6% in urban areas, even after accounting for administrative boundaries, ancestral ethnic regions, and cohort trends (Tables B1-B3).

While we find no evidence of systematic distortions in birth sex ratios, potential non-random heterogeneity in women's characteristics could pose identification concerns. One key issue is selective mortality, where having a female firstborn could influence sample selection if maternal health outcomes differ based on child sex. If firstborn daughters negatively affect maternal health, women with female firstborns may have higher mortality rates, leading to selection bias in observed family structures. Empirical evidence suggests that selective mortality may be relevant. Consistent with findings from Nigeria (Milazzo 2014) and Tanzania (Genicot and Hernandez-de Benito 2022), we observe a declining male-to-female birth ratio after age 40, indicating possible selection effects. However, once we control for mothers' birth cohorts, these differences disappear statistically, even in rural areas (Tables B1-B3). To mitigate this concern, we conduct robustness checks that exclude women aged 40 in the empirical analysis.

Another potential issue is whether the sex of the firstborn child correlates with observable maternal characteristics, which could undermine the assumption of random assignment. We test this by regressing the probability of having a female firstborn on women's observable characteristics, controlling for cohort and geographic heterogeneity. Columns (3)-(7) of Table 1 report these regression results, which account for country, birth cohort, survey year, ethnic area, and DHS sampling unit fixed effects.

A last potential concern could be recall bias if unobserved characteristics of women that influence the probability of misremembering the sex of their firstborn are correlated with family structure outcomes. Generally, it seems fairly unreasonable that a large enough proportion of women would misreport the sex of their firstborn child to the extent that it would impact the conclusions drawn from the empirical analysis. Moreover, our robustness checks, which exclude women aged 40 and above as well as parents whose first child is no longer alive, should alleviate any remaining concern.

Throughout our analysis, we often partition the regression sample into two subsamples: women whose firstborn child was born before their first union (if applicable) and women whose firstborn child was born after their first union. In both cases, birth sex ratios remain within the natural range (1.03 and 1.05, respectively), and maternal characteristics do not predict firstborn sex (Tables B4-B5).[5] On average, women in the first group (firstborn before union) tend to have more years of education, are less likely to reside in rural areas, and are more likely to identify as Christian compared to women whose firstborn child was born after their first union.

3.2 Empirical Strategy

This section tests whether the sex of the firstborn child affects the mother's family structure. The main regression model is specified as follows:

$$y_{iect} = \beta \mathit{Female\ firstborn}_i + X_i' \Gamma + \alpha_c + \lambda_e + \delta_t + \epsilon_{iect}, \tag{1}$$

[5]Subsamples are constructed using the child's date of birth (DHS: *kiddobcmc*) and the date of the woman's first marriage or cohabitation (DHS: *mar1stcmc*).

where y_{iect} is the outcome of interest for woman i residing in ethnic area e, country c and survey year t. $Female\ firstborn_i$ is an indicator variable equal to one if her firstborn's sex is female, and zero otherwise. X_i is a vector of covariates for woman i, including age, age squared, years of education, an urban-rural dummy, and cohort fixed effects, as well as covariates for woman's i's firstborn, including age, age squared, and survival status. We also include fixed effects for country α_c, ethnic area λ_e, and survey year δ_t. We cluster standard errors at the DHS sampling unit (cluster) level.

To account for local unobserved heterogeneity, we will report results using the most restrictive DHS cluster fixed effects, as opposed to λ_e, and also include religion fixed effects. As discussed in section 2.3, this specification includes fewer observations because not all DHS surveys collect religion information.

In addition to presenting the estimated coefficient of interest, $\hat{\beta}$, we will also adopt the approach of Dahl and Moretti (2008) to report the male firstborn baseline and percent effects. The male firstborn baseline is calculated as the average predicted outcome variable for women with a male firstborn child using the estimated coefficients on the control variables. This allows us to also report the "percent effect", the ratio of $\hat{\beta}$ to the male firstborn baseline, which is equivalent to the odds ratio minus one.

Finally, to capture the dynamic effects of having a female firstborn over time, we extend equation (1) by interacting the $Female\ firstborn_i$ indicator with 5-year intervals (a) since the birth of the first child, while also including interval fixed effects μ_a:

$$y_{iect} = \sum_a \beta_a Female\ firstborn_i \times \mathbb{1}\{\text{Years since birth} = a\} + X_i'\Gamma + \alpha_c + \lambda_e + \delta_t + \mu_a + \epsilon_{iect}. \quad (2)$$

3.3 Results: Effect of Having a Female Firstborn on Family Structure

Women With a First Daughter Are More Likely to End Up Married

We first examine whether a child's sex affects the probability of marriage among women whose first child was born "out of wedlock". We do not find a significant effect of the

Table 2: Effect of Female Firstborn on Subsequent Marriage

			Years since Birth			
			< 5		≥ 5	
	(1)	(2)	(3)	(4)	(5)	(6)
Female firstborn	0.004**	0.006***	-0.001	0.001	0.005***	0.007***
	(0.027)	(0.002)	(0.698)	(0.902)	(0.008)	(0.003)
Ind. controls	✓	✓	✓	✓	✓	✓
Year FE	✓	✓	✓	✓	✓	✓
Religion FE		✓		✓		✓
Country FE	✓		✓		✓	
Ethnic area FE	✓		✓		✓	
DHS cluster FE		✓		✓		✓
Male baseline	0.69	0.68	0.30	0.27	0.82	0.81
Percent effect	0.55	0.89	-0.49	0.24	0.61	0.81
Observations	187,751	169,927	47,801	33,940	139,905	123,083

Notes: This table presents OLS regressions where the dependent variable is an indicator variable = 1 if the respondent ever got married after the birth of their firstborn. The sample is limited to women whose firstborn child was born before ever been in a union. Columns (3)-(6) restrict the sample based on the number of years since the firstborn child was born relative to the date of the survey. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. p-values reported in parentheses. Standard errors are clustered at the DHS sampling unit.

firstborn's sex on the likelihood of marrying during pregnancy (Table B6), which provides further evidence against sex-selective abortion. Therefore, to analyze the impact of the firstborn child's sex on union formation, we restrict the sample to the 20% of women whose first child was born before their first marriage or cohabitation, if any.[6]

Table 2 presents the results of estimating equation (1) with the outcome variable equals one if the respondent ever entered a marriage or cohabitation. The coefficient estimates show that women whose firstborn is female are 0.4-0.6 percentage points more likely to be eventually married than those with a male firstborn (columns (1)–(2)). This effect corresponds to an increase of 0.6-0.9% in the probability of subsequent marriage.

[6]Using data from the DHS surveys, we compare the birthdate of the first child with the date of the first union to determine whether the firstborn was born before or after the union. Approximately 36% of women were pregnant before their first union, and 44% of these women married during pregnancy. This implies that about 20% of women had their first child before entering a union.

Though Not to the Father of the Child

The above findings on marriage combine the likelihood of what is often termed a "shotgun marriage", defined as marrying the father of the child shortly after birth, with future marriage outcomes of the mother. To distinguish between "shotgun" and "subsequent" marriages, we analyze the results in two subsamples. Columns (3) and (4) of Table 2 restrict the sample to women whose first child was born no more than five years prior to the survey, capturing the likelihood of a shotgun marriage. Columns (5) and (6), in contrast, focus on women whose firstborn was born more than five years ago, assessing the long-term likelihood of marriage.

The results suggest that having a daughter increases the probability of subsequent marriage over the long term but not the likelihood of shotgun marriage. In Figure 1a, we observe that the increased probability of marriage associated with having a female firstborn peaks 5-10 years after the child's birth, with an increase of 1.2 percentage points. Furthermore, half of the women who marry after the birth of their first child do so within 30 months, and 72% do so within five years. This timing makes it unlikely that delayed shotgun marriages (marrying the firstborns father) account for the observed patterns.

To further investigate, we construct an indicator variable equal to one if the woman's husband in the household is the biological father of her firstborn child for the subsample for which the information is available.[7] The analysis reveals that the probability of the woman's husband being the biological father of her firstborn child is 1.6-2.6 percentage points lower if the child is a girl rather than a boy (Table 3).

Compared to prior findings from higher-income countries, our results indicate an opposite trend. Dahl and Moretti (2008) find that women in the US whose first child is female are 0.09 percentage points more likely to have never been married compared to women whose first child is male. In contrast, our findings suggest an overall higher probability of marriage. Our results are in line with those of Lambert, de Walle, and Villar (2017), who,

[7] This analysis is restricted to married women in their first union whose firstborn child resides in the household and whose partner is listed in the household roster. We exclude women for whom information on the firstborn's father is unavailable due to a missing household identifier. Table B7 shows that this information is slightly less available for female firstborns, but the difference becomes statistically insignificant when restricting the sample to firstborns who are neither adolescents nor adults.

Table 3: Subsequent Marriage: Probability of Firstborn's Child Living with Father

			Years since Birth ≤ 12	
	(1)	(2)	(3)	(4)
Female firstborn	-0.016***	-0.023***	-0.016***	-0.026***
	(0.000)	(0.000)	(0.000)	(0.002)
Ind. controls	✓	✓	✓	✓
Year FE	✓	✓	✓	✓
Religion FE		✓		✓
Country FE	✓		✓	
Ethnic area FE	✓		✓	
DHS cluster FE		✓		✓
Male baseline	0.87	0.88	0.88	0.89
Percent effect	-1.80	-2.62	-1.87	-2.93
Observations	27,258	14,907	19,611	8,838

Notes: This table presents OLS regressions where the dependent variable is an indicator variable = 1 if the firstborn's father identifier coincides with the mother's current husband identifier. The sample is limited to women whose firstborn child was born before ever been in a union, who are currently in their first union, and whose firstborn child lives with her at the date of the survey. Columns (3)-(4) further restrict the sample to women whose firstborn child was born twelve or less years ago. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. p-values reported in parentheses. Standard errors are clustered at the DHS sampling unit.

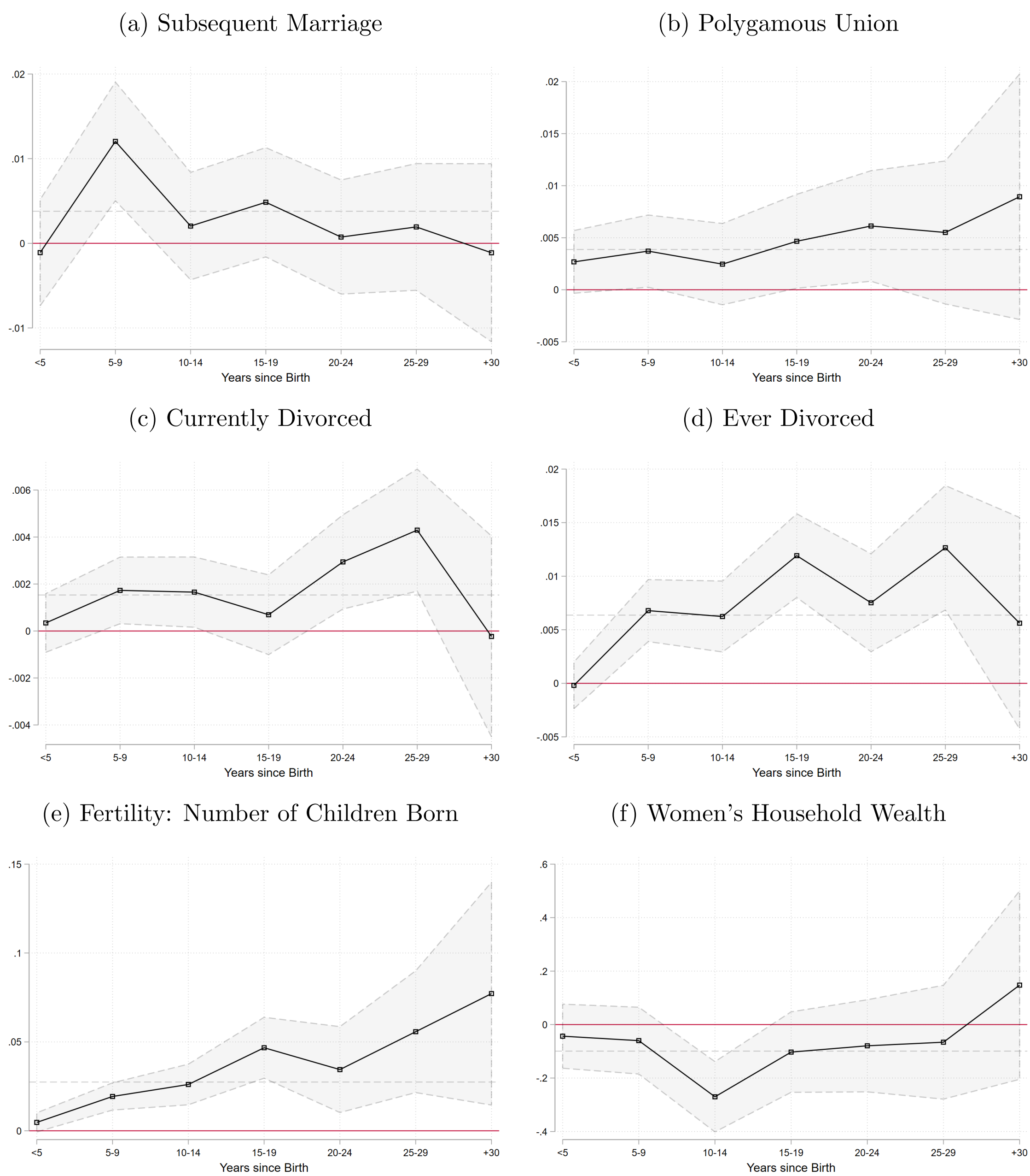
in the context of Senegal, find that female divorcees without a son from a previous union are more likely to remarry.

Women with a Firstborn Girl Are More Likely to Be in a Polygamous Union

We then examine the effect of a child´s sex on post-marital outcomes among the subsample of women whose first child was born after the date of their first marriage or cohabitation (80% of the sample). Table 4 presents the results. We first consider polygamous marriage. In columns (1) to (4), the dependent variable is an indicator variable equal to one if the respondent is currently in a polygamous marriage, with columns (3) and (4) restricting the sample to women currently in a union.

The probability of being in a polygamous marriage increases by 1.2-1.4% for women whose firstborn child is female compared to those whose firstborn is male. Given that polygamy is twice as prevalent among women who self-identify as Muslim (38% of this sample), it is unsurprising that the effect is twice as large within this subsample (Table B8) and closer to the 3.5% effect found by Milazzo (2014) in Nigeria.

Figure 1: Female Firstborn Effect by Years since Firstborn's Birth



(a) Subsequent Marriage (b) Polygamous Union

(c) Currently Divorced (d) Ever Divorced

(e) Fertility: Number of Children Born (f) Women's Household Wealth

Notes: These figures display the estimated $\hat{\beta}_a$ coefficients for *Female firstborn*$_i \times \mathbb{1}\{\text{Years since birth} = a\}$, obtained from the estimation of equation (2). The grey dashed horizontal line represents the corresponding $\hat{\beta}$ estimate from equation (1).

Table 4: Effect of Female Firstborn on Polygamy and Divorce

	Polygamous Marriage				Divorced			
			Currently in Union		Currently		Ever	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Female firstborn	0.003***	0.003***	0.004***	0.004***	0.002***	0.001***	0.006***	0.006***
	(0.001)	(0.003)	(0.000)	(0.001)	(0.000)	(0.000)	(0.000)	(0.000)
Ind. controls	✓	✓	✓	✓	✓	✓	✓	✓
Year FE	✓	✓	✓	✓	✓	✓	✓	✓
Religion FE		✓		✓		✓		✓
Country FE	✓		✓		✓		✓	
Ethnic area FE	✓		✓		✓		✓	
DHS cluster FE		✓		✓		✓		✓
Male baseline	0.24	0.24	0.27	0.27	0.03	0.03	0.17	0.17
Percent effect	1.32	1.17	1.43	1.30	5.08	5.17	3.79	3.53
Observations	740,053	686,421	657,740	610,684	740,053	686,421	740,053	686,421

Notes: This table presents OLS regressions where the dependent variable is an indicator variable = 1 if the respondent is currently in a polygamous marriage (columns (1)-(4)), currently divorced (columns (5)-(6)), and ever divorced (columns (7)-(8)). The sample is limited to women whose firstborn child was born after been in a union. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. p-values reported in parentheses. Standard errors are clustered at the DHS sampling unit.

Marital Dissolution Is More Likely Following a First Born Daughter

Table 4 also reports results on marital dissolution. Women with a firstborn daughter are more likely to experience marital dissolution, with the probability of being currently divorced increasing by over 5% (columns (5)-(6)). The effect is even larger and more consistent effects are observed when using an alternative measure, "ever divorced," defined as a dummy equal to 1 if the woman is currently divorced or has had multiple unions by the survey date (columns (7)-(8)). This is a proxy as it may also capture remarriage following widowhood in addition to divorce. In Appendix Table B9, we confirm similar patterns when limiting the sample to surveys with detailed marital histories, which allows us to distinguish between widowhood and divorce. This subsample also confirm that having a female firstborn does not influence the probability of ever being widowed.

Figure 1 shows that, as with polygamy, the increased probability of divorce does not materialize immediately after the firstborn's birth but instead grows over time.

Our findings from sub-Saharan Africa align with existing literature linking daughters to

Table 5: Effect of Female Firstborn on Fertility

	All		Firstborn Before Union		Firstborn After Union	
	(1)	(2)	(3)	(4)	(5)	(6)
Female firstborn	0.024***	0.022***	0.016**	0.013*	0.027***	0.023***
	(0.000)	(0.000)	(0.021)	(0.095)	(0.000)	(0.000)
Ind. controls	✓	✓	✓	✓	✓	✓
Year FE	✓	✓	✓	✓	✓	✓
Religion FE		✓		✓		✓
Country FE	✓		✓		✓	
Ethnic area FE	✓		✓		✓	
DHS cluster FE		✓		✓		✓
Male baseline	3.92	3.91	3.33	3.31	4.06	4.06
Percent effect	0.62	0.56	0.48	0.39	0.68	0.58
Observations	927,809	863,507	187,751	169,927	740,053	686,421

Notes: This table presents OLS regressions where the dependent variable is the number of children the female respondent ever gave birth to. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. p-values reported in parentheses. Standard errors are clustered at the DHS sampling unit.

a higher probability of divorce (Morgan, Lye, and Condran 1988; Bedard and Deschenes 2005; Dahl and Moretti 2008; Kabatek and Ribar 2020). In terms of magnitude, our point estimate is larger than Dahl and Moretti 2008 for the US, representing a nearly fourfold increase in percentage terms. In the Netherlands, Kabatek and Ribar (2020) find that daughters increase divorce risk only during ages 13-18, whereas we observe these effects emerging much earlier (Figure 1).

Women With a Female Firstborn Have More Children

Looking at overall fertility effect, Table 5 reports the results of estimating equation (1) using the number of children a woman has given birth to by the time of the survey. On average, women with a firstborn daughter have 0.02-0.03 more births compared to those with a firstborn son. This effect is consistent across subsamples, regardless of whether the first child was born before or after the first union. Figure 1e further shows that the fertility effect grows steadily with the number of years since the birth of the firstborn.

Even in the presence of son preference, these significant effects on total fertility might not be expected for three reasons. First, the fertility effect may be offset by women's increased likelihood of lacking a partner or being in a polygamous union. In line with this, Table

B10 shows larger fertility effects for women in their first union, but, the effect remains significant even when excluding this subsample (Table B11). Second, our sample includes women of varying ages, some of whom may not have completed their reproductive years, introducing potential downward bias on the effect on total fertility. Restricting the analysis to women over 40—who are more likely to have completed childbearing—reveals that the effect of a firstborn daughter on fertility exceeds 0.03 (Table B12). Third, the majority of couples desire more than one child. In our sample, 90% of men and 80% of women report ideal family sizes exceeding two and three children, respectively. Thus, the firstborn's sex might have only a modest impact on decisions regarding second and higher order births (Dahl and Moretti, 2008). However, we find that having a firstborn daughter increases the likelihood of having k or more children starting at $k = 2$ (Table B13), suggesting that part of the fertility effect operates through shorter birth intervals (Rossi and Rouanet, 2015). Consistent with this, we find that women with a female firstborn experience a shorter birth interval to their second child (Table B14).

These fertility effects are smaller than those observed in India, a context well-known for strong son preference where mothers are almost universally married, and separations are too rare to register. Prior to the introduction of ultrasounds and sex-selective abortion, Anukriti, Bhalotra, and Tam (2016) estimated that women with a firstborn daughter had 0.155 more births than those with a firstborn son—an effect that disappeared following the spread of ultrasound technology. However, our findings are substantially larger than those reported in high-income countries. In the United States, Dahl and Moretti (2008) finds no fertility effect of female firstborns among married couples but documents a lower likelihood of marriage and remarriage. Consistent with this, Blau et al. (2020) shows that female firstborns are associated with reduced fertility, particularly among native-born populations. Similarly, Ichino, Lindstrom, and Viviano (2014) report that in several high-income countries, women with firstborn sons, as opposed to daughters, are more likely to have additional children due to increased marital stability.

3.4 Robustness Checks

Persistence. Our main analysis pools survey data from the 1990s to 2022, introducing heterogeneity in the calendar years when firstborns were born. Given the potential evolution of social norms and socioeconomic conditions, we do not necessarily expect homogeneous effects across firstborn cohorts. To explore this, we run separate regressions for each outcome, fully interacting equation (1) with dummies for the decade of the firstborn's birth (Table B15). Results reveal persistent effects across decades. The impact of having a female firstborn on subsequent marriage is smaller for firstborns born after 2010, aligning with the delayed nature of family structure effects. Similarly, fertility effects weaken over time, likely reflecting incomplete fertility histories for recent cohorts.

Selective Mortality. To address concerns about selective mortality, we exclude women over 40 at the time of the survey. The results remain consistent, demonstrating robustness to potential age-related selection biases (Table B16). Additionally, we control for the firstborn's survival status. While boys generally face higher early mortality (Pongou, 2013), excess female child mortality is well-documented in sub-Saharan Africa, with an estimated 425,000 additional female deaths annually for children aged 0–14 (Anderson and Ray, 2017). Splitting the sample by firstborn survival status confirms that differential child mortality does not drive our results (Tables B17-B18). If anything, including women whose first child is deceased in the sample attenuates the point estimates.

Local Factors and Migration. The main specifications include fixed effects for DHS sampling units, ensuring that results are not biased by time-invariant local factors influencing residence choices based on the sex of the first child. To further examine robustness, we stratify the sample by migration status, distinguishing between women who have always lived in the same location and those who have moved. This analysis, presented in Tables B19-B20, suggests that migration does not significantly mediate the observed effects.

Outlier Effects. Finally, we re-estimate equation (1) for each outcome, systematically excluding one country at a time to rule out the influence of outliers. The results remain robust across all country exclusions (Table B21).

These robustness checks collectively confirm that our main findings are not driven by cohort heterogeneity, selective mortality, migration, or outlier countries.

4 Female Firstborn Welfare Impact

4.1 Magnitude of the Effects

The findings show child's sex affects family structure through changes in women's marital status, marriage structure, and fertility. The coefficients are small but the effects are sizable as one mother in two has a firstborn daughter. Within the period spanning from 1980 to 2020, an average of approximately 3,257,076 firstborn daughters were born in sub-Saharan Africa each year.[8] Our results imply that the presence of firstborn daughters led to an annual increase of roughly 72 thousand births, resulting in an overall surplus of about 2.9 million births over the course of the last four decades.[9]

Beyond birth statistics, we can predict the annual number of additional subsequent marriages and divorces on the continent due to the births of firstborn girls as opposed to boys. Out of approximately 223,540,630 women who had children in 2020,[10] around 44,708,126 (20%) had a child prior to their first union. Given our estimates, a firstborn daughter (49% of these women) results in more than 130 thousand additional marriages per year. The rest of these women, around 178,832,500, had their firstborn after their first union. Our estimates predict that firstborn daughters will result in an additional half million of these women being ever divorced.

[8] We estimate the total number of firstborn girls born each year by multiplying the total number of new births by 24% (the average proportion of firstborn children from the DHS surveys) and by the annual sex birth ratio. Both the number of new births and the sex birth ratio are sourced from: United Nations, Department of Economic and Social Affairs, Population Division (2022). *World Population Prospects 2022*, Online Edition.

[9] We multiply the estimate of 3,257,076 firstborn daughters born in each year with our estimate (0.024) of column (1) of Table 5.

[10] By multiplying the female population in 2020 by the proportion of women aged 15 to 64 sample (55%, source: United Nations Population Division. World Population Prospects: 2024 Revision.) and the proportion who have children (73% in our DHS sample), we estimate a total of 223,540,630 women.

4.2 Wealth Effects

There is substantial evidence that family structure significantly affects the well-being of both adults and children. Brown and Van de Walle (2021) document higher poverty rates among female-headed households, particularly when the female head is unmarried. For women, the cost of being unmarried is notably steep, as demonstrated by significant excess female mortality among unmarried individuals in Africa, as found by Anderson and Ray (2019). A natural question that arises in our setting is whether the observed impacts on family structure translate into women with firstborn daughters living in poorer households compared to those with firstborn sons.

Without access to a full consumption module, answering this question directly is challenging. To address it indirectly, we merge our sample with the International Wealth Index (IWI), an indicator constructed by Smits and Steendijk (2015) from the household modules of DHS surveys. The IWI ranks households on a common scale, measuring material well-being based on possession of durable goods, access to basic services, and housing characteristics.[11] The IWI scale is additive, ranging from 0 to 100. As expected, the distribution in our sample is heavily right-skewed: 50% of households score below 26, and 75% score below 48 (see Figure B1).

[11] The International Wealth Index (IWI) is constructed using data from 2.1 million households across 165 surveys conducted between 1996 and 2011 in 97 low- and middle-income countries. It is based on a well-established set of assets (Smits and Steendijk 2015). In over 75% of the surveys used in this paper, the correlation between the IWI and DHS survey-specific wealth indices exceeds 0.90, with the lowest observed correlation being 0.77.

Table 6: Effect of Female Firstborn on Wealth, HIV and IPV Justification

	Firstborn Before Union				Firstborn After Union						
		HIV				HIV			IPV Attitudes		
	Wealth (1)	All (2)	High HIV (3)	IPV Att. (4)	Wealth (5)	All (6)	High HIV (7)	High HIV & polyg. (8)	All (9)	Married 1st union (10)	Husband´s Att. (11)
Female firstborn	-0.066	0.006	0.011**	0.004	-0.116***	-0.000	-0.001	0.022**	0.011***	0.012***	0.021*
	(0.358)	(0.127)	(0.045)	(0.560)	(0.000)	(0.794)	(0.752)	(0.012)	(0.004)	(0.007)	(0.056)
Ind. controls	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Year FE	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Religion FE	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
DHS cluster FE	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Male baseline	38.22	0.13	0.18	1.17	31.18	0.07	0.13	0.08	1.59	1.61	0.69
Percent effect	-0.17	4.80	6.35	0.38	-0.37	-0.55	-0.70	25.97	0.70	0.76	3.00
Observations	166,579	47,734	31,696	156,149	673,108	178,830	81,391	7,672	633,360	474,984	59,590

Notes: This table presents OLS regressions where the dependent variable is the women´s household international wealth index (columns (1) and (5)), an indicator variable if the respondent is HIV positive (columns (2)-(3) and (6)-(8)), and the number of reasons respondent find justifying for wife-beating (columns (4) and (9)-(11)). High HIV prevalence restricts the sample to ethnic areas with hiv rates above the sample´s median. The HIV regressions use HIV sample weights. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. p-values reported in parentheses. Standard errors are clustered at the DHS sampling unit.

We observe that women whose first child was a girl live in poorer households at the time of the survey (columns (1) and (5) of Table 6).[12] The negative effect is larger and statistically significant for women whose first child was born after entering a union. In Figure 1f, we observe that the negative effect peaks 10–14 years after the birth of the first child.

4.3 Other Welfare Impacts

The previous section showed that having a firstborn daughter can lead to material disadvantages for women. To be sure, the greater demands on marriage and increased marital instability associated with firstborn daughters is likely led to other negative consequences for women's welfare. The increased marital instability and pressure to secure partners associated with firstborn daughters is likely to diminish women's bargaining power in relationships and to settle for worse and riskier relationships to secure a partner, possibly due to the desire, or need, to have a son.

This decrease in bargaining power may manifest itself in concerning health and safety outcomes, particularly higher acceptance of intimate partner violence (IPV) and increased

[12]We estimate equation (1) using the IWI as the outcome variable, restricting the sample to DHS surveys where the IWI is available (96% of the surveys).

rates of HIV infection. Indeed, established research shows how deteriorating options outside marriage can weaken women's bargaining position within relationships, increasing their vulnerability to intimate partner violence (Aizer, 2010; Anderberg et al., 2016; Baranov et al., 2021; Sanin, 2021; Ansah et al., 2023). Parallel evidence from India demonstrates that firstborn daughters increase both the risk and severity of IPV in states with skewed sex ratios at birth (Weitzman, 2020). Similarly, Anderson (2018) attributes higher female HIV rates in common law countries to married women's weaker property rights compared to civil law countries, which limits their ability to refuse sexual demands.

Recall that we found that women who had a child prior to their first union are less likely to marry their child's father if the firstborn is a girl, but more likely to subsequently marry. This may lead them to engage in riskier sexual behavior. Our analysis confirms that these women are more likely to contract HIV, with this effect naturally concentrated to ethnic areas with high baseline HIV prevalence (columns (2)-(3) of Table 6).[13] In these areas, the percent effect indicates that the probability of women contracting HIV is 6.3% higher if the first child was female. Among women who were married prior to having a child, columns (6)-(8) of Table 6 shows that the elevated probability of HIV infection is concentrated among those in polygamous households. While the mechanism behind this differential effect is not immediately clear, it may stem from male partner behavior or selection effects in marriage duration, though these interpretations warrant further investigation.

Beyond health outcomes, women's relationship quality appears to be also negatively affected. We find that a female firstborn is associated with a greater acceptance of IPV, measured by the number of reasons they find justifying for wife-beating, with a stronger effect on mothers who had their firstborn after their first union (columns (9)-(10) of Table 6).[14] Importantly, this effect persists even when we restrict our analysis to women who remain in their first marriage, indicating that even women who maintain stable marriages may experience deteriorating relationship quality (column (10)). Finally, restricting the sample to couples who are both in their first marriage, living together, and have the same number of children (to maximize the likelihood that they share the same first born child),

[13]We define high HIV prevalence as ethnic areas with HIV rates above the median, which is 3.8%. In low-prevalence areas, the average HIV rate is 1.7%, while in high-prevalence areas, it is 14.7%.

[14]We do not use the separate module on IPV incidence due to a lack of consistency across DHS surveys in the IPV module's sampling strategy based on women's marital status.

we find evidence that husbands who have a firstborn girl also display greater justification of IPV (column (11)). Note that this effect contrasts with findings suggesting that fathers of daughters tend to adopt more progressive views on gender equality (Borrell-Porta, Costa-Font, and Philipp, 2019; Washington, 2008).

These findings collectively suggest that, beyond economic outcomes, the impact of having a firstborn daughter affects women's health risks, relationship quality, and exposure to adverse attitudes regarding intimate partner violence.

4.4 Mechanisms

As seen above, a female firstborn child has systematic impacts on marriage patterns and fertility outcomes. Moreover, heterogeneity analysis confirms the robustness of our findings across diverse population groups. The effects are not confined to rural areas nor predominantly concentrated among women with lower levels of education (see Figure B2). Effects such as higher rates of fertility, separation, and polygamy following the birth of a daughter as opposed to a son clearly suggest a form of son preference. However, a higher ultimate rate of marriage for women with a girl as opposed to a boy firstborn may be harder to explain purely based on a taste-based son preference. This finding may reflect economic or social hardship faced by women without a husband or son, as previously documented by Genicot and Hernandez-de Benito (2022).

In recent years, a substantial body of literature has emerged, delving into the long-lasting impacts of ancient social structures and norms (Nunn, 2020; Gelfand, Gavrilets, and Nunn, 2024). Patrilineality, patrilocality, and dowry customs, in particular, have been linked to fostering cultural preferences for sons and perpetuating discrimination against women (Gupta et al., 2003; Sundaram and Vanneman, 2008; Rossi and Rouanet, 2015; Jayachandran, 2015; Rammohan and Vu, 2018; Lowes, 2022). Demographers emphasize that kinship systems and lineage structures influence fertility by dictating inheritance, the role of children in lineage continuation, and the social status of women (Lesthaeghe, 1989).

These three traditional practices–patrilineality, patrilocality, and dowry customs–likely play a significant role in shaping son preference and the observed family structure dynamics. Among these, patrilineal and matrilineal systems are expected to have particularly pronounced effects, as seen in our data. Patrilineality reinforces son preference, as sons are critical for lineage continuation and inheritance. In contrast, matrilineal societies place intrinsic value on daughters for perpetuating the lineage. Moreover, women in matrilineal systems face fewer economic and social losses in the absence of a husband. Unlike in patrilineal societies, where women often forfeit land and custody of children, matrilineal norms ensure women retain stronger claims to land and family assets (Clignet, 1970; Poewe, 1978; Holden, Sear, and Mace, 2003). In patrilineal systems, the absence of a husband or son often leaves women economically vulnerable, amplifying the incentive for son preference.

The next section explores heterogeneity by kinship system.

5 The Role of Kinship Structure

5.1 Patrilineal vs. Matrilineal Kinship

Matrilineality and patrilineality are systems of lineage and inheritance that define how kinship and descent are tracked within a society. In patrilineal societies, family identity, names, and assets are typically inherited through the father's lineage. Children belong to their father's lineage, but upon marriage, women join their husband's lineage, severing ties with their original lineage. As a result, they no longer play a role in determining descent or inheritance for their birth family. In contrast, matrilineal systems trace descent and inheritance through the mother's side of the family. Children belong to the same matrilineal group as their mother, and married couples belong to different lineages. When a man dies, his sister's children, particularly her sons, are the primary heirs of his property (see Figure C1 in Appendix C.1). While boys are still preferred for inheritance in matrilineal societies, daughters hold a higher status compared to their role in patrilineal societies, as they are crucial for the continuation of the lineage.

Despite patrilineality being the most widespread kinship structure (Murdock 1959), matrilineality is found globally, with its highest concentration in sub-Saharan Africa, particularly in the "matrilineal belt" of Central and West Africa. In Figure 2a, patrilineal groups are colored in green, matrilineal in purple, and cognatic groups,[15] where descent is traced through a combination of male and female links, in beige.

There is no single theory on the origin of matrilineality. Early anthropologists suggested that matrilineality was the original form of human social organization, with the shift to patrilineal lineages occurring due to the rise of alienable property and patrilocal residence, which disempowered women and reversed their social position (Morgan 1877; Engels 1884; Murdock 1949). Recent studies link the prevalence of patrilineal societies to regions dominated by plowing techniques (Alesina, Giuliano, and Nunn 2013; Alesina, Brioschi, and Ferrara 2021) and successful domestication of large animals (Becker, Enke, and Falk 2020, Alsan 2015). Conversely, matrilineal societies are more common in regions suited to hoe agriculture, where conditions are less favorable for domesticating large animals (Tene 2023). Scholars have also argued that the slave trades facilitated the adoption of matrilineal kinship, creating social disruptions that made matrilineal structures more beneficial for incorporating new members and maintaining lineage integrity in the face of demographic imbalances caused by the disproportionate capture of enslaved men (Lovejoy 1989; MacGaffey 2000). Lowes and Nunn (2024) finds a correlation between exposure to the slave trades and the prevalence of matrilineal kinship.

Research indicates that in matrilineal societies, children tend to be healthier, the gender gap in education and political participation is narrower, and the incidence of domestic violence is reduced (Lowes 2021; Lowes 2022; Robinson and Gottlieb 2019). However, studies also show that these societies exhibit lower levels of cooperation between husbands and wives and higher rates of HIV (Loper 2022; Lowes 2022).

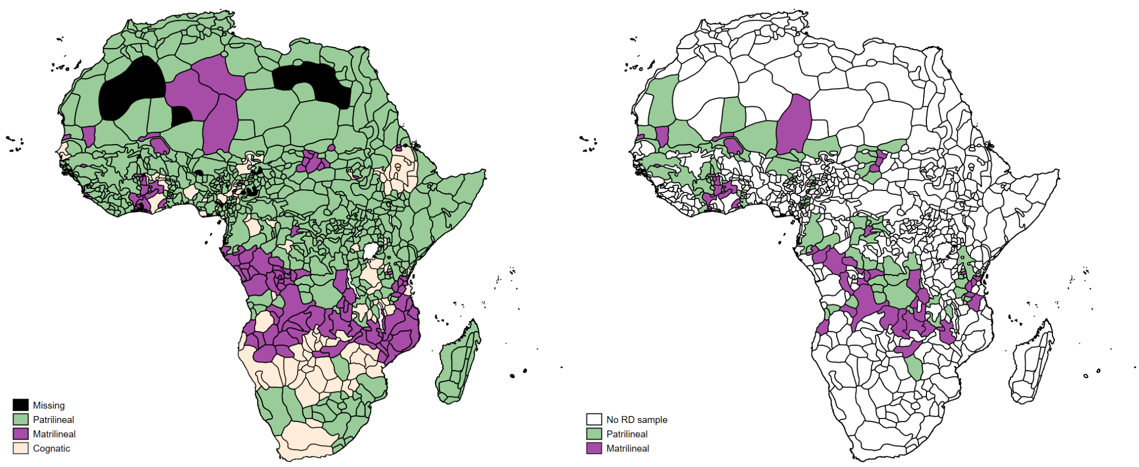
5.2 Empirical Strategy: Geographic RD

We are interested in the heterogeneity of the female firstborn effects on family structure by kinship structure. Our preferred specification is a geographic regression discontinuity design, which allows us to investigate this heterogeneity using a sample of women who are

[15] The cognatic label encompasses groups classified as ambilineal, bilateral, duolateral, and quasi-lineages.

Figure 2: Kinship Structure in Africa

(a) All Ethnic Areas (b) Geographic RD Setting



Notes: Panel (a) maps all ethnic areas in the African continent according to their traditional kinship descent. Panel (b) maps those ethnic areas where at least in one of their boundaries there is a discontinuity between patrilineal and matrilineal kinship.

similar in aspects other than ancestral kinship descent.[16] We match women to the Murdock (1959) ethnic areas using the geographic coordinates of their DHS cluster of residence. As shown in Figure 2b, we limit the sample to adjacent ethnic areas with different kinship practices on each side of the border, specifically pairs where one is patrilineal and the other is matrilineal (as in Moscona, Nunn, and Robinson 2020; Lowes 2022; Fontenay, Gobbi, and Goni 2024). We compare the female firstborn effect on women who live in DHS clusters that are geographically close, but where one DHS cluster is in the ancestral land of a patrilineal ethnic group, while the other DHS cluster is in an ancestral matrilineal one. The rationale behind this approach is that these multiple kinship boundaries are arbitrary, and the regions adjacent to these borders are very similar in terms of geography, historical background, and cultural attributes (Lowes 2022).

Our estimation equation is as follows:

$$\begin{aligned} y_{idep} \quad = \quad & \theta_p + \beta \textit{Female firstborn}_i + \gamma \textit{Female firstborn}_i \times \textit{Patrilineal}_e + \pi \textit{Patrilineal}_e + \\ & f(location_{idep}) + X_i'\Gamma + Z_d'\Sigma + \alpha_c + \delta_t + \epsilon_{idep}, \qquad (3) \end{aligned}$$

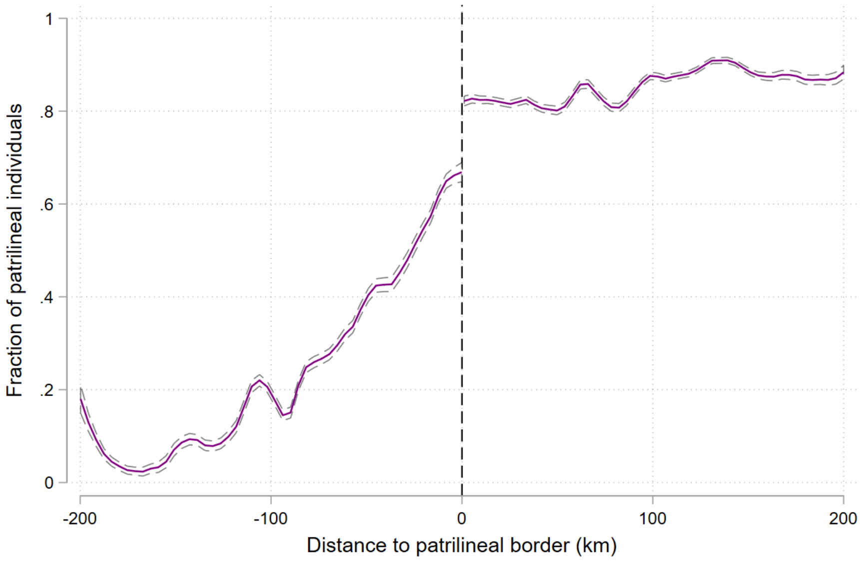
[16]Interested readers can find significant heterogeneity in the firstborn effect between women of matrilineal and patrilineal descent in an OLS analysis across the entire sample in Section C.2 of the Appendix.

where y_{idep} is the outcome of interest for woman i residing in DHS cluster d from ethnic area e and ethnic pair p. θ_p represents ethnic pair fixed effects, where each pair consists of neighboring ethnic groups, with one group practicing matrilineal kinship and the other practicing patrilineal kinship. $f(location_{idep})$ is the RD polynomial, which controls for a smooth function of the geographic location of DHS cluster d for ethnic pair p. In the baseline specification, we use a local linear specification with the latitude and longitude of the DHS cluster as the running variables (Dell and Querubin 2018; Lowes 2022). X_i, α_c, and δ_t are defined as above. Z_d is a vector of geographic covariates for DHS cluster d controlling for local economic characteristics at the time of the survey, including the logarithm of population size, a measure of purchasing power parity, and the shortest distance to the urban center (see Appendix A for definitions). Standard errors will continue to be clustered at the DHS cluster level, but robustness checks will be provided by clustering at the ethnic area level. In the baseline specification, we restrict the sample to women living within 200 km of the ethnic area boundary. However, sensitivity analyses will be provided using alternative distance thresholds ranging from 50 to 300 km.

The estimates of interest are β and $\beta+\gamma$, which capture the female firstborn effect within matrilineal and patrilineal societies, respectively, with $Patrilineal_e$ being a dummy variable equal to one if the woman resides in a historic patrilineal ethnic area.

The heterogeneity design is based on the assumption that the ethnic divisions delineated by Murdock (1959) still accurately reflect current ethnic affiliations of the populations residing in these areas. Figure 3 illustrates a sharp discontinuity in the fraction of women in the sample who report belonging to patrilineal or matrilineal kinship groups at the border, restricting the sample to DHS surveys that collect ethnicity information. There is an approximately 20 percentage point increase in the likelihood of being of patrilineal descent on the patrilineal side of the border, reflecting a strong persistence of kinship affiliation (Table C2). However, as naturally expected, the assignment to matrilineal or patrilineal ethnic groups is not strictly adhered to by all individuals near the geographic boundary. Hence, we also report the coefficients of interest (β and $\beta+\gamma$) in a fuzzy regression discontinuity (RD) design. In this design, the traditional practice of the respondent's location ethnic areas ($Patrilineal_e$) is used as an instrument to predict the kinship practice of the woman's ethnic group ($Patrilineal_i$), see Table C2 for the first-stage results.

Figure 3: Self-Reported Ethnicity and Distance to the Ancestral Border



Notes: This figure plots a local polynomial smooth, with a 95% level CI, of the relationship between women's kinship descent according to self-reported ethnicity and the one assigned based on their geographic location. The x-axis reports geographic distance to the matrilineal or patrilineal border. The y-axis reports the fraction of the sample at each distance that identifies as being a member of the patrilineal kinship group.

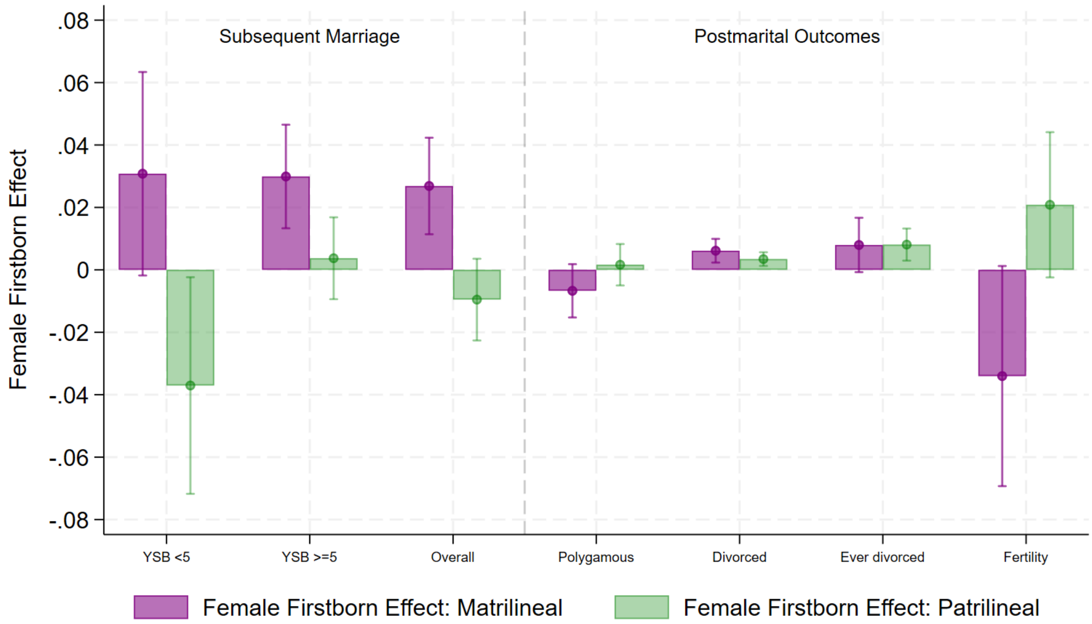
To continue using the firstborn´s sex as a source of exogenous variation, the ancestral borders should also not predict the sex of the firstborn child. Columns (4)–(6) in Table C2 confirm this by estimating a version of equation (3) with $Female\ firstborn_i$ as the dependent variable and showing that $Patrilineal_e$ has no predictive power over $Female\ firstborn_i$.

5.2.1 Female Firstborn Effects and Heterogeneity by Kinship

In Figure 4, we present the estimated female firstborn effect in matrilineal areas ($\hat{\beta}$ from equation (3)) in purple, and the effect in patrilineal areas ($\hat{\beta}+\hat{\gamma}$) in green. The specification plotted in the figure, along with an augmented version that includes additional cluster controls and the fuzzy RD design, can be found in Appendix Tables C3 and C4.

We begin by revisiting the specific subgroup of women who gave birth to their first child before entering into their initial marriage or cohabitation. Figure 4 reveals clear heterogeneity in the effects. In patrilineal areas, the results show a significant 3.7 percentage

Figure 4: Female Firstborn Effect on Family Structure: Kinship Heterogeneity



Notes: This figure plots the estimated female firstborn effect for matrilineal ethnic areas (in purple) and patrilineal ethnic areas (in green), along with the 90% confidence intervals, derived from estimating equation (3).

point decline (10% lower probability) in the likelihood of marriage within the first five years for women who had a firstborn daughter, compared to those with a son (see columns (1)-(2) of Table C3). The fuzzy RD suggests a decline of 6.4 percentage points in the likelihood of marriage within five years for patrilineal women with a firstborn daughter prior to their first union. Remarkably, women in patrilineal areas, and those of patrilineal descent, who had their first child more than five years ago are no longer less likely to be married if that first child was a girl. In sharp contrast, the presence of a firstborn daughter increases the likelihood of marriage by about 3 percentage points for women in matrilineal regions, irrespective of how many years have passed since the birth of the child.

Next, we consider the remaining women who had their first child after their first union (right panel of Figure 4 and Table C4). We observe that the increased likelihood of polygamy following a firstborn daughter, compared to a firstborn son, is only present among women of patrilineal descent, although the effect is not statistically significant (p-value of 0.12 in the fuzzy RD specification). In contrast, the effect on divorce rates is observed in both matrilineal and patrilineal areas, and, if anything, is larger in the former, where marriages tend to be less stable (Loper 2022; Lowes 2022). Finally, when looking at heterogeneity in fertility, the RD estimates confirm the heterogeneous effect of a firstborn daughter compared to a son on fertility. A firstborn daughter decreases fertility by 0.03 children in matrilineal areas (0.08 among women of matrilineal descent using the fuzzy RD estimates), while it increases fertility by 0.02 children in patrilineal areas (0.07 for women of patrilineal descent).

5.2.2 Validity and Sensitivity Checks

We assess the sensitivity of our heterogeneity analysis by kinship descent to various robustness checks (see Appendix C.3). Figure C2 presents the robustness of our findings across different bandwidth specifications (50–300 km), showing how the choice of bandwidth affects the female firstborn effect within both matrilineal and patrilineal groups across the various family structure outcomes of interest. Additionally, we demonstrate that the results remain robust when using alternative specifications of the running variable, such as higher-degree polynomials of the latitude and longitude variables or using the distance to the border polynomial instead (Tables C5, C6). The heterogeneity analysis is also robust to clustering standard errors at the ethnic area level instead of the DHS cluster level (Tables C7, C8).

In the main specification in (3), we already control for local economic characteristics at the time of the survey, measured at the DHS cluster level (Z_d). In addition, the ethnic pair strategy increases the likelihood that women close to the boundaries are very similar in characteristics other than their distinct kinship ancestral origins. Still, in Tables C3-C4, we show that the results remain robust when controlling for geographical variables that exhibit some degree of imbalance at the border (see Appendix Table C9 for balance on geographic and cultural variables at the ethnic area and DHS cluster levels, and Appendix A for a description of variables).

5.2.3 Patrilineality and Other Related Practices

In sub-Saharan Africa, patrilineality and patrilocality are closely intertwined. According to Murdock's classification of marital residence after the initial years of marriage, 98.8% of patrilineal ethnic areas are also patrilocal. In contrast, only 23.8% of matrilineal ethnic areas are patrilocal. However, among the remaining 76.2% of matrilineal areas, the majority still involve women relocating to live with the husband's family, especially through avunculocal residence (living with the husband's maternal uncle). If we restrict the sample to the ethnic areas included in the RD sample, there are only five matrilocal areas amongst the matrilineal ones. This distribution suggests that differences in postmarital residence patterns are unlikely to explain the heterogeneous child's sex effects presented earlier, compared to lineage and inheritance motives. In line with this, our findings remain robust both when controlling for matrilocal ethnic area (Tables C3, C4), as well as when the matrilocal ethnic areas are excluded from the analysis (Tables C10, C11).

In patrilineal areas, the exchange of bride price is also more prevalent than in matrilineal regions. In our RD sample, 94% of the patrilineal areas are traditionally associated with substantial bride prices, compared to just 42% of matrilineal areas. But, as shown in Tables C3-C4, the coefficients on female first born by kinship structure are unchanged when controlling for bride price at the ethnic area level. Furthermore, when we replicate the geographic RD empirical strategy using the bride price discontinuity, limiting to adjacent ethnic areas with and without bride price practices, we find no significant heterogeneity in the female firstborn effect except for the finding that a first born does not cause more divorce where bride price are substantial (Tables C12-C13).

6 Conclusion

This study has investigated the effects of having a firstborn daughter on family structure in sub-Saharan Africa, focusing on key outcomes such as marriage patterns, divorce, polygamy, and fertility.

We document that women with a female firstborn child are more likely to marry in the long run but less likely to marry the child's father if the birth occurred prior to their first union. They are also more likely to experience divorce, enter polygamous unions, and have more children compared to women with firstborn sons. All together, these findings provide evidence that firstborn gender plays a significant role in shaping maternal marital trajectories and fertility decisions.

Our findings also reveal significant heterogeneity by kinship descent in the gendered effects on family dynamics. By leveraging a geographic regression discontinuity design along ethnic borders between patrilineal and matrilineal societies, we identify patrilineal traditions as a key driver of these effects. The impact of a firstborn daughter is particularly pronounced in patrilineal societies, where cultural norms amplify gender disparities in marriage, divorce, and polygamy. Conversely, in matrilineal societies, women with firstborn daughters experience more favorable marriage prospects, and reduced fertility. These findings highlight the importance of traditional practices as drivers of son preference.

From a methodological perspective, our study underscores the importance of accounting for sample selection biases when examining causal links between offspring gender and family or child outcomes. Failure to consider the interplay between gender preferences, family structure, and household dynamics could lead to biased estimates and misleading conclusions in studies of parental investments or sibling effects. For example, if the gender composition of children influences marriage and divorce decisions, it may also affect household survey composition and the allocation of parental resources.

The broader welfare implications of these findings extend beyond family structure to the broader social and economic well-being of women and children. Our findings reveal that women with firstborn daughters tend to be poorer, face higher rates of HIV, and are more likely to to be unions where IPV (intimate partner violence) is more accepted. Addressing gender inequality in family structures requires culturally sensitive policy interventions. Future research should examine the long-term impacts on women, children, and society.

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Appendix

A Data and Variable Definitions

A.1 DHS Survey Data and Variables

The data and detailed information on the sampling procedure and variable definitions can be found at http://dhsprogram.com/data/Data-Variables-and-Definitions.cfm.

Table A1: List of DHS Surveys

Country	DHS Surveys
Angola	2015–2016
Benin	1996, 2001, 2011–2012, 2017-2018
Burkina Faso	1998–1999, 2003, 2010, 2021
Burundi	2010, 2016–2017
Cameroon	2004, 2011, 2018
Car	1994–1995
Chad	2014–2015
Cote D'Ivoire	1994, 1998–1999, 2011-2012, 2021
DCR	2007, 2013–2014
Eswatini	2006–2007
Ethiopia	2000, 2005, 2011, 2016
Gabon	2012, 2019–2021
Gambia	2019–2020
Ghana	1998, 2003, 2008, 2014, 2022
Guinea	1999, 2005, 2012, 2018
Kenya	2003, 2008–2009, 2014, 2022
Lesotho	2004, 2009, 2014
Liberia	2007, 2013, 2019–2020
Madagascar	1997, 2008–2009, 2021
Malawi	2000, 2004, 2010, 2015–2016
Mali	2001, 2006, 2012–2013, 2018
Mauritania	2019–2021
Mozambique	2011
Namibia	2000, 2006–2007, 2013
Niger	1998, 2012
Nigeria	2003, 2008, 2013, 2018
Rwanda	2005, 2010, 2014–2015, 2019-2020
Senegal	1997, 2005, 2010–2011, 2012-2013, 2014, 2015, 2016, 2017, 2018, 2019
Sierra Leone	2008, 2013, 2019
Tanzania	1999, 2007–2008, 2010, 2015-2016, 2022
Togo	1998, 2013–2014
Uganda	2000–2001, 2006, 2011, 2016
Zambia	2007, 2013–2014, 2018
Zimbabwe	1999, 2005–2006, 2010-2011, 2015

Definitions of variables used in this paper from the DHS survey:

- **HIV**: A subset of the DHS surveys are complemented with HIV-related biomarkers. The HIV result is based on blood that is collected in the household. In the analysis it is a dummy variable equal to one if the result is positive.

- **Attitudes IPV**: For women who were randomly chosen and interviewed for the domestic violence module, the outcome is build as the count of affirmative answers about whether domestic violence is justifiable in different situations. The situations are: a woman argues with her husband, a woman burns the food, a woman goes out without her husband's permission, a woman refuses sex, or a woman neglects the children.

- **DHS cluster controls**: These data come from the geospatial covariate datasets that link survey cluster locations to ancillary data that contain data on a variety of local factors.

  - **Ln(population)**: logarithm of the count of individuals living within the 2 km (urban) or 10 km (rural) buffer surrounding the DHS survey cluster at the time of measurement (year).
  - **Ln(average PPP)**: logarithm of the average Purchasing Power Parity (PPP) in 2005 US dollars for the 2 km (urban) or 10 km (rural) buffers surrounding the DHS survey cluster.
  - **Ln(distance to closest urban center)**: logarithm of the average time (minutes) required to reach a high-density urban center, from the area within the 2 km (urban) or 10 km (rural) buffer surrounding the DHS survey cluster location, based on year 2015 infrastructure data.
  - **Ln(distance national border)**: logarithm of the geodesic distance to the nearest international borders.

A.2 Ethnographic Atlas (Murdock, 1959)

The list of variables used from the Ethnographic Atlas defined at the ethnic-area level are:

- **Patrilineal kinship descent**: indicator variable equal to one if the ethnic group practiced patrilineal kinship (v43 =1).

- **Matrilineal kinship descent**: indicator variable equal to one if the ethnic group practiced matrilineal kinship (v43=3).

- **Bride price**: indicator variable equal to one if ethnig group practiced bride price or wealth transferred to the bride's family (v6=1).
- **Polygynous**: indicator variable for different forms of polygyny (v9=3,4,5,6, or 7).
- **Matrilocal**: indicator variable equal to one if the ethnic group practiced matrilocal residence (v12=5 or 9).
- **Level of jurisdictional hierarchy**: variable ranging 1-5 capturing level of centralization beyond the local group (v33).
- **Settlement complexity**: variable ranging 1-8 from nomadic or fully migratory to complex settlements (v30).
- **Dependence on agriculture**: variable ranging 1-9 capturing level of dependence on agriculture and (v5).
- **Female participation in agriculture**: variable ranging 1-6 capturing women's relative participation in agriculture (v54).
- **Plough**: indicator variable equal to one if plough was present (v39= 2 or 3).
- **Moral high god**: indicator variable equal to one if the group had a moral high God involved in human morality (v34=4).

A.3 Other Datasets

- **International Wealth Index (IWI)**: indicator constructed by Smits and Steendijk (2015) from the household modules of DHS surveys. The IWI ranks households on a common scale, measuring material well-being based on possession of durable goods, access to basic services, and housing characteristics. The International Wealth Index (IWI) is constructed using data from 2.1 million households across 165 surveys conducted between 1996 and 2011 in 97 low- and middle-income countries. It is based on a well-established set of assets (Smits and Steendijk 2015). The IWI scale is additive, ranging from 0 to 100.
- **Other geographic variables**: the rest of the geographical variables used in the paper are sourced from Lowes and Nunn (2024)´s and Alsan (2015)´s replication

files: mean daily temperature, mean altitude, malaria ecology, mean distance to coast, tsetse fly suitability index, average agricultural suitability, average suitability forpastoralism, ln(land area), and slave trade (ln (1+atlantic and indian) exports).

B Female Firstborn Effects: Additional Analysis

B.1 Female Firstborn Effects: Appendix Tables

Table B1: Women's Age and Probability of Female firstborn

	(1)	(2)	(3)	(4)	(5)
21-30	0.002	0.002	0.003	0.003	0.004
	(0.294)	(0.270)	(0.225)	(0.268)	(0.142)
31-40	-0.001	-0.001	-0.001	-0.001	-0.001
	(0.624)	(0.775)	(0.765)	(0.691)	(0.858)
+40	-0.005**	-0.004	-0.003	-0.002	-0.003
	(0.031)	(0.229)	(0.316)	(0.483)	(0.438)
Constant	0.489***	0.488***	0.488***	0.488***	0.488***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Country FE	✓	✓			
Mother's year of birth FE		✓			
Country × Mother's year of birth FE			✓		
Ethnic area × Mother's year of birth FE				✓	
Administrative area 1 × Mother's year of birth FE					✓
R-squared	0.000	0.000	0.002	0.029	0.024
Observations	927,809	927,809	927,805	925,000	924,365

Notes: This table presents OLS regressions where the dependent variable is an indicator variable = 1 if the woman's firstborn child is female and 0 otherwise. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. p-values reported in parentheses. Standard errors are clustered at the DHS sampling unit.

Table B2: Rural: Women's Age and Probability of Female firstborn

	(1)	(2)	(3)	(4)	(5)
21-30	0.002	0.003	0.003	0.003	0.003
	(0.334)	(0.158)	(0.369)	(0.379)	(0.247)
31-40	-0.002	0.000	-0.001	-0.001	-0.000
	(0.362)	(0.990)	(0.798)	(0.783)	(0.961)
+40	-0.006**	-0.004	-0.004	-0.004	-0.003
	(0.010)	(0.314)	(0.308)	(0.366)	(0.414)
Constant	0.488***	0.487***	0.487***	0.487***	0.487***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Country FE	✓	✓			
Mother's year of birth FE		✓			
Country × Mother's year of birth FE			✓		
Ethnic area × Mother's year of birth FE				✓	
Administrative area 1 × Mother's year of birth FE					✓
R-squared	0.000	0.000	0.003	0.040	0.033
Observations	625,373	625,373	625,368	622,144	622,756

Notes: This table presents OLS regressions where the dependent variable is an indicator variable = 1 if the woman's firstborn child is female and 0 otherwise. The sample is limited to rural DHS sampling units. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. p-values reported in parentheses. Standard errors are clustered at the DHS sampling unit.

Table B3: Urban: Women's Age and Probability of Female firstborn

	(1)	(2)	(3)	(4)	(5)
21-30	0.001	-0.000	0.004	0.001	0.004
	(0.762)	(0.906)	(0.385)	(0.788)	(0.406)
31-40	0.001	-0.003	-0.001	-0.004	-0.002
	(0.877)	(0.490)	(0.876)	(0.484)	(0.758)
+40	-0.001	-0.005	-0.002	-0.003	-0.004
	(0.748)	(0.322)	(0.699)	(0.625)	(0.522)
Constant	0.490***	0.493***	0.490***	0.492***	0.490***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Country FE	✓	✓			
Mother's year of birth FE		✓			
Country × Mother's year of birth FE			✓		
Ethnic area × Mother's year of birth FE				✓	
Administrative area 1 × Mother's year of birth FE					✓
R-squared	0.000	0.000	0.006	0.054	0.059
Observations	302,436	302,436	302,423	298,639	299,174

Notes: This table presents OLS regressions where the dependent variable is an indicator variable = 1 if the woman's firstborn child is female and 0 otherwise. The sample is limited to urban DHS sampling units. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. p-values reported in parentheses. Standard errors are clustered at the DHS sampling unit.

Table B4: Firstborn Before Union: Women's Descriptive Statistics and Balance Test

	(1) Mean/St.dev.	(2) Obs.	(3)	(4)	(5)	(6)	(7)
					Female firstborn = 1		
15–20	0.12	187,756					
	[0.33]						
21–30	0.42	187,756	0.003	0.003	0.002	0.003	0.006
	[0.49]		(0.583)	(0.507)	(0.760)	(0.518)	(0.290)
31–40	0.30	187,756	–0.006	–0.005	–0.011	–0.007	0.001
	[0.46]		(0.446)	(0.514)	(0.278)	(0.451)	(0.942)
+40	0.16	187,756	–0.010	–0.010	–0.017		–0.007
	[0.36]		(0.391)	(0.422)	(0.263)		(0.611)
First child born before union	1.00	187,756					
	[0.00]						
Firstborn alive	0.87	187,756	0.051***	0.052***	0.053***	0.053***	0.052***
	[0.34]		(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Years of education	6.06	187,756	0.000	0.000	0.000	0.000	–0.000
	[4.52]		(0.225)	(0.239)	(0.329)	(0.260)	(0.235)
Rural	0.55	187,756	–0.000	–0.001	0.002	0.000	
	[0.50]		(0.955)	(0.669)	(0.632)	(0.896)	
Patrilineal area	0.64	187,756	–0.002				
	[0.48]		(0.598)				
Matrilineal area	0.18	187,756	0.003				
	[0.38]		(0.559)				
Always in current residence	0.44	129,027			0.002		
	[0.50]				(0.530)		
Christian	0.73	176,824					0.010
	[0.45]						(0.137)
Muslim	0.21	176,824					0.001
	[0.41]						(0.902)
Other religion	0.06	176,824					
	[0.24]						
Outcome mean			0.492	0.492	0.492	0.492	0.492
Country FE			Yes	Yes	Yes	Yes	
Woman's year of birth FE			Yes	Yes	Yes	Yes	Yes
Survey year FE			Yes	Yes	Yes	Yes	Yes
Ethnic area FE				Yes	Yes	Yes	
Exclude 40+						Yes	
DHS sampling unit FE							Yes
Observations			187,755	187,751	129,019	157,946	169,927

Notes: This table presents summary statistics of all women included in this paper's analytical sample whose firstchild was born before union. Column (1) present sample mean and standard deviation. Column (2) presents number of observations with non-missing values. Columns (3) to (6) present the coefficient and correspondent p-value, respectively, of an OLS regression of an indicator variable equal to one of the woman's firstborn child was female regressed on women's observable characteristics. Standard errors are clustered at the DHS sampling unit.

Table B5: Firstborn After Union: Women's Descriptive Statistics and Balance Test

	(1) Mean/St.dev.	(2) Obs.	(3)	(4)	(5)	(6)	(7)
					Female firstborn = 1		
15–20	0.08	740,053					
	[0.28]						
21–30	0.40	740,053	0.001	0.001	0.000	0.001	0.001
	[0.49]		(0.830)	(0.774)	(0.920)	(0.684)	(0.650)
31–40	0.33	740,053	–0.003	–0.003	–0.007	–0.003	–0.003
	[0.47]		(0.515)	(0.495)	(0.203)	(0.515)	(0.566)
+40	0.19	740,053	–0.006	–0.007	–0.010		–0.006
	[0.39]		(0.307)	(0.257)	(0.194)		(0.358)
First child born before union	0.00	740,053					
	[0.00]						
Firstborn alive	0.85	740,053	0.047***	0.048***	0.046***	0.052***	0.050***
	[0.36]		(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Years of education	3.80	740,053	–0.000	–0.000***	–0.000**	–0.001***	–0.000**
	[4.42]		(0.331)	(0.007)	(0.034)	(0.001)	(0.022)
Rural	0.70	740,053	–0.001	–0.002	–0.001	–0.002	
	[0.46]		(0.336)	(0.146)	(0.495)	(0.330)	
Patrilineal area	0.68	740,053	0.000				
	[0.47]		(0.852)				
Matrilineal area	0.12	740,053	0.000				
	[0.33]		(0.913)				
Always in current residence	0.43	477,090			–0.000		
	[0.50]				(0.986)		
Christian	0.55	686,699					0.000
	[0.50]						(0.999)
Muslim	0.38	686,699					–0.004
	[0.49]						(0.314)
Other religion	0.06	686,699					
	[0.24]						
Outcome mean			0.488	0.488	0.489	0.489	0.488
Country FE			Yes	Yes	Yes	Yes	
Woman's year of birth FE			Yes	Yes	Yes	Yes	Yes
Survey year FE			Yes	Yes	Yes	Yes	Yes
Ethnic area FE				Yes	Yes	Yes	
Exclude 40+						Yes	
DHS sampling unit FE							Yes
Observations			740,053	740,053	477,090	599,150	686,421

Notes: This table presents summary statistics of all women included in this paper's analytical sample whose firstchild was born after union. Column (1) present sample mean and standard deviation. Column (2) presents number of observations with non-missing values. Columns (3) to (6) present the coefficient and correspondent p-value, respectively, of an OLS regression of an indicator variable equal to one of the woman's firstborn child was female regressed on women's observable characteristics. Standard errors are clustered at the DHS sampling unit.

Table B6: Effect of Female Firstborn on Marriage During Pregnancy

	(1)	(2)
Female firstborn	0.000	0.002
	(0.960)	(0.316)
Mother and firstborn controls	✓	✓
Year FE	✓	✓
Religion FE		✓
Country FE	✓	
Ethnic area FE	✓	
DHS sampling unit FE		✓
Male firstborn baseline	0.44	0.44
Percent effect	0.02	0.39
Observations	335,791	313,293

Notes: This table presents OLS regressions where the dependent variable is an indicator variable = 1 if the respondent is estimated to have gotten married during pregnancy. The sample is limited to women that became pregnant before their first union. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. p-values reported in parentheses. Standard errors are clustered at the DHS sampling unit.

Table B7: Probability of Missing Father Information (Firstborn's Child Living with Mother Sample)

			Years since Birth ≤ 12	
	(1)	(2)	(3)	(4)
Female firstborn	-0.007***	-0.009**	0.000	-0.004
	(0.007)	(0.019)	(0.836)	(0.133)
Mother and firstborn controls	✓	✓	✓	✓
Year FE	✓	✓	✓	✓
Religion FE		✓		✓
Country FE	✓		✓	
Ethnic area FE	✓		✓	
DHS sampling unit FE		✓		✓
Male firstborn baseline	0.22	0.22	0.06	0.05
Percent effect	-3.29	-4.18	0.74	-6.87
Observations	34,170	20,355	24,340	12,071

Notes: This table presents OLS regressions where the dependent variable is an indicator variable = 1 if the firstborn's information on whether the father is alive or not, and/or whether is part of the household, is missing. The sample is limited to women whose firstborn child was born before ever been in a union, who are currently in their first union, and whose firstborn child lives with her at the date of the survey. Columns (3)-(4) further restrict the sample to women whose firstborn child was born twelve or less years ago relative to the survey date. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. p-values reported in parentheses. Standard errors are clustered at the DHS sampling unit.

Table B8: Heterogeneity by Women's Religious Affiliation: Effect of Female Firstborn on Family Structure

	Subsequent Marriage			Postmarital Outcomes		
	Overall	< 5	≥ 5	Polyg.	Div	Fert.
	(1)	(2)	(3)	(4)	(5)	(6)
Female firstborn	-0.006	-0.012	-0.006	-0.001	-0.000	0.016
	(0.414)	(0.471)	(0.439)	(0.860)	(0.949)	(0.294)
Female firstborn × Christian	0.011	0.014	0.012	0.003	0.001	0.018
	(0.135)	(0.440)	(0.135)	(0.460)	(0.322)	(0.273)
Female firstborn × Muslim	0.012	0.014	0.013	0.008*	0.002	0.008
	(0.128)	(0.471)	(0.100)	(0.090)	(0.179)	(0.617)
Country FE	✓	✓	✓	✓	✓	✓
Year FE	✓	✓	✓	✓	✓	✓
Ethnic area FE	✓	✓	✓	✓	✓	✓
Mother and firstborn controls	✓	✓	✓	✓	✓	✓
Female firstborn+Female firstborn*Christian	0.005**	0.001	0.006**	0.003**	0.001**	0.034***
	(0.016)	(0.773)	(0.015)	(0.036)	(0.023)	(0.000)
Female firstborn+Female firstborn*Muslim	0.006*	0.002	0.008**	0.007***	0.002***	0.024***
	(0.070)	(0.855)	(0.019)	(0.000)	(0.002)	(0.000)
Observations	176,817	45,094	131,671	611,091	686,699	686,699

Notes: This table presents OLS regressions where the dependent variable are the subsequent marriage, polygamous union, currently divorce, and fertility outcomes. The specification is equation (1) fully interacted with Christian and Muslim religious dummies. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. p-values reported in parentheses. Standard errors are clustered at the DHS sampling unit.

Table B9: Effect of Having a Female Firstborn on Ever Being Divorced or Widowed (Surveys with Prior Union Information)

	Ever Divorced		Ever Widowed	
	(1)	(2)	(3)	(4)
Female firstborn	0.007***	0.005**	0.000	0.001
	(0.001)	(0.013)	(0.843)	(0.681)
Ind. controls	✓	✓	✓	✓
Year FE	✓	✓	✓	✓
Religion FE		✓		✓
Country FE	✓		✓	
Ethnic area FE	✓		✓	
DHS cluster FE		✓		✓
Male baseline	0.15	0.14	0.07	0.07
Percent effect	4.36	3.54	0.38	0.85
Observations	133,455	118,885	133,455	118,885

Notes: This table presents OLS regressions where the dependent variable is an indicator variable = 1 if the respondent has been ever divorced or ever widowed constructed using current marital status and information on how the previous union ended. The sample is limited to surveys for which information on how previous union ended is available. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. p-values reported in parentheses. Standard errors are clustered at the DHS sampling unit.

Table B10: Effect of Female Firstborn on Fertility: Women in First Union

	All		Firstborn Before Union		Firstborn After Union	
	(1)	(2)	(3)	(4)	(5)	(6)
Female firstborn	0.031***	0.030***	0.029***	0.028**	0.033***	0.030***
	(0.000)	(0.000)	(0.004)	(0.027)	(0.000)	(0.000)
Ind. controls	✓	✓	✓	✓	✓	✓
Year FE	✓	✓	✓	✓	✓	✓
Religion FE		✓		✓		✓
Country FE	✓		✓		✓	
Ethnic area FE	✓		✓		✓	
DHS cluster FE		✓		✓		✓
Male firstborn baseline	3.99	3.98	3.97	3.97	3.99	3.98
Percent effect	0.79	0.75	0.74	0.72	0.84	0.76
Observations	638,592	598,666	90,776	74,860	547,801	512,425

Notes: This table presents OLS regressions where the dependent variable is the number of children the female respondent ever gave birth to. The sample is limited to women in their first union at the date of the survey. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. p-values reported in parentheses. Standard errors are clustered at the DHS sampling unit.

Table B11: Effect of Female Firstborn on Fertility: Women Not in First Union

	All		Firstborn Before Union		Firstborn After Union	
	(1)	(2)	(3)	(4)	(5)	(6)
Female firstborn	0.019***	0.016**	0.008	-0.004	0.024***	0.020**
	(0.002)	(0.020)	(0.397)	(0.687)	(0.003)	(0.034)
Ind. controls	✓	✓	✓	✓	✓	✓
Year FE	✓	✓	✓	✓	✓	✓
Religion FE		✓		✓		✓
Country FE	✓		✓		✓	
Ethnic area FE	✓		✓		✓	
DHS cluster FE		✓		✓		✓
Male firstborn baseline	3.76	3.73	2.73	2.68	4.27	4.28
Percent effect	0.50	0.43	0.28	-0.16	0.56	0.47
Observations	289,215	262,015	96,943	80,999	192,249	167,317

Notes: This table presents OLS regressions where the dependent variable is the number of children the female respondent ever gave birth to. The sample is limited to women who are not in their first union at the date of the survey. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. p-values reported in parentheses. Standard errors are clustered at the DHS sampling unit.

Table B12: Effect of Female Firstborn on Fertility: Women Above 40 Years Old

	All		Firstborn Before Union		Firstborn After Union	
	(1)	(2)	(3)	(4)	(5)	(6)
Female firstborn	0.049***	0.030**	0.013	0.036	0.059***	0.038***
	(0.000)	(0.019)	(0.630)	(0.412)	(0.000)	(0.009)
Ind. controls	✓	✓	✓	✓	✓	✓
Year FE	✓	✓	✓	✓	✓	✓
Religion FE		✓		✓		✓
Country FE	✓		✓		✓	
Ethnic area FE	✓		✓		✓	
DHS cluster FE		✓		✓		✓
Male baseline	6.17	6.19	5.59	5.46	6.30	6.33
Percent effect	0.80	0.49	0.23	0.65	0.94	0.60
Observations	170,702	152,212	29,750	17,073	140,896	121,870

Notes: This table presents OLS regressions where the dependent variable is the number of children the female respondent ever gave birth to. The sample is limited to women aged 40 years old and above. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. p-values reported in parentheses. Standard errors are clustered at the DHS sampling unit.

Table B13: Effect of Female Firstborn on Having k or More Children

	(1)	(2)	(3)	(4)	(5)	(6)
	2+	3+	4+	5+	6+	7+
Female firstborn	0.002***	0.003***	0.004***	0.005***	0.003***	0.003***
	(0.005)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Ind. controls	✓	✓	✓	✓	✓	✓
Year FE	✓	✓	✓	✓	✓	✓
Country FE	✓	✓	✓	✓	✓	✓
Ethnic area FE	✓	✓	✓	✓	✓	✓
Male firstborn baseline	0.81	0.63	0.48	0.35	0.25	0.17
Percent effect	0.21	0.48	0.85	1.32	1.29	1.89
Observations	927,809	927,809	927,809	927,809	927,809	927,809

Notes: This table presents OLS regressions where the dependent variable are dummies corresponding to the number of children the female respondent ever gave birth to. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. p-values reported in parentheses. Standard errors are clustered at the DHS sampling unit.

Table B14: Effect of Female Firstborn on Birth Interval to Second Child (in Months)

	All		Firstborn Before Union		Firstborn After Union	
	(1)	(2)	(3)	(4)	(5)	(6)
Female firstborn	-0.106**	-0.097*	-0.016	-0.013	-0.148***	-0.147***
	(0.034)	(0.066)	(0.915)	(0.945)	(0.003)	(0.006)
Ind. controls	✓	✓	✓	✓	✓	✓
Year FE	✓	✓	✓	✓	✓	✓
Country FE	✓		✓		✓	
Ethnic area FE	✓		✓		✓	
Male baseline	36.55	36.61	44.78	44.87	34.76	34.80
Percent effect	-0.29	-0.27	-0.04	-0.03	-0.43	-0.42
Observations	740,921	689,052	133,122	116,308	607,788	563,393

Notes: This table presents OLS regressions where the dependent variable is the number of months between the birth of the respondent's first and second child. The sample is restricted to women who have had at least two children. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. p-values reported in parentheses. Standard errors are clustered at the DHS sampling unit.

Table B15: Effect of Female Firstborn on Family Structure: Heterogeneity by Firstborn's Decade of Birth

	Subsequent marriage			Postmarital Outcomes		
	Overall (1)	< 5 (2)	≥ 5 (3)	Polyg. (4)	Div (5)	Fert. (6)
Female firstborn	0.000	0.029	0.002	0.005**	0.002*	0.045***
	(0.904)	(0.837)	(0.616)	(0.037)	(0.053)	(0.000)
1990-1999 × Female firstborn	0.005	-0.015	0.002	0.001	0.000	-0.012
	(0.271)	(0.919)	(0.690)	(0.753)	(0.918)	(0.357)
2000-2009 × Female firstborn	0.005	-0.034	0.007	-0.004	-0.001	-0.023*
	(0.267)	(0.809)	(0.150)	(0.228)	(0.633)	(0.051)
2010+ × Female firstborn	0.001	-0.031	0.005	-0.001	-0.001	-0.037***
	(0.776)	(0.825)	(0.570)	(0.667)	(0.600)	(0.002)
Ind. controls	✓	✓	✓	✓	✓	✓
Year FE	✓	✓	✓	✓	✓	✓
Country FE	✓	✓	✓	✓	✓	✓
Ethnic area FE	✓	✓	✓	✓	✓	✓
Firstborn´s Birth Decade	✓	✓	✓	✓	✓	✓
Female firstborn+Female firstborn*1990-1999	0.005*	0.015	0.003	0.006***	0.002***	0.033***
	(0.078)	(0.253)	(0.269)	(0.002)	(0.010)	(0.000)
Female firstborn+Female firstborn*2000-2009	0.005*	-0.005	0.008**	0.001	0.001*	0.021***
	(0.084)	(0.474)	(0.016)	(0.395)	(0.068)	(0.000)
Female firstborn+Female firstborn*2010+	0.002	-0.002	0.006	0.004*	0.001	0.008*
	(0.644)	(0.658)	(0.404)	(0.083)	(0.223)	(0.078)
Observations	187,751	47,801	139,905	657,740	740,053	740,053

Notes: This table presents OLS regressions where the dependent variable are the subsequent marriage, polygamous union, currently divorce, and fertility outcomes. The specification includes dummies for firstborn´s decade of birth on its own and interacted with female firstborn. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. p-values reported in parentheses. Standard errors are clustered at the DHS sampling unit.

Table B16: Women´s Age ≤ 40: Effect of Female Firstborn on Family Structure

	Subsequent marriage			Postmarital Outcomes		
	Overall (1)	< 5 (2)	≥ 5 (3)	Polyg. (4)	Div (5)	Fert. (6)
Female firstborn	0.004** (0.026)	-0.001 (0.709)	0.006*** (0.005)	0.003*** (0.002)	0.001*** (0.008)	0.021*** (0.000)
Ind. controls	✓	✓	✓	✓	✓	✓
Year FE	✓	✓	✓	✓	✓	✓
Country FE	✓	✓	✓	✓	✓	✓
Ethnic area FE	✓	✓	✓	✓	✓	✓
Male firstborn baseline	0.65	0.30	0.80	0.25	0.03	3.53
Percent effect	0.65	-0.47	0.77	1.34	3.98	0.60
Observations	157,946	47,748	110,153	542,776	599,150	599,150

Notes: This table presents OLS regressions where the dependent variable are the subsequent marriage, polygamous union, currently divorce, and fertility outcomes. The sample is restricted to women aged 40 years old or less at the survey date. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. p-values reported in parentheses. Standard errors are clustered at the DHS sampling unit.

Table B17: Firstborn Alive: Effect of Female Firstborn on Family Structure

	Subsequent marriage			Postmarital Outcomes		
	Overall (1)	< 5 (2)	≥ 5 (3)	Polyg. (4)	Div (5)	Fert. (6)
Female firstborn	0.004** (0.041)	-0.002 (0.585)	0.005** (0.012)	0.004*** (0.000)	0.002*** (0.000)	0.032*** (0.000)
Ind. controls	✓	✓	✓	✓	✓	✓
Year FE	✓	✓	✓	✓	✓	✓
Country FE	✓	✓	✓	✓	✓	✓
Ethnic area FE	✓	✓	✓	✓	✓	✓
Male firstborn baseline	0.66	0.29	0.81	0.26	0.03	3.84
Percent effect	0.58	-0.74	0.65	1.58	5.45	0.82
Observations	162,446	44,346	118,053	560,894	630,733	630,733

Notes: This table presents OLS regressions where the dependent variable are the subsequent marriage, polygamous union, currently divorce, and fertility outcomes. The sample is restricted to women whose firstborn child is alive at the date of the survey. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. p-values reported in parentheses. Standard errors are clustered at the DHS sampling unit.

Table B18: Firstborn Not Alive: Effect of Female Firstborn on Family Structure

	Subsequent marriage			Postmarital Outcomes		
	Overall (1)	< 5 (2)	≥ 5 (3)	Polyg. (4)	Div (5)	Fert. (6)
Female firstborn	0.004	0.016	0.004	0.003	0.001	-0.001
	(0.329)	(0.310)	(0.282)	(0.313)	(0.296)	(0.907)
Ind. controls	✓	✓	✓	✓	✓	✓
Year FE	✓	✓	✓	✓	✓	✓
Country FE	✓	✓	✓	✓	✓	✓
Ethnic area FE	✓	✓	✓	✓	✓	✓
Male firstborn baseline	0.83	0.41	0.90	0.36	0.03	5.22
Percent effect	0.47	3.98	0.47	0.81	3.57	-0.02
Observations	25,257	3,338	21,801	96,834	109,309	109,309

Notes: This table presents OLS regressions where the dependent variable are the subsequent marriage, polygamous union, currently divorce, and fertility outcomes. The sample is restricted to women whose firstborn child is no longer alive at the date of the survey. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. p-values reported in parentheses. Standard errors are clustered at the DHS sampling unit.

Table B19: Women Always at the Same Residence: Effect of Female Firstborn on Family Structure

	Subsequent marriage			Postmarital Outcomes		
	Overall (1)	< 5 (2)	≥ 5 (3)	Polyg. (4)	Div (5)	Fert. (6)
Female firstborn	0.004	-0.002	0.005	0.008***	0.002*	0.032***
	(0.180)	(0.748)	(0.135)	(0.000)	(0.054)	(0.000)
Ind. controls	✓	✓	✓	✓	✓	✓
Year FE	✓	✓	✓	✓	✓	✓
Country FE	✓	✓	✓	✓	✓	✓
Ethnic area FE	✓	✓	✓	✓	✓	✓
Male firstborn baseline	0.62	0.22	0.78	0.27	0.04	4.18
Percent effect	0.67	-0.85	0.69	2.82	4.21	0.76
Observations	58,216	16,889	41,261	182,157	209,512	209,512

Notes: This table presents OLS regressions where the dependent variable are the subsequent marriage, polygamous union, currently divorce, and fertility outcomes. The sample is limited to DHS surveys with information regarding whether the woman always lived in the same residence as at the time of the survey. The sample is restricted to women who always lived in the same residence. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. p-values reported in parentheses. Standard errors are clustered at the DHS sampling unit.

Table B20: Women Who Changed Residence: Effect of Female Firstborn on Family Structure

	Subsequent marriage			Postmarital Outcomes		
	Overall (1)	< 5 (2)	≥ 5 (3)	Polyg. (4)	Div (5)	Fert. (6)
Female firstborn	0.004 (0.126)	0.001 (0.850)	0.004 (0.119)	0.003* (0.096)	0.001 (0.329)	0.026*** (0.000)
Ind. controls	✓	✓	✓	✓	✓	✓
Year FE	✓	✓	✓	✓	✓	✓
Country FE	✓	✓	✓	✓	✓	✓
Ethnic area FE	✓	✓	✓	✓	✓	✓
Male firstborn baseline	0.76	0.40	0.86	0.24	0.03	3.94
Percent effect	0.55	0.33	0.51	1.10	2.23	0.65
Observations	70,770	15,526	55,175	238,315	267,576	267,576

Notes: This table presents OLS regressions where the dependent variable are the subsequent marriage, polygamous union, currently divorce, and fertility outcomes. The sample is limited to DHS surveys with information regarding whether the woman always lived in the same residence as at the time of the survey. The sample is restricted to women who have not always lived in the same residence. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. p-values reported in parentheses. Standard errors are clustered at the DHS sampling unit.

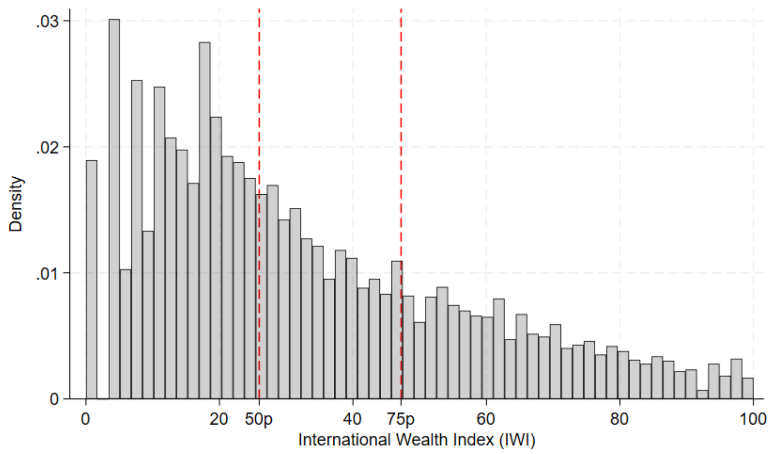
Table B21: Dropping One Country at a Time: Effect of Female Firstborn

	Subsequent marriage					
	Overall	< 5	≥ 5	Polyg.	Div	Fert.
Angola	0.004**	−0.001	0.004**	0.004***	0.002***	0.028***
	(0.002)	(0.004)	(0.002)	(0.001)	(0.000)	(0.004)
Benin	0.004**	−0.002	0.005**	0.004***	0.002***	0.028***
	(0.002)	(0.004)	(0.002)	(0.001)	(0.000)	(0.004)
Burkina Faso	0.004**	−0.001	0.005***	0.004***	0.002***	0.026***
	(0.002)	(0.004)	(0.002)	(0.001)	(0.000)	(0.004)
Burundi	0.004**	−0.002	0.005**	0.004***	0.002***	0.027***
	(0.002)	(0.004)	(0.002)	(0.001)	(0.000)	(0.004)
Cameroon	0.004**	−0.002	0.005***	0.004***	0.002***	0.029***
	(0.002)	(0.004)	(0.002)	(0.001)	(0.000)	(0.004)
Car	0.004**	−0.002	0.005**	0.004***	0.002***	0.027***
	(0.002)	(0.004)	(0.002)	(0.001)	(0.000)	(0.004)
Chad	0.004**	−0.001	0.005***	0.004***	0.002***	0.027***
	(0.002)	(0.004)	(0.002)	(0.001)	(0.000)	(0.004)
Cote D'Ivoire	0.004**	−0.002	0.006***	0.004***	0.002***	0.028***
	(0.002)	(0.004)	(0.002)	(0.001)	(0.000)	(0.004)
DCR	0.004**	−0.001	0.005***	0.004***	0.002***	0.028***
	(0.002)	(0.004)	(0.002)	(0.001)	(0.000)	(0.004)
Eswatini	0.004**	−0.002	0.005***	0.004***	0.002***	0.027***
	(0.002)	(0.004)	(0.002)	(0.001)	(0.000)	(0.004)
Ethiopia	0.004**	−0.001	0.005***	0.004***	0.001***	0.027***
	(0.002)	(0.004)	(0.002)	(0.001)	(0.000)	(0.004)
Gabon	0.004**	−0.000	0.005***	0.004***	0.002***	0.028***
	(0.002)	(0.004)	(0.002)	(0.001)	(0.000)	(0.004)
Gambia	0.004**	−0.002	0.005***	0.004***	0.002***	0.028***
	(0.002)	(0.004)	(0.002)	(0.001)	(0.000)	(0.004)
Ghana	0.004**	−0.002	0.005**	0.004***	0.001***	0.027***
	(0.002)	(0.004)	(0.002)	(0.001)	(0.000)	(0.004)
Guinea	0.004**	−0.002	0.005**	0.004***	0.002***	0.027***
	(0.002)	(0.004)	(0.002)	(0.001)	(0.000)	(0.004)
Kenya	0.003	−0.003	0.004**	0.004***	0.002***	0.026***
	(0.002)	(0.004)	(0.002)	(0.001)	(0.000)	(0.004)
Lesotho	0.004**	−0.000	0.005***	0.004***	0.001***	0.027***
	(0.002)	(0.004)	(0.002)	(0.001)	(0.000)	(0.004)
Liberia	0.004**	−0.001	0.005***	0.004***	0.001***	0.028***
	(0.002)	(0.004)	(0.002)	(0.001)	(0.000)	(0.004)
Madagascar	0.004**	−0.001	0.005***	0.004***	0.002***	0.028***
	(0.002)	(0.004)	(0.002)	(0.001)	(0.000)	(0.004)
Malawi	0.003*	−0.003	0.005**	0.004***	0.001***	0.028***
	(0.002)	(0.004)	(0.002)	(0.001)	(0.000)	(0.004)
Mali	0.004**	−0.002	0.005**	0.003***	0.002***	0.026***
	(0.002)	(0.004)	(0.002)	(0.001)	(0.000)	(0.004)
Mauritania	0.004**	−0.001	0.005***	0.004***	0.001***	0.028***
	(0.002)	(0.004)	(0.002)	(0.001)	(0.000)	(0.004)
Mozambique	0.004**	−0.001	0.005***	0.004***	0.001***	0.028***
	(0.002)	(0.004)	(0.002)	(0.001)	(0.000)	(0.004)
Namibia	0.004**	−0.000	0.005***	0.004***	0.002***	0.027***
	(0.002)	(0.004)	(0.002)	(0.001)	(0.000)	(0.004)
Niger	0.004**	−0.001	0.005***	0.004***	0.001***	0.028***
	(0.002)	(0.004)	(0.002)	(0.001)	(0.000)	(0.004)
Nigeria	0.004**	−0.001	0.005**	0.004***	0.002***	0.026***
	(0.002)	(0.004)	(0.002)	(0.001)	(0.000)	(0.004)
Rwanda	0.004**	−0.001	0.005**	0.004***	0.001***	0.027***
	(0.002)	(0.004)	(0.002)	(0.001)	(0.000)	(0.004)
Senegal	0.004**	−0.001	0.006***	0.004***	0.001***	0.029***
	(0.002)	(0.004)	(0.002)	(0.001)	(0.000)	(0.004)
Sierra Leone	0.004**	−0.002	0.005***	0.004***	0.002***	0.027***
	(0.002)	(0.004)	(0.002)	(0.001)	(0.000)	(0.004)
Tanzania	0.004**	−0.001	0.005**	0.004***	0.002***	0.027***
	(0.002)	(0.004)	(0.002)	(0.001)	(0.000)	(0.004)
Togo	0.004**	−0.002	0.005***	0.004***	0.002***	0.028***
	(0.002)	(0.004)	(0.002)	(0.001)	(0.000)	(0.004)
Uganda	0.003**	−0.002	0.005**	0.004***	0.002***	0.027***
	(0.002)	(0.004)	(0.002)	(0.001)	(0.000)	(0.004)
Zambia	0.004**	−0.002	0.005***	0.004***	0.002***	0.028***
	(0.002)	(0.004)	(0.002)	(0.001)	(0.000)	(0.004)
Zimbabwe	0.003**	−0.002	0.005**	0.004***	0.002***	0.028***
	(0.002)	(0.004)	(0.002)	(0.001)	(0.000)	(0.004)

Notes: This table presents the coefficient estimate of Female firstborn where the dependent variable are the subsequent marriage, polygamous union, currently divorce, and fertility outcomes. Each row represents the country that is excluded from the estimation in each regression. Standard errors, clustered at the DHS sampling unit, reported in parentheses.

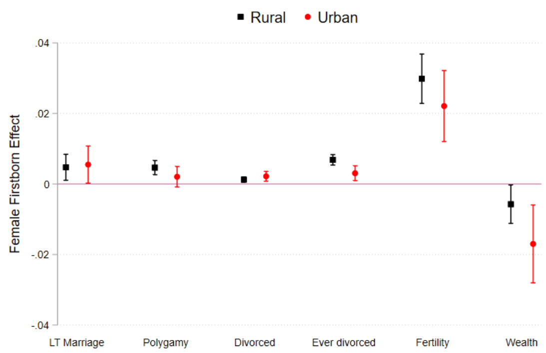
B.2 Female Firstborn Effects: Appendix Figures

Figure B1: Histogram IWI

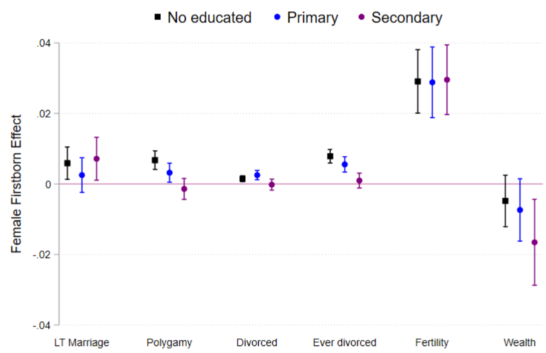


Notes: This figure displays the histogram of the International Wealth Index (IWI). The red dashed lines indicate the 50th and 75th percentiles.

Figure B2: Female Firstborn Effect: Heterogeneity by Residence and Education



(a) Rural vs. Urban



(b) Education Level

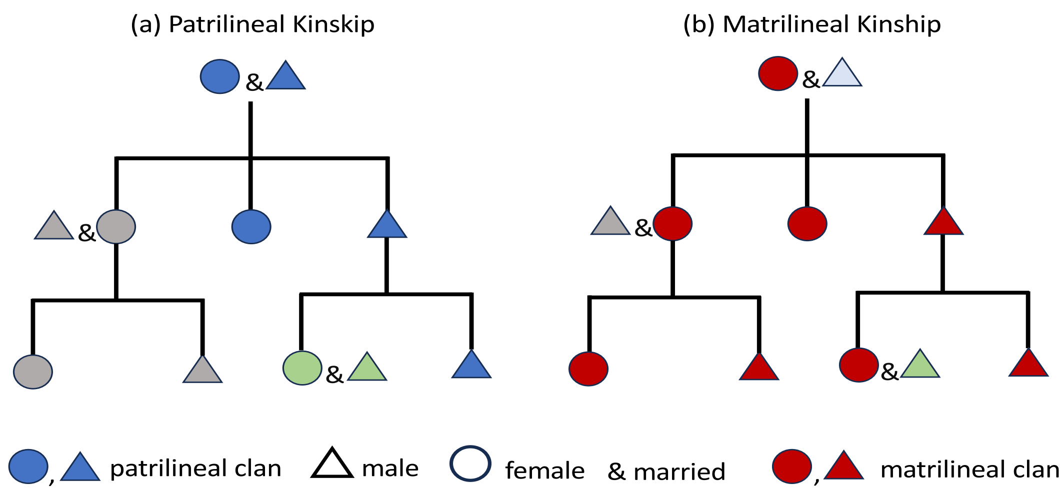
Notes: Panel (a) shows heterogeneity by location of residence. Panel (b) displays heterogeneity by level of education of women.

C Kinship Heterogeneity : Additional Analysis

C.1 Kinship Systems

Matrilineality and patrilineality are systems of lineage and inheritance that determine how kinship and descent are traced within a society. Figure C1 illustrates the difference, where men are represented by triangles and women by circles. An initial couple has three children: a son and two daughters, one of whom is married with children.

Figure C1: Kinship Diagram



In patrilineal societies, sons and unmarried daughters are considered to belong to their father's lineage. Married daughters join their husband's family. Property, family name, and social status are passed down from father to sons.

In matrilineal societies, all three children belong to their mother's lineage. Only the daughter's children will belong to the same lineage. Upon a son's death, his property goes to the next in line descendant, typically his sister's children, mainly her sons. In matrilineal societies, although boys are still favored in terms of inheritance, daughters have a higher status than in patrilineal societies as they are the key to lineage continuation.

C.2 Patrilineal vs. Matrilineal Kinship Heterogeneity: OLS

This section investigates the heterogeneity in the impact of a female firstborn on family structure by kinship descent by extending the OLS equation (1) by including an interaction term between $Female\ firstborn_i$ and the mother's ancestral practice, $Patrilineal_i$. This dummy variable indicates whether woman i belongs to a patrilineal group or a matrilineal group. The estimated equation is:

$$y_{iec} = \beta_1 Female\ firstborn_i + \beta_2 Female\ firstborn \times Patrilineal_i + X_i' \Gamma + \alpha_c + \lambda_e + \delta_t + \epsilon_{iec}. \quad \text{(C1)}$$

Out of the 106 DHS surveys included in our sample, 72 (68%) collect self-reported ethnic information at the individual level. From these, we successfully match 89% of respondents to an ethnic group with documented kinship practices as per Murdock (1959). We focus on women from either patrilineal or matrilineal descent groups, with 79% belonging to patrilineal groups ($Patrilineal_i = 1$) and 21% to matrilineal groups ($Patrilineal_i = 0$).

Table C1 presents the OLS results. The second line displays the effect of a firstborn daughter for women of matrilineal descent, while the sum of the first two lines, highlighted in bold at the bottom of the table, illustrates the effect for women of patrilineal descent. Overall, we observe a higher incidence of subsequent marriages, polygamous unions, and divorces for women following the birth of a firstborn daughter, regardless of whether they are of matrilineal or patrilineal descent. However, two noteworthy differences emerge. First, the marriage patterns for women with a child prior to their first union exhibit distinct variations. Matrilineal women show a clear positive effect of having a daughter on the likelihood of entering into a subsequent union, even in the short term. In contrast, it takes several years before patrilineal women show a slightly increased likelihood of ever marrying if their first-born was a daughter rather than a son. Second, we observe the impact of a female firstborn on the total number of children only within patrilineal societies.

It is important to recognize that women of patrilineal and matrilineal descent groups may also differ along unobserved dimensions that are correlated with family structure. Conditions conducive to plowing techniques, to the domestication of large animals or to

Table C1: Female Firstborn, Kinship, and Family Structure : OLS Estimates (Self Report Ethnicity)

	Subsequent marriage			Postmarital Outcomes		
	Overall	< 5	≥ 5	Polyg.	Div	Fert.
	(1)	(2)	(3)	(4)	(5)	(6)
Female firstborn × Patrilineal	0.001	0.004	0.002	-0.002	-0.003*	0.037***
	(0.782)	(0.738)	(0.774)	(0.532)	(0.059)	(0.001)
Female firstborn	0.005	-0.004	0.006	0.006**	0.004**	0.005
	(0.302)	(0.723)	(0.255)	(0.030)	(0.010)	(0.628)
Patrilineal	0.009	-0.023*	0.018***	0.021***	-0.006***	0.008
	(0.165)	(0.075)	(0.008)	(0.000)	(0.000)	(0.592)
Ind. controls	✓	✓	✓	✓	✓	✓
Year FE	✓	✓	✓	✓	✓	✓
Country FE	✓	✓	✓	✓	✓	✓
Ethnic area FE	✓	✓	✓	✓	✓	✓
Female firstborn+Female firstborn*Patrilineal	0.006**	0.000	0.007***	0.004***	0.001*	0.042***
	(0.017)	(0.956)	(0.008)	(0.009)	(0.055)	(0.000)
Observations	101,309	24,717	76,539	369,406	410,679	410,679

Notes: This table presents OLS regressions where the dependent variable are the subsequent marriage, polygamous union, currently divorce, and fertility outcomes. The sample is restricted to surveys with available women´s ethnicity information and to women who descent from either patrilineal or matrilineal groups. The specification includes dummies for women´s patrilineal ethnicity on its own and interacted with female firstborn. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. p-values reported in parentheses. Standard errors are clustered at the DHS sampling unit.

slavery (Tene 2023, Becker, Enke, and Falk 2020, Alsan 2015, Lowes and Nunn 2024). These differences could directly influence the perceived value of daughters and sons within households. As such, the comparison of the female firstborn effect between patrilineal and matrilineal women in this section may not solely capture the kinship component in our analysis of heterogeneity.

C.3 RD Estimates: Additional Analysis

Table C2: RD Validity: First Stage and Female Firstborn Probability

	Outcome: Patrilineal Ethnic Group			Outcome: Female Firstborn		
	All (1)	Firstborn Before Union (2)	Firstborn After Union (3)	All (4)	Firstborn Before Union (5)	Firstborn After Union (6)
Patrilineal area	0.191*** (0.000)	0.218*** (0.000)	0.184*** (0.000)	0.001 (0.907)	0.001 (0.926)	0.000 (0.947)
Ind. controls	✓	✓	✓	✓	✓	✓
Cluster controls	✓	✓	✓	✓	✓	✓
Year FE	✓	✓	✓	✓	✓	✓
Country FE	✓	✓	✓	✓	✓	✓
Pair FE	✓	✓	✓	✓	✓	✓
LatLon RD	✓	✓	✓	✓	✓	✓
F	139	92.5	126	.0137	.00868	.00437
Observations	122,608	17,302	105,302	151,298	24,305	126,991

Notes: This table presents geographic RD regressions where the dependent variables are an indicator variable = 1 if the respondent reports an ethnicity of patrilineal descent (columns (1)-(3)) and an indicator equal to one if the firstborn child is female (columns (4)-(6)). Cluster controls include the log of population size, log of average purchasing power parity in US dollars, and log of distance to closest urban center. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. p-values reported in parentheses. Standard errors are clustered at the DHS sampling unit.

Table C3: Female Firstborn, Kinship, and Subsequent Marriage: RD Estimates

	Years since birth								
	< 5			≥ 5			Overall		
	ITT (1)	ITT (2)	Fuzzy RD (3)	ITT (4)	ITT (5)	Fuzzy RD (6)	ITT (7)	ITT (8)	Fuzzy RD (9)
Female firstborn × Patrilineal	-0.068** (0.019)	-0.075** (0.011)	-0.134* (0.089)	-0.024* (0.070)	-0.029** (0.027)	-0.013 (0.791)	-0.036*** (0.003)	-0.042*** (0.001)	-0.062* (0.098)
Female firstborn	0.031 (0.120)	0.036* (0.074)	0.070* (0.087)	0.029*** (0.006)	0.032*** (0.002)	0.025 (0.355)	0.027*** (0.004)	0.031*** (0.002)	0.043** (0.046)
Patrilineal	0.029 (0.248)	0.039 (0.196)	0.488** (0.029)	0.061*** (0.000)	0.099*** (0.000)	0.852*** (0.006)	0.054*** (0.000)	0.078*** (0.000)	0.694*** (0.003)
Ind. controls	✓	✓	✓	✓	✓	✓	✓	✓	✓
Cluster controls	✓	✓	✓	✓	✓	✓	✓	✓	✓
Geographic cluster controls		✓	✓		✓	✓		✓	✓
Year FE	✓	✓	✓	✓	✓	✓	✓	✓	✓
Country FE	✓	✓	✓	✓	✓	✓	✓	✓	✓
Pair FE	✓	✓	✓	✓	✓	✓	✓	✓	✓
LatLon RD	✓	✓	✓	✓	✓	✓	✓	✓	✓
Female firstborn+Female firstborn*Patrilineal	-0.037* (0.079)	-0.038* (0.069)	-0.064 (0.158)	0.005 (0.579)	0.003 (0.715)	0.013 (0.613)	-0.010 (0.232)	-0.011 (0.169)	-0.019 (0.328)
Male baseline (patrilineal)	0.37	0.41	1.14	0.78	0.76	-0.27	0.71	0.69	0.52
Percent effect (patrilineal)	-9.99	-9.39	-5.60	0.59	0.38	-4.71	-1.34	-1.60	-3.75
Male baseline (matrilineal)	0.29	0.26	0.72	0.92	0.94	-0.58	0.72	0.74	0.22
Percent effect (matrilineal)	10.58	13.84	9.75	3.11	3.42	-4.36	3.73	4.15	19.63
Observations	6,561	6,417	4,413	16,523	17,238	12,264	24,305	23,661	16,684

Notes: This table presents geographic RD regressions where the dependent variable is an indicator variable = 1 if the respondent ever got married after the birth of their firstborn. The sample is limited to women whose firstborn child was born before ever been in a union. Columns (3) to (6) restrict the sample based on the number of years since the firstborn child was born relative to the time of the survey. Cluster controls include the log of population size, log of average purchasing power parity in US dollars, and log of distance to closest urban center. Geographic controls control for malaria ecology, average agricultural suitability, bride price ethnic area, matrilocal ethnic area, and polygamous ethnic area. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. p-values reported in parentheses. Standard errors are clustered at the DHS sampling unit.

Table C4: Female Firstborn, Kinship, and Postmarital Outcomes: RD Estimates

	Polygamous union			Currently Divorced			Ever Divorced			Fertility		
	ITT (1)	ITT (2)	Fuzzy RD (3)	ITT (4)	ITT (5)	Fuzzy RD (6)	ITT (7)	ITT (8)	Fuzzy RD (9)	ITT (10)	ITT (11)	Fuzzy RD (12)
Female firstborn × Patrilineal	0.008 (0.205)	0.009 (0.179)	0.034 (0.118)	-0.003 (0.316)	-0.003 (0.211)	-0.011 (0.169)	0.000 (0.984)	-0.000 (0.976)	0.016 (0.420)	0.055** (0.033)	0.054** (0.039)	0.145* (0.066)
Female firstborn	-0.007 (0.196)	-0.007 (0.168)	-0.018 (0.154)	0.006*** (0.008)	0.007*** (0.004)	0.011** (0.023)	0.008 (0.132)	0.008 (0.132)	0.001 (0.966)	-0.034 (0.113)	-0.034 (0.128)	-0.078* (0.085)
Patrilineal pair	0.023** (0.013)	-0.004 (0.756)	0.078 (0.374)	-0.000 (0.924)	0.003 (0.376)	0.025 (0.201)	-0.009 (0.154)	0.001 (0.949)	0.038 (0.511)	0.003 (0.906)	0.036 (0.387)	0.453 (0.129)
Ind. controls	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Cluster controls	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Geographic cluster controls		✓	✓		✓	✓		✓	✓		✓	✓
Year FE	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Country FE	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Pair FE	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
LatLon RD	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Female firstborn+Female firstborn*Patrilineal	0.002 (0.684)	0.002 (0.684)	0.017 (0.120)	0.003*** (0.010)	0.003*** (0.010)	-0.000 (0.949)	0.008*** (0.010)	0.008** (0.011)	0.016* (0.064)	0.021 (0.140)	0.020 (0.148)	0.067* (0.075)
Male baseline (patrilineal)	0.32	0.32	0.67	0.00	0.01	-0.05	0.14	0.16	0.11	4.39	4.39	6.83
Percent effect (patrilineal)	0.52	0.52	2.47	147.41	60.60	0.52	5.75	4.94	14.43	0.47	0.47	0.98
Male baseline (matrilineal)	0.27	0.27	0.65	0.06	0.06	-0.04	0.24	0.21	0.10	4.25	4.27	6.50
Percent effect (matrilineal)	-2.49	-2.69	-2.73	10.16	12.10	-27.59	3.35	3.86	0.48	-0.80	-0.79	-1.19
Observations	126,991	124,408	102,965	126,991	124,408	102,965	126,991	124,408	102,965	126,991	124,408	102,965

Notes: This table presents geographic RD regressions where the dependent variable is an indicator variable = 1 if the respondent is currently in a polygamous marriage (columns (1)-(2)), currently divorced (columns (3)-(4)), and the number of children the woman ever gave birth to (colimns (5)-(6)). The sample is limited to women whose firstborn child was born after been in a union. Cluster controls include the log of population size, log of average purchasing power parity in US dollars, and log of distance to closest urban center. Geographic controls control for malaria ecology, average agricultural suitability, bride price ethnic area, matrilocal ethnic area, and polygamous ethnic area.* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. p-values reported in parentheses. Standard errors are clustered at the DHS sampling unit.

Table C5: Alternative RD Estimates: Female Firstborn, Kinship, and Subsequent Marriage

	Years since birth								
	< 5			≥ 5			Overall		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Female firstborn × Patrilineal	-0.075*** (0.000)	-0.075*** (0.000)	-0.074*** (0.001)	-0.029** (0.026)	-0.029** (0.028)	-0.029** (0.028)	-0.042*** (0.001)	-0.041*** (0.001)	-0.041*** (0.001)
Female firstborn	0.037*** (0.005)	0.036*** (0.007)	0.036*** (0.007)	0.032*** (0.002)	0.032*** (0.002)	0.032*** (0.002)	0.031*** (0.002)	0.031*** (0.002)	0.031*** (0.002)
Patrilineal	0.040* (0.087)	0.052* (0.064)	0.082** (0.027)	0.099*** (0.000)	0.103*** (0.000)	0.106*** (0.000)	0.078*** (0.000)	0.085*** (0.000)	0.096*** (0.000)
Ind. controls	✓	✓	✓	✓	✓	✓	✓	✓	✓
Cluster controls	✓	✓	✓	✓	✓	✓	✓	✓	✓
Geographic cluster controls	✓	✓	✓	✓	✓	✓	✓	✓	✓
Year FE	✓	✓	✓	✓	✓	✓	✓	✓	✓
Country FE	✓	✓	✓	✓	✓	✓	✓	✓	✓
Pair FE	✓	✓	✓	✓	✓	✓	✓	✓	✓
LatLon RD	✓			✓			✓		
LatLon^2 RD	✓			✓			✓		
Distance RD		✓	✓		✓	✓		✓	✓
Distance^2 RD			✓			✓			✓
Female firstborn+Female firstborn*Patrilineal	-0.038** (0.023)	-0.039** (0.020)	-0.038** (0.023)	0.003 (0.729)	0.003 (0.701)	0.003 (0.700)	-0.011 (0.166)	-0.011 (0.177)	-0.011 (0.179)
Male baseline (patrilineal)	0.39	0.37	0.37	0.76	0.90	0.90	0.68	0.78	0.78
Percent effect (patrilineal)	-9.73	-10.43	-10.23	0.36	0.34	0.34	-1.62	-1.38	-1.38
Male baseline (matrilineal)	0.27	0.28	0.28	0.94	0.84	0.84	0.74	0.67	0.67
Percent effect (matrilineal)	13.76	12.65	12.59	3.42	3.85	3.85	4.16	4.59	4.59
Observations	6,417	6,417	6,417	17,238	17,238	17,238	23,661	23,661	23,661

Notes: This table presents geographic RD regressions where the dependent variable is an indicator variable = 1 if the respondent ever got married after the birth of their firstborn. The sample is limited to women whose firstborn child was born before ever been in a union. Columns (3) to (6) restrict the sample based on the number of years since the firstborn child was born relative to the time of the survey. Cluster controls include the log of population size, log of average purchasing power parity in US dollars, and log of distance to closest urban center. Geographic controls control for malaria ecology, average agricultural suitability, bride price ethnic area, matrilocal ethnic area, and polygamous ethnic area. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. p-values reported in parentheses. Standard errors are clustered at the DHS sampling unit.

Table C6: Alternative RD Estimates: Female Firstborn, Kinship, and Postmarital Outcomes

	Polygamous union			Currently Divorced			Ever Divorced			Fertility		
	ITT (1)	ITT (2)	Fuzzy RD (3)	ITT (4)	ITT (5)	Fuzzy RD (6)	ITT (7)	ITT (8)	Fuzzy RD (9)	ITT (10)	ITT (11)	Fuzzy RD (12)
Female firstborn × Patrilineal	0.009	0.009	0.009	-0.003	-0.003	-0.003	-0.000	-0.000	-0.000	0.054**	0.054**	0.054**
	(0.178)	(0.180)	(0.184)	(0.208)	(0.210)	(0.211)	(0.971)	(0.977)	(0.975)	(0.039)	(0.040)	(0.041)
Female firstborn	-0.007	-0.007	-0.007	0.007***	0.007***	0.007***	0.008	0.008	0.008	-0.034	-0.033	-0.033
	(0.167)	(0.169)	(0.173)	(0.004)	(0.004)	(0.004)	(0.131)	(0.133)	(0.132)	(0.126)	(0.129)	(0.134)
Patrilineal pair	-0.004	-0.003	-0.011	0.003	0.005	0.007*	0.001	0.006	0.013	0.039	-0.016	0.061
	(0.753)	(0.833)	(0.534)	(0.364)	(0.124)	(0.086)	(0.954)	(0.560)	(0.244)	(0.342)	(0.734)	(0.285)
Ind. controls	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Cluster controls	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Geographic cluster controls	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Year FE	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Country FE	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Pair FE	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
LatLon RD	✓			✓			✓			✓		
$LatLon^2$ RD	✓			✓			✓			✓		
Distance RD		✓	✓		✓	✓		✓	✓		✓	✓
$Distance^2$ RD			✓			✓			✓			✓
Female firstborn+Female firstborn*Patrilineal	0.002	0.002	0.002	0.003***	0.003***	0.003***	0.008**	0.008**	0.008**	0.021	0.020	0.020
	(0.683)	(0.683)	(0.687)	(0.010)	(0.010)	(0.010)	(0.011)	(0.011)	(0.011)	(0.145)	(0.148)	(0.147)
Male baseline (patrilineal)	0.31	0.32	0.32	0.01	0.03	0.03	0.18	0.19	0.19	4.36	4.35	4.35
Percent effect (patrilineal)	0.54	0.52	0.52	24.94	10.58	10.59	4.51	4.09	4.10	0.47	0.47	0.47
Male baseline (matrilineal)	0.29	0.28	0.28	0.05	0.02	0.02	0.19	0.17	0.17	4.31	4.32	4.32
Percent effect (matrilineal)	-2.59	-2.66	-2.63	14.57	27.73	27.73	4.23	4.75	4.75	-0.78	-0.77	-0.76
Observations	124,408	124,408	124,408	124,408	124,408	124,408	124,408	124,408	124,408	124,408	124,408	124,408

Notes: This table presents geographic RD regressions where the dependent variable is an indicator variable = 1 if the respondent is currently in a polygamous marriage (columns (1)-(2)), currently divorced (columns (3)-(4)), and the number of children the woman ever gave birth to (colimns (5)-(6)). The sample is limited to women whose firstborn child was born after been in a union. Cluster controls include the log of population size, log of average purchasing power parity in US dollars, and log of distance to closest urban center. Geographic controls control for malaria ecology, average agricultural suitability, bride price ethnic area, matrilocal ethnic area, and polygamous ethnic area. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. p-values reported in parentheses. Standard errors are clustered at the DHS sampling unit.

Table C7: Female Firstborn, Kinship, and Subsequent Marriage: RD Estimates (SE Clustered at Ethnic Area)

	Years since birth								
	< 5			≥ 5			Overall		
	ITT (1)	ITT (2)	Fuzzy RD (3)	ITT (4)	ITT (5)	Fuzzy RD (6)	ITT (7)	ITT (8)	Fuzzy RD (9)
Female firstborn × Patrilineal	-0.068**	-0.075***	-0.134	-0.024**	-0.029***	-0.013	-0.036***	-0.042***	-0.062*
	(0.014)	(0.006)	(0.102)	(0.024)	(0.008)	(0.742)	(0.002)	(0.000)	(0.071)
Female firstborn	0.031	0.036*	0.070	0.029***	0.032***	0.025	0.027***	0.031***	0.043**
	(0.102)	(0.052)	(0.110)	(0.000)	(0.000)	(0.200)	(0.004)	(0.001)	(0.031)
Patrilineal	0.029	0.039	0.488***	0.061***	0.099***	0.852***	0.054***	0.078***	0.694***
	(0.166)	(0.150)	(0.009)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Ind. controls	✓	✓	✓	✓	✓	✓	✓	✓	✓
Cluster controls	✓	✓	✓	✓	✓	✓	✓	✓	✓
Geographic cluster controls		✓	✓		✓	✓		✓	✓
Year FE	✓	✓	✓	✓	✓	✓	✓	✓	✓
Country FE	✓	✓	✓	✓	✓	✓	✓	✓	✓
Pair FE	✓	✓	✓	✓	✓	✓	✓	✓	✓
LatLon RD	✓	✓	✓	✓	✓	✓	✓	✓	✓
Female firstborn+Female firstborn*Patrilineal	-0.037*	-0.038*	-0.064	0.005	0.003	0.013	-0.010	-0.011	-0.019
	(0.060)	(0.052)	(0.160)	(0.564)	(0.716)	(0.583)	(0.168)	(0.119)	(0.284)
Male baseline (patrilineal)	0.37	0.41	1.14	0.78	0.76	-0.27	0.71	0.69	0.52
Percent effect (patrilineal)	-9.99	-9.39	-5.60	0.59	0.38	-4.71	-1.34	-1.60	-3.75
Male baseline (matrilineal)	0.29	0.26	0.72	0.92	0.94	-0.58	0.72	0.74	0.22
Percent effect (matrilineal)	10.58	13.84	9.75	3.11	3.42	-4.36	3.73	4.15	19.63
Observations	6,561	6,417	4,413	16,523	17,238	12,264	24,305	23,661	16,684

Notes: This table presents geographic RD regressions where the dependent variable is an indicator variable = 1 if the respondent ever got married after the birth of their firstborn. The sample is limited to women whose firstborn child was born before ever been in a union. Columns (3) to (6) restrict the sample based on the number of years since the firstborn child was born relative to the time of the survey. Cluster controls include the log of population size, log of average purchasing power parity in US dollars, and log of distance to closest urban center. Geographic controls control for malaria ecology, average agricultural suitability, bride price ethnic area, matrilocal ethnic area, and polygamous ethnic area. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. p-values reported in parentheses. Standard errors are clustered at the ethnic area level.

Table C8: Female Firstborn, Kinship, and Postmarital Outcomes: RD Estimates (SE Clustered at Ethnic Area)

	Polygamous union			Currently Divorced			Ever Divorced			Fertility		
	ITT	ITT	Fuzzy RD	ITT	ITT	Fuzzy RD	ITT	ITT	Fuzzy RD	ITT	ITT	Fuzzy RD
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Female firstborn × Patrilineal	0.008	0.009	0.034	-0.003	-0.003	-0.011	0.000	-0.000	0.016	0.055*	0.054*	0.145
	(0.226)	(0.207)	(0.213)	(0.450)	(0.328)	(0.178)	(0.984)	(0.976)	(0.433)	(0.066)	(0.079)	(0.275)
Female firstborn	-0.007	-0.007	-0.018	0.006*	0.007**	0.011**	0.008*	0.008	0.001	-0.034	-0.034	-0.078
	(0.262)	(0.237)	(0.288)	(0.058)	(0.029)	(0.017)	(0.095)	(0.104)	(0.964)	(0.208)	(0.231)	(0.354)
Patrilineal pair	0.023**	-0.004	0.078	-0.000	0.003	0.025	-0.009	0.001	0.038	0.003	0.036	0.453
	(0.025)	(0.737)	(0.192)	(0.944)	(0.483)	(0.307)	(0.206)	(0.947)	(0.514)	(0.933)	(0.454)	(0.219)
Ind. controls	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Cluster controls	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Geographic cluster controls		✓	✓		✓	✓		✓	✓		✓	✓
Year FE	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Country FE	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Pair FE	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
LatLon RD	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Female firstborn+Female firstborn*Patrilineal	0.002	0.002	0.017	0.003**	0.003**	-0.000	0.008**	0.008**	0.016	0.021	0.020	0.067
	(0.608)	(0.610)	(0.165)	(0.030)	(0.031)	(0.956)	(0.033)	(0.037)	(0.118)	(0.119)	(0.126)	(0.202)
Male baseline (patrilineal)	0.32	0.32	0.67	0.00	0.01	-0.05	0.14	0.16	0.11	4.39	4.39	6.83
Percent effect (patrilineal)	0.52	0.52	2.47	147.41	60.60	0.52	5.75	4.94	14.43	0.47	0.47	0.98
Male baseline (matrilineal)	0.27	0.27	0.65	0.06	0.06	-0.04	0.24	0.21	0.10	4.25	4.27	6.50
Percent effect (matrilineal)	-2.49	-2.69	-2.73	10.16	12.10	-27.59	3.35	3.86	0.48	-0.80	-0.79	-1.19
Observations	126,991	124,408	102,965	126,991	124,408	102,965	126,991	124,408	102,965	126,991	124,408	102,965

Notes: This table presents geographic RD regressions where the dependent variable is an indicator variable = 1 if the respondent is currently in a polygamous marriage (columns (1)-(2)), currently divorced (columns (3)-(4)), and the number of children the woman ever gave birth to (colimns (5)-(6)). The sample is limited to women whose firstborn child was born after been in a union. Cluster controls include the log of population size, log of average purchasing power parity in US dollars, and log of distance to closest urban center. Geographic controls control for malaria ecology, average agricultural suitability, bride price ethnic area, matrilocal ethnic area, and polygamous ethnic area.* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. p-values reported in parentheses. Standard errors are clustered at the ethnic area level.

Table C9: Balance on Geographic Characteristics at Ethnic Area- and DHS Cluster-Level

	Ethnic-Area-Level			DHS Cluster-Level			
	Matrilineal (1)	Patrilineal (2)	SE (3)	Matrilineal (4)	Patrilineal (5)	SE (6)	RD Coef. (7)
Geographic Variables							
Mean Daily Temperature	24.699	24.862	0.416	23.984	26.061	0.061***	–0.063
	(88)	(88)		(3,420)	(4,677)		
Mean Altitude	0.370	0.363	0.047	0.492	0.248	0.007***	–0.059
	(88)	(88)		(3,420)	(4,677)		
Mean Distance To Coast	635.547	674.407	47.466	517.458	470.264	5.989***	5.281
	(146)	(147)		(6,125)	(6,320)		
Ln(Land Area)	9.952	9.978	0.166	10.487	10.528	0.021**	–0.000
	(146)	(147)		(6,125)	(6,320)		
Malaria Ecology	14.217	14.705	1.044	12.706	16.984	0.167***	1.995**
	(146)	(147)		(6,125)	(6,320)		
Tsetse Fly Suitability Index	0.319	0.331	0.085	0.117	0.161	0.013***	0.039
	(146)	(147)		(6,125)	(6,320)		
Average Agricultural Suitability	0.394	0.394	0.022	0.354	0.398	0.004***	0.040***
	(146)	(147)		(6,125)	(6,320)		
Average Suitability For Pastoralism	0.287	0.296	0.021	0.266	0.360	0.003***	0.034
	(146)	(147)		(6,125)	(6,320)		
Slave Trade and Cultural Variables							
Slave Trade (Ln(1+Atlantic And Indian))	3.012	3.227	0.463	4.709	4.979	0.084***	–0.286
	(146)	(147)		(6,125)	(6,320)		
Bride Price	0.637	0.912	0.046***	0.495	0.946	0.007***	0.305***
	(146)	(147)		(6,125)	(6,320)		
Matrilocal	0.069	0.000	0.021***	0.033	0.000	0.002***	–0.056**
	(144)	(146)		(5,771)	(6,315)		
Polygynous	0.573	0.897	0.048***	0.640	0.873	0.007***	0.314***
	(143)	(145)		(6,106)	(6,318)		
Level Of Jurisdictional Hierarchy	2.169	2.192	0.113	2.571	2.426	0.015***	–0.143
	(136)	(125)		(6,011)	(6,049)		
Settlement Complexity	6.000	5.846	0.229	6.555	6.405	0.029***	–0.035
	(136)	(130)		(6,011)	(6,072)		
Dependence On Agriculture	5.966	5.979	0.164	5.858	5.723	0.022***	–0.208
	(146)	(143)		(6,125)	(6,193)		
Female Participation In Agriculture	4.136	3.655	0.204**	4.007	2.949	0.027***	–0.194
	(81)	(84)		(4,137)	(4,753)		
Plough	0.000	0.008	0.008	0.000	0.009	0.001***	0.015
	(136)	(130)		(6,011)	(6,072)		
Moral High God	0.356	0.465	0.087	0.146	0.583	0.011***	0.079
	(59)	(71)		(2,639)	(3,937)		
DHS Cluster Variables							
Rural				0.673	0.646	0.008***	–0.029
				(6,125)	(6,320)		
Ln(Population)				8.313	8.680	0.042***	0.250***
				(5,320)	(5,338)		
Ln(Average Ppp)				6.913	6.977	0.014***	0.037**
				(4,244)	(4,254)		
Ln(Distance Nearest City)				3.875	3.976	0.039**	–0.336**
				(3,965)	(3,852)		
Ln(Distance National Border)				10.814	10.595	0.029***	–0.207
				(4,235)	(4,244)		

Notes: This table compares the mean values of geographical and cultural characteristics at the ethnic group level (columns (1)–(3)) and the DHS-cluster level (columns (4)–(7)). In the first three columns, the units of observation are the ethnic areas included in the ethnic-pair regression discontinuity sample. In the last three columns, the units of observation are the DHS clusters included in the ethnic-pair regression discontinuity sample. Columns (3) and (6) show the standard errors and significance levels from t-test comparisons of the mean values. Column (7) presents the coefficient from the regression discontinuity estimation of the patrilineal indicator on the variable reported on the right, clustered at the DHS-cluster level. For each variable, the second row shows the number of observations (ethnic areas or DHS clusters) in parentheses. * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$.

Table C10: Female Firstborn, Kinship, and Subsequent Marriage: RD Estimates (Excluding Matrilocal Areas)

	Years since birth								
	< 5			≥ 5			Overall		
	ITT	ITT	Fuzzy RD	ITT	ITT	Fuzzy RD	ITT	ITT	Fuzzy RD
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Female firstborn × Patrilineal	-0.071**	-0.071**	-0.116	-0.025*	-0.025*	-0.022	-0.036***	-0.036***	-0.057*
	(0.015)	(0.015)	(0.135)	(0.066)	(0.057)	(0.579)	(0.004)	(0.004)	(0.099)
Female firstborn	0.035*	0.034*	0.056	0.029***	0.029***	0.030	0.027***	0.027***	0.038*
	(0.084)	(0.093)	(0.162)	(0.005)	(0.006)	(0.202)	(0.005)	(0.006)	(0.054)
Patrilineal	0.029	0.036	0.368**	0.060***	0.088***	0.569***	0.050***	0.068***	0.464***
	(0.253)	(0.218)	(0.041)	(0.000)	(0.000)	(0.002)	(0.000)	(0.000)	(0.002)
Ind. controls	✓	✓	✓	✓	✓	✓	✓	✓	✓
Cluster controls	✓	✓	✓	✓	✓	✓	✓	✓	✓
Geographic cluster controls		✓	✓		✓	✓		✓	✓
Year FE	✓	✓	✓	✓	✓	✓	✓	✓	✓
Country FE	✓	✓	✓	✓	✓	✓	✓	✓	✓
Pair FE	✓	✓	✓	✓	✓	✓	✓	✓	✓
LatLon RD	✓	✓	✓	✓	✓	✓	✓	✓	✓
Female firstborn+Female firstborn*Patrilineal	-0.036*	-0.037*	-0.060	0.005	0.004	0.007	-0.009	-0.010	-0.019
	(0.085)	(0.080)	(0.179)	(0.572)	(0.658)	(0.725)	(0.245)	(0.225)	(0.302)
Male baseline (patrilineal)	0.38	0.42	1.14	0.79	0.77	-0.00	0.70	0.69	0.61
Percent effect (patrilineal)	-9.63	-8.86	-5.23	0.60	0.46	-201.52	-1.31	-1.39	-3.06
Male baseline (matrilineal)	0.28	0.26	0.76	0.92	0.94	-0.27	0.73	0.74	0.37
Percent effect (matrilineal)	12.30	13.33	7.32	3.17	3.04	-11.07	3.71	3.63	10.49
Observations	6,384	6,364	4,532	16,467	17,278	12,699	23,722	23,649	17,238

Notes: This table presents geographic RD regressions where the dependent variable is an indicator variable = 1 if the respondent ever got married after the birth of their firstborn. The sample is limited to women whose firstborn child was born before ever been in a union. Columns (3) to (6) restrict the sample based on the number of years since the firstborn child was born relative to the time of the survey. The sample excludes matrilocal ethnic areas.Cluster controls include the log of population size, log of average purchasing power parity in US dollars, and log of distance to closest urban center. Geographic controls control for malaria ecology, average agricultural suitability, bride price ethnic area, and polygamous ethnic area. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. p-values reported in parentheses. Standard errors are clustered at the DHS sampling unit.

Table C11: Female Firstborn, Kinship, and Postmarital Outcomes: RD Estimates (Excluding Matrilocal Areas)

	Polygamous union			Currently Divorced			Ever Divorced			Fertility		
	ITT (1)	ITT (2)	Fuzzy RD (3)	ITT (4)	ITT (5)	Fuzzy RD (6)	ITT (7)	ITT (8)	Fuzzy RD (9)	ITT (10)	ITT (11)	Fuzzy RD (12)
Female firstborn × Patrilineal	0.009	0.009	0.034	-0.002	-0.002	-0.009	0.001	0.001	0.017	0.056**	0.055**	0.143*
	(0.167)	(0.161)	(0.117)	(0.456)	(0.430)	(0.259)	(0.898)	(0.916)	(0.393)	(0.031)	(0.034)	(0.066)
Female firstborn	-0.008	-0.008	-0.017	0.005**	0.006**	0.010**	0.007	0.007	-0.000	-0.035	-0.034	-0.077*
	(0.146)	(0.140)	(0.153)	(0.019)	(0.017)	(0.046)	(0.172)	(0.178)	(0.992)	(0.108)	(0.119)	(0.082)
Patrilineal pair	0.020**	0.006	0.123*	0.001	0.003	0.022	-0.005	-0.000	0.008	0.006	-0.001	0.211
	(0.035)	(0.600)	(0.074)	(0.770)	(0.244)	(0.165)	(0.417)	(0.961)	(0.867)	(0.833)	(0.985)	(0.351)
Ind. controls	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Cluster controls	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Geographic cluster controls		✓	✓		✓	✓		✓	✓		✓	✓
Year FE	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Country FE	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Pair FE	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
LatLon RD	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Female firstborn+Female firstborn*Patrilineal	0.002	0.002	0.017	0.003**	0.003**	0.000	0.008***	0.008**	0.017*	0.021	0.021	0.066*
	(0.702)	(0.704)	(0.120)	(0.010)	(0.011)	(0.904)	(0.010)	(0.012)	(0.060)	(0.138)	(0.137)	(0.080)
Male baseline (patrilineal)	0.31	0.30	0.61	0.01	0.01	-0.04	0.16	0.18	0.17	4.38	4.40	7.21
Percent effect (patrilineal)	0.50	0.52	2.69	63.64	65.64	-1.04	5.19	4.49	9.81	0.48	0.48	0.91
Male baseline (matrilineal)	0.28	0.30	0.57	0.06	0.06	-0.04	0.22	0.20	0.17	4.28	4.25	6.96
Percent effect (matrilineal)	-2.71	-2.62	-3.07	9.51	9.62	-26.63	3.32	3.69	-0.07	-0.81	-0.80	-1.11
Observations	125,570	125,135	104,946	125,570	125,135	104,946	125,570	125,135	104,946	125,570	125,135	104,946

Notes: This table presents geographic RD regressions where the dependent variable is an indicator variable = 1 if the respondent is currently in a polygamous marriage (columns (1)-(2)), currently divorced (columns (3)-(4)), and the number of children the woman ever gave birth to (colimns (5)-(6)). The sample is limited to women whose firstborn child was born after been in a union. The sample excludes matrilocal ethnic areas. Cluster controls include the log of population size, log of average purchasing power parity in US dollars, and log of distance to closest urban center. Geographic controls control for malaria ecology, average agricultural suitability, bride price ethnic area, and polygamous ethnic area. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. p-values reported in parentheses. Standard errors are clustered at the DHS sampling unit.

Table C12: Female Firstborn, Bride Price, and Subsequent Marriage: RD Estimates

	Years since birth								
	< 5			≥ 5			Overall		
	ITT (1)	ITT (2)	Fuzzy RD (3)	ITT (4)	ITT (5)	Fuzzy RD (6)	ITT (7)	ITT (8)	Fuzzy RD (9)
Female firstborn × Bride Price	0.006	0.006	0.005	-0.011	-0.012	-0.039	-0.005	-0.005	-0.013
	(0.737)	(0.712)	(0.943)	(0.228)	(0.171)	(0.161)	(0.554)	(0.557)	(0.641)
Female firstborn	-0.006	-0.007	-0.011	0.017**	0.017**	0.038**	0.009	0.009	0.017
	(0.655)	(0.628)	(0.822)	(0.017)	(0.017)	(0.046)	(0.168)	(0.169)	(0.360)
Bride Price	0.007	0.013	0.264*	-0.005	-0.000	0.019	-0.003	0.002	0.072
	(0.616)	(0.418)	(0.085)	(0.522)	(0.996)	(0.746)	(0.704)	(0.807)	(0.236)
Patrilineal	-0.022	-0.026	-0.083*	0.007	0.002	0.003	0.002	-0.005	-0.017
	(0.222)	(0.153)	(0.061)	(0.409)	(0.835)	(0.865)	(0.821)	(0.588)	(0.338)
Ind. controls	✓	✓	✓	✓	✓	✓	✓	✓	✓
Cluster controls	✓	✓	✓	✓	✓	✓	✓	✓	✓
Geographic cluster controls		✓	✓		✓	✓		✓	✓
Year FE	✓	✓	✓	✓	✓	✓	✓	✓	✓
Country FE	✓	✓	✓	✓	✓	✓	✓	✓	✓
Pair FE	✓	✓	✓	✓	✓	✓	✓	✓	✓
LatLon RD	✓	✓	✓	✓	✓	✓	✓	✓	✓
Female firstborn+Female firstborn*Bride Price	-0.000	-0.000	-0.006	0.006	0.004	-0.000	0.004	0.004	0.005
	(0.968)	(0.973)	(0.847)	(0.317)	(0.452)	(0.972)	(0.433)	(0.435)	(0.666)
Observations	29,455	29,305	12,995	79,963	81,643	42,085	111,504	110,956	55,095

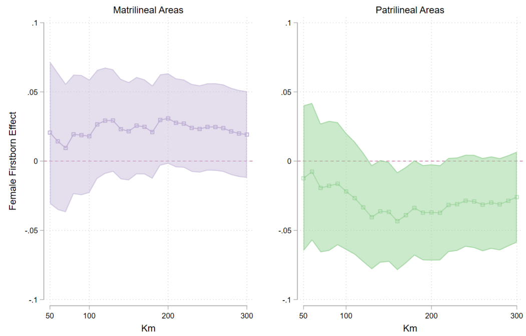
Notes: This table presents geographic RD regressions where the dependent variable is an indicator variable = 1 if the respondent ever got married after the birth of their firstborn. The sample is limited to women whose firstborn child was born before ever been in a union. Columns (3) to (6) restrict the sample based on the number of years since the firstborn child was born relative to the time of the survey. Cluster controls include the log of population size, log of average purchasing power parity in US dollars, and log of distance to closest urban center. Geographic controls control for malaria ecology, average agricultural suitability, matrilocal ethnic area, and polygamous ethnic area. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. p-values reported in parentheses. Standard errors are clustered at the DHS sampling unit.

Table C13: Female Firstborn, Bride Price, and Postmarital Outcomes: RD Estimates

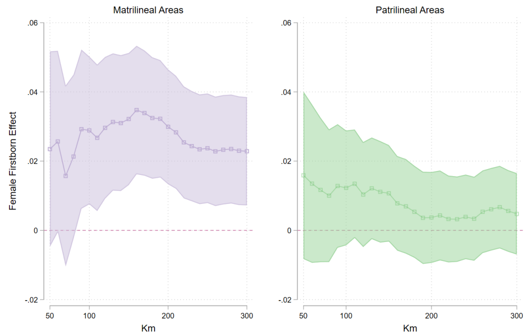
	Polygamous union			Currently Divorced			Ever Divorced			Fertility		
	ITT (1)	ITT (2)	Fuzzy RD (3)	ITT (4)	ITT (5)	Fuzzy RD (6)	ITT (7)	ITT (8)	Fuzzy RD (9)	ITT (10)	ITT (11)	Fuzzy RD (12)
Female firstborn × Bride Price	0.004	0.004	0.001	-0.002	-0.002	-0.008*	-0.005	-0.004	-0.014	0.005	0.003	0.034
	(0.281)	(0.353)	(0.916)	(0.261)	(0.249)	(0.080)	(0.161)	(0.213)	(0.206)	(0.743)	(0.816)	(0.423)
Female firstborn	-0.003	-0.003	-0.002	0.001	0.001	0.006*	0.007**	0.007**	0.014*	0.029***	0.029***	0.011
	(0.334)	(0.342)	(0.828)	(0.306)	(0.289)	(0.084)	(0.014)	(0.014)	(0.077)	(0.009)	(0.009)	(0.734)
Bride Price	0.018***	0.019***	0.116***	0.001	0.002	0.004	-0.004	-0.004	-0.048**	0.015	0.010	-0.054
	(0.000)	(0.000)	(0.000)	(0.271)	(0.237)	(0.613)	(0.233)	(0.242)	(0.028)	(0.322)	(0.543)	(0.560)
Patrilineal	0.029***	0.035***	0.027***	-0.002	-0.002	-0.000	-0.011**	-0.009*	0.009	0.024	0.029	0.036
	(0.000)	(0.000)	(0.007)	(0.241)	(0.330)	(0.888)	(0.019)	(0.071)	(0.220)	(0.261)	(0.187)	(0.252)
Ind. controls	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Cluster controls	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Geographic cluster controls		✓	✓		✓	✓		✓	✓		✓	✓
Year FE	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Country FE	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Pair FE	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
LatLon RD	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Female firstborn+Female firstborn*Bride Price	0.001	0.001	-0.001	-0.000	-0.000	-0.002	0.002	0.002	0.001	0.034***	0.033***	0.045***
	(0.602)	(0.757)	(0.878)	(0.605)	(0.603)	(0.185)	(0.348)	(0.239)	(0.839)	(0.000)	(0.000)	(0.003)
Observations	574,677	568,517	357,244	574,677	568,517	357,244	574,677	568,517	357,244	574,677	568,517	357,244

Notes: This Table presents geographic RD regressions where the dependent variable is an indicator variable = 1 if the respondent is currently in a polygamous marriage (columns (1)-(2)), currently divorced (columns (3)-(4)), and the number of children the woman ever gave birth to (colimns (5)-(6)). The sample is limited to women whose firstborn child was born after been in a union. Cluster controls include the log of population size, log of average purchasing power parity in US dollars, and log of distance to closest urban center. Geographic controls control for malaria ecology, average agricultural suitability, matrilocal ethnic area, and polygamous ethnic area. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. p-values reported in parentheses. Standard errors are clustered at the DHS sampling unit.

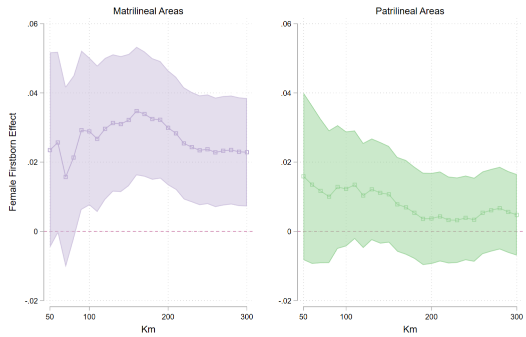
(a) Subsequent Marriage: YSB < 5



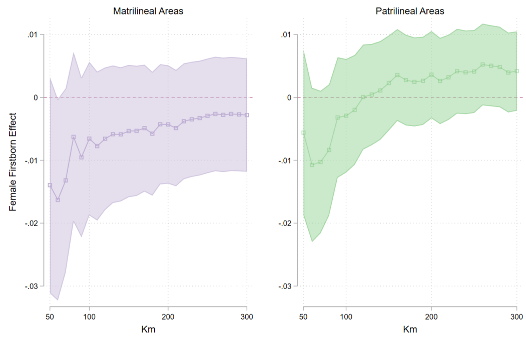
(b) Subsequent Marriage: YSB ≥ 5



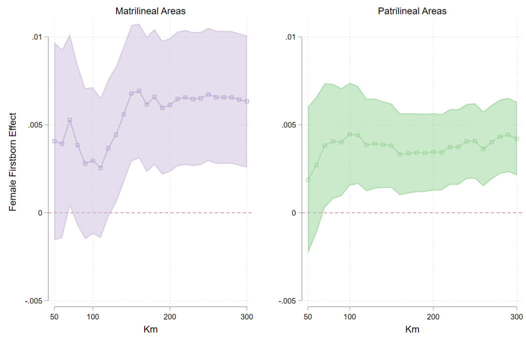
(c) Subsequent Marriage



(d) Polygamy



(e) Divorce



(f) Total Fertility

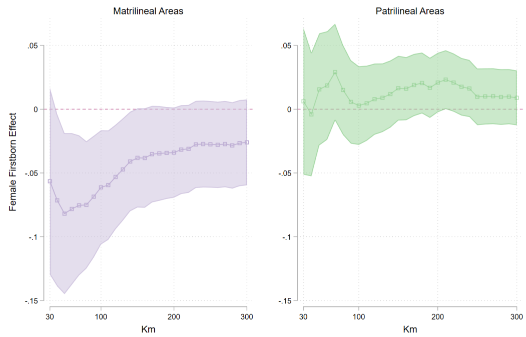


Figure C2: Kinship Heterogeneity: Bandwidth Sensitivity