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Department of Economics
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Sibling Gender, Inheritance Customs and Educational Attainment: Evidence from Matrilineal and Patrilineal Societies

Matthew Collins

March 2022

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Sibling Gender, Inheritance Customs and Educational Attainment: Evidence from Matrilineal and Patrilineal Societies*

Matthew Collins[1]

March 7, 2022

Abstract

Using data from 27 sub-Saharan African countries, I identify the causal effect of sibling gender on education and how it varies according to inheritance customs. Boys who inherit their father's property experience no effect of sibling gender, while boys who do not inherit experience a significant negative effect of having a brother. Having a brother has a small negative effect on the education of girls, regardless of inheritance customs. The effect of sibling gender converges after the introduction of laws guaranteeing that children inherit from their parents, suggesting that parents substitute between transferring inheritance and investing in their children's education.

Keywords: sibling gender, patriliny, matriliny, educational attainment
JEL codes: D13 I20 J16

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1. Introduction

Inequalities in the allocation of resources within households can occur because of differences in cognitive and health endowments but also due to other factors such as gender, expected inheritances, labour market prospects and cultural practices. According to classical models of human capital investment, parents will invest more in the education of children who they believe have a higher marginal return to schooling (Becker, 1981). If parents invest in their children as predicted, this will serve to exacerbate inequalities. Children cannot choose their endowments or early-life circumstances, and the family and society into which a child is born has ramifications for the allocation of resources among siblings. While a large literature examines how parental investments respond to the cognitive and health endowments of their children, we know little about how these investments respond to other factors that determine economic opportunity.[1]

In this paper, I study the effect of sibling gender on education and how that effect varies according to the inheritance customs of different ethnic groups. I first consider the mechanism through which sibling gender and inheritances interact to determine educational attainment. With constrained resources, if there are greater returns to educating boys or if parents' preferences are biased toward sons, then for a given child, having a brother rather than a sister leads to a greater diversion of resources away from that child. This loss of resources reduces educational attainment, regardless of that child's gender. If parents view education and inheritance as substitutes, then for boys who can inherit property, having a brother leads to a loss of inheritance, for which parents compensate with greater educational investment, mitigating the negative effect of having a brother.

I then test these predictions empirically. The gender composition of one's siblings is not random and stems from parental preferences over the number of children of each gender they wish to have. I circumvent this problem by exploiting the fact that for first-born children who have a second-born sibling, the gender of that sibling is as good as random. This allows me to identify the causal effect of having a second-born brother, relative to a second-born sister, on the education of the first-born child. Doing so avoids the issue of the endogeneity of family size with respect to child gender composition.[2] Due to the presence of many matrilineal and patrilineal ethnic groups, Sub-Saharan Africa provides the perfect setting to test how the effects of sibling gender vary according to whether sons will inherit from their father. In both patrilineal and matrilineal societies, property is predominantly held by males but these kinship structures give rise to different patterns of inheritance. In many patrilineal societies, inheritances are passed directly from a man to his sons. In other patrilineal societies and in matrilineal societies, inheritances are typically passed to other male heirs, which could include brothers, cousins or nephews, among others. This setting allows

[1] See Section 4 of Almond et al. (2018) for a review of the literature on how parental investments respond to the endowments of children.

[2] This is consistent with the literature using child gender as an instrument for family size including Angrist et al. (2010), Black et al. (2005) and Hank and Kohler (2000).

me to examine variation in the effect of sibling gender according to whether inheritance customs allow inheritances to be passed from fathers to sons or not.

I use nationally representative data from the Demographic and Health Survey in 27 countries, which includes information on the ethnicity and full birth history of mothers, along with the education outcomes of their children. To identify inheritance customs, these data are matched to the Ethnographic Atlas, an anthropological dataset containing information on the cultural characteristics of ethnic groups across the world.

On average, I find small yet statistically significant negative effects on education of having a brother relative to a sister. This result masks significant heterogeneity. For boys who can inherit property from their fathers, I find no effect of sibling gender on education. For boys who do not inherit from their father, I find a negative effect of having a brother of 9.4% of a year of schooling. For girls, I find a small negative effect of having a brother, regardless of inheritance customs. Overall, these findings are consistent with the hypothesis that parents view the transfer of property and investment in education as substitute goods in investing in the future of their offspring.

I provide evidence in support of this hypothesis using quasi-experimental methods. I identify five countries where, during my period of observation, inheritance laws were introduced guaranteeing the inheritance of one's property by children, regardless of gender. I identify how these reforms interact with sibling gender effects using a fixed effects strategy to identify within-country, over-time variation in inheritance laws. After the introduction of these laws, as the ability to transfer inheritance to children is the same for all parents, the effect of having a brother converges across ethnic groups according to traditional inheritance customs.

In addition, I show that government education policy can also play a large role in reducing sibling gender effects. During my period of observation, 19 countries in my sample introduced free primary education. Using a within-country fixed effects identification strategy, I show that removing primary school tuition fees reduces sibling gender effects in educational attainment for boys who do not inherit from their fathers. This result provides notable implications for the role of policy in reducing gender inequalities.

To identify other mechanisms driving the baseline results, I examine how sibling gender affects family size. In ethnic groups not practising inheritance from fathers to sons, boys who have a brother go on to have relatively more siblings, potentially contributing to the sibling gender effects identified. For girls, regardless of inheritance customs, having a brother leads to fewer total siblings, potentially mitigating the negative effect of having a brother. I also show that differences across ethnic groups in child labour, gender biases, returns to education and access to education are unlikely to contribute to the results.

I provide evidence that the estimated effect of inheritance customs can be given a causal interpretation by showing that the effects are robust to a variety of alternative identification strategies. In particular, I find similar results when using a regression discontinuity design, exploiting spatial

discontinuities in inheritance rules occurring at borders between the historic homelands of different ethnic groups. The results are also robust to alternative definitions of the inheritance customs variable and to conditioning on a battery of observable predictors of educational attainment which may confound the effects of inheritance customs. I show that the results are unlikely to be driven by mis-reporting of inheritance rules by restricting my sample to only ethnic groups whose inheritance rules can be validated by other sources. I also show that my results are not driven by selection, including selection into having a sibling, childhood mortality, selection into being observed by the DHS survey and sibling sex-selection.

This paper provides a number of important contributions. First, it contributes to our understanding of how sibling gender affects education outcomes in less developed countries.[3] Specifically, this paper provides causal evidence on the effect of sibling gender on education in Sub-Saharan Africa, a region where boys continue to attain more education than girls and where there exist diverging trends in the gender gap in education across countries (Evans et al., 2021). Morduch (2000) finds a positive association between having more sisters and years of schooling in Tanzania but finds no association in South Africa. This analysis does not account for the endogeneity of family size, however, so this finding can be seen as descriptive rather than causal. Vogl (2013) studies the effects of sibling gender on the marriage outcomes of females in South Asia. In a comparative analysis using a sample of women in Sub-Saharan Africa, he finds that having a sister leads to fewer years of schooling, lower enrolment and a higher likelihood of being illiterate. My work provides a comprehensive examination of how sibling gender affects education and the mechanisms through which it operates.

Second, my work provides important insights on how policy interacts with culture and traditions. While evidence on how policy affects cultural practices directly is relatively rare, Bau (2021) shows that the introduction of improved pension policies reduced the practice of patrilocality and matrilocality. As patrilocality and matrilocality incentivise investments in the education of sons and daughters, respectively, Bau (2021) shows that these pension plans also reduced inequalities in investments across siblings. Ashraf et al. (2020) show that school construction in Indonesia led to increased educational attainment for girls from ethnic groups practising bride price, which incentivises the education of girls. For other girls, school construction had no effect on education. I show that inheritance laws guaranteeing inheritance to children and the introduction of free primary education can shape the inequalities in the allocation of educational resources that stem from different inheritance customs.

Third, I contribute to our understanding of how kinship affects individual-level outcomes. By identifying how the effect of sibling gender varies according to inheritance customs, I show that

[3]The effect of sibling gender on various outcomes has examined in developed countries, including earnings (Cools and Patacchini, 2019; Gielen et al., 2016; Peter et al., 2018; Rao and Chatterjee, 2018), education (Chen et al., 2019), gender conformity (Brenøe, 2018), family formation (Peter et al., 2018) and personality (Golsteyn and Magnée, 2020).

the ability to transfer inheritance to children can be used to reduce inequalities in the allocation of resources. An increasingly large body of literature examines various mechanisms through which kinship affects outcomes. La Ferrara and Milazzo (2017), exploiting a reform that affected inheritance rules in Ghana, examine how patrilineal inheritances lead to reduced educational attainment among boys. Gneezy et al. (2009) examine how individuals from different kinship systems have different preferences toward competition, while Pondorfer et al. (2017) identify differences between patrilineal and matrilineal societies with regard to stereotypes of risk preferences. Lowes (2020b) shows that matrilineal kinship reduces spousal co-operation and Loper (2019) shows that matrilineal women are more likely to suffer from HIV. In addition to Bau (2021), Levine and Kevane (2003) examine how patrilocality affects investment in daughters' education. My work adds to this body of evidence by showing how kinship-induced inheritance customs act as a mechanism determining intra-household educational investments.

The remainder of the paper proceeds as follows. Section 2 discusses matrilineal and patrilineal inheritance customs and considers the theoretical context. Section 3 outlines the data and empirical strategy. Section 4 presents the results, investigates the potential mechanisms underlying them and examines their robustness. Section 5 provides evidence in support of the main hypothesis and section 6 investigates whether policy can has a role to play in reducing sibling gender effects. Section 7 concludes.

2. Kinship, Inheritance Rules and Resource Allocation

Inheritance customs stem from kinship structures, which define familial descent. The majority of ethnic groups in Sub-Saharan Africa follow a unilineal kinship rule, whereby kin membership is passed from one generation to the next via one gender. In patrilineal societies, kinship passes through males, while in matrilineal societies, kinship passes through females. Figure 1 outlines the structure of patrilineal kinship systems, where men and women are represented by male and female symbols, respectively, with colours denoting kin membership. Children are incorporated into the kin of their father. After marrying, sons maintain the kin of their father, which is passed on to their own children, while daughters effectively give up their father's kin and are incorporated into the kin of their husband. Matriliny and patrilineal kinship, however, are not symmetric. Figure 2 outlines the matrilineal kinship structure. Children are incorporated into the kin of their mother. After marrying, daughters maintain the kin of their mother, which is passed on to their own children. Contrary to patrilineal kinship, sons maintain the kin of their own mother even after marrying, with their children being incorporated into the kin of their wife.

In both patrilineal and matrilineal societies, males tend to own the majority of real property, i.e. land and buildings, with inheritance rules largely following kinship.[4] There also exists variation

[4]This is not true for all matrilineal ethnic groups. For example, in some matrilineal ethnic groups in Malawi, inheritance is passed from mothers to daughters, with the husbands of those daughters working on the land (Berge

in the pattern of inheritance within kinship structures, with inheritances being passed to different heirs across different ethnic groups. While a patrilineal man's property is most commonly inherited by his sons, property may also be passed to others. For example, among the Mende of Western Africa, a man's property is passed to his brothers by order of age (Aguwa, 2010), while a Yoruba man's property is assigned to members of his patrilineage on the basis of need (Barnes, 2009). In matrilineal societies, however, a man's property is often inherited by his sisters' sons or by other matrilineal heirs.[5] For example, among the Southern African Tonga, a man's heir is appointed from within his matrilineage after his death (Colson, 2014) and among the Central African Suku, property is passed to the elders of a matrilineage (Kopytoff, 2016).

In Appendix A, I provide a theoretical framework outlining how sibling gender and the ability to transfer inheritance to sons affect the distribution of educational resources across children. Parents derive utility from preparing their children well to earn their own livelihood, either altruistically or because they need their children to care for them in their old age. One means by which parents prepare their children is through investing in their education. In line with typical models of the household, if parents invest more in children with higher rates of return (Becker, 1981), investments in boys will be greater if there exist higher returns to education for boys. Having a brother will therefore lead to a greater diversion of limited educational resources toward that brother than would otherwise be diverted toward a sister. This relative loss of resources manifests in reduced educational attainment. This produces the framework's first testable prediction.

PREDICTION 1: *For all children, having a brother will lead to lower educational attainment, relative to having a sister.*

For parents from ethnic groups whose customs allow for inheritance to pass from fathers to sons, the transfer of inheritance provides an additional means by which parents can prepare their children. If parents view inheritance and education as substitutes, then boys who can inherit property will receive less educational resources. If inheritance is divisible, this reduces the share of resources diverted towards brothers, in turn reducing the negative effect of having a brother. Moreover, for sons who can inherit property, in addition to a reduced relative loss of educational resources, having a brother also leads to a loss of one's own expected inheritance. Parents compensate for their son's reduced inheritance with increased educational investment, reducing the negative effect of having a brother on education even further. This produces the theoretical framework's second testable prediction.

PREDICTION 2: *The negative effect of having a brother on education will be lower for children*

et al., 2014). Not accounting for this could potentially confound the results, an issue which I address in section 4.4.3.

[5]One commonly used example of inheritance passing from a man to his sisters' sons is among the Akan of western Africa, whereby lineage-owned land is inherited as such (Gilbert et al., 2000).

in ethnic groups where sons inherit property, particularly for boys.

Prediction 2 relies on the assumption that parental preferences toward investing in the education of sons do not dominate any reduction in educational investments that are associated with receiving an inheritance. More crucially, however, these predictions rely on the assumption that parents in ethnic groups where sons do not inherit property from their fathers do not consider potential inheritances from other relatives when deciding on the allocation of educational resources. This is despite the fact that many boys who do not inherit directly from their father may inherit at some point from an uncle, from another family member or be distributed land at some point by the elders or leaders of their kin group.

There are various reasons why this assumption holds in the absence of inheritance from fathers to sons, some of which have received attention in the economic and anthropological literature. Even if sons will inherit from an uncle or another family member, parents face much uncertainty over if or when property will be inherited and how much will be inherited, so they may want to insure against the risk of an inadequate inheritance (La Ferrara and Milazzo, 2017).[6] Similarly, Matlon (1994) notes in a study of land use in Burkina Faso, that inheritances from fathers to sons are considered more secure than other lineage inheritances. An uncle may also have more nephews than sons or a kin leader may have more heirs than sons, leading to greater division of inheritance and, in the case of land inheritance, separation of lands inherited from different relatives, which can make inherited lands less productive. In addition, while all children have a biological father, a child may not have a maternal uncle or other relative from whom to inherit. Moreover, the substitution between education and inheritance has been noted in various contexts.[7]

3. Data and Empirical Strategy

3.1. Contemporaneous Data

Data on education outcomes and sibling sex composition are taken from the Demographic and Health Survey (DHS). The DHS are a series of household surveys implemented in developing countries across the world, providing nationally and/or regionally representative data on health and demography, with a particular focus on female respondents. In my main analysis, I use data

[6]Moreover, ethnic groups for whom I observe inheritance passing from uncles to nephews make up only 2% of my sample and I show in section 4.4.2 that the results are robust to excluding these from the analysis.

[7]In Ghana, Duncan (2010) describes how, in cocoa producing regions where matrilineal women traditionally have the right to claim a portion of their husband's land, they are "willing to accept the education of their children by the men with whom they are involved as acceptable substitutes for land." La Ferrara and Milazzo (2017) find that guaranteeing land inheritance to children in Ghana reduced the education of matrilineal boys. Similarly, Congdon Fors et al. (2019) find in Ethiopia that improving the security of land tenure reduced the education of sons who were in line to inherit, while in Kenya, Migot-Adholla et al. (1994) observe that individuals with less secure land tenure tend to have higher higher levels of education. Outside of Africa, Quisumbing and Otsuka (2001) find in Sumatra, Indonesia, where lineage-owned property was traditionally inherited by women, that a gradual evolution toward sons inheriting land is associated with rising female education.

from the household and woman's questionnaires. The household questionnaire can be completed by any knowledgeable person age 15 or older living in the household and provides information on the age, sex and education of all usual members and visitors of a household, in addition to background information on the household. The woman's questionnaire is given to all women between the ages of 15 and 49 residing in the household. The questionnaire includes a number of sections, with ethnicity and birth histories being of most importance in my analysis. I assign ethnicity according to a child's mother as this is the level at which I observe birth records and thus observe birth order and sibling gender.[8] My sample is comprised of first born children who are residing in their mother's household at the time of the survey. While I observe birth records for children who live elsewhere, I do not observe education outcomes for those children. In section 4.4.2, I show that sibling gender and inheritance customs do not predict the likelihood of being observed in my sample.

I include data from all national DHS surveys using two criteria: (1) surveys in which children's information in the household survey can be linked to the birth history of their mother from the women's survey; and (2) those in which the woman's survey includes a question on the respondent's ethnicity, where that ethnicity can be matched to an ethnic group in the ethnographic atlas which is observed to practise a matrilineal or patrilineal inheritance custom. My main sample includes data from 71 surveys implemented across DHS phases 4-8 in 27 Sub-Saharan African countries. A full list of surveys included is provided in Appendix E.2. The data contain geo-spatial information, which is provided by the DHS and includes the GPS co-ordinates of sampled villages and standardised geo-spatial characteristics of the villages, including data on temperature, rainfall, population density and travel times to nearby cities or international borders, among others. Figure 3 shows the countries and locations of clusters included in my main sample.

As outcome variables, I use three education outcomes, which are a child's highest grade completed, whether a child is attending school at the time of the survey and whether a child has ever attended school. Highest grade completed is calculated based on answers to questions on the highest level of school attended (e.g. primary, lower secondary, etc.) and the highest grade completed at that level. The variable is calculated based on the number of years of schooling required to complete that grade in each country. Whether a child is currently attending school is created based the answer provided to a question asking whether that child had attended school during the current school year. Whether a child ever attended school is based on the answer to a question on that child's education status, where answers may be chosen from a list of possibilities, one of which includes never having attended.

[8] I consider inter-ethnic households in section 4.4.1.

3.2. Ethnographic Data

To obtain data on inheritance customs, I use the Ethnographic Atlas. The ethnographic atlas is a worldwide anthropological dataset containing detailed information on cultural, institutional and economic characteristics of 1,291 ethnic groups prior to industrialisation and colonial contact (Murdock, 1967).[9] As a proxy for present-day inheritance customs, I use as an explanatory variable the inheritance rule practised for real property by each ethnic group. The ethnographic atlas categorises inheritance rules into seven categories: (i) *patrilineal by sons*, (ii) *matrilineal by sister's sons*, (iii) *patrilineal by (other) heirs*, (iv) *matrilineal by (other) heirs*, (v) *children*, (vi) *children, less for daughters* and (vii) groups without individual property rights. Although, categories (iii) and (iv) condense many heterogeneous inheritance rules into broad categories, what is important for the analysis is that all of the ethnic groups in these categories follow customs whereby inheritance is passed to heirs other than sons.

Figure 4 shows the spatial distribution of inheritance rules observed in the ethnographic atlas.[10] Patrilineal inheritance rules are found most commonly in the data but there remains much variation in the rules observed. Matrilineal inheritance rules are common across what is known as the matrilineal belt, which spans the area intersecting modern-day Angola and the Republic of Congo on the west coast of the continent, to Mozambique and southern Tanzania on the east. A number of groups practising matrilineal inheritance rules are also observed in north and west Africa.

To examine how sibling gender affects education outcomes across ethnic groups with different inheritance customs, I match data from the ethnographic atlas with the individual-level DHS data. The classification of the DHS respondents' ethnic groups do not always coincide with those of the ethnographic atlas. For example, ethnic groups may have different names in different regions within and across countries or ethnic groups may be divided into different sub-groups in one dataset, relative to the other. In some cases, matching was straightforward as the names of ethnic groups observed in the same region in both datasets matched exactly. In other cases, a multitude of sources were used to identify matchings, such as Ethnologue, People Groups and the Joshua Project. I observe ethnicity for 169,525 individuals, which corresponds to 93.05% of my sample. Of those for whom I observe ethnicity, I am able to match 158,043, or 93.22%, to the Ethnographic Atlas. Of those matched, I observe 110,675 from ethnic groups observed to practise matrilineal or patrilineal inheritance rules.[11]

[9]The ethnographic atlas is made publicly available online by the Database of Places, Language, Culture, and Environment (D-PLACE) and was compiled by Kirby et al. (2016).

[10]This map is created using the Murdock (1959) map of the homelands of ethnic groups across Africa. The ethnic group classifications used in this map and those included in the Ethnographic Atlas differ. I therefore match ethnic groups to polygons in the map using the matchings of Teso (2019).

[11]These figures include information for Burundi, Rwanda and Lesotho which are not observed in the DHS but are imputed to the rundi, ruanda and sotho ethnic groups respectively, as these are the dominant ethnicities in these countries. In addition, ethnicity information for the Democratic Republic of Congo is categorised by the DHS into broad categories of culturally similar groups. For more information on how these are matched to the ethnographic atlas, see Appendix E.1. As discussed in section 4.4.2, the results are robust to excluding these countries from the

3.3. Empirical Strategy

Under the assumption that changes to parental investments in children's education will be reflected in observable education outcomes, I am able to test the implications of the theoretical framework. In estimating the effect of sibling gender on education outcomes, it would not be appropriate to simply compare children from families with different gender compositions. This is because sibling gender may be endogenous, with parents potentially deciding on the total number of children to have based on the gender of children who are already born. If parents decide to have further children based on the gender of existing children, it is not possible to identify the causal effect of the gender of previously born children or all children on the outcomes of any individual child.

To estimate the causal effect of sibling gender, I restrict my sample to first-born children who have at least one sibling. When parents decide to have a second child, the gender of that second child is unknown. By conditioning on children whose parents went on to have a second child, I can exploit the exogenous variation in the gender of that next sibling. By comparing first born children who have a brother to first born children who have a sister as their next sibling, I identify the causal effect of sibling gender on outcomes.[12]

I restrict my sample to individuals from ethnic groups observed to practise either patrilineal or matrilineal inheritance rules. I create an indicator variable, NDI, which represents *No direct inheritance* and takes a value of 1 if an individual's mother reports belonging to an ethnic group which is observed to practise an inheritance rule whereby a father's property is not directly inherited by his son or sons. I thus combine together groups practising patrilineal inheritance to heirs other than sons and groups practising matrilineal inheritance rules. The comparison is therefore not between patrilineal and matrilineal groups but rather between groups where sons inherit directly from their fathers and groups where sons do not.[13] The empirical specification for the main analysis is as follows:

$$\begin{aligned} y_{iect} = \beta_1 * Brother_i + \beta_2 * Brother_i * NDI_e \\ + \sum_{j=0}^{1} \mathbb{1}[NDI = j] * (\alpha + X_i'\rho + \gamma_c + \delta_t) + u_{iect} \end{aligned} \tag{1}$$

where y_{iect} represents the outcome of interest for individual i from ethnic group e, observed in country c and interviewed in year t. $Brother_i$ is an indicator variable taking a value of 1 if individual

analysis.

[12]This identification strategy is widely used in research examining the effects of sibling gender on various outcomes, including, but not limited to, Brenøe (2018), Cools and Patacchini (2019), Golsteyn and Magnée (2020) and Peter et al. (2018)

[13]By comparing a group comprising only children from patrilineal ethnic groups to one comprising children from both patrilineal and matrilineal groups, it is possible that my results may be confounded by factors that differ across kinship structure. In section 4.4.2, I show that this is not the case by re-estimating the model including only patrilineal ethnic groups.

i's next sibling is a brother and NDI is assigned at the ethnic group level. As inheritance rules are not randomly assigned, I control for a series of individual characteristics, which are contained in the vector X, comprising DHS phase, age at the time of the survey, gender, birth year, the interval to next sibling birth (in months), maternal age, along with indicators for living in a rural area and whether one's mother was married at birth. γ_c and δ_t represent country and interview year fixed effects, respectively. u_{iect} is the error term, which is two-way clustered at the DHS sampling cluster (village) and ethnic group levels.

β_1 and β_2 are the key parameters of interest. β_1 reflects the effect of having a brother rather than a sister for children in direct inheritance groups. If parents place greater value on educating boys and view educational investments and inheritances as substitutes, this coefficient should be negative for girls and weakly negative for boys. This is because for boys in direct inheritance groups, while having a brother leads to a loss of educational investment, it also leads to a loss of inheritance, for which parents compensate by increasing educational investments. β_2 reflects the effect of having a brother rather than a sister for children in no direct inheritance groups, relative to direct inheritance groups. For boys, we should expect this coefficient to be negative as having a brother leads to a reduction in educational investment. For girls, we should expect this coefficient to be weakly negative. This is because the diversion of resources toward a brother should be larger for brothers who do not inherit.

While the main concern of this paper is the causal effect of sibling gender, it is of interest to identify whether the effect of inheritance customs can also be considered causal as ethnic group membership is not randomly assigned. One concern is that other drivers of education may be correlated with inheritance customs, spatially and/or across ethnic groups. In section 4.4.1, using a series of alternative estimation strategies and by investigating a battery of potentially confounding phenomena, I provide evidence that the estimated effect of inheritance customs has a causal interpretation.

I limit my sample to first born children who have at least one sibling. To identify the effect of sibling gender independently of family size effects, I exclude from my sample anyone who was born or whose next sibling was born as part of a twin birth or any higher order multiple birth. Furthermore, I limit my sample to children whose mothers report giving birth at normal child-bearing ages (15-49, which is the cut-off for taking part in the woman's survey) and those who are of school-going age (6-18). This leaves an overall sample of 110,675 children.

Descriptive statistics are presented in appendix table B1. The average age of children observed in my sample is around 11 years old. 67% of the sample are living in rural areas. Siblings are an average of 37 months younger than the children I observe and children in my sample are from families with an average of four total children at the time of the survey. Children in my sample completed an average of 2.97 years of schooling with 79% having attended in school at some point and 73% attending at the time of the survey. 59% of children belong to ethnic groups observed to practise direct inheritance to sons, with the remaining 41% observed practising other inheritance

rules. Although second-born gender and education outcomes are very similar, differences do exist in background characteristics across inheritance groups. Relative to children in the direct inheritance group, those in the no direct inheritance group are less likely to live in rural areas, have longer intervals to the birth of their next sibling and have mothers who are less likely to have been married at birth. As will be shown in section 4.4.1, the results presented in this paper are not sensitive to the inclusion or exclusion of these controls.

The key identifying assumption for this analysis is that sibling sex is exogenous. The phenomenon of missing women has been observed across many developing countries and various continents. Many societies possess fewer women than men, both at birth and surviving into adulthood, which is due to pre-natal sex selection and post-natal mortality (Bongaarts and Guilmoto, 2017). If pre-natal sex selection, i.e. sex-selective abortion, is an option, then sibling gender may not be exogenous. Furthermore, the Trivers-Willard hypothesis proposes that child gender is affected by the maternal condition of the mother (Trivers and Willard, 1973). Sex-selective abortion, in particular, would require the use of ultrasound imagery to identify the sex of the unborn and it has been noted by Wanyonyi et al. (2017) that most women in Sub-Saharan Africa do not have access to ultrasound during pregnancy. So while it has been noted that mothers in Sub-Saharan Africa often possess strong preferences for the gender of their children (Fuse, 2010), the ratio of female to male births across the region is centred around the natural rate of 105:100 (Morse and Luke, 2021).

Were sibling sex to be endogenous, one might expect sibling sex to be predicted by pre-determined characteristics. Table 1 shows that this is not the case for the whole sample or for boys and girls separately. Of 34 tests of individual pre-determined characteristics, only three are significantly different at the 10% level, two of which are significant at the 5% level. In particular, two characteristics are of increased importance. If parents could engage in sex-selective abortions in order to favour sons, one would expect a higher likelihood of mothers reporting terminated pregnancies before the birth of a brother than before the birth of a sister. Table 1 shows that this is not the case. As terminated pregnancies are self-reported by the mother, terminated pregnancies before the birth of a brother might not be observable. In that case, one would expect a longer average interval to the birth of a brother than to a sister, which again is not the case. A series of joint F-tests also shows that the set of pre-determined characteristics and their interactions with own sex and inheritance rule do not predict sibling sex. In section 4.4.2, I discuss in greater detail various other issues of selection which may affect the results, including selection into having a sibling and excess childhood mortality.

4. Results

4.1. Main Results

Table 2 reports the main results for highest grade completed, attending school at the time of the survey (hereafter referred to as current attendance) and ever having attended school, separately

for the full sample, for boys only and for girls only. Columns 1, 3 and 5 show the average effect of having a brother relative to a sister, without consideration of inheritance customs. Overall, having a brother rather than a sister leads to a reduction in years of education of 0.03, which corresponds to just over 1% of the mean and 1% of a standard deviation for my sample. Having a brother also leads to a 0.6 and 0.5 percentage point decrease in the current attendance and ever having attended school. For all three outcomes, the estimated effects are slightly larger in magnitude for girls than for boys. Building on the predictions presented in section 2, this implies that for boys and girls, having a brother rather than a sister leads to a diversion of educational investment toward that brother, which leads to a reduction in the likelihood of attending school of about 0.5 percentage points and reduces educational attainment by 3% of a year of schooling. For girls, the effects on highest grade completed are similar in magnitude but with opposite sign to those of Vogl (2013), who in a comparative analysis of women at all birth orders, found that having a sister as a next sibling led to a reduction in years of schooling of 0.028 in 30 Sub-Saharan African countries.

Columns 2, 4 and 6 then show the interaction between sibling gender and inheritance. The first row in each panel presents the effect of having a brother rather than a sister for those in ethnic groups practising direct inheritance to sons and the second row presents the effect of having a brother rather than a sister for those in no direct inheritance groups, relative to those in direct inheritance groups. If there exist significant differences across ethnic groups according to inheritance customs, this will be reflected in the second row of each panel. As can be seen in column 2 of panel B, there exists significant heterogeneity in the effect of sibling gender across inheritance groups.

For boys who can inherit their fathers property, having a brother rather than a sister has no significant effect on years of education. For boys in no direct inheritance groups, however, there exists a larger negative effect with a coefficient on *Brother*No direct inheritance* of -0.114, which is significant at the 1% level. As this is an interaction term, the net effect of having a brother rather than a sister for boys who cannot inherit from their father is estimated at 0.094 years of schooling. Similar patterns are found with respect to current attendance and ever having attended school although the difference across inheritance groups with regard to current attendance is not statistically significant at conventional levels. This result means that for boys, having a brother leads to a loss of educational investment from parents, reducing the likelihood of ever attending school and attending school at the time of the survey by 1.2 percentage points, which leads to a reduction in years of schooling of 9.4% of a year. For boys who can inherit, however, the loss of educational resources is lower as that brother can also inherit. In addition, as parents compensate for this loss of inheritance with increased educational investment, the negative effect of having a brother is removed and thus boys who can inherit do not experience any net effect of sibling gender on education.

For girls in direct inheritance groups, having a brother leads to a smaller negative effect on highest grade completed of 0.029 and a 0.9 and 1 percentage point decrease in the likelihood of

currently attending or ever having attended school, respectively. While the effects for girls in no direct inheritance groups are relatively smaller, as expected, the effects do not vary significantly across inheritance groups. It may be that, even though we should expect smaller negative effects for girls in direct inheritance group, that parental preferences toward investing more in sons still dominate, even when sons can inherit. So for girls, having a brother leads to a loss of educational resources, resulting in a lower likelihood of attending school and a reduction in years of schooling of around 3% of a year.

Appendix table B2 shows that the gender difference in the effect of sibling gender within the no direct inheritance groups is statistically significant at the 5% level with respect to highest grade completed and ever having attended school. The reason for why girls, who typically do not inherit property in either type of inheritance group, experience smaller effects of having a brother relative to boys who do not inherit is not clear. One potential reason is the competing effect of sibling gender on the future fertility decisions of parents, which I explore in more detail in section 4.2.

It is not uncommon for children to start school one year (or more) later than expected which could have implications for my results. If the effects I identify are driven by children with a brother starting school slightly later, the effects may dissipate as children get older. To investigate how the effects noted in table 2 accrue dynamically, I plot means of the residuals at each age by sibling gender separately for each inheritance rule and outcome for boys. For boys in no direct inheritance groups, the top-right panel of figure 5 shows that differences in years of education are close to zero at early ages and grow larger as those with a brother fall behind relative to those with a sister. When looking at the attendance outcomes, differences are rather constant across ages. This finding is perhaps logical, given that decisions around attendance will occur when children are at younger ages, particularly with regard to ever being enrolled, while differences in attainment will accrue over time due to grade retention and school drop-out.

Land and buildings are durable properties that typically maintain their value over generations. As populations become more urbanised, there will likely be a transition from agriculture toward other sectors, which may reduce the importance of land as a form of inheritance. These results may therefore be of less relevance to families who do not own much real property or do not work in agriculture. It is of interest to understand whether the results can be generalised to other inheritances. Table 3 shows that using the observed inheritance rule for movable property provides similar results to those using the inheritance of real property. This result implies that the findings of this analysis are relevant not just to land and buildings but also to the inheritance of other forms of wealth.

4.2. Mechanisms

In section 4.1, I identified a negative effect of having a brother rather than a sister for boys who cannot inherit from their father and for girls, regardless of inheritance customs. In this section, I investigate additional outcomes that may be affected by sibling gender and/or inheritance customs,

with consequences for education. One mechanism to which I give particular consideration is family size. If parents have strong preferences over the gender composition of their children, then the gender of the first two children in a family can have a significant impact on the total number of children they have and the timing of future childbearing. While the literature on family size finds mixed results, there are a number of empirical studies pointing to a quality-quantity trade-off in the number of children parents choose to have (Booth and Kee, 2009; Chen et al., 2019; Mogstad and Wiswall, 2016; Åslund and Grönqvist, 2010), which means that overall sibling composition could have an impact on education outcomes.

I re-estimate equation 1, using as outcomes the total number of siblings a child has and the interval between the birth of their second- and third-born siblings, which is naturally conditional on having at least three children. The results of this analysis are presented in table 4. For first-born boys in direct inheritance groups, having a brother leads to a reduction in total siblings of 0.025, while for boys who cannot inherit property, there is a significant positive effect, with a coefficient of 0.101 corresponding to a 0.076 increase in total siblings. These results show that, relative to parents in direct inheritance groups, parents in no direct inheritance groups are more likely to have further children after having two sons rather than a son and a daughter, implying that those parents have a preference for a mix of sons and daughters. For boys in no direct inheritance groups, having a brother also leads to a shorter interval to the birth of a next sibling of 0.535 months. More siblings and a shorter interval to the next sibling leads to greater competition for resources, which is likely to contribute to the negative effect of having a brother for boys who cannot inherit. For girls on the other hand, having a brother leads to fewer siblings and a longer interval to the birth of a next sibling, a finding which is not found to vary significantly across inheritance groups. Descriptively, appendix table B3 shows that more siblings and a shorter interval to the birth of a third-born child are associated with worse education outcomes. Effects on family size could potentially mitigate the negative effect of having a brother, which could explain why the sibling gender effects identified are smaller in magnitude for girls.

In Appendix C.1, I examine a number of alternative mechanisms, specifically participation in child labour, differential gender biases according to inheritance customs, differential returns to education according to gender and inheritance customs and differential access and attitudes to education according to inheritance customs. I do not find evidence that any of these act as mechanisms underlying my results.

4.3. Heterogeneous Effects

If the effect of sibling gender is in part attributable to or affected by a family's environment, it could be expected that there exists heterogeneity in the effect of having a brother. If ownership of real property is more common and/or if customs and traditions are more persistent in rural areas, then we might expect to see larger effects in rural areas relative to urban areas. Panel A of table 5 shows that this is the case, although similar effects are still found in urban areas.

Heterogeneous effects may also occur according to household wealth. It can be argued that since less wealthy households are more budget-constrained, the effects of sibling gender may be larger due to greater relative competition for resources. On the other hand, if there is less wealth to be inherited, even boys who can inherit may experience negative effects of having a brother. In addition, if education levels in less wealthy households are generally lower, the marginal effect of having a brother may be smaller. It is therefore unclear ex ante how the results may vary according to household wealth. Panel B of table 5 shows how the effects vary by wealth, splitting the sample at the median level of household wealth observed in my sample.[14] In lower wealth households, having a brother does not appear to cause a reduction in years of education, although similar effects are found on both attendance outcomes for these boys as to the main analysis, albeit they are less precisely estimated. This heterogeneity points toward sibling gender effects manifesting at different margins in lower and higher wealth households. For girls, the effect of having a brother is larger in lower wealth households for all three outcomes, pointing toward greater relative investment in boys in lower wealth homes.

Sibling gender effects may also vary according to other ethnic customs and traditions. Panel C table 5 shows how the estimated effects of sibling gender and inheritance customs vary according to whether or not a child's mother is in a polygynous union. For this analysis, I partition my sample according to whether a mother reports being in a monogamous or polygynous union and re-estimate equation 1 in each sub-sample. For boys, the results are larger in magnitude and more precisely estimated among the children of monogamous mothers. As I identify status as a first-born and sibling gender at the level of the mother, some children who are identified as first-born children may not be the first born child of their mother's partner, which could attenuate the findings for children of polygynous mothers. Panel D of table 5 then shows how the results vary according to whether an ethnic group is observed in the ethnographic atlas to practise a bride price. If a group has a bride price, the higher bride prices associated with higher levels of education incentivise parents to invest in the education of girls, which could reduce sibling gender effects. For girls, however, sibling gender effects are slightly larger in bride price groups. The differences across groups according to bride price are not statistically significant, however.

4.4. Robustness

4.4.1. Alternative Identification Strategies

In this section, I use a variety of alternative identification strategies to show that the variation I identify in the effect of sibling gender according to inheritance customs can be given a causal interpretation. First, I use a spatial regression discontinuity (RD) design. My data includes the co-ordinates of villages sampled by the DHS and the boundaries of the ancestral homeland of each

[14] Household wealth is observed in the DHS according to an index which is based on assets owned by a household at the time of the survey.

ethnic group. I can therefore exploit the spatial discontinuity in inheritance rules occurring at the border between different ethnic groups. Using a fuzzy RD design, I instrument the *No direct inheritance* variable with an indicator for being located in the ancestral homeland of a no direct inheritance ethnic group, conditional on distance to the border of a no direct inheritance group. The main assumption is that while the inheritance rule practised changes discontinuously across ethnic group borders, other factors affecting educational attainment do not vary in space across those borders. I estimate the following system of equations:[15]

$$y_{iev} = \alpha + \beta_1 Brother_i + \beta_2 * NDI_{ev} + \beta_3 * Brother_i * NDI_{ev} + \gamma_1 * Dist_v + \gamma_2 * Dist_v^2 + u_{iev} \quad (2)$$

$$\begin{aligned} NDI_{iev} = \pi_1 + \lambda_1 * Brother_i + \rho_{11} * \mathbb{1}[Dist_v \geq 0] + \\ \rho_{12} * Brother * \mathbb{1}[Dist_v \geq 0] + \delta_{11} * Dist_v + \delta_{12} * Dist_v^2 + \varepsilon_{iev} \end{aligned} \quad (3)$$

$$\begin{aligned} Brother_i * NDI_{ev} = \pi_2 + \lambda_2 * Brother_i + \rho_{21} * \mathbb{1}[Dist_v \geq 0] + \\ \rho_{22} * Brother * \mathbb{1}[Dist_v \geq 0] + \delta_{21} * Dist_v + \delta_{22} * Dist_v^2 + v_{iev} \end{aligned} \quad (4)$$

where $Dist_v$ represents the distance, in kilometres, from village v to the nearest ancestral ethnic group border where direct inheritance to sons was not practised, re-centred such that positive values correspond to no direct inheritance areas. Distance is included using a quadratic functional form and I include only villages located within 300km of a relevant border. The exact location of urban and rural DHS sampling clusters are offset by up to 2 and 5 km from their true location, respectively. To avoid incorrectly assigning inheritance rules, I exclude individuals from villages observed within these distances of a border, resulting in a donut-RD design.

While other studies have used this approach (Loper, 2019; Moscona et al., 2020), the Murdock (1959) map is not entirely accurate in its representation of ethnic group borders and does not take into account overlapping boundaries (Michalopoulos et al., 2019). The results of this analysis may therefore not be robust to bandwidth adjustments but can be seen as indicative of a causal relationship between inheritance customs and sibling gender in determining education outcomes. These concerns are illustrated in the top panel of appendix figure B1, which shows the likelihood of a correct match between that the reported ethnicity of an individual's mother and the ethnic group whose ancestral homeland an individual's village is located in. As can be seen, the likelihood of a correct match is much lower close to the border, although the bottom panel of appendix figure B1 does show that there remains a discrete jump in the likelihood of being in a no direct inheritance ethnic group when crossing the border. Appendix table B4 presents the results of the reduced

[15]Equations 3 and 4 are first stage equations. Although the right hand side variables in both equations are identical, Angrist and Pischke (2008) and Wooldridge (2010) show that this approach is consistent when interacting an instrument with an exogenous explanatory variable.

form and fuzzy spatial RD designs. As can be seen, the results are very similar to those previously estimated. The corresponding results using a fuzzy design are larger in magnitude than those of the reduced form design.

Second, I assign inheritance customs according to the stated ethnicity of the mothers of the children in my sample. In inter-ethnic marriages it is likely that inheritance will follow the husband's customs. I test that this does not affect my results by assigning inheritance customs according to the ethnic group of the husband of the mothers in my sample, for those who can be matched. In addition, if a family migrates, they may take up the customs of where they live. To test that this does not affect my results, I assign inheritance customs according to the ethnic group homeland in which a village is located. The estimated results, using both of these alternative variables, are presented in appendix table B5. The results for boys with regard to highest grade completed are robust to both definitions. For current attendance, the results are robust to the latter definition for boys and for ever having attended, the results for girls are robust to assigning inheritance customs according to the husband.

Finally, I control for any factors correlated with inheritance customs which might confound the results. Specifically, I control for the presence of potential child-carers and foster children in the household, religion, distance to colonial religious missions, other customary characteristics from the ethnographic atlas, ethnic fractionalisation and polarisation, ethnic-group average wealth, geo-spatial controls, colonial power, exposure to the trans-Atlantic slave trade and historic crop yield data. Full details of the specific control variables included and potential biases they might cause are described in Appendix D. As treatment effects could be correlated across DHS villages either spatially or due to other factors which may confound the results, I also include village fixed effects. The results of this analysis are presented in appendix tables B6, B7 and B8. With regard to highest grade completed, the results for boys are robust to all controls. In fact, the net effect of having a brother for boys in no direct inheritance increases from -0.096 years of schooling with no controls (or -0.094 with the standard controls) to -0.105 years of schooling with the full set of controls, or -0.097 when including all controls and village fixed effects. For girls, while the results do lose some significance when controls lead to lower sample sizes, the point estimates remain relatively consistent. For both current attendance and ever having attended school, the effects for boys are not robust to all controls but for girls, the effects estimated are robust to most controls but not the introduction of village fixed effects.

4.4.2. Selection Issues

My analysis relies on the assumption that, conditional on having a sibling, the gender of that sibling is exogenous. If parents favour boys, then the gender of the first-born may affect the likelihood of having a second child and the results could suffer from sample selection bias. Taking a sample of all first born children, I test whether gender and inheritance customs predict the likelihood of having a sibling. Column (1) of appendix table B9 shows that this is not the case.

If parents have a preference for boys and focus on the development of boys relative to girls in more than just education, then it may be that having a brother increases the likelihood of mortality. Assuming that children no longer alive would be the weakest in terms of physical health if they were to survive, they would likely be the weakest academically. This would positively bias the estimated effect of having a brother. As I observe each woman's birth history, I am able to test this and, as shown in columns (2)-(3) of appendix table B9, there is no effect of sibling gender on mortality.

If a child is living away from home, they are unlikely to be observed. If parents choose to send their brightest child or children to boarding school, then having a brother might increase the likelihood of being observed, negatively biasing the estimated effect of having a brother. Assuming that all children not observed in the household survey but who are reported to be alive are living away from home, I can test whether sibling gender affects the likelihood of being observed. As shown in columns (4)-(5) of appendix table B9, this is not the case.

The selection of ethnic groups may also introduce bias by comparing a subset of patrilineal groups to a combination of matrilineal groups and patrilineal groups. Kinship is correlated with residence patterns, which introduces incentives to invest differentially in sons or daughters (Bau, 2021). Lowes (2020b) shows that while matrilineal spouses co-operate less, matrilineal women have more autonomy and have healthier children. Patrilineal ethnic groups are more likely to practice a bride price (Lowes, 2020a), which incentivises daughters' education (Ashraf et al., 2020). In matrilineal groups, the wider kin network typically plays a larger role in investing in children, which could reduce the autonomy of parents in making decisions around investments. To test that these factors do not confound the results, I replicate the main analysis, including individuals from patrilineal groups only. Panel A of appendix table B10 shows that the results are robust to doing so.

Not all DHS surveys ask about ethnicity and in some cases I have imputed ethnicity. In Burundi and Rwanda, I assign all individuals to Rundi and Ruanda, respectively, as these are the predominant ethnic groups in these countries. The DHS categorises ethnic groups in the Democratic Republic of Congo (DRC) according to their region of origin. I categorised ethnic groups originating in present-day DRC according to their observed locations in the ethnographic atlas and assigned inheritance rules according to that observed most often in these categories.[16] This could could cause country- or region-specific factors correlated with ethnic characteristics to affect the results. Panel B of appendix table B10 shows that the results are robust to excluding imputed ethnicities.

[16]see Appendix E.1 for further details on the matching of ethnic groups in the Democratic Republic of Congo.

4.4.3. Data Validity

The ethnographic atlas has been criticised for its reliability. As put by Abad et al. (2021), when published, the atlas "was criticized widely and harshly by linguists, historians, and anthropologists in terms that make an economics seminar seem warm and welcoming". The inheritance rule for real property was even noted by Murdock, who compiled the ethnographic atlas, as being in need of revision (Kirby et al., 2016). Bahrami-Rad et al. (2021) show that, for variables that can be observed in both the atlas and the DHS, the atlas does in fact predict contemporaneous behaviours. While this underlines the validity of the ethnographic atlas, the variables they consider do not include the inheritance rule for real property. In Appendix C.2, I show that the ethnographic atlas is internally valid, in that practices associated with inheritance customs do possess strong correlations in the data. Yet as the ethnographic atlas describes pre-colonial inheritance rules, some may be inaccurately observed. Matrilineal ethnic groups observed to follow inheritance to matrilineal heirs other than sister's sons are likely to include ethnic groups whereby daughters inherit land. The practices of some groups may also have deviated from these pre-colonial rules.

I supplement the main data with data from the e-Human Relations Area Files (eHRAF), an online ethnography summarising information from various sources, largely reflecting the modern day practices of over 300 ethnic groups across the world, 64 of which are in Africa. 53.8% of my sample are from ethnic groups which are represented in eHRAF and of those, 74.7% have inheritance rules for real property which are validated by the information in eHRAF. I restrict my sample to only those ethnic groups whose inheritance rule for real property can be validated and, as shown in appendix table B11, the main results for boys are largely unchanged when doing so, albeit less precisely estimated given the smaller sample size. Deviations from ancestral inheritance rules are also likely driven by institutional changes or by geo-spatial factors, such as changes in land suitability for different types of agriculture. While the main results are estimated using country fixed effects, these do not necessarily reflect local factors that might drive deviations from the rules I observe. As seen in section 4.4.1, however, the results are robust to the inclusion of village fixed effects, which account for unobservable village-level factors, including geo-climactic conditions.

5. Support for the Main Hypothesis

The main results are consistent with the hypothesis that parents invest more in the education of sons and substitute between property inheritance and investment in education. These results do not prove that this substitution is the main mechanism underlying these effects, however. In this section, I present supporting evidence which adds significant weight to the main hypothesis outlined in section 2.

Using the World Bank's Women, Business and the Law data (WBL), I identify five countries which, during my period of observation, introduced inheritance laws guaranteeing that children,

regardless of gender, can inherit a significant proportion of their parents' property.[17] Appendix A.2 considers how such reforms should impact on the effect of sibling gender identified in section 4.1. For boys who previously did not inherit from their father, the negative effect of sibling gender should be reduced. This is because the diversion of resources toward a brother will be reduced when that brother will receive an inheritance. For boys who have always inherited from their father, as having a brother no longer leads to a loss of inheritance, these boys are no longer compensated for that loss. This should lead to a negative effect of having a brother for those boys. As parents in both groups are faced with the same optimisation problem after the introduction of these inheritance reforms, there should no longer be any heterogeneity in the effect of sibling gender according to traditional inheritance customs. This gives rise to the third testable prediction arising from the theoretical framework.

PREDICTION 3: *When inheritance is guaranteed to sons and daughters, the effect of sibling gender should converge across inheritance customs. The negative effect of having a brother will decrease in magnitude among no direct inheritance groups and increase in magnitude among direct inheritance groups.*

To test this, I exploit within-country across-birth cohort variation in exposure to the reform. Specifically, I restrict my sample to these five countries and re-estimate equation 1, introducing a further interaction with two reform variables, which reflect the age each individual would be at the time of the reform in their country.[18] As the results presented in section 4.1 are less robust for girls than than those for boys and because I can not rule out that son preference dominates the inheritance-education trade-off, I continue looking only at boys.

Identifying the impact of these reforms is complicated by the fact that everyone in my sample is affected. Individuals are affected to a greater or lesser extent according to their age at the time these reforms were introduced. As parents may make some decisions around educational investments quite early in life, the effect of the reforms may vary according to whether a child is above or below typical school-starting ages. As such, I define two reform variables, which are respectively equal to one if a child would be between the ages of seven and twelve and if a child would be aged six or younger at the time of the reform. This is because as children aged 6 or younger at the time of exposure to the reform are below typical school-starting ages, they can be considered as fully treated, while those aged 7-12 can be expected to already be enrolled in primary school and are therefore partially treated in comparison. The equation I estimate is as follows:

[17]For a detailed review of the Women, Business and Law data, see Hyland et al. (2020).

[18]Specifically, these are Benin, Mali, Rwanda, Sierra Leone and Zambia. Sources for each of these reforms and what the reforms entailed are provided in Appendix E.2.

$$
\begin{aligned}
y_{iect} = {} & \beta_1 * Brother_i + \beta_2 * Brother_i * NDI_e \\
& + \beta_3 * Brother_i * NDI_e * I^{Age7-12} + \beta_4 * Brother_i * NDI_e * I^{Age\leq 6} \\
& + \mathbb{1}[Brother = 1] * (\pi_1 * I^{Age7-12} + \pi_2 * I^{Age\leq 6}) \\
& + \sum_{j=0}^{1} \mathbb{1}[NDI = j] * (\alpha + \lambda_{1j} * I_i^{Age7-12} + \lambda_{2j} * I_i^{Age\leq 6} + X_i'\rho + \gamma_c + \delta_t) + u_{iect}
\end{aligned} \tag{5}
$$

where $I^{Age7-12}$ and $I^{Age\leq 6}$ represent whether a child was aged 7-12 and 6 or below at the time of the reform, respectively. Some of these reforms were introduced alongside other measures.[19] These reforms increased female empowerment and thus the incentives to educate daughters, which may bias the results of the analysis. However, the reforms introduced in Mali, Rwanda and Zambia, which comprise 65% of this sample, did not coincide with any other reforms improving the legal rights of women relative to men, so the results should still be indicative of the effect of the reforms to inheritance law. Another concern is that families might not comply with these new laws. Mali does not respect customary law as a valid source of law and while Benin and Rwanda do, customary law is considered invalid if it leads to discrimination or inequality. In Sierra Leone and Zambia, who make up 30% of the sample, this is not the case. It is also possible that despite these legal provisions, some non-compliance will occur anyway, particularly in rural areas where customs and traditions are stronger and enforcement may be more difficult. As such, the effects of the introduction of these inheritance reforms may be attenuated.

The results of this analysis are presented in table 6. In columns (1), (3) and (5), I re-estimate the main results for the reduced sample, finding similar results for boys as those found in section 4.1. In columns (2), (4) and (6) I introduce the reform variables. Prior to the reforms, there was a much larger negative effect of having a brother relative to a sister for boys in no direct inheritance groups. The effects correspond to a net 0.186 decrease in highest grade completed and 2.3 and 3.6 percentage point decreases in the likelihood of currently attended or ever having attended school, relative to boys in direct inheritance groups. After the reform, the effect of having a brother does become negative for boys in direct inheritance groups. For boys in no direct inheritance groups, the effect of having a brother is positively affected by the reforms, bringing the difference in effects between groups very close to zero for children aged six or younger at the time of the reforms. While the coefficients on the interactions with the reform are not statistically significant with respect to highest grade completed and current attendance, the reduction in effects is significant at the 5%

[19] In Benin and Sierra Leone, these reforms coincided with the introduction of laws allowing women to get a job and open a bank account without their husband's consent. Benin simultaneously allowed women to be the head of a household and Sierra Leone simultaneously allowed women to sign contracts and register a business without their husband's permission.

level for ever having attended school. Given that the pattern of results is similar across all three outcomes, these results do point toward the guarantee of an inheritance for children reducing the difference across groups with regard to the effect of sibling gender.

The convergence in effects across inheritance groups is presented graphically in an event study analysis. This involves re-estimating equation 5, replacing the interaction between sibling gender, inheritance customs and age at the time of the reform ($\beta_3 * Brother_i * NDI_e * I^{Age7-12} + \beta_4 * Brother_i * NDI_e * I^{Age \leq 6}$) with a series of interactions according to age, $\Sigma_{g,g \notin [7,9]} \tau_g * Brother_i * NDI_e * I_i^{age_i \in g}$, where g represents age groups, categorised into three-year blocks. Age 7-9 is used as the reference age group as children aged 6 or younger can again be seen as being fully treated. Figure 6 shows the effect of sibling gender on highest grade completed for boys in no direct inheritance groups, relative to direct inheritance groups. A reference line is also added for age 13-15 as those aged 12 and younger at the time of the reform are partially treated. As can be seen, there exists a negative but decreasing relative effect of having a brother for boys born before the introduction of these inheritance reforms. Getting closer to the introduction of these reforms, the difference in effects starts to decrease since younger boys and/or their younger siblings would still have been exposed to the reform even if they are already at school-going ages. For boys aged 6 and below at the time of the reform, the difference in effects across inheritance customs is at or close to zero.

The results, including the coefficients on each of the variables included in the interaction terms are presented in appendix table B12. The reform had no effect on years of schooling for boys who could already inherit property and increased years of schooling for boys who previously could not. This finding disagrees with that of La Ferrara and Milazzo (2017), who examined a similar reform in Ghana, finding that guaranteeing inheritance to all children reduced educational attainment for boys who previously would not have inherited from their father. Parents may in fact view education and inheritance as complements in general, but as substitutes with regard to the intrahousehold division of resources. This is in line with the findings of Adhvaryu and Nyshadham (2016), who find that parents reinforce endowments on average but also mitigate against intrahousehold differences among children, a finding they attribute to inequality aversion.

Overall, the finding that guaranteeing inheritances to one's children removes any differences in the effect of having a brother according to inheritance customs points toward the mechanism outlined in section 2 as the main driver of sibling gender effects. Put simply, the intrahousehold substitution between educational investments and inheritance has a significant impact on the effect of sibling gender for boys.

6. Mitigating Sibling Gender Effects

In this section, I examine whether there is a role for educaiton policy to counteract the negative effect of having a brother. The intrahousehold allocation of resources is limited by the budget constraint of the household and one common barrier to education is that of the cost of schooling for

parents. Reducing these costs could enable more children to both attend school and attain greater education. To examine the effect of reduced school costs on the effects identified, I identify 19 countries in my sample which, during my period of observation, introduced free primary education in the form of free tuition.[20]

I restrict my sample to these 19 countries and estimate an equation analogous to equation 5, now interacting sibling gender and inheritance customs with indicators for whether a child would be aged 7-12 and 6 or younger when free primary education was introduced. One issue with this analysis is that the introduction of free primary education has different meanings in different countries. For example, in Kenya and Uganda, free primary education removed tuition fees for all primary school grades. In Malawi, free primary education was introduced beginning only for first grade students, with subsequent grades being phased in over a period of four years (Kan and Klasen, 2020). In Malawi, free primary education covered tuition fees, uniforms and school books, whereas only tuition fees were removed in Ghana (Inoue and Oketch, 2008). While this means that there are likely to be heterogeneous impacts across countries, the results of this analysis are still informative about the average effect of free primary education on parental investments in education.

The results of this analysis are presented in table 7. In columns (1), (3) and (5), I re-estimate the main results for the reduced sample, finding similar results for boys as those found using the main sample. In columns (2), (4) and (6), I introduce the free primary education variables. As can be seen, prior to these reforms, there was a larger negative effect of having a brother relative to a sister for boys in no direct inheritance groups, corresponding to a net 0.205 decrease in highest grade completed. After the reforms, however, this effect is much smaller and closer to zero, significantly reducing the negative impact of having a brother for boys, particularly for boys aged 6 and below at the time of introduction. The results, including the coefficients on each of the variables included in the interaction terms are presented in appendix table B13. Free primary education significantly increases attendance for all boys. When it comes to highest grade completed, however, free primary education has no significant effect for boys in direct inheritance groups but has a negative effect for boys in no direct inheritance groups. This is consistent with studies showing that free primary education increases enrolment but has no effect or sometimes negative effects on achievement. This is because free education leads to increased class sizes and more marginal students enrolling in school (Lucas and Mbiti, 2012; Valente, 2019).

I also perform an event study analysis for boys, again replacing the interaction terms for the age of a child at the time free primary education was introduced with a series of age-group interactions, categorised into three year groups. Figure 7 shows lags and leads for the coefficient on *Brother*No*

[20]These are, in alphabetical order, Benin, Burkina Faso, Burundi, Cameroon, Democratic Republic of Congo, Ethiopia, Ghana, Ivory Coast, Kenya, Liberia, Malawi, Mozambique, Niger, Republic of Congo, Rwanda, Senegal, Sierra Leone, Togo and Zambia. Information on the sources used to identify the time of introduction is provided in Appendix E.2.

direct inheritance around the introduction of free primary education. As with the analysis of the reforms to inheritance law, I use ages 7-9 as the baseline. Prior to the introduction of free primary education, while individual lags are not significantly different to zero, there is an average negative effect of having a brother for boys who cannot inherit from their fathers, relative to boys who can. After the introduction, the effects reach closer to zero on average.

These findings show that government policy has the power to affect cultural phenomena but also that school costs act as an inhibitor to gender equality in education. The use of free primary education as a means of reducing sibling gender effects is of relevance to this sample given that the average years of schooling of those I observe is 2.9 years. Going forward, as more and more children in Sub-Saharan Africa reach higher levels of education, these sibling gender effects may begin to manifest at secondary education.

7. Conclusion

Parents' investments in the human capital of their children respond to various endowments and incentives which can lead to intrahousehold inequalities in educational attainment. This paper provides novel evidence on how sibling gender and inheritance customs interact to determine education outcomes for children in 27 Sub-Saharan African countries and how policy can be leveraged to affect the allocation of resources.

I establish that sibling gender has a significant impact on education and that the effects of sibling gender vary significantly according to patrilineal and matrilineal inheritance customs. Having a brother negatively affects education outcomes for boys who are not in line to inherit property from their father and for girls in groups both with and without inheritance to sons. I supplement this finding with evidence that effects on parents' future fertility may mitigate or compound these effects depending on the gender composition of the first two children. In addition, I find no evidence that child labour, gender bias, differential returns to education or differential access to education act as mechanisms underlying the estimated effects. I show, using various alternative identification strategies and a series of robustness checks, that the estimated variation in sibling gender effects has a causal interpretation. These results underline the importance of customs and traditions in how parents' make decisions around their children's education. In particular, this paper adds to the growing evidence on mechanisms through which kinship determines education outcomes.

This paper also provides novel evidence on the power of policy to affect cultural variation in the intrahousehold allocation of resources. I show that legal reforms guaranteeing the inheritance of property by all children, regardless of gender, reduce differences in the effect of sibling gender according to traditional inheritance customs. Removing primary school tuition fees reduces the parental investment required for children to attain an education, allowing investments to be spread more evenly across children. I show that, in 19 countries, removing primary school tuition reduced the effect of sibling gender.

Overall, this paper provides interesting implications for policy makers, providing evidence that cultural traditions can act as a barrier to gender equality in education within households. These findings suggests a number of interesting avenues for further research, including how inheritance laws can be most efficiently designed to promote education and intergenerational mobility or how policies to reduce the costs of schooling can be leveraged to mitigate gender differences in education.

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Figures

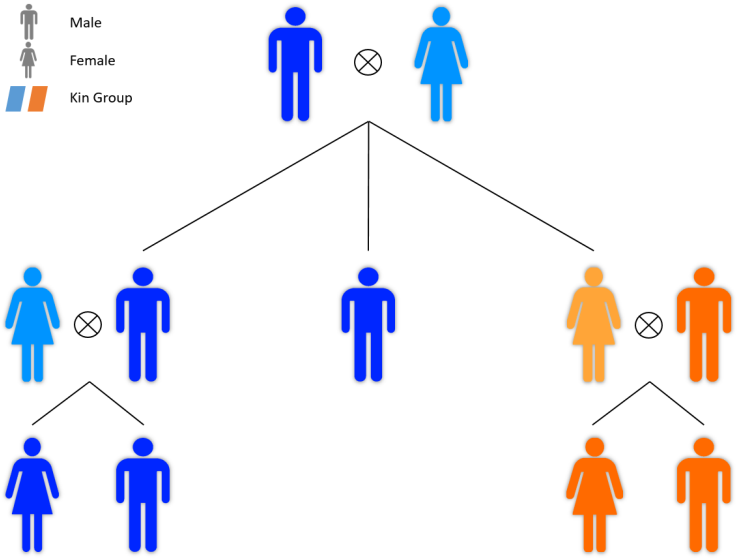

Figure 1: Patrilineal Kinship Structure

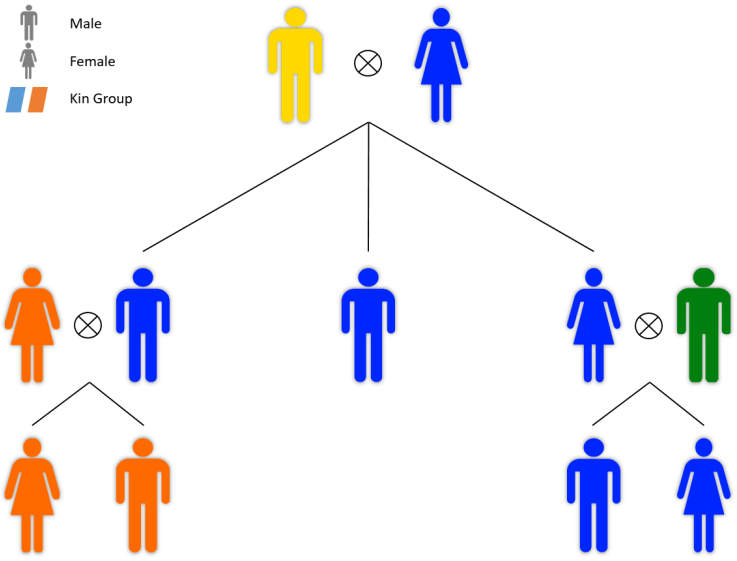

Figure 2: Matrilineal Kinship Structure

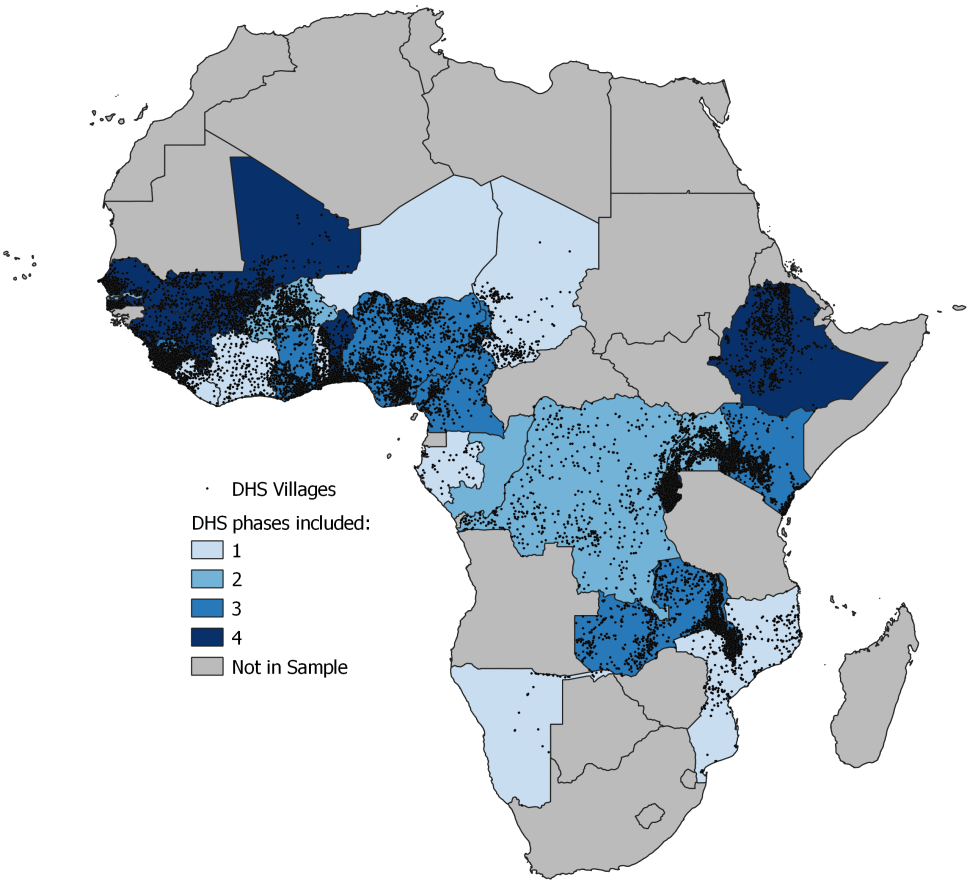

Figure 3: Countries and location of respondents in main sample

Notes: This map shows for the main sample the number of DHS phases included from each country and the location of clusters sampled. Phases correspond to periods between which the standard model DHS questionnaire is reviewed and modified. Participating countries are asked to adopt the model questionnaire in full but can add or delete questions where appropriate. GPS co-ordinates were not collected for all country-phase combinations and thus not all cluster locations are represented on the map but remain in the main sample.

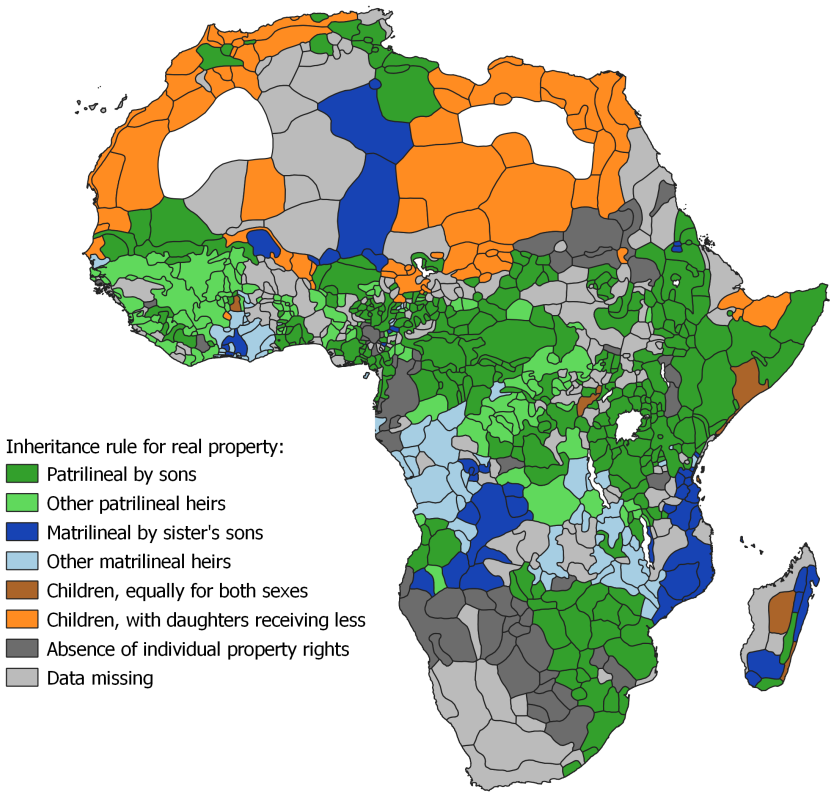

Figure 4: Inheritance rules in pre-colonial African ethnic groups

Notes: This map presents the inheritance rule for real property recorded in the ethnographic atlas for all ethnic groups observed by Murdock (1967) in Africa. This map is created using the Murdock (1959) map of the homelands of ethnic groups across Africa. The ethnic group classifications used in this map and those included in the ethnographic atlas differ. I therefore match ethnic groups to polygons in the map using the matchings of Teso (2019).

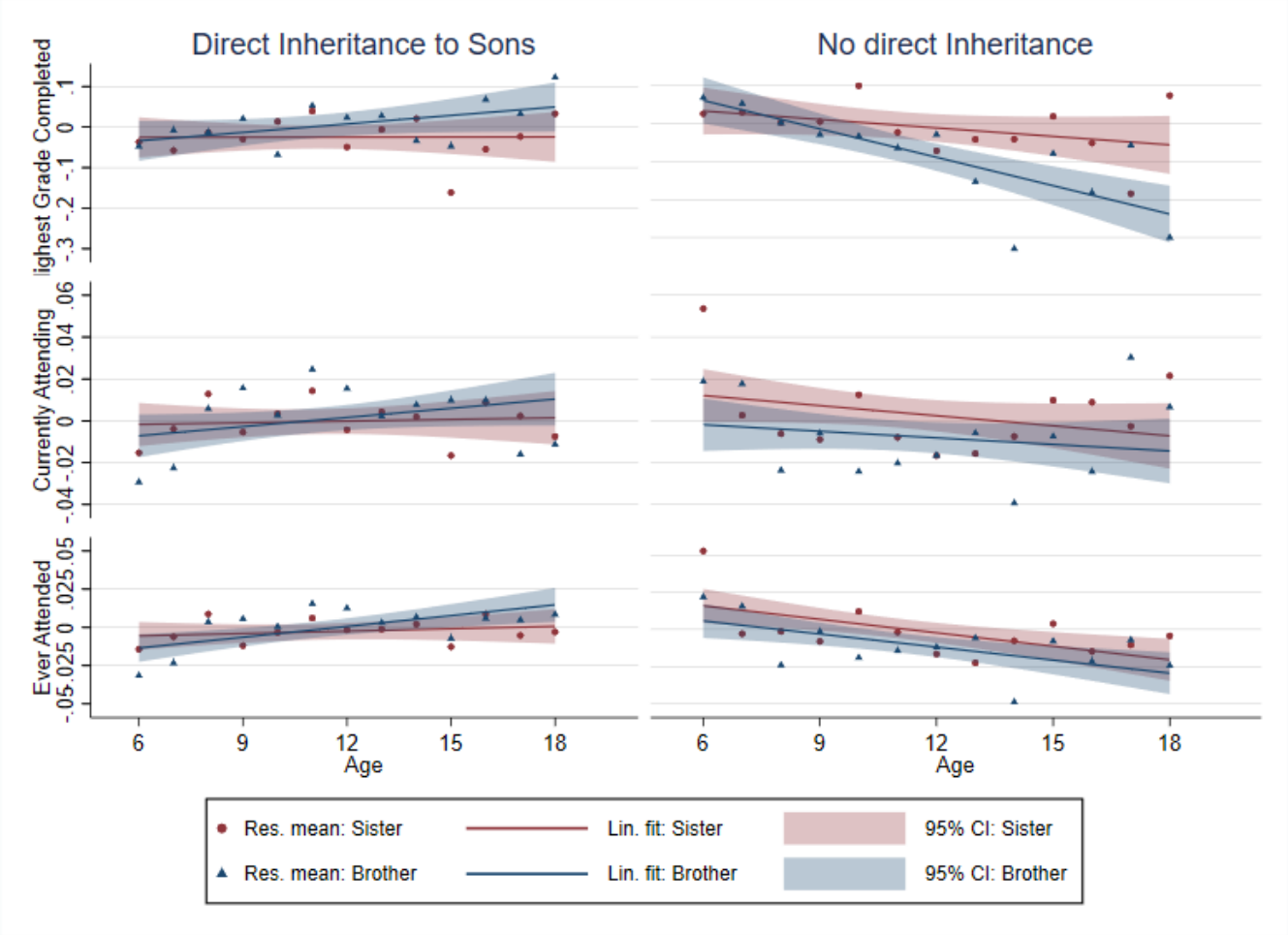

Figure 5: Effect of Sibling Gender on Educational Outcomes by Age - Boys only

Notes: These figures plot the residualised means of the outcomes detailed on the y-axis by age and linear fits of the residualised outcomes as a function of age. Outcomes are residualised on dummies for age, birth year, DHS phase, interview year, country fixed effects, rural and whether the mother was married at birth, in addition to trends for the interval to sibling birth in months and mother's age at birth.

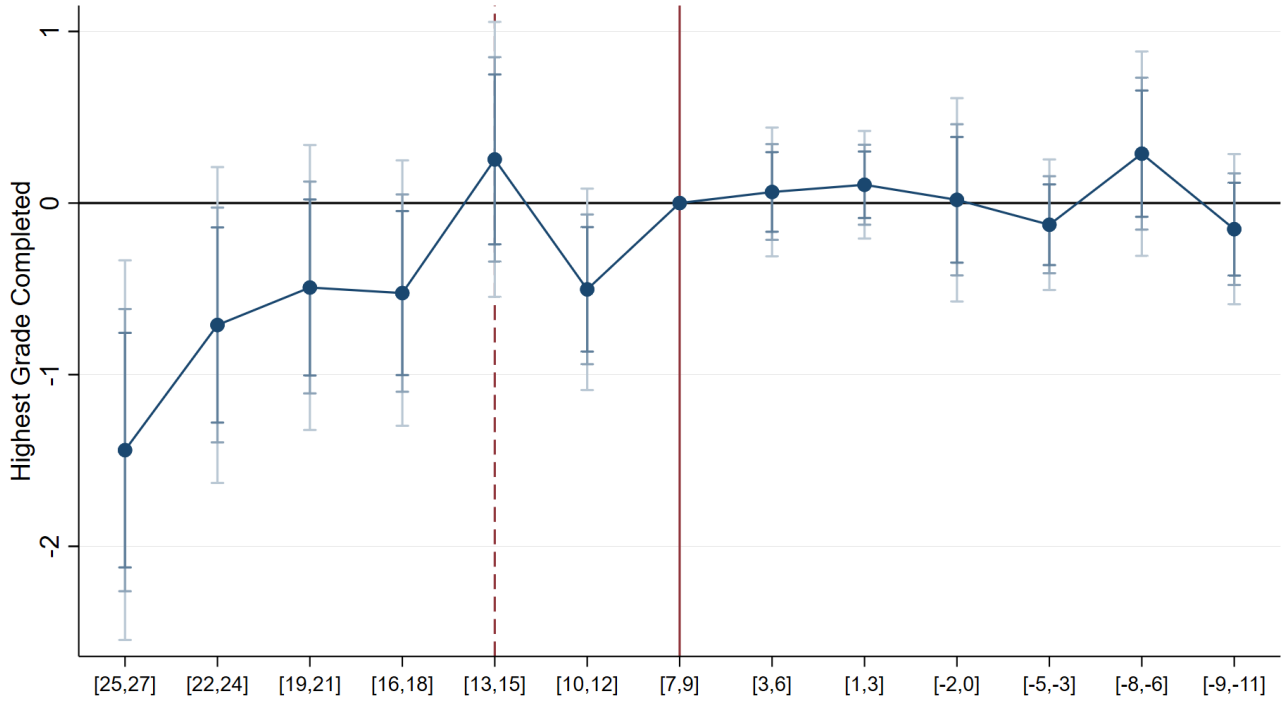

Figure 6: Event Study - Reform to Inheritance Law

Notes: These figures plot the coefficients and 90, 95 and 99% confidence intervals on *Brother*No direct inheritance* by age at the introduction of inheritance reforms guaranteeing an inheritance to children, regardless of gender. Sources for reforms to inheritance law are detailed in Appendix E.2. Controls include dummies for age, birth year, DHS phase, interview year, country fixed effects, rural and whether the mother was married at birth, in addition to trends for the interval to sibling birth in months and mother's age at birth. Each of these controls are also interacted with *No direct inheritance*.

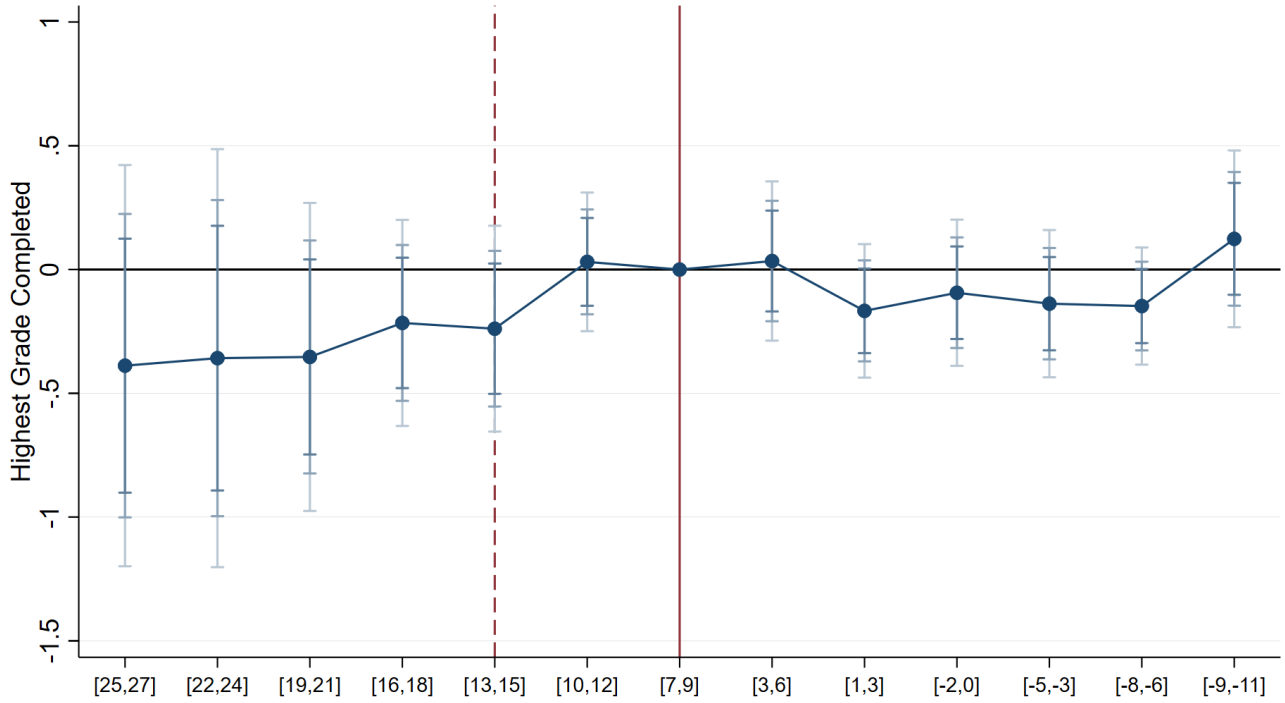

Figure 7: Event Study - Introduction of Free Primary Education

Notes: These figures plot the coefficients and 95% confidence intervals on *Brother*No direct inheritance* by age at the introduction of inheritance reforms guaranteeing an inheritance to children, regardless of gender. Sources for reforms to inheritance law are detailed in Appendix E.2. Controls include dummies for age, birth year, DHS phase, interview year, country fixed effects, rural and whether the mother was married at birth, in addition to trends for the interval to sibling birth in months and mother's age at birth. Each of these controls are also interacted with *No direct inheritance*.

Tables

Table 1: Balancing Tests

Panel A: Covariate Balance

	Full sample				First-Born Boys				First–Born Girls			
	Sister	Brother	Difference	N	Sister	Brother	Difference	N	Sister	Brother	Difference	N
Female	0.490	0.492	0.002	110,675	0.000	0.000	0.000	56,060	1.000	1.000	0.000	54,615
Age	11.035	11.074	0.038	110,675	11.092	11.135	0.042	56,060	10.976	11.011	0.035	54,615
Rural	0.675	0.675	-0.000	110,675	0.680	0.679	-0.001	56,060	0.670	0.671	0.001	54,615
Terminated pregnancy before birth	0.034	0.035	0.001	106,557	0.032	0.034	0.002	54,025	0.036	0.035	-0.000	52,532
Terminated pregnancy before sibling birth	0.030	0.029	-0.001	106,698	0.029	0.028	-0.001	54,101	0.031	0.030	-0.001	52,597
Interval to sibling birth (months)	37.060	37.119	0.059	110,675	37.052	37.132	0.080	56,060	37.068	37.106	0.038	54,615
Mother married at birth	0.893	0.893	0.000	110,675	0.895	0.896	0.000	56,060	0.890	0.891	0.000	54,615
Mother's age at birth	20.119	20.098	-0.021	110,675	20.167	20.101	-0.066*	56,060	20.069	20.094	0.026	54,615
Mother is head of household	0.146	0.152	0.006**	110,675	0.144	0.149	0.005	56,060	0.147	0.155	0.007**	54,615
Mother has primary education	0.348	0.345	-0.002	110,675	0.343	0.343	0.000	56,060	0.352	0.348	-0.005	54,615
Mother has secondary education	0.234	0.234	0.000	110,675	0.232	0.232	-0.000	56,060	0.237	0.237	0.000	54,615
No direct inheritance	0.412	0.415	0.003	110,675	0.418	0.419	0.001	56,060	0.406	0.410	0.004	54,615

Panel B: Balancing Test

	Joint-F	Prob>F	N	Joint-F	Prob>F	N	Joint-F	Prob>F	N
All covariates	0.8255	0.6242	106,557	0.6393	0.7964	54,025	0.598	0.8322	52,532
All, interacted with female	0.6236	0.9166	106,557						
All, interacted with no direct inheritace	0.8221	0.7065	106,557	0.7638	0.7674	54,025	1.079	0.3625	52,532
All, interacted with female and no direct inheritance	0.9168	0.6272	106,557						

Notes: In panel A, Columns (1)-(3) show the mean of a series of pre-determined characteristics for individuals with a sister and brother, respectively, followed by the difference in means and the significance level of that difference. * p<0.10 ** p<0.05 *** p<0.01. Columns (4)-(6) and (7)-(9) shows the same for boys and girls, respectively. Panel B tests whether the pre-determined characteristics included can jointly predict sibling gender.

Table 2: Effect of Sibling Gender and Inheritance Customs on Educational Outcomes

Dep. Var.:	Highest Grade Completed		Currently Attending		Ever Attended	
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A: Full Sample						
Brother	–0.030**	–0.004	–0.006**	–0.004	–0.005*	–0.004
	(0.014)	(0.018)	(0.003)	(0.003)	(0.003)	(0.004)
Brother*No direct inheritance		–0.063**		–0.004		–0.003
		(0.024)		(0.005)		(0.005)
N	110,675	110,675	110,675	110,675	110,675	110,675
Panel B: Boys only						
Brother	–0.028	0.020	–0.005	–0.000	–0.003	0.003
	(0.022)	(0.024)	(0.004)	(0.006)	(0.004)	(0.006)
Brother*No direct inheritance		–0.114***		–0.012		–0.015*
		(0.037)		(0.008)		(0.008)
N	56,060	56,060	56,060	56,060	56,060	56,060
Panel C: Girls only						
Brother	–0.032*	–0.029	–0.006	–0.009	–0.007*	–0.010**
	(0.017)	(0.023)	(0.004)	(0.005)	(0.003)	(0.005)
Brother*No direct inheritance		–0.008		0.006		0.009
		(0.033)		(0.008)		(0.007)
N	54,615	54,615	54,615	54,615	54,615	54,615
Controls	X	X	X	X	X	X
Fixed Effects	Country	Country	Country	Country	Country	Country

Notes: Robust standard errors, clustered by DHS sampling cluster and ethnic group in parentheses. * p<0.10 ** p<0.05 *** p<0.01. Point estimates in each column, within each panel, are taken from the same OLS regression. Controls include dummies for age, gender, birth year, DHS phase, interview year, country fixed effects, rural and whether the mother was married at birth, in addition to trends for the interval to sibling birth in months and mother's age at birth. Each of these controls are also interacted with *No direct inheritance*.

Table 3: Effect of Sibling Gender and Inheritance Customs for Movable Property on Educational Outcomes

Dep. Var.:	Highest Grade Completed		Currently Attending		Ever Attended	
	(1) Boys	(2) Girls	(3) Boys	(4) Girls	(5) Boys	(6) Girls
Brother	0.006	–0.029	–0.007*	–0.008	–0.003	–0.008*
	(0.024)	(0.020)	(0.004)	(0.005)	(0.004)	(0.005)
Brother*No direct inheritance	–0.091**	0.000	–0.005	0.006	–0.011	0.006
	(0.037)	(0.031)	(0.007)	(0.007)	(0.007)	(0.006)
N	63,281	61,998	63,281	61,998	63,281	61,998
Controls	X	X	X	X	X	X
Fixed Effects	Country	Country	Country	Country	Country	Country

Notes: Robust standard errors, clustered by DHS sampling cluster and ethnic group in parentheses. * p<0.10 ** p<0.05 *** p<0.01. In this table, *No direct inheritance* is defined according to the observed inheritance rule for movable property. Point estimates in each column, within each panel, are taken from the same OLS regression. Controls include dummies for age, gender, birth year, DHS phase, interview year, country fixed effects, rural and whether the mother was married at birth, in addition to trends for the interval to sibling birth in months and mother's age at birth. Each of these controls are also interacted with *No direct inheritance*.

Table 4: Effect of Sibling Gender and Inheritance Customs on Family Outcomes

Dep. Var.:	Total Siblings		Interval to Next Sibling	
	(1)	(2)	(3)	(4)
	Boys	Girls	Boys	Girls
Brother	–0.025*	–0.050***	0.187	0.494**
	(0.014)	(0.012)	(0.207)	(0.200)
Brother*No direct inheritance	0.101***	0.032	–0.722**	–0.376
	(0.018)	(0.022)	(0.319)	(0.378)
N	56,060	54,615	46,792	45,678
Controls	X	X	X	X
Fixed Effects	Country	Country	Country	Country

Notes: Robust standard errors, clustered by DHS sampling cluster and ethnic group in parentheses. * p<0.10 ** p<0.05 *** p<0.01. Point estimates in each column, are taken from the same OLS regression. Controls include dummies for age, birth year, DHS phase, interview year, country fixed effects, rural and whether the mother was married at birth, in addition to trends for the interval to sibling birth in months and mother's age at birth. Each of these controls are also interacted with *No direct inheritance*.

Table 5: Effect of Sibling Gender and Inheritance Customs, Heterogeneity

Dep. Var.:	Highest Grade Completed		Currently Attending		Ever Attended		Highest Grade Completed		Currently Attending		Ever Attended	
	(1) Boys	(2) Girls	(3) Boys	(4) Girls	(5) Boys	(6) Girls	(7) Boys	(8) Girls	(9) Boys	(10) Girls	(11) Boys	(12) Girls
	Panel A: Rural/urban status											
	Rural						Urban					
Brother	0.033	–0.043	0.002	–0.010	0.004	–0.014**	0.022	0.001	–0.005	–0.009	–0.002	–0.006
	(0.028)	(0.027)	(0.006)	(0.007)	(0.006)	(0.006)	(0.048)	(0.040)	(0.008)	(0.006)	(0.007)	(0.005)
Brother*No direct inheritance	–0.134**	0.011	–0.021**	0.008	–0.020*	0.008	–0.104	–0.033	0.002	0.007	–0.003	0.015*
	(0.053)	(0.037)	(0.009)	(0.010)	(0.010)	(0.009)	(0.071)	(0.065)	(0.016)	(0.010)	(0.013)	(0.009)
N	38,079	36,603	38,079	36,603	38,079	36,603	17,981	18,012	17,981	18,012	17,981	18,012
	Panel B: Household Wealth											
	Below median						Above median					
Brother	–0.018	–0.074**	0.000	–0.022***	0.002	–0.018**	0.052	–0.007	–0.000	–0.004	–0.003	–0.005
	(0.032)	(0.034)	(0.007)	(0.008)	(0.006)	(0.008)	(0.041)	(0.029)	(0.007)	(0.005)	(0.008)	(0.006)
Brother*No direct inheritance	–0.031	0.019	–0.011	0.011	–0.008	0.014	–0.162***	–0.009	–0.009	0.007	–0.013	–0.002
	(0.065)	(0.047)	(0.012)	(0.011)	(0.011)	(0.014)	(0.052)	(0.051)	(0.009)	(0.009)	(0.011)	(0.010)
N	26,216	25,180	26,216	25,180	26,216	25,180	25,861	25,534	25,861	25,534	25,861	25,534
	Panel C: Polygyny											
	Mother in Monogamous Union						Mother in Polygynous Union					
Brother	0.035	–0.042	0.003	–0.012*	0.004	–0.009	–0.002	–0.078	0.024***	–0.026***	0.008	–0.030***
	(0.029)	(0.029)	(0.006)	(0.006)	(0.006)	(0.007)	(0.044)	(0.054)	(0.009)	(0.007)	(0.008)	(0.009)
Brother*No direct inheritance	–0.128***	0.019	–0.013	0.011	–0.017**	0.007	–0.094	0.074	–0.041***	0.019	–0.018	0.027
	(0.049)	(0.040)	(0.009)	(0.009)	(0.008)	(0.011)	(0.081)	(0.080)	(0.013)	(0.013)	(0.013)	(0.017)
N	37,451	36,400	37,451	36,400	37,451	36,400	11,348	10,885	11,348	10,885	11,348	10,885
	Panel D: Bride Price											
	Ethnic Groups Not Practising Bride Price						Ethnic Groups Practising Bride Price					
Brother	0.077	0.009	0.003	–0.006	–0.010	–0.003	0.007	–0.032	0.003	–0.012**	0.002	–0.010*
	(0.052)	(0.048)	(0.008)	(0.015)	(0.013)	(0.013)	(0.026)	(0.025)	(0.006)	(0.005)	(0.006)	(0.006)
Brother*No direct inheritance	–0.180**	–0.014	–0.020	–0.003	–0.006	0.003	–0.097**	–0.018	–0.013	0.014**	–0.014	0.007
	(0.072)	(0.061)	(0.015)	(0.018)	(0.017)	(0.019)	(0.042)	(0.038)	(0.009)	(0.007)	(0.009)	(0.008)
N	12,986	12,737	12,986	12,737	12,986	12,737	43,074	41,878	43,074	41,878	43,074	41,878
Controls	X	X	X	X	X	X	X	X	X	X	X	X
Fixed Effects	Country	Country	Country	Country	Country	Countrys	Country	Country	Country	Country	Country	Country

Notes: Robust standard errors, clustered by DHS sampling cluster and ethnic group in parentheses. * p<0.10 ** p<0.05 *** p<0.01. Point estimates in each column, within each panel, are taken from the same OLS regression. Household wealth is observed in the DHS according to an index which is based on assets owned by a household at the time of the survey. Malaria prevalence is calculated by the DHS as the percentage of children age 6-59 months tested using either microscopy or a rapid diagnostic test who are positive for malaria. HIV prevalence is calculated as the proportion of positive tests returned among adults tested in a village which produced a valid test result. Controls include dummies for age, birth year, DHS phase, interview year, country fixed effects, rural and whether the mother was married at birth, in addition to trends for the interval to sibling birth in months and mother's age at birth. Each of these controls are also interacted with *No direct inheritance*.

Table 6: Effect of Sibling Gender and Inheritance Customs, Reforms to Inheritance Law

Dep. Var.:	Highest Grade Completed		Currently Attending		Ever Attended	
	(1)	(2)	(3)	(4)	(5)	(6)
Brother	0.008	0.129	–0.011	–0.000	–0.010**	0.016
	(0.020)	(0.214)	(0.008)	(0.010)	(0.005)	(0.017)
Brother*No direct inheritance	–0.126*	–0.315	–0.004	–0.023	–0.010	–0.052*
	(0.066)	(0.247)	(0.012)	(0.017)	(0.009)	(0.026)
Brother*Reform (Age 7-12)		–0.199		–0.020		–0.046
		(0.341)		(0.040)		(0.030)
Brother*Reform (Age ≤6)		–0.126		–0.010		–0.026*
		(0.248)		(0.014)		(0.015)
Brother*NDI*Reform (Age 7-12)		0.119		–0.003		0.051
		(0.391)		(0.045)		(0.045)
Brother*NDI*Reform (Age ≤6)		0.294		0.036		0.053**
		(0.278)		(0.023)		(0.024)
N	16,437	16,437	16,437	16,437	16,437	16,437
Controls	X	X	X	X	X	X
Fixed Effects	Country	Country	Country	Country	Country	Country

Notes: Robust standard errors, clustered by DHS sampling cluster and ethnic group in parentheses. * p<0.10 ** p<0.05 *** p<0.01. Point estimates in each column, within each panel, are taken from the same OLS regression. Data on inheritance law is taken from the World Bank's *Women, Business and the Law* Database. More info on the specific reforms is provided in Appendix E.2. Controls include dummies for age, birth year, DHS phase, interview year, country fixed effects, rural and whether the mother was married at birth, in addition to trends for the interval to sibling birth in months and mother's age at birth. Each of these controls are also interacted with *No direct inheritance*. Results including the coefficients on all variables included in the triple-interaction are presented in table B12.

Table 7: Effect of Sibling Gender and Inheritance Customs, Introduction of Free Primary Education

Dep. Var.:	Highest Grade Completed		Currently Attending		Ever Attended	
	(1)	(2)	(3)	(4)	(5)	(6)
Brother	0.021	0.086	–0.003	0.001	–0.000	0.017
	(0.029)	(0.091)	(0.006)	(0.013)	(0.005)	(0.016)
Brother*No direct inheritance	–0.129***	–0.291**	–0.011	–0.028	–0.012	–0.040*
	(0.047)	(0.121)	(0.009)	(0.021)	(0.009)	(0.021)
Brother*FPE (Age 7-12)		–0.073		–0.000		–0.025
		(0.145)		(0.024)		(0.023)
Brother*FPE (Age ≤6)		–0.086		–0.007		–0.019
		(0.106)		(0.013)		(0.016)
Brother*NDI*FPE (Age 7-12)		0.075		0.023		0.032
		(0.180)		(0.037)		(0.032)
Brother*NDI*FPE (Age ≤6)		0.255*		0.022		0.037
		(0.138)		(0.022)		(0.023)
N	41,007	41,007	41,007	41,007	41,007	41,007
Controls	X	X	X	X	X	X
Fixed Effects	Country	Country	Country	Country	Country	Country

Notes: Robust standard errors, clustered by DHS sampling cluster and ethnic group in parentheses. * p<0.10 ** p<0.05 *** p<0.01. Point estimates in each column, within each panel, are taken from the same OLS regression. Sources for the introduction of free primary education are detailed in Appendix E.2. Controls include dummies for age, birth year, DHS phase, interview year, country fixed effects, rural and whether the mother was married at birth, in addition to trends for the interval to sibling birth in months and mother's age at birth. Each of these controls are also interacted with *No direct inheritance*. Results including the coefficients on all variables included in the triple-interaction are presented in table B13.

Appendix A. Theoretical Framework

In this section, I describe a simple theoretical framework, considering parental investment in education, incorporating gender differences in investment and the inheritance of real property. The first subsection outlines the set-up of the model. I then discuss the implications of the model with regard to how parents invest in the education of a given child according to their gender and expected inheritance. In the second subsection, I consider how the introduction of new inheritance laws allowing parents to transfer inheritance to their children would affect decision-making within this framework.

Appendix A.1. The substitution between inheritance and educational investment

In order to identify the main mechanism of my application, I apply the following simplifying assumptions: (1) Households have parents and two children who differ only by gender; (2) Children are indexed by i and j but parents discriminate between children based only on gender (i.e. parents do not discriminate based on age, birth order or any other characteristics of the children, either observed or unobserved); (3) There exist no direct spillovers from one child to the other; and (4) Real property is divisible and can only be held by males.

Parents derive utility from their own consumption, C, and from what I term the 'preparedness' of their children to lead their own lives, Θ. Preparedness can be thought of more generally as being equivalent to one's earnings power but given the prevalence of subsistence farming in Sub-Saharan Africa, this could also be thought of as the ability to provide for themselves and their family. Parents may derive utility from their children's preparedness simply due to altruism or, for example, because they expect their children to provide for them later in life. Thus, the utility function of parents can be written as:

$$\mathrm{U} = U(C, \Theta_i, \Theta_j) \tag{A.1}$$

Preparedness takes the following form:

$$\Theta = \theta(e, p, g) \tag{A.2}$$

where e denotes parental investment in education, p denotes the inheritance of real property and g denotes gender. $g = 0$ for females and $g = 1$ for males, so comparing boys to girls can be considered as an increase in the value of g. Preparedness is increasing in both educational investment and property inheritance. As I discuss below, I am agnostic as to whether there exist diminishing, constant or increasing returns to educational investment.[21] In a world of perfect equality, preparedness is independent of gender but could be higher for males if, for example, men

[21] For the purposes of this simple model of parental investment, assumptions on the marginal returns to property inheritance are not required, other than that the returns are positive.

have greater autonomy in terms of their legal rights or if society is generally gender biased. Bias toward boys is perceived in many developing country settings. According to the results of rounds 3-7 of the Afrobarometer survey, among respondents in Sub-Saharan African countries, while only 15.6% stated that they believe boys should be prioritised in education, 41.2% believe that men have more of a right to a job than women and 51.6% believe that women should take care of the household. Parents also face the following budget constraint:

$$W = Y + P \tag{A.3}$$

where Y represents the sum of a household's liquid wealth and is divided between consumption and investment in education such that $Y = C + e_i + e_j$. P is the sum of inheritable property such that $P = p_i + p_j$. As inheritance can only be passed to sons and not daughters, among societies where inheritance to sons is not permitted due to traditional customs, $p_i = p_j = P = 0$. The distribution of real property is determined by the the sum of inheritable property and the gender of i and j and given by:

$$p^* = p(g_i, g_j, P) \tag{A.4}$$

Parents maximise their utility subject to their budget constraint and the preparedness functions of their children, choosing C and $e = (e_i, e_j)$. The optimal distribution of investment in education is determined by a household's liquid wealth, the gender of i and j and the expected property inheritance of i and j if parents see investments and inheritances as either complements or substitutes. This optimal distribution of investment in education is thus given by:

$$e^* = e(g_i, g_j, p_i, p_j, Y) \tag{A.5}$$

Using child i as the focal child (using child j provides identical results), I first consider how own gender affects preparedness, with a particular focus on how gender affects own educational investments:

$$\frac{d\Theta_i}{dg_i} = \frac{\partial \Theta_i}{\partial g_i} + \frac{\partial \Theta_i}{\partial p_i}\frac{\partial p_i}{\partial g_i} + \frac{\partial \Theta_i}{\partial e_i}\frac{\partial e_i}{\partial g_i} + \frac{\partial \Theta_i}{\partial e_i}\frac{\partial e_i}{\partial p_i}\frac{\partial p_i}{\partial g_i} \tag{A.6}$$

The term on the left hand side of the equation corresponds to the total effect of gender on preparedness. This total effect is divided on the right hand side into the direct effect of gender on preparedness and a series of indirect effects. The first term represents the direct effect. The second term identifies how preparedness is affected via the inheritance of real property, which is strictly positive. Inheritance is naturally increasing in gender as in this setting, only males may inherit property, which leads to increased preparedness.

The third term identifies how educational investment is affected by own gender, which in turn affects preparedness. In a world of perfect equality, this term would be equal to zero. Educational

investment will be higher for boys if there exist higher returns to education for boys and parents invest more in children for whom there exist higher returns (Becker, 1981; Morduch, 2000). This term may also be positive if parent's possess a preference toward educating sons or negative in the case of a preference toward daughters. Essentially, if parents value the education of sons more than the education of daughters, boys will receive more educational investment than girls, and vice versa.

The fourth term outlines how educational investments are affected by the ability to inherit property, again affecting preparedness in turn. Overall, the sign of this term is ambiguous. As in the second term, $\frac{\partial p_i}{\partial g_i} > 0$, but the sign of $\frac{\partial e_i}{\partial p_i}$ is unknown as inheritance and education could be seen by parents as either complements or substitutes. Increasing property inheritance may lead to greater investment in education as owning more real property could increase the returns to education. On the other hand, parents may view inheritance and investment as substitutes, with the ability to transfer property to a son allowing parents to engage in greater consumption and/or greater investment in the other child's education. Substitution could occur if returns to education are diminishing with land inheritances. For example, returns might be lower for those working in agriculture than other sectors, leading parents to engage in greater consumption and/or greater investment in the other child's education. Alternatively, the returns to education may be increasing with inheritance but parents may be averse to intrahousehold inequality to the point that the negative effects of inequality on the utility of parents dominates the increasing preparedness of children who will inherit. This term is only relevant to sons in ethnic groups where inheritance from fathers to sons is permitted. The term essentially outlines that being a son rather than a daughter leads to the receipt of an inheritance, which could reduce educational investments if parents view educational investments and inheritance as substitutes.

Next, I consider the effect of sibling gender on outcomes, again using child i as the focal child:

$$\frac{d\Theta_i}{dg_j} = \frac{\partial \Theta_i}{\partial p_i}\frac{\partial p_i}{\partial p_j}\frac{\partial p_j}{\partial g_j} + \frac{\partial \Theta_i}{\partial e_i}\frac{\partial e_i}{\partial e_j}\frac{\partial e_j}{\partial g_j} + \frac{\partial \Theta_i}{\partial e_i}\frac{\partial e_i}{\partial e_j}\frac{\partial e_j}{\partial p_j}\frac{\partial p_j}{\partial g_j} + \frac{\partial \Theta_i}{\partial e_i}\frac{\partial e_i}{\partial p_i}\frac{\partial p_i}{\partial p_j}\frac{\partial p_j}{\partial g_j} \tag{A.7}$$

The term on the left hand side of the equation corresponds to the total effect of sibling gender on preparedness. This total effect is divided on the right hand side into four indirect effects, three of which work through the channel of educational investments. The first term identifies how sibling gender affects property inheritance, affecting preparedness in turn. This term is relevant only for children who stand to inherit property themselves, i.e. boys from ethnic groups practising inheritance from fathers to sons. As inheritance is limited to a maximum of P to be divided only among sons, inheritance must therefore decrease if one has a brother rather than a sister. Having a brother therefore has a negative effect on own preparedness.

The second term identifies how sibling gender directly affects educational investments, which in turn affects preparedness. Given the budget constraint, $\frac{\partial e_i}{\partial e_j}$ will be negative and, like $\frac{\partial e_i}{\partial e_j}$, $\frac{\partial e_j}{\partial g_j}$ is positive. If educational investments are higher for sons, then investments will be lower for those

who have a brother, regardless of own gender. Having a brother thus means a larger share of educational resources will be invested in that brother, in comparison to a sister. For girls and boys, having a brother leads to a diversion of some resources away from parental consumption and from the education of the first child, causing a negative effect on that child's education.

The third term applies to both boys and girls in ethnic groups practising direct inheritance to sons. $\frac{\partial p_j}{\partial g_j}$ is positive, i.e. having a brother means that brother will receive an inheritance. $\frac{\partial e_j}{\partial p_j}$ is negative, however, meaning that that brother will receive less educational resources than if he were not in line to receive an inheritance. This implies that the diversion of resources towards brothers should be reduced in ethnic groups practising direct inheritance to sons.

The fourth term identifies how sibling gender affects educational investments via one's own inheritance, which again affects preparedness in turn. This term is relevant only for boys from ethnic groups practising inheritance from fathers to sons. As inheritance is lower for those with a brother, it is decreasing in sibling gender and I assume that $\frac{\partial p_i}{\partial p_j} < 0$. Again, like $\frac{\partial p_i}{\partial g_i}$, $\frac{\partial p_j}{\partial g_j} > 0$ How this reduction in inheritance affects educational investments is unclear. If inheritance and educational investment are complementary, the effect of reducing inheritance on educational investments will be negative, while if they are seen as substitutes, reducing inheritance will have a positive effect on educational investments, diminishing the negative effect of having a brother found in the second term. To sum up, for boys who can inherit real property from their father, having a brother leads to a reduced inheritance. If parents view inheritance and education as substitutes, they will compensate their son's reduced inheritance with increased educational investment, reducing the negative effect of having a brother on education.

With regard to sibling gender, under the assumption that any changes in educational investments manifest themselves in changes to observed education outcomes, this basic model of parental investment in education provides three testable implications: (1) For both girls and boys, if parents place a higher value on educating sons, then having a brother, rather than a sister, should lead to lower educational investment; (2) If parents view inheritance and education as substitutes, then for boys who are in line to inherit property from their father, this reduction in educational investments should be smaller than for boys who are not. This is because the initial reduction in investment is smaller and because parents compensate for lost inheritance by increasing educational investments; and (3) If parents view inheritance and education as substitutes, then for girls in ethnic groups where sons inherit from their father, this reduction in educational investments should be smaller than for girls in ethnic groups where boys do not inherit. This third implication, however, requires that condition that parents' preference for investing in sons will not dominate even when sons can inherit.

Appendix A.2. Guaranteeing inheritance from parents to sons and daughters

This subsection considers how the introduction of inheritance laws guaranteeing inheritance to sons and daughters impacts on the effect of sibling gender. Such a law would impact the theo-

retical framework presented above in a number of ways. First, looking to how own gender affects education, as inheritance is divided among all children, gender no longer matters for inheritance and $\frac{\partial p_i}{\partial g_i}$ goes to zero. This means equation A.6 collapses to:

$$\frac{d\Theta_i}{dg_i} = \frac{\partial \Theta_i}{\partial g_i} + \frac{\partial \Theta_i}{\partial e_i}\frac{\partial e_i}{\partial g_i} \tag{A.8}$$

This implies that now, for any given child, being a boy rather than a girl increases preparedness only through the direct effect of gender and by receiving a greater share of educational resources.

Looking to how sibling gender affects education, sibling gender no longer matters for sibling inheritance and $\frac{\partial p_j}{\partial g_j}$ goes to zero. Equation A.7 therefore collapses to:

$$\frac{d\Theta_i}{dg_j} = \frac{\partial \Theta_i}{\partial e_i}\frac{\partial e_i}{\partial e_j}\frac{\partial e_j}{\partial g_j} \tag{A.9}$$

This implies that sibling gender now only affects education via the diversion of resources toward brothers. Looking only at equations A.8 and A.9, we might expect that the introduction of laws such as this will lead to negative effects of having a brother for all children. But this fails to take into account all aspects of the reform. First, consider boys who previously did not inherit from their parents. Laws such as these guarantee that those boys will receive an inheritance, which will reduce educational investments, assuming that parents view inheritance and education as substitutes. As child i is receiving less education as a result of the inheritance law, the magnitude of the effect of having a brother may be reduced. Moreover, as child j will also receive an inheritance, the educational resources diverted toward that sibling will be reduced. As boys receive a larger share of resources, this reduction in sibling education will be larger in absolute terms for brothers. This will reduce the negative effect of having a brother. Conversely, by guaranteeing inheritance to all children, for boys who could always inherit, having a brother no longer leads to a loss of expected inheritance. This means that those boys are no longer compensated for that loss of inheritance and we should expect to find negative effects of having a brother for boys who have always been able to inherit.

Most importantly, the guarantee of inheritance to sons and daughters means that parents from all ethnic groups will be faced with the same optimisation problem. This means that, after the introduction of these new inheritance laws, the effects of sibling gender should converge and there should be no differences in the effects of sibling gender according to traditional inheritance customs.

Considering the effect of the reform therefore provides three implications that, after guaranteeing inheritance to sons and daughters: (1) The negative effect of sibling gender should be reduced for boys who traditionally could not inherit from their fathers; (2) The negative effect of sibling gender should increase for boys who traditionally could not inherit from their fathers; and (3) The effect of sibling gender should not longer vary according to traditional inheritance customs.

Appendix B. Further Tables and Figures

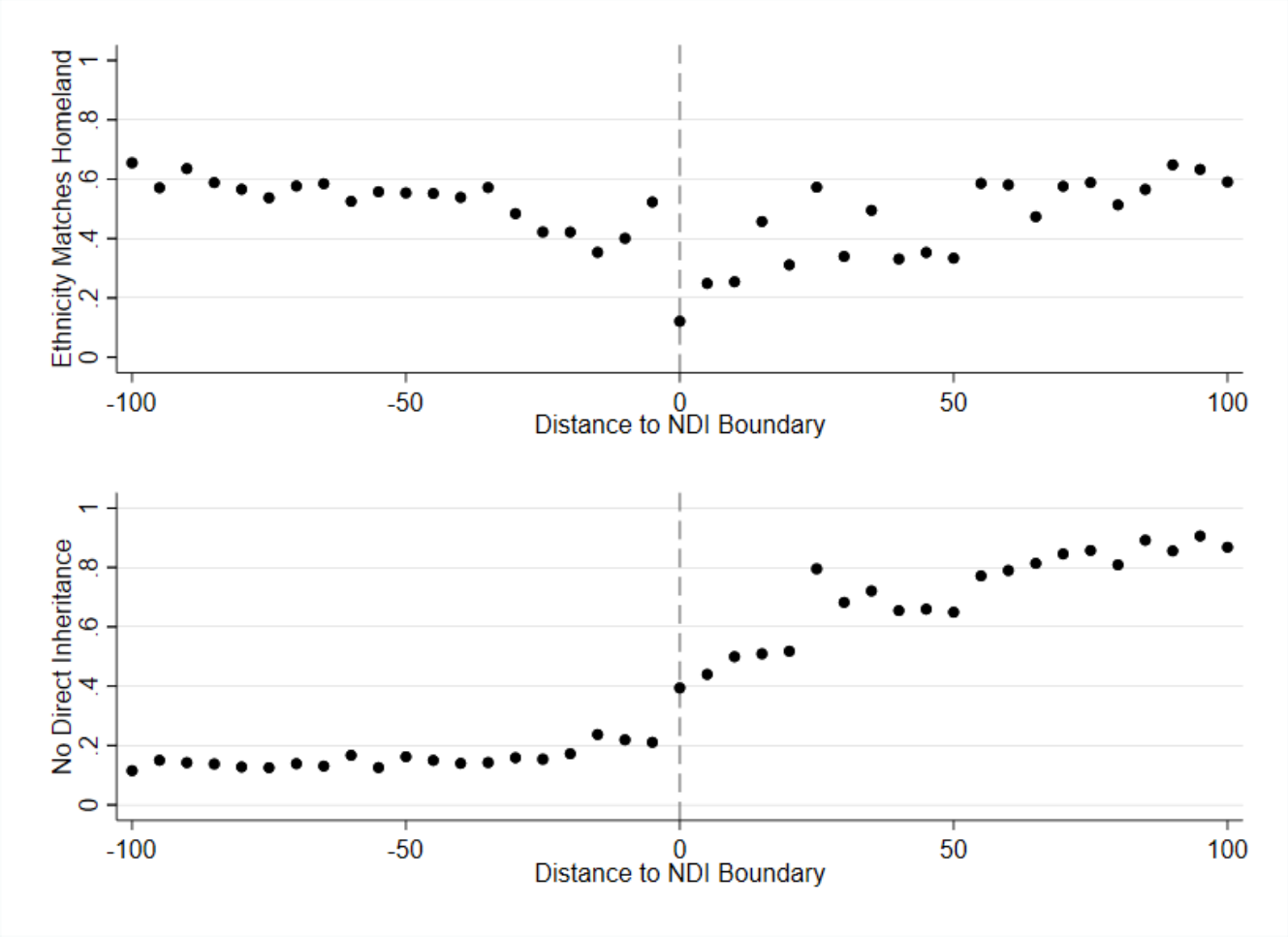

Figure B1: Regression Discontinuity Design

Notes: The top panel plots on the y-axis, in 5km bins, the proportion of individuals whose observed ethnic group in the DHS matches the ethnic group whose homeland the individual's village is located in, according to the Murdock (1959) map of ethnic homelands. The bottom panel shows on the y-axis, in 5km bins, the proportion of individuals observed to belong to an ethnic group practising a no direct inheritance rule. In both panels, the x-axis shows the distance, in km, from an individual's village to the ancestral border of an ethnic group practising a no direct inheritance rule. The ethnic group classifications used in this map and those included in the ethnographic atlas differ. I therefore match ethnic groups to polygons in the map using the matchings of Teso (2019).

Table B1: Descriptive Statistics

	Full Sample			Direct Inheritance to Sons			No Direct Inheritance		
	All first-borns	First-born boys	First-born girls	All first-borns	First-born boys	First-born girls	All first-borns	First-born boys	First-born girls
Background characteristics									
Female	0.49	0.00	1.00	0.50	0.00	1.00	0.49	0.00	1.00
Age	11.07	11.14	11.00	11.08	11.13	11.03	11.04	11.14	10.94
Birth year	1999.42	1999.34	1999.50	1999.06	1998.97	1999.14	1999.94	1999.85	2000.03
Year of interview	2010.86	2010.84	2010.87	2010.51	2010.48	2010.54	2011.36	2011.37	2011.35
Rural	0.67	0.68	0.67	0.70	0.70	0.70	0.64	0.65	0.63
Interval to next sibling (in months)	36.97	36.96	36.98	36.05	36.13	35.98	38.28	38.14	38.43
Family size	4.01	4.01	4.00	4.06	4.05	4.06	3.93	3.95	3.91
Mother's age at birth	20.10	20.12	20.08	20.20	20.20	20.21	19.96	20.02	19.90
Mother married at birth	0.89	0.90	0.89	0.90	0.91	0.90	0.88	0.88	0.88
Mother is household head	0.15	0.15	0.15	0.17	0.17	0.17	0.12	0.12	0.13
Mother completed primary school	0.34	0.33	0.34	0.35	0.35	0.36	0.32	0.31	0.32
Mother completed secondary school	0.23	0.23	0.23	0.22	0.22	0.22	0.24	0.24	0.25
Treatment and Outcomes									
Next sibling is male	0.51	0.51	0.51	0.51	0.51	0.51	0.51	0.51	0.51
Highest grade completed	2.97	2.98	2.97	2.99	2.98	2.99	2.95	2.97	2.93
Currently attending school	0.73	0.74	0.73	0.74	0.74	0.73	0.72	0.73	0.72
Ever attended school	0.79	0.80	0.79	0.80	0.80	0.79	0.78	0.79	0.78
Inheritance rule for real property									
Patrilineal by sons	0.59	0.59	0.59	1.00	1.00	1.00	0.00	0.00	0.00
Other patrilineal heirs	0.23	0.24	0.23	0.00	0.00	0.00	0.56	0.57	0.56
Matrilineal by sister's sons	0.02	0.02	0.02	0.00	0.00	0.00	0.06	0.05	0.06
Other matrilineal heirs	0.16	0.16	0.16	0.00	0.00	0.00	0.38	0.38	0.39
N	110,675	56,060	54,615	65,231	32,812	32,419	45,444	23,248	22,196

Notes: This table presents the mean of individual and family background characteristics, treatment and outcome variables and observed inheritance rules for the whole sample of first-born children who have at least one sibling.

Table B2: Effect of Sibling Gender and Inheritance Customs on Educational Outcomes

Dep. Var.:	Highest grade completed (1)	Currently attending (2)	Ever attended (3)
Brother	0.020	–0.000	0.003
	(0.025)	(0.006)	(0.006)
No direct inheritance	1.263*	–0.127	–0.193
	(0.683)	(0.164)	(0.172)
Female	0.415	–0.141	–0.131
	(0.473)	(0.137)	(0.128)
Brother*Female	–0.049	–0.008	–0.013*
	(0.032)	(0.009)	(0.008)
No direct inheritance*Female	–0.033	0.094	0.159
	(0.776)	(0.198)	(0.196)
Brother*No direct inheritance	–0.114***	–0.012	–0.015*
	(0.038)	(0.008)	(0.008)
Brother*No direct inheritance*Female	0.106**	0.019	0.024**
	(0.052)	(0.012)	(0.011)
N	110,675	110,675	110,675
Controls	X	X	X
Fixed Effects	Country	Country	Country

Notes: Robust standard errors, clustered by DHS sampling cluster and ethnic group in parentheses. * p<0.10 ** p<0.05 *** p<0.01. Point estimates in each column are taken from the same OLS regression. Controls include dummies for age, birth year, DHS phase, interview year, country fixed effects, rural and whether the mother was married at birth, in addition to trends for the interval to sibling birth in months and mother's age at birth. Each of these controls are also interacted with *No direct inheritance*, female and both.

Table B3: Family Outcomes and Educational Attainment

Dep. Var.:	Highest Grade Completed		Currently Attending		Ever Attended	
	(1) Boys	(2) Girls	(3) Boys	(4) Girls	(5) Boys	(6) Girls
Panel A: Total number of siblings						
Siblings	–0.213***	–0.246***	–0.012***	–0.014***	–0.007**	–0.008**
	(0.046)	(0.049)	(0.004)	(0.004)	(0.003)	(0.003)
Siblings*No direct inheritance	–0.050	–0.019	–0.008*	–0.007	–0.005	–0.004
	(0.055)	(0.060)	(0.005)	(0.005)	(0.004)	(0.005)
N	56,060	54,615	56,060	54,615	56,060	54,615
Panel B: Interval from 2nd to 3rd birth						
Interval	0.005***	0.007***	0.000*	0.000*	0.000	0.000
	(0.002)	(0.002)	(0.000)	(0.000)	(0.000)	(0.000)
Interval*No direct inheritance	0.000	–0.001	0.000	0.000	0.000	0.000
	(0.002)	(0.002)	(0.000)	(0.000)	(0.000)	(0.000)
N	46,792	45,678	46,792	45,678	46,792	45,678
Controls	X	X	X	X	X	X
Fied Effects	Country	Country	Country	Country	Country	Country

Notes: Robust standard errors, clustered by DHS sampling cluster and ethnic group in parentheses. * p<0.10 ** p<0.05 *** p<0.01. Point estimates in each column, within each panel, are taken from the same OLS regression. Controls include dummies for age, birth year, DHS phase, interview year, country fixed effects, rural and whether the mother was married at birth, in addition to trends for the interval between the births of the first and second-born siblings in months and mother's age at birth. Each of these controls are also interacted with *No direct inheritance*.

Table B4: Regression Discontinuity Design

Dep. Var.:	Highest Grade Completed		Currently Attending		Ever Attended	
	(1) Boys	(2) Girls	(3) Boys	(4) Girls	(5) Boys	(6) Girls
Panel A: Reduced Form RD Design						
Brother	0.027	–0.060	–0.002	–0.012**	–0.002	–0.012**
	(0.044)	(0.044)	(0.005)	(0.006)	(0.006)	(0.005)
Brother*No direct inheritance	–0.091	0.035	–0.013	0.001	–0.011	0.002
	(0.066)	(0.064)	(0.010)	(0.009)	(0.011)	(0.008)
Panel B: Fuzzy RD Design						
Brother	0.073	–0.058	0.004	–0.012	0.004	–0.011
	(0.060)	(0.061)	(0.008)	(0.008)	(0.008)	(0.007)
Brother*No direct inheritance	–0.186*	0.043	–0.026	0.000	–0.022	0.002
	(0.113)	(0.108)	(0.018)	(0.015)	(0.018)	(0.013)
N	48,265	46,915	48,265	46,915	48,265	46,915

Notes: Robust standard errors, clustered by DHS sampling cluster and ethnic group in parentheses. * p<0.10 ** p<0.05 *** p<0.01. Point estimates in each column in panel A, within each panel, are taken from the same regression. Regressions include a second order polynomial for distance to the boundary of an ethnic group practising no direct inheritance.

Table B5: Alternative Inheritance Variables

Dep. Var.:	Highest Grade Completed		Currently Attending		Ever Attended	
	(1) Boys	(2) Girls	(3) Boys	(4) Girls	(5) Boys	(6) Girls
Panel A: Inheritance Rule of Husband's Ethnic Group						
Brother	0.017	–0.028	–0.005	–0.010	–0.006	–0.022**
	(0.043)	(0.048)	(0.008)	(0.011)	(0.007)	(0.009)
Brother*No direct inheritance	–0.135*	0.069	–0.011	–0.010	–0.005	0.002
	(0.070)	(0.062)	(0.016)	(0.015)	(0.014)	(0.015)
N	17,720	17,670	17,720	17,670	17,720	17,670
Panel B: Inheritance Rule According to Location in Ethnic Group Homeland						
Brother	0.051	–0.023	0.006	0.006	–0.003	–0.001
	(0.038)	(0.039)	(0.005)	(0.009)	(0.005)	(0.009)
Brother*No direct inheritance	–0.159***	–0.012	–0.021**	–0.000	–0.008	0.009
	(0.054)	(0.051)	(0.010)	(0.011)	(0.008)	(0.011)
N	28,114	26,954	28,114	26,954	28,114	26,954
Controls	X	X	X	X	X	X
Fixed Effects	Country	Country	Country	Country	Country	Country

Notes: Robust standard errors, clustered by DHS sampling cluster and ethnic group in parentheses. * p<0.10 ** p<0.05 *** p<0.01. Point estimates in each column, within each panel, are taken from the same OLS regression. Controls include dummies for age, birth year, DHS phase, interview year, country fixed effects, rural and whether the mother was married at birth, in addition to trends for the interval to sibling birth in months and mother's age at birth. Each of these controls are also interacted with *No direct inheritance*.

Table B6: Controlling for Confounders - Highest Grade Completed

	Dep. Var. = Highest Grade Completed											
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Panel A: Boys only												
Brother	0.055	0.020	0.022	0.000	0.023	0.021	0.018	0.033	0.032	–0.033	0.070	0.052
	(0.037)	(0.024)	(0.024)	(0.042)	(0.027)	(0.026)	(0.029)	(0.023)	(0.023)	(0.059)	(0.044)	(0.066)
Brother*No direct inheritance	–0.151***	–0.114***	–0.108***	–0.110**	–0.121***	–0.115***	–0.145***	–0.136***	–0.135***	–0.139**	–0.160**	–0.149**
	(0.054)	(0.036)	(0.038)	(0.043)	(0.038)	(0.037)	(0.042)	(0.036)	(0.035)	(0.053)	(0.067)	(0.061)
N	56,060	56,060	54,173	50,541	48,094	52,077	46,638	52,223	52,596	34,236	47,988	34,046
Panel B: Girls only												
Brother	0.009	–0.029	–0.030	–0.107***	–0.029	–0.042*	–0.035	–0.036	–0.030	–0.085*	0.032	–0.055
	(0.039)	(0.023)	(0.022)	(0.033)	(0.025)	(0.025)	(0.028)	(0.023)	(0.023)	(0.051)	(0.039)	(0.050)
Brother*No direct inheritance	–0.088	–0.008	–0.009	0.022	0.003	0.002	0.005	–0.006	–0.009	0.017	0.004	0.048
	(0.059)	(0.032)	(0.035)	(0.032)	(0.034)	(0.034)	(0.034)	(0.033)	(0.032)	(0.048)	(0.067)	(0.052)
N	54,615	54,615	52,716	49,054	46,941	50,714	45,221	50,698	51,098	33,208	46,207	32,823
Standard controls		X	X	X	X	X	X	X	X	X		X
Child-carer present			X							X		X
Foster children			X							X		X
Religion				X						X		X
Mission distance				X						X		X
Ethnographic controls					X					X		X
Ethnic fractionalisation						X				X		X
Ethnic polarisation						X				X		X
Ethnic-group wealth						X				X		X
Geo-spatial controls							X			X		
Slave trade exposure								X		X		X
Crop yields									X	X		X
Fixed effects	None	Country	Country	Country	Country	Country	Country	Country	Country	Country	Village	Village

Notes: Robust standard errors, clustered by DHS sampling cluster and ethnic group in parentheses. * p<0.10 ** p<0.05 *** p<0.01. Point estimates in each column, within each panel, are taken from the same OLS regression. Standard controls include dummies for age, birth year, DHS phase, interview year, country fixed effects, rural and whether the mother was married at birth, in addition to trends for the interval to sibling birth in months and mother's age at birth. Information on other controls included is provided in section Appendix D. Each of these controls are also interacted with *No direct inheritance*.

Table B7: Controlling for Confounders - Currently Attending

	Dep. Var. = Currently Attending											
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Panel A: Boys only												
Brother	–0.005	–0.000	0.001	0.005	–0.004	0.002	0.003	0.002	0.001	–0.003	0.001	0.004
	(0.006)	(0.005)	(0.005)	(0.008)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.010)	(0.006)	(0.014)
Brother*No direct inheritance	–0.011	–0.012	–0.015*	–0.015**	–0.009	–0.013	–0.018**	–0.014*	–0.014*	–0.013	–0.014	–0.017
	(0.008)	(0.008)	(0.008)	(0.007)	(0.008)	(0.008)	(0.007)	(0.008)	(0.008)	(0.011)	(0.010)	(0.015)
N	56,060	56,060	54,173	50,541	48,094	52,077	46,638	52,223	52,596	34,236	47,988	34,046
Panel B: Girls only												
Brother	–0.008	–0.009	–0.010*	–0.023***	–0.008	–0.011**	–0.011*	–0.010*	–0.009*	–0.026**	–0.005	–0.006
	(0.006)	(0.005)	(0.005)	(0.008)	(0.006)	(0.005)	(0.006)	(0.005)	(0.005)	(0.012)	(0.007)	(0.013)
Brother*No direct inheritance	–0.001	0.006	0.005	0.013	0.003	0.007	0.007	0.009	0.008	0.002	0.013	0.003
	(0.009)	(0.008)	(0.008)	(0.010)	(0.008)	(0.009)	(0.010)	(0.008)	(0.008)	(0.012)	(0.012)	(0.014)
N	54,615	54,615	52,716	49,054	46,941	50,714	45,221	50,698	51,098	33,208	46,207	32,823
Standard controls		X	X	X	X	X	X	X	X	X		X
Child-carer present			X							X		X
Foster children			X							X		X
Religion				X						X		X
Mission distance				X						X		X
Ethnographic controls					X					X		X
Ethnic fractionalisation						X				X		X
Ethnic polarisation						X				X		X
Ethnic-group wealth						X				X		X
Geo-spatial controls							X			X		
Slave trade exposure								X		X		X
Crop yields									X	X		X
Fixed effects	None	Country	Country	Country	Country	Country	Country	Country	Country	Country	Village	Village

Notes: Robust standard errors, clustered by DHS sampling cluster and ethnic group in parentheses. * p<0.10 ** p<0.05 *** p<0.01. Point estimates in each column, within each panel, are taken from the same OLS regression. Standard controls include dummies for age, birth year, DHS phase, interview year, country fixed effects, rural and whether the mother was married at birth, in addition to trends for the interval to sibling birth in months and mother's age at birth. Information on other controls included is provided in section Appendix D. Each of these controls are also interacted with *No direct inheritance*.

Table B8: Controlling for Confounders - Ever Attended

	Dep. Var. = Ever Attended											
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Panel A: Boys only												
Brother	–0.001	0.003	0.003	0.007	–0.001	0.003	0.004	0.004	0.003	–0.007	0.003	0.008
	(0.006)	(0.005)	(0.005)	(0.008)	(0.005)	(0.005)	(0.006)	(0.006)	(0.006)	(0.010)	(0.007)	(0.012)
Brother*No direct inheritance	–0.013	–0.015*	–0.017**	–0.017**	–0.014*	–0.012	–0.023***	–0.016*	–0.015*	–0.020**	–0.020*	–0.022*
	(0.009)	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)	(0.009)	(0.011)	(0.011)
N	56,060	56,060	54,173	50,541	48,094	52,077	46,638	52,223	52,596	34,236	47,988	34,046
Panel B: Girls only												
Brother	–0.010*	–0.010**	–0.011**	–0.016**	–0.011**	–0.013***	–0.012**	–0.011**	–0.010**	–0.020**	–0.007	–0.003
	(0.006)	(0.005)	(0.005)	(0.008)	(0.005)	(0.004)	(0.006)	(0.004)	(0.005)	(0.010)	(0.005)	(0.010)
Brother*No direct inheritance	0.004	0.009	0.009	0.012	0.010	0.011	0.010	0.012*	0.010	0.011	0.014	0.008
	(0.007)	(0.006)	(0.006)	(0.008)	(0.007)	(0.007)	(0.007)	(0.006)	(0.006)	(0.009)	(0.010)	(0.009)
N	54,615	54,615	52,716	49,054	46,941	50,714	45,221	50,698	51,098	33,208	46,207	32,823
Standard controls		X	X	X	X	X	X	X	X	X		X
Child-carer present			X							X		X
Foster children			X							X		X
Religion				X						X		X
Mission distance				X						X		X
Ethnographic controls					X					X		X
Ethnic fractionalisation						X				X		X
Ethnic polarisation						X				X		X
Ethnic-group wealth						X				X		X
Geo-spatial controls							X			X		
Slave trade exposure								X		X		X
Crop yields									X	X		X
Fixed effects	None	Country	Country	Country	Country	Country	Country	Country	Country	Country	Village	Village

Notes: Robust standard errors, clustered by DHS sampling cluster and ethnic group in parentheses. * p<0.10 ** p<0.05 *** p<0.01. Point estimates in each column, within each panel, are taken from the same OLS regression. Standard controls include dummies for age, birth year, DHS phase, interview year, country fixed effects, rural and whether the mother was married at birth, in addition to trends for the interval to sibling birth in months and mother's age at birth. Information on other controls included is provided in section Appendix D. Each of these controls are also interacted with *No direct inheritance*.

Table B9: Selection Into Having a Sibling, Being Observed

Dep. Var.:	Any Sibling	Survival to Survey		Observed by Survey	
	All	Boys	Girls	Boys	Girls
	(1)	(2)	(3)	(4)	(5)
Female	0.001				
	(0.002)				
Brother		–0.000	0.002	0.006	0.001
		(0.003)	(0.003)	(0.005)	(0.005)
Female*No direct inheritance	–0.003				
	(0.003)				
Brother*No direct inheritance		–0.001	–0.004	–0.004	0.001
		(0.005)	(0.005)	(0.008)	(0.009)
N	162,854	92,163	89,365	76,803	76,647
Controls	X	X	X	X	X
Fixed Effects	Country	Country	Country	Country	Country

Notes: Robust standard errors, clustered by DHS sampling cluster and ethnic group in parentheses. * p<0.10 ** p<0.05 *** p<0.01. Point estimates in each column are taken from the same OLS regression. Controls include dummies for age, birth year, DHS phase, interview year, country fixed effects, rural and whether the mother was married at birth, in addition to trends for the interval to sibling birth in months and mother's age at birth. Each of these controls are also interacted with *No direct inheritance*.

Table B10: Selection of Ethnic Groups

Dep. Var.:	Highest Grade Completed		Currently Attending		Ever Attended	
	(1)	(2)	(3)	(4)	(5)	(6)
	Boys	Girls	Boys	Girls	Boys	Girls
Panel A: Excluding Matrilineal Groups						
Brother	0.020	–0.029	–0.000	–0.009	0.003	–0.010**
	(0.024)	(0.024)	(0.006)	(0.006)	(0.006)	(0.005)
Brother*No direct inheritance	–0.141***	–0.005	–0.010	0.005	–0.018*	0.012*
	(0.047)	(0.035)	(0.009)	(0.009)	(0.010)	(0.007)
N	46,031	44,775	46,031	44,775	46,031	44,775
Panel B: Excluding Imputed Ethnicities						
Brother	0.000	–0.037	–0.001	–0.010	0.007	–0.007
	(0.030)	(0.025)	(0.007)	(0.006)	(0.006)	(0.006)
Brother*No direct inheritance	–0.089**	0.001	–0.013	0.006	–0.019**	0.006
	(0.042)	(0.034)	(0.009)	(0.009)	(0.009)	(0.007)
N	46,159	44,477	46,159	44,477	46,159	44,477
Controls	X	X	X	X	X	X
Fixed Effects	Country	Country	Country	Country	Country	Country

Notes: Robust standard errors, clustered by DHS sampling cluster and ethnic group in parentheses. * p<0.10 ** p<0.05 *** p<0.01. Point estimates in each column, within each panel, are taken from the same OLS regression. Controls include dummies for age, birth year, DHS phase, interview year, country fixed effects, rural and whether the mother was married at birth, in addition to trends for the interval to sibling birth in months and mother's age at birth. Each of these controls are also interacted with *No direct inheritance*.

Table B11: Inheritance Rules Validated by eHRAF

Dep. Var.:	Highest Grade Completed		Currently Attending		Ever Attended	
	(1) Boys	(2) Girls	(3) Boys	(4) Girls	(5) Boys	(6) Girls
Brother	0.040	–0.013	0.007	–0.005	0.004	–0.005
	(0.024)	(0.029)	(0.006)	(0.007)	(0.008)	(0.007)
Brother*No direct inheritance	–0.107	–0.059	–0.008	0.000	–0.021*	0.001
	(0.066)	(0.040)	(0.011)	(0.013)	(0.010)	(0.011)
N	22,246	21,881	22,246	21,881	22,246	21,881
Controls	X	X	X	X	X	X
Fixed Effects	Country	Country	Country	Country	Country	Country

Notes: Robust standard errors, clustered by DHS sampling cluster and ethnic group in parentheses. * p<0.10 ** p<0.05 *** p<0.01. Point estimates in each column are taken from the same OLS regression. Controls include dummies for age, birth year, DHS phase, interview year, country fixed effects, rural and whether the mother was married at birth, in addition to trends for the interval to sibling birth in months and mother's age at birth. Each of these controls are also interacted with *No direct inheritance*.

Table B12: Effect of Sibling Gender and Inheritance Customs, Reforms to Inheritance Law

Dep. Var.:	Highest Grade Completed (1)	Currently Attending (2)	Ever Attended (3)
Brother	0.129	–0.000	0.016
	(0.214)	(0.010)	(0.017)
No direct inheritance	0.427	–0.060	–0.152
	(1.436)	(0.251)	(0.312)
Brother*No direct inheritance	–0.315	–0.023	–0.052*
	(0.247)	(0.017)	(0.026)
Reform (Age 7-12)	0.079	0.099***	0.079**
	(0.342)	(0.025)	(0.033)
Reform (Age ≤6)	–0.128	0.140***	0.083
	(0.421)	(0.046)	(0.071)
Brother*Reform (Age 7-12)	–0.199	–0.020	–0.046
	(0.341)	(0.040)	(0.030)
Brother*Reform (Age ≤6)	–0.126	–0.010	–0.026*
	(0.248)	(0.014)	(0.015)
NDI*Reform (Age 7-12)	0.810*	–0.011	0.037
	(0.462)	(0.044)	(0.052)
NDI*Reform (Age ≤6)	1.094*	–0.042	0.070
	(0.623)	(0.073)	(0.095)
Brother*NDI*Reform (7-12)	0.119	–0.003	0.051
	(0.391)	(0.045)	(0.045)
Brother*NDI*Reform (Age ≤6)	0.294	0.036	0.053**
	(0.278)	(0.023)	(0.024)
N	16,437	16,437	16,437
Controls	X	X	X
Fixed Effects	Country	Country	Country

Notes: Robust standard errors, clustered by DHS sampling cluster and ethnic group in parentheses. * p<0.10 ** p<0.05 *** p<0.01. Point estimates in each column are taken from the same OLS regression. Data on inheritance law is taken from the World Bank's *Women, Business and the Law* Database. More info on the specific reforms is provided in Appendix E.2. Controls include dummies for age, birth year, DHS phase, interview year, country fixed effects, rural and whether the mother was married at birth, in addition to trends for the interval to sibling birth in months and mother's age at birth. Each of these controls are also interacted with *No direct inheritance*.

Table B13: Effect of Sibling Gender and Inheritance Customs, Introduction of Free Primary Education

Dep. Var.:	Highest Grade Completed (1)	Currently Attending (2)	Ever Attended (3)
Brother	0.086	0.001	0.017
	(0.091)	(0.013)	(0.016)
No direct inheritance	0.941	–0.085	–0.349
	(1.003)	(0.235)	(0.223)
Brother*No direct inheritance	–0.291**	–0.028	–0.040*
	(0.121)	(0.021)	(0.021)
FPE (Age 7-12)	0.420***	0.070***	0.045
	(0.149)	(0.026)	(0.031)
FPE (Age ≤6)	0.429**	0.050	0.037
	(0.181)	(0.034)	(0.041)
Brother*FPE (Age 7-12)	–0.073	–0.000	–0.025
	(0.145)	(0.024)	(0.023)
Brother*FPE (Age ≤6)	–0.086	–0.007	–0.019
	(0.106)	(0.013)	(0.016)
NDI*FPE (Age 7-12)	–0.614***	–0.070*	–0.032
	(0.215)	(0.040)	(0.040)
NDI*FPE (Age ≤6)	–0.909***	–0.045	–0.046
	(0.263)	(0.051)	(0.055)
Brother*NDI*FPE (7-12)	0.075	0.023	0.032
	(0.180)	(0.037)	(0.032)
Brother*NDI*FPE (Age ≤6)	0.255*	0.022	0.037
	(0.138)	(0.022)	(0.023)
N	41,007	41,007	41,007
Controls	X	X	X
Fixed Effects	Country	Country	Country

Notes: Robust standard errors, clustered by DHS sampling cluster and ethnic group in parentheses. * p<0.10 ** p<0.05 *** p<0.01. Point estimates in each column are taken from the same OLS regression. Sources for the introduction of free primary education are detailed in Appendix E.2. Controls include dummies for age, birth year, DHS phase, interview year, country fixed effects, rural and whether the mother was married at birth, in addition to trends for the interval to sibling birth in months and mother's age at birth. Each of these controls are also interacted with *No direct inheritance*.

Appendix C. Additional Results

Appendix C.1. Mechanisms

In section 4.1, I identified a negative effect of having a brother rather than a sister for boys who cannot inherit from their father and for girls, regardless of inheritance customs, and in section 4.2 I showed that family size outcomes contribute to the difference in effects between boys and girls. In this section, I investigate various additional outcomes that may be affected by sibling gender and/or inheritance customs, with consequences for education outcomes.

One mechanism which may contribute to sibling gender effects is that of child labour. If some household tasks are assigned based on gender, then the gender of one's sibling could have a significant impact on the amount and type of work conducted by children. If children can inherit property, they may be expected to engage more in family work as a child in order to learn skills relevant to the land or business they inherit or may simply be expected to do more work during the time they would otherwise be in school. A subset of DHS surveys include modules on the performance of child labour. For this subset of surveys, I re-estimate equation 1 using as outcomes whether, in the week prior to the survey, a child is reported to have engaged in any work, paid work, fetched wood or water, engaged in household chores or other unpaid work for family. The results are presented in table C1. For boys in no direct inheritance groups, having a brother appears to reduce th likelihood of fetching firewood or water, while for girls, having a brother appears to reduce the likelihood of having done unpaid work for family. There is no evidence of any effect of sibling gender on other measures of child labour, however. Overall, these results do not provide any conclusive evidence that sibling gender and inheritance affect the likelihood of engaging in child labour. As these variables measure the extensive margin of any child labour in the week prior to the survey, I cannot rule out effects of sibling gender at the intensive margin, i.e. the amount of labour engaged in.

I now turn my attention to the possibility that the effects I find are partly due to other factors that are correlated with inheritance customs and also affect educational investments. If groups who do not practise direct inheritance to sons are also more gender biased they may invest more in the education of sons. I test for this using a similar model to that used above but including only inheritance customs as an explanatory variable. As an outcome, using data from the woman's and the man's questionnaires from the DHS, I create an index based on a question which asks respondents if it is justified for a husband to beat his wife in five different scenarios. The index represents the average response to the five scenarios, with 1 representing five yes answers and 0 five no answers. I supplement the DHS with data from Afrobarometer. Afrobarometer conducts public attitude surveys on democracy, governance, the economy and society on a repeated basis in over 30 African countries. Afrobarometer rounds 3-7 include questions on the ethnicity of respondents, which allows me to match data on individuals to the ethnographic atlas in the same manner as with the DHS. As outcomes, I create binary variables reflecting whether a respondent has experienced

gender discrimination, whether a respondent believes men make more suitable leaders, whether men have a greater right to a job, whether women should take care of the household and whether boys should be prioritised in education. The results of this analysis are presented in table C2. I do not find any significant evidence that individuals in no direct inheritance groups are more gender biased than those in direct inheritance groups. If anything, the opposite may be true, as individuals from no direct inheritance groups are less likely to agree that men have more of a right to a job than women or that boys should be prioritised in education.

Even if individuals' gender biases are the same in both groups, the returns to education could be relatively larger for males in no direct inheritance groups, relative to direct inheritance groups. To test this hypothesis, I take six outcomes reflecting returns to education. From the DHS, I take indicators for whether a respondent is currently working, if they work year-round and the household wealth index. From Afrobarometer, I use indicators for whether a respondent is employed, employed full-time and whether they responded positively about their living conditions relative to others. As my main explanatory variables, I include a triple-interaction between inheritance customs, gender and indicators for whether an individual has completed primary and secondary school, respectively. As the likelihood of completing primary or secondary school is not exogenous to inheritance customs, the results of this analysis should be considered as descriptive of the likely returns to schooling rather than a causal effect. The results are presented in table C3. If returns to education are larger for men relative to women in no direct inheritance groups, relative to men and women in direct inheritance groups, then we should expect to find negative and significant coefficients on *Female*Primary*No direct inheritance* and *Female*Secondary*No direct inheritance*. While there is a negative and significant coefficient on the interaction with primary school completion with regard to household wealth, none of the other interaction terms are not statistically significant. This analysis does not therefore provides much evidence in support of differential returns to education as a key mechanism.

Another alternative explanation for my findings is that groups not practising direct inheritance to sons may have differential access to education. If educational opportunities are lacking, parents may choose to focus more of their investment in boys if they perceive a greater return to investment. In addition, if attending school requires a lot of travel, parents may feel that it is less safe for girls to travel to school than for boys, leading to greater investment in sons' education. To test this hypothesis, I examine whether there are differences across inheritance groups using data from Afrobarometer on attitudes and access to education. I take as outcomes whether an individual has a school in their local public services area, whether they think school is too expensive, if they think their nearest school has poor teaching or poor facilities, whether a respondent thinks the government should prioritise education and whether they have a positive view of free education. The results of this analysis are presented in table C4. These results do not provide any evidence of differences in attitudes or access to school across inheritance groups.

Table C1: Child Labour

Dep. Var.:	Any work (1)	Paid work (2)	Fetching wood or water (3)	Household chores (4)	Other unpaid work for family (5)
Panel A: Boys only					
Brother	–0.001	–0.001	0.003	–0.004	0.002
	(0.009)	(0.005)	(0.011)	(0.011)	(0.010)
Brother*No direct inheritance	0.019	0.008	–0.031*	0.014	0.027
	(0.013)	(0.007)	(0.017)	(0.017)	(0.018)
Sample mean	.128	.0247	.565	.645	.278
N	12,216	12,216	6,871	12,026	12,194
Panel B: Girls only					
Brother	–0.001	0.001	0.019	0.010	–0.021**
	(0.009)	(0.004)	(0.016)	(0.011)	(0.010)
Brother*No direct inheritance	–0.018	–0.008	–0.026	0.014	0.016
	(0.012)	(0.005)	(0.025)	(0.017)	(0.013)
Sample mean	.129	.0178	.688	.799	.236
N	12,222	12,222	7,006	12,055	12,184
Controls	X	X	X	X	X
Fixed Effects	Country	Country	Country	Country	Country

Notes: Robust standard errors, clustered by DHS sampling cluster and ethnic group in parentheses. * p<0.10 ** p<0.05 *** p<0.01. Point estimates in each column, within each panel, are taken from the same OLS regression. Controls include dummies for age, birth year, DHS phase, interview year, country fixed effects, rural and whether the mother was married at birth, in addition to trends for the interval to sibling birth in months and mother's age at birth. Each of these controls are also interacted with gender and *No direct inheritance*.

Table C2: Gender Bias

	DHS	Afrobarometer				
Dep. Var.:	Dom. Violence Justified (1)	Experienced Gender Disc. (2)	Men as Leaders (3)	Men Have More Right to Job (4)	Women Take Care of Household (5)	Prioritise Boys in Education (6)
No direct inheritance	–0.007	0.001	–0.016	–0.032*	–0.026	–0.021**
	(0.016)	(0.009)	(0.010)	(0.019)	(0.020)	(0.010)
Sample mean	.257	.115	.369	.412	.516	.156
N	561,513	18,289	72,938	18,127	18,124	22,675
Controls	X	X	X	X	X	X
Fixed Effects	Country	Country	Country	Country	Country	Country

Notes: Robust standard errors, clustered by DHS sampling cluster and ethnic group in parentheses. * p<0.10 ** p<0.05 *** p<0.01. Point estimates in each column are taken from separate OLS regressions. Where included in the data, controls include dummies for DHS phase or Afrobarometer round, interview year, country fixed effects and rural location, in addition to trends for the age and age squared.

Table C3: Returns to Education

	DHS			Afrobarometer		
Dep. Var.:	Currently Working	Working All Year	Household Wealth	Employed	Employed Full-Time	Relative Living Cond.
	(1)	(2)	(3)	(4)	(5)	(6)
No direct inheritance	0.057	0.012	–0.140**	–0.005	–0.015	0.041
	(0.038)	(0.033)	(0.055)	(0.013)	(0.011)	(0.048)
Female	0.116**	0.113***	0.055***	–0.107***	–0.069***	–0.027
	(0.055)	(0.032)	(0.015)	(0.016)	(0.012)	(0.019)
Female*No direct inheritance	0.001	–0.032	0.033*	0.029*	0.022*	–0.032
	(0.060)	(0.035)	(0.019)	(0.017)	(0.013)	(0.028)
Primary	–0.084***	–0.020	0.168***	0.054***	0.048***	0.149***
	(0.025)	(0.019)	(0.022)	(0.011)	(0.009)	(0.027)
Secondary	0.072***	0.097***	0.233***	0.122***	0.117***	0.244***
	(0.013)	(0.012)	(0.031)	(0.014)	(0.012)	(0.029)
Female*Primary	0.121***	0.050**	–0.036***	0.016	–0.006	0.065**
	(0.039)	(0.024)	(0.013)	(0.010)	(0.010)	(0.025)
Female*Secondary	–0.079***	–0.036**	0.017	–0.011	0.005	0.007
	(0.019)	(0.016)	(0.023)	(0.011)	(0.009)	(0.026)
Primary*No direct inheritance	–0.043	0.005	0.192**	0.005	0.011	–0.026
	(0.030)	(0.028)	(0.077)	(0.015)	(0.013)	(0.047)
Secondary*No direct inheritance	–0.015	–0.008	0.043	–0.001	0.001	–0.028
	(0.013)	(0.024)	(0.045)	(0.033)	(0.032)	(0.039)
Female*Primary*No direct inheritance	0.030	0.051	–0.070**	–0.021	–0.005	–0.020
	(0.053)	(0.035)	(0.035)	(0.014)	(0.013)	(0.040)
Female*Secondary*No direct inheritance	0.009	–0.023	–0.044	0.016	–0.015	0.007
	(0.023)	(0.020)	(0.037)	(0.019)	(0.016)	(0.048)
Sample mean	.741	.616	–3.36e-06	.337	.237	2.85
N	618,641	462,999	592,552	85,416	85,416	84,756
Controls	X	X	X	X	X	X
Fixed Effects	Country	Country	Country	Country	Country	Country

Notes: Robust standard errors, clustered by DHS sampling cluster and ethnic group in parentheses. * p<0.10 ** p<0.05 *** p<0.01. Point estimates in each column are taken from the same OLS regression. Where included in the data, controls include dummies for DHS phase or Afrobarometer round, interview year, country fixed effects, rural, in addition to trends for the age and age squared. Each of these controls are also interacted with gender and *No direct inheritance*.

Table C4: Attitudes and Access to Education

Dep. Var.:	School in local area	School too expensive	School has poor teachers	School has poor facilities	Govt. should prioritise ed.	Attitude to free education
	(1)	(2)	(3)	(4)	(5)	(6)
No direct inheritance	0.017	–0.007	–0.025	–0.019	–0.015	0.004
	(0.011)	(0.009)	(0.021)	(0.017)	(0.014)	(0.021)
Sample mean	.873	.278	.378	.419	.372	.375
N	87,068	23,967	23,031	23,366	20,870	11,520
Controls	X	X	X	X	X	X
Fixed Effects	Country	Country	Country	Country	Country	Country

Notes: Robust standard errors, clustered by DHS sampling cluster and ethnic group in parentheses. * p<0.10 ** p<0.05 *** p<0.01. Point estimates in each column are taken from separate OLS regressions. Controls include dummies for age, age squared, Afrobarometer round, interview year, country fixed effects, rural, whether the respondent has primary education and whether the respondent has secondary education.

Appendix C.2. Internal validity of the ethnographic atlas data

In this section, I test the internal validity of the ethnographic atlas data. Bau (2021) and Lowes (2020b) discuss various theories explaining the rise of matriliny in Africa, which both authors are able to verify using the sample of ethnic groups they examine in the ethnographic atlas. They discuss how societies relying more on animal husbandry and where bride prices are practised are more likely to practise patriliny while societies practising hoe agriculture, as opposed to plow agriculture, are more likely to practise matriliny. As discussed in section 2, matriliny is also positively correlated with extensive agriculture and hunting and gathering. It should also be expected that matrilineal kinship and matrilocal residence are correlated with matrilineal inheritance and, in turn, the no direct inheritance variable. To test these predictions, I examine the relationships between each of these characteristics and my explanatory variable. Table C5 shows the results of this analysis for the full sample of ethnic groups observed in Africa in the ethnographic atlas and for those groups present in my sample. As can be seen, the predicted relationships exist in my data, emphasising the internal validity of the variables included in the ethnographic atlas.

Table C5: Internal Validity

	Dep. Var. = No direct inheritance									
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Panel A: All of Africa										
Patrilineal kinship	–0.364***									–0.064
	(0.054)									(0.074)
Matrilineal kinship		0.619***								0.470***
		(0.041)								(0.099)
Patrilocality			–0.493***							–0.051
			(0.056)							(0.124)
Matrilocality				0.597***						0.005
				(0.042)						(0.137)
Plow use					–0.364***					–0.191***
					(0.064)					(0.047)
Bride price						–0.216***				–0.005
						(0.070)				(0.069)
Animal husbandry							–1.199***			–0.751***
							(0.150)			(0.156)
Hunting, gathering								0.668		–0.128
								(0.448)		(0.265)
Extensive agriculture									0.221***	0.075
									(0.052)	(0.057)
N	346	346	346	346	321	346	346	346	346	321
Panel B: Ethnic Groups in Main Sample										
Patrilineal kinship	–0.479***									–0.117
	(0.073)									(0.111)
Matrilineal kinship		0.702***								0.523***
		(0.039)								(0.120)
Patrilocality			–0.510***							–0.148
			(0.078)							(0.292)
Matrilocality				0.564***						–0.163
				(0.071)						(0.313)
Plow use					–0.427***					–0.239***
					(0.040)					(0.084)
Bride price						–0.222**				0.008
						(0.088)				(0.084)
Animal husbandry							–1.629***			–0.884***
							(0.317)			(0.310)
Hunting, gathering								0.268		–0.387
								(0.484)		(0.270)
Extensive agriculture									0.230***	0.106
									(0.074)	(0.074)
N	170	170	171	171	164	173	173	173	173	160

Notes: Robust standard errors in parentheses. * p<0.10 ** p<0.05 *** p<0.01. Point estimates in each column, within each panel, are taken from the same OLS regression.

Appendix D. Controlling for Confounders

In addition to the controls included in the main analysis, I control for a series of potential confounders:

Child-carer Controls

I control for whether, in addition to a child's mother, an additional potential child-carer is present in the household. As the analysis assumes parents have limited resources to invest in children's education, an additional child-carer may relax the budget constraint with regard to time investments by parents, in turn affecting the results. Specifically, for individuals who are the children, foster children or grandchildren of the household head, I designate a potential child-carer as being present if I can identify an aunt or grandmother as being present in the household.

Foster Children

I include indicators for whether a household contains a foster brother or sister who is either older than the child in my sample or born before the birth of that child's next biological sibling. Even if foster children do not affect the expected division of inheritance, it is likely that they require time investment from parents which could affect the time invested in the first-born child.

Religion

I include indicators for the largest religious groups in my sample, Christianity and Islam. It is possible that families with different religious beliefs may treat siblings of different genders differently and/or place a different emphasis on education. If religion is correlated with ethnicity, then this may be driving the results.

Mission distance

I control for the distance from each individual's village to the nearest Christian, Protestant or any religious mission.[22] Missions of all denominations enacted change in culture and customs. Protestant missions, in particular, placed greater emphasis on the education of women (Nunn, 2014). If protestant missions were more common near direct inheritance groups, this could explain the smaller effects of sibling gender found among direct inheritance groups.

Ethnographic Controls

As discussed in section 4.4.3, inheritance customs stem from kinship, which is correlated with various other characteristics of pre-colonial ethnic groups. Other research has also shown that various ethnographic characteristics affect the distribution of education resources and investment across gender directly and/or affect female empowerment today, which in turn affects education. Practising patrilineal or matrilineal kinship is highly correlated with practising direct inheritance to sons. The same can be said for patrilocal and matrilocal residence, whereby married couples and their families reside with the extended family of the husband or wife, respectively, which has been

[22]The location of religious missions was mapped by Roome (1925) and was digitised by Nunn (2014).

shown by Bau (2021) to affect educational investment across gender. Similarly, kinship tightness also varies with unilineal descent systems and has recently been shown to affect beliefs and culture (Enke, 2019). To test that the results are not driven by these channels, rather than by inheritance customs, I control for patriliny, matriliny, patrilocality, matrilocality and kinship tightness.[23] I control for whether ethnic groups practise a bride price, which affects female education (Ashraf et al., 2020), and whether ethnic groups practised plow agriculture before colonisation, which affect present-day gender roles (Alesina et al., 2013), along with indicators for whether females were the main performers of an ethnic group's primary economic activity, if the performance of that main activity was mixed between men and women, whether a group's main agricultural crop was a cereal grain and whether ethnic groups have a tradition of polygyny and continuous measures of community size, the number of hierarchical segments in a group's historical societies and pre-colonial reliance on animal husbandry.

Ethnic fractionalisation and polarisation

It is possible that the degree of ethnic homogeneity in an area can affect the extent to which families maintain traditional ethnic customs. For example, families who wish to break from the traditions of their ethnic group may be more willing to do so in more heterogeneous societies, where traditions may be less strong (Atkin et al., 2021). Similarly, families who wish to break from tradition but who live in more ethnically polarised societies may perceive a greater cost to doing so as to break from tradition may be seen as turning one's back on their group. This means that the strength of the relationship between ancestral inheritance rules and outcomes may be correlated with ethnic homogeneity in a society. I thus control for ethnic fractionalisation and polarisation at both the village and country-year level. These are defined by Montalvo and Reynal-Querol (2005). Ethnic fractionalisation is measured using a Herfindahl index, which estimates the probability that any two individuals selected at random from the same sampling cluster will not belong to the same ethnic group. It is calculated using the formula $1 - \Sigma_{i=1}^{N} \pi_e^2$ where π represents the proportion of a population from ethnicity e and N the number of ethnic groups present in a population. Ethnic polarisation measures how far the distribution of ethnic groups in a population deviates from a (0.5,0.5,0,0,...,0) distribution, which represents the maximum level of polarisation. It is calculated using the formula $1 - \Sigma_{i=1}^{N} (\frac{0.5-\pi_i}{0.5})^2 \pi_i^2$.

Ethnic-group wealth

I control for mean household wealth at the ethnic group level (excluding the focal household), as a group's relative affluence may affect social customs with regard to investment in children's

[23] I follow Enke (2019) in defining kinship tightness as the average of four variables defined using data from the ethnographic atlas. These are indicators equalling one if an ethnic group is not observed to practise bilateral kinship (which applies to everyone in my sample), equalling one if an ethnic group is observed practising either matrilocality or patrilocality, equalling one if an ethnic group is not observed to practise residence in the form of nuclear families and equalling one if an ethnic group is observed to live in segmented communities or clan barrios.

education.

Geo-spatial controls

As can be seen in figure 4, there exists apparent spatial correlation in the inheritance rules observed among different ethnic groups. In an attempt to ensure that inheritance rules are not correlated with some other spatially correlated factors affecting education outcomes, both on average and via interactions with sibling gender, I include a battery of geographic and economic covariates. These are provided at the village level by the DHS. Specifically, I control for latitude, longitude, altitude, ground slope, length of the growing season (in months), malaria prevalence (in 2010), mean temperature (2010), rainfall (2010), population density (in 2010), a nightlight composite to proxy for economic activity, travel time to the nearest large city (in 2015), distance to an international border and distance to the nearest body of water.

Slave trade exposure

Recent research has pointed out further channels affecting gender roles along ethnic lines. Specifically, Teso (2019) shows how exposure to the transatlantic slave trade led to increased female empowerment today. I thus control for exposure to the transatlantic slave trade and its interaction with sibling gender. Using data from Nunn and Wantchekon (2011), I measure slave trade exposure as the natural log of the number of males taken from an ethnic group divided by its ancestral land area.

Crop Yields

Demie (2018) shows how societies producing cereal grains as their main crop exhibit less female empowerment today. Using data from the Global Agro-Ecological Zones project, I control for the difference in the potential yield (measured in millions of kilo-calories per hectare per year) of the best cereal crop and best root or tuber crop that can be harvested on an ethnic groups ancestral homeland, as defined by the Murdock (1959) map.

Appendix E. Data Appendix

Appendix E.1. Matching Ethnicities in the Democratic Republic of Congo

The Demographic and Health Survey (DHS) categorises ethnic groups in the Democratic Republic of Congo into large geographic groups, based on shared cultures. These are "Kasaï-Katanga-Tanganyika", "Basele-Komo, Maniema et Kivu", "Bas-Kasaï et KwiluKwango", "Ubangi et Itimbiri-Ngiri", "Cuvette Centrale", "Bakongo du Nord et du Sud", "Uele-Lac Albert", "Lunda" and "Pygmèes".

While I am unable to match the "Lunda" and "Pygmèes" groups to the ethnographic atlas, I match "Bakongo du Nord et du Sud" directly to the "Kongo" group in the ethnographic atlas. As the ethnographic atlas provides geographic co-ordinates of ethnic groups, I categorise groups located within the modern-day national border by location to match the categories used by the DHS and assign inheritance rules for real property according to the majority rule within each category. These are assigned as follows:

1. To the "Basele-Komo, Maniema et Kivu" category, I assign all groups located within the provinces of Maniema, North Kivu and South Kivu.
2. To the "Cuvette Centrale" category, I assign all groups located in the Cuvette Central region, which is the region bordered to the west, north and south by the Congo river.
3. To the "Ubangi et Itimbiri-Ngiri" category, I assign all groups located north of the Congo river, to the south and east of the Ubangi river and to the west of both the point where the Itimbiri and Congo rivers meet and the point where the Ubangi and Uele rivers meet.
4. To the "Uele-Lac Albert" category, I assign all groups located east of the point where the Ubangi and Uele rivers meet, to the west of Lake Albert and to the north of the provinces of Maniema and North Kivu.
5. To the "Kasaï-Katanga-Tanganyika" category, I assign all groups located in the provinces of Kasaï, Kasaï-Central, Kasaï-Oriental, Katanga and Tanganyika and all areas in between these provinces which are not part of the provinces of Maniema and South Kivu.
6. To the "Bas-Kasaï et KwiluKwango" category, I assign all groups located in the provinces of Kwilu and Kwango and all groups located in the vicinity of the lower Kasaï river south of the Cuvette Central region and any remaining groups to the south-west of the country.

This will naturally lead to some misallocation of ethnic groups in the ethnographic atlas to categories in the DHS. Using majority rule to classify inheritance rules within each category should reduce the likelihood of errors in classifying inheritance rules for DHS categories. The geographic locations of these groups and the categories to which they are assigned are presented graphically in figure E1

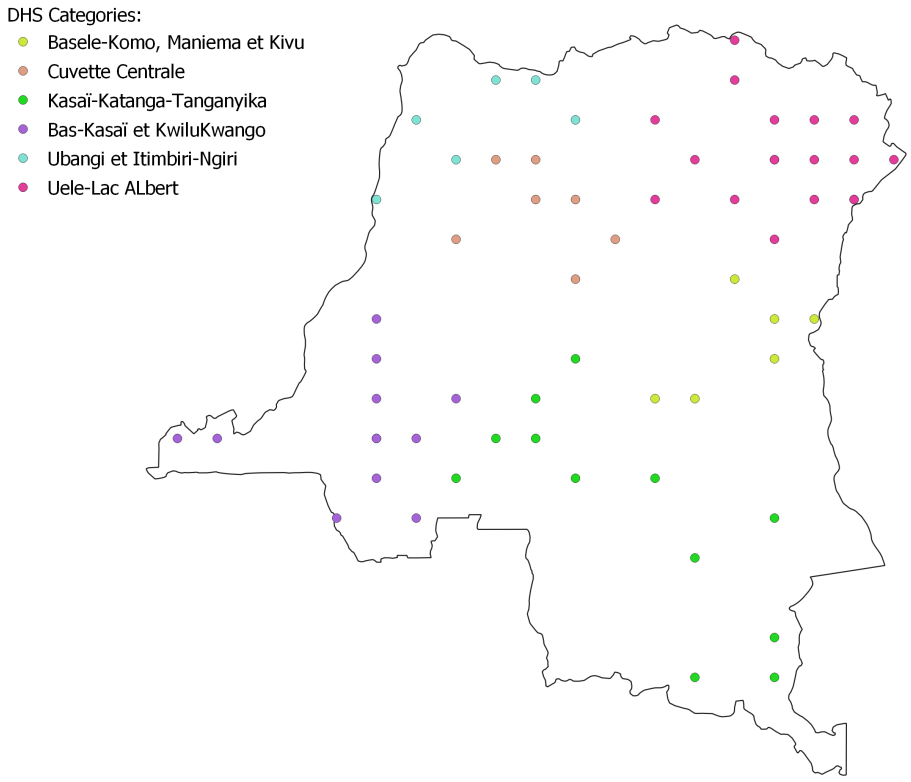

Figure E1: Ethnic Groups in the Ethnographic Atlas, matched to DHS categories

Appendix E.2. Surveys Included in Sample

Survey data on educational outcomes for individuals is provided from various Demographic and Health Surveys (DHS). I use data from all surveys from which children observed in the household questionnaire could be matched to their mother's birth history from the women's questionnaire and from which their mother reported being from an ethnic group which is observed to practive a matrilineal or patrilineal inheritance rule in the Ethnographic Atlas. Table E1 thus provides information on the countries, DHS phases and interview years of each survey used.

Table E1: Surveys included in estimation sample

Country	Phase	Interview Year	Country	Phase	Interview Year
Benin	4	2001	Malawi	4	2000
Benin	5	2006	Malawi	4	2004 - 2005
Benin	6	2011 - 2012	Malawi	6	2010
Benin	7	2017 - 2018	Malawi	7	2015 - 2016
Burkina Faso	4	2003	Mali	4	2001
Burkina Faso	6	2010	Mali	5	2006
Burundi	6	2010 - 2011†	Mali	6	2012 - 2013
Burundi	7	2016 - 2017†	Mali	7	2018
Cameroon	4	2004	Mozambique	6	2011
Cameroon	6	2011	Namibia	4	2000
Cameroon	7	2018 - 2019	Niger	5	2006
Chad	7	2014 - 2015	Nigeria	5	2008
Republic of Congo	5	2005	Nigeria	6	2013
Republic of Congo	6	2011 - 2012	Nigeria	7	2018
Congo Democratic Republic	5	2007	Rwanda	4	2000†
Congo Democratic Republic	6	2013 - 2014	Rwanda	5	2005†
Ethiopia	4	1992	Rwanda	6	2010 - 2011†
Ethiopia	5	1997	Rwanda	7	2014 - 2015†
Ethiopia	6	2003	Senegal	4	2005
Ethiopia	7	2008	Senegal	6	2010 - 2011
Gabon	6	2012	Senegal	6	2012 - 2013
The Gambia	6	2013	Senegal	7	2014
The Gambia	8	2019 - 2020	Senegal	7	2015
Ghana	4	2003	Senegal	7	2016
Ghana	5	2008	Senegal	7	2017
Ghana	7	2014	Senegal	8	2018
Guinea	4	1999	Senegal	8	2019
Guinea	5	2005	Sierra Leone	5	2008
Guinea	6	2012	Sierra Leone	6	2013
Guinea	7	2018	Sierra Leone	7	2019
Ivory Coast	6	2011 - 2012	Togo	6	2013 - 2014
Kenya	4	2003	Uganda	6	2011
Kenya	5	2008 - 2009	Uganda	7	2016
Kenya	7	2014	Zambia	4	2001 - 2002
Liberia	6	2013	Zambia	5	2007
			Zambia	6	2013 - 2014

Notes: †Ethnic information for Burundi and Rwanda was imputed to the rundi and ruanda ethnic groups, respectively, as these are the predominant groups in each country.

Reforms to Inheritance Law

This section outlines the national laws used to identify reforms to land inheritance rules, as discussed in section 5.[24]

Benin

Loi N° 2002-07: Portant Code des personnes et de la famille, Art. 619

Article 619

Les enfants ou leurs descendants succèdent à leurs père et mère ou autres ascendants sans distinction de sexe ni d'âge encore qu'ils soient issus de différents mariages, sous réserve des dispositions prévues au présent code relativement aux enfants incestueux.

[Translated to English:
Children or their descendants succeed their father and mother or other ascendants without distinction of sex or age, even if they are from different marriages, subject to the provisions of this code relating to incestuous children.]

Mali

Loi No. 2011-087 Portant Code des Personnes et de la Famille, Arts. 772, 773

Article 772

Les parents en l'absence de conjoint successible, sont appelés à succéder ainsi qu'il suit:

1. les enfants et leurs descendants;
2. les père et mère; les frères et sœurs et les descendants de ces derniers;
3. les ascendants autres que les père et mère;
4. les collatéraux autres que les frères et sœurs et les descendants de ces derniers.

A l'exception des père et mère qui héritent du dixième, chacune de ces quatre catégories constitue un ordre d'héritiers qui exclut les suivants.

[Translated to English:
Parents in the absence of a succeeding spouse are called upon to succeed as follows:

1. the children and their descendants;
2. the father and mother; siblings and descendants of the latter;
3. the ascendants other than the father and mother;
4. the collaterals other than siblings and their descendants.

With the exception of the father and mother who inherit one tenth, each of these four categories constitutes an order of heirs which excludes the following.]

[24]For laws that are not originally written in English, translations are made by the author and presented in square parentheses.

Article 773

Les enfants ou leurs descendants succèdent à leurs père et mère ou autres ascendants, sans distinction de sexe, ni de primogéniture, même s'ils sont issus d'unions différentes.

[Translated to English:
Children or their descendants succeed their father and mother or other ascendants without distinction of sex or primogeniture, even if they come from different unions.]

Rwanda

Law N°27/2016 of 08/07/2016 Governing Matrimonial Regimes, Donations and Successions, Arts. 54, 73

Article 54: Equal treatment of children in succession

Legitimate children of the de cujus succeed in equal portions without any discrimination between male and female children.

Article 73: Order of regular heirs

Heirs are entitled to inherit in the following order:

1° children of the de cujus;

2° father and mother of the de cujus;

3° full-blood brothers and sisters of the de cujus;

4° half-brothers and half-sisters of the de cujus;

5° grandparents of the de cujus;

6° paternal and maternal uncles and aunts of the de cujus;

Subject to provisions of Article 41 of this Law, each category of successors excludes others in the order of succession.

Full-blood children of the de cujus inherit from both the paternal and maternal sides, while consanguineous and uterine children inherit only from the side of the parent to whom they are related.

Sierra Leone

The Devolution of Estates Act, 2007, Secs. 7, 8

Section 7: Intestate survived by child only

(1) Subject to subsection (2) and section 15, where an intestate is survived by one child and no spouse, parent or grandchild, the whole of the estate shall devolve to the surviving child.

(2) Where an intestate is survived by two or more children and no spouse, parent or grandchild, the estate shall devolve to the children in equal shares.

Section 8: Intestate survived by spouse, child and parent

Where the intestate is survived by a spouse, child and parent, the estate shall devolve in the following manner:-

(a) thirty five percent to the surviving spouse;

(b) thirty five percent to the surviving child;

(c) fifteen percent to the surviving parent;

(d) fifteen percent in accordance with customary law or Muslim law, as applicable.

Zambia

The Intestate Succession Act, Sec. 5, 6(a), 7

Section 5: Distribution of estate

(1) Subject to sections eight, nine, ten and eleven the estate of an intestate shall be distributed as follows:

(a) twenty per cent of the estate shall devolve upon the surviving spouse; except that where more than one widow survives the intestate, twenty per cent of the estate shall be distributed among them proportional to the duration of their respective marriages to the deceased, and other factors such as the widow's contribution to the deceased's property may be taken into account when justice so requires;

(b) fifty per cent of the estate shall devolve upon the children in such proportions as are commensurate with a child's age or educational needs or both;

(c) twenty per cent of the estate shall devolve upon the parents of the deceased;

(d) ten per cent of the estate shall devolve upon the dependants, in equal shares:

Provided that a priority dependant whose portion of the estate under this section is unreasonably small having regard to his degree of dependence on the deceased shall have the right to apply to a court for adjustment to be made to the portions inherited and in that case, Part III of the Wills and Administration of Testate Estates Act shall apply, with the necessary changes, to the application.

(2) In respect of a minor, the mother, father or guardian shall hold his share of the estate in trust until he ceases to be a minor.

Section 6: Distribution where intestate survived by no spouse, etc.

Where an intestate leaves-

(a) no spouse, the portion of the estate which the spouse would have inherited shall be distributed to the children in such proportions as are commensurate with a child's age or educational needs or both; Distribution where intestate survived by no spouse, etc.

(b) no spouse or children; the aggregate portion of the estate which the spouse and children would have inherited shall be distributed equally to the parents of the deceased;

(c) no spouse, children or parents, the estate shall be distributed to dependants in equal shares;

(d) no spouse, children, parents, or dependants, the estate shall be distributed to near relatives in equal shares;

(e) no spouse, children, parents, dependants or near relatives, the estate shall be bona vacantia and shall devolve upon the State;

Section 7: Distribution where intestate survived by spouse, etc.

Where an intestate leaves-

(a) a spouse, children, dependants but no parents, the proportion of the estate which the parents would have inherited shall be shared equally between the surviving spouse and children on the one hand and the dependants on the other;

(b) a spouse, parents, dependants but no children, the portion of the estate which the children would have inherited shall be distributed to the surviving spouse, parents and dependants in proportion to their shares of the estate as specified in section five;

(c) a spouse, children, parents but no dependants, the portion which the dependants would have inherited shall be distributed equally to the parents;

(d) a spouse and dependants but no children or parents, the portion of the estate which the children and parents would have inherited shall be distributed to the surviving spouse and the dependants in proportion to their shares of the estate as specified in section five;

(e) a spouse and children but no parents or dependants, the portion of the estate which the parents and dependants would have inherited shall be shared equally among the surviving spouse on the one hand and the children on the other;

(f) a spouse but no children, parents or dependants, the portion of the estate which the children, parents and dependants would have inherited shall be distributed equally between the surviving spouse on the one hand and the near relatives on the other.

Introduction of Free Primary Education

This section outlines the sources used to identify the introduction of free primary education, as discussed in section 6.

Benin

According to Engel et al. (2011):

"The gross admissions rate for Grade 1 was over 150% in 2007/08, a result of the abolition of school fees in the previous year", implying that tuition fees were removed for the 2006/07 school year.

Burkina Faso

According to Kouraogo and Dianda (2008):

"In 2007 the government launched a general education reform that should bring among other innovations an extension of basic education from the current six years to ten years, and generalise progressively free education for children aged 6-16."

Burundi

According to Sommeiller and Wodon (2014):

"Following two decades of conflict and after a process of reconciliation that lasted several years, the newly elected President of Burundi declared in 2005 that primary education in public schools would be provided for free. The policy became effective starting with the 2005-06 school year."

Cameroon

According to Kamga (2011):

"In assessing free primary education, the General State of Education Workshop held in May 1995 in Yaoundé, Cameroon, provided a general consensus calling for free and compulsory basic education for all. As a result, the principle of free primary education was underlined by the government's order of February 1996 that organises education in the country, and was translated into the Finance Law 2000/8"

Democratic Republic of Congo

According to World Bank (2020):

"To tackle these challenges, the DRC launched a sweeping reform, introducing free primary education throughout the country as of September 2019."

Republic of the Congo

According to United Nations (2012):

"Following the announcement made by the head of State in his end-of-year speech in 2007, an order signed jointly by the Ministers of Finance and Budget, Technical and Vocational Education

and Primary, Secondary and Literacy Education (No. 278/MEFB/METP/MEPSA of 20 March 2008) put into effect the constitutional provisions on free primary and secondary education."

Ethiopia

According to Birger and Craissati (2009):

"Approach and year of fee abolition: "Big Bang" in 1994. Instructions to schools provided one year after decision."

Ghana

According to Birger and Craissati (2009):

"Approach and year of fee abolition: 2005; scaling up of pilot started in 2003 for deprived districts"

Ivory Coast

According to Oyeniran (2018):

"Just recently in 2015-16, the state enacted grants free tuition in the basic education and colleges in the country. 'Free' education denotes that tuition fees will be waived through government funding."

Kenya

According to Birger and Craissati (2009):

"Approach and year of fee abolition: "Big Bang" in January 2003 followed December 2002 election."

Liberia

According to Ministry of Forreign Affairs, Liberia (2011):

"This level of education, which consists of full-time formal schooling that is provided for children from age six (6) to age twelve (12), and constituting grades 1-6, shall be free and compulsory for all children of the age range for such school level, and shall be free for all pupils within the public school system;"

Malawi

According to Birger and Craissati (2009):

"Approach and year of fee abolition:"Big Bang" in 1994 followed pledge during first multiparty election, although partial fee removal was introduced in 1991 and 1992."

Mozambique

According to Birger and Craissati (2009):

"Approach and year of fee abolition: Decision in 2003 became effective in 2004 after testing. Phased implementation of direct support to schools 2004–06."

Niger

According to United Nations (2001):

"The Constitution is complemented by legislative and regulatory instruments (decrees, laws, orders) which constitute the legal framework for education. Act No. 98-12 of 1 June 1998, which sets out the aims of the education system, states that formal education is a means of acquiring education and vocational training in a school setting. The Act sets forth the right of the child to education and the obligation of the State to make primary education compulsory and free. "

Rwanda

According to Government of Rwanda (2003):

"Primary school education is compulsory and free both in public and government aided schools. Free education refers to free access to learning, teaching aid as well as basic textbooks needed by pupils and teachers."

Senegal

According to Ndiaye (2012):

"Although, the first president's educational policies were strongly based on the importance of French as the language of instruction, he attempted to reform the colonial system under the guideline of l'enracinement and l'ouverture (Sylla, 1993). This reform was presented as a multicultural policy that would "ensure an awareness of firm roots [and] simultaneously incorporate universal values and civilization" (Sylla, 1993:376). This new law was also meant to be democratic in the sense that it was meant to provide all citizens with free education, recognize their rights to equal educational opportunities (Sylla, 1993) and ensure that the curriculum would be relevant to the citizens' lived experiences."

Sierra Leone

According to Government of Sierra Leone (2018):

"To attain the set goals, the Government has decided that basic education in Sierra Leone should be 'free and compulsory' to the extent stated in the Education Act of 2004."

Togo

According to Hoogeveen and Rossi (2019):

"Encouraged by the success of the 2007 elections and the new government's reform platform, which included the abolition of school fees starting in the 2008/2009 school year and the gradual integration of EDIL schools in the public school system, donors reengaged with the country after more than 15 years of providing limited assistance."

Zambia

According to Riddell (2003):

"Country: Zambia; FPE Provision: February 2002. user fees abolished. uniforms not compulsory. fees can be levied by PTAs and boards, but no student can be denied an education because of cost"