

Becker, Anke

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On the Economic Origins of Restrictions on Women's Sexuality

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Poschingerstr. 5, 81679 Munich, Germany

Telephone +49 (0)89 2180-2740, Telefax +49 (0)89 2180-17845, email office@cesifo.de

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On the Economic Origins of Restrictions on Women's Sexuality

Abstract

This paper studies the origins and function of customs aimed at restricting women's sexuality, such as a particularly invasive form of female genital cutting, restrictions on women's freedom of mobility, and norms about their sexual behavior. The analysis tests the anthropological theory that a particular form of pre-industrial subsistence – pastoralism – favored the adoption of such customs. Pastoralism was characterized by heightened paternity uncertainty due to frequent and often extended periods of male absence from the settlement, implying larger payoffs to imposing restrictions on women's sexuality. Using within-country variation across 500,000 women in 34 countries, the paper shows that women from historically more pastoral societies (i) are significantly more likely to have undergone infibulation, the most invasive form of female genital cutting; (ii) adhere to more restrictive norms about women's promiscuity; (iii) are more restricted in their freedom of mobility. Instrumental variable estimations that make use of the ecological determinants of pastoralism support a causal interpretation of the results. The paper further shows that the mechanism behind these patterns is indeed male absence, rather than male dominance, *per se*, or historical economic development.

JEL-Codes: I150, N300, Z130.

Keywords: infibulation, female sexuality, paternity uncertainty, concern about women's chastity.

Anke Becker
Harvard University
Department of Economics & Department
of Human Evolutionary Biology
USA - Cambridge, MA 02138
ankebecker@fas.harvard.edu

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1 Introduction

Inherent in the human reproductive process is a fundamental information asymmetry between men and women. While there is *maternal* certainty, men can usually *not* be fully certain of their *paternity*: ovulation is concealed, fertilization takes place internally, and there is a possibility of women's infidelity. With male investment being crucial for the children's economic and social success, this asymmetry generates incentives for men to prevent women from having extramarital sex and incentives for women to signal fidelity.¹

This paper studies norms and customs that have been theorized by anthropologists to reduce women's incentive or ability to seek out extramarital affairs.² Such customs manifest in a variety of ways all over the world. First, infibulation, the most invasive form of female genital cutting, is a procedure under which the vaginal opening gets sutured closed, leaving only a small hole open to allow for the passage of urine and menstrual blood. This makes vaginal penetration painful, which reduces the benefits of having extramarital sex. Second, more commonly practiced in many parts of the world are restrictions on women's freedom of mobility, e.g., rules about whether a woman can leave the house by herself, after dark, or whether she has to cover (parts of) her body before doing so. Such rules interfere with a woman's freedom to interact with others outside of her family, reducing her ability to meet potential partners. Third, social disapproval of women's promiscuity or other restrictive norms about women interacting with men regulate and restrict women's sexual behavior.

These customs and norms often have serious economic and health-related repercussions for women. Undergoing infibulation has effects on women's health, e.g., by increasing the risk of infections or complications during childbirth. Customs that impede women's mobility or social disapproval of women interacting with men can negatively affect their educational attainment or their labor market participation. Yet, despite these economically relevant consequences, there is little empirical work that explains the presence or cross-societal variation in adherence to these customs and, in particular, their functional origin.³

The key observation underlying this paper is that the central functional need behind these practices – mate guarding as a result of paternal uncertainty – was particularly pronounced in pre-industrial pastoralism because it was characterized by frequent and often extended periods of male absence from the settlement, making women's behavior less observable for men. This paper, hence, tests the hypothesis that historical dependence on pastoralism favored the adoption of customs and norms that reduce women's incentive or ability to seek out extramarital

¹See [Platek and Shackelford \(2006\)](#) for evolutionary perspectives on male anti-cuckoldry tactics as a response to female infidelity and paternal uncertainty.

²See, e.g., [Mackie \(1996, 2000\)](#); [Hicks \(1996\)](#); [Daly et al. \(1982\)](#); [Hayes \(1975\)](#).

³The customs studied here are by no means an exhaustive list of customs that presumably aim at restricting women's sexual freedom. Another example is (full or partial) veiling or eye-covering ([Pazhoohi, 2016](#); [Pazhoohi et al., 2017](#)). In China, footbinding became a nearly universal practice during the Sung Dynasty, a period that was characterized by urbanization, increasing trade, and Mongol invasions ([Mackie, 1996](#)). Similarly, in medieval Europe, knights allegedly put chastity belts on their women to keep them chaste when they were gone on crusades ([Robinson, 1984](#)).

relations, and that these customs and norms have persisted until today. For this purpose, I link contemporary individual-level data on adherence to such customs to a historical ethnicity-level measure of reliance on pastoralism. In a broad set of within-country analyses across roughly half a million women, I find that women who descend from ethnic groups that historically relied more strongly on pastoralism (i) are more likely to be infibulated, (ii) adhere to more restrictive norms about women's promiscuity, and (iii) are more restricted in their freedom of mobility.

Pastoralism is the breeding, care, and use of herd animals such as sheep, goats, camels, cattle, horses, llamas, reindeer, and yaks and involves taking the herds out to natural pasture.⁴ In pastoralism, men are frequently away from camp on various occasions. During the day, they have to take the animals out to pasture grounds. If these are far away, absences from camp can amount to multiple days or even weeks. During the night, men often have to stay with the herd to protect them from predators or thieves. If a society's production relies largely on pastoralism, trade is important and represents another reason for men to leave the settlement for some time. Importantly, male absence increases paternity uncertainty. Consequently, incentives to reduce it are particularly pronounced in pastoralism.

The data on historical subsistence style are based on information from the *Ethnographic Atlas* (Murdock, 1967), an anthropological database covering more than 1,200 ethnic groups worldwide. The database contains detailed ethnographic information on the ways of life of the portrayed ethnic groups prior to industrialization and colonial contact. Combining information on the type of domesticated animal and dependence on animal husbandry, I construct an ethnic-group level measure of historical dependence on pastoralism.

The contemporary data on adherence to customs that reduce women's ability or incentives to seek out extramarital sex stem from the *Standard Demographic and Health Surveys* (DHS). The DHS surveys are nationally representative household surveys which are run in about 90 countries worldwide, eliciting detailed household and respondent characteristics. Since one central topic of the DHS is the empowerment of women, the majority of respondents are female and detailed information, for example, on their living situation, health, and relationship with family members is recorded. In particular, the DHS contains information on whether a woman has undergone infibulation, her sexual behavior and attitudes, and her freedom to be mobile outside her house. Importantly, the DHS contains information on respondents' ethnicity. Based on this, my empirical analysis links individuals' responses to their ethnic group's historical dependence on pastoralism from the *Ethnographic Atlas*.

This procedure generates substantial within-country variation. First, many countries are populated by multiple ethnic groups that often differ in their historical reliance on pastoralism. For example, for Uganda, my sample contains data on descendants from 21 different ethnic groups, some of which historically depended on pastoralism by ten percent or less, and others by 30–40 percent. Second, even if historical ethnic diversity in a country was relatively low, contemporary ethnic diversity is often higher due to migration. For example, for Moldova, the

⁴For more detailed descriptions, see, for example, (Bates, 2001; Kardulias, 2015; Salzman, 2004).

sample contains women who are of Bulgarian, Gagauzian, Romanian, Russian, and Ukrainian descent. Thus, within countries, we expect that individuals' adherence to customs that restrict women's incentive or ability to be unfaithful is determined by how strongly their ancestors relied on pastoralism.

My empirical strategy rests on three pillars. First, throughout the analysis, I compare individuals from different ethnic groups who live in the same country today, thereby holding constant the institutional environment and other factors that vary at the country level. In the same spirit, the analysis accounts for a large set of individual-level observables and ethnic-group level characteristics. Second, variation in historical dependence on pastoralism is largely determined by climatic and soil conditions. These environmental conditions are plausibly exogenous to gender norms and customs. As described in greater detail below, these ecological determinants also facilitate an instrumental variable approach. Third, I conduct a set of placebo analyses to rule out potential alternative factors that might generate the results, such as male dominance over women, *per se*, or the historical economic development of pastoral societies.

The analysis begins by showing that, in a sample of about 80,000 women from 13 countries in Africa, historical dependence on pastoralism significantly affects the prevalence of infibulation today. This effect is quantitatively meaningful. A one standard deviation increase in historical dependence on pastoralism increases the likelihood that a woman has undergone infibulation by 6.7 percentage points, which amounts to more than 60% of the baseline probability of being infibulated. This result is robust across a wide range of regression specifications that account for (i) individual-level observables such as age, year of interview, religious denomination, urban residence, educational attainment, or marital status and (ii) historical ethnic group level characteristics such as plow use, year of observation, settlement patterns, kinship structure, or the jurisdictional hierarchy.

Individuals exhibit variation not only in the *incidence* of infibulation but also in its *severity*. While every infibulated woman needs to be 'deinfibulated' when giving birth to a child, some require an incision to allow for the passage of menstrual blood or for making penetration possible when getting married, which is an indication that the initial procedure was unusually severe. For a small sample of women in four countries, the *DHS* contains data on the occurrence of deinfibulation at the onset of menstruation or when getting married. I show that women of pastoral descent are more likely to have undergone a particularly severe form of infibulation: they are more likely to have needed an incision in their vaginal area at the onset of menstruation or when getting married.

Next, I extend the analysis to a much larger sample of about 500,000 women descending from 275 ethnic groups in 35 countries in Africa, Asia, Europe, and South America to test whether ancestral reliance on pastoralism has a similar effect on more common ways in which women's sexual behavior is regulated. First, I use data on attitudes about women's promiscuity and on their actual sexual behavior as proxies for adherence to restrictive norms about sexual behavior. I find that women who descend from groups that historically relied more on pastoralism deem it more important that married women should be faithful and that women should

wait until marriage before having sex. In line with these beliefs, women of pastoral descent report having fewer sex partners in their lifetime and are less likely to cheat on their spouse. These response patterns at least partially reflect actual behavior: women with more pastoral ancestors are less likely to be HIV-positive in a test administered by the *DHS*.

Finally, I turn to restrictions on women's freedom of mobility as a means to limit their ability to interact with people and thereby seek out extramarital affairs. I use four different *DHS* items that speak to this: (i) whether a respondent finds domestic violence acceptable if a woman leaves the house without telling her husband; (ii) whether the respondent's husband is jealous if the respondent talks to other men; (iii) whether it is the husband alone who decides about visits to relatives; (iv) whether the respondent's husband insists on knowing where she is. I combine these items into a 'restrictions on freedom of mobility' score. The results show that this score is positively predicted by how strongly a respondent's ancestral ethnic group relied on pastoralism. Again, these patterns are robust to controlling for a comprehensive set of individual and ethnic group level observables.

To further support a causal interpretation of these results, I turn to an instrumental variable approach, which makes use of the fact that variation in historical dependence on pastoralism was largely determined by ecological conditions. Based on data provided by [Beck and Sieber \(2010\)](#), I construct a measure of land suitability for pastoralism relative to agriculture and use this measure as an instrument for an ethnic group's historical dependence on pastoralism. The resulting IV estimates are consistent with their OLS counterparts in terms of coefficient sign and statistical significance but tend to be larger in terms of effect size.

In a final step of the analysis, I resort to various placebo analyses to provide additional evidence that it is indeed male absence that generates the results. First, I address the fact that pastoralism is not only characterized by periods of male absence but is also a particularly male-dominated form of subsistence: in the vast majority of societies, pastoralism is practiced exclusively or almost exclusively by men. Therefore, it is conceivable that customs and norms that restrict women in their sexual freedom are simply manifestations of a culture of male dominance, *per se*. To test whether male dominance *alone* is sufficient to generate the observed patterns, I explore whether the same results hold true for plow agriculture, another particularly male-dominated form of subsistence ([Boserup, 1970](#); [Alesina et al., 2013, 2018](#)). Since men are not absent in plow agriculture, there should be no unusually high incentive to restrict female sexuality if absenteeism is the key mechanism. I find that the relationship between restrictions of female sexuality and plow agriculture is weak at best: the OLS coefficients are either small and statistically insignificant or even have the wrong sign. This suggests that male dominance alone does not generate customs or norms aimed at inhibiting or controlling female sexual behavior. In contrast, the effect of pastoralism always holds when controlling for historical plow use.

Second, I explore whether differences in *historical* economic development explain the documented relationship between pastoralism and customs that impose restrictions on women's ability or incentives to seek out extramarital sex. Intuitively, one might worry that societies that were less economically developed exhibit more gender inequality in general and that this has

persisted until today. I rule this out empirically by showing that proxies for historical economic development, such as the level of jurisdictional hierarchy, are uncorrelated with contemporary customs.

Third, I verify that other forms of animal husbandry, such as animal husbandry with domesticated species that are not taken out to pasture, do not predict adherence to customs that restrict women's sexual freedom. Thus, the results do not reflect some general aspect of having domesticated animals but are specific to having animals that are taken out to pasture, implying the absence of men.

Relating this work to the literature, this paper adds to recent research on the historical origins of heterogeneity in gender inequality, such as the effect of the historical division of labor on contemporary norms about women in the labor market (Alesina et al., 2013; Baiardi, 2016), the role of legal institutions in explaining female HIV rates (Anderson, forthcoming), the origins of Chinese Footbinding (Fan and Wu, 2018), the importance of women in historical production and their corresponding value in society (Qian, 2008; Xue, 2016; Carranza, 2014), and how traditional customs can affect women's education levels (Ashraf et al., 2016), the prevalence of intimate-partner violence (Tur-Prats, 2017) or cooperation between spouses (Lowe, 2018). The paper also relates to the literature on the relationship between restrictive gender norms and women's economic outcomes (Bursztyn et al., 2017, 2018; Dean and Jayachandran, 2019), to recent work highlighting the role of ethnic or religious identity (Abdelgardir and Fouka, 2019), and to the literature on female genital cutting that studies the effects of regime stability on prevalence (Poyker, 2018), proximate determinants of the persistence of female genital cutting (Bellemare et al., 2015), or the effect of interventions on attitudes towards the continuation of the practice (Vogt et al., 2016).

The paper contributes to this literature by (i) providing the first study on the origins and deeper purpose of customs such as infibulation or restrictions on women's freedom of mobility; (ii) introducing the novel explanatory variable of pastoralism; (iii) focusing on the reduction of paternity uncertainty as the main function underlying economically relevant phenomena.⁵ The paper thereby points to and provides empirical evidence for the idea that concerns about girls' and women's chastity and fidelity are an important motivation for behavior and decision-making.

More generally, the paper also speaks to the literature on long-run determinants of contemporary variation in culture (Becker et al., 2017; Chen, 2013; Enke, 2019; Falk et al., 2018; Galor and Özak, 2016; Galor and Savitskiy, 2018; Michalopoulos, 2012; Schulz et al., 2019), to the literature on the persistence of cultural traits (Fernandez and Fogli, 2009; Galor et al., 2017; Giavazzi et al., 2018; Michalopoulos and Papaioannou, 2013; Michalopoulos et al., forthcoming; Olivetti et al., forthcoming; Safronov and Strulovici, 2018; Voigtländer and Voth, 2012), to the literature on women's empowerment (Anderson and Eswaran, 2009; Anukriti et al., 2018;

⁵Other papers have studied a slightly different notion of male absenteeism that has positive effects on female empowerment: when male absence is permanent, e.g., due to the slave trade (Teso, 2016) or due to casualties from the World Wars (Goldin and Olivetti, 2013; Mazumder, 2017), more gender equal norms and higher female labor force participation emerge.

Ashraf et al., 2010; Bahrami-Rad, 2019; Beaman et al., 2009; Field et al., 2010), and, more broadly, to the literature on the role of culture in understanding economically relevant phenomena (Fernandez and Fogli, 2009; Giuliano, 2007; Guiso et al., 2006, 2008). It also speaks to the recent literature on the effect of historical experiences on variation in norms (Heldring, 2018), trust (Chen and Yang, 2016; Nunn and Wantchekon, 2011; Lowes and Montero, 2018), anti-immigrant sentiments (Tabellini, forthcoming), individualism (Bazzi et al., 2018), or prevalence of democratic institutions (Schulz, 2017).

The remainder of the paper is structured as follows. Section 2 discusses customs that impose restrictions on women's ability or incentives to seek out extramarital affairs. Section 3 provides an overview of preindustrial pastoralism, derives the hypotheses, presents the historical data, and shows that variation in pastoralism is largely determined by ecological conditions. In section 4, I present the contemporary data and the empirical strategy, and in section 5, the results on infibulation, restrictions on women's freedom of mobility, and restrictive norms about their sexual behavior. Section 6 provides the corresponding IV analyses. Section 7 presents three placebo analyses, and Section 8 some additional analyses, such as country-level evidence and an analysis of the persistence of the effect of pastoralism across cohorts. Section 9 concludes.

2 Explicit and Implicit Restrictions on Women's Sexuality

2.1 Infibulation

Infibulation is the most invasive form of female genital cutting, a term that comprises all procedures involving the partial or total removal of or any form of injury done to the female external genital organs for non-medical reasons (WHO, UNICEF, UNFPA, 1997).⁶ Typically, infibulation involves the complete removal of the clitoris, the labia minora and most or all of the labia majora. The opposing raw sides of the vulva are then sutured together so that they heal together to form a physical barrier over the vaginal opening. A small hole is left open to allow for the passage of urine and menstrual blood. As a consequence, vaginal penetration becomes painful.⁷

Infibulation is practiced in some parts of Africa, yet there is substantial geographical variation in prevalence both across and within countries. For example, in my sample, a high preva-

⁶According to estimates of the United Nations Population Fund, 3.9 million girls underwent some form of female genital cutting in 2015. This number is projected to rise to annually 4.6 million girls by 2030. About 10 percent of them will undergo infibulation, although these estimates should be taken as a lower bound. Often, infibulation gets reported as "just a prick" or "Sunna". For example, a study with 537 participants in Sudan found that about half of the women and girls who reported to have undergone pricking or Sunna had actually been infibulated (Elmusharaf et al., 2006).

⁷Other forms of female genital cutting are less invasive (no narrowing of the vaginal opening) and are often performed at the onset of puberty, in a ritual involving the whole age cohort. Infibulation, on the other hand, is performed on young girls well before puberty in a private ceremony. This sets infibulation apart from other forms that are often regarded as initiation rituals or rites of passage (Kennedy, 1970; Hayes, 1975).

lence is found in Kenya (18 percent), Senegal (17 percent), and Ethiopia (24 percent). In contrast, in Guinea and Benin, less than 7 percent of women in my sample are infibulated, and not even one percent of women in Burkina Faso have undergone infibulation. Similarly, within Benin, the prevalence of infibulation exceeds 10% in the northwestern departments but is less than 4% in close-by central-east departments. In practicing societies, parents subject their daughters to this custom in order to secure or improve their marriage prospects. While this gives a proximate explanation for why infibulation is practiced, its origins remain unclear.

Infibulation is usually performed on young girls before the onset of puberty, typically between the ages of four and ten. Upon marriage, it can take days or weeks until full penetration during vaginal intercourse is possible (see reports in [Gruenbaum \(2006\)](#)). Before giving birth, infibulated women have to be de-infibulated, i.e., an incision has to be made because the scar tissue presents a physical barrier that is an obstruction to childbirth.⁸ After childbirth, women typically undergo re-infibulation in order to restore the closure over the vaginal opening.⁹

2.2 Social Norms about Women's Sexual Behavior

A common way through which behavior is regulated and sanctioned is through social norms. Disregarding them generates costs to the individual, either through some form of social punishment or through internal feelings, such as guilt or shame. Applying this to the context of this paper, any form of social disapproval of women's promiscuity or social desirability of women's chastity imposes restrictions on women's sexual behavior. So-called "honor cultures", for instance, cultures in which the family's honor depends on women's chastity and women's infidelity is sanctioned with violence or even death, are one extreme manifestation of such social norms ([Vandello and Cohen, 2003](#); [Kulzcycki and Windle, 2011](#)). But even less severe prescriptions on women's (sexual) behavior can have negative downstream consequences. For example, if society disapproves of or is suspicious of women interacting with men outside of their family, this potentially affects her educational attainment or her labor market participation, which might partly explain why women often seek jobs in female-dominated sectors rather than taking up employment in often more lucrative male-dominated fields.

In this paper, I measure women's adherence to restrictive norms about their sexual behavior by examining their attitudes towards female virginity and promiscuity and their actual sexual behavior.

⁸Among the most common side effects associated with infibulation are obstructed or prolonged labor, which can cause fistulae (openings between the vagina and either the rectum or the bladder or both so that feces or urine pass through the vagina without the woman having control over it), see, for example, p. 14 in [Shell-Duncan and Hernlund \(2000\)](#).

⁹See [Lightfoot-Klein \(1983, 1989\)](#); [Hicks \(1996\)](#); [Mackie \(1996\)](#); [Shell-Duncan and Hernlund \(2000\)](#); [El Dareer \(1983\)](#) and references therein for more detailed descriptions and variations of the procedure.

2.3 Restrictions on Women's Freedom of Mobility

In 2009, about one-third of countries in a sample of 122 non-OECD countries had some restrictions on either women's freedom of movement or freedom of dress in public spaces encoded within their law (OECD, 2010). Such legally encoded restrictions include the need for a woman to get approval by the husband or father when applying for a passport or the prescription to cover all or parts of her body when in a public space.

While such *de jure* restrictions on women's freedom of mobility capture important aspects of the phenomenon studied this paper, here I am interested in *de facto* restrictions. Such *de facto* restrictions are often not encoded in law and refer to any reduction in women's agency with regard to decisions about leaving the house. Such restrictions include, for example, prohibitions on leaving the house alone or after dark, prescriptions on staying within a certain radius or avoiding certain places, or rules on who not to interact with outside of the family. Often, the narrative behind such practices revolves around the safety of women. This paper points to the idea that the underlying psychology behind these restrictions is concern about female chastity.

To measure whether a woman today is restricted *de facto* in her freedom of mobility, I use answers to questions that relate to the decision-making power over her leaving the house, the tolerance of sanctions for disregarding such restrictions, and concerns about her interacting with men outside of the family.

3 Pastoralism

3.1 Pastoralism in Preindustrial Societies

In pre-industrial times, pastoralism as a form of subsistence was found in almost all regions of the world. Diverse ecologies such as the most northern regions of Scandinavia and Russia, the steppes of Eurasia, the deserts of the Arabian Peninsula and Northern Africa, or the Andes in South America were (and still are) homes to pastoral people. Herd animals cover a broad spectrum of species, from smaller ones like goats and sheep to larger ones like horses, reindeer, donkeys, camels and camelids, and a large variety of cattle.¹⁰ While some pastoral societies were (almost) fully sedentary, some practiced a more localized transhumance lifestyle, and others were semi-nomadic or permanently mobile people (Hall, 2015). Typically, pastoral societies

¹⁰According to Barfield (1993), the Old World can be divided into five herding zones: (1) the cattle raising zone south of the Sahara, in the Sahel across the African continent, and in and around the Great Rift Valley in East Africa; (2) the camel herding zone in the Saharan and Arabian Desert; (3) a sheep and goat herding zone along the Mediterranean littoral through the Anatolian and Iranian Plateaus into mountainous central Asia; (4) a horse herding zone in the Eurasian steppe running from the Black Sea to Mongolia; (5) the Tibetan Plateau with herding of yaks, sheep, goats, and horses at high altitude. For the New World, Kardulias (2015) identifies three to four zones. Here, the Andes are the only place where people tended herds in prehistoric times (camelids like llamas and alpacas). Horses were brought to Mexico and the Southwest of North Americas by the Spanish, from where they eventually spread to the Great Plains. Finally, next to horses, the Spanish also brought sheep to the North American Southwest.

were not entirely dependent on animal resources, but most of them additionally subsisted on horticulture or some other form of agriculture.

Unlike other forms of preindustrial subsistence, pastoralism is characterized by frequent and often extended periods of male absence from the settlement. Men not only spend the day out with the animals, but they often have to stay with the herd at night to protect them from predators or thieves. When pasture grounds or water sources are far away, they are absent from camp for multiple days and in some cases, even weeks. In nomadic groups, which highly depend on pastoralism, trade is important, which is another reason for men to spend time away from their settlement. In describing the economic status of women among the Bororo, a pastoral society in Niger, [Dupire \(1963\)](#) sums this up by stating "[to] look after the cattle, which are only semi-domesticated, demands activities of which a woman is physically incapable. It would be beyond a woman's strength to draw water for the herd in the dry season, to go on long marches to reconnoiter for grazing lands, to protect the herd against wild animals and thieves, to hold her own with a buyer at the market, to castrate bulls, or to train the pack oxen. This hard, dangerous life, full of uncertainty and of prolonged absences from the camp, would be incompatible with the duties of motherhood, which require a more sedentary and more regular life".¹¹

Thus, in pastoralism, men are frequently away from camp, and absences are often prolonged. Importantly, the reason why men are absent and not women is rooted in the disadvantage that women have in most tasks involved in pastoralism due to childbearing and nursing. Going on long marches, handling large or many animals, and protecting them from predators or thieves are incompatible with pregnancy or nursing infants.

3.2 Hypotheses

While women know with certainty that they are related to their children, men face varying degrees of uncertainty about whether they are the biological father of their wife's children. Male absenteeism is the prime example for heightened paternity uncertainty, as mate guarding is difficult during absences. As long as fathers have to invest in their children, it is relevant to them whether they are genetically related to the children.¹²

In pastoralism, men are not only frequently absent from camp, but they are also the ones providing the economic basis for their families. Hence, being absent – increased paternity uncertainty – is particularly costly for them. Consequently, they have a particularly pronounced incentive to control or restrict female sexuality in order to increase the likelihood that they are genetically related to their children ([Trivers, 1972](#); [Xia, 1992](#)).

¹¹In hunting, men leave the camp for hunting trips, which are short, and typically hunters return to camp on the same day. Exceptions are rare and include whale hunting, for example. Some forms of fishing are more similar to pastoralism in terms of male absence, i.e., in some forms of reef fishing men go on trips that last several days. However, this form of fishing is most common among some islands of the Pacific and cannot explain any of the variation that I am studying in this paper.

¹²Men who invest only in genetically related offspring have a higher chance of passing on their genes, and hence their 'type' will prevail in the population ([Trivers, 1972](#)).

In analogy, when men invest in children, women have an incentive to credibly signal their willingness to be faithful to their husbands to ensure ongoing investment in them and their children.¹³ This incentive increases with the level of economic reliance of women on men and therefore, is presumably pronounced in pastoralism.

Anthropologists have argued that the customs studied in this paper have the function of reducing paternity uncertainty (Hicks, 1996; Mackie, 1996, 2000; Shell-Duncan and Hernlund, 2000; Pazhoohi, 2016; Pazhoohi et al., 2017). Consequently, in this paper, I test the following hypothesis:

Hypothesis. *Subsisting on pastoralism favored the adoption of customs and norms that restrict women’s sexual behavior, such as infibulation, restrictions on women’s freedom of mobility outside their homes, and restrictive norms about women’s promiscuity. These customs and norms have persisted until today.*

3.3 Data on Pastoralism in Preindustrial Societies

The *Ethnographic Atlas* is an anthropological database compiled by George Peter Murdock (Murdock, 1967) consisting of information collected from ethnographies on more than 1,200 ethnic groups worldwide. It contains ethnic group level information on subsistence, kinship organization, religious beliefs, settlement patterns, political organizations, and institutional complexity and is intended to reflect ancestral ways of living before colonization and industrialization, even when the exact timing of observation differs between ethnic groups.

I construct my main explanatory variable – an ethnic group’s historical dependence on pastoralism – by combining two variables from the *Ethnographic Atlas*: (i) the degree to which a society depended on animal husbandry (0-100%) and (ii) which animal was the predominant type in that society. I create an indicator that takes the value 1 if the predominant animal in a society classifies as a herding animal (i.e., sheep, cattle, horses, reindeer, alpacas, or camels), and 0 otherwise, such as if the predominant type of animal is a ‘non-herding’ species such as pigs, dogs, or poultry, or if there are no animals at all. Multiplying this indicator with a society’s dependence on animal husbandry produces the main explanatory variable: a society’s historical dependence on pastoralism. Formally,

$$\text{pastoralism}_j = \text{animalhusbandry}_j \times \mathbb{1}_j^{\text{herd_animal}}$$

where animalhusbandry_j denotes a society’s dependence on animal husbandry and $\mathbb{1}_j^{\text{herd_animal}}$ indicates whether the predominant animal in a society was a species that is herded, in other words, those that need to be taken out to pasture.

Figure 1 shows the variation in historical dependence on pastoralism for 1,202 societies in

¹³Henrich (2009) provides a theory for the cultural emergence of such costly ‘credibility-enhancing displays’.

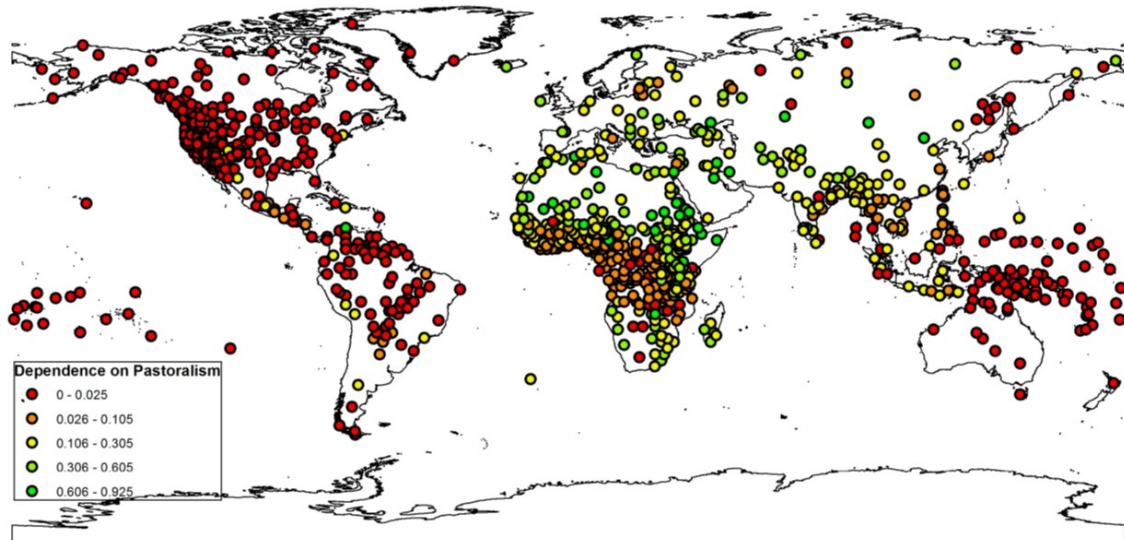


Figure 1: Location of 1,202 societies in the *Ethnographic Atlas* and their dependence on pastoralism.

the *Ethnographic Atlas*.¹⁴ About one-third of societies have very little or no pastoral production (< 5%).¹⁵ Similarly, few societies depend on pastoralism by more than 50% (about 5%). Most societies have intermediate shares of pastoral production. On average, societies dependence on pastoralism is about 15% ($\pm 19\%$).

Historical dependence on pastoralism varies within relatively narrowly defined regions. For example, in what is present-day Kenya, the Teso and Turkana dependence on pastoralism was about 30 percent compared to the Borana with a 50 percent dependence on pastoralism or the Somali and Samburu with about 90 percent pastoral production. Similarly, in what is present-day Guinea, the Toma had about 10 percent pastoral production, the Susu 20, and the Pulaar 40. This fine-grained variation is important for my empirical analysis, which relies on comparing individuals who live in the same country.

Moreover, since historical populations moved and dispersed to different countries, in my analysis, I leverage more variation than is depicted in the map. For example, present-day Moldova has residents who are of Bulgarian, Montenegrin, Romanian, Russian, or Ukrainian descent and thus exhibit variation in their ancestral reliance on pastoralism.

¹⁴Figure A1 in section A in the appendix shows a histogram of the variation in dependence on pastoralism for 1,202 societies in the *Ethnographic Atlas*.

¹⁵Many of these societies are in North and South America. Here, the lack of pastoralism is largely due to the fact that many domesticated species did not arrive in the New World until relatively recently. The lack of pastoralism in the Pacific, however, is rather due to ecological conditions, as the following section shows.

3.4 Ecological Determinants of Pastoralism

The empirical analysis will relate contemporary outcomes to historical pastoralism. To rule out reverse causality, dependence on pastoralism must not be a function of gender attitudes – in particular of concerns about women’s chastity – themselves. This would be the case if the variation in subsistence mode were largely determined by ecological factors. Intuitively, certain ecological conditions are highly favorable for pastoralism, whereas others make pastoralism impossible to practice. A good example of the latter is regions in Africa where the TseTse fly is endemic as it transmits trypanosome disease that is lethal to livestock such as cattle (Alsan, 2015; Diamond, 1997). More generally, herding animals need access to pasture grasses, which grow on different soils such as gleyosols (wetland soils) or leptosols, soils that are typically shallow over calcareous material making them unattractive for agriculture because of their inability to hold water but that have the potential for extensive grazing.

In a recent study, Beck and Sieber (2010) explore the extent to which climate and soil conditions determine the spatial distribution of basic land-use types (hunting-gathering, agriculture, sedentary animal husbandry, and nomadic pastoralism).¹⁶ Using these variables in maximum entropy modelling (Phillips et al., 2006; Phillips and Dudik, 2008), they estimate the probability with which each type of land use occurs on five-by-five kilometer grid cells for the Old World and Australia.

To calculate grid cell level suitability for pastoralism relative to agriculture, I compute the difference between a grid cell’s suitability for pastoralism and its suitability for agriculture.¹⁷ Figure 2 shows the resulting heat map of land suitability for pastoralism relative to agriculture. Darker areas indicate a higher probability of occurrence of pastoralism as compared to agriculture, and lighter areas indicate a lower probability of occurrence.

Using this data, I assign a measure of suitability for pastoralism relative to agriculture to 750 societies in the *Ethnographic Atlas*. Based on information on their location in latitude and longitude, I calculate the average suitability for pastoralism of the land relative to agriculture in a 25-kilometer radius around their historical centroid. Actual historical dependence on pastoralism is strongly positively correlated with this suitability measure ($\rho = 0.59$, $p < 0.01$). Figure A2 in Section A in the appendix depicts this relationship conditional on continent fixed effects.¹⁸ Thus, the evidence presented here suggests that variation in historical dependence on pastoralism is largely determined by ecology.

¹⁶The environmental data they employ include detailed information about climate (e.g., temperature, precipitation, or altitude) between 1961 and 1991 (Hijmans et al., 2005), and soil classification data from the United Nations Food and Agriculture Organization.

¹⁷As general suitability for pastoralism, I take the maximum value of a grid cell’s suitability for sedentary animal husbandry and its suitability for nomadic pastoralism, since my measure for pastoralism encompasses both nomadic and sedentary types.

¹⁸Note that this analysis likely underestimates the size of the true association between actual historical pastoralism intensity and land suitability for pastoralism. For example, the suitability measure is based on contemporary conditions. Moreover, we can also expect the data on the dependence on pastoralism to have some measurement error.

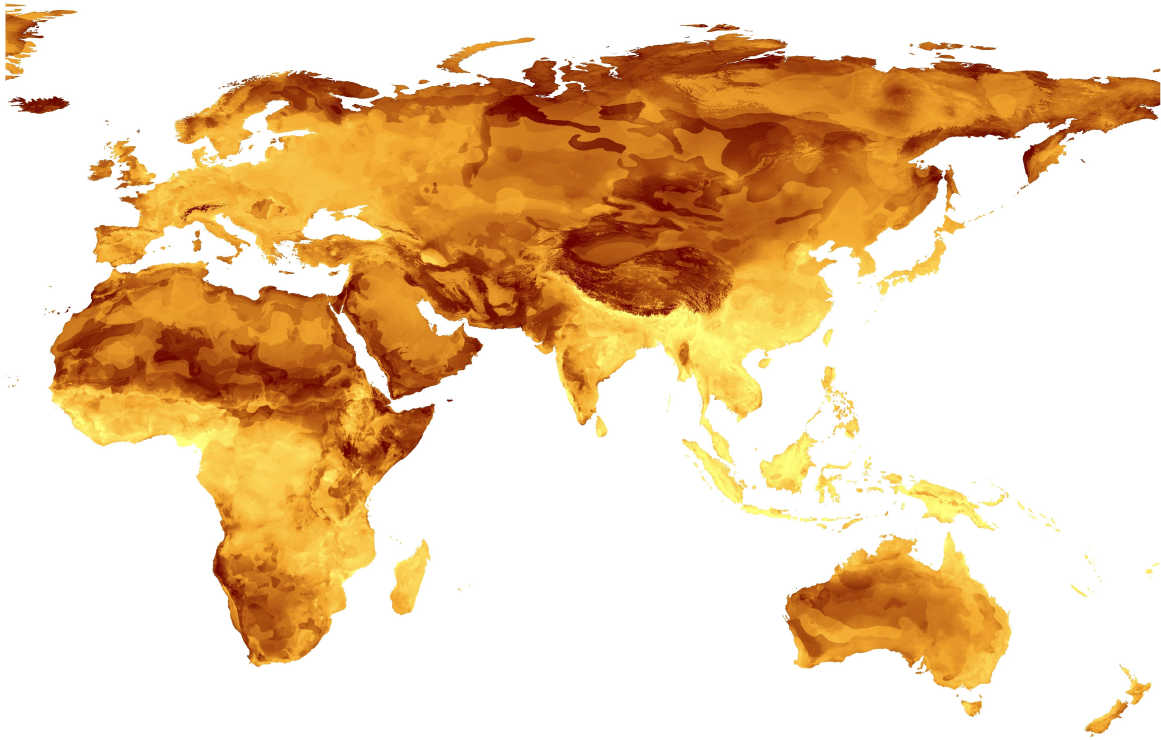


Figure 2: Land suitability for pastoralism based on data from [Beck and Sieber \(2010\)](#). Darker areas indicate higher suitability. Data is available only for Africa, Europe, Asia, and Australia.

3.5 Evidence for Historical Validity of the Hypothesis

The data in the *Ethnographic Atlas* allow me to tentatively evaluate the historical validity of the narrative about pastoralism that is put forward here. First, I verify whether pastoralism is indeed a particularly male-dominated form of subsistence, for example, relative to agriculture. Figure 3 illustrates this. The blue bars depict the share of societies in which pastoralism, other animal husbandry, or agriculture is mostly or exclusively done by men. The orange bars depict the share of societies in which the respective type of subsistence is mostly or exclusively done by women. For example, in almost 70% of the societies that practice pastoralism, it is a mostly or exclusively male activity, and in only 5%, do women predominantly practice it. For other forms of animal husbandry, this ratio is almost reversed. Agriculture is neither a male nor female-dominated type of subsistence: the share of societies in which agriculture is done by women is very similar to the share in which it is done mostly by men.¹⁹ Thus, pastoralism is male dominated, suggesting that it is men who are typically absent from camp, not women.

Second, directly speaking to the hypothesis tested in this paper, the *Ethnographic Atlas* contains information about whether a society practiced patrilocal postmarital residence, such as whether the wife would move to the husband's family. Since this means that her behavior can

¹⁹Societies in which agriculture is a female-dominated subsistence tend to practice horticulture, whereas societies in which agriculture is male dominated tend to use the plow.

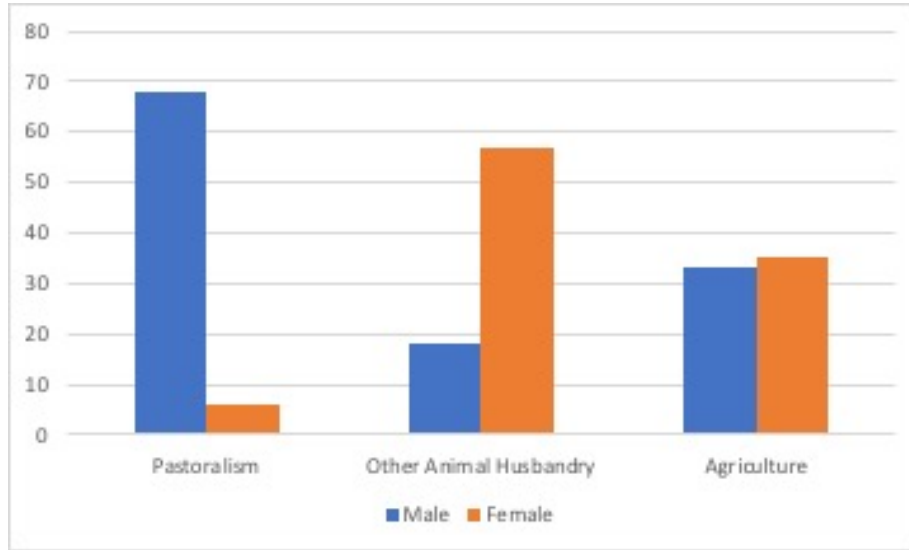


Figure 3: Share of societies in which a form of subsistence (indicated on the x-axis) is done mostly or exclusively by men (blue bars), versus share of societies in which a subsistence form is practiced mostly or exclusively by women (orange bars). Based on data from the *Ethnographic Atlas*.

Table 1: Ethnographic Atlas: Patrilocality and Insistence on Virginty

	<i>Dependent variable:</i>			
	Patrilocal Residence After Marriage [0/1]		Insistence On Virginty [0/1]	
	(1)	(2)	(3)	(4)
% Dependence on Pastoralism [Std.]	0.21*** (0.013)	0.095*** (0.014)	0.061*** (0.021)	0.052** (0.025)
Continent FE	No	Yes	No	Yes
Observations	1167	1167	592	592
R ²	0.176	0.392	0.016	0.045

Notes. OLS estimates, robust standard errors. The unit of observation is an ethnic group in the *Ethnographic Atlas*. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

be monitored by her husband's kin in his absence, this custom presents another way through which women's sexual behavior is presumably restricted. Furthermore, for a subset of societies, the *Ethnographic Atlas* indicates whether insistence on female virginty was common in a society, indicating social disapproval of women's (pre-marital) promiscuity. In line with the hypothesis, both patrilocal postmarital residence and insistence on female virginty are predicted by a society's reliance on pastoralism at the ethnicity level, as Table 1 illustrates.

Thus, the historical data provide evidence that the narrative about pastoral groups holds true in pre-industrial times at the ethnic group level.

4 Contemporary Data and Empirical Strategy

The contemporary individual-level data stem from the *Standard Demographic and Health Surveys (DHS)*. The *DHS* surveys are nationally representative household surveys covering more than 90 countries worldwide. From 1984 until today, seven waves have been conducted. The country samples are quite large, with typically between 5,000 and 30,000 households being surveyed. The *DHS* elicits detailed household and respondent characteristics. It records not only standard sociodemographic variables but also, for example, information on housing quality, availability of electricity, school attendance of children, literacy, access to clean water, sanitation, or use of cooking fuel. Since empowerment of women is one central topic of the *DHS* surveys, respondents are women, and the surveys provide ideal measures for the research question at hand. It contains questions about whether a respondent has undergone infibulation, attitudes about women’s sexual behavior as well as respondents’ actual sexual behavior, and questions relating to a respondent’s freedom of mobility.

Importantly, for some countries and waves, the *DHS* contains information about respondents’ ethnicity. This information allows me to match respondents in the *DHS* to their ancestors’ ethnic group in the *Ethnographic Atlas*. The matching procedure follows the methodology outlined in [Bahrami-Rad et al. \(2018\)](#): based on the language an ethnic group speaks today – as given by Glottolog²⁰ – I identify the ethnic group in the *Ethnographic Atlas* that spoke the same language and match them accordingly. In cases where more than one historical ethnic group spoke that language, all ethnic groups who spoke the same language get assigned to the current population, and values (e.g., dependence on pastoralism) are averaged. In total, I match about 700,000 women representing more than 300 ethnic groups in 44 countries to their ethnic group’s historical dependence on pastoralism. For about 500,000 women descending from 275 ethnic groups in 35 countries, some measure of restrictions on women’s sexuality is available.

4.1 Baseline Specification

Using this sample, I regress my outcomes of interest, for example, an indicator for whether a woman has undergone infibulation, on her ethnic group’s historical dependence on pastoralism. The baseline regression specification is

$$y_{i,j} = \alpha + \beta \times \text{pastoralism}_j + \sum_c \delta_c \times \text{Country}_i^c + \epsilon_{i,j}$$

where $y_{i,j}$ denotes an individual-level outcome for individual i from ethnic group j , pastoralism_j is the ethnic group’s historical dependence on pastoralism, Country_i^c is a dummy for the country of residence c of individual i , and $\epsilon_{i,j}$ is the error term.²¹ Since variation in the main explanatory

²⁰This comprehensive language database can be found at glottolog.org.

²¹Throughout, I will always only compare individuals who live in the same country since institutional differences are an important aspect, such as in explaining differences in female empowerment. For example, [Doepke and Tertilt \(2009\)](#) and [Anderson \(forthcoming\)](#) illustrate the role of legal rights in female empowerment, and [Goldin \(1995\)](#) looks at the relationship between economic development and female

variable occurs at the ethnic group level, observations of outcomes of individuals of the same ethnic group are not independent. Standard errors are, therefore, clustered at the ethnic group level.

4.2 Covariates

Throughout the analysis in this paper, in addition to the baseline specification, I will present three additional specifications: (i) adding plausibly exogenous individual-level controls; (ii) adding plausibly exogenous ethnic group level controls from the *Ethnographic Atlas*; (iii) adding a broad set of additional endogenous controls, some of which are potentially a function of pastoralism themselves and hence potentially 'bad controls'. Thus, while the baseline and the first two additional specifications are the ones that seem most appropriate, the fourth specification will merely serve as a sensitivity check.

All variable definitions and sources are discussed in section E in the Appendix.

5 Main Results

5.1 Infibulation

Of the total sample of 77,074 women, about 10 % (N=7,534) have undergone infibulation. In line with the hypothesis, I find that an ethnic group's historical dependence on pastoralism significantly increases the likelihood that a woman is infibulated today. Column 1 in Table 2 documents that a one standard deviation increase in the dependence on pastoralism in pre-industrial times leads to a 6.7 percentage point increase in the likelihood that a woman has undergone infibulation. In light of the fact that the unconditional likelihood of a woman to undergo infibulation in my sample is only 10 percent, this effect is large.

In a first step, I add the respondent's age and fixed effects for the year of the interview to the regression (column 2). Adding these exogeneous individual-level controls leaves the coefficient on ancestral reliance on pastoralism largely unchanged. Next, I add exogenous controls at the ethnicity level (column 3). Here, I include an ethnic group's year of observation to alleviate the concern that some groups were portrayed later than others and might, therefore, have been more developed and hence potentially more gender equal, for example. I also include an indicator for whether an ethnic group used the plow in agriculture since the use of the plow as opposed to the digging stick or hoe has been shown to affect norms about women in the labor market today (Alesina et al., 2013) and to induce a preference for sons (Alesina et al., 2018). Adding these two controls decreases the coefficient, but it remains large and statistically significant.

labor force participation. Similarly, it is conceivable that countries differ in whether infibulation is legal and how well potential laws against infibulation are enforced.

Table 2: Historical Pastoralism and Contemporary Infibulation

	<i>Dependent variable:</i> Respondent is Infibulated [0/1]			
	(1)	(2)	(3)	(4)
Hist. Dep. on Pastoralism [Std.]	0.067** (0.028)	0.067** (0.027)	0.048** (0.022)	0.037** (0.018)
Country FE	Yes	Yes	Yes	Yes
Individual Controls	No	Yes	Yes	Yes
Historical Controls	No	No	Yes	Yes
Endogenous Controls	No	No	No	Yes
Observations	77074	77074	77074	65701
# of Clusters	114	114	114	96
Mean of Dep. Var.	0.098	0.098	0.098	0.094
R^2	0.074	0.082	0.101	0.144

Notes. OLS estimates, standard errors are clustered at the ethnicity level. Individual controls are age and year of interview fixed effects. Historical controls are traditional plow use and year of observation. Endogenous controls include (at the individual level) religion fixed effects, a dummy for urban status, marital status fixed effects, educational attainment fixed effects, and at the ethnicity level measures for jurisdictional hierarchy, settlement patterns, polygyny, and kinship structure. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

In a final step, I include a broad set of variables which might be outcomes of pastoralism themselves. At the individual level, I add fixed effects for educational attainment, marital status, and a dummy for living in an urban area. I also include fixed effects for respondents' religion. At the historical ethnic group level, I include a measure for settlement patterns to alleviate the concern that the effect of pastoralism is not merely the result of a more nomadic as opposed to a more sedentary life. Similarly, I include a measure for how hierarchical a society was in terms of their political organization to ensure that pastoral groups are not simply less egalitarian and hence also less equal, for example, in terms of their relations between men and women. Finally, I include measures for polygyny – mate guarding is potentially more difficult the more wives a husband has – and for kinship tightness (Enke, 2019) – a woman's sexual freedom might be more limited in societies that place emphasis on the interest of the extended versus the nuclear family.²²

Next, I explore the effect of pastoralism on the *severity* of the practice. Women who undergo a particularly severe initial infibulation are presumably more likely to need 'de-infibulation',

²²Corno et al. (2019) explore the hypothesis that the Red Sea slave trade was a driver of diffusion of female genital cutting in East Africa. However, I find no evidence that this potential channel is relevant here, as briefly discussed in Section B.1.1 in the Appendix. First, my measure of historical reliance on pastoralism and historical exposure to the slave trade are negatively correlated. Moreover, within countries, there is no association between the two variables. Second, when adding slave trade exposure as a control, the coefficient for pastoralism remains unchanged or even increases slightly.

Table 3: Hist. Pastoralism and De-Infibulation at Onset of Menstruation or Upon Marriage

	<i>Dependent variable:</i> Had to be Deinfibulated [0/1]			
	(1)	(2)	(3)	(4)
Historical Dependence on Pastoralism [Std.]	0.011** (0.005)	0.010** (0.004)	0.010** (0.004)	0.013** (0.006)
Country FE	Yes	Yes	Yes	Yes
Individual Controls	No	Yes	Yes	Yes
Historical Controls	No	No	Yes	Yes
Add. Controls	No	No	No	Yes
Observations	8579	8579	8579	8579
# of Clusters	24	24	24	24
R^2	0.005	0.006	0.006	0.008

Notes. OLS estimates, standard errors are clustered at the ethnicity level. Individual controls include age and year of interview fixed effects. Historical controls is year of observation only because there is no variation in the historical use of the plow in this sample. Additional controls include (at the individual level) religion fixed effects, a dummy for urban status, marital status fixed effects, educational attainment fixed effects, and at the ethnicity level measures for jurisdictional hierarchy, settlement patterns, polygyny, and kinship structure. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

such as an incision to extend the remaining vaginal opening at the onset of menstruation or when getting married.²³ Data on the incidence of de-infibulation for reasons other than child-birth stems from the IPUMS database (Heger Boyle et al., 2018), which is based on data collected within the *DHS* framework.²⁴

In 1998 and 1999 in four countries – Guinea, Cote d’Ivoire, Niger, and Burkina Faso – the *DHS* asked participants "With your first period or when you got married, did someone have to make an incision to open the vaginal area?". Of the total sample of 8,579 women – descendants from 24 ethnicities –, 93 reported having undergone de-infibulation (21 cases in Burkina Faso, 67 in Guinea, and 5 in Niger). Clearly, given the small number of countries and ethnicities, the low incidence rate, and the fact that we observe variation only in three of the four countries, the analysis of this data is only tentative. Nevertheless, the results are in line with what we expected: a stronger dependence on pastoralism of a woman’s ancestral ethnicity leads to a higher likelihood of having needed to undergo deinfibulation with the onset of menstruation or upon marriage. The positive coefficient remains stable across the first three specifications shown in Table 3 and increases slightly in the specification in column 4 that includes an extensive set of controls.

²³For childbirth, almost all infibulated women need such an incision.

²⁴It can be downloaded from <https://www.idhsdata.org/idhs/>

5.2 Social Norms About Women's Sexual Behavior

Next, we turn to norms, a more common way through which women's sexual behavior can be restricted. The *DHS* contains measures of attitudes about women's promiscuity and measures of respondents' sexual behavior, which serve as proxies for the presence and intensity of restrictive social norms about women's promiscuity.

5.2.1 Norms About Sexual Behavior of Married Women

Relating to norms about women's faithfulness in marriage, respondents in the *DHS* were asked to indicate whether or not they agree with the following statement: "*Married women should be faithful*". This measure of respondents' attitude is available for about 60,000 women from 6 countries in Africa.²⁵ In a separate section of the survey, the respondents were also asked how often they have had sex with a partner other than their own spouse during the 12 months before the interview. This information is available for a sample of more than 470,000 women who descend from 259 ethnic groups in 32 countries.

To measure norms about women's faithfulness in marriage, I generate (i) an indicator for agreement with the statement about desirability of faithfulness in marriage and (ii) an indicator for whether a respondent had cheated on their partner. While there is little variation in attitudes towards faithfulness of married women – 94% agree with the statement above – there is slightly more variation in whether a respondent cheated on her partner: almost 10% did.

Table 4 illustrates the results. Both attitudes towards faithfulness in marriage and actual fidelity in marriage are predicted by an individual's ancestral reliance on pastoralism, although the association with the former measure tends to be small and is sometimes only marginally significant. This is not surprising given the low level of variation in this measure. A one standard deviation increase in historical dependence on pastoralism increases the likelihood of agreeing that married women should be faithful by almost 1 percentage point and decreases the likelihood that a respondent cheated on their partner by about 2 percentage points.

Overall, the evidence suggests that women who descend from more pastoral groups adhere to stricter norms about fidelity in marriage.

5.2.2 Norms About Female Sexual Behavior Before Marriage

Relating to norms about women's sexual behavior *before* marriage, respondents in the *DHS* were asked to indicate whether or not they agreed with the following statement: "*Women should wait with sex until marriage*". Again, this measure of respondents' attitude is available for about 60,000 women from 6 countries in Africa. 92% of respondents agree with the statement. In addition, the *DHS* elicits information about the number of sex partners a woman has had in her lifetime. This information is available for a sample of about 280,000 women from 27 coun-

²⁵The overlap with the infibulation sample is relatively small (about 25%), hence, despite the small sample for this measure, the analysis provides a test of the generalizability of the results.

Table 4: Historical Pastoralism and Norms About Faithfulness of Married Women

	<i>Dependent variable:</i>					
	Married Women Should Be Faithful [0/1]			Cheated on Spouse Past 12 Months [0/1]		
	(1)	(2)	(3)	(4)	(5)	(6)
Hist. Dep. on Pastoralism [Std.]	0.0086* (0.005)	0.0086* (0.005)	0.028*** (0.006)	-0.023*** (0.003)	-0.024*** (0.003)	-0.015*** (0.005)
Country FE	Yes	Yes	Yes	Yes	Yes	Yes
Ind. & Hist. Controls	No	Yes	Yes	No	Yes	Yes
Endog. Controls	No	No	Yes	No	No	Yes
Observations	59348	59348	51531	476667	476667	397684
Mean of Dep. Var.	0.940	0.940	0.939	0.097	0.097	0.100
# of Clusters	50	50	43	259	259	210
R^2	0.024	0.024	0.028	0.062	0.082	0.217

Notes. OLS estimates, standard errors are clustered at the ethnicity level. Individual controls are age and year of interview fixed effects. Historical controls are ethnic group's year of observation and historical plow use. Additional controls include (at the individual level) religion fixed effects, a dummy for urban status, marital status fixed effects, educational attainment fixed effects, and at the ethnicity level measures for jurisdictional hierarchy, settlement patterns, polygyny, and kinship structure. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

tries, representing 224 ethnic groups. While the median woman has had one sex partner in her lifetime, on average, women in my sample have had 1.8 sex partners (± 1.9).

Table 5 shows the results. In line with what we hypothesized, variation in both attitudes towards female sexual activity before marriage and in actual behavior is significantly affected by ancestral dependence on pastoralism. A one standard deviation increase in historical reliance on pastoralism increases the likelihood of agreeing with the statement that women should not have sex before marriage by about 1.3 percentage points (column 1). Similarly, it decreases the number of sex partners in a woman's lifetime by about 6% of a standard deviation.

5.2.3 Behavioral Validity: HIV Status of Respondents

Since all proxies for women's sexual behavior are self-reported measures, it is possible that they merely reflect social desirability bias but not actual behavior. Put differently, it is conceivable that in societies with norms or customs restricting female sexual behavior, women simply report being less promiscuous while actual behavior does not differ from that of women in less restrictive societies. While social desirability of non-promiscuity of women is exactly what I want to measure, for a more precise interpretation, it is important to understand whether social desirability is reflected only in *reporting* or also in *behavior*.²⁶

²⁶If social desirability bias in reporting alone would drive the results, we might expect that this is also reflected in non-responses because some people might prefer not to answer at all instead of adjusting their answer to what they believe to be socially desirable. However, there is no association between not

Table 5: Historical Pastoralism and Norms About Female Premarital Sex

	<i>Dependent variable:</i>					
	Women Should Wait Until Marriage [0/1]			# Sex Partners In Lifetime [Std.]		
	(1)	(2)	(3)	(4)	(5)	(6)
Hist. Dep. on Pastoralism [Std.]	0.013** (0.005)	0.013** (0.005)	0.026** (0.012)	-0.066*** (0.014)	-0.061*** (0.015)	-0.070*** (0.018)
Country FE	Yes	Yes	Yes	Yes	Yes	Yes
Ind. & Hist. Controls	No	Yes	Yes	No	Yes	Yes
Endog. Controls	No	No	Yes	No	No	Yes
Observations	60051	60051	52086	284777	284777	254716
Mean of Dep. Var.	0.922	0.922	0.921	0	0	0
# of Clusters	50	50	43	224	224	186
R^2	0.043	0.044	0.035	0.130	0.136	0.145

Notes. OLS estimates, standard errors are clustered at the ethnicity level. Individual and historical controls include respondent's age, religion fixed effects, year of interview fixed effects, and the ethnic group's year of observation. There is no variation in historical plow use in this sample. Additional controls include (at the individual level) a dummy for urban status, marital status fixed effects, educational attainment fixed effects, and at the ethnicity level measures for jurisdictional hierarchy, settlement patterns, polygyny, and kinship structure. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

To explore whether reporting reflects actual behavior, I make use of data on respondent's HIV status as a proxy for the frequency of sexual contact. In 19 countries in Africa, respondents could volunteer to participate in a blood test to determine their HIV status. The respondents were not informed of their HIV status in order to ensure their anonymity.²⁷

I find that respondents from ethnic groups with higher dependence on pastoralism are indeed less likely to be HIV positive as measured by a blood test.²⁸ This shows that more restrictive sexual behavior is also reflected in actual health outcomes and is in line with the interpretation that pastoralism generates norms that reduce female promiscuity. Table A5 in Section D in the Appendix shows these results.

In sum, we find strong evidence that pastoralism induces norms aimed at restricting female sexuality. These norms are reflected in more restrictive attitudes towards female sexuality and more constrained female sexual behavior.

answering the questions on sexual behavior and historical dependence on pastoralism.

²⁷In order to guarantee anonymity, the *DHS* does not record participants' names in connection with their survey ID. Similarly, the blood sample was not connected to a participant's name, and results of testing could, therefore, not be traced back to any individual.

²⁸This provides evidence that variation in sexual behavior induced by environmental conditions is reflected in health outcomes (Oster, 2012).

5.3 Restrictions on Women's Freedom of Mobility

Finally, we turn to restrictions on women's freedom of mobility. The *DHS* contains a number of questions that capture various aspects of potential restrictions on a woman's agency in her decision to leave the house and motivations behind them.

First, for some waves and countries, it contains a question about whether a respondent regards it as justified if a husband beats his wife for going out without telling him (yes/no). Tolerance of domestic violence for leaving the house without informing the husband suggests that some explicit or implicit restriction on a woman's freedom to be mobile outside the house is in place and that she has internalized the corresponding norm. Second, some respondents are asked (yes/no) whether the husband gets jealous if the respondent talks to other men. Even though this does not necessarily mean that the respondent is restricted in her mobility, it captures male concern about her interacting with men. Third, respondents were asked to state who decides about visits to relatives: the respondent alone, the husband alone, respondent and husband together, or some other family member. I generate an indicator that takes the value 1 if it is the husband alone who decides about visits to relatives. Fourth, in a smaller subsample, respondents were asked (yes/no) whether their husband insists on knowing where she is.

To assess whether a woman is restricted in her freedom of mobility outside her house, I calculate the average of these four indicators. This gives me a measure of restrictions on mobility between 0 and 1, with higher values indicating more restrictions, on average. Since not all items were asked in each wave/country, this score consists of up to 4 items for each respondent, in some cases of fewer. In line with my hypothesis, the score is positively predicted by an individual's ancestral reliance on pastoralism. Columns 5 to 8 in table 6 illustrate this. A one standard deviation increase in an individual's ancestral reliance on pastoralism increases the score by 3.4 percentage points, corresponding to about 10% of the mean of the score. The effect size is very similar across all three main specifications (columns 5 to 7) and decreases only when adding a large set of potentially endogenous controls.

Looking at the components of the score individually (columns 1 to 4 in Table 6) gives a very similar picture overall. How strongly an individual's ancestors relied on pastoralism positively predicts whether she finds domestic violence justified for going out without telling the husband (column 1) and whether it is the husband alone who decides about visits to family (column 3). The association with a husband's jealousy when talking to other men is positive, too, but not significant ($p = 0.13$, column 2). There is no association between historical pastoralism and whether the husband insists on knowing where the respondent is.

Overall, in line with the hypothesis tested in this paper, women who descend from ethnic groups that historically relied more on pastoralism are more restricted in their freedom of mobility.²⁹

²⁹Many herd animals, such as cattle or camels, also need to be milked, a duty that was potentially done by women and that might require them to be home. However, milking does not seem to play a role in explaining contemporary adherence to restrictions on women's freedom of mobility. As Table A6 in Section B.3 shows, the coefficient on milking and on the interaction term with pastoralism is usually

Table 6: Historical Reliance on Pastoralism and Restrictions on Women's Freedom of Mobility

	<i>Dependent variable:</i>							
	Beating OK: Go Out w/o Asking [0/1]	Husb. Jealous: Talk to Men [0/1]	Husb. Decides: Visits to Relatives [0/1]	Husb. Insists on Knowing Where Resp. Is [0/1]	(5)	(6)	(7)	(8)
Hist. Past. [Std.]	0.033 ^{***} (0.01)	0.014 (0.01)	0.053 ^{***} (0.01)	-0.0084 (0.01)	0.034 ^{***} (0.01)	0.036 ^{***} (0.01)	0.034 ^{***} (0.01)	0.016 [*] (0.01)
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Individual Controls	No	No	No	No	No	Yes	Yes	Yes
Historical Controls	No	No	No	No	No	No	Yes	Yes
Add. Controls	No	No	No	No	No	No	No	Yes
Observations	481604	128927	353333	129352	507048	507048	507048	412643
Mean of Dep. Var.	0.374	0.531	0.381	0.410	0.378	0.378	0.378	0.368
# of Clusters	267	222	262	222	269	269	269	209
R ²	0.171	0.040	0.144	0.052	0.168	0.190	0.190	0.209

Notes. OLS estimates, standard errors are clustered at the ethnicity level. Individual controls include age and year of interview fixed effects. Historical controls are year of observation and historical use of the plow. Additional controls include (at the individual level) religion fixed effects, a dummy for urban status, marital status fixed effects, educational attainment fixed effects, and at the ethnicity level measures for jurisdictional hierarchy, settlement patterns, polygyny, and kinship structure. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

5.4 Specificity of the Effect of Pastoralism

The above results show a robust association between a woman's descent from a pastoral group and the likelihood that she adheres to a custom that reduces her willingness or ability to seek out extramarital sex. In order to show that this association indeed specifically reflects elevated concerns about women's chastity arising from pastoralism, this section provides empirical evidence that pastoralism is not associated with customs that are very similar to the ones studied above but that do not reduce women's incentive or ability to have sex with men outside their marriage. To this end, I implement several placebo tests of the left-hand-side variables.

First, in section 2, I showed that pastoralism predicts the likelihood that a woman has undergone infibulation, in line with the hypothesis that pastoralism favors customs that decrease a woman's desire or ability to have extramarital affairs. Alternatively, it could be that for some reason pastoralism is generally associated with genital cutting, for instance, with variants of genital cutting that do not make penetration painful.³⁰ To rule out this alternative explanation, I test whether pastoralism predicts (i) male circumcision or (ii) other types of female genital cutting without infibulation, such as clitoridectomy or excision. As Table A8 in Section D in the Appendix shows, there is no association between pastoralism and male circumcision (columns 1 to 3) or types of female genital cutting without infibulation (columns 4 to 6). Thus, the effect of pastoralism is *specific* to the form of circumcision that makes penetration painful for women.

Second, as shown in section 5.3, pastoralism predicts a woman's tolerance of domestic violence as a sanctioning device when she goes out without telling her husband. While I interpret this as evidence for the internalization of concerns about women's fidelity arising from pastoralism, it could be that women of pastoral descent *experience* more intimate partner violence or that, for some reason, they are generally more tolerant of domestic violence, not only with regard to leaving the house without permission. However, as Table A9 in Section D in the appendix shows, how strongly an individual's ancestors relied on pastoralism is *negatively* associated with the likelihood that her partner has ever abused her physically. Similarly, tolerance towards domestic violence is particularly pronounced for going out without asking the husband as opposed to, for example, for burning the food or neglecting the kids, two domains much less related to suspicions about a woman's fidelity. Table A10 in section D in the appendix shows this. Finally, there is even a negative association between historical reliance on pastoralism and whether the husband forbids the respondent to meet her *female* friends (see Table A12 in Section D in the Appendix). Thus, the effect of pastoralism is specific to the proxies for restrictions on women's freedom of mobility as it relates to concerns about their chastity.

In sum, pastoralism is related to customs or attitudes that reduce a woman's incentives or ability to seek out extramarital sex, and this relationship does not extend to other similar customs or attitudes. This provides corroborating evidence for the idea that pastoralism generates

insignificant.

³⁰Due to being inherently difficult to study, there is substantial disagreement about how much variants of female genital cutting other than infibulation decrease women's sexual pleasure. See [Obermeyer \(2005\)](#) for an overview of the literature.

a specific effect on the prevalence of customs and norms restricting women's sexual freedom.

6 Instrumental Variable Approach

So far, the analysis has relied on simple OLS regressions based on the idea that variation in the main independent variable – historical reliance on pastoralism – is determined by ecological conditions. To lend further empirical support to the causal interpretation of the results, I now instrument historical reliance on pastoralism with land suitability for pastoralism relative to agriculture, as described in section 3.4. The assumption underlying the exclusion restriction is that land suitability does not affect the gender customs through channels other than pastoralism. Table A7 in section C in the appendix shows the first stage. The F -statistic of the first stage is 12.

For each main outcome presented in section 5, Table 7 presents both the OLS and the IV estimates. The IV estimates confirm the results from the OLS regressions in terms of coefficient sign and statistical significance. Historical dependence on pastoralism predicts contemporary adherence to norms and customs that restrict women's sexuality. In terms of magnitude, the IV coefficients are consistently larger than their OLS counterparts.

One potential explanation for this difference in coefficient size is the non-perfect take-up of the treatment, for instance, groups that 'receive treatment' because they live in an area that is suitable for pastoralism, but they do not practice it. Similarly, they might practice pastoralism but not in a way that most others do, such as with men taking animals out but with women being the shepherds. Such a case would presumably lack male absence and therefore, lack incentives to generate the customs described in this paper.

Another plausible explanation that could induce downward bias in the OLS coefficients is measurement error in dependence on pastoralism. First, the measure of dependence on pastoralism for each society was given by a different ethnographer who estimated the number of calories that was provided by this type of subsistence. Second, dependence on pastoralism is measured in ten steps between 0 and 1. Thus, even if ethnographers could perfectly observe how strongly a society depended on pastoralism, the discrete nature of the variable alone induces measurement error.

Overall, the IV estimates provide further support for a causal interpretation of the results.

7 Placebo Analyses

This paper argues that it is male absence that favors the adoption of restrictions on women's sexuality. It uses reliance on pre-industrial pastoralism as a proxy for male absence. Of course, pastoralism is not only characterized by male absence. To rule out that other aspects of historical reliance on pastoralism generate the documented pattern, I conduct several placebo exercises.

Table 7: Historical Pastoralism and Constraints on Women's Sexuality: IV Estimates

	<i>Dependent variable:</i>							
	Is Infi- bulated [0/1]		# Sexpartners in Life [Std.]		Cheated [0/1]		Restrictions on Free- dom of Mobility [(0,1)]	
	OLS	IV	OLS	IV	OLS	IV	OLS	IV
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Hist. Past. [Std.]	0.067** (0.03)	0.098*** (0.03)	-0.065*** (0.01)	-0.18*** (0.06)	-0.023*** (0.00)	-0.046*** (0.02)	0.034*** (0.01)	0.076*** (0.02)
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	76198	76198	261131	261131	435083	435083	464012	464012
R ²	0.076	0.068	0.129	0.118	0.063	0.059	0.162	0.155

Notes. Standard errors are clustered at the ethnicity level. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

7.1 Male Dominance

Pastoralism is not only characterized by male absence, but also by being a form of subsistence that is predominantly done by men. While the narrative put forward in this paper posits that male absence is a necessary condition to generate incentives to regulate female sexuality, it could, in principle, also be that the customs and norms aimed at controlling female sexual behavior are just a manifestation of male dominance *per se*. In this section, I show that male dominance alone does not drive the results.

If male dominance alone was sufficient to generate the observed patterns, we should expect to see similar associations between the outcomes – customs and norms that reduce women's incentive or ability to seek out extramarital affairs – and other male-dominant cultures such as plow agriculture. Like in pastoralism, in plow agriculture men have a pronounced advantage in production over women (Boserup, 1970; Alesina et al., 2013). Consequently, in 92% percent of societies in the *Ethnographic Atlas* that have plow agriculture, it is mostly or exclusively done by men. Recent research has shown that the historical use of the plow in agriculture induces unequal gender norms, lower female participation in the labor market (Alesina et al., 2013), and a preference for sons over daughters (Alesina et al., 2018).

To test whether plow agriculture has a similar effect on the regulation of female sexuality, I regress the outcomes on an indicator for whether the ancestral ethnic group of an individual traditionally used the plow in agriculture. Table 8 illustrates the results. The effect of plow use on the outcome variables is either insignificant, or the coefficient has the wrong sign. The association between historical plow agriculture and the likelihood of being infibulated today is significantly *negative* in all specifications (Table 8, columns 1 and 2). If anything, using the plow in agriculture leads to a lower incidence of infibulation today, although there is little variation in historical plow use in this sample (and in most parts of Africa more generally). Similarly, for promiscuous behavior, we find that, if anything, the effect of the plow is opposite to what we would expect if male dominance *per se* generated a culture of suppression of female sexuality: the association between the number of sex partners in a woman's lifetime and historical plow use is *positive* and statistically significant when only accounting for country fixed effects, and

Table 8: Placebo: Historical Plow Use and Contemporary Customs Restricting Female Sexuality

	<i>Dependent variable:</i>							
	Resp. Is Infibulated [0/1]		# Sexpartners Life [Std.]		Cheated [0/1]		Restrictions on Freedom of Mobility [(0,1)]	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Hist. Plow Use	-0.43*** (0.15)	-0.31*** (0.10)	0.15*** (0.05)	0.050 (0.05)	0.0081 (0.02)	-0.017 (0.02)	-0.071* (0.04)	-0.033 (0.04)
Hist. Past. [Std.]		0.048** (0.02)		-0.061*** (0.01)		-0.024*** (0.00)		0.034*** (0.01)
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Ind. Controls	No	Yes	No	Yes	No	Yes	No	Yes
Hist. Controls	No	Yes	No	Yes	No	Yes	No	Yes
Observations	76915	77074	284243	284777	445076	476667	459726	507048
R ²	0.072	0.101	0.127	0.136	0.061	0.082	0.144	0.190

Notes. OLS estimates, standard errors are clustered at the ethnicity level. Individual controls include age, religion fixed effects, and year of interview fixed effects. Historical controls is year of observation. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

it becomes indistinguishable from zero once other observables are included (columns 3 and 4 in table 8). Columns 5 and 6 in table 8 show that the same holds true for the relationship between historical plow use and the likelihood that a woman cheated on her husband. Finally, as columns 7 and 8 illustrate, there is no association between historical plow use and contemporary restrictions on women's freedom of mobility. On the other hand, the coefficient on pastoralism is always significant when controlling for historical plow use.

In conclusion, the evidence shows that the effect of pastoralism on contemporary restrictions on female sexuality is not merely a manifestation of a male-dominant culture *per se*.

Of course, this does not imply that male dominance does not play *any* role in generating the results. In fact, if men had no economic power over women at all, we would not see the same patterns even if men were absent and paternity uncertainty was high. For example, in the extreme case, if women fully provided for themselves and their children, there would be no incentive for them to signal faithfulness, at least not for the reason of securing resources. Similarly, if men did not invest in children at all, paternity certainty would be irrelevant, as offspring survival (fitness) would not involve any costs for them.

Section D.4 in the appendix provides evidence in line with male dominance being a necessary condition. Here, I make use of information on whether pastoralism is done by women, as is the case in a small minority of societies ($N = 8$). In analogy to my main explanatory variable, I generate a measure for a society's historical reliance on pastoralism *done by women*. As Table A13 shows, the relationship between this measure and contemporary adherence to customs that impose restrictions on women's sexual freedom is if anything, *opposite* to the one documented for pastoralism. Thus, when subsistence is done by women, and they hold more economic power, there is no evidence for stronger adherence to customs that restrict their sexuality.

Table 9: Placebo: Historical Economic Development and Contemporary Customs Restricting Female Sexuality

	<i>Dependent variable:</i>							
	Resp. Is		# Sexpartners		Cheated		Restrictions on Free-	
	Infibulated [0/1]		Life [Std.]		[0/1]		dom of Mobility [(0,1)]	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Jurisd. Hierarchy [Std.]	0.032 (0.03)	0.013 (0.01)	-0.045* (0.02)	-0.038* (0.02)	-0.011 (0.01)	-0.0084 (0.01)	0.0014 (0.01)	0.0040 (0.01)
Hist. Past. [Std.]		0.056*** (0.02)		-0.076*** (0.02)		-0.024*** (0.00)		0.034*** (0.01)
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Ind. Controls	No	Yes	No	Yes	No	Yes	No	Yes
Hist. Controls	No	Yes	No	Yes	No	Yes	No	Yes
Observations	76519	76677	279295	279792	439170	467407	453840	497879
R ²	0.043	0.106	0.127	0.136	0.061	0.082	0.144	0.188

Notes. OLS estimates, standard errors are clustered at the ethnicity level. Individual controls include age, religion fixed effects, and year of interview fixed effects. Historical controls are year of observation and plow use. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

7.2 Historical Economic Development

Even though all regressions shown in section 5 include country and year fixed effects and therefore, attempt to hold constant the level of *contemporary* economic development, it is conceivable that the results reflect differences in *historical* economic development. Intuitively, one might worry that societies that are less developed exhibit more gender inequality.

While the *Ethnographic Atlas* does not contain direct measures of economic development, such as output per capita, it does contain information on the level of the jurisdictional hierarchy, which is often taken as a proxy for how economically developed a society was. To rule out historical economic development as a driver behind my results, I regress my outcome measures on the jurisdictional hierarchy. As shown in table 9, there is no association between this proxy for historical economic development and any of the outcomes. In fact, the signs of the coefficients are the opposite of what we would expect if the contemporary prevalence of these customs reflected lack of historical economic development.

7.3 Other Forms of Animal Husbandry

Pastoralism is not the only form of subsistence that involves caring for and using domesticated animals. Some societies practice animal husbandry with species that are not herded, such as pigs, dogs, or poultry. While these species also sometimes live in packs, they are not taken out to pasture and usually live within the confines of the human settlements. In comparison to pastoralism, this type of animal husbandry is less common, in particular, in Africa, and it is most prevalent in the Pacific. Since animal husbandry with non-herd species lacks the crucial aspect of pastoralism – taking animals out to pasture and being absent from camp – we should not expect it to affect the outcome variables in the same way.

Table 10: Placebo-Test: Animal Husbandry without Herding and Contemporary Customs Restricting Women's Sexuality

	<i>Dependent variable:</i>							
	Resp. Is Infibulated [0/1]		# Sexpartners Life [Std.]		Cheated [0/1]		Restrictions on Freedom of Mobility [(0,1)]	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Hist. Anim. Husb. [Std.]	-0.099 (0.13)	-0.078 (0.14)	0.017*** (0.01)	0.018*** (0.01)	0.0035** (0.00)	0.0036** (0.00)	0.00096 (0.00)	-0.00056 (0.00)
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Ind. Controls	No	Yes	No	Yes	No	Yes	No	Yes
Hist. Controls	No	Yes	No	Yes	No	Yes	No	Yes
Observations	77074	77074	284777	284777	476667	476667	507048	507048
R ²	0.040	0.086	0.127	0.134	0.058	0.078	0.163	0.186

Notes. OLS estimates, standard errors are clustered at the ethnicity level. Individual controls are age and year of interview fixed effects. Historical controls are plow use and year of observation. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

To conduct a placebo test using animal husbandry with non-herding species, such as pigs or poultry, I generate an ethnicity-level index for dependence on animal husbandry with non-herding species analogous to my measure for dependence on pastoralism.³¹ Regressing my outcome measures on the dependence on animal husbandry as my main independent variable does not generate the same patterns. Table 10 illustrates the results. The coefficient on animal husbandry with non-herding species is either statistically indistinguishable from zero, or has the opposite sign of the coefficient on pastoralism.³²

In sum, the results confirm that the associations found above are specific to having domesticated species that are taken out to pasture – they are specific to pastoralism, and they do not extend to having domesticated animals in general.

8 Additional Analyses

8.1 Heterogeneity in Persistence

An immediate question that arises from the results presented in this paper is whether persistence of 'culture', for instance, customs and norms, gets weaker over time and why we observe persistence at all. While these questions are beyond the scope of this paper, I present some initial evidence that persistence weakens over time and that it is not only driven by the persistence of pastoralism itself.

³¹First, I generate an ethnicity-level indicator that takes value 1 if the predominant animal in a society was a non-herding species, such as pigs, dogs, fowls, bees, guinea pigs, or other smaller species, and takes value 0 if it is a herding species, such as cattle, sheep, goats, horses, donkeys, reindeer, or camels. Then, I multiply this indicator with a society's dependence on animal husbandry, which gives me my measure of a society's dependence on animal husbandry with non-herding species.

³²This is not surprising in light of the fact that animal husbandry with pigs, dogs, or poultry actually tends to be a female-dominated activity, as also documented in section 3.

Comparing Cohorts To evaluate whether cultural persistence gets weaker over time, I test if the effect of historical pastoralism on contemporary outcomes is weaker for respondents from more recently born cohorts as compared to respondents from older cohorts. To this end, I interact historical reliance on pastoralism with an indicator for being from an early cohort, defined as being born before 1985. The results from adding this interaction term and the indicator for early cohorts to the baseline specifications are shown in Table A16 in section D in the appendix. For infibulation and the number of sex partners, the effect of pastoralism is stronger for early cohorts, suggesting some weakening of the effect of pastoral descent over time.

Persistence of Pastoralism While this paper has focused on the persistence of customs and norms that presumably arose as a consequence of practicing pastoralism, it is equally conceivable that the mode of economic production that historically favored their adoption has similarly persisted. Thus, the persistence of pastoralism could be part of the explanation of why norms and customs associated with it persist.

To test whether the effect of pastoralism on contemporary adherence to norms and customs that restrict women's sexuality is mostly driven by the persistence of pastoralism, I use information on whether the household of a respondent owns animals that – at least historically – are classified as herding species. Of the women in my sample, 55% live in a household that owns herd animals.³³

However, the effect of pastoralism on contemporary adherence to customs that restrict women's sexuality does not seem to be exclusively driven by the persistence of pastoralism itself. If I exclude people who own herd animals today, the results still hold despite a substantial reduction in sample size. Table A18 in Section D in the Appendix illustrates this.

8.2 Contemporary Male Absence

This paper uses historical reliance on pastoralism as a proxy for the historical absence of men to test whether male absence affects adherence to customs that restrict women's sexuality. Of course, there are reasons for male absence other than pastoralism, e.g., war or seasonal migration for employment. Even though male absence due to war or migration is arguably endogenous to a number of confounding factors, it is interesting to see whether we find a similar relationship with customs that restrict women's sexuality.

For a smaller sample, the *DHS* asked whether men had been away from home for more than one month during 12 months preceding the interview. I generate an indicator that takes value 1 if the respondent's partner had been away from home for more than one month during the 12 months preceding the interview. Overall, I find a very similar association between this direct measure of (contemporary) male absence and adherence to norms and customs that reduce women's incentive or ability to seek out extramarital affairs. Table A17 in Section D in the

³³There is persistence in terms of economic production: owning herd animals today is positively correlated with historical dependence on pastoralism ($\rho = 0.24$, $p < 0.01$).

Appendix provides the results. The coefficients all have the same sign as before, even though in some cases they are not statistically significant at conventional levels. This might be due to the substantial reduction in sample size to less than 20 percent of the initial sample, the reduction in countries and ethnicities included in it, or due to endogeneity of the independent variable.

8.3 Country-Level Evidence

So far, the analysis has relied on individual-level variation *within* countries to test whether historical reliance on pastoralism explains contemporary adherence to customs that reduce women's ability or willingness to be unfaithful. Thereby, the analysis held constant those factors that vary between countries, such as institutions. Now, we briefly explore whether country-level *de jure* restrictions on women's civil liberties, in particular, legal restrictions on their mobility and legal requirements on their dress, vary in a similarly systematic way *across* countries.

The OECD Gender, Institutions and Development Database provides country-level data on social institutions related to gender inequality in 102 countries described in [Branisa et al. \(2009\)](#). For the purpose of this paper, I use the restrictions on 'civil liberties' index, which captures the extent to which women's freedom of movement and women's freedom of dress is legally restricted. Such legal restrictions include the necessity of having a husband's or father's permission to get a passport or travel or the obligation to wear a veil or a burqa in public spaces.

Based on data provided by [Giuliano and Nunn \(2016\)](#), I construct a country-level measure of historical reliance on pastoralism and match the historical measure to the OECD data. I find that countries that historically relied more strongly on pastoralism are more likely to have restrictions on women's freedom of movement or freedom of dress encoded in their law. Figure A4 and table A15 in section D in the Appendix illustrate this.

9 Conclusion

This paper provides evidence that norms and customs that restrict women in their sexuality emerge as a response to a fundamental information asymmetry between men and women arising from the human reproductive process. While women know that they are related to their child, there is some degree of uncertainty for men. This paternal uncertainty creates incentives for men to impose restrictions on women's sexual behavior and for women to signal their fidelity.

The paper, thereby, sheds light on the ultimate origins of customs that restrict women in their freedom of mobility or infibulation, the most invasive form of female genital cutting. Moreover, it provides evidence for the idea that concerns about girls' and women's chastity or 'purity' are an important motivation underlying economically relevant behaviors.

Anthropologists have long put forward the idea of functional relationships between modes of economic production and societal phenomena such as female status ([Boserup, 1970](#); [Sanday, 1973, 1981](#); [Aberle, 1973](#)). By showing that contemporary adherence to customs that restrict

women's sexuality can be traced back to historical reliance on pastoralism, the narrative of this paper fits the idea that the environmental conditions in which humans have lived historically have not only determined their subsistence and biology but have also ultimately shaped their 'cultures' ([Boyd and Richerson, 1988, 2005](#); [Harris, 1977](#); [Henrich, 2015](#)).

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A Pastoralism

A.1 Historical Data

Figure A1 illustrates the variation in dependence on pastoralism for 1,202 societies in the *Ethnographic Atlas*. About one third of societies do not subsist on pastoralism at all, and about 5% do so to only a very small extent. Most societies range between 10% and 50% in their dependence on pastoralism, and there are only a few societies that almost exclusively depend on it.

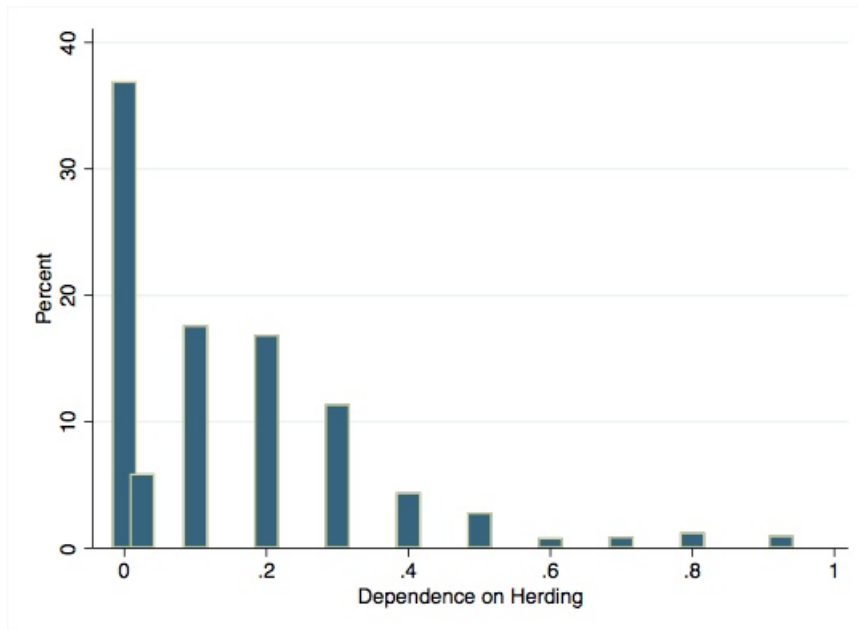


Figure A1: Distribution of dependence on pastoralism across 1,202 societies in the *Ethnographic Atlas*.

A.2 Ecological Determinants of Pastoralism

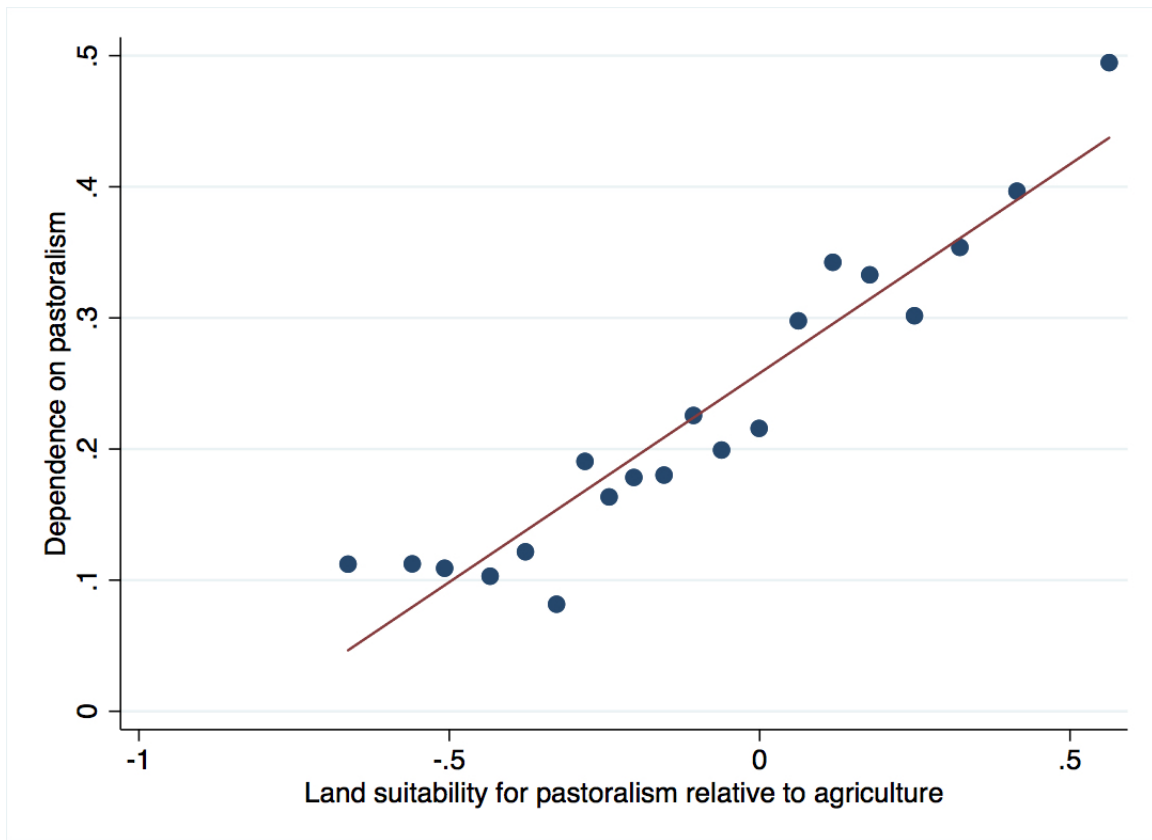


Figure A2: Binscatter plot: dependence on pastoralism and land suitability for pastoralism relative to agriculture for 750 societies in the *Ethnographic Atlas* conditional on continent fixed effects.

A.3 Historical Validity of the Hypothesis

Table A1: Sex Differences in Pastoralism, Animal Husbandry, and Agriculture (Ethnographic Atlas)

Subsistence	Predominantly Male*	Predominantly Female**	Participation Equal but Differentiated	Participation Equal, No Differentiation
Pastoralism	67.8%	6.1%	16.6%	6.6%
- Sheep, Goats	45.5%	15.9%	9.1%	22.7%
- Cattle	70.8%	5.2%	18.7%	5.3%
- Equines	75.0%	0%	7.7%	1.9%
- Deer	69.2%	15.9%	0%	7.7%
- Camelids	68.8%	0%	31.6%	0%
Other Animal Husbandry	17.9%	56.7%	1.5%	14.9%
Agriculture	33.0%	35.0%	12.4%	19.3%

Percentages in rows do not necessarily add up to 100: two omitted categories (sex differentiation not specified; activity absent or unimportant in the society).

* Denotes the share of societies in which either males alone performed the activity, or males did appreciably more than females.

** Denotes the share of societies in which either females alone performed the activity, or females did appreciably more than males.

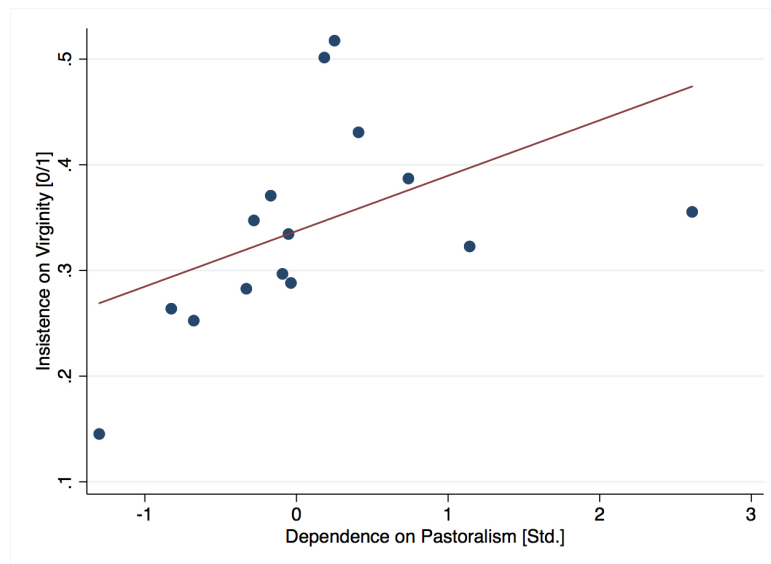


Figure A3: Binscatter plot, $N = 592$ societies, data from the *Ethnographic Atlas*. Association between insistence on female virginity in a society and a society's dependence on pastoralism, residualized of continent fixed effects.

B Main Results

B.1 Infibulation

Table A2: Historical Pastoralism and Contemporary Infibulation: Probit Estimates

	<i>Dependent variable:</i> Respondent is Infibulated [0/1]			
	(1)	(2)	(3)	(4)
Hist. Dep. on Pastoralism [Std.]	0.28*** (0.082)	0.25*** (0.075)	0.14*** (0.055)	0.14* (0.074)
Country FE	Yes	Yes	Yes	Yes
Individual Controls	No	Yes	Yes	Yes
Historical Controls	No	No	Yes	Yes
Add. Controls	No	No	No	Yes
Observations	76915	76915	76915	65701
Pseudo R^2	0.102	0.113	0.130	0.161

Notes. Probit estimates, standard errors are clustered at the ethnicity level. Individual controls include age, religion fixed effects, and year of interview fixed effects. Historical controls include traditional plow use and year of observation. Additional controls include (at the individual level) a dummy for urban status, marital status fixed effects, educational attainment fixed effects, and at the ethnicity level measures for jurisdictional hierarchy, settlement patterns, polygyny, and kinship structure. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

B.1.1 Infibulation and the Slave Trade

Using data provided by [Nunn and Wantchekon \(2011\)](#), I construct an ethnic group level measure of historical exposure to the slave trade. I divide the sum of the total number of slaves exported in the Indian Ocean trade and in the Atlantic Ocean trade between 1400 and 1900 by the historical population size.

Table A3: Contemporary Infibulation and Historical Exposure to Slave Trade

	<i>Dependent variable:</i>		
	# of Slaves Relative to Population [Std.]	Woman is Infibulated [0/1]	
	(1)	(2)	(3)
Hist. Dep. on Pastoralism [Std.]	-0.096 (0.078)	0.067*** (0.020)	0.050*** (0.018)
# Slaves Relative to Population [Std.]		0.028 (0.019)	0.024 (0.016)
Country FE	Yes	Yes	Yes
Individual Controls	No	No	Yes
Historical Controls	No	No	Yes
Observations	989973	58043	58043
R^2	0.587	0.102	0.128

Notes. OLS estimates, standard errors are clustered at the ethnicity level. Individual controls are age and year of interview fixed effects. Historical controls are traditional plow use and year of observation. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

B.2 Norms about Women’s Sexual Behavior

Table A4: Historical Pastoralism and Norms About Faithfulness of Married Women: Probit Estimates

	<i>Dependent variable:</i>					
	Married Women Should Be Faithful [0/1]			Cheated on Spouse Past 12 Months [0/1]		
	(1)	(2)	(3)	(4)	(5)	(6)
Hist. Dep. on Pastoralism [Std.]	0.096** (0.048)	0.10** (0.051)	0.23*** (0.051)	-0.22*** (0.040)	-0.18*** (0.032)	-0.19*** (0.042)
Country FE	Yes	Yes	Yes	Yes	Yes	Yes
Ind. & Hist. Controls	No	Yes	Yes	No	Yes	Yes
Add. Controls	No	No	Yes	No	No	Yes
Observations	59348	59114	51531	475804	444214	396822
Pseudo R ²	0.046	0.046	0.053	0.085	0.136	0.337

Notes. Probit estimates, standard errors are clustered at the ethnicity level. Individual and historical controls include respondent’s age, religion fixed effects, year of interview fixed effects, and the ethnic group’s year of observation. There is no variation in historical plow use in this sample. Additional controls include (at the individual level) a dummy for urban status, marital status fixed effects, educational attainment fixed effects, and at the ethnicity level measures for jurisdictional hierarchy, settlement patterns, polygyny, and kinship structure. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table A5: Revealed Promiscuity and Pastoralism

	<i>Dependent variable:</i>			
	Respondent is HIV positive [0/1]			
	(1)	(2)	(3)	(4)
Historical Dependence on Pastoralism [Std.]	-0.0064*** (0.002)	-0.0051** (0.002)	-0.0053** (0.002)	-0.011** (0.005)
Country FE	Yes	Yes	Yes	Yes
Individual Controls	No	Yes	Yes	Yes
Historical Controls	No	No	Yes	Yes
Add. Controls	No	No	No	Yes
Observations	343426	137792	137792	122937
R ²	0.026	0.059	0.059	0.090

Notes. OLS estimates, standard errors are clustered at the ethnicity level. Individual controls include age and year of interview fixed effects. Historical controls include traditional plow use and year of observation. Additional controls include (at the individual level) religion fixed effects, a dummy for urban status, marital status fixed effects, educational attainment fixed effects, and at the ethnicity level measures for jurisdictional hierarchy, settlement patterns, polygyny, and kinship structure. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

B.3 Milking

Table A6: Milking

	<i>Dependent variable:</i> Restrictions on Freedom of Mobility Score [(0,1)]			
	(1)	(2)	(3)	(4)
Hist. Dep. on Pastoralism [Std.]	0.078** (0.03)	0.087*** (0.03)	0.081*** (0.03)	0.052*** (0.02)
Animal Is Milked	0.044 (0.05)	0.049 (0.05)	0.055 (0.05)	0.022 (0.02)
Pastoralism * Milking	-0.29 (0.21)	-0.33* (0.20)	-0.32 (0.20)	-0.25** (0.11)
Country FE	Yes	Yes	Yes	Yes
Individual Controls	No	Yes	Yes	Yes
Historical Controls	No	No	Yes	Yes
Add. Controls	No	No	No	Yes
Observations	507048	507048	507048	412643
R ²	0.168	0.190	0.191	0.210

Notes. OLS estimates, standard errors are clustered at the ethnicity level. Individual controls include age and year of interview fixed effects. Historical controls include traditional plow use and year of observation. Additional controls include (at the individual level) religion fixed effects, a dummy for urban status, marital status fixed effects, educational attainment fixed effects, and at the ethnicity level measures for jurisdictional hierarchy, settlement patterns, polygyny, and kinship structure. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

C IV Analysis

Table A7: IV Analysis: First Stage

	<i>Dependent variable:</i> Dependence on Pastoralism [Std.]
	(1)
Land Suitability for Pastoralism	1.74*** (0.494)
Country FE	Yes
Observations	686221
# of Clusters	254
R ²	0.512
F-Statistic	12.41

Notes. OLS estimates, standard errors are clustered at the ethnicity level. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

D Additional Analyses

D.1 Other Forms of Female Genital Cutting and Male Circumcision

Table A8: Historical Pastoralism and other Forms of Genital Cutting

	<i>Dependent variable:</i>					
	Man is Circumcised [0/1]			Woman Has Undergone FGC w/o Infibulation [0/1]		
	(1)	(2)	(3)	(4)	(5)	(6)
Hist. Dep. on Pastoralism [Std.]	0.0037 (0.009)	0.0095 (0.011)	0.0016 (0.032)	0.034 (0.041)	0.037 (0.042)	0.022 (0.042)
Country FE	Yes	Yes	Yes	Yes	Yes	Yes
Ind. & Hist. Controls	No	Yes	Yes	No	Yes	Yes
Add. Controls	No	No	Yes	No	No	Yes
Observations	81167	81167	68918	140200	140200	123581
R^2	0.617	0.621	0.639	0.375	0.387	0.446

Notes. OLS estimates, standard errors are clustered at the ethnicity level. Individual controls are age and year of interview fixed effects. Historical controls include traditional plow use and year of observation. Endogenous controls include (at the individual level) religion fixed effects, a dummy for urban status, marital status fixed effects, educational attainment fixed effects, and at the ethnicity level measures for jurisdictional hierarchy, settlement patterns, polygyny, and kinship structure. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table A9: Historical Pastoralism and Intimate Partner Violence

	<i>Dependent variable:</i>					
	Has Experienced IPV [0/1]			Has Experienced Severe IPV [0/1]		
	(1)	(2)	(3)	(4)	(5)	(6)
Hist. Dep. on Pastoralism [Std.]	-0.026*** (0.006)	-0.024*** (0.006)	-0.028*** (0.011)	-0.011*** (0.003)	-0.011*** (0.003)	-0.0069 (0.006)
Country FE	Yes	Yes	Yes	Yes	Yes	Yes
Ind. & Hist. Controls	No	Yes	Yes	No	Yes	Yes
Endog. Controls	No	No	Yes	No	No	Yes
Observations	152355	152355	111775	134291	134291	111733
R ²	0.089	0.092	0.095	0.045	0.050	0.071

Notes. OLS estimates, standard errors are clustered at the ethnicity level. Individual controls are age and year of interview fixed effects. Historical controls include traditional plow use and year of observation. Endogenous controls include (at the individual level) religion fixed effects, a dummy for urban status, marital status fixed effects, educational attainment fixed effects, and at the ethnicity level measures for jurisdictional hierarchy, settlement patterns, polygyny, and kinship structure. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

D.2 Experience of and Attitudes Towards Violence

Table A10: Less Tolerance of Domestic Violence in Areas Unrelated to Women's Mobility

	<i>Dependent variable: Diff. in Tolerance of Violence for Leaving House...</i>			
	Versus Burning Food		Versus Neglecting Kids	
	(1)	(2)	(3)	(4)
Hist. Dep. on Pastoralism [Std.]	0.0098 (0.006)	0.0077 (0.005)	0.013*** (0.003)	0.011*** (0.003)
Country FE	Yes	Yes	Yes	Yes
Ind. & Hist. Controls	No	Yes	No	Yes
Observations	473265	473265	478750	478750
R ²	0.080	0.088	0.029	0.033

Notes. OLS estimates, standard errors are clustered at the ethnicity level. Individual controls are age and year of interview fixed effects. Historical controls are traditional plow use and year of observation. Additional controls include (at the individual level) religion fixed effects, a dummy for urban status, marital status fixed effects, educational attainment fixed effects, and at the ethnicity level measures for jurisdictional hierarchy, settlement patterns, polygyny, and kinship structure. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table A11: No Effect of Historical Dependence on Pastoralism on Sexual Violence

	<i>Dependent variable:</i>			
	Has Experienced Sexual Violence [0/1]			
	(1)	(2)	(3)	(4)
Hist. Dep. on Pastoralism [Std.]	-0.0041 (0.005)	-0.0038 (0.005)	-0.0041 (0.005)	-0.0078 (0.006)
Country FE	Yes	Yes	Yes	Yes
Ind. Controls	No	Yes	Yes	Yes
Hist. Controls	No	No	Yes	Yes
Add. Controls	No	No	No	Yes
Observations	132861	132861	132861	111753
R ²	0.038	0.041	0.041	0.059

Notes. OLS estimates, standard errors are clustered at the ethnicity level. Individual controls are age and year of interview fixed effects. Historical controls are traditional plow use and year of observation. Additional controls include (at the individual level) religion fixed effects, a dummy for urban status, marital status fixed effects, educational attainment fixed effects, and at the ethnicity level measures for jurisdictional hierarchy, settlement patterns, polygyny, and kinship structure. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

D.3 Meeting Female Friends

Table A12: Historical Pastoralism and Meeting Female Friends

	<i>Dependent variable:</i>			
	Husb. Forbids to Meet Female Friends [0/1]			
	(1)	(2)	(3)	(4)
Hist. Past. [Std.]	-0.0096** (0.005)	-0.010** (0.005)	-0.011** (0.005)	-0.015** (0.006)
Country FE	Yes	Yes	Yes	Yes
Individual Exog. Controls	No	Yes	Yes	Yes
Historical Exog. Controls	No	No	Yes	Yes
Additional Controls	No	No	No	Yes
Observations	129489	129489	129489	107844
R ²	0.025	0.029	0.029	0.048

Notes. OLS estimates, standard errors are clustered at the ethnicity level. Individual controls are age and year of interview fixed effects. Historical controls include traditional plow use and year of observation. Endogenous controls include (at the individual level) religion fixed effects, a dummy for urban status, marital status fixed effects, educational attainment fixed effects, and at the ethnicity level measures for jurisdictional hierarchy, settlement patterns, polygyny, and kinship structure. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

D.4 The Role of Male Dominance

Table A13: Pastoralism Done By Women and Customs That Restrict Their Sexuality

	<i>Dependent variable:</i>							
	Respondent Is Infibulated [0/1]		# Sexpartners in Life [Std.]		Cheated Last Year [0/1]		Restrict. on Freed. of Mobility [0,1]	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Dep. Pastoralism done by Women	-0.44*** (0.06)	-0.42*** (0.13)	1.26** (0.60)	1.26** (0.59)	0.24 (0.21)	0.27 (0.20)	-0.73* (0.39)	-0.78* (0.40)
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Individual Controls	No	Yes	No	Yes	No	Yes	No	Yes
Historical Controls	No	Yes	No	Yes	No	Yes	No	Yes
Observations	50205	50205	191720	191720	344572	344572	366083	366083
R ²	0.060	0.137	0.074	0.080	0.050	0.066	0.173	0.197

Notes. OLS estimates, standard errors are clustered at the ethnicity level. Individual controls are age and year of interview fixed effects. Historical controls include traditional plow use and year of observation. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

D.5 Economic Development: Population Size

Table A14: Placebo-Test: Economic Development (Population Size)

	<i>Dependent variable:</i>							
	Resp. Is Infibulated [0/1]		# Sexpartners Life [Std.]		Cheated [0/1]		Restrictions on Freedom of Mobility [(0,1)]	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Jurisd. Hierarchy [Std.]	0.032 (0.03)	0.013 (0.01)	-0.045* (0.02)	-0.038* (0.02)	-0.011 (0.01)	-0.0084 (0.01)	0.0014 (0.01)	0.0040 (0.01)
Hist. Past. [Std.]		0.056*** (0.02)		-0.076*** (0.02)		-0.024*** (0.00)		0.034*** (0.01)
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Ind. Controls	No	Yes	No	Yes	No	Yes	No	Yes
Hist. Controls	No	Yes	No	Yes	No	Yes	No	Yes
Observations	76519	76677	279295	279792	439170	467407	453840	497879
R^2	0.043	0.106	0.127	0.136	0.061	0.082	0.144	0.188

Notes. OLS estimates, standard errors are clustered at the ethnicity level. Individual controls are age and year of interview fixed effects. Historical controls are plow use and year of observation. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

D.6 OECD Data: Women's Civil Liberties

Table A15: Restrictions on Women's Civil Liberties (OECD)

	<i>Dependent variable:</i> Restrictions on Women's Civil Liberties (OECD Data) [Std.]				
	(1)	(2)	(3)	(4)	(5)
Dep. on Pastoralism [Std.]	0.22* (0.12)	0.19** (0.09)	0.22** (0.10)	0.21** (0.09)	0.12 (0.12)
Latitude		0.00072 (0.01)	-0.00028 (0.01)	0.0029 (0.01)	0.000077 (0.01)
Longitude		0.0051 (0.01)	0.0079 (0.01)	0.0071 (0.01)	0.0068 (0.01)
Average temperature			0.035* (0.02)	0.029* (0.02)	0.011 (0.02)
Average precipitation			0.00034 (0.00)	-0.00051 (0.00)	0.00041 (0.00)
Percentage of population living in tropical zones			-0.084 (0.29)	-0.057 (0.29)	-0.020 (0.29)
Log [GDP p/c PPP]					0.11* (0.06)
Share of Catholics					0.0044 (0.00)
Share of Muslims					0.010** (0.00)
Continent FE	No	Yes	Yes	Yes	Yes
Legal Origins FE	No	No	No	Yes	Yes
Observations	118	117	113	113	111
R^2	0.054	0.496	0.515	0.527	0.569

Notes. OLS estimates, robust standard errors. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

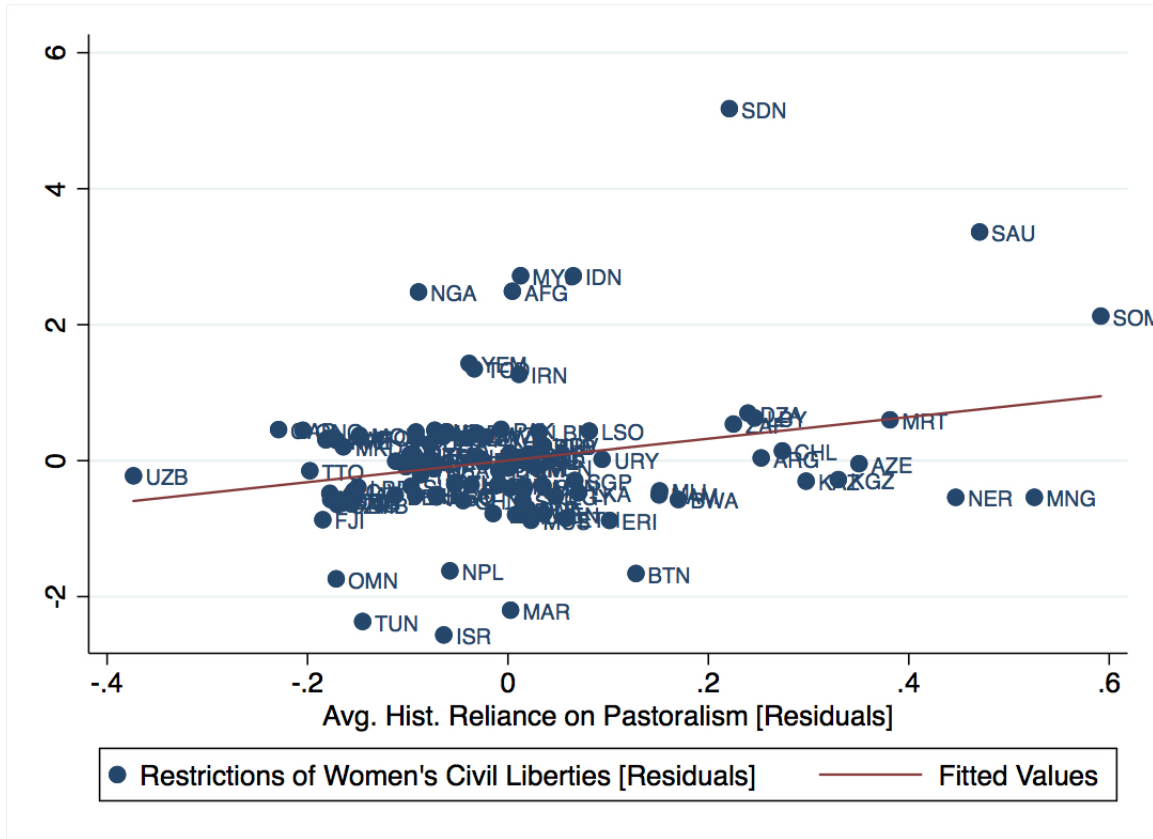


Figure A4: The association between historical reliance on pastoralism and restrictions on women’s civil liberties, residualized from continent fixed effects and geographical location (latitude, longitude).

D.7 Heterogeneity in Persistence: Cohorts

Table A16: Heterogeneity in Persistence: Comparing Cohorts

	<i>Dependent variable:</i>							
	Respondent Is Infibulated [0/1]		# Sexpartners in Life [Std.]		Cheated Last Year [0/1]		Restrict. on Freed. of Mobility [0,1]	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Hist. Dep. on Pastoralism [Std.]	0.057** (0.02)	0.042** (0.02)	-0.048*** (0.01)	-0.045*** (0.01)	-0.041*** (0.01)	-0.042*** (0.01)	0.039*** (0.01)	0.037*** (0.01)
EarlyCohort	-0.026* (0.01)	-0.024* (0.01)	0.16*** (0.02)	0.060*** (0.02)	-0.12*** (0.01)	-0.070*** (0.01)	0.039*** (0.01)	0.015** (0.01)
EarlyCohort*Past.	0.12* (0.06)	0.084* (0.05)	-0.17*** (0.06)	-0.17*** (0.06)	0.18*** (0.03)	0.19*** (0.04)	-0.012 (0.03)	-0.027 (0.02)
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Individual Controls	No	Yes	No	Yes	No	Yes	No	Yes
Historical Controls	No	Yes	No	Yes	No	Yes	No	Yes
Observations	76915	77074	284243	284777	445076	476667	459726	507048
R ²	0.076	0.102	0.133	0.136	0.083	0.086	0.151	0.190

Notes. OLS estimates, standard errors are clustered at the ethnicity level. Individual controls include age and year of interview fixed effects. Historical controls include traditional plow use and year of observation. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

D.8 Male Absence Today

Table A17: Male Absence: Husband Away for More Than 1 Month Past Year

	<i>Dependent variable:</i>							
	Respondent Is Infibulated [0/1]		# Sexpartners in Life [Std.]		Cheated Last Year [0/1]		Restrict. on Freed. of Mobility [0,1]	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Husb. absent for > 1 month	0.014 (0.01)	0.0092 (0.01)	-0.014 (0.01)	-0.0033 (0.01)	-0.0027** (0.00)	-0.0030** (0.00)	0.010* (0.01)	0.0042 (0.00)
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Individual Controls	No	Yes	No	Yes	No	Yes	No	Yes
Historical Controls	No	Yes	No	Yes	No	Yes	No	Yes
Observations	9788	9788	36637	36637	42099	42099	42683	42683
R^2	0.039	0.099	0.124	0.131	0.022	0.023	0.114	0.143

Notes. OLS estimates, standard errors are clustered at the ethnicity level. Individual controls include age and year of interview fixed effects. Historical controls include traditional plow use and year of observation. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

D.9 Heterogeneity in Persistence: Excluding Contemporary Pastoralists

Table A18: Heterogeneity in Persistence: Excluding People Who Own Herd Animals Today

	<i>Dependent variable:</i>							
	Respondent Is Infibulated [0/1]		# Sexpartners in Life [Std.]		Cheated Last Year [0/1]		Restrict. on Freed. of Mobility [0,1]	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Hist. Dep. on Pastoralism [Std.]	0.077*** (0.02)	0.062*** (0.02)	-0.082*** (0.02)	-0.073*** (0.02)	-0.027*** (0.01)	-0.029*** (0.01)	0.034*** (0.01)	0.030** (0.01)
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Individual Controls	No	Yes	No	Yes	No	Yes	No	Yes
Historical Controls	No	Yes	No	Yes	No	Yes	No	Yes
Observations	23087	23120	95728	95866	114397	114559	114021	120844
R^2	0.066	0.083	0.128	0.137	0.057	0.077	0.142	0.156

Notes. OLS estimates, standard errors are clustered at the ethnicity level. Individual controls include age and year of interview fixed effects. Historical controls include traditional plow use and year of observation. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

E List of Variables

E.1 Contemporary Individual-Level Measures: *DHS*

Infibulation Based on g105: indicator that takes value 1 if respondent has undergone infibulation, 0 if she has not undergone infibulation.

Husband decides about visits Based on v743d: indicator that takes value 1 if the respondent's husband decides about visits to relatives and family, and 0 if the respondent alone or the respondent together with her husband decides about such visits.

Number of sex partners in lifetime Based on v836: the number of sex partners a respondent has had in her lifetime.

Cheated last year Based on v766a, which asks the respondent to state the number of people she has had sex with other than her spouse during the 12 months preceding the interview: indicator that takes value 1 if the respondent has had sex with at least one other person, and 0 if she has not had sex with a partner other than her spouse.

Married women should be faithful Based on v851k: Indicator that takes value 1 if respondent agrees with the statement "*Married women should be faithful.*", and 0 if she disagrees.

Women should not have sex before marriage Based on v851g: Indicator that takes value 1 if respondent agrees with the statement "*Young women should wait for sex until marriage.*", and 0 if she disagrees

HIV Status Based on hiv03 of the *DHS* HIV dataset: indicator that takes value 1 if blood test for HIV of respondent is positive, and 0 if blood test for HIV is negative.

E.2 Historical Ethnicity-Level Measures: *Ethnographic Atlas*

Dependence on pastoralism Based on v4 and v40. V4 indicates a society's dependence on animal husbandry between 0 and 100 in 10 intervals. This variable was rescaled to 10 discrete steps (the midpoint of the intervals) between 0 and 1. V40 indicates the predominant domestic animals that a society had. Using information from v40, I generated an indicator that takes value 1 if the predominant animal is a herding animal (sheep or goats, equine animals such as horses or donkeys, deer/reindeer, camels or camelids such as alpacas or llamas, bovine animals such as cattle, water buffalos or yaks). To generate my measure for a society's dependence on pastoralism, I multiplied this indicator with the rescaled variable measuring dependence on animal husbandry.

Dependence on animal husbandry without herding Based on v4 and v40. V4 indicates a society's dependence on animal husbandry between 0 and 100 in 10 intervals. This variable was rescaled to 10 discrete steps (the midpoint of the intervals) between 0 and 1. V40 indicates the predominant domestic animals that a society had. Using information from v40, I generated an indicator that takes value 1 if the predominant animal is a *non*-herding animal (poultry, bees, pigs, dogs, fowls, guinea pigs). To generate my measure for a society's dependence on animal husbandry without herding, I multiplied this indicator with the rescaled variable measuring general dependence on animal husbandry.

Plow use Based on v39. Indicator variable that takes value 1 if a society traditionally used the plow in agriculture.

Settlement patterns Based on v30 which indicates the prevailing type of settlement patterns. 8-step variable: 1=nomadic, 2=seminomadic, 3=semisedentary, 4=impermanent, 5=dispersed homesteads, 6=hamlets, 7=villages/towns, 8=complex permanent settlements.

Polygyny Based on v9 (marital composition of families). Indicator that takes value 1 if polygyny is common.

Kinship score Measure for kinship tightness, based on v43 (major type of descent), v11 (transfer of residence at marriage), v8 (domestic or familial organization), v15 (prevalence of local endogamy and localized kin groups), v27 (degree of distinction between different types of cousins), v9 (marital composition of families), and v24 (allowed cousin marriages). For construction of the index see [Enke \(2019\)](#).

F Overview: Main Sample

The following table gives an overview of the full sample which encompasses all individuals from the *Standard DHS* for which (i) information on their ethnic affiliation was available and (ii) whose ethnic group could be matched to a population documented in the *Ethnographic Atlas*.

Table A19: Ethnic Composition of the Full Sample by Country

Country	# Obs.	Ethnic Groups (DHS)
Afghanistan	17,102	Hazara, Nuristani, Pashtun, Turkmen
Albania	7,455	Albanian, Greek, Montenegrin
Azerbaijan	32	Russian
Benin	29,551	Betamaribe, Fon (and related), Peulh (and related), Yoruba (and related)
Bolivia	3,380	Aymara, Guarani
Burkina Faso	35,551	Bissa, Bobo, Dioula, Fulfulde/Peul, Gourmantche, Lobi, Mossi, Samo, Touareg/Bella
CAR	5,071	Banda, Gbaya, Haoussa, Mandjia, Mboum, Ngbaka-Bantou, Zande-Nzakara
Cameroon	10,426	Arabe Choa, Bamilike-Central, Bamoun, Banen-Bandem, Banyang, Bassa-Bakoko, Bata, Bendi, Efik-Korop, Ejagham, Fali, Gbaya, Haoussa, Kotoko, Mafa, Mambila, Massa, Mbembe, Mboum, Momo, Mousgoum, Ngoe-Oroko, Peulh, Ring, Samba, Tiv, Wimbun-Yamba
Chad	19,275	Arab, Baguirmi/Barma, Gorane, Kanembou-Bornou, Massa/Mousseye/Mousgoume, Moundang, Peul/Foulbe, Sara, Toupouri
Congo (Brazzaville)	4,139	Baboma, Bakotas, Bambama, Bandja, Bangala, Basundi, Batak, Bayombe, Bomwali, Kota, Mbochi, Sangha, Teke
Cote d'Ivoire	5,781	Aboure, Abron, Agni, Akye/Attie, Alladian, Avikam, Bakwe, Bambara, Bete, Birifor, Dioula, Gagou, Gouro, Koulango, Lobi, Senoufo, Toura, Yacouba, Yacouda/Dan
DRC	292	Lunda

Ethiopia	40,441	Affar, Amhara, Anyiwak, Ari, Basketo, Bena, Burji, Dasenech, Gedeo, Guragie, Hamar, Kefficho, Komo, Konso, Kore, Malie, Mao, Me'enite, Nuwer, Oromo, Sheko, Sidama, Somalie, Tigray, Tigrie, Yem
Gabon	5,310	Fang, Kota-Kele, Myene, Okande-Tsogho
Gambia	7,942	Bambara, Fula/Tukulur/Lorobo, Jola/Karoninka, Mandinke/Jahanka, Serahuleh, Serere
Ghana	31,038	Akan, Akwapim, Asante, Dagarti, Ewe, Fante, Ga-Adangbe, Ga-Dangme, Grusi/Grussi, Gurma, Hausa, Mande, Mole-Dagbani, Twi
Guatemala	9,673	Garifuna, Maya
Guinea	22,119	Kissi, Malinke, Peulh, Soussou, Toma
Honduras	3,845	Garifuna, Lenca, Maya Chorti, Misquito, Tolupan
Kazakhstan	7,662	Chechen/Ingush, Kazak, Russian, Tatar, Ukrainian, Uzbek
Kenya	57,258	Boran, Gabbra, Iteso, Kalenjin, Kamba, Kikuyu, Kisii, Luo, Maasai, Meru/Embu, Mijikenda/Swahili, Pokomo, Samburu, Somali, Taita/Tavate, Turkana
Kyrgyz Republic	1,004	Kazak, Russian, Uzbek
Liberia	7,948	Gbandi, Gio, Gola, Kpelle, Krahn, Kru/Sapo, Mande/Mende, Sarpo, Vai
Malawi	53,055	Amanganja/Anyanja, Chewa, Ngoni, Nkonde, Nyanga, Tonga, Tumbuka, Yao
Mali	46,812	Bambara, Bobo, Dogon, Malinke, Peul/Toucouleur, Sarakole/Soninke/Marka, Senoufo/Minianka, Sonrai, Tamachek/Bella
Moldova	7,348	Bulgarian, Gagauzan, Moldovan, Romanian, Russian, Ukrainian
Mozambique	15,464	Cicewa, Cichopi, Cindau, Cisena, Ciyao, Emakhuwa, Shimakonde, Shona, Xichangana, Xitsonga
Namibia	5,182	Afrikaans, Damara>Nama, Herero, Lozi, San, Tswana
Nepal	2,020	Bangali, Lepcha, Magar, Santhal/Satar, Sherpa
Niger	22,539	Arab, Djerma/Songhai, Gourmantche, Haoussa, Kanouri, Peul, Touareg/Bella, Toubou

Nigeria	51,530	Adra/Adarawa, Afemai, Afo, Anaguta, Angas, Attakar, Auchi, Aulliminden, Babur, Bachama, Badakare/Dakarkari, Baggara, Basa, Bashama, Basso Komo, Baya, Bchama, Berom, Bini/Edo, Birom, Bogom, Bolawa, Buduma, Bura/Babur, Butawa, Buzu, Calabar, Chamba, Dakar Kari, Djerma, Ebira/Igbira, Ebu, Edo, Efik, Egba, Ejagham, Ekoi, Etsako, Fulani, Fulfulde, Gede/Gude/Gai, Gizmawa, Gobiri/Gobirawa/Bogobiri, Gude, Gunganchi, Gwari, Hausa, Honna, Ibibio, Ichen, Idoma, Igala, Igbo/Ibo, Ilaje, Irbira, Isoko, Itsekiri, Jibu, Jukun, Kadara, Kagoro, Kalabari, Kambu/Kangu, Kamuku, Kanakuru, Kanawa, Kanuri, Karekare, Kataf/Atyap, Koro, Koto, Kurama, Ma Takam, Mafa/Maka/Maga, Manga, Marghi/Mangi, Mumuje, Ndola, Ngezim/Ngizim, Nnebe, Nupe, Shuwa, Tarok, Tera, Tiv, Verre/Kila, Wula, Yakurr, Yoruba, Yungur, Zabarmawa, Zuru
Pakistan	9,603	Balochi, Brushaski, Farsi, Kashmiri, Pushto, Shina, Sindhi
Peru	43,370	Aymara, Castellano, Quechua, Spanish
Philippines	18,913	Akeanon/Aklanon, Boholano, Cebuano, Ifugao, Igorot, Manabo, Sama
Senegal	37,337	Diola, Poular, Serer, Soninke, Wolof, Bambara, Diola, Poular, Sarakole/Soninke, Serer, Wolof/Lebou
Sierra Leone	17,665	Fullah, Koranko, Mende, Sherbro, Temne
Sri Lanka	5,569	Indian Tamil, Low Sinhalese, Sri Lankan Tamil, Up Sinhalese
Togo	2,358	Ana, Bassar, Cotokoli, Ewe, Fon, Gourma, Kabye, Konkomba, Moba, Mossi, Yanga, Yoruba
Turkey	5,800	Arabic, Circassian, Georgian, Greek, Turkish
Uganda	17,830	Acholi, Alur, Atesa, Baamba, Bachope, Bafumbira, Baganda, Bahororo, Bakiga, Bakonjo, Banyankole, Banyarwanda, Banyoro, Barundi, Basoga, Batoro, Iteso, Kakwa, Karimojong, Langi, Lendu, Lugbara, Madi, Mufumbira, Muganda, Mugishu, Mukiga, Mukonjo, Munyankole, Munyarwanda, Munyoro, Musoga, Mutoro, Mwamba, Sebei
Uzbekistan	3,945	Iranian, Kazak, Russian, Turkmen, Ukrainian, Uzbek
Vietnam	10,241	Cham, Chinese E De, Khmer, Muong, Vietnamese

Zambia	38,673	Ambo, Baroste, Bemba, Bisa, Byanja, Chewa, Chikunda, Chishinga, Chokwe, Gowa, Ila, Kabende, Kaonde, Kunda, Lala, Lamba, Lozi, Luano, Luchazi, Lunda/Luapula, Lungu, Luvale, Mambwe, Namwanga, Ngumbo, Nyanja, Senga, Shila, Swaka, Tabwa, Tambo, Toka-Leya, Tonga, Tumbuka, Unga, Yombe
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