

On the Origins of Son Preference and Female Genital Cutting

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Abstract

Son preference and female genital cutting – two of the most extreme forms of gender discrimination – exhibit large variation across the globe, often within narrowly defined geographical regions. This paper studies the historical origins of this variation by testing the anthropological theory that pre-industrial subsistence on pastoralism – herding animals – (i) induced a preference for sons over daughters because herding was by far the most male-dominated form of subsistence and (ii) generated larger payoffs to controlling female sexuality, e.g., through invasive forms of genital cutting, due to extended periods of male absenteeism. The analysis exploits within-country variation across 500,000 women in 43 countries who exhibit heterogeneity in the extent to which their ethnic group's ancestors subsisted on pastoralism. The results document that women from historically pastoral societies (i) exhibit a higher preference for sons, as reflected both in desired and actual ratios of sons at birth; (ii) are more likely to have been infibulated, the most invasive form of female genital cutting; and (iii) report to have less control over their sexuality in general. These results suggest that contemporary variation in the extent to which sons are more valued than daughters and how self-determined women are in their sexuality can be traced back to a functional relationship between historical environmental conditions and societal norms which have persisted until today.

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1 Introduction

Two of the most severe forms of gender discrimination – a preference for sons over daughters and invasive forms of female genital cutting – exhibit substantial variation not only across but also within countries. For example, [Sen \(2003\)](#) notes that the percentage of "missing women" varies greatly even within India, with sex ratios being much more male biased in the north and west compared to the south and east, a difference that cannot be explained by differences in economic well-being, education, or religion. Similarly, while the WHO estimates about 3 million girls to be at risk every year of undergoing female genital cutting, prevalence rates vary greatly between countries from more than 85 percent in Egypt, Guinea, or Mali, to less than 50 percent in Nigeria, Benin, or Kenya ([Yoder et al., 2004](#)). This paper investigates the historical origins of this variation by testing a hypothesis that emerges from the anthropological literature and that speaks to both dimensions of female well-being: subsisting on pastoralism in pre-industrial times induced a societal structure in which sons came to be valued more than daughters, and it provided strong incentives to control female sexuality. How so?

First, pastoralism was by far the most male dominated form of pre-industrial subsistence.¹ In pastoralism, women had a particularly pronounced disadvantage relative to men due to child rearing duties. For example, taking animals out on long marches to new pasture grounds and staying away from camp over days or weeks is incompatible with pregnancy or nursing infants. The same holds true for protecting the herd at night from predators or thieves. Hence, men were more important to subsistence than women, and sons potentially came to be valued more than daughters.

Second, and unlike other forms of subsistence, pastoralism was characterized by often extended periods of male absenteeism. During the day, men had to take the herd to pasture grounds, and at night they often stayed with the animals for protection. More often than not, they were away from camp for multiple days or even weeks. Such a setting is a prime example for increased paternity uncertainty as mate guarding is difficult during absence. Since men were the main providers in pastoral societies, it was relevant for them to know that they are closely related to the offspring they are investing in, providing strong incentives for them to control and restrain female sexuality.² Several customs aimed at restraining or completely inhibiting female sexuality have been associated with male absenteeism and increased paternity uncertainty. In medieval Europe, knights allegedly would put chastity belts on their women to keep them chaste when they were gone on crusades ([Robinson, 1984](#)).³ In China, the practice of footbinding became a nearly universal practice during the Sung Dynasty, a period that was characterized by urbanization, increasing trade, and Mongol invasions ([Mackie, 1996](#)). This paper looks at the custom of infibulation – the most invasive form of female genital cutting –

¹This is well-documented in the ethnographic record. See Table 1 in Section 3.

²Similarly, from the female perspective, women have a strong incentive to credibly signal their faithfulness so as to ensure investment into them and their offspring. After all, in pastoral societies they depend much more on men than vice versa.

³How common this practice was is unclear, see for example [Classen \(2007\)](#) or [Smith \(2007\)](#).

which similarly has been hypothesized to be a means to reduce paternity uncertainty (Hicks, 1996; Mackie, 2000), and has explicitly been connected to pastoral groups (Hicks, 1996).⁴

More specifically, this paper tests whether contemporary variation at the individual level in son preference on the one hand and the practice of infibulation on the other hand can both be partially traced back to historically subsisting on pastoralism. Using data from the *Ethnographic Atlas* (Murdock, 1967), an old anthropological database with information on the pre-industrial lifeways of about 1,300 ethnic groups, I construct an ethnicity level measure for historical dependence on pastoralism. I then assign women from the *Demographic and Health Surveys (DHS)* their ancestral dependence on pastoralism based on their ethnicity, resulting in a total sample of about 500,000 women from about 240 ethnic groups in 43 countries around the globe for the analysis of son preference, and a sample of about 80,000 women from about 130 ethnic groups in 12 countries in Africa for the analysis of infibulation.

I find that, indeed, the strength with which a woman's ancestral ethnic group depended on pastoralism is positively associated with how strongly she prefers sons over daughters. This does not only hold true for a measure of stated but also for a measure of revealed son preference: a woman's share of sons at birth is positively associated with how strongly her historical ethnic group depended on pastoralism. While I find no indication that this relationship is driven by sex-biased fertility-stopping behavior, I instead find supportive evidence for selective abortion of female fetuses. First, I document that there is no association between the likelihood of the last-born child to be a son and historical pastoralism (which would speak for sex-biased fertility-stopping). Instead, historical pastoralism is positively associated with the likelihood that the first-born child is a son. In line with this, I find that the relationship between ancestral pastoralism and contemporary share of sons is stronger for women who had better access to fetal sex revealing ultrasound technology.

Next, I show that women whose ancestral ethnic group depended more on pastoralism are more likely to have been infibulated during childhood. Moreover, historical dependence on pastoralism predicts the severity with which this procedure was performed, as measured by the occurrence of de-infibulation at the onset of menstruation or when getting married.⁵ These results seem to be part of a more general pattern of lack of control over their own sexuality among women whose ancestral ethnic group subsisted on herding: they are also less likely to state that they can refuse sex with their partner, or that they can demand safe sex practices, such as the use of condoms.

⁴Infibulation describes the suturing of the vulva such that only a relatively small vaginal opening is left to allow for the passage of urine and menstrual blood. This is typically done in addition to the partial or complete removal of the clitoris and the labia minora and majora. Penetration is often only possible after an incision has been made, and typically women have to be de-infibulated for child-birth. It is common for women to get re-infibulated after child-birth.

⁵Typically, de-infibulation describes the surgical incision that has to be made when an infibulated woman gives birth to allow for the passage of the child through the birth canal. However, sometimes the vaginal opening that the initial infibulation procedure left is too small to allow for the passage of menstrual blood or for vaginal penetration during intercourse. My measure for the severity of the practice is whether a woman had to be de-infibulated when she started menstruating or when she got married.

The analyses include an extensive set of contemporary individual-level covariates, such as age, whether a participant lives in an urban or a rural environment, and fixed effects for educational attainment, marital status, religious affiliation, and the year in which the interview was conducted. Moreover, the institutional environment is held constant by only comparing individuals who live in the same country throughout. In fact, in an extension I show that all results hold when conditioning on subnational-region fixed effects, thereby ruling out that institutional variation at the subnational level drives the findings.

Likewise, I control for a broad set of historical ethnicity-level observables to rule out that other historical factors confound the results, such as jurisdictional hierarchy and year of observation. Importantly, I make sure the results are not driven by the traditional practice of plough agriculture which [Alesina et al. \(2013\)](#) have identified to influence current rates of female labor force participation and corresponding social norms about the appropriate role of women in the labor market, confirming the hypothesis put forward by Esther Boserup ([Boserup, 1970](#)). Since there is almost no variation in plow use in many parts of Africa, the potential role of historical plow use is close to negligible in the analysis of infibulation, with less than 4% of the sample being a member of an ethnic group that historically practiced plow agriculture. However, almost 20% of women in the son preference sample are from ethnic groups that historically used the plow. Conditioning on historical plow use does not affect the results. In the most extensive specifications I also include polygyny and settlement patterns as further controls.

A number of additional robustness checks confirm the validity of the results. For example, I can show that with very few exceptions, all results replicate when running the analyses separately for sheep and goat herding, cattle herding, horse herding, and camel herding. Hence, the results are not driven by one specific type of pastoralism. The results are also robust to excluding people who currently own herding animals.

Moreover, I conduct a placebo exercise by regressing all outcome variables on animal husbandry with non-herd animals such as pigs, dogs, or poultry. These species are not herded but they rather live close to humans within the confinements of their settlements. Since the results should be driven by the specific characteristics of herding animals and not by taking care of animals per se, there should be no effect of historical dependence on this type of animal husbandry on son preference or infibulation.⁶ The placebo analysis confirms this: there is no association between historical dependence on animal husbandry with non-herd animals and contemporary measures of female submission.

In addition to finding strong evidence for cultural persistence of a pastoralism-related pattern of male dominance over women until today, the paper also documents that the relationship between this particular form of subsistence and similar measures of female well-being or status in society prevailed in pre-industrial times. Using historical ethnicity-level data from the *Standard Cross-Cultural Sample* ([Murdock and White, 1969](#)), a particularly well-documented subset of *Ethnographic Atlas* societies, I show that societies that depended more strongly on pastoralism

⁶In fact, if anything, the opposite effect should be expected since animal husbandry with these species was often a more female dominated form of subsistence.

had a stronger preference for sons, are more likely to hold the belief that men are superior to women, and marriages are characterized by stronger institutionalized deference from wives to their husbands. This provides an important historical validation check of the hypothesis.

An immediate question that arises from this type of research is why "culture" – induced by pre-industrial conditions – persists until today. While this is certainly not the focus of this paper, I add some tentative analysis of potential channels through which beliefs and attitudes might be transmitted across generations and reinforced even when they are not adaptive responses to the current environment anymore. First, I show that ethnic groups with higher dependence on pastoralism are more likely to speak a language that encodes gender in its pronouns, thereby forcing the speaker to make a grammatical distinction when talking to or about a woman versus a man. Second, pastoral societies are more likely to have a male creator in their tale of origin. Since both language and religious beliefs are particularly "sticky" aspects of culture, they are prime candidates for channels through which culture can persist. The empirical evidence presented here is in line with this idea.

More or less explicitly stated, the narrative that is put forward in the paper is that historical pastoralism imposed a way of living that was conducive to son preference and controlling female sexuality. Put differently, this suggests that there is a causal pathway from pastoralism to these measures of female status in society. To empirically substantiate this claim and address the potential reverse causality concern that it could have been the case that societies which, for whatever reason, already hold gender-discriminatory values were more likely to take up a pastoral lifestyle I make use of biogeographic data on land suitability for pastoralism generated by [Beck and Sieber \(2010\)](#) to document that variation in the intensity with which pastoralism is practiced is largely driven by environmental factors. The strong and positive relationship between dependence on pastoralism and land suitability for pastoralism alleviates some of the reverse causality concerns. Overall, the narrative is very much in line with the idea that the environmental conditions in which humans have lived historically have not only largely determined their subsistence and their biology, but have also ultimately shaped their cultures ([Boyd and Richerson, 1988, 2005](#); [Harris, 1977](#); [Henrich, 2015](#)).

In fact, anthropologists have long put forward a functional relationship between mode of subsistence and female status. Some have noted that matrilineal kinship structure is disproportionately frequent in horticultural societies ([Aberle, 1973](#)) and was replaced by a patrilineal kinship system among Bantu groups when they started herding cattle ([Holden and Mace, 2003](#)). [Sanday \(1981\)](#) postulated an association between female subordination and having domesticated animals. [Boserup \(1970\)](#) and [Sanday \(1973\)](#) both point out the importance of female production for female empowerment. In describing the economic status of women among the Bororo, a pastoral society in Niger, [Dupire \(1963\)](#) notes that "[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 reconnoitre 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". This paper provides empirical evidence for the intuition that female status depends on the ability of women to contribute to subsistence and explores the extent to which contemporary variation in measures of female subordination can be traced back to this.

It thereby adds to the literature on historical origins of cross-cultural contemporary variation in economically relevant outcomes today (Ashraf et al., 2016; Becker et al., 2017; Chen, 2013; Dell, 2010; Enke, 2017; Falk et al., forthcoming; Galor and Özak, 2016; Schulz, 2017; Teso, 2016). It is most closely related to studies examining more ultimate explanations of contemporary phenomena, such as Alesina et al. (2013) who find that current rates of female labor force participation and corresponding cultural beliefs have their deep roots in pre-industrial plow use. It also speaks to research on the persistence of cultural traits, such as fertility decisions (Fernandez and Fogli, 2009), trust (Nunn and Wantchekon, 2011), or anti-semitism (Voigtländer and Voth, 2012). In particular, it relates to Grosjean (2014) and Cohen and Nisbett (1994) who provide evidence for a persistence of a "culture of honor" introduced into the US South by immigrating Scot-Irish herders.

The paper is structured as follows. Section 2 presents the historical and contemporary data sources. Section 3 describes pre-industrial pastoralism both qualitatively and quantitatively, derives hypotheses, and shows that variation in pre-industrial dependence on pastoralism is largely determined by ecological conditions. Section 4 presents the historical results. In Section 5 I document the main results for contemporary son preference, contemporary incidence of infibulation, and control over own sexuality more generally. Section 6 presents several extensions and robustness checks, such as within-region evidence, analyses by different types of pastoralism, and the placebo test with animal husbandry. In Section 7 I show some tentative results on language and religious beliefs as potential channels of persistence, and Section 8 concludes.

2 Data

2.1 Historical Data

The *Ethnographic Atlas* – an old anthropological database – is a collection of information from ethnographic work on cultural aspects such as historical subsistence, kinship organization, religious beliefs, settlement patterns, political organization, or institutional complexity for approximately 1,300 ethnic groups worldwide, compiled by George Peter Murdock (Murdock, 1967). The *Ethnographic Atlas* is regarded to reflect ancestral lifestyle as each society was portrayed prior to contact with industrialization, even when the exact timing of observation differs across ethnic groups. Based on information from this database – the degree to which a society depends on a animal husbandry and which type of animal is the predominant one in a society – I can construct an ethnicity-level measure of dependence on pastoralism.

In addition, I will make use of a particularly well-documented small subset of the *Ethno-*

graphic Atlas: the so-called *Standard Cross-Cultural Sample* (Murdock and White, 1969) consists of 186 societies and, among other aspects, contains measures that are relevant to the pastoralism-hypothesis, such as son preference, cultural beliefs about male superiority, or the typical nature of husband-wife interactions. These measures will allow me to validate my main hypotheses at the historical ethnicity level.

2.2 Contemporary Data

The contemporary individual-level data comes from the *Standard Demographic and Health Surveys (DHS)*. The *DHS* surveys are nationally representative household surveys covering more than 90 countries worldwide. Until today, seven waves have been conducted, starting in 1984. The country samples are quite large, with typically between 5,000 and 30,000 households being surveyed. The *DHS* elicits very 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 one central topic of *DHS* surveys is the empowerment of women, respondents are female, and the surveys provide ideal measures for research question at hand.

For the purpose of this study, I will use all available *DHS* data since its inception in 1984 that contains information on individuals' ethnicity. Based on their ethnicity, I match individuals to their ancestral historical populations in the ethnographic record and thereby combine contemporary individual-level measures of son preference, infibulation, and control over own sexuality with the historical ethnicity level measure of dependence on pastoralism. This results in a sample of more than 700,000 individuals from 44 countries⁷ for which information on ancestral dependence on pastoralism is available. For about 500,000 women, the dataset has measures for son preference. For female genital cutting the sample is much smaller (about 77,000 women) since this information is only collected in African countries.

3 Pastoralism

3.1 Pastoralism in Pre-Industrial Societies

Pastoralism is a form of subsistence that can be 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

⁷Afghanistan, Albania, Azerbaijan, Benin, Bolivia, Burkina Faso, Cameroon, Chad, Central African Republic, Congo Brazzaville, Cote d'Ivoire, DRC, Ethiopia, Gabon, Gambia, Ghana, Guatemala, Guinea, Honduras, Kazakhstan, Kenya, Kyrgyz Republic, Liberia, Malawi, Mali, Moldova, Mozambique, Namibia, Nepal, Niger, Nigeria, Pakistan, Peru, Philippines, Rwanda, Senegal, Sierra Leone, Sri Lanka, Togo, Turkey, Uganda, Uzbekistan, Vietnam, and Zambia.

smaller ones like goats and sheep to larger ones like horses, reindeer, donkeys, camels and camelids, not to mention the large variety of cattle.⁸ While pastoral societies in general are almost never fully sedentary, some practice a more localized transhumance lifestyle, others are semi-nomadic, while again others are permanently mobile people (Hall, 2015). Typically, pastoral societies are not entirely dependent on animal resources, but most of them additionally also subsist on horticulture or some other form of agriculture.

For 1,202 societies, the *Ethnographic Atlas* contains information on the degree to which a society depends on animal husbandry, measured on a 10-point scale. In order to create a measure for how much a society depended on pastoralism, I make use of a second variable: the predominant animal in a society. I generate an indicator that takes value 1 if the predominant type of animal is a herding animal (e.g. sheep, goats, donkeys, horses, reindeer, cattle, or camels/camelids), and 0 if it is an animal that is not herded (e.g., pigs, bees, dogs, poultry, or guinea pigs). Multiplying this indicator with dependence on animal husbandry gives my measure of historical dependence on pastoralism, which I will use throughout the paper.

Figure 1 illustrates the variation in dependence on pastoralism for 1,202 societies in the *Ethnographic Atlas*. About one third of societies do not herd 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.

Two distinct features set pastoralism apart from other forms of subsistence, such as agriculture or hunting and gathering.

(i) Pastoralism is by far the most male-dominated form of subsistence, meaning that men do (almost) all the work related to subsistence, i.e., to the animals. This results from the disadvantage that women have due child rearing duties, which is particularly pronounced in pastoralism. For example, capital in pastoral societies is mobile and hence needs to be protected from thieves or predators, day and night. Moreover, many tasks either involve a certain risk of injury (e.g. castrating bulls, shepherding large animals like long-horn cattle) or long and potentially strenuous walks, e.g. finding new grazing grounds or watering places. Table 1 illustrates how pronounced the gender difference in terms of contribution to subsistence is in pastoralism for societies in the *Ethnographic Atlas*. In only 6% of societies is pastoralism a predominantly female activity.⁹ Note that, even when participation is equal, it is differentiated by gender more than twice as often than it is undifferentiated. As a result, sons might be preferred over daughters simply because

⁸According 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 America 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.

⁹Note that this contrasts strongly with animal husbandry without herd animals and agriculture. The former is a predominantly female form of subsistence in 57% of cases, and the latter in 35%.

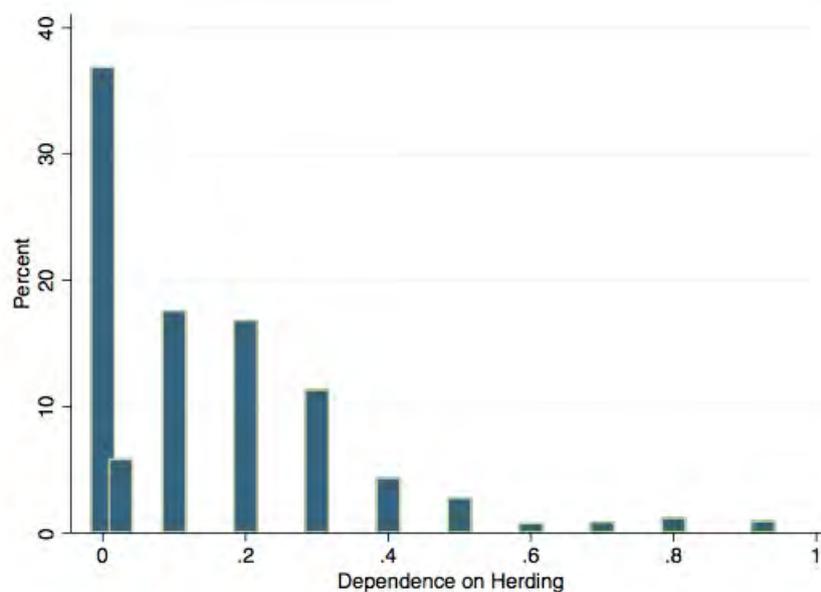


Figure 1: Distribution of dependence on pastoralism across 1,202 societies in the *Ethnographic Atlas*.

sons will be more able to participate in herding activities than their female siblings. Such a preference for sons might even be perpetuated through customs such as patrilocal residence or patrilineal inheritance, which, as section 4 showed and briefly discussed, are disproportionately frequent among pastoral groups.

(ii) Pastoralism is characterized by a strong segregation between the sexes and often extended periods of male absenteeism. Men not only spend the day out with the animals. They often have to stay with the herd at night to protect them from predators or from thieves. On a regular basis, men will have to leave camp for a couple of days or even weeks to take the animals to new feeding grounds or water holes. As mate guarding becomes harder, paternity uncertainty increases. Several cultural practices, such as Chinese footbinding, the complete veiling of women, and similarly infibulation, the most invasive form of female genital cutting have been hypothesized to occur disproportionately often in environments with potentially high paternity uncertainty (Hicks, 1996; Mackie, 2000; Shell-Duncan and Hernlund, 2000), and to have a functional relationship with this environment. One possible interpretation of infibulation is that it is a means to control or inhibit female sexuality. Alternatively, and in the light of the fact that in pastoral societies women have a stronger economic dependence on men than vice versa, one might think of such a custom as costly signal of a woman's willingness to be faithful to her husband.¹⁰

¹⁰Such practices can also be understood as credibility enhancing displays that evolve culturally to provide a credible measure of commitment to a value, belief, or preference (Henrich, 2009).

Table 1: 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%
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.

3.2 Ecological Determinants of Pastoralism

While pastoralism occurs in a wide variety of regions around the world, 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). In a recent study, Beck and Sieber (2010) explore the extent to which climate and soil conditions determine the spatial distribution of basic landuse types (hunting-gathering, agriculture, sedentary animal husbandry, and nomadic pastoralism). The environmental data they employ includes detailed information about temperature and precipitation between 1961 and 1991 (Hijmans et al., 2005), altitude, and soil classification data from the United Nations Food and Agriculture Organization. Using these variables in maximum entropy modelling (Phillips et al., 2006; Phillips and Dudik, 2008), they estimate the probability with which each type of landuse occurs on 5x5 km grid cells for the Old World and Australia. Figure 2 shows the resulting heat map of land suitability for pastoralism.

Using Beck and Sieber’s data, I can assign a measure of suitability for pastoralism to 750 societies in the *Ethnographic Atlas* to evaluate the degree to which actual dependence on pastoralism is determined by ecological conditions. As Figure 3 shows, variation in actual dependence on pastoralism is strongly predicted by ecological conditions, i.e., how suitable the land is for pastoralism.¹¹ Continent fixed effects are already partialled out. Moreover, the association between pastoralism and suitability for pastoralism remains strong and statistically highly significant when adding historical controls or fixed effects for 24 world regions although, unsurprisingly, the coefficient becomes a bit smaller. Hence, even though other, more endogenous factors such as cultural beliefs could in principle also contribute to whether and how intensively

¹¹Note 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 dependence on pastoralism to have some measurement error.

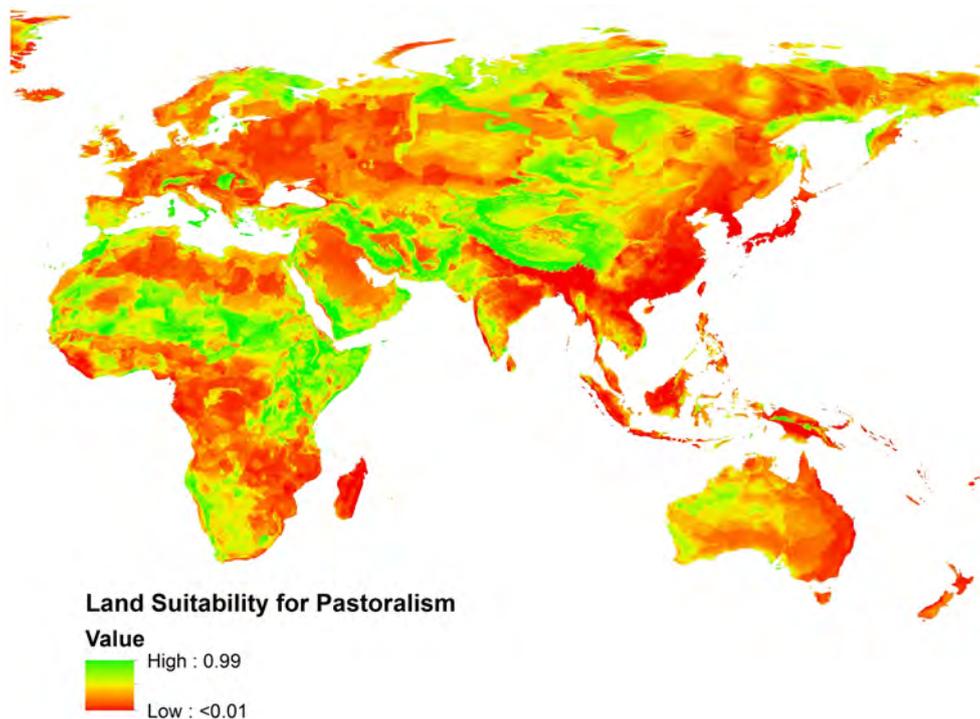


Figure 2: Land Suitability for Pastoralism Based on Data from [Beck and Sieber \(2010\)](#).

an ethnic group practiced pastoralism, the evidence presented here strongly suggests that variation in historical dependence on pastoralism is largely determined by the ecology.

4 Historical Results

Before we test our hypothesis that a pastoralism induced pattern of son preference and regulation of female sexuality has persisted until today, we turn to historical data to check whether the assumed functional relationship between pastoralism and similar measures of female well-being holds true in pre-industrial societies. The *Standard Cross-Cultural Sample* which consists of 186 particularly well-documented societies (a subset of the *Ethnographic Atlas*) contains various society-level measures for female status, more broadly speaking, that are ideal to perform this validation check.

First, directly speaking to one of our main dimensions of interest, for 93 societies, the *Standard Cross-Cultural Sample* contains a measure for son preference. I generate an indicator for son preference that takes value 1 if the society prefers sons over daughters, and 0 if there is a preference for daughters over sons or if the society does not prefer one gender over the other. Similarly, the *Standard Cross-Cultural Sample* has a measure for whether a general belief in male superiority was present in a society, coded as 1 if this was the case, and 0 otherwise.¹² Moreover,

¹²More specifically, [Whyte \(1978\)](#) introduced *Belief in male superiority* into the *Standard Cross-Cultural Sample* as a binary variable that indicates whether the ethnographer regarded such a belief

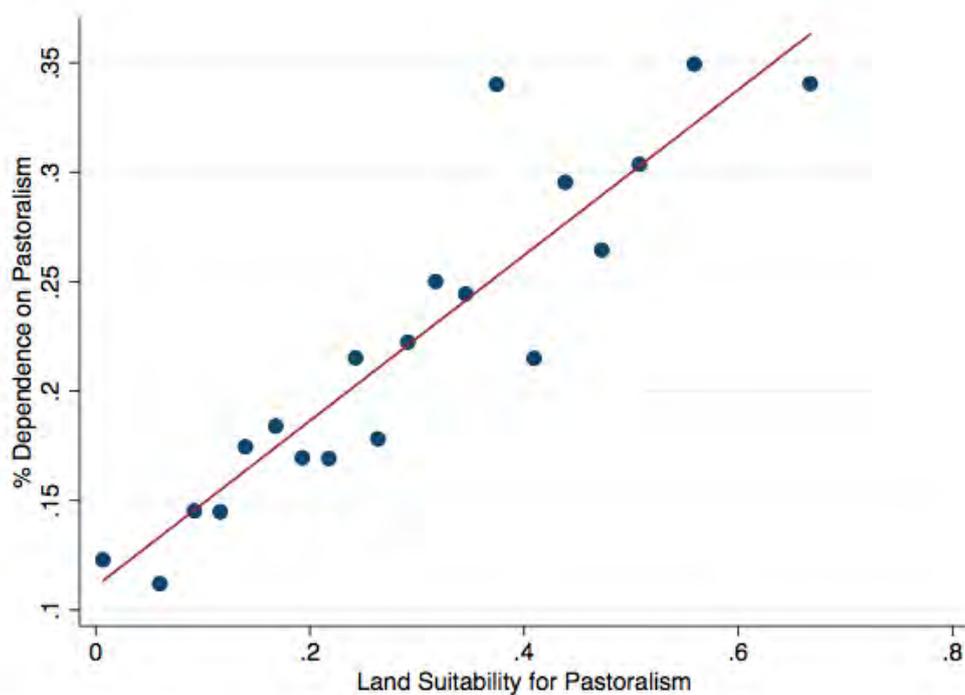


Figure 3: Binscatter Plot: Dependence on Pastoralism and Land Suitability for Pastoralism for 750 societies in the *Ethnographic Atlas*, including Continent Fixed Effects.

the *Standard Cross-Cultural Sample* also has information about typical aspects of husband-wife interaction that we will use as a third proxy for male dominance over women. *Institutionalized deference from wife to husband* is a Guttman-scale from 1 to 6 and measures whether the husband dominates domestic decision making, whether the wife is excluded from many social gatherings, whether the wife rarely disputes her husband, whether the husband has seating priority, and whether the wife kneels and bows when she greets her husband.¹³

In line with our hypothesis, we indeed find that pre-industrial societies with a stronger dependence on pastoralism have a stronger preference for sons, are more likely to believe in male superiority, and have stronger institutionalized deference from wife to husband. Table 2 illustrates this. The association between a preference for sons and pastoralism becomes slightly weaker once continent fixed effects, tropical climate, and other historical controls, such as traditional plow use, jurisdictional hierarchy, settlement patterns, and year of observation, are accounted for. A similar pattern holds true for institutional deference from wife to husband. However, the association between belief in male superiority and pastoralism remains stable and significant.

to be prevalent in a society.

¹³*Institutionalized deference from wife to husband* was also introduced into the *Standard Cross-Cultural Sample* by Whyte (1978), who collected information on this for 84 societies.

Table 2: Pastoralism and Female Well-Being in Pre-Industrial Societies (Standard Cross-Cultural Sample)

	<i>Dependent variable:</i>								
	Son Preference			Belief in Male Superiority [0/1]			Institutional Deference: Wife to Husb. [Std.]		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Dep. on Pastoralism [Std.]	0.13** (0.06)	0.096 (0.06)	0.093 (0.07)	0.17*** (0.06)	0.15** (0.06)	0.11* (0.06)	0.30*** (0.10)	0.32** (0.14)	0.21 (0.16)
Continent FE	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes
Historical Controls	No	No	Yes	No	No	Yes	No	No	Yes
Observations	93	93	90	93	93	90	84	84	82
R^2	0.078	0.097	0.159	0.125	0.136	0.246	0.088	0.093	0.182

Notes. OLS estimates, robust standard errors. Historical controls include traditional plow use, jurisdictional hierarchy, settlement patterns, a dummy for polygyny, a dummy for location in a tropical region, and year of observation. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

These results seem to be part of a more general systematic relationship between dependence on pastoralism and societal measures of female status or female empowerment. For example, I also find that even kinship organization is related to a society's dependence on pastoralism: more pastoral groups are more likely to have a patrilineal kinship organization as reflected in a higher likelihood of practicing patrilocal residence, having patrilineal inheritance systems, and tracing their descent through the patriline. Table 12 in section C in the appendix illustrates this.

In sum, the historical data clearly validate the hypothesis of a (functional) relationship between pastoralism and, broadly speaking, female well-being or female status in pre-industrial societies. Up next, we will test whether this pattern has persisted until today, using individual-level data.

5 Contemporary Results

5.1 Empirical Strategy

In what follows, we will use contemporary individual-level data to test whether a culture of male dominance over women induced by pre-industrial pastoralism persists until today. For many countries and waves, the *DHS* contains information on individual's ethnicity. Based on this information, i.e., by matching contemporary ethnic groups to the historical record, individuals can be assigned data on their ancestral ethnic group from the *Ethnographic Atlas*. The matching procedure is taken from [Bahrami-Rad et al. \(2018\)](#).

The resulting main sample consists of 735,999 women from 43 countries all around the globe, but for only about 500,000 (80,000) women does the sample also include information on son preference (infibulation). Using this sample, we will test the association between our

contemporary measures of discrimination against women and historical pastoralism by regressing the current individual-level measures on the historical ethnicity-level measure of historical dependence on herding. The baseline regression specification will be

$$y_{i,j} = \alpha + \beta \times \text{dep_pastoralism}_j + \text{CountryFE} + \epsilon_i$$

with $y_{i,j}$ denoting some measure for our dimensions of interest (son preference, infibulation, sexual self-determination) reported by individual i from ethnic group j , dep_pastoralism_j the ethnic group's historical dependence on pastoralism, and ϵ_i the error term.

All regressions in this section will include country-fixed effects because differences in institutional settings are an important aspect 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 labor force participation. Holding the institutional environment constant by only comparing individuals within the same country will allow us to rule out such alternative factors.

Next, we will address the concern that our OLS estimates simply reflect individual differences that are related to ancestral pastoralism in some way other than an induced culture of male dominance. For example, it could be that descendants of pastoral ethnic groups have lower levels of education than descendants of predominantly agricultural ethnic groups or are more likely to live in non-urban settings, which might be correlated with gender norms. Similarly, it could be that certain religious belief systems, e.g., Christianity or Islam, are more prevalent among descendants of pastoralist ethnic groups, which in turn might affect female empowerment.¹⁴ We therefore add controls for a number of individual-level observables such as age, educational attainment fixed effects, an indicator for whether a person lives in an urban or a rural setting, marital status fixed effects, religion fixed effects, and survey wave fixed effects.

Next to systematic differences in contemporary individual-level observables, it could be that our measure of historical pastoralism picks up some other aspects of pre-industrial societies that have a similar impact on the status of women. The traditional use of the plow in agriculture is a prime candidate. [Alesina et al. \(2013\)](#) trace variation in contemporary female labor force participation and attitudes towards women in the labor market back to variation in traditional plow use. If plow use affects gender norms beyond those pertaining to the labor market, our estimates might be biased. This seems plausible in the light of the idea that societies that subsist on pastoralism could be more likely to use the plow in their agricultural production because their large animals, e.g., oxen, are ideal traction animals for the plow. We therefore add a control for whether a society traditionally employed the plow in their agricultural production.

Similarly, we control for jurisdictional hierarchy to rule out potential effects of institutional sophistication on women's role in society.

A further potential concern arises from the fact that the year of observation varies between

¹⁴Indeed, female genital cutting and in particular infibulation is sometimes thought of as a Muslim tradition (even though the Quran does not mention it).

societies in the *Ethnographic Atlas*. Even though the information about each society is thought to reflect the life of the portrayed ethnic groups in the decades prior to industrialisation, one might nevertheless worry that year of observation correlates with societal development and correspondingly with the status of women. Adding year of observation as a control takes care of this potential confound.

The augmented regression specification will then be

$$y_{i,j} = \alpha + \beta \times \text{dep_pastoralism}_j + \text{CountryFE} + I_i + H_j + \epsilon_i$$

where I_i denotes a vector of contemporary individual-level controls and H_j a vector of historical controls at the ethnic group level.

5.2 Son Preference

Being a particularly male-dominated type of subsistence, having a son (or multiple sons) was of particular value to parents in pre-industrial pastoral societies. We begin the contemporary analysis by testing whether we find that ancestral dependence on pastoralism comes with a stronger preference for sons over daughters today.

First, we will examine stated son preference. In many waves and countries, the *DHS* asks participants to name (i) the ideal number of sons and (ii) the ideal number of daughters they would want to have. Using these two variables, we create a measure for son preference for each participant by subtracting the stated ideal number of daughters from the stated ideal number of sons and dividing by the sum of the two.¹⁵ For a sample of 482,791 women from 239 different ethnic groups in 39 countries this information is available. While the majority (55%) want as many daughters as sons, the sample shows considerable variation and there are more participants with a preference for sons than with a preference for daughters. On average, the index is slightly larger than 0 (0.035 ± 0.271). Comparing only individuals who live in the same country, column 1 of Table 3 shows that women with stronger ancestral dependence on herding have a more pronounced preference for sons today. This effect becomes larger when adding individual level and historical society level controls (columns 2 and 3, respectively).

Next, we explore whether the sex ratio of children at birth is male-biased among descendants of pastoral societies, i.e., whether their stated son preference is also revealed in terms of the ratio of sons to daughter that they bear. For 548,216 women from 302 ethnic groups in 43 countries we know how many sons and how many daughters live with them, live away from home, and have died after birth. We construct a measure for sex ratio at birth by dividing the number of sons ever born over the total number of children ever born. Regressing the share of sons at birth on the historical dependence on pastoralism of an individual's ancestor yields a positive and statistically significant coefficient. As columns (4) to (6) in Table 3 document,

¹⁵If a participant wants all her children to be girls, the index takes value -1 . If she wants all of them to be boys, the index takes value 1 . A 0 means that she wants as many sons as daughters. Table 9 in section B in the appendix shows the overall distribution of this index.

Table 3: Contemporary Son Preference and Historical Dependence on Pastoralism

	<i>Dependent variable:</i>											
	Stated Son Preference [Std.]	Share of Sons at Birth [Std.]	Diff. Mortality Sons vs Daughters [Std.]	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Hist. Dep. on Pastoralism [Std.]	0.034*** (0.01)	0.038*** (0.01)	0.046*** (0.01)	0.0077*** (0.00)	0.0081*** (0.00)	0.0078** (0.00)	-0.00082 (0.00)	-0.0033 (0.00)	-0.0022 (0.00)			
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Individual Controls	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes
Historical Controls	No	No	Yes	No	No	Yes	No	Yes	Yes	No	No	Yes
Observations	482791	438918	435207	548216	466891	461691	366173	311067	307324			
R ²	0.046	0.036	0.037	0.001	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000

Notes. OLS estimates, standard errors are clustered at the ethnicity level. Individual controls include age, urban residence, educ. attainment, marital status FE, religion FE, survey wave FE. Historical controls include jurisdictional hierarchy, traditional plow use, and year of observation. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

the relationship between reported sex ratio at birth and ancestral dependence on pastoralism remains virtually unchanged when controlling for individual-level contemporary and ethnicity-level historical factors. At the same time, we do not find any evidence for a similar association with a difference in reported child mortality for sons versus daughters, as columns (7) to (9) in the same table show.¹⁶

A question that immediately arises from the preceding results is how the relationship between ancestral pastoralism and current sex ratio at birth is generated. At least two potential mechanisms are conceivable. One, it could be that parents of pastoral descent have more sons at birth than others because they are more likely to stop reproducing once they have a certain number of sons. If this were the case, they would be more likely to have a son as their youngest child. To test this idea, we generate a dummy for the most recently born child being a boy and regress this indicator on ancestral dependence on pastoralism. We find no association between the two measures, as can be seen in columns (1) to (3) in Table 4. We do, however, find a statistically significant relationship between the intensity with which a woman’s ancestors depended on pastoralism and the likelihood that her first born child is male, as columns (4) to (6) of the same table show. This seems to suggest that a second mechanism – selective abortion of female fetuses – might explain how the found association comes about.

Table 4: Historical Pastoralism and Sex Ratio at Birth

	<i>Dependent variable:</i>					
	Most Recently Born Child is Male [0/1]			First Born Child is Male [0/1]		
	(1)	(2)	(3)	(4)	(5)	(6)
Hist. Dep. on Pastoralism [Std.]	0.00095 (0.00)	0.0015 (0.00)	0.0022 (0.00)	0.0047*** (0.00)	0.0042*** (0.00)	0.0033** (0.00)
Country FE	Yes	Yes	Yes	Yes	Yes	Yes
Individual Controls	No	Yes	Yes	No	Yes	Yes
Historical Controls	No	No	Yes	No	No	Yes
Observations	548216	466891	461691	548216	466891	461691
R^2	0.001	0.001	0.001	0.001	0.001	0.000

Notes. OLS estimates, standard errors are clustered at the ethnicity level. Individual controls include age, a dummy for urban residence, educational attainment fixed effects, marital status fixed effects, religion fixed effects, and survey wave fixed effects. Historical controls include traditional plow use, jurisdictional hierarchy, and year of observation. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

To test the plausibility of the idea that selective abortion might play a role in explaining the

¹⁶This is in line with evidence for a trade-off between number of daughters and investment into daughters: Anukriti et al. (2018) show that while the introduction of sex-detection technologies in India led to an increase in the abortion of female fetuses, it also decreased gender gaps in parental investments (breastfeeding, immunization) and in under-5 mortality rates.

effect of historical pastoralism on current sex ratios at birth, we make use of the fact that some women in the sample were less likely to have access to advanced ultrasound technologies that reveal the sex of the fetus than others. In particular, access to such technologies was presumably much harder – if not completely impossible – for women who were interviewed during early waves, e.g., in the 1980’s and the early 1990’s, than for women who were interviewed during more recent waves. Decisions about whether to carry a fetus to term or not could not be based on the sex of the fetus for women interviewed during earlier waves. If our conjecture is correct, we should not find that the association between ancestral dependence on pastoralism and share of sons at birth differs between earlier and later cohorts.

To test this hypothesis, we generate an indicator for whether a participant was interviewed before or after 1994 and interact this indicator with historical dependence on pastoralism.¹⁷ Adding the interaction term (and the indicator) to our regression model with share of sons at birth as the dependent variable provides further evidence that female feticide is driving the results: the interaction term is negative and statistically different from zero (see columns (1) and (2) in Table 5).

To address the most immediate concern – that the preference for sons differs between the early and the later cohorts – we also regress stated son preference on the same set of variables. Columns (3) and (4) in Table 5 show that a difference in the preference for sons cannot explain the negative effect of the interaction term on the share of sons at birth. To the contrary, here the interaction term has the opposite sign and is again statistically different from zero. For later cohorts the relationship between historical dependence on pastoralism and son preference is weaker than for earlier cohorts. Thus, while the preference for sons induced by historical culture seems to get weaker over time, its effect on decision making, i.e., whether or not to abort based on sex of the fetus, gets stronger as technology advances.

¹⁷We choose 1994 as a cutoff because this seems to be a good proxy for when obstetric ultrasound technology revealing the sex of the fetus became available in developing countries. For example, India implemented the PC-PDNT Act in 1994 prohibiting prenatal diagnostic techniques determining the sex of the fetus to prevent female feticide (Bhaktwani, 2012). Similarly, Bhalotra and Cochrane (2010) argue and show empirically that access to ultrasound strongly increased in the beginning to mid 1990’s, resulting from a combination of trade liberalization and technological progress.

Table 5: Historical Pastoralism and Sex Ratio at Birth: Access to Ultrasound Technology

	<i>Dependent variable:</i>			
	Share of Sons At Birth [Std.]		Son Preference [Std.]	
	(1)	(2)	(3)	(4)
Hist. Dep. on Pastoralism [Std.]	0.0082*** (0.00)	0.0086** (0.00)	0.032*** (0.01)	0.045*** (0.01)
Interview Before 1994	0.012* (0.01)	0.029 (0.03)	-0.063 (0.04)	-0.024 (0.04)
Before1994*Pastoralism	-0.057*** (0.02)	-0.077*** (0.03)	0.24*** (0.08)	0.16* (0.09)
Country FE	Yes	Yes	Yes	Yes
Individual Controls	No	Yes	No	Yes
Historical Controls	No	Yes	No	Yes
Observations	548216	461691	482791	435207
R ²	0.001	0.001	0.046	0.037

Notes. OLS estimates, standard errors are clustered at the ethnicity level. Individual controls include age, a dummy for urban residence, educational attainment fixed effects, marital status fixed effects, religion fixed effects, and survey wave fixed effects. Historical controls include traditional plow use, jurisdictional hierarchy, and year of observation.

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Similarly, albeit much more endogenous, access to prenatal health care and fetal gender revealing technology might be easier for urban than for rural participants. At the same time, however, people living in urban areas often differ from their rural counterparts along many dimensions, such as education, religiosity, or income, many of which potentially affect the willingness to (selectively) abort fetuses, in one direction or another. Moreover, the persistence of cultural beliefs such as a preference for sons could be weaker in urban areas, e.g., due to less homogeneity in cultural beliefs in urban areas and more frequent interactions with people from different cultural heritages. To explore the possibility that the association between historical dependence on pastoralism and revealed son preference differs between urban and rural samples we interact the urban dummy with dependence on pastoralism, although we acknowledge the fact that it is not clear from an ex ante perspective whether we should expect an interaction effect in the first place and which sign such an interaction term would have. Table 15 in section C.3 shows the results. Neither for the share of sons at birth nor for stated son preference do we find a significant difference in the effect of historical dependence on pastoralism between urban and rural participants.

5.3 Infibulation and Control Over Own Sexuality

As outlined in section 3, the pastoral lifestyle is characterized by a pronounced segregation between men and women which, *ceteris paribus*, decreases mate guarding opportunities for men and potentially increases uncertainty about biological relatedness between men and their wives' children. Infibulation, the most invasive form of female genital cutting, has been hypothesized to be a cultural practice intended to increase paternity uncertainty. In what follows, we will use data from women in 12 countries in Africa to test whether contemporary occurrence is associated with historical dependence on pastoralism.

Infibulation – sometimes also referred to as "pharaonic circumcision"¹⁸ – is usually performed when a girl is between the age of 4 and 10, in all cases well before puberty. Typically, it 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 to allow for the passage of urine and menstrual blood. Depending on the individual circumstances, the procedure is performed in a hospital-like setting by trained medical personnel, e.g., a midwife, using local anesthesia, or in a more traditional way by some senior woman without anesthesia under non-sterile conditions. 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. the physical barrier has to be opened surgically as the barrier given by the scar tissue can obstruct childbirth.¹⁹ After childbirth, women often undergo "re-infibulation" in order to restore the closure over the vaginal opening. See [Hicks \(1996\)](#), [Mackie \(1996\)](#) or [Shell-Duncan and Hernlund \(2000\)](#) and references therein for more detailed descriptions and variations of the procedure.

For 12 countries in Africa the *DHS* collected information on female genital cutting.²⁰ Our resulting sample consists of 77,074 women who indicated whether they had been infibulated or not. Almost 10 % of them (N=7,534) reported to have undergone infibulation.

Regressing an indicator for being infibulated on historical dependence on pastoralism reveals that, indeed, women whose ancestral ethnic group depended more on pastoralism are significantly more likely to be infibulated today (see Table 6), providing empirical evidence for the hypothesized functional relationship between this practice and the ancestral environment. The relationship remains stable when adding individual-level controls, and decreases slightly when accounting for historical variables.²¹

¹⁸Infibulation is often thought to originate in ancient Egypt but there is no direct evidence that it was practiced there ([Hicks, 1996](#); [Shell-Duncan and Hernlund, 2000](#)).

¹⁹Among 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 full control over it), see for example p. 14 in [Shell-Duncan and Hernlund \(2000\)](#). Indeed, I find a positive albeit small correlation between reports of having experienced fistula and being infibulated ($\rho = 0.02$, $p < 0.05$).

²⁰Benin, Burkina Faso, Chad, Cote d'Ivoire, Ethiopia, Guinea, Kenya, Mali, Niger, Nigeria, Senegal, and Sierra Leone.

²¹Probit estimates can be found in Table 14 in section C.2 in the appendix.

Table 6: Historical Pastoralism and Contemporary Infibulation

	<i>Dependent variable:</i>		
	Underwent Infibulation [0/1]		
	(1)	(2)	(3)
Hist. Dep. on Pastoralism [Std.]	0.067** (0.03)	0.060** (0.02)	0.045*** (0.02)
Country FE	Yes	Yes	Yes
Individual Controls	No	Yes	Yes
Historical Controls	No	No	Yes
Observations	77074	76912	76516
R^2	0.074	0.086	0.112

Notes. OLS estimates, standard errors are clustered at the ethnicity level. Individual controls include age, a dummy for urban residence, educational attainment fixed effects, marital status fixed effects, religion fixed effects, and survey wave fixed effects. Historical controls include traditional plow use, jurisdictional hierarchy, and year of observation. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Next, we explore whether in addition to the *incidence* of infibulation we can also find evidence that the *severity* of the practice is associated with ancestral dependence on pastoralism. To this end, we make use of data on the incidence of de-infibulation for reasons other than childbirth.²² The idea is that the likelihood that a woman has to be de-infibulated with the onset of menstruation or when she gets married is related to the size of the opening that the initial procedure left. The smaller the opening, the more likely it is that it gets obstructed by menstrual blood or that penetration is not possible without enlarging it surgically.

In 1998 and 1999 in some countries 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 from 24 ethnicities in 5 countries²³, 93 reported to have undergone de-infibulation (21 cases in Burkina Faso, 67 in Guinea, and 5 in Niger). Clearly, given the small number of countries, ethnicities, the low incidence rate, and the fact that we observe variation only in three of the five countries, the analysis of this data is only tentative at best. It should also be noted that not only women who stated that they had been infibulated but also those who answered "do not know" were asked whether they had been de-infibulated, which might induce additional noise.

Nevertheless, we can say that the relationship between the contemporary occurrence of de-infibulation and ancestral dependence on pastoralism is in line with our previous results: a stronger dependence on pastoralism of a woman's ancestral ethnicity is associated with a higher

²²This data comes from the IPUMS database, which is based on data collected within the *DHS* framework. It can be downloaded from <https://www.idhsdata.org/idhs/>.

²³Guinea, Cote d'Ivoire, Niger, Egypt, and Burkina Faso.

likelihood of having needed to undergo deinfibulation with the onset of menstruation or upon marriage. The positive coefficient remains virtually unchanged when including the usual set of controls. Table 7 illustrates this.²⁴

Table 7: Historical Pastoralism and Incidence of De-Infibulation

	<i>Dependent variable:</i>		
	Had to be Deinfibulated [0/1]		
	(1)	(2)	(3)
Historical Dependence on Pastoralism [Std.]	0.011** (0.00)	0.010** (0.00)	0.010** (0.00)
Country FE	Yes	Yes	Yes
Individual Controls	No	Yes	Yes
Historical Controls	No	No	Yes
Observations	8579	8579	8579
R^2	0.005	0.007	0.007

Notes. OLS estimates, standard errors are clustered at the ethnicity level. Individual controls include age, a dummy for urban residence, educational attainment fixed effects, marital status fixed effects, religion fixed effects, and survey wave fixed effects. Historical controls include jurisdictional hierarchy and year of observation. Traditional plow use is not included because it does not vary in this sample (no historical plow use for all observations). * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

We now turn to a different measure of how much women control their own sexuality. The first measure of sexual self-determination that we employ is the answer to the question "Can you refuse sex with your husband/partner?". This not only captures the degree to which a woman's preferences are secondary to her husband's, but potentially also reflects how well the woman is in control over her own fertility. The second measure we use is the answer to the question "Can you demand the use of a condom?". While the second measure certainly also picks up control over own sexuality and fertility, it also measures whether a woman can protect herself from sexually transmittable diseases.

In line with what we hypothesized we find that (female) descendants of societies with a higher dependence on pastoralism exert less control over their own sexuality: they are less able to refuse sex with their partner and they are less able to demand the use of a condom. Again, both associations are robust to including the usual set of contemporary individual-level and historical ethnicity-level covariates.²⁵

²⁴Probit estimates can be found in Table 14 in section C.2 in the appendix.

²⁵While this suggests that stronger dependence on pastoralism comes with a woman's preferences being secondary to her partner's preferences, this does not necessarily imply that women who are descendants of pastoral societies are more likely to experience sexual violence. They could simply subordinate their own wishes to their partner's. In fact, we find no association between stating to have experienced sexual violence and historical dependence on pastoralism (see Table 16 in section C in appendix).

Overall, these results are in line with women being subordinate to men more generally, presumably due to their stronger (historical) economic dependence on men. It is also in line with our historical ethnicity-level results in section 4.

Table 8: Historical Pastoralism and Contemporary Sexual Self-Determination

	<i>Dependent variable:</i>					
	Can Refuse Sex [0/1]			Can Demand Use Of Condom [0/1]		
	(1)	(2)	(3)	(4)	(5)	(6)
Hist. Dep. on Pastoralism [Std.]	-0.052*** (0.01)	-0.027*** (0.01)	-0.020** (0.01)	-0.065*** (0.01)	-0.030*** (0.01)	-0.036*** (0.01)
Country FE	Yes	Yes	Yes	Yes	Yes	Yes
Individual Controls	No	Yes	Yes	No	Yes	Yes
Historical Controls	No	No	Yes	No	No	Yes
Observations	260047	259536	254863	223622	210275	206197
R^2	0.179	0.305	0.309	0.171	0.227	0.225

Notes. OLS estimates, standard errors are clustered at the ethnicity level. Individual controls include age, a dummy for urban residence, educational attainment fixed effects, marital status fixed effects, religion fixed effects, and survey wave fixed effects. Historical controls include traditional plow use, jurisdictional hierarchy, and year of observation. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

6 Extensions

6.1 Within-Region Evidence

In our analyses so far we always only compared individuals living in the same country to hold the factors constant that vary between countries, such as institutions. However, it is conceivable that important aspects of an individual's environment vary at the subnational level as well. In fact, we often observe variation in institutions even at the subnational level, i.e., between subnational states. We therefore replicate our analyses but instead of country fixed effects include subnational region fixed effects in order to rule out that factors that vary between individual's more local environment drive our results.

It should be noted, however, that it is not clear a priori whether such an analysis is appropriate when studying cultural variation. After all, culture might not vary too much at more local levels such that conditioning on subnational region fixed effects might simply soak up much of the variation. In that case, not replicating our results from above would not disprove our findings but would merely reflect the lack of variation at that more local level.

Table 9 presents the results of running our regressions including subnational region fixed effects. In all cases, the same relationships in terms of sign of the coefficient results. Only for

share of sons at birth and infibulation the association to historical dependence on pastoralism becomes weaker although the coefficient is still significantly different from zero at the 10-percent level. In particular for the case of infibulation this is not too surprising given that only about 10 percent of women in the sample have been infibulated and the practice is not evenly spread across countries. Therefore, there will be many subnational regions where we see hardly any variation.

Overall, we find very similar results when only comparing individuals who live in the same subnational region.

Table 9: Within Region Evidence

	<i>Dependent variable:</i>				
	Son Pref. [Std.]	Share of Sons [Std.]	Infibulated [0/1]	Can Refuse Sex [0/1]	Can Demand Condom [0/1]
	(1)	(2)	(3)	(4)	(5)
Hist. Dep. on Pastoralism [Std.]	0.035*** (0.01)	0.0063* (0.00)	0.016* (0.01)	-0.018*** (0.01)	-0.027*** (0.01)
Region FE	Yes	Yes	Yes	Yes	Yes
Individual Controls	Yes	Yes	Yes	Yes	Yes
Historical Controls	Yes	Yes	Yes	Yes	Yes
Observations	435207	461691	76516	254863	206197
R^2	0.046	0.002	0.176	0.347	0.255

Notes. OLS estimates, standard errors are clustered at the ethnicity level. Individual controls include age, urban residence, educ. attainment fixed effects, marital status fixed effects, religion fixed effects, and survey wave fixed effects. Historical controls include jurisdictional hierarchy, traditional plow use, and year of observation. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

6.2 Placebo Test: Animal Husbandry without Herding

The hypothesis that we tested is explicitly about pastoralism, i.e., about one specific type of animal husbandry. This implies that we should not find a similar relationship between measures of female status and other types of animal husbandry, i.e., animal husbandry with animals such as pigs, dogs, poultry, or other smaller species. While these animals sometimes live in packs, such as dogs, they are not herded but typically live close to humans within the confines of their settlements. In fact, if anything, we should expect to find the opposite effect, that dependence on this type of animal husbandry is beneficial for women, because this type of subsistence tends to be female dominated, as Table 1 in section 3 shows.

In analogy to our measure for dependence on pastoralism, the data in the *Ethnographic Atlas* allows us to generate a measure of dependence on animal husbandry with species that are

not herded. Since this type of animal husbandry is much rarer, at least as the primary type of animal husbandry, in particular in our set of countries²⁶, the number of observations is much smaller than before.²⁷ More importantly, the number of clusters decreases substantially to only 17 clusters for the case of son preference and share of sons at birth, and to 12 and 11 clusters for the ability to refuse sex and demand safe sex practices, respectively. There are no observations for infibulation. This analysis is therefore only tentative.

As Table 10 shows, for neither of the four dimensions do we find a significant association with ancestral dependence on animal husbandry. In two cases – share of sons at birth and ability to refuse sex – the coefficient has the opposite sign of the one found for historical dependence on pastoralism. This confirms the idea that the relationship we identified is about pastoral life specifically, and not more generally about animal husbandry.

Table 10: Placebo-Test: Animal Husbandry without Herding

	<i>Dependent variable:</i>			
	Son Preference [Std.]	Share of Sons at Birth [Std.]	Can Refuse Sex [0/1]	Can Demand Use of Condom [0/1]
	(1)	(2)	(3)	(4)
Hist. Dep. on Animal Husbandry [Std.]	0.0022 (0.09)	-0.0029 (0.02)	0.10 (0.13)	-0.026 (0.11)
Observations	26316	30917	17228	14830
R ²	0.000	0.000	0.054	0.003

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

6.3 Robustness Across Different Types of Pastoralism

Because our hypothesis about the relationship between pastoralism and measures of female empowerment is about the pastoral lifestyle in general and does not refer to one specific type of pastoralism, throughout our analyses we have not distinguished between them. For example, we have not distinguished between whether an ethnic groups traditionally herded goats or whether they traditionally herded camels or cattle. It is conceivable, however, that pastoral life varies to some degree by which species a group herds. This might raise concerns about the generalizability of our results. For example, one might worry that the relationship between son preference and pastoralism is not present among herders that have smaller species such as goats or sheep. Similarly, it could be that some results are driven by pastoral life in more

²⁶This type of animal husbandry is much more common, for example, in the Pacific, a world region that is not represented in our sample.

²⁷Note that societies that herd animals are not part of this analysis: here, we compare dependence on animal husbandry to dependence on agriculture, hunting and gathering, or fishing.

extreme climates that might be particularly tough for women, such as camel pastoralism in the Sahara or the Arabian Peninsula.

The data in the *Ethnographic Atlas* allows us to explore the generalizability of our results across the different types of pastoralism as it contains information on which type of animal was the predominant one in a society. In analogy to how we generated our measure for dependence on pastoralism, we now create measures for dependence on goat and sheep herding, cattle herding, horse herding, and camel herding.²⁸ For each contemporary measure of male dominance we will now compare groups that depended on, say, cattle herding to agricultural groups or hunter-gatherers.

Before we get to the results, it should be noted that this analysis has to be taken with a grain of salt. In all cases the number of observations is much smaller than in our main analyses since when we look at one species, we set dependence on the other types of pastoralism as missing. In some cases, in particular for horse and camel herding, the number of clusters becomes very small. In these cases, we bootstrapped the standard errors (and clustered them at the ethnic group level). Also, the categories are not completely mutually exclusive. For example, groups that are classified as camel or cattle herders will often also have secondary sheep or goat herding (sheep and goats are easy to have as a secondary type of species because their eating and living habits are less specific and demanding than those of larger species). Nevertheless, this analysis might potentially bear some additional insight.

Table 11 illustrates the results from running separate analyses for the different types of pastoralism. Despite the data limitations discussed in the preceding paragraph, there are four insights that we can take away from this table. First, the overall picture strongly suggests that our results are not driven by one specific type of pastoralism. Only in 3 out of 40 cases is the sign of the coefficient not equivalent to the one we found when running the analyses with general dependence on pastoralism, and in most cases both the sign of the coefficient and the statistical significance levels are very similar. Second, sheep and goat herding does not seem to be much different from cattle, horse, or camel herding. This is reassuring that the size of the species does not matter much, but again suggests that the results tell a story of pastoral life more general. Third, the results for infibulation seem to be strongest for dependence on camel herding. This is not surprising given that infibulation is a custom that is only practiced among ethnic groups in the Sahara and parts of East and West Africa. Fourth, while it seems that overall the effect for camel herding is strongest, it should be noted that camel herders on average depend much more on pastoralism than the average cattle, sheep or goat herding group. This effect is therefore indistinguishable from merely reflecting strong dependence on pastoral life.

²⁸We also create a measure for deer herding but we have no individuals in our sample whose ancestral ethnic group depended on deer herding.

Table 11: Comparison Between Different Types of Pastoralism

<i>Type of Pastoralism</i>	<u>Dependent Variable</u>									
	Son Preference		Share of Sons At Birth		Can Refuse Sex		Can Demand Use Of Condom		Is Infibulated	
Sheep, Goats	✓	✓	(✓)		(✓)	(✓)	✓	(✓)	(✓)	
Cattle	✓	(✓)	✓	(✓)	✓	✓	✓	✓	(✓)	(✓)
Horses, Donkeys	(✓)		(✓)	✓	(✓)	✓	(✓)	✓	NA	NA
Camels, Camelids	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Controls?	no	yes	no	yes	no	yes	no	yes	no	yes

A "✓" indicates that the relationship between the dependent variable and type of pastoralism is the same in terms of sign of coefficient and that the coefficient is statistically different from zero at least at the 10-percent level.

A "(✓)" indicates that the coefficient has the same sign but is not statistically different from zero.

An empty field indicates that the coefficient has the opposite sign.

NA means no observations for this combination of dependent variable and type of pastoralism.

6.4 Further Robustness Checks

Contemporary Presence of Herding Animals One potential concern is that the results are driven by individuals who still live a pastoral lifestyle, i.e., that there is a persistence of the mode of subsistence but no independent persistence of the associated culture. A similar sample, based on the IPUMS database, allows me to identify people who currently own animals that classify as herding animals, such as sheep, goats, or cattle. Excluding these from the analysis leads to a reduction in sample size of about 30% but leaves the coefficients largely unchanged. This confirms that cultural values persist somewhat independent of the mode of subsistence which arguably generated them.

Controlling for Polygyny and Settlement Patterns While potentially endogenous to pastoralism, it might be relevant to control for polygyny and settlement patterns (with higher values implying more nomadic) to provide evidence that it is neither polygynous marriage systems nor nomadic lifestyle per se that drive the results. For example, it is conceivable that polygyny might be positively associated with infibulation, because compared to monogamous relationships, mate guarding is likely to be more difficult on polygynous unions, hence paternity concerns might be relevant in these societies as well. Similarly, it could be that it is not herding per se, but rather the nomadism that often comes with it that drives a preference for sons, since a nomadic lifestyle might in itself be incompatible with child rearing duties. Hence, in a more extensive specification I also include measures for polygyny and settlement patterns. Only the coefficient for share of sons at birth is affected by this. It becomes smaller and drops slightly below conventional levels of statistical significance ($p=0.105$). All other results are largely unaffected. Table 17 in the appendix documents the results.

7 Channels of Cultural Persistence

How does culture persist? Why does pastoralism affect the lifeways of people long after it has ceased to be a form of subsistence? While not the main focus of this paper, this section will tentatively explore two aspects of culture – religious beliefs and language – as potential channels through which cultural beliefs persist. Because religious beliefs and language structures are arguably much less responsive to changes in the environment than other cultural traits, they can serve to transmit and perpetuate existing biases and beliefs even when these are not an adaptive response to the current environment anymore.²⁹

As Galor et al. (2017) argue and show empirically, language structures evolved as a response to environmental conditions and thereby came to reflect prevalent cultural traits. Moreover, they show that language structures do not only reflect ancestral experiences, but they can also have an independent effect on behavior, beliefs, and ultimately outcomes, and therefore play an important role in the persistence of culture.

A way in which language can potentially reinforce unequal gender norms is by forcing the speaker to make an explicit distinction between men and women when talking about or to them, i.e., by encoding gender in the pronouns. While pastoralism is an ancient form of subsistence that evolved during the Neolithic, i.e., some time earlier than 4,000 BCE, the gendered pronoun feature is a much more recent phenomenon. It is therefore possible that the gender-unequal societal structure that was imposed by pastoralism at some point also found its way into language, e.g., by requiring the speaker to identify grammatically whether she is talking about a woman or a man. Using the classification in chapter 44 of the World Atlas of Language Structures³⁰ (Siewierska, 2013) and the Compendium of World Languages (Campbell, 2013), I classified languages in the *Ethnographic Atlas* into whether they encode gender in their pronouns or not. About half of the languages make no distinction between male and female in their pronouns. The other half of the languages forces their speakers to make an explicit grammatical distinction when speaking about women versus when speaking about men. As Figure 4 shows, there is a strong positive association between a society's dependence on pastoralism and the probability that the language they speak encodes gender in its pronouns.

A similar picture emerges when turning to religious beliefs as another potential channel through which culture can persist. Here, I make use of a variable in the *Standard Cross-Cultural Sample* which denotes whether the tale a society tells about their origin has a male creator, a female creator, or a couple symbolism. I generate an indicator that takes value 1 if the creator in the tale of origin is male, and 0 if the creator was female or if the society believes in a couple to have created them. In line with the evidence for language, societies that depend more strongly on pastoralism are more likely to trace their origin back to a male creator. Figure 5 illustrates this.

²⁹For example, as Galor et al. (2017) argue, language is a central coordination device among members of society. Unlike with other cultural traits, such as behavioral norms or customs, unilateral deviations are infeasible. Hence, once they have evolved, language structures are particularly persistent.

³⁰wals.info

Taken together, these two aspects of culture which particularly "sticky" seem to be systematically related to pre-industrial pastoralism, and thereby provide some suggestive evidence for why beliefs and attitudes can persist.

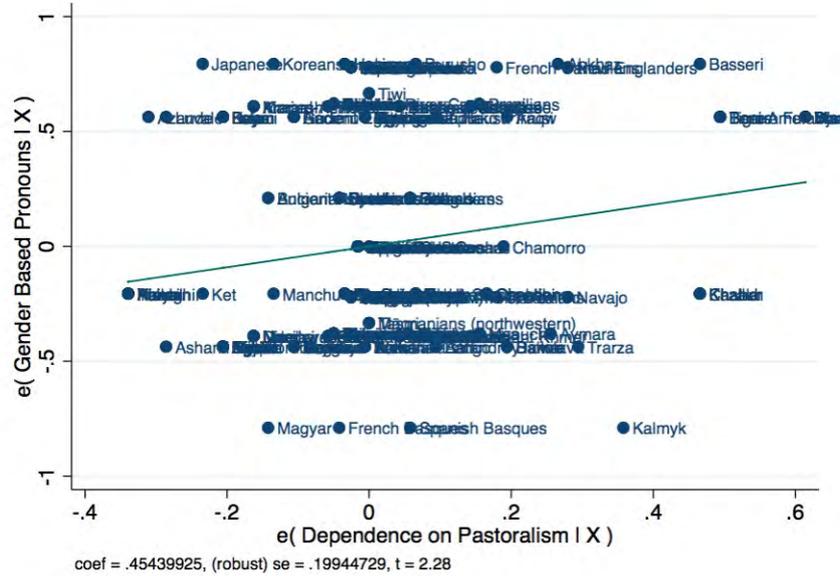


Figure 4: Partial correlation plot: dependence on pastoralism and speaking a language that encodes gender in its pronouns, conditional on continent fixed effects. The sample includes 279 societies from the *Ethnographic Atlas*. Standard errors are clustered at the language family level.

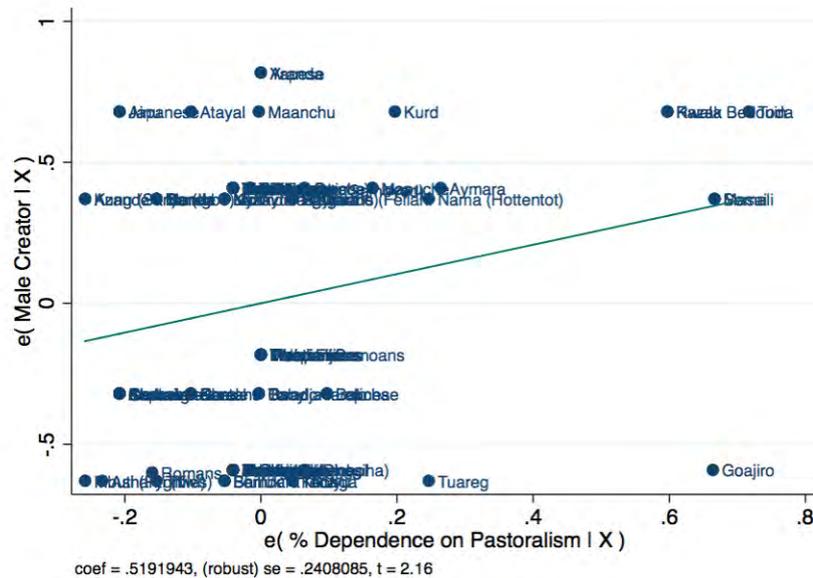


Figure 5: Partial correlation plot: dependence on pastoralism and believing in a male creator, conditional on continent fixed effects. The sample includes 112 societies from the *Standard Cross-Cultural Sample*.

8 Conclusion

This paper explores the historical origins of two of the most extreme forms of contemporary gender discrimination: a preference for sons over daughters and infibulation, the most invasive form of female genital cutting. It tests a hypothesis that emerges from the anthropological literature and that speaks to both dimensions of female well-being: in pre-industrial times, pastoralism induced people to prefer sons over daughters since pastoralism was by far the most male dominated form of subsistence. In addition, it was characterized by frequent and often extended periods of male absenteeism, generating incentives to control and inhibit female sexuality.

This pattern seems to have persisted until today. Using data on women from the *DHS*, the paper shows that women whose ethnic group historically had a higher dependence on pastoralism have a stronger preference for sons today, both stated and revealed by the share of sons they bear. This relationship seems to be at least partially behaviorally modified, because it is stronger for women with better access to fetal sex revealing ultrasound technology. Higher ancestral dependence on pastoralism is also associated with a higher likelihood of having undergone infibulation, and with the severity with which the procedure is performed, as measured by the incidence of de-infibulation at the onset of menstruation or when getting married. In line with the idea, that this reflects lack of control over own sexuality, descendants of pastoral groups are also less likely to state that they can refuse sex or demand safe sex practices, such as the use of condoms.

Both son preference and infibulation are important measures of female well-being, in particular in the developing world. For example, seminal work by Amartya Sen estimates the total number of "missing women" worldwide to be around 100 million, due to excess female mortality because of neglect or female infanticide (Sen, 1992), or more recently female foeticide (Sen, 2003). Invasive forms of female genital cutting, such as infibulation, can come with complications such as excessive bleeding or wound infection, and long term complications such as urinary tract infections, bacterial vaginosis, and complications during child birth such as prolonged labor and caesarean section deliveries (for a meta-analysis see Berg et al. (2014)).

This paper tries to advance our understanding of more ultimate determinants of gender inequality, with potential implications for the design of policies aimed at preventing female foeticide or abolishing invasive forms of female genital cutting. The results provide evidence that might not only be the current environment that affects how strongly women are discriminated against. History or ancestral culture seem to play an important role in shaping people's current attitudes, beliefs, and ultimately behavior. Beyond consequences for individual well-being, this can have societal level consequences. For example, male biased sex ratios have been shown to be associated with higher levels of crime (Edlund et al., 2013) and high saving rates in China (Wei and Zhang, 2011). More generally, the results in the paper also underline the importance of female contribution to subsistence to female empowerment.

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A Societies in the Ethnographic Atlas

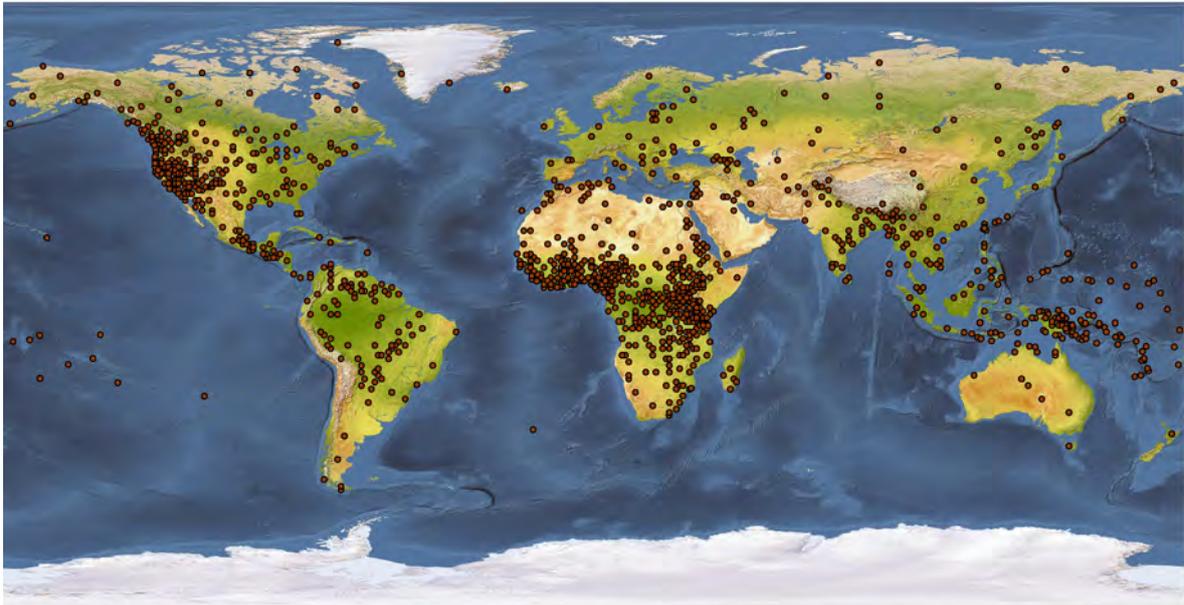


Figure 6: Locations of ethnic groups in the Ethnographic Atlas

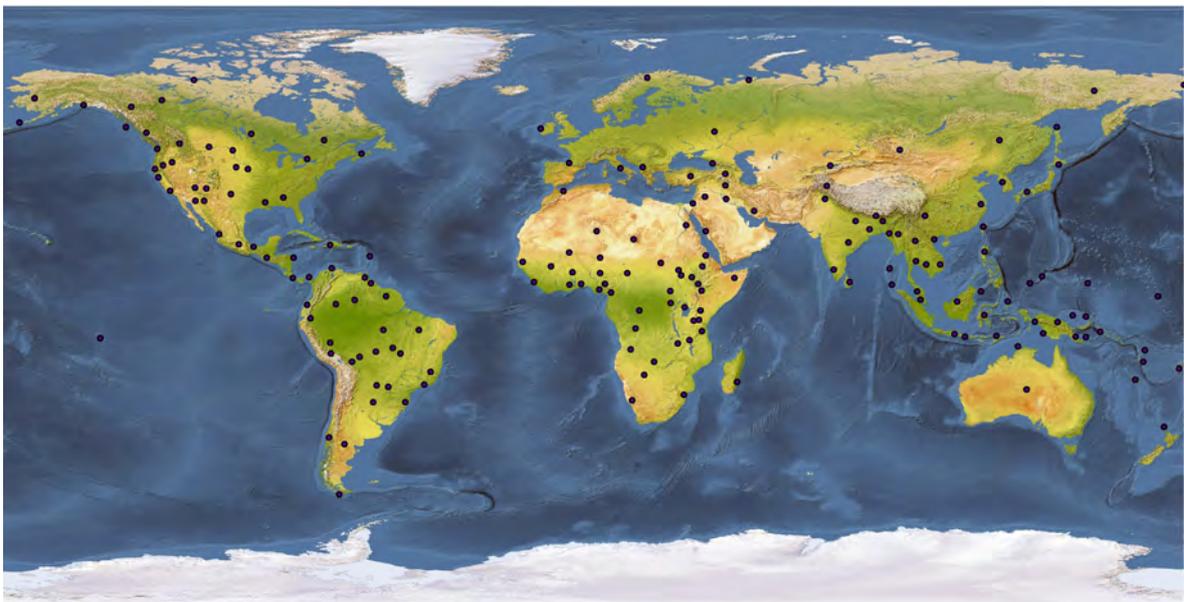


Figure 7: Locations of ethnic groups in the Standard Cross-Cultural Sample

B Additional Graphs and Figures

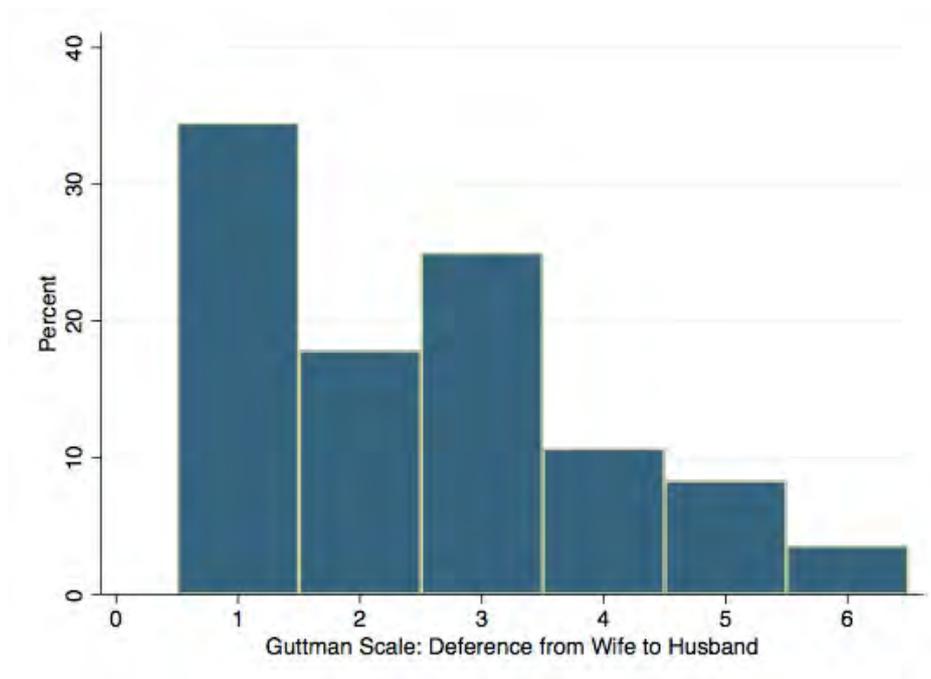


Figure 8: Institutionalized Deference from Wife to Husband (N=84)

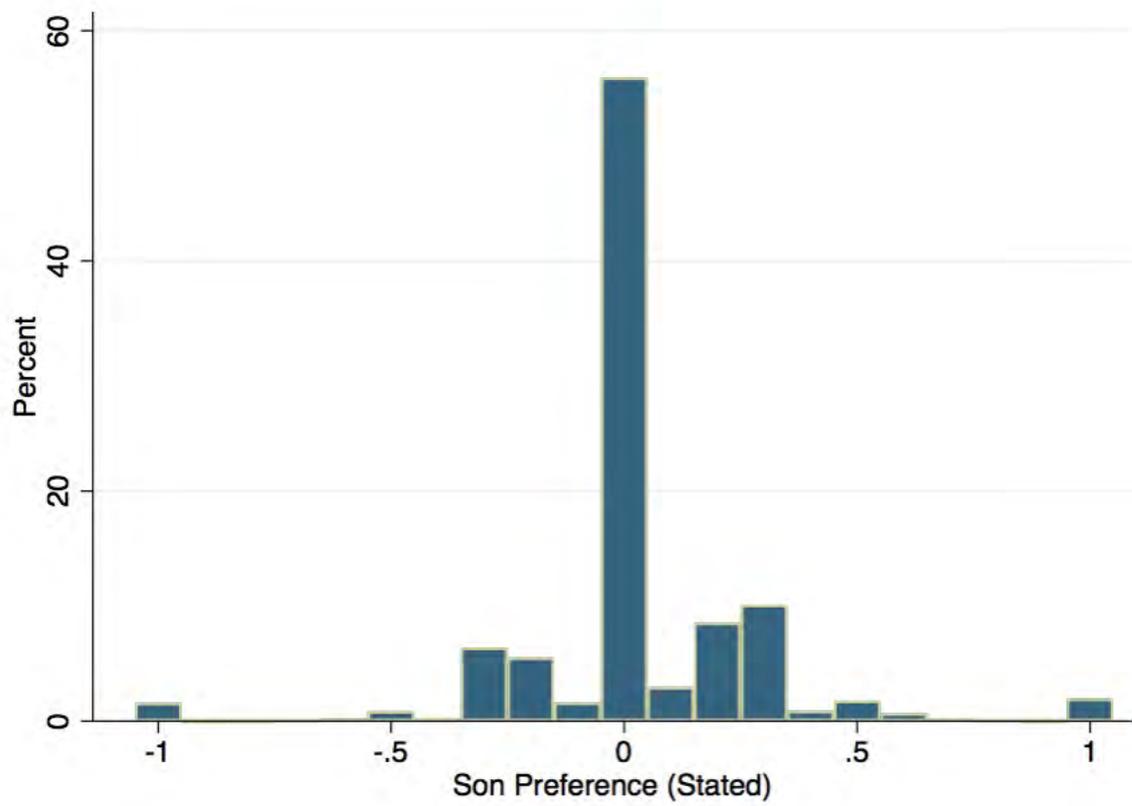


Figure 9: Distribution of Son Preference Index (N=482,791)

C Additional Analyses

C.1 Pastoralism and Kinship Organization in Pre-Industrial Societies

Table 12: Kinship Organization in Pre-Industrial Societies: SCCS Sample (OLS)

	<i>Dependent variable:</i>					
	Patrilocal Residence [0/1]		Patrilineal Inheritance [0/1]		Patrilineal Descent [0/1]	
	(1)	(2)	(3)	(4)	(5)	(6)
Dep.on Pastoralism [Std.]	0.20*** (0.02)	0.19*** (0.03)	0.076** (0.03)	0.052 (0.04)	0.13*** (0.03)	0.11*** (0.04)
Continent FE	No	Yes	No	Yes	No	Yes
Historical Controls	No	Yes	No	Yes	No	Yes
Observations	182	179	147	145	181	178
R^2	0.231	0.424	0.035	0.117	0.103	0.269

Notes. OLS estimates, robust standard errors. Historical controls include traditional plow use, jurisdictional hierarchy, settlement patterns, an indicator for whether polygyny is common, and year of observation. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

C.2 Probit Regressions

Table 13: Sexual Autonomy (Probit Estimates)

	<i>Dependent variable:</i>					
	Can Refuse Sex [0/1]			Ok to Refuse When Tired [0/1]		
	(1)	(2)	(3)	(4)	(5)	(6)
main						
Hist. Dep. on Pastoralism [Std.]	-0.17*** (0.03)	-0.081*** (0.02)	-0.082** (0.04)	-0.12*** (0.03)	-0.059** (0.03)	-0.066* (0.04)
Individual Controls	No	Yes	Yes	No	Yes	Yes
Historical Controls	No	No	Yes	No	No	Yes
Country FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	260047	220454	215477	224932	160744	157581
Pseudo R^2	0.251	0.239	0.242	0.120	0.120	0.122

Notes. Probit estimates, standard errors are clustered at the ethnicity level. Historical controls include traditional plow use, jurisdictional hierarchy, settlement patterns and year of observation. Individual controls include age, a dummy for urban residence, educational attainment, marital status FE, religion FE and survey wave FE. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 14: Historical Pastoralism and Infibulation (Probit Estimates)

	<i>Dependent variable:</i>					
	Underwent Infibulation [0/1]			Had to be Deinfibulated [0/1]		
	(1)	(2)	(3)	(4)	(5)	(6)
Hist. Dep. on Pastoralism [Std.]	0.28*** (0.08)	0.25*** (0.08)	0.15*** (0.05)	0.31** (0.14)	0.28** (0.14)	0.53*** (0.09)
Individual Controls	No	Yes	Yes	No	Yes	Yes
Historical Controls	No	No	Yes	No	No	Yes
Country FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	77074	76035	75636	8533	8357	8357
Pseudo R^2	0.109	0.114	0.134	0.039	0.058	0.069

Notes. Probit estimates, standard errors are clustered at the ethnicity level. Historical controls: traditional plow use, jurisdictional hierarchy, settlement patterns, year of observation. Individual controls: age, a dummy for urban residence, educ. attainment, marital status FE, religion FE, survey wave FE.
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

C.3 Son Preference: Urban vs Rural

Table 15: Historical Pastoralism and Access to Ultrasound: Urban vs. Rural

	<i>Dependent variable:</i>			
	Share of Sons At Birth [Std.]		Son Preference [Std.]	
	(1)	(2)	(3)	(4)
Hist. Dep. on Pastoralism [Std.]	0.0089*** (0.00)	0.0088** (0.00)	0.038*** (0.01)	0.051*** (0.01)
Urban	0.0047 (0.00)	0.0045 (0.01)	-0.0043 (0.02)	-0.0026 (0.01)
Urban*Pastoralism	-0.029* (0.02)	-0.020 (0.02)	-0.11* (0.06)	-0.087 (0.06)
Country FE	Yes	Yes	Yes	Yes
Individual Controls	No	Yes	No	Yes
Historical Controls	No	Yes	No	Yes
Observations	548216	461691	482791	435207
R^2	0.001	0.001	0.046	0.037

Notes. OLS estimates, standard errors are clustered at the ethnicity level. Individual controls include age, a dummy for urban residence, educational attainment fixed effects, marital status fixed effects, religion fixed effects, and survey wave fixed effects. Historical controls include traditional plow use, jurisdictional hierarchy, and year of observation.
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

C.4 Alternative Measures of Female Subordination

Table 16: Historical Pastoralism and Contemporary Experience of Sexual Violence

	<i>Dependent variable:</i>		
	Has Experienced Sexual Violence [0/1]		
	(1)	(2)	(3)
Hist. Dep. on Pastoralism [Std.]	-0.0041 (0.00)	0.00063 (0.00)	-0.0018 (0.01)
Country FE	Yes	Yes	Yes
Individual Controls	No	Yes	Yes
Historical Controls	No	No	Yes
Observations	132861	120872	117183
R ²	0.038	0.056	0.058

Notes. OLS estimates, standard errors are clustered at the ethnicity level. Individual controls include age, a dummy for urban residence, educational attainment fixed effects, marital status fixed effects, religion fixed effects, and survey wave fixed effects. Historical controls include traditional plow use, jurisdictional hierarchy, and year of observation. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

C.5 Robustness

Table 17: Incl. Polygyny and Settlement Patterns

	<i>Dependent variable:</i>				
	Son Preference [Std.]	Share of Sons [Std.]	Can Refuse Sex [0/1]	Can Demand Condom [0/1]	Infibulated [0/1]
	(1)	(2)	(3)	(4)	(5)
Hist. Dep. on Pastoralism [Std.]	0.045*** (0.01)	0.0056 (0.00)	-0.023** (0.01)	-0.029*** (0.01)	0.034*** (0.01)
Individual Controls	Yes	Yes	Yes	Yes	Yes
Historical Controls	Yes	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes	Yes
Observations	430766	458051	252623	203999	76293
R ²	0.037	0.001	0.311	0.227	0.118

Notes. OLS estimates, standard errors are clustered at the ethnicity level. Historical controls include jurisdictional hierarchy, settlement patterns, polygyny, plow use, and year of observation. Individual controls include age, a dummy for urban residence, educational attainment fixed effects, marital status fixed effects, religion fixed effects, and survey wave fixed effects. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.