On the Economic Origins of Restricting Women's Promiscuity

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October 22, 2021

Abstract

This paper studies the origins and function of customs and norms that intend to keep women from being promiscuous. Using large-scale survey data from more than 100 countries, I test the anthropological theory that a particular form of pre-industrial subsistence – pastoralism – favored the adoption of such customs and norms. Pastoralism was characterized by heightened paternity uncertainty due to frequent and often extended periods of male absence from the settlement, implying larger incentives to imposing restrictions on women's sexuality. The paper shows that women from historically more pastoral societies (i) are subject to stronger anti-abortion attitudes; (ii) are more likely to have undergone infibulation, the most invasive form of female genital cutting; (iii) are more restricted in their freedom of mobility; and (iv) adhere to more restrictive norms about women's promiscuity. Instrumental variable estimations that make use of the ecological determinants of pastoralism support a causal interpretation of the results. I also provide evidence that the mechanism behind these patterns is indeed paternity uncertainty, rather than male dominance, *per se*, or historical economic development.

JEL classification: I15, N30, Z13

Keywords: Anti-abortion attitudes; infibulation; women's freedom of mobility; paternity uncertainty.

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Every move you make, every step you take,
I'll be watching you.
— The Police, *Every Breath You Take*

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 children's economic and social success, this asymmetry generated incentives for men to prevent women from having extramarital sex and incentives for women to signal fidelity. According to evolutionary theory, men evolved to be jealous, to want to deter women from having extramarital sex (Symons, 1979; Buss et al., 1992; Buss, 2000; Trivers, 1972). Yet, constantly monitoring women's behavior is hard or impossible, creating demand for alternative ways in which women can be hindered from having extramarital sex.

A large body of anthropological work theorizes that a broad set of norms and customs evolved to serve as 'probability of paternity' or 'paternity certainty' mechanisms, i.e., to aim at keeping women from having extramarital affairs by alleviating the monitoring problem (Mackie, 1996, 2000; Hicks, 1996; Daly et al., 1982; Hayes, 1975a; Dickemann, 1981, 1979). A common manifestation of such norms and customs are restrictions on women's freedom of mobility, e.g, rules about whether a woman can leave the house by herself, after dark, or limitations on the types of places she can go to. Similarly widespread are forms of social disapproval of women's promiscuity or, more generally, disapproval of women freely interacting with men outside of their family. They often manifest in appraisal of women's 'purity' or social desirability of women's virginity when entering marriage as well as their chastity and modesty thereafter. Infibulation, on the other hand, is a custom that is much less widespread but seemingly similar in its intention and effect. It is a particularly invasive form of female genital cutting which makes vaginal penetration painful. Finally, limits on women's access to abortion impose a barrier on ending an unwanted pregnancy and make extramarital sex more risky. Anti-abortion attitudes might therefore simply reflect the desire to keep women from being promiscuous.

While these customs and norms appear to differ in many respects, at their (presumed) core they all reduce women's ability or their incentives to seek out extramarital affairs. Their immediate consequences for women, e.g., for their health, their free access to abortion, or their ability to freely participate in society make it imperative to understand their origins and underlying psychology.

The key argument 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, the subsistence of having domesticated animals that need to be taken

out to pasture. Pastoralism was characterized by frequent and often extended periods of male absence from the settlement, making women's behavior less observable for men. Consequently, pastoralism implied heightened concerns over women's chastity. The ethnographic record on pastoral societies is full of mentions of these concerns. For example, in her work on pastoral communities around the Mediterranean, Schneider (1971) describes "the great emphasis [that] is placed on the chastity and virginity of women" as a defining feature of these communities. In particular, she notes that "families associate their honor with the virginity of unmarried daughters, and with the chastity of these women after they get married". She regards infibulation as a particularly strong manifestation of such concerns. Peristiany (1966) writes about life in Cypriotic villages, in which "woman's foremost duty to self and family is to safeguard herself against all critical allusions to her sexual modesty". Bedouins, camel-herding societies of North Africa, have a separate word for the honor, chastity and prudence of women: *'ird'*, which is regarded as so valuable that once damaged through extramarital sex, a woman is often murdered by one of her kinsmen (Abou-Zeid, 1966). Female adultery is punished in similarly harsh ways in pastoral groups in other parts of the world, such as the Kazakh, the Mongols, or the Armenians (Hudson, 1938; Villa and Matossian, 1982). In some pastoral societies, such as the Zulu of Southern Africa, the "male obsession with [...] possible female adultery" has led to rituals to confirm the paternity of the father. When a child is born, the final joint of the little finger is cut off and buried. If the woman has committed adultery, the child is believed to bleed to death (Klopper, 1987). In many cases, pastoral societies impose restrictions on women's movement, for example the Kurds, where "married women seldom [leave] their homes, young girls practically never, and none of them must allow themselves to be seen by male strangers" (Hansen, 1961).

Even though the ethnographic record is full of examples that connect pastoralism to heightened concerns over women's chastity, there is no quantative evidence that this represents a systematic, functional relationship and that it can explain the contemporary presence of the practices described in the opening paragraphs. In what follows, I test the hypothesis that historical reliance on pastoralism favored the adoption of customs and norms that reduce women's incentive or ability to seek out extramarital relations, and that it explains contemporary individual-level variation in different manifestations of concerns over women's chastity.

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 using survey data from more than 1.3 million people in more than 100 countries around the world, I find that descent from societies that historically relied more on pastoralism predicts contemporary individual-level variation in (i) anti-abortion attitudes, (ii) the likelihood of being infibulated, (iii) how strongly women are restricted in their freedom of mobility, and (iv) women's adherence to more restrictive norms about their promiscuity.

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 anti-abortion attitudes comes from the *World Values Survey* (*WVS*), which regularly collects nationally representative survey data on various beliefs and values around the world. The contemporary data on infibulation, restrictions on women's freedom of mobility, and social norms about women's promiscuity come from the *Standard Demographic and Health Surveys* (*DHS*). These are very extensive, nationally representative household surveys that are conducted on a regular basis in developing countries worldwide.

To connect the individual-level survey data from the *WVS* and the *DHS* to the historical ethnicity-level data from the *Ethnographic Atlas*, I make use of information on respondents' ethnicity or the language they speak. This procedure generates substantial within-country variation. First, many countries are historically 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 22 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 is relatively low, contemporary ethnic diversity is often substantially higher due to migration. For example, for the small country of Moldova, the sample contains women who are of Bulgarian, Gagauzian, and Romanian descent.

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 historical reliance on pastoralism predicts individual-level variation in all four customs and norms that presumably aim at keeping women from being promiscuous. In particular, in the *WVS* sample of 205,201 respondents from 96 countries, respondents with greater ancestral reliance on pastoralism rate exhibit stronger anti-abortion attitudes. Next, zooming into 13 countries in Africa and using data on 96,471 women from the DHS, those who descend from more pastoral societies are more likely to have undergone infibulation, the most invasive form of female genital cutting. Similarly, and in a much larger sample of 697,964 women from 41 countries, women from ethnic groups that historically relied more on pastoralism are more restricted in their freedom of mobility. Finally, historical reliance on pastoralism predicts adherence to more restrictive norms about women's promiscuity as captured by the number of sexpartners they have had (N=447,834 from 37 countries) and

the likelihood that they have cheated on their partner (N=664,313 from 39 countries). These relationships hold across individuals within countries and are not affected in any meaningful way when including exogenous controls at the individual level, such as age, gender, or year of interview fixed effects, as well as, at the historical ethnicity level, the year in which the ethnographic information was collected.

Next, I test the sensitivity of my results and show that the documented pattern is largely robust to including a large set of endogenous controls. At the individual level these controls include fixed effects for religion, educational attainment, marital status, and living in an urban area. At the historical ethnicity level I include a measure for a society's kinship structure, polygyny, and jurisdictional hierarchy which captures the institutional development.

To support a causal interpretation of my results, I turn to an instrumental variable approach, which makes use of the fact that variation in historical reliance 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 largely consistent with their OLS counterparts in terms of coefficient sign and statistical significance but tend to be larger in terms of effect size, as should be expected if actual reliance on pastoralism is measured with error.

In a final step of the analysis, I resort to various placebo analyses to provide additional evidence that it is indeed paternity uncertainty in pastoralism 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. The seminal work by Boserup (1970) and Alesina et al. (2013) has illustrated how this type of agriculture has long-lasting effects on the labor market participation of women. However, since men are not absent in plow agriculture, there should be no unusually high incentive to restrict women's promiscuity if paternity uncertainty is the key mechanism. Reassuringly, I find no systematic relationship between restrictions on women's promiscuity and plow agriculture: 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 discouraging women from having extramarital sex. 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 test this potential confound empirically by showing that various proxies

for historical economic development – the level of jurisdictional hierarchy, population size, and settlement patterns – are not systematically related with my outcome measures. This suggests that differences in historical economic development are not the main drivers of my results.

Third, I verify that other forms of 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, 2018), the origins of Chinese footbinding (Fan and Wu, 2021), 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., 2020), the prevalence of intimate-partner violence (Tur-Prats, 2017) or cooperation between spouses (Lowes, 2018) and the the relationship between restrictive gender norms and women's economic outcomes (Bursztyn et al., 2017, 2020; Dean and Jayachandran, 2019). More specifically, it also relates to the literature on female genital cutting, for example work that studies the effects of regime stability on prevalence (Poyker, forthcoming), proximate determinants of the persistence of female genital cutting (Bellemare et al., 2015), the effect of interventions on attitudes towards the continuation of the practice (Vogt et al., 2016), and the geographic diffusion (Corno et al., 2020). It also speaks to work on the cross-cultural variation in jealousy responses and paternal investment (Scelza et al., 2020), and more generally, to the literature on the role of 'culture' in economics (Fernandez and Fogli, 2009; Falk et al., 2018; Giuliano, 2007; Guiso et al., 2006; Enke, 2019), its persistence (Voigtländer and Voth, 2012; Michalopoulos and Papaioannou, 2013; Giavazzi et al., 2018), and determinants (Schulz, 2017; Galor and Özak, 2016; Galor and Savitskiy, 2018; Bahrami-Rad, 2019).

The paper contributes to these literatures by providing the first study on the functional origins of a large set of customs that impose restrictions on women's freedom to interact with men outside of the family. It also introduces the novel explanatory variable of pastoralism. Moreover, it provides systematic evidence for the theory that the reduction of paternity uncertainty is the main function behind economically relevant phenomena, such as restricting women's access to certain types of healthcare, limiting women's freedom of mobility, or the practice of infibulation.

The remainder of the paper is structured as follows. In section 2, I describe the characteristics of preindustrial pastoralism, present the historical data, and provide evidence on the historical validity of the hypothesis. In section 3, I present the contemporary data and the empirical strategy. Section 4 presents the main results including robustness checks, section 5 the corresponding IV analyses and in section 6 I provide evidence on the proposed mechanism behind my results. Section 7 offers a discussion of some aspects of the methodology and results and section 8 concludes.

2 Pastoralism and Paternity Uncertainy

2.1 Pastoralism in Preindustrial Societies

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

Unlike agriculture, the other common form of pre-industrial subsistence, pastoralism is characterized by frequent and often extended periods of male absence from the settlement.[2] The main reason for these absences is the need to take the herd animals to pasture. The duration of absence is variable across and within groups and determined by a variety of factors, such as the length of the dry and wet season, the size of the herd, the presence of other herds in one's vicinity, how populated the area is, local soil conditions, and the availability of and distance to markets to trade for agricultural products. Taking a herd to pasture sometimes implies many short absences during the cold or the wet season, but it also implies prolonged absences of several weeks or even months during the warm or the dry season.[3] Moreover, even when pasture grounds are close, men often have to stay out with the herd at night to protect them from predators or thieves. Higher reliance on pastoralism furthermore implies more need to trade for agricultural products, another reason for men to be absent from the settlement.

Importantly, pastoralism is practiced by men in the vast majority of pre-industrial societies, hence men are periodically absent, not women.[4] Presumably, this is because pregnancy, childrea-

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

[2] Other forms of subsistence are quantitatively much less relevant in that they contribute only a tiny fraction to overall calories. In 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.

[3] This variable pattern of absence duration is described in different environments, such as among the Fulani, a cattle herding society in West Africa (Stenning, 1965), the reindeer-herding Saami of Northern Europe (Paine, 1994), the sheep-herding Basques of Western Europe (Ott, 1981), the Saraguros of South America (Belote, 1998), the cattle-herding Shilluk of East Africa (Westermann, 1912) or the cattle herders on Scottish Islands in Western Europe (Klimm and Geddes, 1956).

[4] As figure A2 in section A.1 in the appendix illustrates, pastoralism is practiced exclusively by men in almost 70 percent of pre-industrial societies. In contrast, this holds true for only 30 percent of agricultural societies. At the same time, male absence in societies that rely on pastoralism does not imply that *all* men are gone at the same time. First, not every herd has the same needs at the same time, i.e., different herds go to potentially different grazing grounds at slightly different times. Second, no single society exclu-

ring and nursing imply a disadvantage for women when it comes to taking care of the animals. On average, men also have a physical comparative advantage over women in protecting the animals from predators and thieves. As Dupire (1963) notes in describing life of the Bororo, a pastoral society in Niger: "[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".

2.2 Data on Pastoralism in Preindustrial Societies

The *Ethnographic Atlas* is an anthropological database consisting of information collected from ethnographies on more than 1,200 ethnic groups worldwide, most of which were written in the 19th and early 20th century. 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.[5] It was compiled by George Peter Murdock (Murdock, 1967; Murdock and White, 1969) and later extended in work by Barry (1980), Gray (1999), Korotayev et al. (2004), and Bondarenko et al. (2005). The dataset I use here is provided by D-PLACE (Kirby et al., 2016) and includes these various extensions. Recent work has highlighted the validity of the *Ethnographic Atlas* (Bahrami-Rad et al., 2021).

I construct my main explanatory variable – an ethnic group's historical reliance 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 reliance on animal husbandry produces the main explanatory variable: a society's historical reliance on pastoralism. Formally,

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

where animalhusbandry_j denotes a society's reliance on animal husbandry and $\mathbb{1}_j^{herd\_animal}$

sively practices pastoralism. Instead, societies partially rely on agriculture and partially on pastoralism. Hence, there is always a share of the population that stays behind that engages in agricultural activities.

[5]For the vast majority of societies, the data was collected in the 19th and early 20th century, before 1950. In the empirical analysis, I add a control for the exact timing of data collection.

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 reliance on pastoralism for 1,202 societies in the *Ethnographic Atlas*.[6] About one-third of societies have very little or no pastoral production ($< 5\%$).[7] Similarly, few societies depend on pastoralism by more than 50% (about 5%). Most societies have intermediate shares of pastoral production. On average, societies rely on pastoralism to about 15% ($\pm 19\%$).

Historical reliance 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.

Moreover, since historical populations moved and dispersed to different countries and regions, in my analysis, I leverage substantially more variation than is depicted in the map. For example, present-day Moldova has residents who are of Bulgarian, Montenegrin, or Romanian descent. Thus, even within small countries there is variation in people's ancestral reliance on pastoralism.

2.3 Historical Validity of the Hypothesis

In addition to data on subsistence modes, the *Ethnographic Atlas* documents many other aspects of life in pre-industrial societies. This allows me to test the historical validity of the hypothesis that pastoralism favored customs and norms designed to keep women from having extramarital affairs. For example, the *Ethnographic Atlas* notes whether a society practiced patrilocal residence after marriage, i.e., whether it was customary that a couple resides with or close to the husband's family after getting married. This type of living arrangement makes it easier for the husband and his family to monitor and restrict the bride's behavior. As Table 1 shows, it is positively associated with pastoralism. Similarly, the *Ethnographic Atlas* has information on societies' view on premarital sex.[8] In line with my hypothesis, societies that relied more on pastoralism were more likely to insist on virginity before marriage (columns 3 and 4 in Table 1).

Next, I turn to data on the beliefs and values held by societies as captured in their oral traditions, their narratives, stories, jokes or proverbs. Over the course of his life, Yuri Berezkin,

[6]Figure 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*.

[7]Many 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.

[8]For 558 societies, the *Ethnographic Atlas* has information on their insistence on women's virginity before marriage. 208 of them freely permitted premarital sex without sanctions. Examples are the Luvale in Southern Africa, the Chenchu in Southeast Asia, or the Sanema in South America.

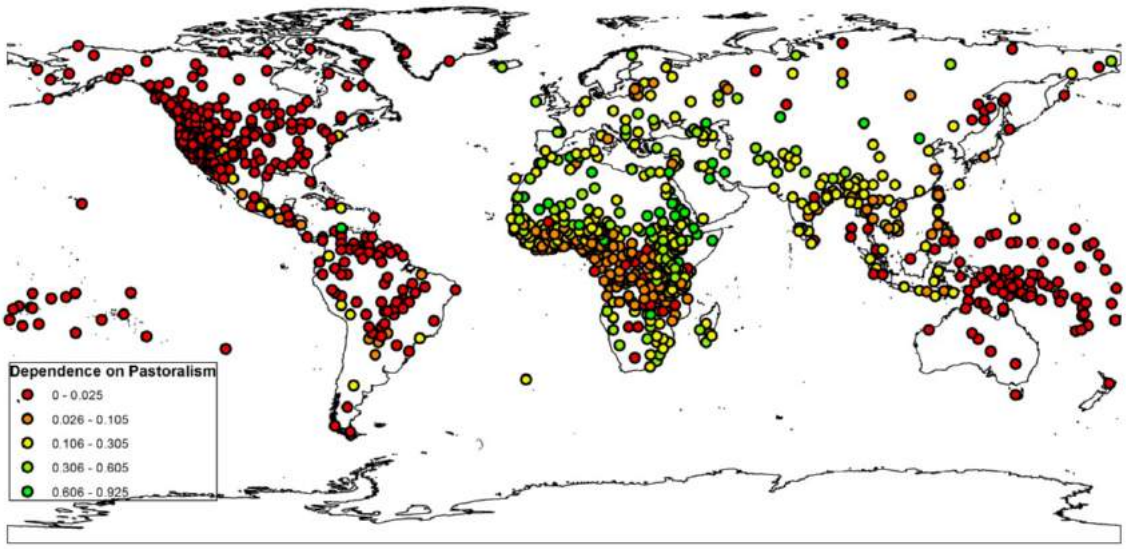

Figure 1: Location of 1,202 societies in the *Ethnographic Atlas* and their reliance on pastoralism, grouped into five bins.

Table 1: Ethnographic Atlas: Patrilocality and Insistence on Virginity

	Dependent variable:			
	Patrilocal Residence After Marriage [0/1]		Insistence On Virginity [0/1]	
	(1)	(2)	(3)	(4)
% Dependence on Pastoralism [Std.]	0.21***	0.095***	0.061***	0.052**
	(0.013)	(0.014)	(0.021)	(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*. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

an anthropologist and folklorist, generated a catalog that documents the presence of 2,564 motifs in the folklore of almost 1,000 societies around the world. A motif is "an episode or an image found in the set of narratives recorded in an ethnolinguistic community" (Berezkin, 2015). In recent work, Michalopoulos and Xue (forthcoming) digitize the Berezkin catalog and use text analysis to capture the presence of concepts or keywords in societies' motifs. They also match the groups in their datasets to those portrayed in the *Ethnographic Atlas*, which allows me to test whether reliance on pastoralism is related to motifs that promote women's chastity or disapprove of women's promiscuity.

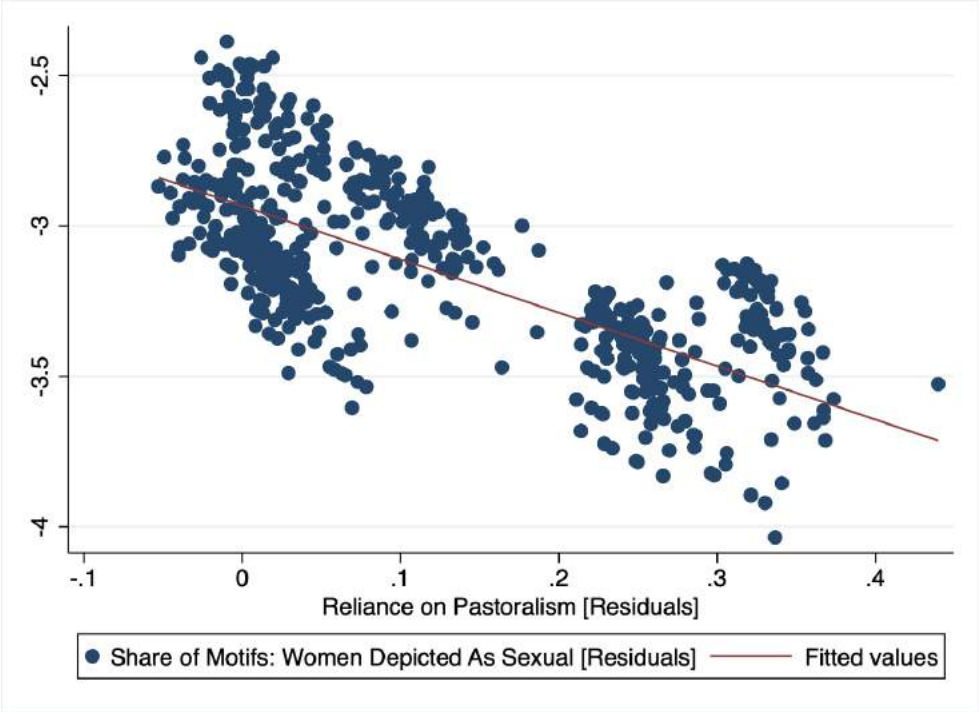

Figure 2: Share of motifs in a society's folklore in which women are depicted as sexual and a society's reliance on pastoralism. $N = 1,124$. Variables are residualized off continent fixed effects, the natural log of the year of first publication, and the natural log of the number of publishers of the sources in a society's oral traditions, following the analysis in Michalopoulos and Xue (forthcoming).

Among the concepts in their database is the number of motifs in which women are depicted as sexual, which can be interpreted as a measure for whether a society approves of women's promiscuity. Presumably, societies that place strong emphasis on women's chastity have folklore with fewer descriptions of women as sexual. Following the analysis in Michalopoulos and Xue (forthcoming), I calculate the natural log of the share of motifs that depict women as sexual among the total number of motifs a society has. Societies that rely more on pastoralism have a lower share of motifs that depict women as sexual. Figure 2 shows this association, residualized off continent fixed effects, the natural log of the number of publishers of the sources in the societies' oral traditions, and the natural log of the year of first publication. Importantly, there is no association between pastoralism and the share of motifs in which *men* are depicted as sexual (see table A1 in section A.2 in the appendix). This provides empirical support for the idea that pastoralism favors disapproval of women's promiscuity in particular.

In sum, historical data as collected by ethnographers and as provided through the oral traditions of societies shows that societies that relied more strongly on pastoralism place more emphasis on women's virginity, are more likely to have brides reside with their husband's family where she can be monitored by his kin, and have fewer depictions of women as sexual in their traditional folklore.

3 Contemporary Data and Empirical Strategy

3.1 Data Sources

The individual-level contemporary data come from the *Standard Demographic and Health Surveys (DHS)* and the *World Values Survey (WVS)*.

The *DHS* are nationally representative household surveys covering more than 90 countries worldwide. The country samples are quite large, with typically between 5,000 and 30,000 households being surveyed. The health, empowerment and living situation of women around the world is a central focus of the *DHS*. Therefore, respondents in the main *DHS* samples are women and the surveys elicit information on female genital cutting, sexual behavior and attitudes, and women's freedom of mobility. The country samples are quite large, with typically between 5,000 and 30,000 households being surveyed.

The *WVS* are nationally representative surveys conducted in almost 100 countries. They ask a wide range of questions about the 'beliefs, values and motivations of people throughout the world', including a question about respondents' attitudes about abortion. Their country samples are smaller than those of the *DHS*, with a median of about 1,000 respondents per wave in each country.

For each outcome measure, I construct my samples to include every observation from the *DHS* and the *WVS* that can be matched to a historical population portrayed in the *Ethnographic Atlas*.

3.2 Matching Historical to Contemporary Data

My analysis relies on matching contemporary populations (respondents in the *DHS* and *WVS*) to their ancestral ethnic groups. To generate this match, I make use of either information on individuals' ethnicity or the language that they speak.

In many instances, the *DHS* directly elicits respondents' ethnicity. To match a respondents' ethnicity to their ancestral ethnic group, I use the language-based matching outlined, for example, in Bahrami-Rad et al. (2021), Giuliano and Nunn (2018), or Alesina et al. (2013). Each present-day ethnicity is assigned their language through Glottolog (Hammarström et al., 2021). Then, a society from the *Ethnographic Atlas* is assigned to a present-day ethnicity if they speak the same language. If more than one society in the *Ethnographic Atlas* spoke the same language, all societies speaking the same language get assigned to the present-day ethnicity.[9] This reflects the idea that two societies that speak the same language are potentially closely related. Hence, they should not be treated as independent observations.

In other instances, the *DHS* does not elicit information on respondents' ethnicity, but has information on the language they speak. In these cases, I directly assign respondents to the societies from the *Ethnographic Atlas* that speak the same language.

[9]The variables are simply averaged over all matched societies.

For most countries and waves, the *WVS* does not record any useful information on respondents' ethnicity. However, the *WVS* often records the language a respondent speaks at home.[10] Based on this information, I assign respondents in the *WVS* the ethnic groups that speak the same language in the *Ethnographic Atlas*.

3.3 Baseline Specification

Using the four respective samples from the *DHS* and the *WVS*, I regress the outcome measures on the respondent's ethnic group's historical reliance 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.[11] Since variation in the main explanatory 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 *Ethnographic Atlas* group level.

3.4 Covariates

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

As a first step, I always present the baseline specification noted above. In a second step, I add plausibly exogenous controls. These are a respondent's age, year of interview fixed effects and the year at which the ethnographic information was collected. Whenever the samples are mixed gender – this is the case for the data from the World Values Survey – I also control for respondents' gender. In a third step, as a sensitivity check, I add a large set of additional controls, all of which are potentially endogenous. At the individual level, these are religion fixed effects, a dummy for living in an urban area, marital status fixed effects, and educational attainment

[10] In a small subsample, the *WVS* elicits ethnicity, but in the vast majority of cases this information does not contain categories that can be used to generate a match to a historical society. For example, in many countries, the variable takes values such as 'Black', 'White', or 'Hispanic'.

[11] Throughout, 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 (2018) illustrate the role of legal rights in female empowerment, and Goldin (1995) looks at the relationship between economic development and female labor force participation. Similarly, it is conceivable that countries differ in whether infibulation is legal and how well potential laws against infibulation are enforced.

fixed effects. At the ethnicity level, these are measures for jurisdictional hierarchy, polygyny, and kinship structure. All variable definitions and sources are described in section F in the appendix.

4 Main Results

4.1 Main Outcome Variables

This paper explores whether four seemingly distinct customs and norms serve the same purpose of disincentivizing women's promiscuity. In what follows, I test this hypothesis by exploring whether contemporary variation in individual-level adherence in these four norms is explained by ancestral reliance on pastoralism, a proxy for heightened paternity uncertainty.

First, I study anti-abortion attitudes using data from the *WVS* on 205,201 respondents from 96 countries. These respondents were asked to rate on a scale from 0 to 10 how justifiable abortion is. I generate a measure of anti-abortion attitudes using the same scale, so that higher values indicate stronger disapproval of abortion. On average, respondents give a rating of 7.5 (± 2.9).

Second, I zoom into a few countries in Africa where female genital cutting is practiced. The term female genital cutting refers to any alteration of women's genital area for non-medical reasons.[12] Infibulation is a specific form of female circumcision and describes the suturing close of the vaginal opening, leaving only a small opening to allow for the passage of urine and menstrual blood. A key feature of undergoing this procedure is that vaginal penetration becomes painful. Unlike other forms of female genital cutting, infibulation does not have the characteristics of a rite of passage or initiation ritual (Kennedy, 1970; Hayes, 1975b) as it is usually performed at home and well before the onset of puberty. Rather, it has been theorized to be a means of keeping women from having extramarital sex (Mackie, 1996; Dickemann, 1979). The *DHS* regularly asks (female) respondents whether they are circumcised. Typically, those who say 'yes' are then asked the follow-up question of whether they have undergone infibulation. Of the women who get asked this question, about 9% have undergone infibulation, 78% have not undergone infibulation, and 13% say that they don't know. Using this variable, I generate an indicator that takes value 1 if a respondent says she has undergone infibulation ($N = 10,379$) and value 0 if she has not undergone infibulation ($N = 86,092$). In total, this sample comprises 96,471 women from 13 countries.

Third, I rely on *DHS* data on 697,964 women from 41 countries to study their freedom to be mobile outside their house. Women were asked (i) whether they regard it as justified if a husband beats his wife for going out without telling him (yes/no), (ii) whether their husband gets jealous if the respondent talks to other men (yes/no), (iii) who decides about visits to relatives (1 if the husband alone decides, 0 if the respondent decides alone or together with the

[12] Different forms of female genital cutting exist, some less invasive, some more invasive. Many forms of female genital cutting are part of rites of passage from girl- into womanhood (Abusharaf, 2006; Shell-Duncan and Hernlund, 2000).

husband), (iv) whether their husband insists on knowing where she is (yes/no). Typically, each respondent answered only a subset of these questions. To proxy how restricted a woman is in her freedom of mobility, I generate a score by simply averaging over all non-missing indicators. This gives me a measure between 0 and 1 of how restricted a woman is in her freedom of mobility, with higher values indicating more restrictions.[13] On average, the score takes value 0.35 (±0.38).

Fourth, I proxy the presence of strong social norms against women's promiscuity by making use of data from the *DHS* on their sexual behavior. 664,313 women in 39 countries were asked whether they had cheated on their spouse in the year preceding the interview. A slightly smaller sample of 447,834 women in 37 were asked to state the number of sexpartner they have had in their lifetime. Arguably, strong social norms against women's promiscuity should result in fewer sexpartners and a lower likelihood of cheating. I further explore this intuition by making use of a much smaller sample of about 50,000 women who were asked to state their opinion about whether women should wait with sex until marriage and whether they should be faithful in marriage.

4.2 Baseline Results

To test my hypothesis, I first regress each individual-level outcome on an individual's ancestral ethnic group's reliance on pastoralism holding constant the country that respondents live in. In a second specification, I add controls for an individual's age, their gender (if the sample includes both men and women), year of interview fixed effects, and the year in which the ethnographic information was collected. I hypothesize that ancestral reliance on pastoralism predicts stronger anti-abortion attitudes, a higher likelihood of being infibulated, more restrictions on women's freedom of mobility, and adherence to more restrictive norms about women's promiscuity as captured by a lower likelihood of cheating on a spouse and overall fewer sexpartners.

For each outcome, I find statistically significant and economically meaningful relationships in the way predicted by my hypothesis. Figure 3 depicts the resulting coefficients on historical reliance on pastoralism.[14]

Anti-Abortion Attitudes Historical reliance on pastoralism predicts respondents' anti-abortion attitudes. A one standard deviation increase in a respondent's ancestral reliance on pastoralism increases a respondent's disapproval of abortion by about 4.9 percentage points of a standard deviation. Including controls for gender, age, the year in which the ethnographic information was collected and year of interview fixed effects only slightly decreases the coefficient on pastoralism to 0.041 ($p < 0.001$).

[13] In the analysis, I always include fixed effects for all potential item combinations that an individual's score can be made up of.

[14] Section B.2 in the appendix presents the corresponding, more detailed regression tables.

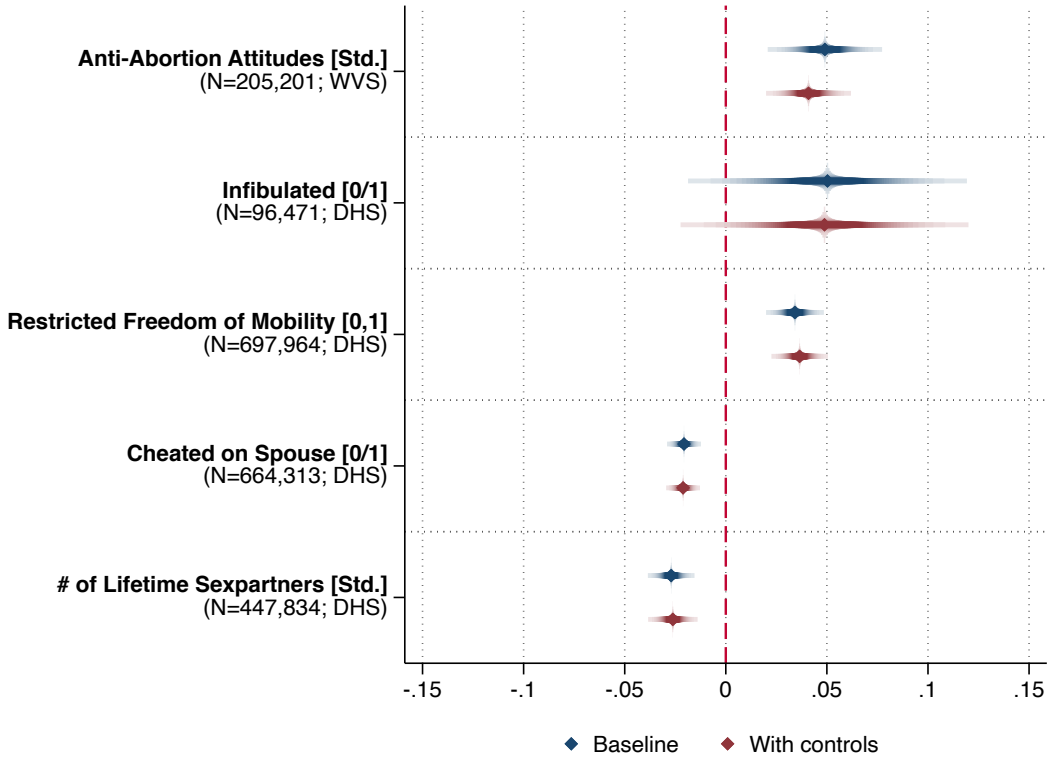

Figure 3: Coefficients on standardized values of individuals' ancestral ethnic group's reliance on pastoralism. The error bars represent confidence intervals (95%). Standard errors are clustered at the historical ethnicity level. Blue values represent the coefficients from the baseline specification that only includes country fixed effects. Red values represent the coefficients resulting from the specification that additionally includes a respondent's gender (only for the anti-abortion attitudes sample from the WVS), a respondent's age, year of interview fixed effects, and the year in which the ethnographic information was collected. The corresponding, more detailed regression tables are relegated to section B.2 in the appendix. Detailed information on the samples for each outcome, including the number of observations and the countries in which the data was collected, can be found in section B.1 in the appendix.

Infibulation Ancestral reliance on pastoralism affects the likelihood that a woman has undergone infibulation. A one standard deviation increase in how strongly a woman's ancestral ethnic group relied on pastoralism increases the likelihood that she has undergone infibulation by about 5 percentage points. Adding controls leaves this relationship virtually unchanged. Importantly, the relationship between historical reliance of an individual's ancestral ethnic group on pastoralism and the likelihood that she has undergone infibulation today is *specific* to this particular type of genital circumcision that makes vaginal penetration painful. Pastoralism does *not* predict other forms of female genital cutting that do not make penetration painful for women.[15] Similarly, it does *not* predict male circumcision, as shown in Table A8 in the appendix. These two placebo exercises provide additional important evidence for the interpretation that the relationship between pastoralism and infibulation indeed reflects the desire to keep women from having extramarital sex.

[15]Table A7 in Section B.3.1 in the appendix shows the results.

Restrictions on Women's Freedom of Mobility How strongly a woman's ancestors relied on pastoralism predicts how strongly a woman is restricted in her freedom of mobility. More specifically, a one standard deviation increase in ancestral reliance on pastoralism increases the restrictions on mobility score by about 3.2 percentage points, which again remains unaffected when including controls.[16] While these results capture the effect of pastoralism on *de facto* restrictions, women can also *de jure* be restricted in their freedom of mobility. In line with my individual-level results, countries with a higher average ancestral reliance on pastoralism are more likely to have legal restrictions on women's freedom of movement or freedom of dress in public spaces (OECD, 2010).[17]

Social Norms against Women's Promiscuity Women who descend from societies that historally relied more on pastoralism are less likely to cheat on their partner and have fewer sexpartners in their lifetime. Again, this effect remains stable when adding controls for age, year of historical data collection, or year of interview fixed effects. One plausible interpretation of these results is that they reflect the presence of strong social norms against women's promiscuity. To further explore this interpretation, I use data from questions that asked respondents to state (i) whether or not women should abstain from having sex before marriage and (ii) whether or not married women should be faithful. This data is available for a smaller sample of about 50,000 respondents from 8 countries for both measures. In line with the idea that pastoralism favors the presence of strong social norms against women's promiscuity, I find that women who descend from more pastoral societies are more likely to say that women should abstain from having sex before marriage and that they should be faithful during marriage.[18] However, these results should be interpreted with some caution because there is only very little variation in the stated norms: 94% of respondents think that married women should be faithful and about 90% of respondents say that women should not have sex before marriage.[19]

An alternative – and non-mutually exclusive – interpretation of the relationships between pastoralism on the one hand and the number of sexpartners and likelihood of cheating on the other hand is that these two results provide evidence on the presence and efficacy of some custom that intends to keep women from being promiscuous, other than social norms.

[16]Section B.3.2 in the appendix presents the results on the single components of these scores and discusses them in more detail.

[17]Section B.4 in the appendix provides these results.

[18]Section B.3.3 in the appendix documents these results.

[19]Moreover, the same patterns hold true for men: they are also expected to be faithful and not cheat, and respondents from more pastoral societies hold these views more strongly. This is perhaps somewhat unsurprising: if women are expected to abstain from extramarital sex it seems almost mechanical that men are expected to behave similarly simply because of their counterpart role in this. The corresponding regression table is relegated to section B.3.3 in the appendix.

4.3 Sensitivity to Endogenous Variables

Next, I test the robustness of the pattern documented in the preceding section by exploring their sensivity to a set of additional control variables.

At the individual level, I add fixed effects for a person's marital status, their educational attainment, and their religion. I also include a dummy for whether a respondent lives in a more urban or more rural setting. At the historical level, I control for jurisdictional hierarchy, kinship structure, and polygyny. Most if not all of these controls are 'bad' in the sense that they are likely endogenous to pastoralism. Nevertheless, it is interesting to explore the sensitivity of the results. A detailed description of all control variables can be found in section F in the appendix.

Including this large set of additional controls decreases the sample sizes, due to missing values both at the individual level and at the historical society level. However, even after including these endogenous controls, an individual's historical reliance on pastoralism still significantly predicts contemporary variation in most outcomes as illustrated in figure 4. For anti-abortion attitudes, infibulation, and the number of sexpartners a woman has had the coefficient on pastoralism remains virtually unchanged when including this large set of controls. For restrictions on women's freedom of mobility, the coefficient decreases in size by almost two thirds, but remains marginally significant. For whether a respondent has cheated on their spouse, including the endogenous controls yields a very small coefficient that is statistically indistinguishable from zero. This can entirely be attributed to including religion fixed effects into the specification. Thus, overall, the pattern documented in the preceding section does not appear to be particularly sensitive to the inclusion of additional endogenous variables.

5 Instrumental Variable Approach

So far, the analysis has relied on simple OLS regressions using historical reliance on pastoralism as a predictor variable. Whether the documented associations can be understood as causal crucially depends on what determines variation in historical reliance on pastoralism.

Pastoralism involves having domesticated animals which need certain ecological conditions to survive. For example, herding animals need access to pasture grasses, which grow well on certain soils.[20] Similarly, areas in which the Tsetse fly is endemic are particularly unsuitable for pastoralism because the Tsetse fly transmits trypanosome disease that is lethal to livestock (Alsan, 2015; Diamond, 1997). Therefore, environmental conditions of societies' homelands are the most immediate candidate as an exogenous source of variation across groups in reliance on pastoralism.

In a recent study, Beck and Sieber (2010) explore the extent to which climate and soil conditions determine the spatial distribution of four basic land-use types (hunting-gathering, agriculture, sedentary animal husbandry, and nomadic pastoralism) and provide data on the

[20] E.g., wetland soils or leptosols are typically shallow over calcareous material and unattractive for agriculture because of their inability to hold water but are ideal for extensive grazing.

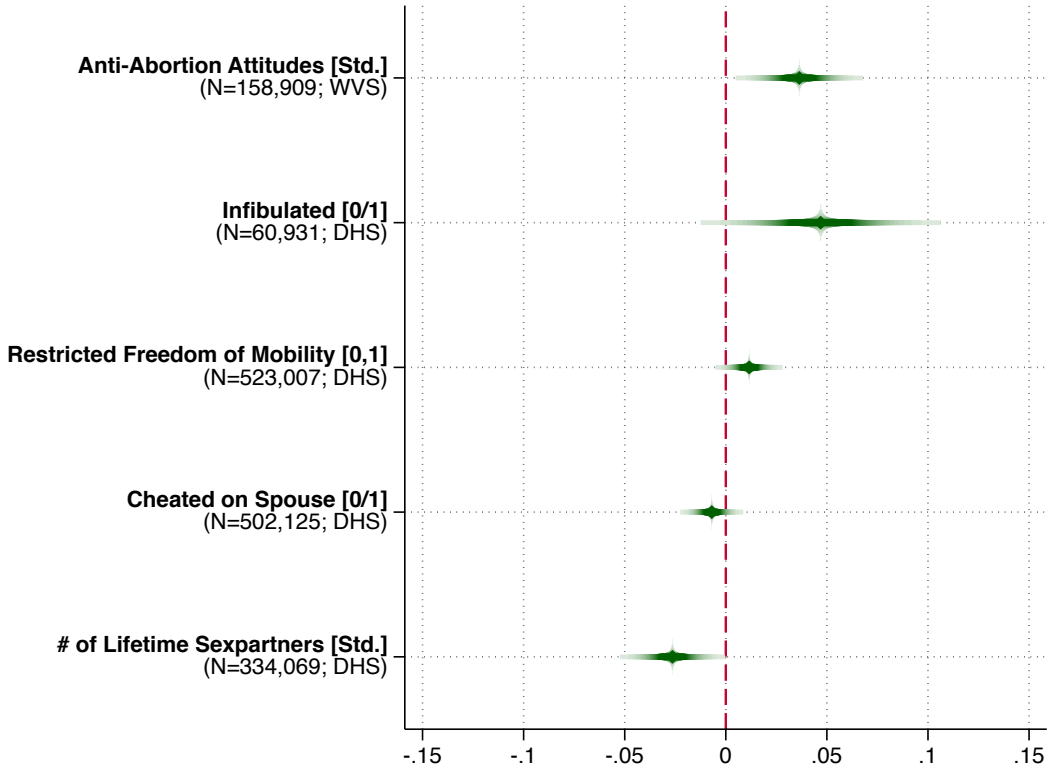

Figure 4: Coefficients on standardized values of individuals' ancestral ethnic group's reliance on pastoralism. The error bars represent confidence intervals (95%). Standard errors are clustered at the historical ethnicity level. The depicted coefficients result from an extensive specification that includes country fixed effects, a respondents age (and gender in the case of anti-abortion attitudes), year of interview fixed effects, as well as a large set of potentially endogenous controls: religion fixed effects, marital status fixed effects, a dummy for living in an urban area, educational attainment fixed effects, and historical group-level measures for polygyny, jurisdictional hierarchy, and kinship structure. The sample sizes for these regressions are smaller than the ones presented in the preceding figure due to missing values in the additional control variables. The corresponding, more detailed regression tables are relegated to section B.2 in the appendix. Detailed information on the samples for each outcome, including the number of observations and the countries in which the data was collected, can be found in section B.1 in the appendix.

environmental conditions that are favorable for the different land-use types. To generate their measures of land suitability for the land-use types, they combine detailed information about climate (e.g., temperature, precipitation, and altitude) between 1961 and 1991 (Hijmans et al., 2005) with soil classification data from the United Nations Food and Agriculture Organization. Using maximum entropy modelling for each land use type, they estimate the probability with which each type of land use occurs on five-by-five kilometer grid cells for Africa, Asia, Australia, and Europe.

Based on their data, I first identify for each grid cell the maximum value of its suitability for sedentary and for nomadic pastoralism. From that measure of suitability for pastoralism I subtract a grid cell's suitability for agriculture.[21] This gives me a grid cell level measure of land

[21]The correlation between land suitability for agriculture and land suitability for pastoralism is -0.08.

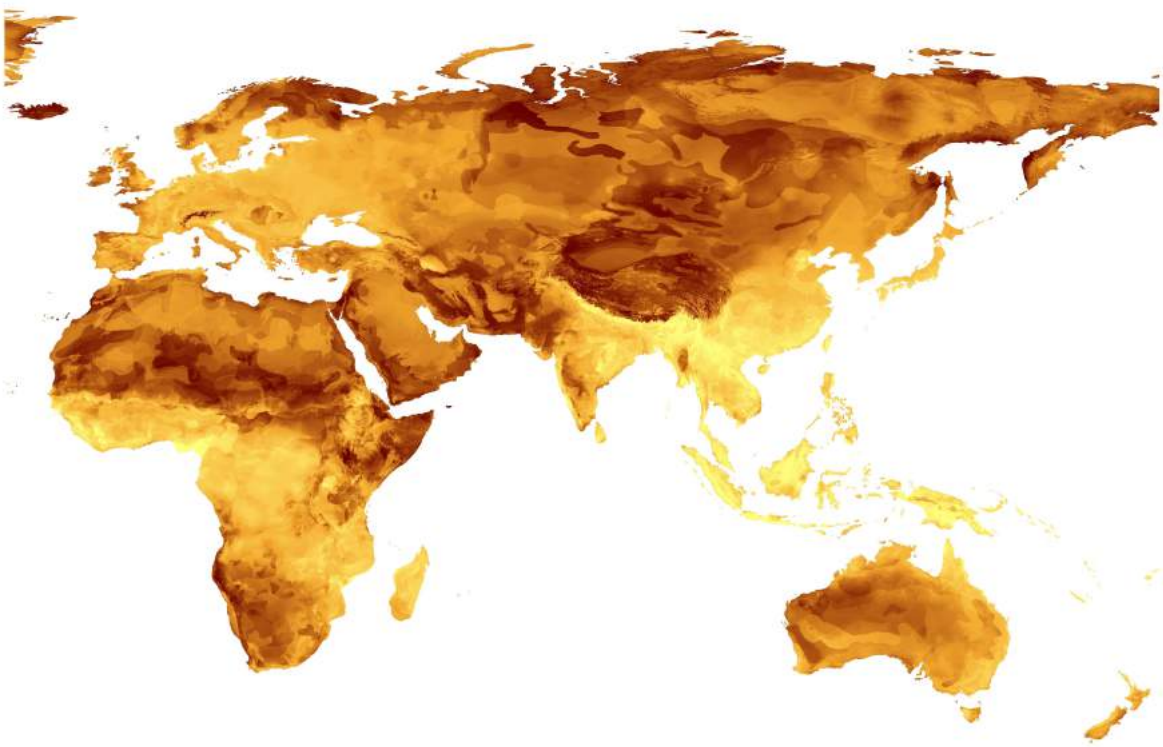

Figure 5: Land suitability for pastoralism based on data from Beck and Sieber (2010). Darker areas indicate higher suitability. Data is available only for Africa, Europe, Asia, and Australia.

suitability for pastoralism relative to agriculture. Figure 5 shows the resulting heat map. Darker areas indicate a higher land suitability for pastoralism relative to agriculture, and lighter areas indicate a lower land suitability.

Using this data, I assign a measure of suitability for pastoralism relative to agriculture to the 750 societies in the *Ethnographic Atlas* located in Africa, Asia, Australia and Europe. 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.[22] Actual historical reliance on pastoralism is strongly positively correlated with this suitability measure ($\rho = 0.54$, $p < 0.01$). Figure A3 in Section A in the appendix depicts this relationship conditional on continent fixed effects.[23] Thus, the evidence presented here suggests that variation in historical dependence on pastoralism is largely determined by ecology.

To lend further empirical support to the causal interpretation of my results, I instrument historical reliance on pastoralism with land suitability for pastoralism relative to agriculture. The assumption underlying the exclusion restriction is that land suitability does not affect the gen-

[22]None of the results presented in this section depend on the somewhat arbitrary 25-km radius. Very similar estimates result when taking a radius of 10, 50, or 75 km.

[23]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 measurement error.

der customs through channels other than pastoralism. The samples in this analysis are slightly smaller because the land suitability data is available only for about 750 of the more than 1,200 societies in the *Ethnographic Atlas*. Using these slightly smaller samples, table 2 presents the results for the OLS and the corresponding IV estimates for each of my main outcome measures.

Overall, the IV estimates are largely in line with the OLS estimates. All have the same sign although the IV estimates tend to be larger than their OLS counterparts. This can at least partly be attibuted to measurement error in the variable capturing reliance on pastoralism. For four of the five outcome variables, the instrumental variable approach yields significant coefficients. For anti-abortion attitudes, the F-statistic of the first stage is so small that, unsurprisingly, the second stage is not significant. For this outcome, the instrument is not valid because there is only very little within country variation in the land suitability measure for pastoralism in this sample.[24] For infibulation, the instrument seems weak as well, but the second stage is significant and similar to the OLS estimate. For the other three outcome measures, the first stage is much stronger, and the second stage yields significant coefficients.

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

6 Evidence on Paternity Uncertainty as the Mechanism

This paper argues that pastoralism favored the adoption of customs that keep women from having extramarital sex because pastoralism was characterized by frequent male absences, making women's behavior less observable to them. To provide further evidence for the idea that the customs that I study indeed represent attempts to decrease paternity uncertainty, I show that they are *not* predicted by variables that capture a range of plausible alternative explanations.

I begin by addressing the concern that the results in this paper merely reflect that pastoralism is a particularly male-dominated form of subsistence. If indeed male dominance alone was sufficient to generate the observed patterns, other forms of subsistence that are similarly male-dominated, such as plow agriculture, should generate the same results. Indeed, as documented in the seminal work by Alesina et al. (2013), plow agriculture contributed to low female labor force participation. Presumably, this is because in plow agriculture men have a pronounced physical advantage in production over women (Boserup, 1970). In line with this view, in 92% percent of societies in the *Ethnographic Atlas* that have plow agriculture, it is mostly or exclusively practiced by men. Plow agriculture therefore constitutes an important alternative explanatory variable. To rule out that this plausible alternative, I regress all main outcome variables on an indicator for the use of the plow in agriculture, following the work by Alesina et al. (2013). Table 3 presents the results. Historical plow use is not associated with anti-abortion attitudes, restrictions on women's freedom of mobility, or the likelihood that a woman has cheated on her partner. It is negatively associated with the likelihood that a woman has undergone infibulation and positively associated with the number of sexpartners a woman has had, opposite

[24] A regression of the land suitability measure on country fixed effects yields an R-squared of 0.84.

Table 2: Instrumental Variable Estimates

	Dependent variable:									
	Anti-Abortion Attitudes [Std.]		Infibulated [0/1]		Restrictions on Freedom of Mobility [(0,1)]		Cheated Last Year [0/1]		# Lifetime Sexpartners [Std.]	
	OLS	IV	OLS	IV	OLS	IV	OLS	IV	OLS	IV
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Hist. Dep. on Pastoralism [Std.]	0.057	0.140	0.050	0.084	0.034	0.068	-0.021	-0.026	-0.027	-0.058
	(0.000)	(0.223)	(0.058)	(0.031)	(0.000)	(0.000)	(0.000)	(0.014)	(0.000)	(0.022)
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	167073	167073	96471	96471	691583	691583	657848	657848	445721	445721
R^2	0.161	0.158	0.048	0.039	0.131	0.126	0.102	0.101	0.021	0.020
# of clusters	138	138	102	102	269	269	262	262	252	252
F-statistic (1st stage)	NA	1.03	NA	2.48	NA	11.98	NA	10.01	NA	10.11

Notes. OLS and IV estimates, p-values in parentheses. Standard errors are clustered at the ethnicity level. Samples are slightly smaller than in section 4 because of missing data in the instrumental variable.

to the pattern found with pastoralism.[25] This pattern remains the same when adding historical reliance on pastoralism to the model. Importantly, the coefficient on pastoralism is always virtually identical to the one in the baseline specification presented in Section 4. Thus, plow agriculture does not systematically predict the outcomes, and in some cases, has the *opposite* relationship with the outcomes than pastoralism. This strongly suggests that male dominance alone does not explain my main results.

Next, I turn to economic development as a potential mechanism behind the observed pattern. While the analysis holds constant *current* economic development by always including country fixed effects, it is conceivable that the level of *historical* economic development varies with pastoralism and that this might contribute to explaining the results. Unfortunately, the *Ethnographic Atlas* does not contain any direct measures of the historical economic development. However, economic development tends to be strongly associated with population size, institutional development, and more permanent settlements (see, for example, Gennaioli and Rainer (2007)). To explore whether the level of historical economic development is a likely mechanism behind my findings, I therefore explore the association between my main outcome variables and three proxies for historical economic development: (i) historical population size, (ii) jurisdictional hierarchy as a measure for institutional development, and (iii) settlement patterns. None of these proxies are perfect measures of historical economic development, and all of them are potentially endogenous to pastoralism. The latter is true in particular for settlement patterns. Groups with more pastoralism are more mobile, on average, and, unsurprisingly, there is a strong negative correlation between a society's reliance on pastoralism and their settlement pattern (coded from fully nomadic to fully settled). Nevertheless, in sum, neither of the three proxies exhibits a (robust) systematic relationship with contemporary adherence to customs that reflect concerns over women's chastity. For jurisdictional hierarchy and population size, all coefficients are insignificant. Settlement patterns exhibit a somewhat systematic relationship with the various customs. However, this seems to be attributable entirely to the fact that settlement patterns are an outcome of pastoralism themselves. The coefficients on settlement patterns tend to go to zero in size and become insignificant in their statistical relevance once pastoralism is added as a predictor. Section C.1 in the appendix provides the results. In sum, it seems unlikely that the relationship between customs that keep women from being promiscuous and pastoralism is merely a reflection of historical differences in economic development.

In the same way, I show that the relationship studied in this paper is specific to the form of

[25] I can only speculate about these two statistically significant associations, if they represent more than false positives. In the case of infibulation, one potential reason is that the significant association with plow agriculture is just an artefact of this sample. There is very little variation in historical plow use in the sample. In fact, plow use varies only within two countries in the infibulation sample. Therefore, it is unclear whether this result is particularly valid. An alternative explanation is that societies with plow use had very little reason to be concerned about women's chastity as they were mostly doing work around the house, as argued in the work by Boserup (1970) and Alesina et al. (2013). Maybe, this generated particularly little need for a custom like infibulation and a more accepting attitude towards women's promiscuity, as reflected in the larger number of sexpartners. However, in that case it would be unclear why we do not significant associations in the case of restrictions on women's freedom of mobility and anti-abortion attitudes.

Table 3: The use of the plow in agriculture and concerns over women's chastity

	Dependent variable:									
	Anti-Abortion Attitudes [Std.]		Infibulated [0/1]		Restricted Freedom of Mobility [Std.]		Cheated [0/1]		# Sexpartners [Std.]	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Hist. Plow Use [0/1]	0.035	0.013	-0.43	-0.36	-0.051	-0.022	-0.0099	-0.024	0.085	0.069
	(0.634)	(0.702)	(0.005)	(0.003)	(0.182)	(0.498)	(0.697)	(0.149)	(0.004)	(0.001)
Hist. Dep. on Pastoralism [Std.]		0.048		0.039		0.034		-0.021		-0.026
		(0.000)		(0.062)		(0.000)		(0.000)		(0.000)
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	205644	205644	96471	96471	697964	697964	664313	664313	447834	447834
R^2	0.1822	0.1830	0.053	0.064	0.128	0.133	0.098	0.101	0.020	0.021

Notes. OLS estimates, p-values in parentheses.

animal husbandry that involves male absence (pastoralism), but does not generalize to other forms of animal husbandry. The most common *other* forms of animal husbandry are having pigs or poultry, somewhat less common are bee keeping, having dogs, fowls, or guinea pigs. Neither of these types of domesticated animals are taken out to pasture. Accordingly, this type of animal husbandry should not predict contemporary adherence to norms that aim at preventing women's promiscuity. For anti-abortion attitudes, the coefficient is statistically significant and has the same sign as pastoralism but is very small (0.007). However, animal husbandry with other animals is unrelated to restrictions on women's freedom of mobility and the likelihood of cheating. In constrast to pastoralism, it has a *positive* association with the number of sexpartners a woman has in her lifetime.[26] Thus, overall, there is no systematic relationship with customs that restrict women's promiscuity. Section C.2 in the appendix provides these results.

In sum, the customs that presumably intend to keep women from having extramarital sex are systematically predicted by reliance on pastoralism, but are not associated in the same systematic way with historical measures of male dominance, economic development, or forms of animal husbandry that do not involve male absence. Taken together, this provides suggestive evidence for paternity uncertainty as the main functional need behind the adoption and practice of such customs.

7 Discussion

Several aspects about the method in this paper and the possible interpretations of the empirical results are worth discussing.

First, pastoralism is certainly not the only form of economic production that comes with frequent and extended periods of male absence, or, more generally, a monitoring problem of women's behavior. For example, in certain types of high sea fishing, such as whale hunting, men leave the settlements frequently for extended periods. Similarly, many types of employment in modern economies feature absences, typically of men, such as oil mining, long-distance truck driving, or more generally, seasonal migration for work opportunities across regions. However, using pre-industrial pastoralism as a measure for high paternity uncertainty has several important features. First and foremost, variation in pre-industrial pastoralism is largely exogenously determined by conditions in the natural environment, allowing for causal inference. Moreover, studying the adoption of customs or social norms typically requires a long time horizon, as they take time to evolve. Pre-industrial pastoralism, was practiced over many centuries, and in many regions, even millenia, and is therefore ideally suited when studying more ultimate determinants. Finally, almost all regions of the world exhibit variation in pre-industrial pastoralism. This is important to adequately adress the very general hypothesis about a functional relationship between paternity uncertainty and customs that reflect concerns over women's chastity.

Second, this paper is concerned with paternity uncertainty as a result of frequent but non-

[26]There is no variation in animal husbandry with other animals in the infibulation sample.

permanent absences of men. A recent literature has shown that *permanent* absences of men have quite different implications than the ones documented here. For example, Teso (2019) demonstrates that the large number of permanently missing men in parts of Africa as a result of the slave trade pushed women to engage in previously male work domains, leading to permanently higher rates of female labor force participation and more social acceptance of women in the labor market. In the same spirit, Goldin and Olivetti (2013) study the role of the second world war in understanding the rise in female labor force participation. When men are gone permanently, the question of paternity is not relevant and therefore these scenarios are somewhat distinct.

Third, while the results shown in this paper show a strong and robust relationship between pastoralism and customs that aim at keeping women from having extramarital sex, this does not imply that *all* pastoral societies exhibit that pattern. For example, Voigtländer and Voth (2013) study a very particular case of pastoralism in England after the Black Death (1348-1350). After the Black Death had killed between a third and half of the European population, land became abundant, leading to a general shift of the economy towards pastoral production and creating demand for female employment as servants in the pastoral sector. There is no evidence that this specific case of pastoralism created a monitoring problem of women's sexual behavior, nor that customs aimed at restricting women's promiscuity were adopted.

Fourth, this paper uses spatial data, which can be highly autocorrelated and the standard errors in the data might be underestimated, as pointed out in recent research by Kelly (2020) and discussed in Voth (2020). To make sure that the results in this paper do not merely reflect spatial noise or incorrect adjustments for non-independent observations, I run two types of robustness checks. First, I employ a heteroskedasticity and autocorrelation consistent procedure by computing adjusted standard errors following Conley (1999) and Colella et al. (2019) based on the geographical location of the historical societies. As section D.1 in the appendix shows, the results are robust to adjusting the standard errors to account for spatial autocorrelation. Second, I go a step further to account for the fact that historical societies might be related even when they are geographically distant and cluster standard errors at the language family level. This arguably very conservative approach reflects the idea that language trees are another way to capture cultural relatedness. Intuitively, groups that speak languages that are part of the same language family are more closely related than groups that speak languages from different language families. As section D.2 in the appendix shows, the results are largely robust to this procedure as well. For infibulation, the results are a bit inconclusive as the number of language family clusters in the sample is too small (N=11).

8 Conclusion

Throughout history, people around the world have been concerned with women's promiscuity and typically idealized their chastity. Mary's virginity is a central aspect of religious worship of the mother of Jesus. Hindu epics tell of the Panchakanya, a group of five iconic women who are

described as ideal women: virgins and chaste wives (Battacharya, 2000). European medieval and Renaissance literature and poetry is full of allusions to the (mythical) chastity belt, a device that allegedly gave jealous husbands some peace of mind when they spent time away from their wives (Classen, 2007).

This paper provides evidence that norms and customs that presumably intend to keep women from being promiscuous emerge as a response to heightened paternity uncertainty. It shows that contemporary variation in anti-abortion attitudes, infibulation, restrictions on women's freedom of mobility, as well as restrictive norms about women's promiscuity can be traced back to ancestral reliance on pastoralism, which was characterized by paternity uncertainty as men were frequently gone when taking the animals to pasture grounds.

These results not only shed light on the historical origins. Equally so, they suggest that various customs and norms that are practiced in different parts of the world and that might seem unrelated are conceptually closely related through their common functional role. Anti-abortion attitudes are functionally equivalent to infibulation or restrictions on women's freedom of mobility.

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.

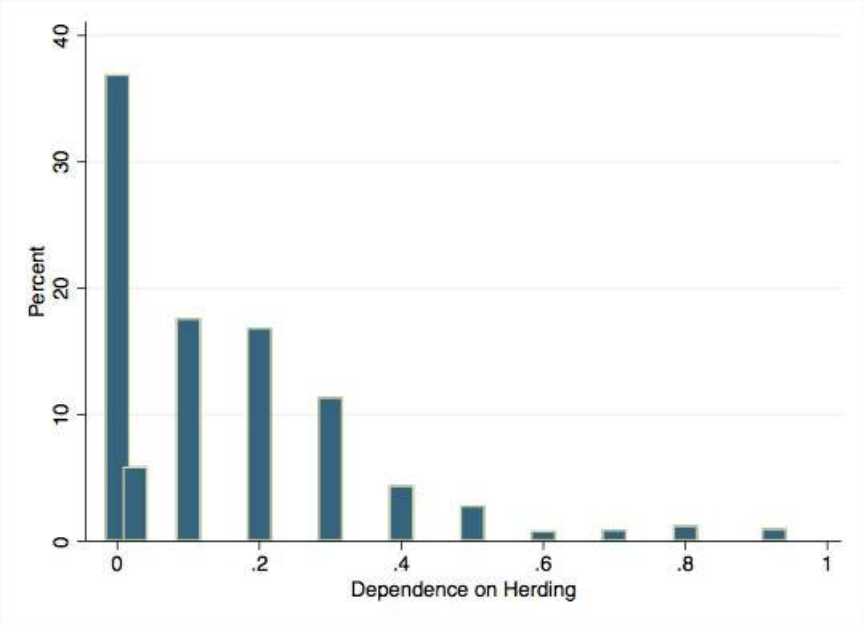

Figure A1: Distribution of dependence on pastoralism across 1,202 societies in the *Ethnographic Atlas*.

Figure A2 illustrates that pastoralism, in the vast majority of societies, is practiced exclusively by men. 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.[27] Thus, pastoralism is male dominated, suggesting that it is men who are typically absent from camp, not women.

[27]Societies 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.

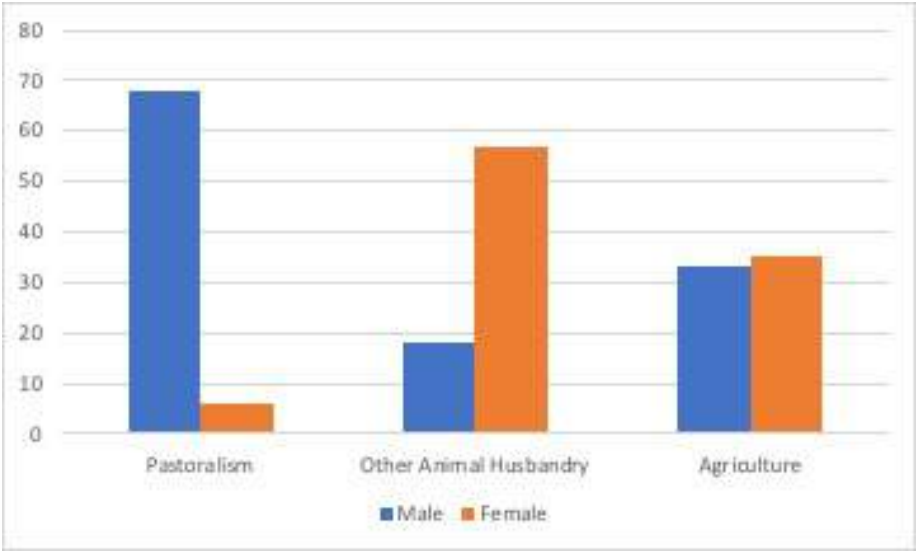

Figure A2: Share of societies in which a form of subsistence (indicated on the x-axis) is done mostly or exclusively by men (blue bars), versus share of societies in which a subsistence form is practiced mostly or exclusively by women (orange bars). Based on data from the *Ethnographic Atlas*.

A.2 Historical Validity

Table A1: Historical Pastoralism and Motifs in Traditional Folklore

	Dependent variable:	
	Share of Motifs: Women as Sexual	Share of Motifs: Men as Sexual
	(1)	(2)
Reliance on Pastoralism [Std.]	-0.071	-0.0084
	(0.004)	(0.747)
Ln(Year of First Publication)	4.78	6.43
	(0.006)	(0.001)
Ln(Number of Publishers)	0.20	0.18
	(0.000)	(0.000)
Continent FE	Yes	Yes
Observations	1124	1124
R^2	0.159	0.076

Notes. OLS estimates, robust standard errors.

A.3 Ecological Determinants of Pastoralism

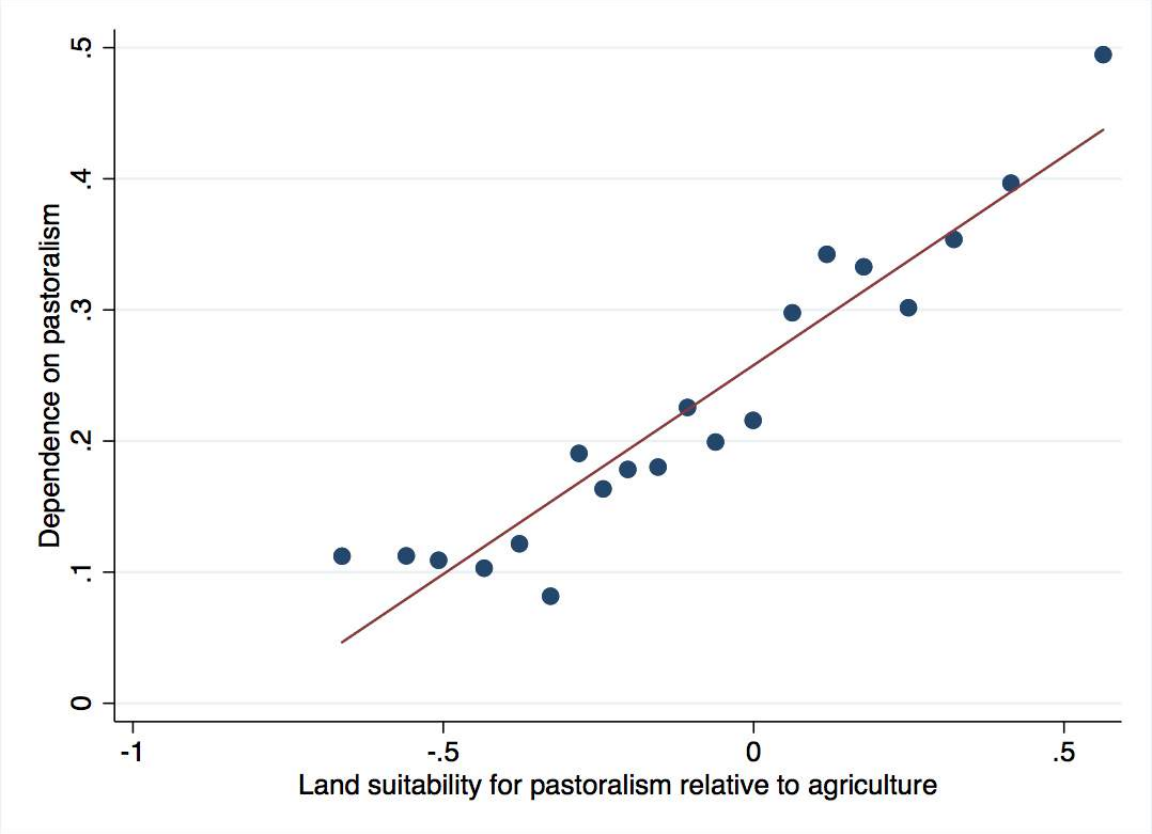

Figure A3: Binscatter plot: dependence on pastoralism and land suitability for pastoralism relative to agriculture for 750 societies in the *Ethnographic Atlas* conditional on continent fixed effects.

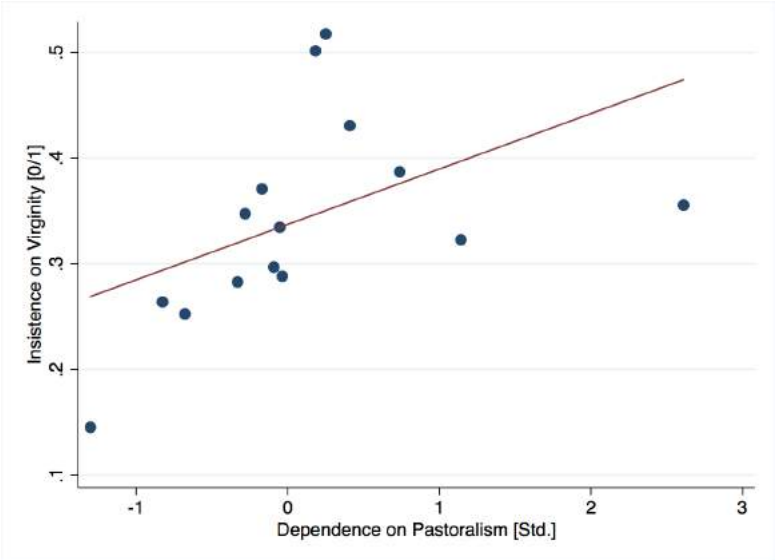

Figure A4: Binscatter plot, $N = 592$ societies, data from the *Ethnographic Atlas*. Association between insistence on female virginity in a society and a society's dependence on pastoralism, residualized of continent fixed effects.

B Main Results: Additional Material

B.1 Sample Details

Variable (Source)	Sample size	List of countries in which data was collected
Anti-Abortion Attitudes (WVS)	205,201 (in 96 countries)	Albania, Algeria, Andorra, Azerbaijan, Argentina, Australia, Bangladesh, Armenia, Bolivia, Bosnia Herzegowina, Brazil, Bulgaria, Myanmar, Belarus, Canada, Chile, China, Taiwan, Colombia, Cyprus, Czech Republic, Ecuador, Ethiopia, Estonia, Finland, France, Georgia, Germany, Ghana, Greece, Guatemala, Haiti, Hong Kong, Hungary, India, Indonesia, Iran, Iraq, Italy, Japan, Kazakhstan, Jordan, South Korea, Kuwait, Kyrgyzstan, Lebanon, Latvia, Libya, Lithuania, Macau SAR, Malaysia, Mali, Mexico, Moldova, Montenegro, Morocco, Netherlands, New Zealand, Nicaragua, Nigeria, Pakistan, Peru, Philippines, Poland, Puerto Rico, Qatar, Romania, Russia, Rwanda, Saudi Arabia, Serbia, Singapore, Slovakia, South Africa, Zimbabwe, Spain, Sweden, Switzerland, Tajikistan, Thailand, Trinidad and Tobago, Tunisia, Turkey, Uganda, Ukraine, North Macedonia, United Kingdom, Tanzania, United States, Burkina Faso, Uruguay, Uzbekistan, Venezuela, Yemen, Zambia.
Infibulation (DHS)	96,471 (in 13 countries)	Benin, Burkina Faso, Chad, Côte d'Ivoire, Ethiopia, Guinea, Kenya, Mali, Niger, Nigeria, Senegal, Sierra Leone, Togo.
Restrictions on on Women's Freedom of Mobility Score (DHS)	697,964 (in 41 countries)	Afghanistan, Albania, Angola, Benin, Bolivia, Burkina Faso, Cameroon, Chad, Congo (Brazzaville), Côte d'Ivoire, DRC, Ethiopia, Gabon, Gambia, Ghana, Guatemala, Guinea, Honduras, India, Kenya, Liberia, Malawi, Mali, Moldova, Mozambique, Namibia, Nepal, Niger, Nigeria, Pakistan, Papua New Guinea, Peru, Philippines, Senegal, Sierra Leone, South Africa, Togo, Uganda, Ukraine, Zambia, Zimbabwe.
Cheated (DHS)	664,313 (in 39 countries)	Albania, Angola, Benin, Bolivia, Burkina Faso, Cameroon, Chad, Congo (Brazzaville), Côte d'Ivoire, DRC, Ethiopia, Gabon, Gambia, Ghana, Guatemala, Guinea, Honduras, India, Kenya, Liberia, Malawi, Mali, Moldova, Mozambique, Namibia, Nepal, Niger, Nigeria, Papua New Guinea, Peru, Philippines, Senegal, Sierra Leone, South Africa, Togo, Uganda, Ukraine, Zambia, Zimbabwe.
# Sexpartners (DHS)	447,834 (in 37 countries)	Albania, Angola, Benin, Burkina Faso, Cameroon, Chad, Congo (Brazzaville), Côte d'Ivoire, DRC, Ethiopia, Gabon, Gambia, Ghana, Guatemala, Guinea, Honduras, India, Kenya, Liberia, Malawi, Mali, Mozambique, Namibia, Nepal, Niger, Nigeria, Papua New Guinea, Peru, Philippines, Senegal, Sierra Leone, South Africa, Togo, Uganda, Ukraine, Zambia, Zimbabwe.

B.2 Main Results: Regression Tables

B.2.1 Anti-Abortion Attitudes

Table A2: Main Results: Anti-Abortion Attitudes

	Dependent variable:			
	Anti-Abortion Attitudes [Std.]			
	(1)	(2)	(3)	(4)
Hist. Reliance on Pastoralism [Std.]	0.049	0.046	0.041	0.036
	(0.000)	(0.000)	(0.000)	(0.001)
Age of Respondent (in years)		0.0058	0.0058	0.0035
		(0.000)	(0.000)	(0.000)
Female [0/1]		-0.00037	-0.00056	-0.022
		(0.976)	(0.963)	(0.055)
Year of Historical Data Collection			-0.00058	-0.00044
			(0.000)	(0.000)
Urban [0/1]				-0.072
				(0.000)
Jurisdictional Hierarchy				0.0026
				(0.885)
Polygyny				-0.0026
				(0.973)
Kinship Structure (Score)				0.0097
				(0.902)
Country FE	Yes	Yes	Yes	Yes
Year of Interview FE	No	Yes	Yes	Yes
Religion FE	No	No	No	Yes
Marital Status FE	No	No	No	Yes
Edu. Attainm. FE	No	No	No	Yes
Observations	205201	205201	205201	158909
R^2	0.183	0.198	0.199	0.230
# of Clusters	138	138	138	125
Mean of Dependent Variable	0 [Std.]	0 [Std.]	0 [Std.]	0 [Std.]

Notes. OLS estimates, p-values in parentheses. Standard errors are clustered at the ethnicity level.

B.2.2 Infibulation

Table A3: Main Results: Infibulation

	Dependent variable:			
	Respondent is Infibulated [0/1]			
	(1)	(2)	(3)	(4)
Hist. Dep. on Pastoralism [Std.]	0.050	0.050	0.049	0.047
	(0.058)	(0.058)	(0.075)	(0.040)
Age at interview		0.00045	0.00046	0.00014
		(0.044)	(0.043)	(0.541)
Year of Observation			-0.00031	-0.0012
			(0.785)	(0.150)
Urban				0.00090
				(0.871)
Jurisdictional Hierarchy [Std.]				-0.013
				(0.293)
(mean) polygyny				0.26
				(0.037)
(mean) kinship_score				0.19
				(0.108)
Country FE	Yes	Yes	Yes	Yes
Year of Interview FE	No	Yes	Yes	Yes
Educ. Attainm. FE	No	No	No	Yes
Religion FE	No	No	No	Yes
Marital Status FE	No	No	No	Yes
Observations	96471	96471	96471	60931
R^2	0.048	0.055	0.055	0.151
# of Clusters	102	102	102	82
Mean of Dependent Variable	0.11	0.11	0.11	0.10

Notes. OLS estimates, p-values in parentheses. Standard errors are clustered at the ethnicity level.

B.2.3 Restrictions on Women's Freedom of Mobility

Table A4: Main Results: Restrictions on Freedom of Mobility

	Dependent variable:			
	Restrictions on Freedom of Mobility (0,1)			
	(1)	(2)	(3)	(4)
Hist. Dep. on Pastoralism [Std.]	0.032	0.034	0.034	0.012
	(0.000)	(0.000)	(0.000)	(0.066)
Age at interview		-0.0013	-0.0013	-0.0025
		(0.000)	(0.000)	(0.000)
Year of Observation			0.000039	0.000039
			(0.391)	(0.198)
Urban [0/1]				-0.054
				(0.000)
Jurisdictional Hierarchy [Std.]				-0.0077
				(0.358)
Polygyny				0.029
				(0.096)
Kinship Structure (Score)				-0.065
				(0.096)
Country FE	Yes	Yes	Yes	Yes
Year of Interview FE	No	Yes	Yes	Yes
Educ. Attainm. FE	No	No	No	Yes
Religion FE	No	No	No	Yes
Marital Status FE	No	No	No	Yes
Observations	697964	697964	697964	523007
R^2	0.139	0.162	0.162	0.189
# of Clusters	274	274	274	193
Mean of Dependent Variable	0.35	0.35	0.35	0.32

Notes. OLS estimates, p-values in parentheses. Standard errors are clustered at the ethnicity level. All specifications include fixed effects for the combination of variables an individual's score is composed of.

B.2.4 Respondent Cheated on Spouse

Table A5: Main Results: Respondent Cheated Last Year

	Dependent variable:			
	Respondent Cheated on Partner [0/1]			
	(1)	(2)	(3)	(4)
Hist. Dep. on Pastoralism [Std.]	-0.021	-0.021	-0.021	-0.0069
	(0.000)	(0.000)	(0.000)	(0.248)
Age at interview		-0.0038	-0.0038	0.0011
		(0.000)	(0.000)	(0.000)
Year of Observation			-0.000014	-0.000018
			(0.356)	(0.034)
Urban [0/1]				0.016
				(0.000)
Jurisdictional Hierarchy [Std.]				0.00020
				(0.963)
Polygyny				0.024
				(0.209)
Kinship Structure (Score)				0.023
				(0.289)
Country FE	Yes	Yes	Yes	Yes
Year of Interview FE	No	Yes	Yes	Yes
Educ. Attainm. FE	No	No	No	Yes
Religion FE	No	No	No	Yes
Marital Status FE	No	No	No	Yes
Observations	664313	664313	664313	502125
R^2	0.101	0.117	0.117	0.223
# of Clusters	267	267	267	194
Mean of Dependent Variable	0.10	0.10	0.10	0.10

Notes. OLS estimates, p-values in parentheses. Standard errors are clustered at the ethnicity level.

B.2.5 Number of Sexpartners in Lifetime

Table A6: Main Results: Number of Sexpartners in Lifetime

	Dependent variable:			
	Number of Lifetime Sexpartners [Std.]			
	(1)	(2)	(3)	(4)
Hist. Dep. on Pastoralism [Std.]	-0.027	-0.026	-0.026	-0.026
	(0.000)	(0.000)	(0.000)	(0.009)
Age at interview		0.0032	0.0032	0.0032
		(0.000)	(0.000)	(0.000)
Year of Observation			-0.000055	-0.000045
			(0.216)	(0.291)
Urban [0/1]				0.027
				(0.000)
Jurisdictional Hierarchy [Std.]				-0.014
				(0.136)
Polygyny				-0.0084
				(0.763)
Kinship Structure (Score)				0.026
				(0.539)
Country FE	Yes	Yes	Yes	Yes
Year of Interview FE	No	Yes	Yes	Yes
Educ. Attainm. FE	No	No	No	Yes
Religion FE	No	No	No	Yes
Marital Status FE	No	No	No	Yes
Observations	447834	447834	447834	334069
R^2	0.021	0.023	0.023	0.027
# of Clusters	256	256	256	179
Mean of Dependent Variable	0 [Std.]	0 [Std.]	0 [Std.]	0 [Std.]

Notes. OLS estimates, p-values in parentheses. Standard errors are clustered at the ethnicity level.

B.3 Main Results: Additional Analyses

B.3.1 Infibulation: Placebo Exercises

Table A7: Historical Reliance on Pastoralism and Circumcision w/o Infibulation

	Dependent variable:		
	Circumcised w/o Infibulation [0/1]		
	(1)	(2)	(3)
Hist. Dep. on Pastoralism [Std.]	0.049	0.052	0.052
	(0.317)	(0.285)	(0.287)
Age at interview		0.0055	0.0055
		(0.000)	(0.000)
Year of Observation			0.000058
			(0.977)
Country FE	Yes	Yes	Yes
Year of Interview FE	No	Yes	Yes
Observations	175216	175216	175216
R^2	0.412	0.426	0.426

Notes. OLS estimates, p-values in parentheses. Standard errors are clustered at the ethnicity level.

Table A8: Historical Reliance on Pastoralism and Male Circumcision

	Dependent variable:		
	Male Respondent is Circumcised [0/1]		
	(1)	(2)	(3)
Hist. Dep. on Pastoralism [Std.]	0.056	0.059	0.059
	(0.291)	(0.260)	(0.266)
Age at interview		0.0050	0.0050
		(0.000)	(0.000)
Year of Observation			-0.00013
			(0.957)
Country FE	Yes	Yes	Yes
Year of Interview FE	No	Yes	Yes
Observations	203171	203171	203171
R^2	0.384	0.397	0.397

Notes. OLS estimates, p-values in parentheses. Standard errors are clustered at the ethnicity level.

B.3.2 Freedom of Mobility: Components of the Score

Studying the relationship between pastoralism and the components of the score individually suggests that the effect of pastoralism on restrictions on women's freedom of mobility reflects that decision-making over leaving the house is in the hands of the husband instead of the woman herself. Higher ancestral reliance on pastoralism strongly predicts (i) that the respondent accepts being beaten by her husband if she goes out without asking him and (ii) that it is the husband alone who decides about visits to relatives. The former relationship remains significant also when controlling for a respondent's tolerance for other 'misbehaviors', such as burning the food or neglecting the kids, suggesting that the documented association does not merely reflect a respondent's general acceptance of intimate partner violence. On the other hand, historical reliance on pastoralism is not significantly associated with the two other components of the restrictions on freedom of mobility score: (i) whether the respondent thinks her husband is jealous if she talks to other men and (ii) the likelihood that the husband insists on knowing where a respondent is. Tables A9, A11, A12, and A10 show the results. One possible interpretation of the lack of association between the husband's jealousy and ancestral pastoralism is that, in line with evolutionary theory (Buss et al., 1992; Daly et al., 1982), male jealousy is a more universal trait of men as a result of evolution and should therefore not vary with historical subsistence modes. Similarly, it is conceivable that pastoralism does not make a husband more likely on insisting to know where a respondent is if husbands in more pastoral ethnic groups are already successful in deciding over women's mobility outside the house.

Table A9: Freedom of Mobility: Beating OK if Going Out w/o Asking

	Dependent variable:			
	Beating OK if Going Out w/o Asking [0/1]			
	(1)	(2)	(3)	(4)
Hist. Dep. on Pastoralism [Std.]	0.015	0.016	0.015	-0.0024
	(0.000)	(0.000)	(0.000)	(0.582)
Beating OK: When Neglecting Kids	0.54	0.53	0.53	0.51
	(0.000)	(0.000)	(0.000)	(0.000)
Beating OK: When Burning Food	0.22	0.21	0.21	0.20
	(0.000)	(0.000)	(0.000)	(0.000)
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	682111	682111	682111	570713
R^2	0.509	0.514	0.514	0.514

Notes. OLS estimates, p-values in parentheses. Standard errors are clustered at the ethnicity level.

Table A10: Freedom of Mobility: Husband Jealous

	Dependent variable:			
	Husband Jealous if Talk w other Men [0/1]			
	(1)	(2)	(3)	(4)
Hist. Dep. on Pastoralism [Std.]	0.0088	0.0075	0.0077	-0.015
	(0.360)	(0.418)	(0.407)	(0.186)
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	192626	192626	192626	159217
R^2	0.094	0.100	0.100	0.112

Notes. OLS estimates, p-values in parentheses. Standard errors are clustered at the ethnicity level.

Table A11: Freedom of Mobility: Husband Decides About Visits

	Dependent variable:			
	Husband Decides About Visits [0/1]			
	(1)	(2)	(3)	(4)
Hist. Dep. on Pastoralism [Std.]	0.057	0.056	0.055	0.017
	(0.000)	(0.000)	(0.000)	(0.023)
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	464296	464296	464296	386459
R^2	0.164	0.176	0.176	0.183

Notes. OLS estimates, p-values in parentheses. Standard errors are clustered at the ethnicity level.

Table A12: Freedom of Mobility: Husband Insists on Knowing Where Respondent is

	Dependent variable:			
	Husband Insists on Knowing Whereabouts [0/1]			
	(1)	(2)	(3)	(4)
Hist. Dep. on Pastoralism [Std.]	-0.0065	-0.0073	-0.0070	-0.020
	(0.248)	(0.187)	(0.189)	(0.017)
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	193637	193637	193637	159953
R^2	0.106	0.112	0.113	0.125

Notes. OLS estimates, p-values in parentheses. Standard errors are clustered at the ethnicity level.

B.3.3 Norms about Women's Sexual Behavior: Alternative Measures

Table A13: Historical Reliance on Pastoralism and Norms about Women's Promiscuity

	Dependent variable:					
	Women Should Wait Until Marriage [0/1]			Married Women Should Be Faithful [0/1]		
	(1)	(2)	(3)	(4)	(5)	(6)
Hist. Dep. on Pastoralism [Std.]	0.014	0.011	0.0053	0.0046	0.0042	-0.000072
	(0.000)	(0.000)	(0.580)	(0.033)	(0.099)	(0.996)
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	56020	56020	51364	56296	56296	51669
R^2	0.061	0.063	0.061	0.024	0.024	0.024

Notes. OLS estimates, p-values in parentheses. Standard errors are clustered at the ethnicity level. Individual controls are age and year of interview fixed effects. Historical controls are 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, polygyny, and kinship structure. The data for these samples come from respondents in the following countries: Benin, Congo (Brazzaville), Mali, Namibia, Niger, Nigeria, Ukraine, Zambia.

Table A14: Historical Reliance on Pastoralism and Norms about Men's Promiscuity

	Dependent variable:					
	Men Should Wait Until Marriage [0/1]			Married Men Should Be Faithful [0/1]		
	(1)	(2)	(3)	(4)	(5)	(6)
Hist. Dep. on Pastoralism [Std.]	0.013	0.011	-0.019	0.0064	0.0070	0.0011
	(0.014)	(0.010)	(0.237)	(0.002)	(0.002)	(0.930)
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	55690	55690	42494	56593	56593	43497
R^2	0.132	0.134	0.149	0.006	0.006	0.010

Notes. OLS estimates, p-values in parentheses. Standard errors are clustered at the ethnicity level. Individual controls are age and year of interview fixed effects. Historical controls are 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, polygyny, and kinship structure. The data for these samples come from respondents in the following countries: Benin, Congo (Brazzaville), Mali, Namibia, Niger, Nigeria, Ukraine, Zambia.

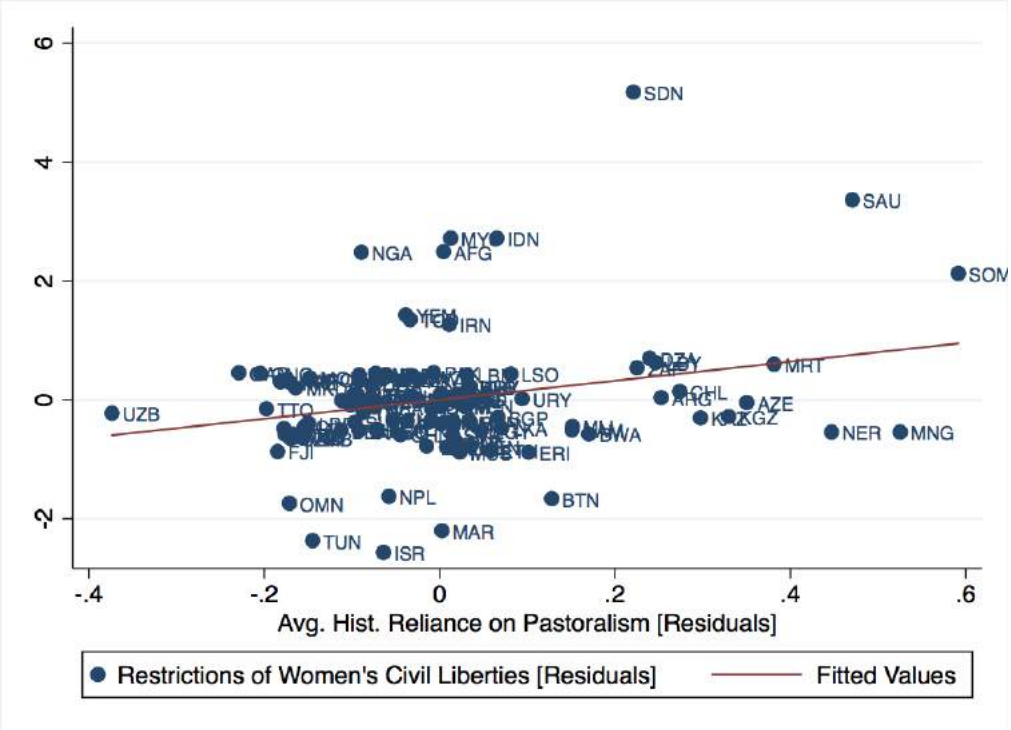

Figure A5: Historical reliance on pastoralism and the presence of laws restricting women in their freedom of mobility (OECD SIGI-4 Index).

B.4 De Jure Restrictions on Women's Freedom of Mobility

In 2009, about one-third of countries in a sample of 122 non-OECD countries had some legal restriction on either women's freedom of movement or their freedom of dress in public spaces (OECD, 2010). Such laws prescribe the necessity of having a husband's or father's permission to get a passport or travel or what to wear, e.g., the obligation to veil in public spaces. Male guardianship in Saudi Arabia is a prominent example of such a law.

To analyze whether cross-country variation in the presence of such laws is systematically related to pastoralism, I construct a country-level measure of historical reliance on pastoralism based on data from Giuliano and Nunn (2018) and match it to the OECD data. As Figure A5 shows, countries that historically relied more on pastoralism are more likely to have restrictions on women's freedom of movement or freedom of dress encoded in their law.

However, cross-country comparisons are inherently difficult, and, more importantly, such laws only capture *de jure* restrictions on women's freedom of mobility. Clearly, even in the absence of mobility-restricting laws, women can be restricted in their freedom to interact with the world beyond their immediate family, through local norms or customs.

C Evidence on the Mechanism

C.1 Historical Economic Development

Table A15: Placebo-Test: Population Size as a Proxy for Historical Economic Development

	Dependent variable:				
	Anti-Abortion Attitudes [Std.]	Infibulated [0/1]	Restricted Freedom of Mobility [Std.]	Cheated [0/1]	# Sexpartners [Std.]
	(1)	(2)	(3)	(4)	(5)
Hist. Population Size [Std.]	-0.146	-0.063	-0.014	0.0017	0.0042
	(0.123)	(0.205)	(0.213)	(0.621)	(0.597)
Country FE	Yes	Yes	Yes	Yes	Yes
Observations	110938	82083	592308	560079	374516
R^2	0.213	0.047	0.122	0.093	0.020

Notes. OLS estimates, standard errors are clustered at the ethnicity level, p-values in parentheses.

Table A16: Placebo-Test: Jurisdictional Hierarchy as a Proxy for Historical Economic Development

	Dependent variable:				
	Anti-Abortion Attitudes [Std.]	Infibulated [0/1]	Restricted Freedom of Mobility [Std.]	Cheated [0/1]	# Sexpartners [Std.]
	(1)	(2)	(3)	(4)	(5)
Jurisd. Hierarchy [Std.]	-0.035	0.022	-0.0067	0.0012	-0.017
	(0.056)	(0.461)	(0.386)	(0.820)	(0.116)
Country FE	Yes	Yes	Yes	Yes	Yes
Observations	205574	95843	683129	649257	438035
R^2	0.183	0.030	0.130	0.099	0.021

Notes. OLS estimates, standard errors are clustered at the ethnicity level, p-values in parentheses.

Table A17: Placebo-Test: Settlement Patterns as a Proxy for Historical Economic Development

	Dependent variable:									
	Anti-Abortion Attitudes [Std.]		Infibulated [0/1]		Restricted Freedom of Mobility [Std.]		Cheated [0/1]		# Sexpartners [Std.]	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Settlement Patterns [Std.]	-0.048	-0.033	-0.064	-0.035	-0.026	-0.0058	0.013	-0.000067	0.015	-0.0073
	(0.000)	(0.004)	(0.068)	(0.155)	(0.009)	(0.388)	(0.036)	(0.991)	(0.140)	(0.517)
Hist. Dep. on Pastoralism [Std.]		0.030		0.032		0.031		-0.021		-0.032
		(0.061)		(0.064)		(0.000)		(0.000)		(0.000)
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	205633	205633	96466	96466	696656	696606	662964	662914	446784	446747
R^2	0.183	0.183	0.047	0.051	0.130	0.133	0.099	0.101	0.020	0.021

Notes. OLS estimates, standard errors are clustered at the ethnicity level, p-values in parentheses.

C.2 Other Forms of Animal Husbandry

Table A18: Other Forms of animal husbandry (with animals that are not taken out to pasture)

	Dependent variable:			
	Anti-Abortion Attitudes [Std.]	Restricted Freedom of Mobility [Std.]	Cheated [0/1]	# Sexpartners [Std.]
	(1)	(2)	(3)	(4)
Reliance on Other Animal Husbandry [Std.]	0.0074	0.00017	0.0040	0.0078
	(0.000)	(0.906)	(0.086)	(0.010)
Country FE	Yes	Yes	Yes	Yes
Observations	205644	697964	664313	447834
R^2	0.182	0.127	0.098	0.020

Notes. OLS estimates, standard errors are clustered at the ethnicity level, p-values in parentheses. For infibulation, there is no variation in animal husbandry with animals that are not taken out to pasture.

D Robustness

D.1 Conley Standard Errors

Table A19: Conley Standard Errors

	Dependent variable:			
	Infibulated [0/1]	Restrictions on Freedom of Mobility [Std.]	Cheated [0/1]	# of Sexpartners [Sd.]
Hist. Dep. on Pastoralism [Std.]	0.047	0.034	-0.021	-0.027
	(0.040)	(0.000)	(0.000)	(0.000)
Country FE	Yes	Yes	Yes	Yes
Observations	116,865	701,310	667,636	450,338
R^2	0.042	0.132	0.102	0.021

Notes. OLS estimates, standard errors adjusted to account for spatial autocorrelation using the method proposed by Colella et al. (2019).

D.2 Clustering SE at Language Family Level

Table A20: Clustering SE at Language Family Level

	Dependent variable:			
	Freedom of Mobility Restricted [(0,1)]	Infibulated [0/1]	Cheated [0/1]	# Sexpartners [Std.]
	(1)	(2)	(3)	(4)
Hist. Dep. on Pastoralism [Std.]	0.034	0.050	-0.021	-0.027
	(0.000)	(0.133)	(0.000)	(0.000)
Country FE	Yes	Yes	Yes	Yes
Observations	701310	96929	667636	450338
R^2	0.132	0.047	0.101	0.021

Notes. OLS estimates, standard errors are bootstrapped and clustered at the language family level.

Table A21: Clustering SE at Language Family Level (WVS)

	Dependent variable:
	Disapproval of Abortion [Std.]
	(1)
Hist. Reliance on Pastoralism [Std.]	0.061
	(0.000)
Country FE	Yes
Observations	122134
R^2	0.188

Notes. OLS estimates, standard errors are clustered at the language family level.

E Additional Scatterplots

E.1 Anti-Abortion Attitudes

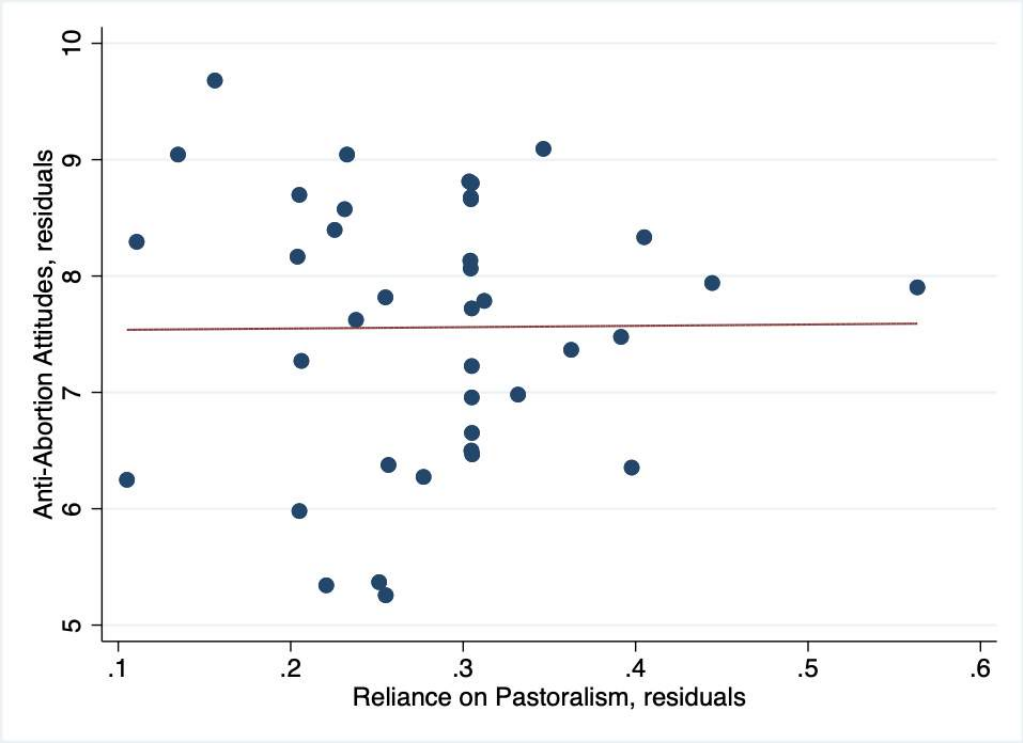

Figure A6: Binscatter plot. Anti-abortion attitudes and historical reliance on pastoralism, residualized off country fixed effects. N=205,201; World Values Survey.

E.2 Infibulation

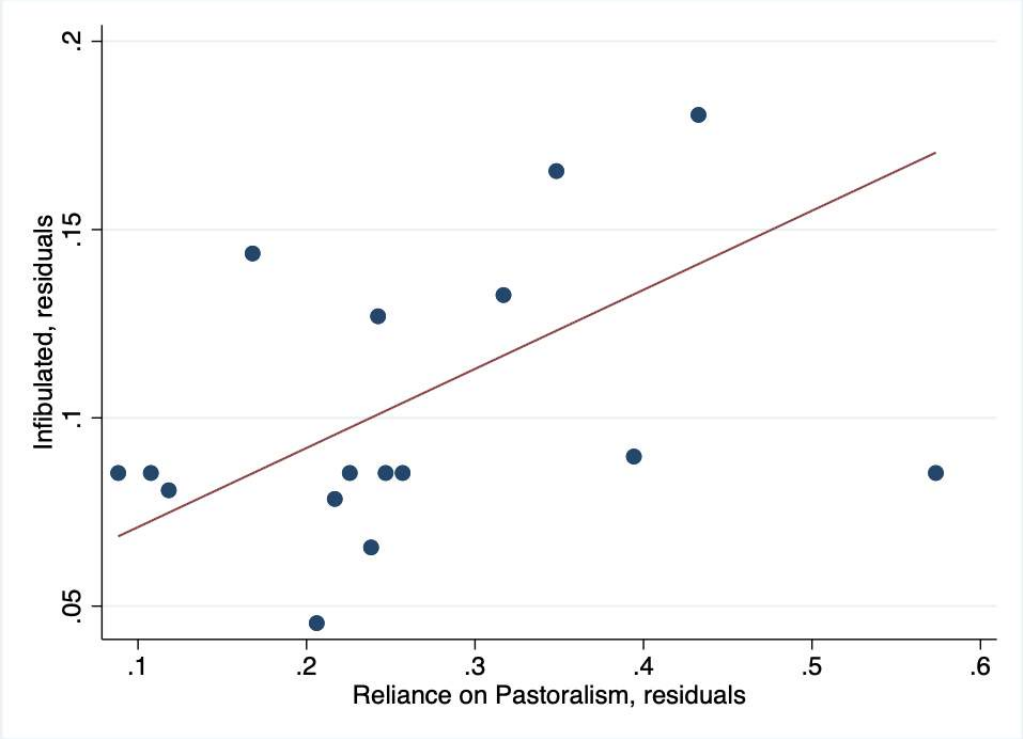

Figure A7: Binscatter plot. Infibulation and historical reliance on pastoralism, residualized off country fixed effects. N=96,471; Demographic and Health Surveys.

E.3 Restrictions on Women's Freedom of Mobility

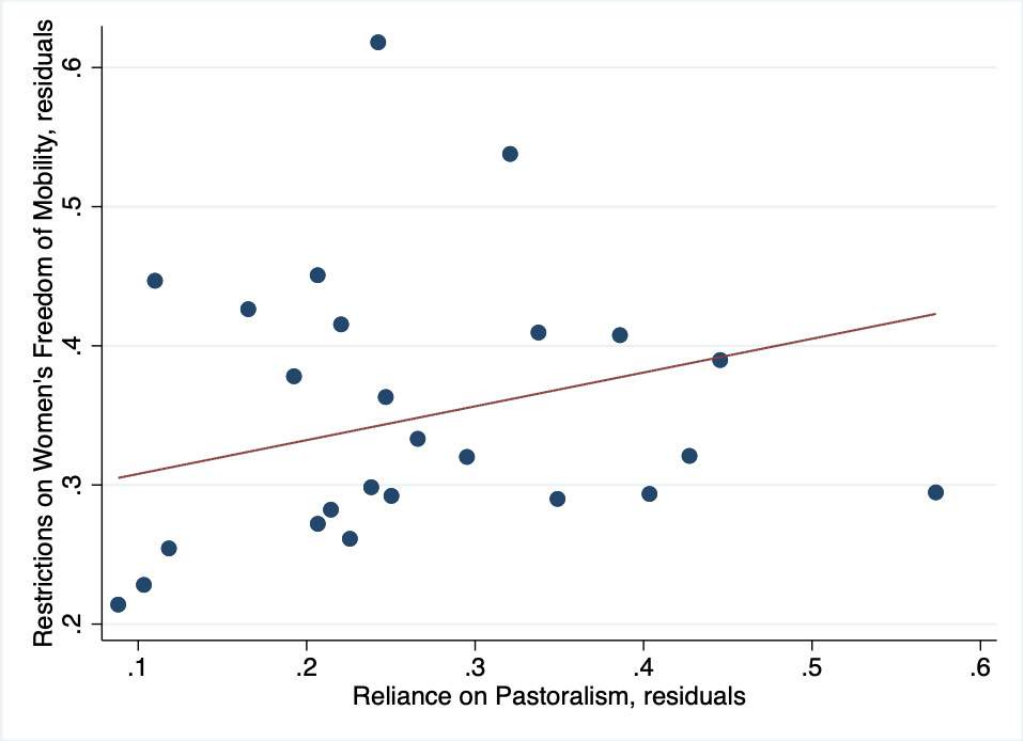

Figure A8: Binscatter plot. Restrictions on women's freedom of mobility and historical reliance on pastoralism, residualized off country fixed effects. N=697,964; Demographic and Health Surveys.

E.4 Cheating on Spouse

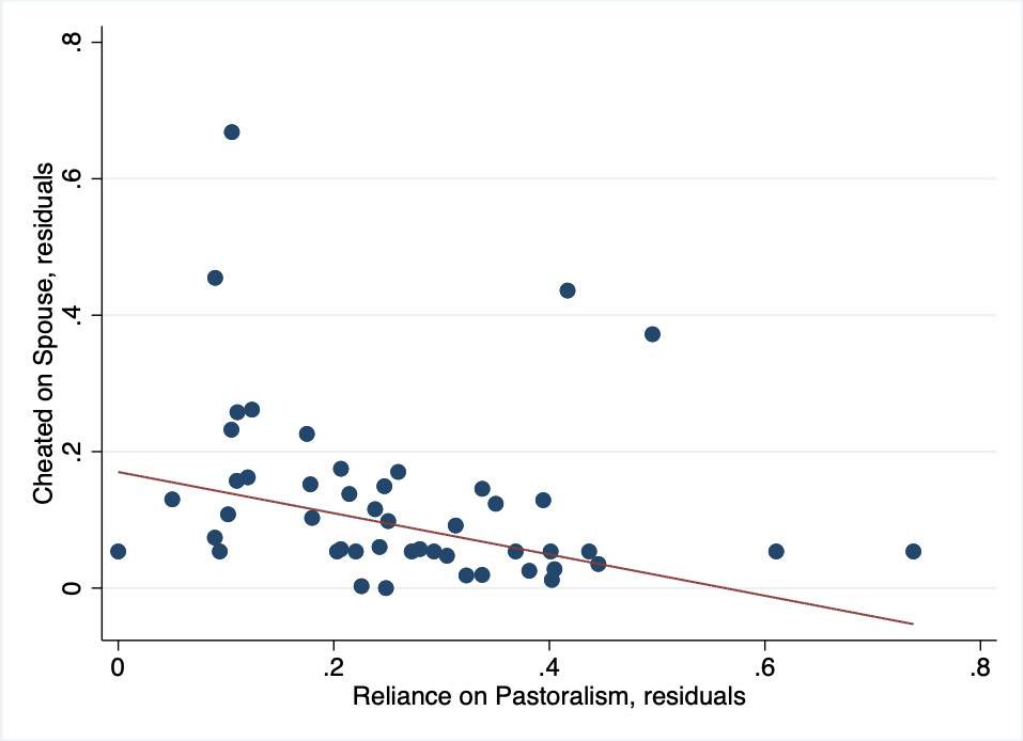

Figure A9: Binscatter plot. Cheating on spouse and historical reliance on pastoralism, residualized off country fixed effects. N=664,313; Demographic and Health Surveys.

E.5 Number of Sexpartners in Lifetime

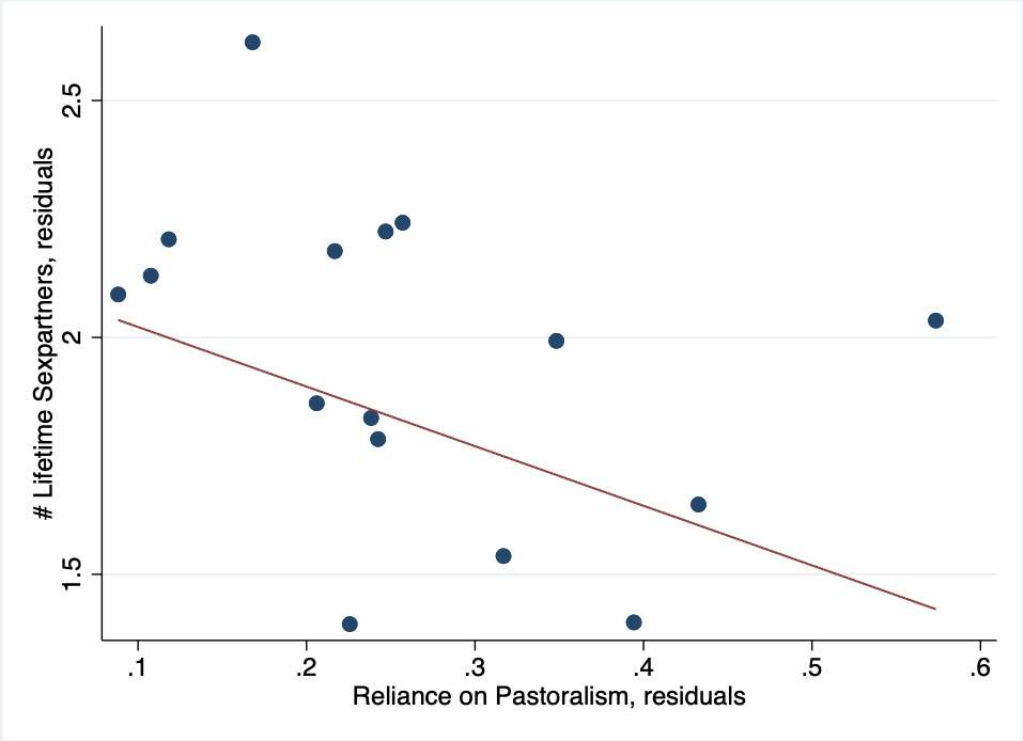

Figure A10: Binscatter plot. Number of sexpartners and historical reliance on pastoralism, residualized off country fixed effects. N=447,834; Demographic and Health Surveys.

F List of Variables

F.1 Contemporary Individual-Level Measures: *DHS* and *WVS*

Anti-Abortion Attitudes Scale from 1 to 10. Based on F120 from WVS.

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

Age In years. For WVS: based on X003. For DHS: based on v012.

Year of interview For WVS: based on S020. For DHS: based on v007.

Female Indicator that takes value 1 if respondent is female, 0 if respondent is male. WVS only. Based on X001.

Religion For WVS: based on F025. For DHS: based on v130 (country specific).

Urban Indicator that takes value 1 if respondent lives in an urban area, 0 otherwise. For WVS: based on X049A. For DHS: based on v102.

Marital status For WVS: based on X007. For DHS: based on v501.

Educational attainment For WVS: based on X025R. For DHS: based on v149.

F.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.

Jurisdictional hierarchy Based on v33 of the *Ethnographic Atlas*. Captures the number of levels of political authority beyond the local community (bands or villages).

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

Settlement patterns Based on v30 of the *Ethnographic Atlas*. 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) of the *Ethnographic Atlas*. 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) of the *Ethnographic Atlas*. For construction of the index see Enke (2019).