Institute for Fiscal Studies

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Working paper
25/22

Female genital cutting and the slave trade

Economic and Social Research Council

Female Genital Cutting and the Slave Trade

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April 10, 2025

Abstract

This paper investigates the historical origins of female genital cutting (FGC). We test the historical hypothesis that FGC is associated with the Red Sea route of the African slave trade, where women were typically sold as concubines in the Middle East and infibulation was used as a means to preserve virginity. Using individual-level data from 28 African countries combined with historical records of Red Sea slave shipments from 1400 to 1900, we find that women from ethnic groups whose ancestors experienced greater exposure to the Red Sea slave trade are more likely to undergo infibulation or circumcision today. They are also more inclined to support the continuation of this practice. Our findings are robust to instrumenting Red Sea slave exports with the distance to the nearest port used for this route. We also leverage a dataset on oral traditions (*Folklore*) to show that greater exposure to the Red Sea slave trade correlates with a stronger association between infibulation and the cultural values of chastity and purity, which may have facilitated the diffusion of infibulation among local populations.

Keywords: FGC, FGM, social norms, slave trade, Africa

*We thank Ralph Austen, Pietro Biroli, Alfredo Burlando, Stelios Michalopoulos, Owen Ozier, Mohamed Saleh and seminar participants at Brown, Harvard, Oxford, Birmingham, Bocconi, Gottingen, Navarra and Boston University and to the ASSA Meetings and EUDN conference for helpful comments. We are grateful to Nathan Nunn for helpful discussions and for sharing data on slave exports. Francesca Agosti, Silvia Barbareschi, Giulia Buccione, Silvia Farina, Alessandro Fusari, Carolina Marsiglia, Jack Melbourne, Samuel Plach, Armin Satzger and Matthew Schwartzmann provided excellent research assistance. We acknowledge financial support from Economic Development Institutions (EDI) and from Corno's ERC Starting Grant no. 852172 ("HarmfulTraditions"). The usual disclaimer applies. Corno: Department of Economics and Finance, Cattolica University, CEPR, LEAP, lucia.corno@unicatt.it; La Ferrara: Harvard Kennedy School, NBER, CEPR, LEAP, elaferrara@hks.harvard.edu; Voena: Department of Economics, Stanford University, NBER, CEPR, LEAP, avoena@stanford.edu.

"...some severe forms of genital mutilation may have originated with, or were at the very least intensified by, the institutions of slavery and the harem system." De Meo, 1997, p.10.

1 Introduction

Harmful gender norms persist in many parts of the developing world, leading to severe consequences for women's health and well-being. These include practices such as dowry and sex-selective abortion (Anderson and Bidner, 2015; Bhalotra, Chakravarty and Gulesci, 2020), child marriage (Field and Ambrus, 2008; Corno, Hildebrandt and Voena, 2020; Corno and Voena, 2023; Buchmann et al., 2023), restrictions on women's employment (Jayachandran, 2021), and limitations on mobility during menstruation (Macours, Rueda and Webb, 2024). But what are the historical origins of these norms?

This paper focuses on the origins of one of the most pervasive and harmful gender norms: female genital cutting (FGC). FGC is a practice that involves "the partial or total removal of external female genitalia or other injuries to the female genital organs for non-medical reasons" (World Health Organization, 2022). The most severe form, infibulation, entails the complete closure of the vulva.[1] Despite extremely serious health effects, it is estimated that over 200 million women worldwide have undergone FGC (UNICEF, 2019). The practice is prevalent in approximately 30 countries across Africa and the Middle East, with near-universal rates in some areas: over 90% of women are cut in Somalia, Guinea, Djibouti, Eritrea, Sudan, Egypt, and Sierra Leone. By contrast, in other African countries, FGC prevalence is below 1% (UNICEF, 2019).[2]

The evolution and variation of gender norms across countries have been proved to be influenced by the past (Alesina, Giuliano and Nunn, 2013; Alesina, Brioschi and La Ferrara, 2021; Fernández and Fogli, 2009; Fernández, 2007). However, despite the importance of the topic, there is limited empirical evidence on the historical origins of FGC —a notable exception being Becker (2023). Understanding the origins and diffusion of this harmful norm is crucial for explaining its persistence and designing effective policies to reduce its prevalence. This paper aims at contributing in this direction, by asking the question: can the current prevalence of FGC be traced back to the African slave trade?

A significant number of historical and ethnographic records theorize that the most extreme

[1] FGC is classified by the World Health Organization (WHO) into four different types: i) Type 1 (or clitoridectomy) is the partial or total removal of the clitoris; ii) Type 2 (or excision) is the partial or total removal of the clitoris and the inner labia with or without excision of the outer labia; iii) Type 3 (or infibulation) is the removal of the inner and outer labia and closure of the vulva, with or without the removal of the clitoris; iv) Type 4 encompasses all other harmful procedures performed on the female genitalia for non-medical reasons, such as pricking, piercing, incising, scraping, and cauterizing the genital area.

[2] Appendix Figure B1 illustrates the prevalence of FGC across Africa and highlights the countries with legal bans against the practice (WorldBank, 2024). Of the 28 countries with available data, only four do not prohibit FGC, suggesting that differences in prevalence cannot simply be attributed to the presence or absence of legislation.

form of female genital cutting, infibulation, was associated with the Red Sea route of the African slave trade. This route transported slaves from North-East Africa to the Middle East. Along this route, female slaves were typically sold to work as concubines in the harems in the Middle East and infibulation was used as a signal of purity or virginity, as well as to decrease the likelihood of pregnancy during the journey.[3] Infibulated women commanded a higher price on the slave market in recognition of their higher 'quality' (De Meo, 1997).

We empirically test this hypothesis. We conjecture that the differential exposure of ethnic groups to the Red Sea route during the African slave trade determined differential adoption of the practice by these groups and that this may translate into differences in the contemporary prevalence of FGC in Africa.

To test this hypothesis, we link contemporary individual-level data from all the available Demographic and Health Surveys (DHS) and Multiple Indicator Cluster Surveys (MICS) in Africa that elicit information on FGC, with historical estimates on the number of slaves from each ethnic group exported across the four African slave trade routes between 1400 and 1900. We rely on Nunn (2008) for estimates of slave exports along the trans-Saharan, trans-Atlantic, and Indian Ocean routes, given that his data already have broad coverage of these routes. For the Red Sea route, we examine a variety of historical sources (archives, ethnographic materials, manumission acts) and expand Nunn's (2008) estimates on the number of slaves exported. We thus assemble a new and more comprehensive dataset on the ethnicity and the number of slaves shipped across the Red Sea between 1400 and 1900.

We then use information on respondents' ethnicity to connect survey data from DHS and MICS with historical ethnicity-level data on slaves. Our analysis is based on a final sample of nearly 600,000 women born between 1942 and 2002, belonging to 198 different ethnic groups and living in 28 different African countries. We test the relationship between exposure to the Red Sea slave route and the contemporary prevalence of FGC separately for different types of FGC, focusing in particular on infibulation —the form most directly related to the practice performed on female slaves. We exploit within-country variation in the exposure of different ethnic groups to the Red Sea slave route, controlling for exposure to other routes and for a number of potentially confounding factors, including geography and historical customs.

Our results show that women belonging to ethnic groups whose ancestors were exposed to the Red Sea slave trade are significantly more likely to be infibulated —and, in general, circumcised— today. According to our most conservative specification, a one standard deviation increase in the slave exports to the Red Sea for one's ethnic group increases the probability of infibulation by 5.7 percentage points (or 71.4% of the mean for groups not exposed to this slave trade) and the probability of circumcision by about 2.5 percentage points (or 4.5% of the mean for groups not enslaved in Red Sea route). We do not find any effect of having ancestors traded along the other African slave routes, which have not been historically associated with

[3] See, among others, Dos Santos (1609); Browne (1799); Larrey (1803); Burckhardt (1819); Cailliaud (1826); Russegger (1843).

infibulation. When we focus only on countries located in East Africa (Egypt, Sudan, Ethiopia, Somalia, Djibouti, Eritrea) we find that a one standard deviation increase in exposure to Red Sea exports leads, on average, to a 5.5 percentage points increase in the likelihood of infibulation (12% of the mean). This finding suggests that differences in exposure to the Red Sea slave trade across ethnic groups within the Eastern part of Africa still explain a non-negligible part of the variation in infibulation today.

We also find significant effects on attitudes towards FGC: women whose ancestors were traded along the Red Sea route are more likely to be in favor of continuing the practice, compared to women whose ancestors were exported via other slave trade routes or not enslaved.[4] This is a relevant finding from a policy perspective, as it suggests that efforts to eradicate FGC in Africa may face obstacles created by distant historical experiences whose effects on culture are still felt today.

A potential concern in interpreting the above results in a causal way may be that societies historically more prone to adopting infibulation might also have been those targeted by the slave raiders.[5] To mitigate potential endogeneity concerns, we propose three strategies. First, we consider slaves exported along all four slave trade routes to control for any unobserved factors that affect the propensity to enslave certain groups, without being specific to the Red Sea route. By doing this, any threat to identification should come from unobserved factors that are specific to ethnic groups historically located along the Red Sea route, and not to the others. Second, we match our data with pre-industrial characteristics of ethnic groups, using the *Ethnographic Atlas* (Murdock 1967). This allows us to control for historical characteristics of ethnic groups potentially correlated with both FGC and the Red Sea slave trade, such as norms related to premarital sexual behavior or dependence on pastoralism. Third, we follow the existing literature that uses distance from the Atlantic coast as an instrument for trans-Atlantic slave exports (e.g., Nunn and Wantchekon, 2011; Whatley and Gillezeau, 2011; Teso, 2019) and we instrument our Red Sea exposure variable using the distance to the closest port of exit for the Red Sea route.[6] Our first stage shows that ethnic groups located closer to the port of exit for the Red Sea route were more likely to be traded along that route. Our IV estimates are significant and very similar in magnitude to the OLS ones, suggesting that the association between infibulation and Red Sea slave trade is unlikely to be driven by selection or omitted variable bias.

Finally, we use the *Folklore* dataset (Michalopoulos and Xue (2021)) to investigate a potential mechanism underlying the contemporary adoption of FGC: the demand for chastity.

[4]The effect of a one standard deviation increase in exposure to the Red Sea slave trade on the probability of supporting FGC is +2.6 percentage points, i.e., approximately 7% of the mean for groups not exposed to the Red Sea slave trade.

[5]Note that all our specifications include country fixed effects, hence we compare individuals from different ethnic groups holding constant any institutional factors that vary at the level of the present-day country of residence.

[6]In this regression we also control for the distance to the closest port of exit and the closest coast, to account for any other characteristics potentially correlated with the ports and FGC (e.g., economic development).

Folklore is a collection of beliefs and values held by societies as captured in their oral traditions, their narratives, stories, jokes or proverbs. This database represents the lifelong work of the anthropologist Yuri Berezkin and has been validated by Michalopoulos and Xue (2021). In the database, each ethnic group is associated with a series of 'motifs', episodes or images found in the set of narratives. Some motifs depict women as chaste, virgin and pure, which can be interpreted as an indication that a society has a preference for these traits. We use text analysis to compute the share of motifs related to chastity and FGC in each ethnic group, which we take as a proxy for an ethnic group's demand for chastity and purity. We find a positive correlation between the prevalence of themes related to purity and chastity in the oral traditions of a group and the share of women who are infibulated today. Interestingly, this association is only present among the ethnic groups exposed to the Red Sea slave trade. These results are consistent with the idea that groups exposed to the Red Sea slave trade may have internalized the belief that infibulated women were more chaste and pure, contributing to the wider adoption of FGC among non-slave populations.

Our work relates to three strands of literature. At a broad level, it contributes to the literature that studies the long-term effects of history on contemporary attitudes and behavior (Michalopoulos and Papaioannou, 2020; Valencia Caicedo, 2023), and in particular on gender norms. Alesina, Giuliano and Nunn (2013) and Alesina, Brioschi and La Ferrara (2021) explore the effects of historical modes of production on contemporary gender attitudes and female labor force participation and on intimate partner violence, respectively. The outcome we study in this paper, FGC, is another important component of women's status, which entails significant health and psychological costs.

Second, our work relates to the empirical literature on the effects of Africa's slave trade on economic development. This literature has shown long term impacts of this trade on economic performance (Nunn, 2008), ethnic fractionalization (Nunn, 2008; Whatley and Gillezeau, 2011; Green, 2013), conflicts (Fenske and Kala, 2017), trust (Nunn and Wantchekon, 2011), family structure (Edlund and Ku, 2011), female labor force participation (Teso, 2019) and financial development (Pierce and Snyder, 2018; Levine, Lin and Xie, 2017). All the above papers focus on the role of the trans-Atlantic slave trade. In contrast, our emphasis is on the Red Sea slave trade, which has been significantly less studied by economists and for which we expand the existing data coverage, as well as on an outcome previously not empirically associated with the slave trade, i.e., FGC.

Finally, our paper relates to the growing literature on the drivers and persistence of female genital cutting. A first set of contributions studies coordination failures and the role of people's beliefs in sustaining the norm (Mackie, 1996; Bicchieri, 2005; Platteau, Camilotti and Auriol, 2018), including recent tests on the relevance of coordination in field settings (Efferson et al., 2015; Novak, 2020; Gulesci et al., 2023). Other studies stress the intrinsic value of cutting as a signal of virginity or sexual fidelity that is valued on the marriage market (e.g., Chesnokova and

Vaithianathan, 2010; Wagner, 2015; Khalifa, 2022). While anthropologists have highlihgted the significance of FGC in terms of of cultural identity (Shell-Duncan and Hernlund, 2000), until recently the economic literature has not systematically investigated its historical roots. A notable exception, related in spirit to our work, is a recent paper by Becker (2023), who tests the theory that pre-industrial reliance on pastoralism, characterized by extended periods of male absence, made it desirable to control female sexuality and led to the adoption of restrictive norms, including infibulation. Our work offers a complementary (non-exclusive) explanation for the diffusion of infibulation, based on historical accounts linking this practice to the Red Sea slave trade.

The remainder of the paper is organized as follows. Section 2 provides background information on infibulation and the slave trade. Section 3 describes the data used in the analysis, while Section 4 outlines the empirical strategy. Section 5 contains the main empirical results and Section 6 explores the underlying mechanisms. Finally, Section 7 concludes.

2 Historical background

2.1 The African slave trade

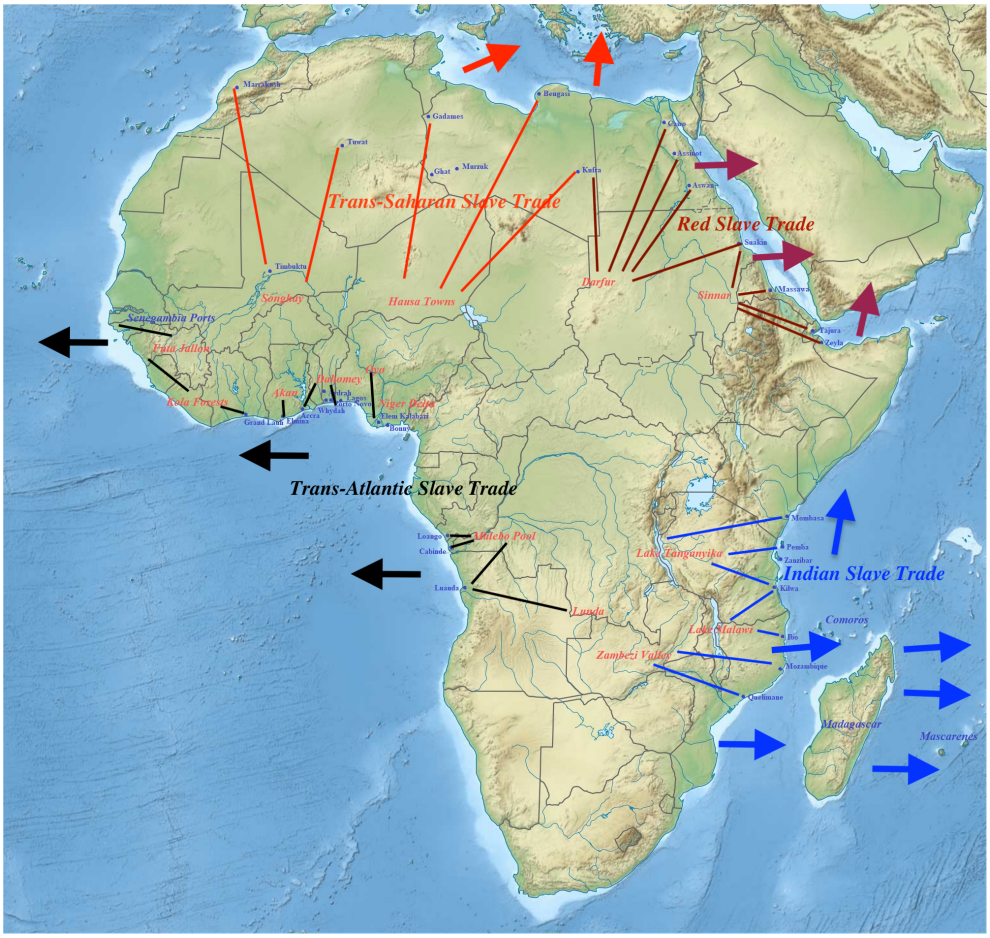
For a period of nearly 500 years, between 1400 and 1900, about 18 million slaves were exported from Africa. This was a profound and devastating shock for the entire African continent. According to calculations by Patrick Manning, in 1850, Africa's population was only half of what it could have been in the absence of the slave trade.

The slave trade was organized along four main routes (Mowafi, 1981; Lovejoy, 1989). The most recent was the *trans-Atlantic route*. Through this route, approximately 12 million slaves were taken from West Africa and West-Central Africa and shipped to colonies in North and South America to work in plantations. The majority of enslaved people worked on sugar cane plantations, an important local crop at the time, but also in the production of other commodities such as tobacco, rice, cotton, fruit, and corn. Three other (and older) routes involved approximately 6 million slaves in total: (i) the *Red Sea route*, where slaves were taken from the inland of the Red Sea and the coast of east Africa and exported to the Middle East, in particular to the Arabian Peninsula and the Persian Gulf (approximately 1.3 million slaves) (Austen, 1988, 1979); (ii) the *trans-Saharan route*, where slaves were taken from the south of the Sahara, moved across the Saharan desert and reached the Northern part of Africa (approximately 3.1 million slaves) (Austen, 1992); and (iii) the *Indian Ocean route*, where slaves were taken from Eastern Africa and shipped partly to the islands in the Indian Ocean (Reunion, Mauritius and Madagascar) and partly to the Arabian Peninsula (approximately 9,700 slaves) (Harris, 1971).

Figure 1 stylized the four slave trade routes, using differently colored arrows for each of them: *black* for the trans-Atlantic route, *orange* for the trans-Saharan one, *red* for the Red Sea and *blue* for the Indian Ocean route. In Figure 1 we also report the names and locations of the

main ports of departure for African slaves, which we compiled assembling various historical sources.[7]

Figure 1. African slave trade routes



Source: Authors' elaboration based on historical accounts.

The different geographical destinations of slaves along the four routes generated variation in the type of slaves demanded. The slaves exported across the trans-Atlantic route were typically employed on plantations and were preferably males.[8] On the contrary, slaves traded along the Red Sea route were mainly women. The estimated male-to-female ratio was 1:2 (Segal, 2001; Lovejoy and Richardson, 1995). Female slaves were mainly employed in the royal harems in the Middle East (Harris, 1971). Indeed, during the the Ottoman empire, one of the Sultan's privileges was having as many women as he desired (Zilfi, 2010*b*). Furthermore, Islamic injunctions against the enslavement of Muslims led to the large-scale importation of slaves from the outside. Peirce (1993) mentions that "since the enslavement of Muslims was forbidden, concubines, like other slaves, came from outside the Islamic lands and were generally either

[7]We report the full list of ports of exits from Africa with the corresponding historical sources in Appendix Table B1.

[8]Estimates by Lovejoy (1989) suggest that the ratio of male-to-female slaves involved in trans-Atlantic slave trade was about 181:100 between the 17th and the end of the 19th century.

taken as war booty or purchased from slave traders".

The trans-Saharan slave trade overlapped significantly with the trans-Atlantic trade, particularly after the 18th century, with the latter primarily focused on providing labor (Lovejoy, 1989, 2000). The Ottoman Empire also exerted influence in North Africa, but studies on slavery in the region tend to highlight the roles of enslaved women in domestic labor and agricultural work (Zilfi, 2010*a*). Finally, the Indian Ocean slave trade was somewhat more complex and it was the one with the lowest number of slaves. In the 1600s and early 1700s, slave exports were essentially an extension of the trade across the Red Sea and trans-Saharan routes. In the 18th century, however, new currents affected this maritime trade. Slaves were taken to the Dutch settlement in Cape Town and the French relied heavily on enslaved labor in their established plantations on the Mascarene Islands in the Indian Ocean. Europeans were trying to establish in these islands a plantation economy similar to the one created in the New World. The Indian Ocean slave trades occurred only periodically because merchants' movements depended on trade winds and ocean tides that greatly limited their operations (Lovejoy, 2000). The Red Sea, trans-Saharan and Indian Ocean routes are part of what is also referred to as the Arab slave trade.

The vast majority of those who were enslaved through the trans-Atlantic route were sold by other West Africans to European slave traders (Sowell, 2005), while others were captured directly by the slave traders in coastal raids. The Red Sea slave trade, on the other hand, mainly involved Arabs as the primary merchants. These used smaller ships to move slaves from Africa to the Arabian Peninsula. At a minimum, the journey was 13-weeks long (Renault, 1988). During the journey, sexual abuse of slaves, rape and other forms of violence were common aboard the slave ships.[9]

2.2 The origins of infibulation

The practice of infibulation has ancient roots but the exact origin and motives behind its adoption are still scarcely documented. We did our best to gather and cross-check several sources and historical writings by ancient geographers, travelers and historians. Infibulation appears to have been practiced in Ancient Egypt and among nomadic tribes around the Red Sea as a tool to control female sexuality and as a marker of womanhood (Ghalioungui, 1963; Levy, 1962; Boyle, 2005).[10,11]

[9]For example, the slave trader John Newton writes: "The men were packed together below deck and were secured by leg irons. Women and children were kept in separate quarters, sometimes on deck, allowing them limited freedom of movement, but this also exposed them to violence and sexual abuse from the crew" (Newton, 1962).

[10]We did not find any reliable historical sources reporting that the practice originated in the Middle East (Erlich, 1986; Hosken, 1982).

[11]During the Pharaonic era, the Egyptians believed in gods having bisexual features. The sociologist Elizabeth Boyle (2005) recounts that these features were believed to reflect upon the mortals, with women's clitoris representing the masculine soul and men's prepuce the feminine one. Thus, she argues that circumcision was considered to be a marker of womanhood and a way to detach a woman from her masculine soul.

The earliest written evidence of infibulation is in a Greek Papyrus of the 163 BC, currently preserved in the London British Museum, which indicates that a certain Harmais of Sarapeum (Alexandria, Egypt) "gave money to the mother of a girl for dowry and the usual ceremony of circumcision" (Kenyon, 1893). About one hundred years later (25 BC), the Greek geographer and historian Strabo (64 or 63 BC-24 AD), after traveling to Egypt and along the West coast of the Red Sea, reported the practice of excision on Egyptian girls. He noted that two groups of people, the Kreophagoi and Koloboi, located on the west coast of the Red Sea, "mutilated the sexual glands and excised their women in the Jewish manner" (Widstrand, 1964; Knight, 2001).[12,13] During the same period, Philo of Alexandria, a Jewish philosopher who lived in Alexandria (20 BC-50 AD), also made reference to infibulation as follows: "the Egyptians, by the custom of their country, circumcise the marriageable youth and maid in the fourteenth (year) of their age, when the male begins to get seed, and the female to have a menstrual flow" (Knight, 2001). Another mention of infibulation is attributed to a Greek physician, Claudius Galenus (129 - 216 AD): "When [the clitoris] sticks out to a great extent in their young women, Egyptians consider it appropriate to cut it out". The reference to Egyptian origin also emerges from the fact that in some countries (e.g., Somalia, Sudan) infibulation is today called 'Pharaonic circumcision'.

In the 16th century, Pietro Bembo, a Venetian historian and the secretary to Pope Leo X, provides, for the first time, a detailed description of infibulation on the basis of the accounts of travelers around the Red Sea area. He writes that "the private parts of the girls are sewn together immediately after their birth" since "an indubitable virginity at the marriage is held in such a high esteem" (Bembo, 1551). His position as secretary to the Pope may have given him opportunity to meet and discuss with travelers as well as having access to the papal archives. Afterwards, at the beginning of the twentieth century, ethnographic studies document cases of infibulation around the contiguous areas of the Red Sea coast among the nomadic populations. Seligmann (1913), a British physician and ethnologist, argues that the practice arose in the Hamito-Semitic areas of the Red Sea and maps the locations where it was documented. Widstrand (1964) combines all the ancient writings and also draws a figure on the historical spatial distribution of infibulation within Africa. We report his map as Figure B2 in Appendix B.2, to show that infibulation was present in clusters scattered in North-Eastern Africa, along the Nile valley.

[12]Referring to the work of pathologist Grafton Elliot Smith, who examined hundreds of mummies at the beginning of the 20th century, Knight (2001) argues that their genital area may resemble what the World Health Organization classifies as 'type 3' circumcision. However, no rigorous evidence shows that infibulation was performed among Egyptian mummies.

[13]The real source of this information seems to be the first book by Agatharchides, a greek historian and geographer, *On the Erythraean Sea*, 2nd century BC.

2.3 The historical link between infibulation and slavery

A significant body of historical and ethnographic records suggests a connection between infibulation and slavery. According to descriptions by early travelers, infibulated female slaves had a higher price on the slave market because infibulation, which makes vaginal penetration painful and difficult, was thought to prevent undesired pregnancies during the long slaves' journey and to ensure chastity, 'purity' and loyalty to the owner (Browne, 1799; Larrey, 1803; Burckhardt, 1819; Cailliaud, 1826; Russegger, 1843). In particular, infibulation seems to be connected to the Red Sea route of the slave trade, given that slave women traded along the Red Sea route were employed as concubines and domestic servants in the harems in the Middle Eastern countries and kingdoms (Mackie, 1996; De Meo, 1997).

Several historical sources report on the connection between infibulation and slavery. Joao Dos Santos, a Portuguese missionary, reports that a group from Mogadishu (Somalia) has a "custom to sew up their females, especially their slaves being young to make them unable to conception, which makes these slaves more valuable in the market both for their chastity, and for better confidence which their Masters put in them" (Dos Santos, 1609). The value of slaves "would be diminished by impregnation, or even by the necessary result of coition, though unaccompanied by conception" mentioned Browne (1799). Again, Johann Ludwig Burckhardt (1819), a Swiss traveller and geographer, writes that "I am unable to state whether [infibulation] is performed by their parents in their native country, or by the merchants, but I have reason to believe by the latter. Girls in this state are worth more than others." According to Russegger (1843) "infibulation was done to slave women to keep them virginal prior to selling them in the destination places" and Larrey (1803) indicates that the Turks infibulated female slaves prior to selling them (Hicks, 2018).

More recently, Lightfoot-Klein (1989) reports that "infibulation appears to have been reserved for slave girls, who were transported from Sudan and Nubia, (...) to prevent their getting pregnant. An infibulated virgin fetched a far higher price on the slave market". Finally, De Meo (1997) writes that "girls were once infibulated to ensure their virginity when presented for the Near Eastern harem slave trade. The regions that today practice infibulation were once primary 'capture zones' in the Turk and Arab slave trade for young African girls and boys. This suggests that some severe forms of genital mutilation may have originated with, or were at the very least intensified by, the institutions of slavery and the harem system".

The historical hypothesis that female slaves traded along the Red Sea route were young and so still plausibly virgin is substantiated by the historical records assembled by Miran (2013). He analyzed 67 manumission records where age is provided from Massawa, one of the main ports of exit for the Red Sea route, and reported that 41 percent of female slaves were in the age range between 13-15 years. Although not representative, this suggests that slaves crossing the Red Sea were fairly young. We show these figures in Appendix Table B2. In addition, Browne (1799) mentions that "the operation [infibulation] is performed at all ages from 8 to 16 years

but generally between 11-12 years".

Further accounts suggest that, once the practice of infibulation consolidated through the slave trade and became associated with traits related to virginity, purity, and beauty, the adoption of the practice spread among other female populations, also taking less severe forms (DeMeo, 2003).[14] Mackie (1996) writes that "the geographic distribution of FGC suggests that it originated on the western coast of the Red Sea, where infibulation is most intense, diminishing to clitoridectomy in westward and southward radiation" and that "a practice associated with shameful female slavery came to stand for honor". Abdalla (1982) also argues that in this context virginity became a "trademark".

The reappropriation and transformation of practices originally associated with negative or lower-status origins into symbols of honor or prestige is common across cultures (Galinsky et al., 2003). Communities often redefine these practices to align with their own values and social structures. An illustrative example is the case of tattoos in Western societies (Adams, 2009). Historically, tattoos were associated with marginalized or low status groups (e.g., prisoners, gang members, sailors) and sometimes seen as markers of deviance. However, over time they have been reappropriated as symbols of individual expression and art. In the context of FGC, the reappropriation process may have involved a shift away from its role in the slave trade toward emphasizing perceived benefits, such as purity or aesthetic ideals (Mackie, 1996).

In summary, historical and anthropological evidence suggests a pathway through which infibulation originated in ancient Egypt and intensified during the Red Sea slave trade due to a demand shock for virginal and chaste women. The higher valuation of infibulated female slaves reinforced an association between the practice and perceived traits of chastity and beauty, contributing to the diffusion among the local population. In what follows, we empirically test this hypothesis.

3 Data

3.1 Contemporaneous data: Female Genital Cutting

Data on female genital cutting (FGC) comes from the Demographic and Health Survey (DHS) and the Multiple Indicator Cluster Surveys (MICS). DHS are nationally-representative, individual-level surveys carried out in several countries around the world. We assembled all the DHS datasets publicly available for Africa between 1994 and 2017 with information on respondents' FGC status and ethnicity. The latter information is crucial as it is used to merge the DHS data with historical data on slavery. We have a sample of 28 countries and 66 waves of data collection.

In the DHS surveys, the information on FGC is collected retrospectively during the woman's

[14] Historical photographic documentation shows ornaments on the genitalia of cut women, highlighting the connection with beauty (Widstrand, 1964).

interview. Women are asked the following questions: 1) "In some countries, there is a practice in which a girl may have part of her genitals cut. Have you yourself ever been circumcised?"; 2) "At what age?". In most of the countries in our sample, DHS also elicit information on the type of circumcision by asking 3) "Now I would like to ask you what was done to you at that time: (a) Was any flesh removed from the genital area?" (type 1-2 circumcision following the WHO definition); (b) "Was your genital area sewn closed?" (infibulation, or type 3 circumcision following the WHO definition).[15] In our analysis, we consider two main dependent variables: a dummy for whether the woman is infibulated and a dummy for whether she is circumcised (comprising any type of FGC). Infibulation is the most invasive form of circumcision and the one with the most harmful consequences. It is also the practice most closely related to the one originally performed on female slaves, and hence, it will be our primary outcome of interest.

For some countries, information on respondents' ethnic group (Egypt, Swaziland, Somalia and Sudan) or on FGC (Djibouti, Guinea-Bissau, Mauritania, Somalia and Sudan) was not recorded in the DHS. Therefore, we completed our sample using available data from the Multiple Indicator Cluster Surveys (MICS), a nationally-representative dataset collected by UNICEF that elicits information on FGC as well as on respondents' ethnicity for a subset of countries. Importantly, the questions related to female genital cutting asked in the MICS are identical to the ones used in the DHS.

Finally, information regarding the respondent's ethnicity was not available in either the DHS nor in the MICS databases for Egypt, Somalia, Sudan, and Swaziland. Consequently, we exploit data on the respondent's smallest geographical area of residence (region/sub-region/district) from the DHS and from online sources, such us the Joshua Project (https://joshuaproject.net/), to correlate the respondent's residence location with the predominant ethnic group in that area.[16] Notably, our empirical results remain robust even when excluding countries with incomplete information on the respondent's ethnicity.

We validated self-reported questions on FGC in the DHS and MICS datasets by analyzing their correlation with country-level FGC prevalence data from the 2009 Gallup World Poll. Given that the DHS and MICS variables on FGC are self-reported and may be affected by social desirability bias, which could vary across countries, we compared the average prevalence from these surveys with Gallup data on attitudes toward FGC. Specifically, we examined correlations with two measures: "FGC is a normal practice" and agreement with the statement "FGC should be illegal". As shown in Appendix Figure B3, FGC prevalence is positively associated with the belief that "FGC is a normal practice" and negatively associated with agreeing that "FGC should be illegal"."

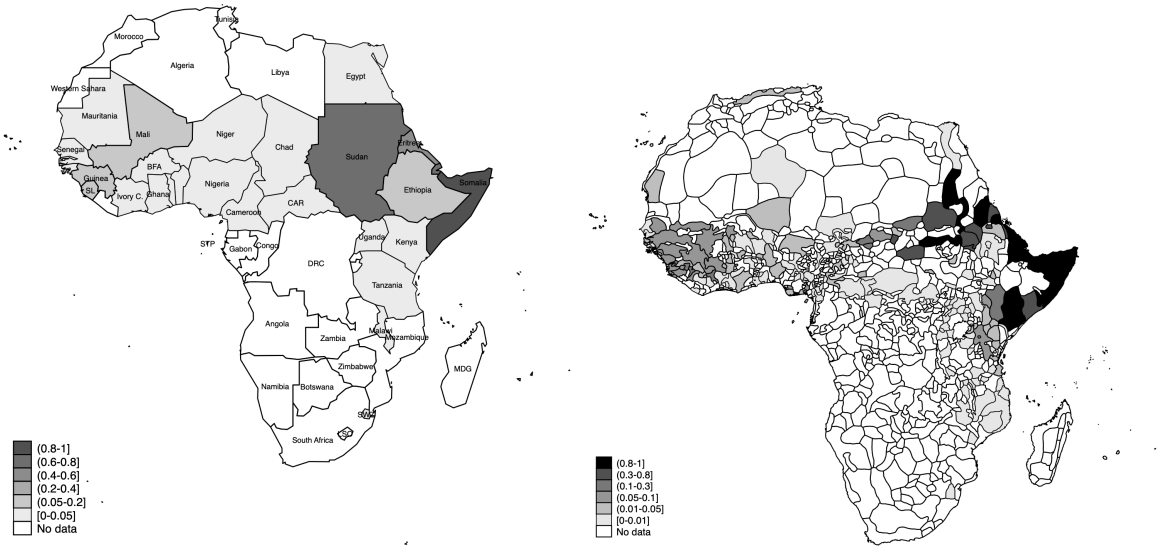
Figure 2 shows variation in the prevalence of infibulation (Panel A) and circumcision (Panel B) in our sample, disaggregated by country (left panels) and ethnic group (right panels). Infibu-

[15]The DHS does not differentiate between Type 1 and Type 2 circumcision as defined by the WHO.

[16]The Joshua Project website provides details on the ethnic composition of various regions, allowing us to identify the most prevalent ethnic group in the respondent's current location. This information was then matched with the corresponding historical ethnic groups outlined in Murdock (1959).

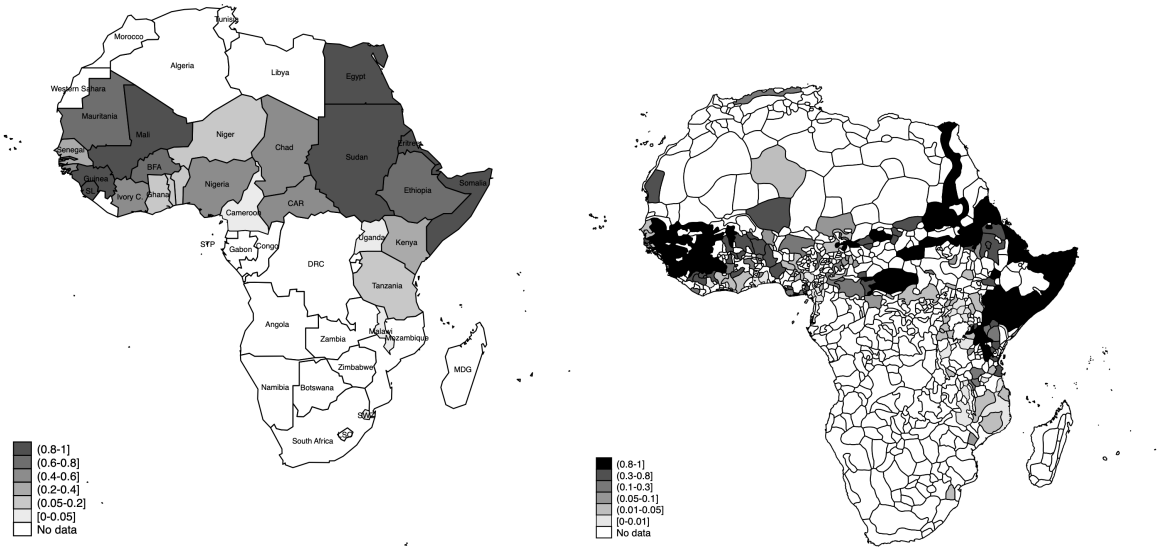
Figure 2. Prevalence of infibulation and circumcision

Panel A: Infibulation



(a) By country (b) By ethnic group

Panel B: Circumcision



(c) By country (d) By ethnic group

Notes: Infibulation corresponds to type-3 circumcision, while circumcision corresponds to any type of FGC in the WHO classification.
Source: Authors' calculation based on DHS and MICS data.

lation is practiced mainly in East Africa, with higher prevalence in the northeastern region of the continent. Strikingly, the current distribution of infibulation prevalence mirrors the historical patterns documented in Figure B2. When considering any type of cicumcision (including infibulation but also the less severe types), we note high prevalence both in East and West Africa. The rightmost panels of Figure 2 further highlights significant within-country variation across ethnic groups, a key source of variation leveraged in our empirical analysis, as all specifications include country fixed effects.

In Appendix Table B3 we report the fraction of infibulated and circumcised women by country and the average age at cutting. In our sample, 13% of the women are infibulated, while approximately 65% have been circumcised, more broadly defined. The countries with the highest rates of circumcision are Somalia (99%), Djibouti (97%), Egypt (94%), Eritrea (93%), Sierra Leone (91%), and Sudan (85%). The countries with the lowest prevalence are Cameroon (0%), Uganda (1%), Swaziland (1%) and Malawi (1%). There is also significant variation in the average age at cutting, from a minimum of about 4 years in Gambia to a maximum of 12 years in Sierra Leone.

3.2 Historical data: Slave exports and ethnicity

Data on the ethnicity and number of slaves exported across different routes were originally assembled by Nunn (2008) and have been already used in a number of papers (e.g., Nunn and Wantchekon, 2011; Teso, 2019). While Nunn (2008) draws on a wide array of different sources and has large samples available for the trans-Atlantic, trans-Saharan, and Indian Ocean routes, the sample of slaves used in his estimates for the Red Sea route, which was not the focus of these studies, is substantially smaller. Therefore, we complement Nunn (2008)'s database of the trans-Atlantic, the trans-Saharan, and the Indian Ocean route with newly collected data for the Red Sea route.

Red-Sea Slave Trade. For our purposes it is crucial to have complete information on the number of slaves exported across the Red-Sea route, by ethnic group. We conducted a meticulous search of several sources to attempt to expand the representativeness of Nunn's (2008) data.[17] First, as in Nunn (2008) we rely on data on the total number of slaves exported across the Red Sea route from 1400 to 1900 from Austen (1979, 1988, 1992). Second, Austen (1988) also provides information on the route of the Red Sea slave trade from the origin to the destination countries. Slaves were mainly taken from Sawakin (Sudan), Zayla (Somalia), Tajura (Gibuti), and Massawa (Eritrea), and shipped to the Arabian Peninsula and the Middle East, mainly in Hijaz in western Arabia, in Yemen and in the Arabian/Persian Gulf. Starting from this information and following a procedure similar to Nunn (2008) and Harris (1971), we conducted a detailed search of manumission acts and other relevant documents originating from the various ports of origin and destination.

One of the most relevant data sources we found is a book by Jonathan Miran (2013), titled "*From Bondage to Freedom on the Red Sea Coast: Manumitted Slaves in Egyptian Massawa, 1873 - 1885*". Miran (2013) examined 233 manumission acts registered in the Massawa Islamic Court Records and compiled individual ethnic information on slaves who may have been captured before their shipment across the Red Sea. For 85 percent of the slaves freed, Miran

[17] Nunn and Wantchekon (2011), referring to Nunn (2008)'s data, mention "Since only two of the four slave trades —the Trans-Atlantic and Indian Ocean— have ethnicity data detailed enough to construct reliable estimates of the number of slaves taken from each ethnicity, our empirical analysis is restricted to the transatlantic and Indian Ocean slave trades".

(2013) was able to retrieve the individual's ethnicity or geographic provenance. In Table B4 in Appendix B.2 we report the ethnic groups of manumitted slave already assembled by Miran (2013). In addition, we found another particularly useful source: "*Slavery in the Gulf in the First Half of the 20th Century*" by Jerzy Zdanowski (2008). Zdanowski (2008) lists a large number of statements —either applications or acts of manumission— recorded at British Agencies, Consulates and Residencies in Arabia in several locations (Addis Ababa, Bahrain, Bandar Abbas, Basidu, Bushire, Dubai, Kuwait, Lingah, HMS Fowey, HMS Lupin, Muscat, and Sharjah).[18] An example of a statement we found in Zdanowski (2008) book is reported in Figure B4. Between 1906 and 1949 a total of 949 statements were made by former slaves. When the ethnicity of the slave was not reported in the statement, we exploit information related to the slave's birthplace and the slave's name (religious, geographical and linguistic origin of the name) to infer the ethnic group of each slave. The main reference throughout this procedure was again Murdock's book (1959). In cases in which more ethnic groups were possible, we selected the most prevalent one within the region.

Appendix Figure B5 provides examples of statements from Zdanowski (2008), illustrating how we infer the ethnic groups of specific individuals. For instance: i) *Nubi bin Mubarak*: his birthplace is identified, allowing us to determine the ethnic group assigned to Mombasa by Murdock (1959), which is Bajun (Bantu); ii) *Nubi bin Taufiq*: the only information available is that he was born in Africa/Asia, without further details, so no ethnic group could be assigned; iii) *Omar bin Ali*: his ethnicity is explicitly identified as Somali. The Somali ethnic group has been proportionally allocated to the three groups located in Somaliland: Esa, Ishak and Mijertein, consistent with the categorization in Murdock's work (1959).

We add these two new data sources to Harris (1971) and League of Nations (1936, 1937), which were already assembled and used in Nunn (2008), and cross-check all sources against each other to avoid potential double counting of the same slave.

Appendix Table A1 shows our final sample, by data source. We have a sample of 317 slaves from 66 different ethnicities. To compute the total number of slaves in each ethnic group we follow the same procedure as in Nunn (2008): we first calculate the share of slaves in each ethnic group in the Red Sea slave trade sample (assumed to be constant across time periods) and then multiply these shares by the total number of slaves in the Red Sea route assembled by Austen (1988). In Appendix Table B5 we report the top exporting countries in the Red Sea route: Eritrea and Ethiopia are among the top exporting countries, followed by Kenya, Djibouti, and Sudan.

Trans-Atlantic, Indian Ocean and Trans-Saharan Slave Trade. For the remaining three slave trade routes we take the number and ethnicity of slaves from Nunn (2008).[19] It is important to stress that our procedure to compute the exposure to the Red Sea slave route and type of sources used are fully consistent with those of Nunn (2008), hence the data are comparable.

[18] HMS stands for High Majesty's Ship and are the ships where names of the slaves have been collected.
[19] We refer the reader to Nunn (2008) for details about the construction of his database.

Appendix Figure A1 shows the spatial distribution of the number of slaves across the four different slave trade routes.[20]

3.3 Ancestral characteristics

Ancestral characteristics of each ethnic group come from the Ethnographic Atlas, a worldwide ethnicity level database assembled by George Peter Murdock (1967) containing ethnographic information for 1,265 ethnic groups prior to industrialization, most of which were written in the 19th and early 20th century. This dataset has been widely used (Cao et al., 2021) and recently validated (Bahrami-Rad, Becker and Henrich, 2021). We rely on this source for our control variables. In particular, we include in our empirical specification five variables that capture the historical characteristics of an ethnic group, which can be correlated with practicing FGC and with exposure to the slave trade.

First, given the potentially high correlation between female and male circumcision, we create a dummy for whether *male* circumcision was historically a common practice for the ethnic group.[21] Second, we construct a variable capturing norms on the premarital sexual behavior of girls, to control for ethnic groups with a stronger demand for chastity and potentially more likely to adopt FGC. Third, following Becker (2023), we construct an indicator capturing the ethnic group's historical dependence on herding animals/pastoralism. Fourth, we take into account any past form of slavery by constructing a variable equal to one if the ethnic group was exposed to the presence of historical slavery. This variable would, for instance, capture if the ethnic group was involved in slavery in Ancient Egypt, well before the African slave trade. The measure comes as well from Murdock (1967) and identifies the precolonial settlement patterns of the ethnic groups, ranging from fully nomadic to permanent or complex settlements. We construct an indicator for nomadic ethnic groups. A more detailed description of the historical controls used in the empirical analysis is provided in Section 5.

3.4 Folklore

Our last data source is a dataset recently released by Michalopoulos and Xue (2021), *Folklore*. We use these data to test whether there is an association between ethnic groups' exposure to the Red Sea slave trade and cultural beliefs related to purity and chastity for women. Folklore is a collection of tales, narratives, jokes, transmitted from generation to generation through word-of-mouth and reflecting a society's traditional beliefs, customs and culture (Cao et al., 2021). The data has been originally assembled by the folklorist Yuri Berezkin who coded the

[20] Data of ethnographic boundaries for Africa come from Murdock (1959) and were later digitized by Nathan Nunn and Suzanne Biler. Each historic African ethnic group's location is represented by a polygon in a vector shapefile. The various polygons of the different ethnic groups are non-overlapping. These data are available at `https://worldmap.harvard.edu/data/geonode:murdock_ea_2010_3`

[21] Unfortunately, the Ethnographic Atlas (Murdock, 1967) does not contain information on whether the ethnic group was practicing female genital cutting.

presence of 2,564 motifs across nearly 956 groups. The year of the first publication of motifs in the Folklore dataset is 1638 and the year of the last one is 2015, with the majority of publications being around 1900 (see the Appendix material in Michalopoulos and Xue (2021)).

A motif is a combination of images, episodes, or structural elements that appear in multiple narratives, including both sacred and profane stories. Importantly for our purposes, the data contain motifs that are related to the culture of women's purity and chastity. To construct the variables relevant for our analysis, we started by selecting a set of seed words associated with two key themes: "chastity" and "female genital cutting". The seed words we associate with chastity are "chastity", "purity", "innocence", and "virgin", while those associated to female genital cutting include "circumcision", "clitoris", and "female genital mutilation". Using *ConceptNet*, a freely available semantic network designed with artificial intelligence to help computers understand word meanings, we generated the 50 most closely related words for each seed word. For example, words related to chastity included modesty, fidelity and others, while words related to clitoris included genitals, infibulation and others.

Next, we cross-referenced the words generated by *ConceptNet* with the Folklore dataset by Michalopoulos and Xue (2021). This dataset organizes motifs around specific conceptual themes (*Concepts*) identified through associated keywords. For instance, the concept of "innocence" in Michalopoulos and Xue (2021) includes terms like "innocent", "naive", and "simplicity". Our final selection of words include the overlapping between those generated by ConceptNet and the concepts in Michalopoulos and Xue (2021).[22]

We then select motifs containing the final selections of words. For example, the motif "A magic medicine demonstrates that the only chaste woman is a servant girl, king chooses the chaste one" is related to the key theme of "chastity", while the motif "Female genitals are as long as a big snake" is related to "female genital cutting". Finally, we compute our variable of interest: the *share of motifs in the domain of chastity and FGC* for each ethnic group. This measure represents the proportion of motifs associated with chastity and FGC out of the total number of motifs attributed to each ethnic group and is a proxy of the relative importance of these themes in a group's oral tradition.

4 Descriptive Statistics

Our final dataset is obtained by matching historical ethnic groups in Murdock's Atlas (on which the slave trade data are based) with the ethnic groups reported in the DHS and in the MICS. The procedure we use for the matching is described in Appendix B.1. We were able to match 86% of the ethnic groups in the DHS or MICS (256 ethnic groups out of the 298 originally listed in the DHS), which corresponds to a sample of 198 groups in the Murdock's Atlas (1967). Our final sample comprises 28 countries and 598,515 women born between

[22]Furthermore, we refine our approach by excluding completely unrelated concepts, such as "vaccination" (linked to circumcision), as well as removing flags attributed for generic words like girls, man, or masculine.

1942 and 2002, for whom we have information on whether they are circumcised or not and information on the number of slaves traded across the Red Sea route. The list of countries and survey waves included in the analysis is reported in Appendix Table A2.

Table 1. Descriptive Statistics

	Obs	Mean	Std. Dev.
Panel A: Outcomes and Socio-Demographic Controls (DHS)			
Infibulated	458645	0.129	0.336
Any female circumcision	598515	0.652	0.476
1 if FGC should continue, 0 if stopped or depends	498493	0.444	0.497
Age	598515	29.428	9.405
Age squared	598515	954.452	587.646
Urban	598515	0.394	0.489
Primary Education	598515	0.263	0.434
Secondary Education	598515	0.252	0.428
Higher Education	598515	0.059	0.233
Muslim	598515	0.623	0.432
Catholic	598515	0.107	0.274
Wealth	598515	0.090	1.443
PANEL B: Historical Controls (Murdock Atlas 1967)			
Male Circumcision	598515	0.918	0.244
Premarital Sex Permitted	598515	0.315	0.325
Herding	598515	0.578	0.453
Historical Slavery	598515	0.934	0.225
Nomadic	598515	0.086	0.258
PANEL C: Variables on Slave Trade			
1 if exposed to the Red Sea slave trade	598515	0.271	0.444
1 if exposed to the Trans-Saharan slave trade	598515	0.105	0.307
1 if exposed to the Trans-Atlantic slave trade	598515	0.461	0.498
1 if exposed to the Indian Ocean slave trade	598515	0.094	0.292
Red Sea Exports/Area	598515	0.181	1.303
Saharan Exports/Area	598515	0.044	0.428
Atlantic Exports/Area	598515	1.750	5.769
Indian Exports/Area	598515	0.007	0.128
IHS - Red Sea Exports / Area	598515	0.088	0.360
IHS - Trans-Saharan Exports / Area	598515	0.029	0.173
IHS - Trans-Atlantic Exports / Area	598515	0.541	0.992
IHS - Indian Exports/ Area	598515	0.005	0.077
PANEL D: Folklore			
Share of motifs in the domain chastity or FGC	590101	0.144	0.056

Source: DHS and MICS for socio-demographic characteristics, Murdock (1967) for historical controls, and Michalopoulos and Xue (2021) for Folklore data. *Notes:* All the variables are described in Section 5 in the text. The variable *Wealth* is constructed as the first principal component from a set of household durable goods per capita including electricity, refrigerators, bicycles, motorcycles, cars/trucks, radios, and televisions. The ethnic-level historical controls include an indicator for whether premarital sex is permitted, a dummy for male circumcision, a dummy for the presence of slavery in the past, dependence on animal husbandry, a dummy indicating if the pre-colonial settlement patterns is nomadic.

Table 1 displays summary statistics for key variables of interest. Looking at socio-demographic characteristics (Panel A), we show that 65% of the women underwent some form of female gen-

ital cutting and 12.9% reported the most extreme form, infibulation. The average age of women in the sample is 29 years with 39% living in urban areas, 26% reported to have achieved primary education and 62% are Muslim. In Panel B, we report descriptive statistics on historical controls: 92% of respondents belong to groups that historically practiced male circumcision, 32% belong to groups that allowed promiscuous relationships and permitted premarital sex, and 93.4% belong to ethnic groups that historically experienced ancient slavery. Almost 58% of respondents belong to ethnic groups that historically relied on pastoralism. In Panel C, we report characteristics related to the slave trade. 27.1% belong to an ethnic group that was affected by the Red Sea slave trade, about 46.1% by the Trans-Atlantic trade, 10.5% by the trans-Saharan trade and 9.4% by the Indian Ocean route. If we take into account the number of slaves exported along the various routes from the ethnic groups to which our respondents belong (and normalize by the land area inhabited by the group), we confirm that the trans-Atlantic route was by far the most sizeable route, followed by the Red Sea one, while the trans-Saharan and Indian routes were comparatively smaller. Finally, in Panel D we report descriptive statistics related to the variables in the Folklore dataset. The share of narratives in the domain of chastity or FGC among ethnic groups is 14.4%.

In Appendix Table A3 we examine potential differences between ethnic groups that were exposed to the Red Sea slave trade and those that were not, as well as between women within these groups and women from unexposed ethnic groups. The table displays the coefficients from a regression where the dependent variable measures exposure to the Red Sea route and the independent variables include the covariates we will include in our regressions, as detailed in the next section. We analyze these associations at both the individual and ethnic group levels: in columns 1-2, the correlates include contemporary individual-level socio-economic characteristics and ethnic group-level historical controls, while in columns 3-4, all covariates are at the ethnic group level. Our results indicate no systematic correlation between exposure to the Red Sea slave trade and the individual or ethnic group covariates.

5 Empirical strategy

We exploit heterogeneity across ethnicities within country to test whether ethnic groups historically more exposed to the Red Sea slave route have a higher prevalence of infibulation and female circumcision today, compared to ethnic groups that were exposed to other routes or that were not at all exposed to the African slave trade. We estimate the following linear probability model:

$$\text{FGC}_{iec} = \beta_1 \text{Red}_e + \beta_2 \text{Saharan}_e + \beta_3 \text{Atlantic}_e + \beta_4 \text{Indian}_e + \gamma X_{iec} + \delta W_e + \lambda_c + \varepsilon_{iec} \qquad (1)$$

where FGC_{iec} takes value 1 if person i, in ethnic group e, living in country c, is infibulated

(or cicumcised, depending on specification) as self-reported in the DHS/MICS data, and 0 otherwise. The variables Red_e, $Saharan_e$, $Atlantic_e$ and $Indian_e$ capture the intensity of slave trade across different slave routes. We used two measures for slave exports. First, we normalize the total number of slaves taken from ethnic group e and shipped through a given route from 1400 to 1900 by its size, measured by the area of land inhabited by the ethnic group e in the 19th century.[23] Ideally, we would prefer to use a measure of slave exports that is normalized by the historical population of each ethnic group prior to the slave trade. Unfortunately, these data are unreliable. Some historical population data are available from Murdock (1959), but they are from the colonial period (approximately the early twentieth century) after the end of the slave trade, and they exist for only about 85% percent of the ethnicities in the sample (Nunn and Wantchekon, 2011). Results are however robust using this alternative and imprecise measure. Second, we account for the skewness in the distribution of slave exports by using the inverse hyperbolic sine transformation (IHS).[24]

X_{iec} is a vector of contemporaneous individual controls including: age, age squared, an indicator for residing in urban areas, religion (dummies for Muslim or Catholic), educational attainment (dummies for primary, secondary or higher education) and wealth (measured as the first principal component from a set of durable goods owned by the household: refrigerators, bicycles, motorcycles, cars/trucks, radios, televisions, and electricity). W_e is a set of historical controls: dummies for male circumcision, norms on premarital sex, reliance herding, ancient slavery, nomadic settlement pattern. λ_c are country fixed effects.

Our main coefficient of interest is β_1: following the historical hypothesis, we should expect $\beta_1 > 0$. As for the other coefficients, β_2, β_3 and β_4, we would expect no statistically significant association between FGC and slave trade along the other routes, with maybe a possible exception for the Indian Ocean route, given that some of the slaves along this route were exported to the Middle East. We cluster standard errors at the Murdock's Atlas (1959) ethnic group level.

5.1 Identification

In interpreting the β_1 coefficient in equation (1) as causal, we make the following considerations. The variables related to slave exports are pre-determined, so endogeneity problems due to reverse causation are not an issue in our case. A potential concern may be the presence of unobserved variables that are correlated with a woman's probability to be infibulated or circumcised today and with her ancestors' exposure to the slave trade. However, note that we include in our specification slave exports along all four slave trade routes. This implies that any unobserved factors that affect the propensity to enslave certain groups, without being specific to the Red Sea route, would generate a spurious correlation for other routes as well as for the Red

[23] Land area is measured in millions of square kilometers and is from Parker (1997). By dividing the number of slave exports by land area, we take into account differences in the historical size of ethnic groups.

[24] The inverse hyperbolic sine transformation is equal to $ln\left(x+\sqrt{x^2+1}\right)$.

Sea one. For example, if the concern was that ethnic groups more prone to violence towards women —and therefore more likely to practice FGC— may have been the ones that supplied a higher number of slaves, this argument should apply regardless of the particular route taken by the slaves.

Any threat to identification should therefore come from unobserved factors that are specific to ethnic groups historically located along the Red Sea route, and not to the others. For example, a potential confounder would exist if slave traders were more likely to select women from ethnic groups that had a greater focus on chastity or beauty to be sent specifically to the Red Sea route (not to other routes) and if the same groups were more likely to practice FGC. While we cannot rule out the existence of such unobserved factors, we follow two strategies to mitigate this concern.

First, we gauge the extent to which unobserved ethnicity-specific factors may be a problem by augmenting our benchmark specification with historical characteristics of ethnic groups, characteristics that may potentially be correlated with both FGC and with exposure to the Red Sea slave trade. In particular, we include among our controls five variables from Murdock's (1967) Ethnographic Atlas:

i) An indicator for whether the ethnic group historically practiced male circumcision, potentially correlated with the historical presence of FGC;

ii) A variable capturing norms on premarital sexual relationships. Specifically, we construct a dummy taking value 1 if the ethnic group historically allowed premarital sex regardless of pregnancy results or forbade trial marriage and promiscuous relationships, and 0 otherwise;[25]

iii) A variable measuring the extent to which the ethnic group was historically dependent on animal husbandry/pastoralism. This control variable is particularly important in our context given recent evidence showing that women from historically more pastoral societies are more likely to have undergone infibulation (Becker, 2023).[26]

Finally, given that it was actually the most developed areas of Africa that tended to select into the slave trades (Nunn, 2008), following Nunn and Wantchekon (2011) we also use historical

[25]The original variable includes information on whether the ethnic groups practiced early marriage, insisted on virginity, prohibited premarital sex but weakly censured it, allowed premarital sex but censured it in case of pregnancy, prohibited trial marriage and promiscuous relations; or freely permitted premarital sex even if pregnancy results.

[26]The Ethnographic Atlas contains information on the degree to which a society depends on animal husbandry, measured on a 10-point scale (variable v4), and on the predominant animal in a society (variable v40). Following Becker (2023), we generate an indicator that takes value 1 if the predominant type of animal is a herding animal (e.g. sheep, goats, donkeys, horses, reindeer, cattle, or camels/camelids), and 0 if it is an animal that is not herded (e.g., pigs, bees, dogs, poultry, or guinea pigs) and multiply this indicator with an indicator for the degree of dependence on animal husbandry (going from 0 to 100). Departing from Becker (2023), we then create a dummy indicating if the historical dependence on pastoralism of the ethnic group is greater than the 25^{th} percentile. Nonetheless, the results remain robust when using Becker (2023)'s original measure of reliance on pastoralism.

data to construct two additional proxies for ancient slavery and the initial levels of prosperity. We additionally control for:

iv) An indicator for whether the ethnic group was historically exposed to ancient slavery. This includes any past form of slavery, including those that preceded the African slave trade (e.g., slavery in Ancient Egypt, etc.);

v) An indicator for whether the ethnic group had a nomadic precolonial settlement pattern, as opposed to sedentary ones.

As we will show, our estimates of the effect of Red Sea slave exports are not significantly affected by the inclusion of historical controls, which increases our confidence in the fact that unobserved ethnic-specific factors should not drive our results.

Our second way of addressing potential endogeneity, following the previous literature, is to adopt an instrumental variable (IV) approach. This requires an instrument that is correlated with the number of slaves shipped across the Red Sea route but uncorrelated with characteristics of ethnic groups that may affect the adoption of FGC by their descendants. Slave traders purchased slaves at the ports in Africa to ship them to the relevant destinations, making groups located in areas closer to the ports more likely to be traded. Previous literature testing the effect of the African slave trade on economic outcomes has used distance to the Atlantic coast as an instrument for slave exports along the trans-Atlantic route (e.g., Nunn and Wantchekon, 2011; Whatley and Gillezeau, 2011; Teso, 2019). Since we are interested in the Red Sea route, we instead rely on the distance to the ports of exit of slaves in the Red Sea route as an instrument for the number of slaves exported trough the Red Sea route. More details on our IV strategy are reported in subsection 6.3.

6 Results

6.1 Prevalence of FGC

Table 2 reports our main results. We estimate equation (1) using as dependent variable a dummy taking value 1 if the respondent is infibulated (type 3 circumcision) and 0 otherwise (, i.e. not circumcised or any other type of circumcision). The sample includes all the women for whom we have information on whether they are circumcised as well as on the type of circumcision.[27] In columns 1 to 3, we measure exposure to the slave trade as the number of slaves exported along a given slave route divided by the area of land inhabited by the ethnic group during the 19th century. In columns 4 to 6, we use the inverse hyperbolic sine (IHS) of the exports/area variables, to account for the fact that the distribution of slaves' exports is highly skewed to the left, with a relatively small number of observations taking on large values,

[27] The number of observations in Table 2 is smaller than the one reported in Table 1 because information on the *type* of FGC is available for a little over 450,000 respondents.

Table 2. Infibulation and slave exports

	(1)	(2)	(3)	(4)	(5)	(6)
Dependent variable = 1 if infibulated						
	Red Sea Exports / Area			IHS - Red Sea Exports / Area		
Red Sea Exports	0.045***	0.045***	0.044***	0.210***	0.211***	0.198***
	(0.016)	(0.016)	(0.014)	(0.041)	(0.041)	(0.044)
Saharan Exports		0.000	-0.006		-0.025	-0.041
		(0.003)	(0.006)		(0.016)	(0.027)
Atlantic Exports		-0.001*	-0.000		-0.007	0.001
		(0.000)	(0.001)		(0.005)	(0.006)
Indian Exports		0.004	-0.008		-0.004	-0.020
		(0.004)	(0.012)		(0.006)	(0.016)
Cont. controls	NO	NO	YES	NO	NO	YES
Hist. controls	NO	NO	YES	NO	NO	YES
Mean of the dep. var.	0.129	0.129	0.129	0.129	0.129	0.129
Mean of the dep. var. Red Sea = 0	0.080	0.080	0.080	0.080	0.080	0.080
R^2	0.508	0.508	0.519	0.515	0.516	0.524
No. Obs	458,645	458,645	458,645	458,645	458,645	458,645

Notes: OLS estimates with country and survey wave fixed effects. Standard errors clustered at the ethnic group level in parentheses. *, **, *** denote significance at 10, 5, 1 percent level, respectively. Contemporaneous controls include individual level controls: age, age squared, a dummy for living in an urban area, a dummy for primary, secondary and higher education, dummies for Muslim and Catholic religion, and a wealth index. Historical controls are at the ethnic group level and include an indicator for whether premarital sex is permitted, a dummy for male circumcision, a dummy for the presence of slavery in the past, a dummy for dependence on animal husbandry greater than 25th percentile, a dummy indicating if the pre-colonial settlement patterns is nomadic. *Source:* Demographic and Health Surveys and Multiple Indicator Cluster Surveys for socio-demographic characteristics, Murdock (1967) for historical controls.

and a large fraction of the observations taking 0 values.[28] In both cases we estimate three specifications: first with country and survey wave fixed effects only, then adding all the four slave routes and finally including individual socio-economic controls and historical controls at the ethnic group level. For conciseness, in Table 2 we display only the coefficients on the main variables of interest, i.e., slave exports along the various routes. In Appendix Table A4 we also report coefficients on individual and ethnic group level controls.

In column 1 of Table 2, the coefficient on *Red Sea Exports/Area* represents the effect of a unit increase in this variable on the probability of infibulation. This coefficient is positive and statistically significant, as predicted by the historical hypothesis at the core of this paper. The estimated coefficient remains similar in magnitude and significance level when we add among the controls slave exports for the other slave routes (column 2), individual contemporaneous controls and historical controls (column 3). Notably, the exports along the other routes are uncorrelated with the probability of infibulation.[29] The most comprehensive specification is the one reported in column 3: according to this specification, a one standard deviation increase in *Red Sea Exports/Area* increases the probability of infibulation by 5.7 percentage points (or 71.4% of the mean for groups with no Red Sea exports).

When we account for the skewness in the distribution of slave exports by using the IHS transformation (columns 4-6), the results are qualitatively similar to those reported in columns

[28]The share of women in the sample not exposed to the Red Sea, Atlantic, Saharan and Indian slave trade is, respectively, 73%, 54%, 89%, and 90%. The share of women not exposed to any slave trade is 22%.

[29]The small and marginally significant negative coefficient on the trans-Atlantic route in column 2 does not survive the inclusion of additional controls.

1-3: in all specifications the coefficient on the *IHS-Red Sea exports/Area* variable is significant at 1 percent level. In terms of magnitude, based on the estimates in column 6, on average, a 10% increase in exposure to Red Sea exports increases the probability of infibulation by 0.43 percentage points, an increase of 5.4% over the mean for groups with no Red Sea slave exports.[30]

Among the individual-level contemporaneous controls included in the regression (and displayed in Appendix Table A4), primary education, wealth and urban residence are negatively correlated with the probability of infibulation, and religion also plays a significant role. In Appendix Table B6 we also show that our results remain robust when we normalized our exports variable by the historical population instead of by the area of land inhabited by the ethnic groups. Furthermore, in Appendix Table B7, we re-estimate Table 2 excluding countries where the match between slave exports data and DHS/MICS data was done at the regional level (Egypt, Swaziland, Somalia, and Sudan). The coefficient on Red Sea slave exports remains positive and significant at the 1 percent level and, if anything, larger in magnitude.

Table 3. Circumcision and slave exports

	(1)	(2)	(3)	(4)	(5)	(6)
Dependent variable = 1 if circumcised						
	Red Sea Exports / Area			IHS - Red Sea Exports / Area		
Red Sea Exports	0.013**	0.012**	0.019**	0.118**	0.117**	0.121**
	(0.005)	(0.005)	(0.009)	(0.048)	(0.047)	(0.057)
Saharan Exports		0.029	0.015		0.025	-0.029
		(0.025)	(0.026)		(0.105)	(0.115)
Atlantic Exports		-0.005	-0.005		-0.039	-0.026
		(0.004)	(0.004)		(0.044)	(0.031)
Indian Exports		0.049	-0.024		0.047	-0.097
		(0.031)	(0.070)		(0.071)	(0.130)
Cont. Controls	NO	NO	YES	NO	NO	YES
Hist. Controls	NO	NO	YES	NO	NO	YES
Mean of the dep. var.	0.652	0.652	0.652	0.652	0.652	0.652
Mean of the dep. var. Red Sea = 0	0.556	0.556	0.556	0.556	0.556	0.556
R^2	0.396	0.398	0.453	0.399	0.402	0.455
No. Obs	598,515	598,515	598,515	598,515	598,515	598,515

Notes: OLS estimates with country and survey wave fixed effects. Standard errors clustered at the ethnic group level in parentheses. *, **, *** denote significance at 10, 5, 1 percent level, respectively. Individual and historical controls as in Table 2. *Source:* Demographic and Health Surveys and Multiple Indicator Cluster Surveys for socio-demographic characteristics, Murdock (1967) for historical controls.

Next, we move to examine the relationship between having ancestors in the Red Sea slave trade and the probability of being 'circumcised', intended as including all forms of FGC (and not only on the most severe form as in the previous analysis). While the historical accounts on female slaves mostly describe practices that can be classified as infibulation, it is possible that different variants of the practice (including milder forms of female circumcision) may have developed over time among populations initially exposed to infibulation.[31]

[30] We calculate this number using the expression for the elasticity in case of IHS-transformed regressors recommended by Bellemare and Wichman (2020). In particular, we compute the semi-elasticity $\beta \cdot (x/(\sqrt{(x^2+1)}))$, where x is the *Red Sea Exports/Area* variable, averaged over the sample with positive exports. With a β equal to 0.198 and x equal to 0.225, we obtain a magnitude of 0.043 percentage points.

[31] For example, Gulesci et al. (2023) show evidence of transition from type-3 to type-1 and type-2 circumcision

In Table 3, the dependent variable is a dummy variable taking value 1 if the woman is circumcised (with any type of FGC) and 0 if she is not. Similarly to Table 2, we find a positive and significant relationship between having ancestors traded across the Red Sea route and being circumcised today, with very similar coefficients across specifications. The magnitude of the effect is somewhat smaller than that of infibulation: based on the estimates in column 3, a one standard deviation increase in exposure to Red Sea exports increases the probability of FGC by 2.5 percentage points (or 4.5% of the mean for the group with no Red Sea slave trade). For the IHS transformation in columns 4-6, a 10% increase in the volume of Red Sea slave exports increases the probability of female circumcision by 0.22 percentage points (a 0.39% increase over the mean for groups with no Red Sea slave exports) (column 6). Similar to what we found in Table 2, slave exports along trade routes other than the Red Sea one are not associated with contemporary prevalence of FGC.

In Appendix Table A5 we explore the correlation between exposure to the Red Sea route and the likelihood of being infibulated (columns 1-3) or circumcised (columns 4-6) today, by looking at the extensive margin in exposure –i.e., dummies for whether the respondent belongs to an ethnic group exposed to Red Sea slave trade. Results are consistent with those in Table 2 and Table 3.

Table 4. Infibulation and slave exports in East Africa

	(1)	(2)	(3)	(4)	(5)	(6)
Dependent variable = 1 if infibulated						
	Red Sea Exports / Area			IHS - Red Sea Exports / Area		
Red Sea Exports	0.044***	0.044***	0.042***	0.201***	0.202***	0.140***
	(0.016)	(0.016)	(0.014)	(0.046)	(0.045)	(0.049)
Saharan Exports		-0.376	-0.275		-0.500	-0.282
		(0.397)	(0.324)		(0.424)	(0.337)
Indian Exports		10.703	5.116		6.731	4.632
		(13.430)	(9.255)		(10.826)	(9.065)
Cont. controls	NO	NO	YES	NO	NO	YES
Hist. controls	NO	NO	YES	NO	NO	YES
Mean of the dep. var.	0.406	0.406	0.406	0.406	0.406	0.406
Mean of the dep. var. Red Sea = 0	0.456	0.456	0.456	0.456	0.456	0.456
R^2	0.493	0.496	0.560	0.501	0.505	0.560
No. Obs	116,747	116,747	116,747	116,747	116,747	116,747

Notes: OLS estimates with country and survey wave fixed effects. Standard errors clustered at the ethnic group level in parentheses. *, **, *** denote significance at 10, 5, 1 percent level, respectively. Individual and historical controls as in Table 2. *Source:* Demographic and Health Surveys and Multiple Indicator Cluster Surveys for socio-demographic characteristics, Murdock (1967) for historical controls.

Given the geographic concentration of Red Sea slave exports in the eastern part of the continent, one may be concerned that the positive coefficient on the Red Sea exports variable merely captures a difference between East and West Africa. While this concern is attenuated by the inclusion of country fixed effects in all our specifications, as a further robustness check in Table 4 we restrict the sample to countries located in East Africa, namely Egypt, Sudan, Ethiopia,

in Somalia.

Somalia, Djibouti and Eritrea. We report results for our main outcome of interest, infibulation, but the pattern is similar (positive and significant) if we use as the dependent variable a dummy for any type of FGC. It is reassuring to observe that our results hold in this restricted sample and remain significant at the 1 percent level in all the specifications despite the smaller sample size.[32] This suggests that differences in exposure to the Red Sea slave trade across ethnic groups *within East Africa* explain part of the variation in the prevalence of infibulation across these groups today.[33]

6.2 Attitudes towards FGC

In addition to studying the relation between the slave trade and the practice of FGC, we are interested in understanding how the historical experience of slavery shaped culture in a way that translates into contemporary attitudes. The DHS asks respondents the following question: "Do you think female genital cutting should continue, stop, or it depends?" We construct a dummy taking value 1 if the respondent answers that FGC should be continued and 0 if she says that it depends or that it should be stopped. On average, 44 percent of the women interviewed say that FGC should continue.

Figure A2 shows the average share of respondents who support FGC at the country level (panel A), and at the ethnic group level (panel B). Support for the practice is widespread in East Africa but also in West African countries such as Mali, Sierra Leone and Guinea. These are countries where the prevalence of circumcision (all types) is above 90 percent (see Table B3).

In Table 5, we estimate equation (1) using as an outcome a dummy for whether the respondent is in favor of continuing FGC. We find a positive and significant coefficient on the Red Sea variable, indicating that women whose ancestors were traded in larger numbers along the Red Sea route are more in favor of continuing the practice compared to women who had ancestors in other slave trade routes or not enslaved. Based on the estimates in column 3, on average a one standard deviation increase in Red Sea slave exports increases the probability of supporting FGC by 2.6 percentage points (or 7% of the mean for groups not exposed to the Red Sea slave trade). The estimates in column 6 indicate that a 10% increase in exposure to Red Sea exports increases the probability of infibulation by 0.18 percentage points (or 0.49% over the mean of groups not enslaved in the Red Sea route). The above results suggest that efforts to eradicate FGC in Africa may face obstacles created by distant historical experiences with long-term effects on contemporaneous culture.

[32] Based on the estimates in column 3, a one standard deviation increase in our measure for Red Sea slave trade increases the probability of infibulation within East Africa by 5.5 percentage points (or 12% of to the mean for groups with no Red Sea slave trade). According to the estimates in column 6, a 10% increase in exposure to Red Sea exports leads, on average, to a 0.91 percentage points increase in the likelihood of infibulation, or to a 2% increase over the mean for groups with no Red Sea slave exports.

[33] The large coefficient on Indian exports is driven by the tiny mean and variance of this variable, equal to 0.0000793 and 0.000000112, respectively.

Table 5. Attitudes towards FGC

	(1)	(2)	(3)	(4)	(5)	(6)
Dependent variable = 1 if respondent says FGC should continue						
	Red Sea Exports / Area			IHS - Red Sea Exports / Area		
Red Sea Exports	0.021***	0.021***	0.020***	0.123***	0.117***	0.090***
	(0.008)	(0.008)	(0.006)	(0.036)	(0.032)	(0.032)
Saharan Exports		0.035**	0.013		0.086**	0.002
		(0.017)	(0.016)		(0.043)	(0.061)
Atlantic Exports		-0.001	0.003		-0.024	0.004
		(0.002)	(0.002)		(0.024)	(0.015)
Indian Exports		-3.832	-4.078		-3.598	-3.735
		(2.676)	(2.769)		(2.345)	(2.605)
Cont. controls	NO	NO	YES	NO	NO	YES
Hist. controls	NO	NO	YES	NO	NO	YES
Mean of the dep. var.	0.444	0.444	0.444	0.444	0.444	0.444
Mean of the dep. var. Red Sea = 0	0.367	0.367	0.367	0.367	0.367	0.367
R^2	0.288	0.290	0.354	0.290	0.293	0.354
No. Obs	498,493	498,493	498,493	498,493	498,493	498,493

Notes: OLS estimates with country and survey wave fixed effects. Standard errors clustered at the ethnic group level in parentheses. *, **, *** denote significance at 10, 5, 1 percent level, respectively. Individual and historical controls as in Table 2. *Source:* Demographic and Health Surveys and Multiple Indicator Cluster Surveys for socio-demographic characteristics, Murdock (1967) for historical controls.

6.3 Instrumental variable estimates

One potential confounder in the interpretation of the results presented so far is that ethnic groups that were exposed to the Red Sea slave trade may differ from other groups in some unobserved characteristics correlated with the practice of FGC. For example, slave raiders may have chosen to target ethnic groups in which women were more secluded, or potentially even already practicing FGC if these characteristics were considered more desirable at the destination. While we are not aware of any evidence in this direction in the historical literature, in what follows we attempt to rule out this potential endogeneity concern using an instrumental variable approach.

Following Nunn (2008) and the literature on the effects of the trans-Atlantic slave trade, which uses distance from the Atlantic coast as an instrument for exposure to the trans-Atlantic slave trade (Nunn and Wantchekon, 2011; Teso, 2019), we compute the overland distance from an ethnic group's centroid to the closest port of exit of slaves traded through the Red Sea route.[34] We construct a vector of dummies that take value 1 if the distance from the ethnic group centroid and the Red Sea ports is smaller than a given cutoff and 0 otherwise.

We estimate a first-stage relationship between our *IHS - Red Sea exports/Area* variable and each of these dummies separately from 110 to 190 km, controlling for the distances from the centroid of ethnic groups to both the closest port (any port) and to the closest coast. By controlling for these variables, our goal is to pick up generic effects coming from proximity to the sea, not specifically linked to the Red Sea slave trade. These first-stage results are reported in

[34]The centroid of each ethnic group comes from the map of historical boundaries according to Murdock (1959), while the Red Sea ports and their historical sources are displayed in Appendix B.2: Table B1 and Figure A3. The ports of exit characterizing the Red Sea route are Assab, Berbera, Massawa, Suakin, Tajura and Zeyla.

Figure A4.[35]

We find that ethnic groups historically located within 110 km, 130 km, 150 km, or 170 km of the Red Sea ports were significantly more likely to have been traded via the Red Sea route. As expected, the first-stage coefficient is larger for shorter distance thresholds and gradually declines in magnitude as the cutoff increases. Based on these results, we use an indicator for whether an ethnic group was historically located within 150 km of the Red Sea ports as our primary instrument for Red Sea slave exports, as this cutoff exhibits the strongest first-stage relationship (Figure A4). For robustness, in Table B9 in Appendix B.2 we also report results using a 170 km threshold.

As additional evidence, Appendix Figure A5 presents the coefficients from a 'reduced form' specification where the dependent variable is a dummy for being infibulated, and the distance cutoff dummies are included alongside all individual and historical controls and country fixed effects. The blue dots in the figure are the estimated coefficients on the dummies indicating whether the distance to the Red Sea ports is below the threshold shown on the horizontal axis. The red squares are the equivalent estimates for distance cutoffs to any African port. The figure also displays the 95% confidence intervals for the estimates. Consistent with our hypothesis, we find that proximity to general African ports has no significant relationship with infibulation, while proximity to ports involved in the Red Sea trade exhibits a strong positive relationship.

In Table 6, we report our two-stage-least squares estimates (top panel), as well as the first stage (bottom panel), instrumenting *IHS - Red Sea exports/Area* with an indicator for whether the ethnic group was historically located within 150 km from the ports of exits of slaves in the Red Sea route. The exclusion restriction is that, conditional on the distance to the closest port and coast, proximity to the ports on the Red Sea coast only affects FGC through its effect on the Red Sea slave trade. Under this assumption, the estimated causal effect of the Red Sea trade on infibulation remains positive, statistically significant, and very similar in magnitude to the one estimated with OLS.[36]

[35] We stop our first stage estimation at the 190 km dummies because after this threshold the relationship is not longer statistically significant. If we use a *continuous* measure of distance to the Red Sea ports, the results indicate that distance to the Red Sea ports is negatively correlated with Red Sea slave exports, but the relationship is not statistically significant (see Table B8). This finding aligns with Nunn (2008, p. 162), who also notes a weaker relationship between continuous distance and trade volumes for the Red Sea route. This may reflect the relatively limited scale of the Red Sea slave trade, which involved fewer slaves than the trans-Atlantic trade, as well as the differing geophysical characteristics of the two areas. Notably, while the terrain leading to the Atlantic coast in West Africa is relatively flat, the area surrounding key Red Sea ports such as Massawa is mountainous (see Figure 1). These factors suggest that Red Sea slave exports may exhibit a highly non-linear relationship with distance from the Northeastern African coast where the ports were located.

[36] In Table B9 we show first and second stage coefficients when considering as instrument a binary variable indicating ethnic groups located within 170 km from the Red Sea ports. Results still hold but the first stage is weaker.

Table 6. Infibulation and slave export. IV estimates with 150km cut-off

	(1)	(2)	(3)
Second stage - Dependent variable = 1 if infibulated			
IHS - Red Sea Exports / Area	0.246***	0.242***	0.220***
	(0.059)	(0.060)	(0.065)
Distance to the closest port	-0.002	-0.008	-0.013
	(0.012)	(0.013)	(0.014)
Distance to the closest coast	0.011	0.012	0.014
	(0.012)	(0.012)	(0.014)
IHS - Trans-Saharan Exports / Area		0.010	-0.008
		(0.018)	(0.025)
IHS - Trans-Atlantic Exports / Area		-0.011	-0.008
		(0.007)	(0.010)
IHS - Indian Exports/ Area		-0.016	-0.032*
		(0.012)	(0.018)
R^2	0.522	0.523	0.532
Mean of dep. var.	0.129	0.129	0.129
Mean of dep. var. Red Sea = 0	0.080	0.080	0.080
	(4)	(5)	(6)
First stage - Dependent variable = IHS - Red Sea Exports/Area			
Dummy for being within the 150 km distance to Red Sea ports	1.717***	1.741***	1.755***
	(0.567)	(0.566)	(0.531)
Distance to the closest port	0.131	0.157*	0.196**
	(0.090)	(0.095)	(0.096)
Distance to the closest coast	-0.107	-0.119	-0.141*
	(0.082)	(0.084)	(0.085)
Cont. Controls	NO	NO	YES
Hist. Controls	NO	NO	YES
Mean of dep var	0.106	0.106	0.106
R^2	0.411	0.419	0.427
F-Stat of excluded instrument	9.176	9.469	10.936
F-Stat $>$ 0 (p-value)	0.003	0.002	0.001
No. Obs	458,645	458,645	458,645

Notes: Two-stage-least-squares estimates (top panel) and OLS estimates (bottom panel). Standard errors clustered at the ethnic group level in parentheses. Country and survey wave fixed effects included. *, **, *** denote significance at 10, 5, 1 percent level, respectively. Individual and historical controls as in Table 2. All the columns include the squared distances to the closest ports and coasts. The variables *distance to the closest port* and *distance to the closest coast* are computed by dividing the distances measured in meters by 100,000. *Source:* Demographic and Health Surveys and Multiple Indicator Cluster Surveys for socio-demographic characteristics, Murdock (1967) for historical controls.

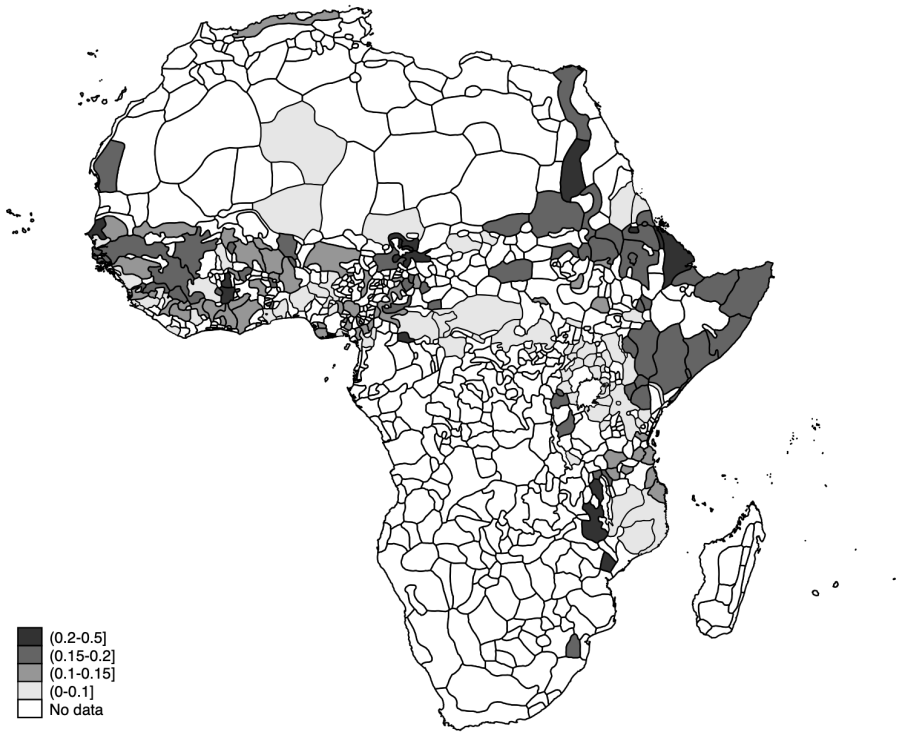
7 Mechanisms of adoption: The demand for chastity

The previous analysis has established a robust positive relationship between the historical exposure of a woman's ethnic group to the Red Sea slave trade and her likelihood of being infibulated or circumcised today (and of supporting the practice). In what follows, we investigate a possible channel through which the practice of infibulation, historically associated with female slaves, may have spread to the rest of the population: the demand for chastity.

As discussed, infibulated women traded along the Red Sea route commanded a higher price on the slave market due to the association between infibulation and the concepts of 'chastity' and 'purity', important values in the destination markets at that time. Ethnic groups exposed to the Red Sea slave trade may have internalized these views, so that over time infibulation may have become a marker for purity, virginity, chastity and beauty, and may have been spread to a greater extent as a desirable trait by local populations. This hypothesis is mentioned by Mackie (1996).

To measure a cultural preference for chastity, we examine beliefs and values of societies as reflected in their oral traditions using the *Folklore* dataset. As explained in subsection 3.4, we merge our dataset with the *Folklore* data at the ethnic group level and identify motifs related to chastity, purity, and FGC using text analysis. Presumably, if a society places strong emphasis on women's chastity, purity, virginity, and FGC, this should be reflected in their folklore. We compute the share of motifs related to chastity and FGC among the total number of motifs a society has, and find that this share is 17.8% for ethnic groups exposed to the Red Sea route and 13.2% for groups not exposed to the Red Sea route. The variation in this measure across ethnic groups is displayed in Figure 3. In the eastern part of the continent, the visual pattern resembles that of slave exports across the Red Sea (Appendix Figure A1).

Figure 3. Share of motifs in the domain of chastity or FGC

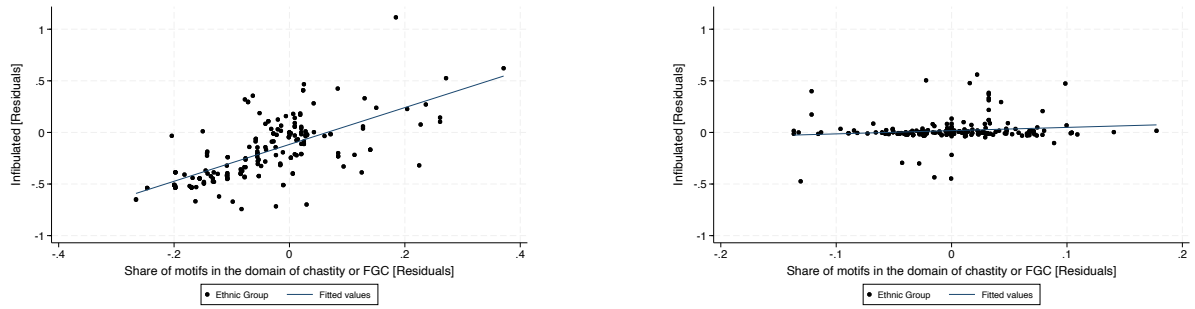


Source: Authors' calculation based on Michalopoulos and Xue (2021) folklore data.

In Figure 4, we show the relationship between the share of motifs associated with chastity or FGC at the ethnic group level and the share of infibulated women. Both variables are residualized from a regression including country fixed effects, the logarithm of the number of publications consulted by Berezkin for an ethnic group, and the natural log of the year of first publication (as in Michalopoulos and Xue (2021) and Becker (2023)). Panel (a) shows that ethnic groups exposed to the Red Sea slave trade exhibit a strong positive correlation between chastity motifs and infibulation. On the other hand, the relationship disappears for ethnic groups not exposed to the Red Sea slave trade (Panel b).

Table 7 reports the corresponding regression coefficients, for different specifications. In par-

Figure 4. Infibulation and share of motifs in the domain of chastity or FGC



(a) Exposed to the Red Sea slave trade

(b) Not exposed to the Red Sea slave trade

Notes: Scatter plot on the correlation between infibulation and the share of motifs in the domain of chastity or FGC, residualized of country fixed effects, log year of earliest publication and log of number of publications. *Source*: Demographic and Health Surveys and Multiple Indicator Cluster Surveys and Michalopoulos and Xue (2021) data on Folklore.

ticular, we control for log number of sources and log year of first publication (columns 1, 4, 7), socio-demographic contemporanous controls (columns 2, 5, 8) and historical controls (columns 3,6, 9). Again, we find a significant positive association between the values of chastity and virginity and infibulation among ethnic groups exposed to the Red Sea slave trade (columns 4-6), but not for the other ethnic groups (columns 7-9). This finding is consistent with the interpretation that exposure to the slave trade may have strengthened the association between positive traits of purity and chastity in a group's culture and the practice of infibulation, facilitating a more widespread adoption also among non-enslaved women.

Table 7. Infibulation and share of motifs in the domain of chastity or FGC

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Dependent variable = 1 if infibulated									
				Exposed to the Red Sea slave trade			Not exposed to the Red Sea slave trade		
Share of motifs in the domain chastity or FGC	0.202	0.150	0.295	1.038**	0.799**	3.271**	0.057	0.053	0.047
	(0.178)	(0.161)	(0.209)	(0.469)	(0.384)	(1.258)	(0.142)	(0.142)	(0.121)
Cont. Controls	NO	YES	YES	NO	YES	YES	NO	YES	YES
Hist. Controls	NO	NO	YES	NO	NO	YES	NO	NO	YES
Mean of the dep. var.	0.123	0.123	0.123	0.355	0.355	0.355	0.072	0.072	0.072
R^2	0.491	0.504	0.508	0.655	0.679	0.715	0.372	0.374	0.380
No. Obs	450,423	450,423	450,423	81,937	81,937	81,937	368,486	368,486	368,486

Notes: OLS estimates with country and survey wave fixed effects. Standard errors clustered at the ethnic group level in parentheses. *, **, *** denote significance at 10, 5, 1 percent level, respectively. Individual and historical controls as in Table 2, as well as the logarithm of the number of publications consulted by Berezkin for an ethnic group and logarithm of the year of the earliest publication cited for each group. For the last three columns, the sample has been restricted to exclude respondents from groups exposed to the Red Sea slave route. *Source:* Demographic and Health Surveys and Multiple Indicator Cluster Surveys for socio-demographic characteristics, Murdock (1967) for historical controls, and Michalopoulos and Xue (2021) for Folklore data.

8 Conclusions

Female genital cutting (FGC) remains a widespread and harmful practice, particularly in Africa. This paper empirically tests the hypothesis, discussed in several historical accounts, that infibulation is linked to the legacy of the African slave trade. We show that contemporary FGC rates are significantly higher among women from ethnic groups whose ancestors were more exposed to the Red Sea route of the African slave trade. Along this route, female slaves

were often taken to the Middle East to serve as concubines in harems, and infibulation was believed to reduce pregnancies during the journey and ensure chastity. In contrast, we find no significant correlation between contemporary FGC prevalence and exposure to other slave trade routes, a result that aligns with historical differences in the roles of female slaves (who were primarily used as concubines along the Red Sea route and as laborers elsewhere).

It should be stressed that our focus on the Red Sea route of the slave trade does not imply that other historical (e.g., pastoralism) and contemporaneous (e.g., cultural identity or religion) factors are unimportant. However, we show that, even after controlling for these factors, the Red Sea slave trade remains a strong predictor of the prevalence of infibulation practices today.

Our results offers potentially useful insights for efforts to reduce FGC. First, our findings underscore the role of historical and cultural transmission in the persistence of this practice. Previous research has emphasized marriage market incentives and coordination failures as key drivers of FGC, leading –for example– to interventions that promote collective abandonment through public declarations. Our results suggest that FGC has deep historical roots and may have evolved into a marker of cultural identity for certain groups. Acknowledging this identity component in policy design could help reshape societal norms and shift demand for the practice, as recent evidence by Corno and La Ferrara (2025) suggests.

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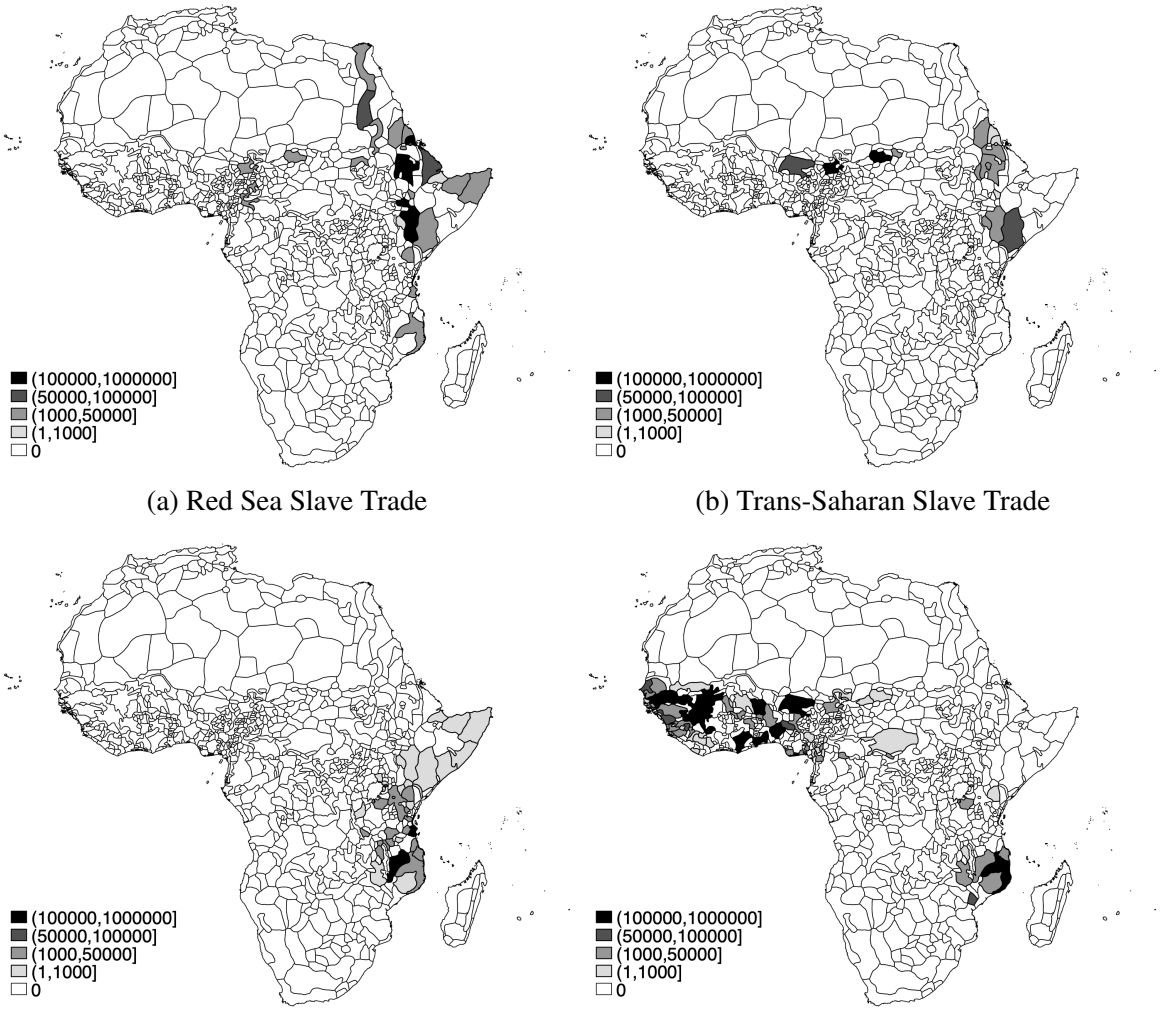
Appendix A
Figures and Tables

Figure A1. Ethnic Groups exposure to the slave trade, by route



(a) Red Sea Slave Trade

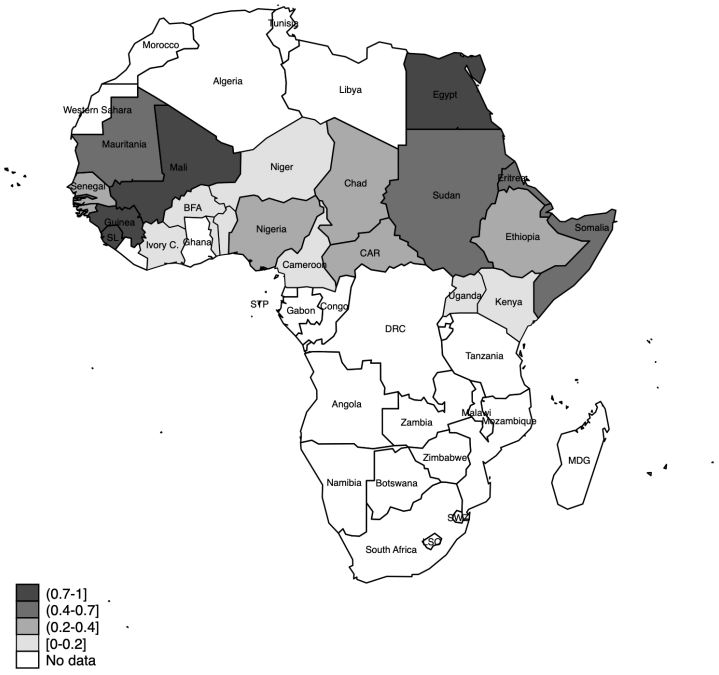
(b) Trans-Saharan Slave Trade

(c) Indian Ocean Slave Trade

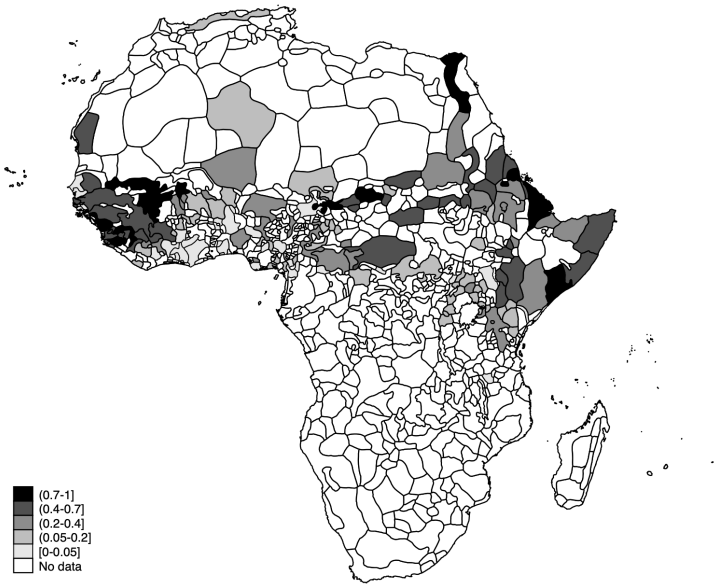
(d) Transatlantic Slave Trade

Notes: The variables used for the graphs represent the total number of slaves by routes in our sample. *Source:* For the Red Sea trade: Austen (1979,1988,1992), Nunn (2008) Harris (1971), Miran (2013) Zdanowski (2008). For the Trans-Atlantic, Indian Ocean, Trans-Saharan Slave Trade: Nunn (2008)

Figure A2. Support for FGC



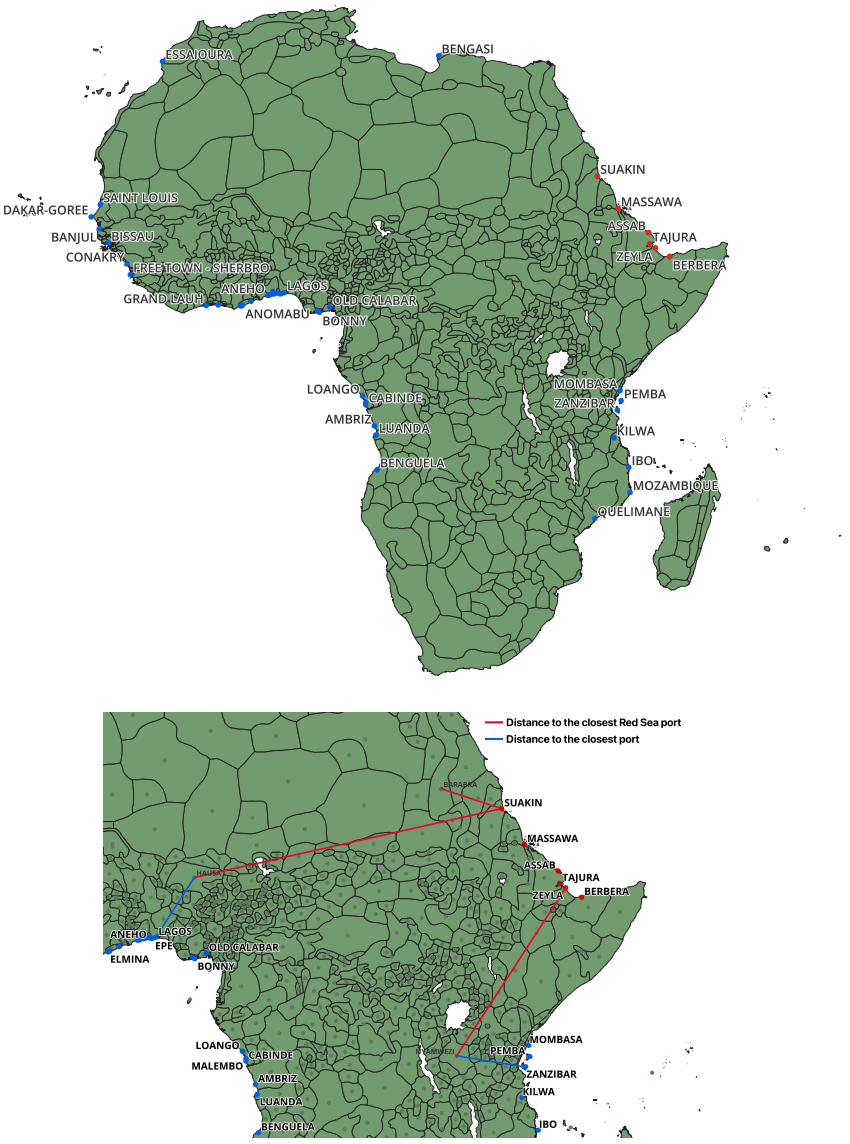
(a) By country



(b) By ethnic group

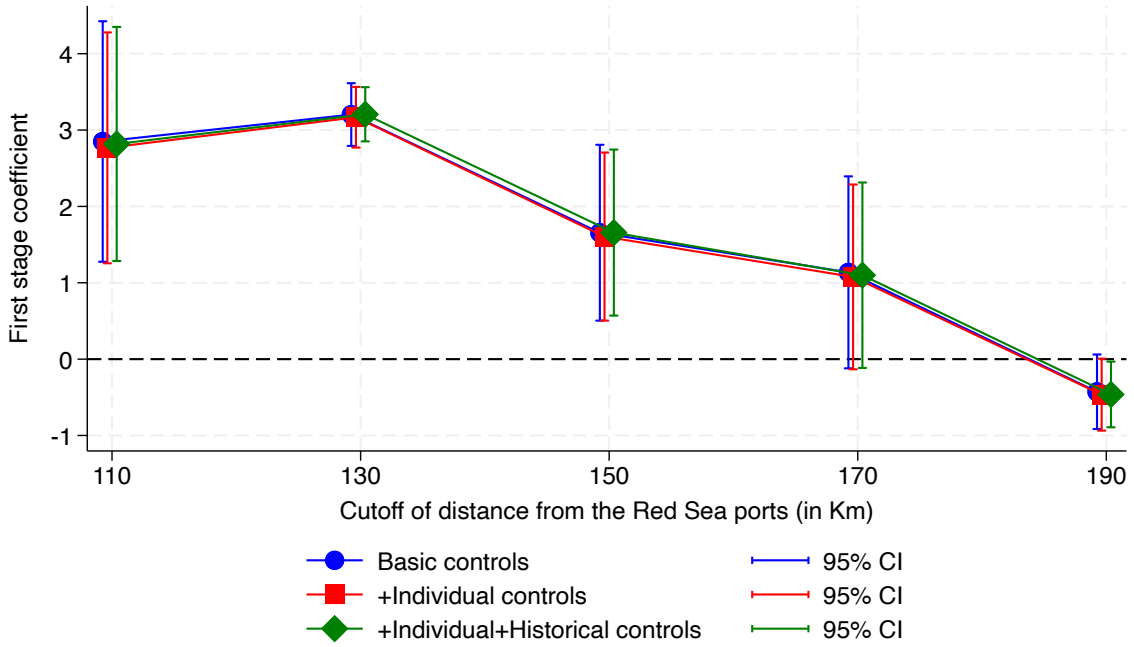
Notes: The figures represent the share of respondents by country (Panel A) and by ethnic group (Panel B) supporting the continuation of female genital cutting. *Source:* Authors' calculation on Demographic and Health Surveys (DHS) and Multiple Indicator Cluster Surveys (MICS) data.

Figure A3. Map of the ports of exit of slaves



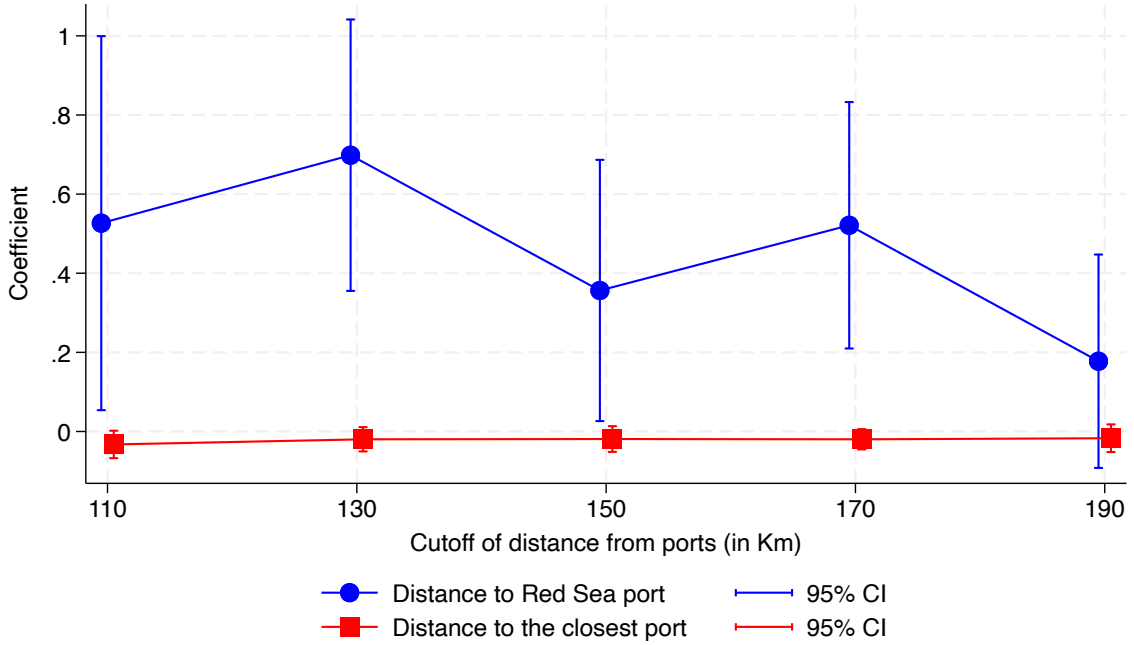
Source: Lovejoy (1989); Miège (1981); Zdanowski (2008); Mowafi (1981), Trans-Atlantic Slave Trade Database

Figure A4. First Stage: Red Sea slave exports and distance to the closest Red Sea port



Notes: The figure reports estimated coefficients from a series of regressions using the IHS - Red Sea slave exports/Area as dependent variable and a dummy for whether the centroid of the ethnic group is within X km from the nearest Red Sea port as independent variable, with X taking the values indicated on the horizontal axis. The different set of controls are those reported in Table 2, as well as the distances to the closest ports and coasts and their squared terms.

Figure A5. Reduced Form: Infibulation and distance to the closest Red Sea port



Notes: The figure reports estimated coefficients from a series of regressions where the dependent variable is a dummy equal to 1 if the woman is infibulated on a dummy for whether the centroid of the ethnic group is within X km from the Red Sea ports of exit of slaves with X taking the values indicated on the horizontal axis. The different sets of controls are those reported in Table 2, as well as an indicator for whether the centroid of the ethnic group is within X km from any port of exit.

Table A1. Summary of the Red Sea slave trade ethnicity data

Region	***Years***	***No. Ethnic group***	***No. Obs.***	***Type***	***Source***
Bombay, India	1837-1882	2	5	Manumission requests	Harris (1971)
Jedda, Saudi Arabia	1892-1924	32	62	Refugee records	League of Nations (1936, 1937)
Massawa, Eritrea	1873-1885	13	204	Destination port traffic estimates	Miran (2013)
Arabian Peninsula (multiple locations)*	1907-1942	19	46	Manumission requests	Zdanowski (2008)
Total		*66*	*317*		

Notes: * The manumission requests were recorded at the British Agencies at the following locations: Addis Ababa, Bahrain, Bandar Abbas, Basidu, Bushire, Dubai, Kuwait, Lingah, HMS Fowey, HMS Lupin, Muscat, and Sharjah.

Table A2. Individual survey data by country

Country	**Source**	**Waves**
Benin	DHS	2001, 2006, 2011-12
Burkina Faso	DHS	1998, 2003, 2010
Cameroon	DHS	2004
CAR	DHS	1994-95
Chad	DHS	2004, 2014-15
Cote DâIvoire	DHS	1998, 2005, 2011-12
Djibouti	MICS	2006
Egypt	DHS	1995, 2000, 2003, 2008, 2014
Eritrea	DHS	1995, 2002
Ethiopia	DHS	2000, 2005, 2016
Gambia	DHS	2013
Ghana	DHS	2003
Guinea	DHS	1999, 2005, 2012
Guinea-Bissau	MICS	2006, 2014
Kenya	DHS	1998, 2003, 2008, 2014
Malawi	DHS	1996
Mali	DHS	1995, 2001, 2006, 2012-13
Mauritania	MICS	2007, 2011, 2015
Niger	DHS	1998, 2006
Nigeria	DHS	2003, 2008, 2013
Senegal	DHS	2005, 2010, 2014, 2015, 2016, 2017
Sierra Leone	DHS	2008, 2013
Somalia	MICS	2006, 2011
Sudan	MICS	2000, 2014
Swaziland	DHS	2006-2007
Tanzania	DHS	1996
Togo	DHS	2013-14
Uganda	DHS	2011, 2016

Table A3. Correlates of exposure to Red Sea slave trade

	(1)	(2)	(3)	(4)
	Individual level		Ethnic Group level	
Dependent variable =	Red Sea Export / Area	IHS - Red Sea Export / Area	Red Sea Export / Area	IHS - Red Sea Export / Area
Age	-0.000	-0.000	0.087	-0.005
	(0.000)	(0.000)	(0.095)	(0.020)
Urban	-0.058	-0.010	-0.623	-0.124
	(0.042)	(0.010)	(0.560)	(0.157)
Primary Education	-0.084*	-0.033**	-0.636	-0.232**
	(0.045)	(0.014)	(0.423)	(0.111)
Secondary Education	-0.049	-0.018	0.175	-0.266
	(0.031)	(0.011)	(0.726)	(0.288)
Higher Education	0.032	0.008	0.134	0.687
	(0.031)	(0.012)	(0.947)	(0.484)
Muslim	0.566	0.166*	0.598	-0.024
	(0.364)	(0.100)	(0.605)	(0.142)
Catholic	0.329	0.078	0.410	-0.129
	(0.216)	(0.049)	(0.694)	(0.153)
Wealth	-0.025	-0.007*	-0.336	-0.097
	(0.016)	(0.004)	(0.263)	(0.077)
Male circumcision		0.004		0.084
		(0.039)		(0.055)
Premarital Sex Permitted		-0.064		-0.011
		(0.067)		(0.093)
Herding		-0.036		0.183
		(0.066)		(0.111)
Historical Slavery		0.055		0.059
		(0.086)		(0.065)
Nomadic		-0.024		-0.303**
		(0.096)		(0.134)
R^2	0.333	0.503	0.041	0.156
No. Obs	598515	598515	198	198

Notes: OLS estimates with standard errors clustered at the ethnic group level in column (1) and (2) and robust standard errors in column (3) and (4) in parentheses. *, **, *** denote significance at 10, 5, 1 percent level, respectively. *Source:* Demographic and Health Surveys and Multiple Indicator Cluster Surveys for socio-demographic characteristics, Murdock (1967) for historical controls.

Table A4. Infibulation and slave exports, full set of controls

	(1)	(2)	(3)	(4)
Dependent variable = 1 if infibulated				
	Red Sea Export / Area		IHS - Red Sea Export / Area	
Red Sea Exports	0.045***	0.044***	0.211***	0.198***
	(0.016)	(0.014)	(0.041)	(0.044)
Saharan Exports	0.000	-0.006	-0.025	-0.041
	(0.003)	(0.006)	(0.016)	(0.027)
Atlantic Exports	-0.001*	-0.000	-0.007	0.001
	(0.000)	(0.001)	(0.005)	(0.006)
Indian Exports	0.004	-0.008	-0.004	-0.020
	(0.004)	(0.012)	(0.006)	(0.016)
Age		0.003***		0.003***
		(0.001)		(0.001)
Age squared		-0.000**		-0.000**
		(0.000)		(0.000)
Urban		-0.017**		-0.017**
		(0.008)		(0.008)
Primary Education		-0.016*		-0.015*
		(0.008)		(0.008)
Secondary Education		0.005		0.004
		(0.008)		(0.007)
Higher Education		0.010		0.007
		(0.011)		(0.010)
Muslim		0.069**		0.065*
		(0.032)		(0.033)
Catholic		0.025*		0.023
		(0.014)		(0.015)
Wealth		-0.003**		-0.003**
		(0.002)		(0.002)
Premarital Sex Permitted		0.023		0.027
		(0.031)		(0.032)
Male Circumcision		0.044*		0.034
		(0.023)		(0.022)
Historical Slavery		0.057		0.039
		(0.040)		(0.035)
Herding		-0.001		0.014
		(0.020)		(0.019)
Nomadic		-0.004		-0.003
		(0.052)		(0.049)
Mean of the dep. var.	0.129	0.129	0.129	0.129
Mean of the dep. var. Red Sea = 0	0.080	0.080	0.080	0.080
R^2	0.508	0.519	0.516	0.524
No. Obs	458645	458645	458645	458645

Notes: OLS estimates with country and survey wave fixed effects. Standard errors clustered at the ethnic group level in parentheses. *, **, *** denote significance at 10, 5, 1 percent level, respectively. Individual and historical controls as in Table 2. *Source:* Demographic and Health Surveys and Multiple Indicator Cluster Surveys for socio-demographic characteristics, Murdock (1967) for historical controls.

Table A5. Infibulation, circumcision and slave export. Extensive Margin

	(1)	(2)	(3)	(4)	(5)	(6)
Dependent variable = 1 if	*Infibulated*			*Circumcised*		
1 if exposed to the Red Sea slave trade	0.227***	0.267***	0.250***	0.190***	0.202***	0.171**
	(0.061)	(0.069)	(0.060)	(0.069)	(0.064)	(0.067)
1 if exposed to the Trans-Saharan slave trade		-0.114	-0.132*		-0.064	-0.105
		(0.076)	(0.069)		(0.078)	(0.093)
1 if exposed to the Trans-Atlantic slave trade		-0.012	-0.004		0.044	0.062
		(0.022)	(0.025)		(0.050)	(0.060)
1 if exposed to the Indian Ocean slave trade		-0.041	-0.038		-0.004	0.018
		(0.046)	(0.047)		(0.104)	(0.097)
Cont. controls	NO	NO	YES	NO	NO	YES
Hist. controls	NO	NO	YES	NO	NO	YES
Mean of the dep. var.	0.129	0.129	0.129	0.652	0.652	0.652
Mean of the dep. var. Red Sea = 0	0.080	0.080	0.080	0.556	0.556	0.556
R^2	0.505	0.512	0.522	0.402	0.403	0.456
No. Obs	458,645	458,645	458,645	598,515	598,515	598,515

Notes: OLS estimates with country and survey wave fixed effects. Standard errors clustered at the ethnic group level in parentheses. *, **, *** denote significance at 10, 5, 1 percent level, respectively. Individual and historical controls as in Table 2. *Source:* Demographic and Health Surveys and Multiple Indicator Cluster Surveys for socio-demographic characteristics, Murdock (1967) for historical controls.