We are short on men! The long-run effects of the transatlantic slave trade on anti-gay sentiments

Cristian Navarro Serrano
Universitat de Barcelona - UB School of Economics

Advisors

Alexsandros Cavgias
Universitat de Barcelona

Federico Tadei
Universitat de Barcelona

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Abstract

Despite accounts showing that homosexuality was tolerated among many ethnic groups before colonization, Africa is arguably the most homophobic region of the planet. Is such apparent reversal of beliefs explained by historical events? In this thesis, I study whether ancestral exposure to the transatlantic slave trade, which led to the emergence of female-biased sex ratios, affected anti-gay sentiments in contemporary Africa. Using three different methodologies (OLS, IV and DID), I find that ancestral exposure to the transatlantic slave trade is related to higher levels of anti-gay sentiments among women, but not among men. Across the three methods, women with the largest ancestral exposure to the shock experience an estimated increase in homophobia between 2.39% and 9.05% with respect to the average levels. Falsification exercises suggest that this relationship is not a general byproduct of slavery, and is unlikely to be explained either by endogeneity biases or a general shift towards intolerance. Results are consistent with a causal effect of the transatlantic slave trade on anti-gay sentiments among women, explained by an increase in female intrasexual competition in the marriage market due to scarcity of men.

Key words — Anti-gay sentiments, sex ratio, Africa, slave trade, cultural persistence

JEL Codes — I31, J15, N37, Z13

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If you look at the history of countries around the world, when you start treating people differently —not because of any harm they're doing anybody, but because they're different–– that's the path whereby freedoms begin to erode.

Barack Obama, at a press conference in Kenya, on July 25, 2015.[1]

1 Introduction

Historical accounts (Murray and Roscoe, 1998; Epprecht, 2008) show that many African ethnic groups tolerated same-sex relationships before colonization. In contrast, recent evidence shows homosexuality is a taboo in many African countries,[2] to such an extent that Africa is arguably the most homophobic region of the planet.[3] If the existence and tolerance of homosexual relationships have been a common feature throughout the history of the continent, why is homophobia such a salient phenomenon in contemporary Africa? Is such apparent reversal of beliefs explained by historical events?

While there is a nascent literature studying how *scarcity of women* shaped masculinity norms and sexual prejudice throughout history (see Brodeur and Haddad, 2018; Baranov, De Haas, and Grosjean, 2020a; Baranov, De Haas, and Grosjean, 2020b), whether *scarcity of men* affects attitudes towards LGBT is so far an open question. In this thesis, I fill this gap by testing whether ancestral exposure to the transatlantic slave trade, which was characterized by a preference for male slaves and led to the emergence of female-biased sex ratios, affected anti-gay sentiments in contemporary Africa. Ideally, I would link current variation in attitudes towards homosexuality to historical differences in sex ratios, but data on the last is not available. Thus, I explore this relationship using the reduced form that links historical exposure to the transatlantic slave trade and anti-gay sentiments.

The effect of female-biased sex ratios on attitudes towards homosexuality is, a priori, ambiguous. Moreover, the effect is likely to be heterogeneous across gender. On one hand, *scarcity of men* increases competitive pressure among women in the marriage market. Then, hostility against homosexuals among women can increase if they see gay men as a threat in their efforts to find a partner. I refer to this mechanism as the *increase in female intrasexual competition.* On the other hand, relative *abundance of women* can lead to a reduction in male-male competi-

[1] Complete statement in Neal, 2019, p.131

[2] Homosexuality is considered a criminal offense in 31 out of 54 countries (Mendos, 2019) and 79% of African people show negative attitudes towards homosexuals (Afrobarometer, 2016).

[3] The 6th Wave of the World Value Survey includes a open question asking, spontaneously, which type of individual the respondent would not like to have as a neighbor. While 30% and 37% of American and European respondents, respectively, answer "Homosexuals", the percentage increases up to 72% among African respondents.

tion in the marriage market. If intrasexual male competition decays, prevalence of masculinity norms may be lower, inducing more tolerant attitudes towards homosexuality. I refer to this mechanism as the *decrease in male intrasexual competition*.

Studying the historical origins of homophobia is relevant for several reasons. First, as the existing evidence shows that sexual orientation is not a voluntary choice, anti-gay sentiments distort welfare by affecting marital choices of individuals with innate same-sex attraction.[4] Secondly, lower levels of subjective and mental well-being are observed both among those who are the target of harassment (Inglehart et al., 2008) and among those who are intolerant (Dinh et al., 2014). Thirdly, recent evidence by Ruck, Bentley, and Lawson (2020) suggests that respect for individuality and tolerance towards marginalized groups may be important prerequisites for functioning democracies and social development. Fourthly, hate speech, which is one of the most extreme versions of social intolerance, is closely linked to episodes of violence.[5,6]

Identifying the long term effects of the transatlantic slave trade on attitudes towards homosexuality poses a few challenges. First and most important, there is no data available on precolonial levels of homosexuality and anti-gay sentiments. Secondly, there is the risk of Omitted Variable Bias (OVB) caused by selection into the treatment. Recent literature asserts it is very likely that unobservable characteristics at the ethnic group level could be correlated with selection into the slave trade (Nunn and Wantchekon, 2011), but also with preexisting attitudes towards homosexuality.[7] Thirdly, measurement error in the historical estimates of slave trade exports is likely to generate attenuation bias in the OLS coefficients of interest.

Despite those endogeneity concerns, Africa is an ideal laboratory to study the effect of female-biased sex ratios on attitudes towards homosexuality. First, the transatlantic slave trade is a unique natural experiment in this setting: it was a large demographic shock that generated relative *scarcity of men*.[8] Secondly, data on the treatment is available: Nunn (2008) and Nunn

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[4] This includes the role played by genetics, the structure and development of the brain, the hormonal environment and the influence of social factors. Illustrative evidence is reported by Bailey and Pillard (1991), Burri et al. (2011), Balthazart (2012) or Ganna et al. (2019), among others.

[5] Literature on traditional and social media provides evidence on how public diffusion of hate speech fosters intolerance and violence (see Adena et al. (2015), Yanagizawa-Drott (2014), Bursztyn et al. (2019)).

[6] Violence against LGBT people is a severe problem in African countries. In South Africa, one of the most progressive countries in the continent, a 2015 survey reveals that 34% of LGBT people had been verbally insulted and 13% had suffered physical violence in the two previous years. There are also particular examples that reflect this structural violence. For instance, the Ugandan newspaper *Rolling Stone* published in 2010 a list of 100 men's names, accusing them of committing homosexual acts under the heading: *"Hang them!"*. At least four of them were attacked after the publication (Olukya and Straziuso, 2010).

[7] Ethnic groups most affected by the slave trade were those more prosperous initially (Nunn, 2008). According to Inglehart, Ponarin, and Inglehart (2017), better material conditions are correlated with more progressive attitudes towards homosexuality. Thus, selection into the slave trade would lead to a negative bias in my estimates.

[8] The work at plantations in the Americas required physical strength. Therefore, the transatlantic slave trade

and Wantchekon (2011) provide estimates for historical exposure to the transatlantic slave trade at the ethnic-group level.[9] Thirdly, data on the outcome of interest is also available: the 6th wave of the Afrobarometer survey includes a question that measures contemporary anti-gay sentiments in Africa, identifying also the ethnic group from which the respondent descends. Finally, distance to the coast can be used as a proper instrument for slave trade intensity to overcome endogeneity concerns, as already shown by Nunn and Wantchekon (2011). Thus, it provides a source of exogenous variation in sex ratios.

I use a three step methodology to overcome the endogeneity issues. First, I estimate by OLS a baseline specification with country fixed effects and a comprehensive set of individual, village and ethnic-group controls to mitigate concerns on OVB. Given the heterogeneous priors across genders, I use estimation samples for men and women separately. Secondly, I move to an Instrumental Variables (IV) approach that allows me to address concerns on measurement errors in slave trade estimates and further reduce the risk of OVB. I follow Nunn and Wantchekon (2011) and use distance to coast as an instrument for transatlantic slave trade exports. Thirdly, I use a Differences in Differences (DID) strategy with ethnic fixed effects to compare levels of sexual prejudice between men and women (1st difference) across ethnic groups with different levels of ancestral exposure to the transatlantic slave trade (2nd difference). The DID strategy with ethnic fixed effects eliminates the risk of unobservable differences across ethnic groups driving the results, because it only exploits within-ethnic group variation in anti-gay sentiments. However, this advantage comes at a cost: it does not provide the average treatment effect both for males and females, but only the difference in the ATE between them.[10]

Results from the three distinct methodologies (OLS, IV and DID) show that ancestral exposure to the transatlantic slave trade significantly increases contemporaneous levels of anti-gay sentiments among women, but has no effect on men's attitudes towards homosexuality.[11] First, using the OLS specification with country fixed effects and the full set of controls, I find that, while men remain unaffected, women who descend from the ethnic group most affected by the transatlantic slave trade show, on average, 2.91% higher levels of sexual prejudice compared to

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was characterized by a preference for male slaves (Michalopoulos and Papaioannou, 2020). This situation led to a shortage of men in the areas most affected: the estimated sex-ratio in Western Africa was of 7 men for each 10 women at the end of the 18th century (Manning, 1990).

[9] They also provide estimates for the Indian Ocean slave trade, not characterized by a preference for male slaves: it can be used as a placebo treatment to confirm that the effect of the transatlantic slave trade on sexual prejudice is plausibly related to the distortion in sex ratios, and is not a general byproduct of exposure to slavery.

[10] Since the treatment varies at the ethnic group level, the part of the treatment that is common for men and women of the same ethnic group is absorbed by the set of ethnic fixed effects.

[11] The *Stata* code to replicate the results of this thesis can be found in the following link: https://drive.google.com/file/d/1QsotsFWxB7hRUV4zTO8BeG000fVaa9Vp/view?usp=sharing

women from ethnic groups not exposed to the shock. Secondly, in the IV specification using distance to the coast as an instrument for the intensity of the transatlantic slave trade, the magnitude of the coefficient triples: the estimated effect increases from 2.91% to 9.05%. Thirdly, using the DID specification with country and ethnic-group fixed effects, I find that women who descend from the ethnic group most affected by the transatlantic slave trade show, on average, an increase of 2.39% in their levels of sexual prejudice in comparison to men of their own ethnic group, which are the reference group unaffected by the shock.[12]

The magnitude of the effect estimated in the OLS and DID specifications is likely to be a lower bound for the real causal effect of interest. First, the magnitude of the OLS coefficient increases once ethnic-group controls are included, which suggests that OVB caused by selection into the treatment is mitigating the estimated effect. Secondly, in the DID strategy with ethnic fixed effects, the difference in the ATE between men and women is interpreted as a close estimate for the ATE among women. Although this strategy alleviates the endogeneity concerns, it is likely to underestimate the real causal effect among women because, if anything, men become also more intolerant after the shock. Thirdly, the larger magnitude of the IV coefficient suggests that OLS estimates are not affected only by OVB, but also by attenuation bias due to measurement error in slave trade figures. Thus, IV estimates are the ones more likely to be closer to the real causal effect.

I perform two falsification tests to discard competing interpretations. First, I use the Indian Ocean slave trade, which did not generate female-biased sex ratios, as a placebo treatment. I find that larger exposure to the Indian Ocean slave trade is not related to an increase in homophobia, neither among women nor among men. This suggests that the effect of the transatlantic slave trade on contemporary anti-gay sentiments is related to the distortion in sex ratios, and is not just a general byproduct of exposure to slavery. Secondly, I perform four estimations linking exposure to the transatlantic slave trade to alternative measures of prejudice towards other collectives. I find that the transatlantic slave trade did not increase the levels of prejudice among women in these other dimensions. Thus, I confirm that the increase in sexual prejudice is not part of a general shift towards intolerance. The results for the two falsification test provide additional support for the *increase in female intrasexual competition* mechanism, and are not in line with a noteworthy *decrease in male intrasexual competition.*

In a further step, I test whether the increase in homophobia among women is heterogeneous according to preexisting gender inequality across ethnic groups. If the effect takes place through

[12] The effect estimated in the DID specification, which is formally the difference in the ATE between men and women, coincides with the ATE among women if men are unaffected by the shock, as it seems according to the OLS and IV for the male subsample.

the distortion in sex ratios, it is reasonable to argue that the disutility of staying single would be larger in ethnic groups where women were more financially dependent on men prior to the transatlantic slave trade. I find that the increase in homophobia among women is mainly concentrated in ethnic groups with larger gender gaps in economic participation before the transatlantic slave trade. This provides additional support for the *increase in female intrasexual competition* mechanism as the underlying explanation for the relationship found.

Once I find that ancestral exposure to the transatlantic slave trade is related to an increase in contemporary levels of homophobia among women, I move to discuss the mechanisms of persistence that explain this long-run relationship. Since the transatlantic slave trade was a temporary shock, its effects in the long run can only be observed if mechanisms of cultural persistence come into play. I argue that vertical cultural transmission, horizontal peer-to-peer socialization, and stickiness of cultural norms could be the mechanisms that explain why this temporary shock can generate persistent effects in cultural norms and social values.

This thesis contributes to several strands of the literature. First and most important, it contributes to the nascent literature analyzing the effects of gender-biased sex ratios on attitudes towards homosexuality. Brodeur and Haddad (2018) analyze the case of male-biased sex ratios in US Gold Rush counties. They find that self-selection of gay men migrating to work in the gold mines, along with the weakness of preexisting religious institutions, led to the emergence of gay-friendly attitudes that persist in the long run. Baranov, De Haas, and Grosjean (2020) study the case of Australia in the 18th and 19th century, where the British colonial power allocated convicts across the territory in a ratio of about 5 men for every woman. Conversely, they find that contemporary support to same-sex marriage is lower in areas more heavily male-biased in the past, due to the higher prevalence of masculinity norms.

I complement such nascent literature on several aspects. First, while existing papers study the effects of *scarcity of women*, I study the effects of *scarcity of men* on anti-gay sentiments. To the best of my knowledge, I am the first in doing so. Secondly, by documenting that *scarcity of men* increases anti-gay sentiments among women, I suggest a broader interpretation for the mechanism proposed by Baranov, De Haas, and Grosjean (2020): the scarcity of one gender fosters anti-gay sentiments among the other gender by increasing intrasexual competition in the mating market. Thirdly, by exploiting substantial variation of preexisting cultural traits particular to the African context, I show that the increase in anti-gay sentiments is concentrated among ethnic groups where men were the main economic provider within the family before the slave trade. Fourthly, while existing papers document the effects of male-biased sex ratios caused by *immigration* to a scarcely populated region as the US or Australia in the 19th century, I

study the consequences of female-biased sex ratios caused by *emigration* from already populated regions.

Secondly, my findings relate to two broader strands of the literature. On one hand, the economics literature studying the effects of imbalances in sex ratios. Illustrative examples are those linking gender-biased sex ratios to marriage patterns, gender norms and female labor force participation (Grosjean and Khattar, 2019; Teso, 2019; Alix-Garcia et al., 2020). On the other hand, a small literature on the economics of LGBT that analyzes, among others, hiring and workplace discrimination (Aksoy et al., 2018), earning differences (Antecol and Steinverger, 2013) or the spatial distribution of LGBT people (Smart and Whittemore, 2017). Black, Sanders, and Taylor (2007) provide a literature review.

Thirdly, I also contribute to the vast literature studying the effects of the slave trade in Africa. Several authors have linked this historical episode to long-term levels of development (Nunn, 2008), interpersonal trust (Nunn and Wantchekon, 2011), polygyny (Edlund and Ku, 2013; Fenske, 2015), conflict (Besley and Reynal-Querol, 2014; Fenske and Kala, 2017), ethnic fractionalization (Whatley and Gillezeau, 2011; Green, 2012), political institutions and corruption (Whatley and Gillezeau, 2011; Obikili, 2016), education (Okoye and Pongou, 2015) and financial development (Pierce and Snyder, 2017). This literature lies within the broader strand that studies historical legacies of colonial institutions. I contribute to this literature by documenting one more legacy of the transatlantic slave trade: the increase in anti-gay sentiments among women.

Finally, this thesis is also related to the economics literature on the historical determinants of cultural evolution. Notorious examples are the ones studying the interplay between formal institutions and cultural evolution (Lowes et al., 2017) or the influence of technological conditions on gender roles (Alesina, Giuliano, and Nunn, 2013) Moreover, it adds to the literature on the persistence of cultural norms (Bisin and Verdier, 2001; Fernández and Fogli, 2009; Guiso, Sapienza, and Zingales, 2016). I provide evidence for an historical event that has long-lasting effects on social tolerance. My findings are consistent with a temporary imbalance in sex ratios that may explain a reversal of beliefs in anti-gay sentiments in the long run, in some sort of hysteresis process.

The structure of the thesis is the following. Section 2 describes the historical background of the slave trade in Africa, and section 3 describes the potential mechanisms that could explain the effect of the transatlantic slave trade on anti-gay sentiments. Section 4 describes the data. Section 5 details the empirical strategy. Section 6 presents the results, while Section 7 includes a discussion on the mechanisms of persistence. Section 8 concludes.

2 Historical background

This section describes the historical context of the slave trade in Africa, the emergence of female-biased sex ratios due to the transatlantic slave trade and the existence and acceptance of homosexuality before this historical event.

The slave trade: a large population decline. Between 1400 and 1900, approximately 18 million slaves were exported from Africa in 4 different slave trade waves. According to Nunn (2008), 12 million were shipped from Africa to the Americas in the transatlantic slave trade. The other 6 million were distributed in the trans-Saharan, Indian, and Red Sea slave trades, mostly to India, Indochina, and the Middle East. And these numbers only account for effectively traded slaves, but not for people who died in the raids and conflicts derived from slavery or during transportation.

The demographic impact of slavery in Africa goes uncontested. Manning (2013) estimates a 50 percent decline in population by 1850 compared to the counterfactual without slavery. What is more, the slave trade not only generated a decline in population, but also created a temporary distortion in sex ratios.

Gender preferences in the slave trade. Slave traders had a preference for male or female slaves depending on the type of task that slaves had to perform at their destinations. In particular, the transatlantic slave trade was characterized by a preference for male slaves. Michalopoulos and Papaioannou (2020) state that *"As the colonies in the Americas needed manual labor, slave traders targeted physically strong men"* (p.99).[13] According to Lovejoy (2011), European traders' objective in the transatlantic slave trade was to export two men for each female.

In contrast, the three remaining slave trades were not characterized by a preference for male slaves, but the other way around. According to the literature, demand for slaves on the Eastern Coast was larger for females, which were later used as concubines or domestic servants (see Harris (1971), Lewis (1990) and Manning (1990)).

Emergence of imbalances in sex ratios. Not surprisingly, gender preferences in the slave trade led to regional imbalances in sex ratios. Figure 1 shows a simulation of the evolution of population and sex ratios between 1700 and 1900 in both Western and Eastern Africa, along with the volume of slave exports, constructed by Manning (1990).

[13] As it was expressed by a British politician of the time: "*I have to observe, that though it is impossible to conduct the business, either of a house or of a plantation without a number of females... the nature of the slave-service in the West Indies (being chiefly field labor) requires, for the immediate interest of the planter, a greater number of males.*" (Edwards, 1801, p.118).

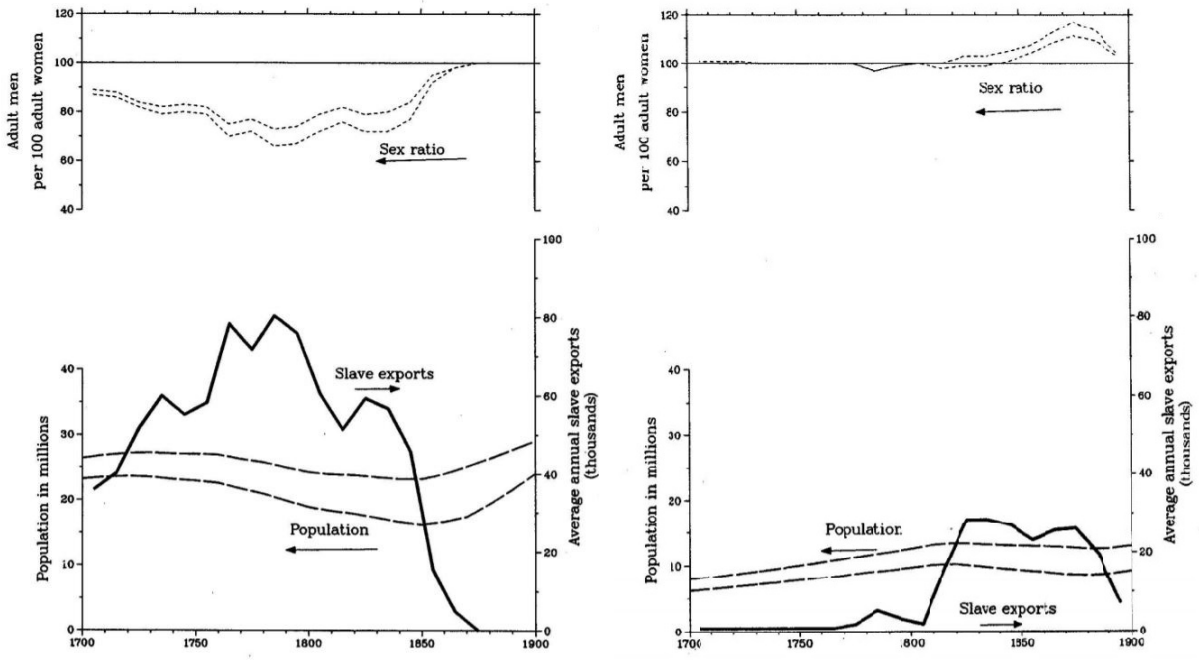

Figure 1: The effect of the slave trade in population and sex ratios in the 18th and 19th century: the left-side panel shows the effect of the transatlantic slave trade in Western Africa, whereas the right-side panel shows the effect of the Indian Ocean slave trade in Eastern Africa. The top panel presents two simulations (low and high estimate) of the evolution of sex ratios. The bottom panel shows the yearly volume of slave exports in each slave trade and two simulations (low and high) of the evolution of population. *Source: Manning (1990)*

In the case of Western Africa (left-side panel), mostly affected by the transatlantic slave trade, preference for male slaves led to the emergence of female-biased sex ratios. The estimated sex ratio around 1790, at the peak of the transatlantic export activity, was of 7 men for every 10 women. This distortion persisted for over two centuries, until the abolition of slavery in the second half of the 19th century. Conversely, in the case of Eastern Africa (right-side panel), preference for female slaves led to the emergence of male-biased sex ratios. However, the magnitude of the imbalance was smaller, took place later in time and lasted for a shorter period.

Homosexuality and homophobia in precolonial Africa. Same-sex relationships have existed in Africa for centuries. Contrary to the popular belief that homosexuality is a western import, homosexual behaviors were rooted and tolerated in the African culture before colonization (Murray and Roscoe, 1998; Epprecht, 2008). Even the richness of the vocabulary in traditional African languages used to refer to homosexual relationships demonstrates the widespread presence and acceptance of these practices. Unfortunately, detailed data on preexisting levels of homosexuality and anti-gay sentiments is not available.

3 Conceptual framework

This section describes mechanisms explaining how female-biased sex ratios could potentially affect anti-gay sentiments. Table A1 in Section A of the Appendix includes, for a sake of comparison, a short summary of those mechanisms along with the existing evidence for the opposite scenario of male-biased sex ratios.

Increase in female intrasexual competition. Evidence from social psychology shows that, in a mating market where single women face a shortage of eligible single men, women systematically react through an increase in female intrasexual competition (Dillon, Adair, and Brase, 2017). The sexual economics literature also supports this view (Baumeister et al., 2017). In this context of strengthened competitiveness, women's perception of male homosexuality might be affected.

The effect of female intrasexual competition on anti-gay sentiments among women may take place through different channels. First, for heterosexuals, intolerance against opposite-sex homosexuals can be the result of feeling rejected as potential sexual partners (Cory, 1951). Thus, relative *scarcity of men* might reinforce women's negative sentiments against male homosexuals. Secondly, one of the common triggers of inter-group prejudice is the belief of vulnerability (Coon and Mitterer, 2007).[14] Therefore, the lower availability of eligible single men may exacerbate the risk portrayed by gay men among women when they try to find a partner. Thirdly, in addition to the previous point, individuals that feel vulnerable often engage in "catastrophic thinking": they infer pessimistic scenarios based on little or no information, overestimating the risks faced. In such a situation, it will be easy to *"find people thinking along these lines: (...) Other groups are a threat to us. (...) Naturally, we are hostile toward them. They don't deserve our respect or cooperation"* (Coon and Mitterer, 2007, p.641).

Mechanism 1: In a context of *scarcity of men*, competitive pressure between women to find a partner increases. If women feel rejected by gay men and see them as a threat in their efforts on getting to this objective, hostility against homosexuals among females can arise in response.

Decrease in male intrasexual competition. Besides increasing female intrasexual competition, relative *scarcity of men* is also related to a decrease in male intrasexual competition. Male dominance, which confers a higher relative status and control over resources, makes men more

[14] Beck, Emery, and Greenberg (1985) define vulnerability as *"a person's perception of himself as subject to internal or external dangers over which his control is lacking or is insufficient to afford him a sense of safety"* (p. 67)

attractive for women (Borgerhoff, 1987; Smith, 2016). But, in a context of relative *abundance of eligible single women*, men may not adhere to strict masculinity norms if they do not need to achieve such a high level of male dominance to find a partner.

If men adhere to less strict masculinity norms, they may also shift towards more tolerant attitudes regarding homosexuality. This is because men are less likely to punish and subdue those that do not share a dominant ideal of masculinity if they do not need to reaffirm their own masculinity (Herek and McLemore, 2013). Therefore, *relative abundance of women*, which makes more easy for men to find a partner, may lead to softer anti-gay sentiments through a decreased prevalence of masculinity norms.

Not only men's attitudes but also women's attitudes towards homosexuality could be affected. Women may adhere to the new and softer standard of masculinity: by doing so, they would be able to achieve higher social status and benefits in the marriage market. As indicated by Mahalik et al. (2003), in a society characterized by the male hierarchy, women become benefited by adhering to the prevailing masculine stereotype.

Mechanism 2: In a context of men scarcity, intrasexual male competition decays. If this leads to a lower prevalence of masculinity norms, men should become more tolerant towards homosexuality. A increase in tolerance should also be observed among women if they adhere to the new and softer standard of masculinity.

Ambiguous and heterogeneous priors. The priors on which mechanism may come into play are ambiguous. It could be the case that relative *scarcity of men* could generate an *increase in female intrasexual competition*, a *decrease in male intrasexual competition*, both or neither. Moreover, the effects are heterogeneous across gender: an *increase in female intrasexual competition* would increase anti-gay sentiments among women but should not affect men, whereas a *decrease in male intrasexual competition* would decrease anti-gay sentiments among men and, most probably, also among women. Thus, I split the sample in two to estimate the effect of ancestral exposure to the transatlantic slave trade on anti-gay sentiments separately for men and women.

4 Data

This section describes the sources of the data, the sample and the main variables used in the analysis.

Data Sources. I combine data from five main sources. First, I obtain individual-level data from the 6th round of the Afrobarometer survey (2016). Second, historical data on ethnic

exposure to the slave trade is obtained from the estimations by Nunn (2008) and Nunn and Wantchekon (2011). Finally, I obtain data on historic and cultural ethnic characteristics from a variety of sources, being the main ones Murdock (1959) and the Ethnographic Atlas by Murdock (1967).[15,16]

Sample. The sample includes data of 33.696 respondents. This represents the 74.09% of the potential sample offered by the Afrobarometer.[17] The remaining 11.782 respondents not included are those individuals in the Afrobarometer dataset that did not provide information on their ethnic origin, belong to ethnic groups that are not indigenous African ethnicities or indicated and indigenous ethnic origin that was not possible to match with slave trade data. The sample is divided between 16.899 women (50.15%) and 16.797 men (49.85%). Given the heterogeneous priors on the transatlantic slave trade effect across genders, I use estimation subsamples for men and women. Hereunder, I refer to them as *male subsample* and *female subsample*.

Outcome of interest. Information on attitudes towards homosexuality is obtained from *Question 89C* in the Afrobarometer survey, which asks whether the respondent would like, dislike or don't care having an homosexual as neighbor. The question is formulated as follows:

> *For each of the following types of people, please tell me whether you would like having people from this group [homosexuals] as neighbors, dislike it, or not care.*

and the respondent chooses between five answers: strongly dislike, somewhat dislike, would not care, somewhat like or strongly like. The distribution of answers is included in Section D of the appendix.

I convert the five categorical responses in a 0 to 4 variable to obtain a increasing measure of prejudice. This variable attributes the value 0 to the answer "strongly like", 1 to "somewhat like", 2 to "would not care", 3 to "somewhat dislike" and 4 to "strongly dislike". Given the large mass of respondents with negative sentiments towards homosexuality that answer "somewhat dislike" or "strongly dislike", it is relevant to preserve the original variation in the answers.[18]

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[15] The complementary sources for ethnic-group level data are Century Company, 1911; Roome, 1924; Chandler, 1987; Oliver, 2000; Kiszewski et al., 2004; IIASA/FAO, 2012; Besley and Reynal-Querol, 2014.

[16] All sources are detailed in Section B of the Appendix, along with the description of the variables.

[17] This sample covers a total of 28 countries: Benin, Botswana, Burkina Faso, Cameroon, Cote d'Ivoire, Gabon, Ghana, Guinea, Kenya, Lesotho, Liberia, Madagascar, Malawi, Mali, Morocco, Mozambique, Namibia, Niger, Nigeria, Senegal, Sierra Leone, South Africa, Swaziland, Tanzania, Togo, Uganda, Zambia and Zimbabwe. Figure 2 shows the distribution of respondents across countries.

[18] I provide complementary results for two alternative codifications of *Question 89C* in Table A3 in Section E of the Appendix. On one hand, a 0 to 2 measure that assigns 0 to the answers "somewhat like" or "strongly like", 1 to the answer "would not care" and 2 to the answers "strongly dislike" or "somewhat dislike". On the other hand, a dummy variable that takes value 1 if the respondent answers "strongly dislike" or "somewhat dislike", 0 otherwise. Results are qualitatively similar independently of the alternative employed.

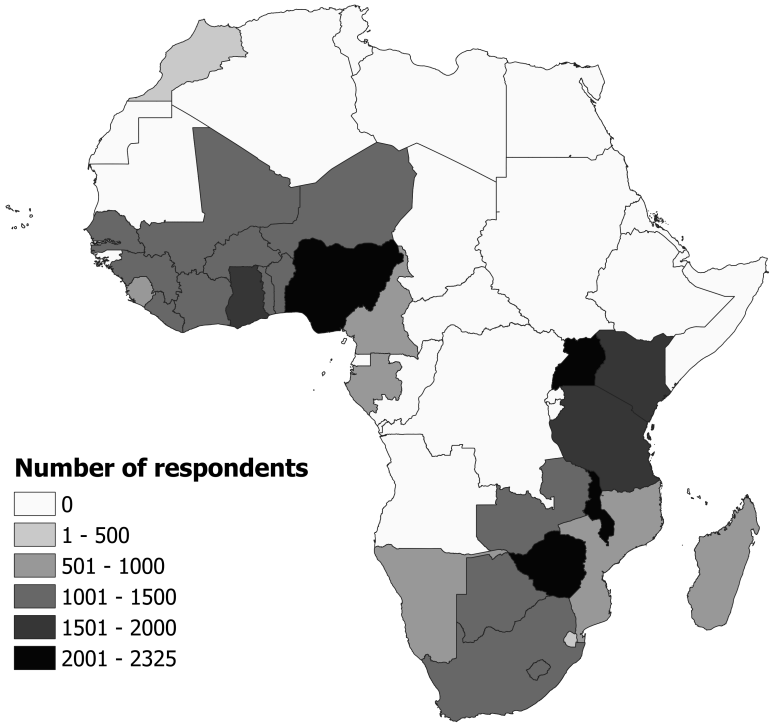

Figure 2: Number of respondents by country in the Afrobarometer survey (Round 6) included in the sample. The sample covers most of the territories affected by the transatlantic and Indian Ocean slave trade, as can be seen in a comparison with Figure 3

Answers to this question do not allow to disentangle between prejudice against gay men and against lesbians.[19] As stated by Herek (2000), this shortcoming is present in most of the previous studies on sexual prejudice. To perfectly analyze the effect of the slave trade on prejudice across the two groups, it would be necessary to use two more detailed questions asking, specifically, whether the respondent would like or dislike having a gay man or a lesbian as neighbor, separately. Despite this limitation in the data, answers to *Question 89C* in the Afrobarometer survey are still of interest to evaluate the effects of the transatlantic slave trade on anti-gay sentiments.

Modern Africa: an homophobic continent. Two noteworthy features are observed in the data. First, Africans show a high level of prejudice against homosexuality: 84.01% of the respondents in the sample say they would "strongly dislike" or "somewhat dislike" having an homosexual as neighbor. Secondly, African women are, on average, slightly more tolerant than African men. The proportion of women that dislike homosexuals is 1.14% smaller than the

[19] It may be argued that the outcome of the question should be closer to a measure of intolerance against gay men than against lesbians. A report by the Global Legal Research Directorate (2014) shows that, in 2015, out of 34 African countries that criminalised homosexuality, 9 included specific or stiffer penalties for gay men in their criminal provisions. By contrast, none of them defined specific or more severe penalties for lesbians, which suggests that gay men may play a more relevant role in the collective imagery of homosexuality.

proportion of men.

A comparison with other continents using data from the World Value Surveys provides additional insights. First, it confirms that Africa is the most homophobic continent: both African men and women are less tolerant than their respective counterparts in other regions of the planet. Secondly, it shows that, within every continent, men are less tolerant than women. Thirdly, the most striking insight: the difference in tolerance between men and women (hereunder, the gender gap in intolerance) is significantly smaller in Africa than in any other place. This is, compared to men from their respective continents, African women are relatively less tolerant than women from any other part of the world.

Table 1: Cross-continental comparison of anti-gay sentiments: average values for all respondents, male respondents and female respondents

	Dislike	Dislike (Men)	Dislike (Women)	Men intolerance surplus (Absolute)	Men intolerance surplus (Relative)
Africa	72.86%	74.19%	71.44%	2.75%	3.85%
America	30.91%	33.02%	28.97%	4.05%	13.98%
Asia	64.42%	66.32%	62.56%	3.76%	6.01%
Europe	37.51%	40.63%	34.85%	5.78%	16.59%
Oceania	14.05%	21.05%	8.05%	13.00%	161.49%

Note: Information is obtained from Questions 36 to 44 in the 6th wave of the *World Value Survey*: the interviewer shows a list of 9 groups of people and asks the respondent to choose which of those he/she would not like to have as a neighbor. One of the groups listed is *"Homosexuals"* (item 40). In the table, *"Dislike"* indicates the percentage of respondents within each continent that indicated they would not like to have an homosexual as a neighbor. *"Dislike (Men)"* and *"Dislike (Women)"* show this same percentage for the subsample of men and women, respectively. *"Men intolerance surplus (Absolute)"* is the difference between the percentage of men and the percentage of women disliking homosexuals, in absolute terms ($\%Men - \%Women$). Finally, *"Men intolerance surplus (Relative)"*, is the difference between the percentage of men and the percentage of women disliking homosexuals, in relative terms, with respect to the percentage of intolerant women in that continent ($\frac{\%Men - \%Women}{\%Women}$) Source: (World Value Surveys Association, 2014).

The unusually high levels of homophobia in contemporary Africa, especially in the case of women, contrast with historical accounts showing that homosexuality was widely accepted in precolonial times (see Section 2). Thus, it seems there is a reversal of beliefs in attitudes towards homosexuality that may be explained by historical events.

Treatment Variable. Nunn (2008) and Nunn and Wantchekon (2011) provide data on exposure to the slave trade. They provide estimates of the number of slaves taken from each ethnic group in the transatlantic and Indian Ocean slave trades. In the case of the trans-Saharan and Red Sea slave trades, they cannot provide reliable estimates due to the lack of detailed historical sources. The estimation is constructed using the ethnicity classification created and mapped by Murdock (1959), which consists of a total of 842 ethnic groups.

The two maps in Figure 3 show the historical boundaries of the ethnic groups in the 19th

century, along with the number of slaves from each ethnicity that were traded in the transatlantic and the Indian Ocean slave trade. It can be observed how the main impact of the transatlantic slave trade is concentrated in Western Africa and some additional areas in Eastern Africa and Madagascar. On the other hand, the impact of the Indian Ocean slave trade only shows up in Eastern Africa.

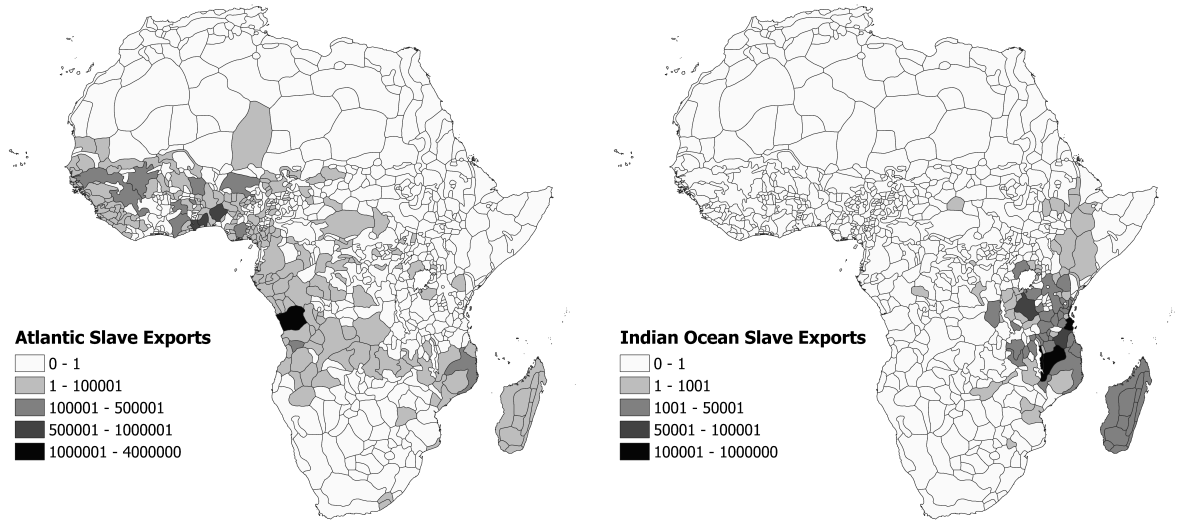

Figure 3: Number of slaves taken from each ethnic group in the transatlantic slave trade (left-side panel) and the Indian Ocean slave trade (right-side panel) from 1400 to 1900, along with the land they historically inhabited. The location of the ethnic groups is obtained from Murdock (1959), whereas the estimation of the number of slaves is from Nunn and Wantchekon (2011). Own construction replicating Figure 1 in Nunn and Wantchekon (2011).

Following Nunn and Wantchekon (2011) and Teso (2019), I take two steps to define the variable that captures ancestral exposure to each slave trade wave. First, I normalize the number of slaves taken from each ethnic group using data on the area of land they historically inhabited: I do this to account for the dissimilar sizes between ethnic groups. I use the area inhabited because there are not convincing estimates of the ethnic population prior to the slave trade. Secondly, I take the natural logarithm of one plus the normalized measure of slave exports. I do this to reduce the skewness to the right in the distribution of slave trade figures: by doing so, I alleviate the risk that influential observations could drive the results. In consequence, I define the two treatment variables as follows:

$$Transatlantic\ Trade_e = ln\left(1 + \frac{Transatlantic\ Slaves_e}{Historical\ Area_e}\right)$$

$$Indian\ Ocean\ Trade_e = ln\left(1 + \frac{Indian\ Ocean\ Slaves_e}{Historical\ Area_e}\right)$$

where $Transatlantic\ Slaves_e$ and $Indian\ Ocean\ Slaves_e$ are the number of slaves of ethnic

group e that were traded in the transatlantic and the Indian Ocean slave trade, respectively, and $Historical\ Area_e$ is the area of land historically inhabited by the ethnic group e, measured in squared kilometers.

Control Variables. I use control variables at the individual, village and ethnic-group level. Individual and village controls are obtained from self-reported answers by the respondent and the information filled by the survey manager in the Afrobarometer. Ethnic controls, which cover geographical, cultural and historical characteristics of the ethnic group, are obtained from a variety of sources. The definition of each control, its source and the reason to include it in the baseline specification are detailed in Section B of the Appendix.

Instruments. The Murdock map of ethnographic regions for Africa (Murdock, 1959) provides data on the distance to the coast from the centroid of the land historically inhabited by each ethnic group. Following Nunn and Wantchekon (2011), I use this variable as an instrument for transatlantic slave trade exports in the IV strategy described in Section 5.2.

Falsification outcomes. The Afrobarometer survey includes also four measures of intolerance against other groups. Answers to questions *89A, 89B, 89D* and *89E* provide information on attitudes towards people of a different religion, from other ethnic groups, who have HIV/AIDS or are immigrants/foreign workers. These questions are formulated in exactly the same way as the question related to homophobia, so they provide comparable measures of prejudice. I use this information to perform the falsification test in Section 6.5.

5 Empirical Strategy

In this section, I describe the three methodologies used to investigate whether ancestral exposure to the transatlantic slave trade affected anti-gay sentiments in contemporary Africa. First, I describe the baseline specification used for the OLS analysis, which includes a comprehensive set of individual, village and ethnic-group controls to mitigate concerns on Omitted Variable Bias (OVB). Secondly, I move to an Instrumental Variables (IV) approach, which allows to address concerns on potential measurement errors in the estimates of slave trade exports and further reduce the risk of OVB. Thirdly, I describe the Differences in Differences strategy, which only exploits within ethnic-group variation between men and women to eliminate the risk that unobservable differences across ethnic groups may drive the results.

5.1 OLS

Baseline specification. I examine the long-run relationship between ancestral exposure to the transatlantic slave trade and contemporary attitudes towards homosexuality by estimating the following specification:

$$\begin{aligned} Prejudice_{\,i,e,v,c} = \alpha_{\,c} + \beta_1\, Transatlantic\, Trade_{\,e} + \beta_2\, Indian\, Ocean\, Trade_{\,e} \\ + X'_{i,e,v,c}\,\Gamma + X'_{v,c}\,\Omega + X'_{e}\,\Phi + \varepsilon_{\,i,e,v,c} \end{aligned} \tag{1}$$

where i indexes an individual descendant from ethnic group e that lives in village v in country c. *Prejudice* is the measure of prejudice against homosexuality, that varies across individuals. *Transatlantic Trade* and *Indian Ocean Trade* are the measures of ancestral exposure to the transatlantic and Indian Ocean slave trades, respectively.[20] Given the heterogeneous priors for men and women, I estimate it for the two subsamples separately.

Control variables and standard errors. Control variables include a set of covariates at the individual level ($X'_{i,v,d,c}$), the village level ($X'_{v,c}$) and the ethnic group level (X'_{e}). Its inclusion to mitigate concerns on OVB is discussed in detail in Section B of the Appendix. Additionally, $\alpha_{\,c}$ denotes a full set of country fixed effects. Thus, I account for country-specific factors that may influence anti-gay sentiments and be also correlated to ancestral exposure to the transatlantic slave trade (e.g. criminalization of homosexuality). Finally, since exposure to the transatlantic slave trade takes place at the ethnic group level, I use clustered standard errors at this level in all the estimations performed (Abadie et al., 2017). This way, I account for potential within-cluster correlation of the residuals.

Coefficients of interest. The coefficient of interest, β_1, captures the relationship between the intensity of transatlantic slave trade exports at the ethnic group level and anti-gay sentiments at the individual level. Moreover, I use the Indian Ocean slave trade, which did not generate female-biased sex ratios, as a placebo treatment: results for β_2 provide suggestive evidence on whether the potential effect of the transatlantic slave trade is just a byproduct of exposure to the slave trade or it is plausibly related to the emergence of female-biased sex ratios.

5.2 Instrumental Variables

Endogeneity concerns. In the previous OLS specification, measurement error in the historical estimates of slave trade exports is likely to generate attenuation bias in the coefficients of

[20] The construction of the two variables is discussed in section 4.

interest. Moreover, concerns regarding OVB due to unobservable ethnic characteristics may still persist, despite the comprehensive set of ethnic-group controls already included. To address these concerns, I adopt the IV strategy employed by Nunn and Wantchekon (2011) and Teso (2019).

Instrument and specification. I stick to the model defined in equation (1) and use distance to the coast from the centroid of the land historically inhabited by the ethnic group as an instrument for transatlantic slave trade exports. This choice is based on 3 arguments. First, distance to the coast satisfies the relevance condition for an instrument. Since slaves that were sent to the Americas were purchased by traders at the African coast, ethnic groups living closer to the coast line were more likely to be affected by the transatlantic slave trade. Secondly, distance to the coast is clearly fixed, as it is a given geographical characteristic. Thirdly, by including the full set of country fixed effects and controls through which distance to the coast may affect anti-gay sentiments, this instrument is also likely to satisfy the exclusion restriction.[21]

5.3 Differences in Differences

Endogeneity concerns. In the previous OLS and IV specifications, the idea that disparities between ethnic groups could drive the results may be still a concern. To address this issue, I estimate a Differences in Differences (DID) model to compare levels of sexual prejudice between men and women (1st difference) across ethnic groups with different levels of ancestral exposure to the transatlantic slave trade (2nd difference). Using information on the gender of the respondent and a full set of ethnic-group fixed effects, I estimate the difference in the average treatment effect (ATE) between men and women exploiting only within-ethnic group variation.[22]

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[21] With respect to the exclusion restriction, three relevant points raised by Nunn and Wantchekon (2011) are worth mentioning. First, it could be argued that those ethnic groups living closer to the coast line could have higher levels of initial prosperity. If initial prosperity affected both the degree of exposure to the slave trade and attitudes towards homosexuality, the exogeneity assumption would not hold. However, in the studied regions, overseas trade was not present before the slave trade. Then, the risk that distance to the coast could affect initial levels of development through the trade channel is mitigated. Secondly, ethnic groups living closer to the coast may have experienced different forms of European contact compared to those living further. This emphasizes the necessity to account for the full set of ethnic controls, which include proxies for the role of European colonizers, in the IV estimation. Thirdly, in a similar fashion, distance to the coast is negatively correlated with distance to the Saharan trade networks and positively correlated with ethnic reliance on fishing. Since the set of ethnic controls accounts for three variables that measure these two dimensions (distance to the closest Saharan node, distance to the closest Saharan route and the index for ethnic reliance on fishing), the risk of endogeneity caused by these three characteristics is also mitigated. All in all, it seems plausible that distance to the coast satisfies the exogeneity assumption necessary to be a valid instrument.

[22] For a similar strategy see Robinson and Gottlieb (2019), who use a DID approach to compare levels of political participation between men and women (1st difference) across matrilineal and non-matrilineal ethnicities (2nd difference). The main difference is that, while I employ a continuous treatment, they use a discrete one.

DID specification. Using the whole sample, I estimate the following specification:

$$\begin{aligned} Prejudice_{\,i,e,v,c} = \alpha_{\,c} + \alpha_{\,e} + \gamma_1\, Female_i + \gamma_2\, Female_i \times Transatlantic\, Trade_{\,e} \\ + \gamma_3\, Female_i \times Indian\ Ocean\ Trade_{\,e} + X'_{i,e,v,c}\,\Gamma + X'_{v,c}\,\Omega + \varepsilon_{\,i,e,v,c} \end{aligned} \tag{2}$$

where i indexes an individual descendant from ethnic group e that lives in village v in country c. *Prejudice* is the measure of prejudice against homosexuality. *Transatlantic Trade* and *Indian Ocean Trade* are the measures of ancestral exposure to the transatlantic and Indian Ocean slave trades, respectively.[23] *Female* is a dummy variable that takes value one if the respondent is a female. The specification includes the full set of control variables at the individual ($X'_{i,v,d,c}$) and village level ($X'_{v,c}$) described in section B of the Appendix, plus a full set of country fixed effects ($\alpha_{\,c}$) and ethnic fixed effects ($\alpha_{\,e}$).[24]

The causal interpretation of the DID estimates lies in the validity of the parallel-trends assumption. This means that, in the absence of the transatlantic slave trade, the difference in average levels of prejudice between men and women in ethnic groups with different levels of exposure to the slave trade would have remained stable. Although apparently reasonable, it is not possible to directly test this assumption due to the absence of data on anti-gay sentiments for the period prior to the treatment.

Coefficient of interest. The coefficient of interest is γ_2, which is the ATE of the transatlantic slave trade on the gender gap in intolerance. The gender gap in intolerance is the difference in anti-gay sentiments between men and women. The coefficient γ_1 provides an estimation of this gender gap in intolerance for my sample. According to Herek (2000), higher levels of prejudice against homosexuality are generally found among men. Thus, I can confirm whether, once accounted for the effect of ancestral exposure to the transatlantic slave trade, women in the sample are, on average, more tolerant than men.

Identification. The major advantage of this specification, compared to previous ones, is that it only exploits within-ethnic group variation across gender to identify the effect of transatlantic slave trade exposure on attitudes towards homosexuality. By doing so, I eliminate the concern that unobservable differences across-ethnic groups may be driving the results: all potential ethnic characteristics that may be correlated with the slave trade and may also influence attitudes towards homosexuality are captured by the vector $\alpha_{\,e}$ of ethnic fixed effects.

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[23] The construction of the two variables is discussed in section 4.

[24] The vector (X'_e) of ethnic group control variables and the two main effects for the two slave trade waves in equation 1 are not included because their effect on anti-gay sentiments is already captured by the set of ethnic-group fixed effects.

However, this advantage comes at a cost. Since the treatment varies at the ethnic group level, I cannot estimate the ATE both for men and women. The part of the treatment effect that is common for both genders is absorbed by the set of ethnic fixed effects. However, the ATE on the gender gap in intolerance, captured by γ_2, is still informative. According to the mecanisms described in Section 3, if female-biased sex ratios led to an increase in *female intrasexual competition*, women should have become less tolerant but men should have remained unaffected, and this differential effect would be captured by γ_2.

6 Results

This section describes the results for the estimated relationship between ancestral exposure to the transatlantic slave trade and contemporary attitudes towards homosexuality using the three empirical methods previously described: OLS, IV and DID. Additionally, it includes a short interpretation that condenses the evidence found across the three methods. I also provide the results for a falsification test using alternative measures of intolerance to discard competing hypothesis. Finally, I include suggestive evidence on preexisting characteristics at the ethnic-group level that may moderate the relationship of interest.[25]

6.1 OLS Results

Tables 2 and 3 report the OLS results on the effect of historical exposure to the transatlantic slave trade on contemporary attitudes towards homosexuality in the subsample of women and men, respectively. In both cases I start, in Column (1), using a specification that only includes individual controls and country fixed effects. The estimation in Column (2) includes the village controls. Finally, I introduce the ethnic-group controls in Column (3).

The results show that women with higher levels of ancestral exposure to the transatlantic slave trade have stronger anti-gay sentiments. In contrast, ancestral exposure to the transatlantic slave trade does not seem to have any impact on men's attitudes towards homosexuality.

Female subsample. The results in Table 2 show that higher levels of prejudice against homosexuality are observed among women whose ancestors where more heavily exposed to the transatlantic slave trade. The coefficient associated to the transatlantic slave trade in Column (1) is positive but not statistically significant. The introduction of village controls in Column (2) does not change the magnitude, sign or significance of the coefficient. However, the introduction

[25] The *Stata* code to replicate the results of this thesis can be found in the following link: https://drive.google.com/file/d/1QsotsFWxB7hRUV4zTO8BeG000fVaa9Vp/view?usp=sharing

Table 2: OLS estimates: the effect of the Transatlantic Slave Trade on contemporary attitudes towards homosexuality among Women

	(1) Prejudice	(2) Prejudice	(3) Prejudice
ln Transatlantic Trade	0.013	0.012	0.028*
	(0.013)	(0.012)	(0.017)
ln Indian Ocean Trade	−0.001	0.016	−0.099
	(0.094)	(0.093)	(0.136)
Observations	16899	16899	16899
R^2	0.203	0.206	0.21
Ethnic groups	219	219	219
Country FE	Yes	Yes	Yes
Individual Controls	Yes	Yes	Yes
Village Controls	No	Yes	Yes
Ethnicity Controls	No	No	Yes
Sample	Female	Female	Female

Note: Standard errors in parenthesis, clustered at the ethnicity level. The unit of observation is a female respondent. *ln Transatlantic Trade* is the natural logarithm of one plus the number of slaves of the ethnic group taken during the transatlantic slave trade, normalized by the area historical inhabited. *ln Indian Ocean Trade* is the natural logarithm of one plus the number of slaves of the ethnic group taken during the Indian Ocean slave trade, normalized by the area historical inhabited. The dependent variable is obtained from the answer to *Question 89C* in the Afrobarometer survey, which asks whether the respondent would like, dislike or don't care having an homosexual as neighbor. Larger values of the dependent variable imply higher levels of prejudice against homosexuality. The dependent variable is coded as follows: "strongly like" (0); "somewhat like" (1); "don't care" (2); "somewhat dislike" (3); "strongly dislike" (4). The set of controls at the individual, village and ethnic group level is detailed in Section B of the Appendix. Significance levels: + p < 0.15, * p < 0.1, ** p < 0.05, *** p < 0.01.

of ethnic-group controls in Column (3) is especially relevant, inasmuch as it reduces the potential biases that could arise due to the omission of unobservable ethnic characteristics correlated both with transatlantic slave trade exposure and sexual prejudice (OVB).[26] The coefficient of interest in Column (3) turns statistically significant at 10%, and its magnitude is more than doubled. This pattern suggests that the estimated coefficients in Columns (1) and (2) are affected by a negative OVB, as discussed in Section 5.1.

The results reveal a small but economically relevant effect of the transatlantic slave trade on anti-gay sentiments among women. A one standard deviation increase in a woman's ancestral exposure to the transatlantic slave trade leads to an increase of 2.67% of the standard deviation in anti-gay sentiments among females. Moreover, the comparison between a woman descendant from an ethnic group not exposed to the transatlantic slave trade and a woman descendant from the Fon people, a Beninese ethnic group which was the most affected by the transatlantic slave trade in the sample, provides more substantial results. 2.91% of the sexual prejudice among Fon women is explained by their ancestral exposure to the transatlantic slave trade.

[26]The risk of omitted variables bias in this scenario is very likely to occur, according to recent literature (see Nunn and Wantchekon (2011) and Teso (2019)). Therefore, the more complete specification that controls for village and ethnic characteristics is the one more likely to produce unbiased coefficients closer to the real causal effect.

Male subsample. The estimates in Table 3 for the subsample of men provide totally different results. The coefficient on the transatlantic slave trade in the three columns is statistically not significant and close to 0 in all cases. These results suggest that, in the case of men, ancestral exposure to the transatlantic slave trade had no influence in contemporary attitudes towards homosexuality.

Placebo treatment. I use the measure for the Indian Ocean slave trade as a placebo treatment. If the effect of the transatlantic slave trade on sexual prejudice among women is just a consequence of exposure to slavery or a byproduct of a selection mechanism that is common to the different slave trade waves, a similar effect should be found for the Indian Ocean slave trade. The coefficient associated to the Indian Ocean slave trade is, though, negative and statistically not significant both in the subsample of women and in the subsample of men.[27] This result suggests that the effect of the transatlantic slave trade on anti-gay sentiments is most likely driven by the distortion in sex ratios.

Robustness Checks. Table A3 in Section E of the Appendix provides additional estimates for two alternative codifications of the measure of sexual prejudice. In Panel A, the 0 to 2 measure of intolerance against homosexuality. In Panel B, the dummy variable of prejudice. The results for these two alternative codifications are qualitatively similar. Moreover, the estimated magnitude for the effect of the transatlantic slave trade on average levels of sexual prejudice among women is between 1.34 and 1.80 times larger than the one estimated in Table 2.[28]

The results for the whole sample of men and women are also reported in Table A3 in Section E of the Appendix. As could be expected, the coefficients associated to the transatlantic slave trade are in magnitude between the ones for the men and women subsamples, and not statistically significant.

For the remaining of the analysis I keep using, as dependent variable, the 0 to 4 measure of sexual prejudice used in Tables 2 and 3. Furthermore, I stick to the specification in Column (3), that includes the full set of individual, village and ethnic-group controls, plus the set of country-fixed effects.

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[27] The relatively large size of the coefficient associated with the Indian Ocean slave trade is explained by the smaller mean and standard deviation in the distribution of this variable. Thus, its real effect would be really small in magnitude. This can be seen comparing the standardized coefficients for the OLS estimates in Table 2, Column (3), where the one associated with the Indian Ocean slave trade (0.015) is 43.38% smaller than the one associated with the transatlantic slave trade (0.027).

[28] This refers to the estimated effect of an increase in one standard deviation of ancestral exposure to the transatlantic slave trade with respect to the average level of sexual prejudice.

Table 3: OLS estimates: the effect of the Transatlantic Slave Trade on contemporary attitudes towards homosexuality among Men

	(1) Prejudice	(2) Prejudice	(3) Prejudice
ln Transatlantic Trade	0.003	0.002	0.004
	(0.014)	(0.014)	(0.021)
ln Indian Ocean Trade	−0.002	0.009	−0.038
	(0.077)	(0.075)	(0.129)
Observations	16797	16797	16797
R^2	0.173	0.175	0.178
Ethnic groups	223	223	223
Country FE	Yes	Yes	Yes
Individual Controls	Yes	Yes	Yes
Village Controls	No	Yes	Yes
Ethnicity Controls	No	No	Yes
Sample	Male	Male	Male

Note: Standard errors in parenthesis, clustered at the ethnicity level. The unit of observation is a female respondent. *ln Transatlantic Trade* is the natural logarithm of one plus the number of slaves of the ethnic group taken during the transatlantic slave trade, normalized by the area historical inhabited. *ln Indian Ocean Trade* is the natural logarithm of one plus the number of slaves of the ethnic group taken during the Indian Ocean slave trade, normalized by the area historical inhabited. The dependent variable is obtained from the answer to *Question 89C* in the Afrobarometer survey, which asks whether the respondent would like, dislike or don't care having an homosexual as neighbor. Larger values of the dependent variable imply higher levels of prejudice against homosexuality. The dependent variable is coded as follows: "strongly like" (0); "somewhat like" (1); "don't care" (2); "somewhat dislike" (3); "strongly dislike" (4). The set of controls at the individual, village and ethnic group level is detailed in Section B of the Appendix. Significance levels: + p < 0.15, * p < 0.1, ** p < 0.05, *** p < 0.01.

6.2 Instrumental Variables Results

Table 4 reports the IV estimates for the specification with country fixed effects and the full set of controls. Columns (1) and (2) provide the results for the subsample of men and women, respectively.

First Stage. As expected, the first stage coefficient is negative, showing that ethnic groups with homeland closer to the coast were more exposed to the transatlantic slave trade. Moreover, the large values for the F-statistic, well above 10, corroborate that distance to the coast is a strong instrument for the transatlantic slave trade.

Second Stage. The results for the IV estimates are consistent with the results obtained in the OLS analysis. Ancestral exposure to the transatlantic slave trade fosters anti-gay sentiments among women in the long run, with an associated coefficient positive and statistically significant at 10%. In contrast, it does not have a statistically significant effect in the subsample of men. Moreover, the coefficient associated to the Indian Ocean slave trade, which did not result into female-biased sex ratios, remains insignificant in both cases.

Magnitude of the IV coefficient. Regarding the magnitude of the effect, a one standard deviation increase in a woman's ancestral exposure to the transatlantic slave trade leads to an

Table 4: IV estimates, the effect of the Transatlantic Slave Trade on contemporary attitudes towards homosexuality - Complete sample and subsample analysis: Men subsample vs Women subsample

	(1) Prejudice	(2) Prejudice
	Second Stage	
ln Transatlantic Trade	0.023	0.087*
	(0.049)	(0.051)
ln Indian Ocean Trade	−0.035	−0.094
	(0.129)	(0.136)
R^2	0.18	0.223
	First Stage - Dependent variable: ln Transatlantic Trade	
Distance to sea	−0.0011***	−0.0011***
	(0.0002)	(0.0002)
1st stage F-stat	30.85	32.09
R^2	0.788	0.789
Observations	16797	16899
Ethnic groups	223	219
Country FE	Yes	Yes
Individual Controls	Yes	Yes
Village Controls	Yes	Yes
Ethnicity Controls	Yes	Yes
Sample	Male	Female

Note: Standard errors in parenthesis, clustered at the ethnicity level. The unit of observation is an individual: male respondent in Column (1) and female respondents in Column (2). *ln Transatlantic Trade* is the natural logarithm of one plus the number of slaves of the ethnic group taken during the transatlantic slave trade, normalized by the area historical inhabited. *ln Indian Ocean Trade* is the natural logarithm of one plus the number of slaves of the ethnic group taken during the Indian Ocean slave trade, normalized by the area historical inhabited. The dependent variable is obtained from the answer to *Question 89C* in the Afrobarometer survey, which asks whether the respondent would like, dislike or don't care having an homosexual as neighbor. Larger values of the dependent variable imply higher levels of prejudice against homosexuality. The dependent variable is coded as follows: "strongly like" (0); "somewhat like" (1); "don't care" (2); "somewhat dislike" (3); "strongly dislike" (4). *Distance to sea* is the historical distance from the centroid of each ethnicity to the closest point in the coast. The set of controls at the individual, village and ethnic group level is detailed in Section B of the Appendix. Significance levels: + p < 0.15, * p < 0.1, ** p < 0.05, *** p < 0.01.

increase of 8.29% of the standard deviation in anti-gay sentiments among females. In a more illustrative example, ancestral exposure to the transatlantic slave trade explains 9.05% of the sexual prejudice among Fon women, the ethnic group most affected by the shock.

The magnitude of the IV coefficient is three times larger than its OLS counterpart. This increase is in line with the aforementioned attenuation bias due to measurement error in the slave trade exports figures.[29] If there is negative OVB (see *"Female subsample"* in Section 6.1) and attenuation bias due to measurement error in slave trade figures, then OLS estimates can be interpreted as a lower bound for the real effect of ancestral exposure to the transatlantic slave trade on anti-gay sentiments among women. Thus, IV estimates are the ones most likely to approximate the real causal effect.

[29] However, the increase in magnitude may also be influenced by the fact that the IV estimation identifies the effect of exposure to the transatlantic slave trade on anti-gay sentiments only among individuals who descend from ethnic groups affected by the slave trade due to the proximity of their homeland to the coast.

6.3 Differences in Differences Results

Table 5 reports the DID estimates for the specification with country fixed effects and the full set of controls. Column (1) provides, for a sake of comparison, the results for the gender gap in intolerance before accounting for the effect of the slave trade and the ethnic fixed effects.[30] Column (2) includes the measures for ancestral exposure to the slave trade interacted with the female dummy. Thus, it accounts for the effect of the slave trade on the gender gap in intolerance. Column (3) incorporates the ethnic fixed effects, which corresponds to the specification in Equation 2. Lastly, Column (4) incorporates also the interaction of the set of individual controls with the female dummy.

Using men as control group. Including the set of ethnic fixed effects (estimates in Columns 3 and 4) prevents the results from being driven by unobservable differences across ethnic groups, but makes impossible to estimate the ATE for the whole sample. Since the treatment varies at the ethnic group level, the part of the effect of ancestral exposure to the transatlantic slave on anti-gay sentiments that is common for men and women is absorbed by the set of ethnic-group fixed effects.

I overcome this limitation using men as the control group. Previous results in the OLS and IV specifications show that men's attitudes towards homosexuality are apparently unaffected by the transatlantic slave trade. This suggests that any effect of the transatlantic slave trade on the gender gap in intolerance should be explained by the effect on anti-gay sentiments among women. I take advantage of this feature to interpret the outcomes of the DID estimates: the ATE on the gender gap in intolerance, captured by γ_2 in Equation 2, should be close to the ATE of the transatlantic slave trade for the female subsample (estimated from an ideal experiment that randomizes ancestral exposure to the transatlantic slave trade across individuals within the same ethnic group).

DID results. Results in Column (1) do not include the effect of the slave trade nor the ethnic fixed effects. The coefficient associated to the female dummy, though only significant at 15%, is in line with African women being slightly more tolerant than African men.

Column (2) includes the effect of the slave trade, before adding the ethnic fixed effects. It confirms what is expected: the ATE of the transatlantic slave trade for men is statistically not significant, with an associated coefficient close to zero, but the ATE of the transatlantic slave trade on the gender gap in intolerance is positive and statistically significant at 10%. Moreover,

[30] The gender gap in intolerance refers to the difference, on average, in anti-gay sentiments between men and women.

Table 5: Differences in Differences estimates, the effect of the Transatlantic Slave Trade on the gender gap in intolerance

	(1) Prejudice	(2) Prejudice	(3) Prejudice	(4) Prejudice
ln Transatlantic Trade		0.006		
		(0.019)		
ln Indian Ocean Trade		−0.061		
		(0.125)		
Female	−0.018^{+}	−0.029**	−0.029**	−0.103
	(0.011)	(0.014)	(0.014)	(0.121)
Female × ln Transatlantic Trade		0.023*	0.023*	0.022*
		(0.013)	(0.013)	(0.013)
Female × ln Indian Ocean Trade		−0.013	0.000	0.007
		(0.044)	(0.039)	(0.041)
Observations	33682	33682	33682	33682
R^2	0.192	0.192	0.207	0.208
Ethnic groups	216	216	216	216
Country FE	Yes	Yes	Yes	Yes
Individual Controls	Yes	Yes	Yes	Yes
Village Controls	Yes	Yes	Yes	Yes
Ethnicity Controls	Yes	Yes	Yes	Yes
Ethnic FE	No	No	Yes	Yes
Individual Controls x Female	No	No	No	Yes
Sample	Complete	Complete	Complete	Complete

Note: Standard errors in parenthesis, clustered at the ethnicity level. The unit of observation is an individual. *ln Transatlantic Trade* is the natural logarithm of one plus the number of slaves of the ethnic group taken during the transatlantic slave trade, normalized by the area historical inhabited. *ln Indian Ocean Trade* is the natural logarithm of one plus the number of slaves of the ethnic group taken during the Indian Ocean slave trade, normalized by the area historical inhabited. The dependent variable is obtained from the answer to *Question 89C* in the Afrobarometer survey, which asks whether the respondent would like, dislike or don't care having an homosexual as neighbor. Larger values of the dependent variable imply higher levels of prejudice against homosexuality. The dependent variable is coded as follows: "strongly like" (0); "somewhat like" (1); "don't care" (2); "somewhat dislike" (3); "strongly dislike" (4). The set of controls at the individual, village and ethnic group level is detailed in Section B of the Appendix. Significance levels: + p < 0.15, * p < 0.1, ** p < 0.05, *** p < 0.01.

the negative coefficient associated to the female dummy increases from -0.018 to -0.029 and becomes significant at 5%. This is, once controlling for the effect of the transatlantic slave trade, the underlying gender gap in intolerance widens by approximately 60%.

Column (3) includes the set of ethnic fixed effects. In this case, the common effect of the transatlantic slave trade for both genders is absorbed by the ethnic-group fixed effects. However, the ATE on the gender gap in intolerance remains unchanged: positive, with the same magnitude and statistically significant at 10%. Additionally, the coefficient associated to the female dummy remains also unchanged.

Column (4) allows all individual characteristics to have a heterogeneous effect according to the gender of the respondent. In this case, the coefficient for the interaction of the transatlantic slave trade with the female dummy remains roughly unchanged. On the other hand, the coefficient associated to the female dummy is not significant anymore, but this is just the natural result of allowing individual characteristics to have a different effect for women and men.

Placebo treatment. The non-significant coefficient for the placebo treatment in the DID specification reinforces the idea that the effect of the transatlantic slave trade on anti-gay sentiments among women is not just a direct effect of exposure to slavery or a byproduct of a selection mechanism that is common to the different slave trade waves, but is most likely related to the distortion in sex ratios.

Magnitude of the DID coefficient. The DID estimates shed light on a puzzling pattern. To evaluate it, I make use of the coefficients in Column (3). First, according to the coefficient associated to the gender dummy, women in the sample show, on average, a 0.83% lower level of sexual prejudice than men, once accounted for the effect of ancestral exposure to the slave trade. This is in line with existing evidence stating that higher levels of sexual prejudice are generally found among men than among women (Herek, 2000). As aforementioned, I refer to this difference in average levels of anti-gay sentiments as the gender gap in intolerance.

The DID analysis reveals that the transatlantic slave trade has a sufficient impact to close or even revert this gender gap in intolerance. Two comparisons are exemplary. First, a increase of one standard deviation in ancestral exposure to the transatlantic slave trade reduces the difference in the average level of prejudice between men and women to only 0.20%. This is a reduction by three-quarters of the gender gap in intolerance. Secondly, the comparison between ethnic groups not exposed to the shock and the ethnic groups that suffered most from it give again a notorious contrast. In an ethnic group not exposed to the slave trade, men show, on average, a level of sexual prejudice 0.83% higher than women. In the opposite case, if the ethnic group is exposed to the highest level of transatlantic slave trade exports in the sample, women in the ethnic group show, on average, a level of prejudice 1.56% higher than men. The gender gap in intolerance is reversed and nearly doubled in size.

6.4 The picture emerging from the results

Results from three distinct methodologies - OLS, IV and DID - show that ancestral exposure to the transatlantic slave trade significantly increases anti-gay sentiments among women, but has no effect among men. OLS and IV results for the subsamples of men and women are consistent with the *increase in female intrasexual competition* mechanism, but against the *decrease in male intrasexual competition* mechanism. Additionally, the DID coefficient, that remains significant and roughly unchanged once the ethnic fixed effects are included, confirms that a gender-specific mechanism like the *increase in female intrasexual competition* is the type of mechanism that should explain the effect found.

The DID strategy also sheds light on a puzzling pattern that is hard to conciliate with com-

peting interpretations. While existing evidence shows that women are generally more tolerant than men (see Herek, 2000), this gender gap in intolerance is smaller in Africa than in any other continent (see Table 1). DID results show that, in ethnic groups more heavily affected by the transatlantic slave trade, the gender gap in intolerance is smaller or even reversed. Thus, ancestral exposure to the transatlantic slave trade may explain why African women are relatively less tolerant than women in other parts of the world.

Finally, there are three reasons why the results found are unlikely to be explained by endogeneity biases. First, OVB is likely to mitigate the estimated effect, because the OLS coefficient increases once ethnic controls are included. Secondly, attenuation bias due to measurement error in slave trade figures is also likely to mitigate this effect, as suggested by the increase in magnitude of IV estimates. Thirdly, the results found using OLS and IV hold also for the DID specification, which only exploits within-ethnic group variation. This alleviates the risk that OLS and IV results could be driven by unobservable differences across ethnic groups.

6.5 Falsification test: other dimensions of prejudice

To rule out the hypothesis that my results could be explained by a general shift towards intolerance, in this subsection I perform an additional falsification test using other forms of intolerance as dependent variables.

Competing hypothesis: a general shift towards intolerance. Despite previous results, it could still be argued that exposure to the transatlantic slave trade may have fostered intolerance against those who are different, not only against homosexuals. Thus, the increase in anti-gay sentiments among women might be just part of a general shift towards intolerant attitudes.

If the increase in anti-gay sentiments among women is part of a general shift towards intolerance, I should find a positive relationship between exposure to the transatlantic slave trade and prejudice against other collectives in the subsample of females.

Falsification test results. Table 6 reports OLS estimates for the falsification test in the subsample of women. The transatlantic slave trade is not related to higher levels of prejudice in any of the four alternative dimensions considered. In Column (1), the coefficient associated to the transatlantic slave trade is negative and statistically significant. In columns (2), (3) and (4), the coefficient associated to the transatlantic slave trade is not statistically significant. Thus, the results confirm that the increase in anti-gay sentiments among women is not part of a general shift towards intolerance.

Moreover, the coefficient associated to the transatlantic slave trade shares sign with the coefficient associated to the Indian Ocean slave trade in all four specifications, something which

Table 6: OLS estimates, the effect of the Transatlantic Slave Trade on alternative dimensions of prejudice - Women Subsample

	(1) Religion	(2) Ethnicity	(3) HIV/AIDS	(4) Immigrants
ln Transatlantic Trade	−0.055*	−0.027	0.006	−0.010
	(0.029)	(0.023)	(0.030)	(0.026)
ln Indian Ocean Trade	−0.199**	−0.189**	0.066	−0.024
	(0.087)	(0.084)	(0.131)	(0.095)
Observations	16717	16717	16717	16717
R^2	0.166	0.122	0.292	0.122
Ethnic Groups	219	219	219	219
Country FE	Yes	Yes	Yes	Yes
Individual Controls	Yes	Yes	Yes	Yes
Village Controls	Yes	Yes	Yes	Yes
Ethnicity Controls	Yes	Yes	Yes	Yes
Sample	Female	Female	Female	Female

Note: Standard errors in parenthesis, clustered at the ethnicity level. The unit of observation is an individual in the women subsample. *ln Transatlantic Trade* is the natural logarithm of one plus the number of slaves of the ethnic group taken during the transatlantic slave trade, normalized by the area historical inhabited. *ln Indian Ocean Trade* is the natural logarithm of one plus the number of slaves of the ethnic group taken during the Indian Ocean slave trade, normalized by the area historical inhabited. The dependent variable is obtained from the answer to *Question 89A, 89B, 89D and Q89E* in the Afrobarometer survey, which asks whether the respondent would like, dislike or don't care having someone of a different religion, of a different ethnicity, with HIV/AIDS or an immigrant/foreign worker as neighbor, respectively. Larger values of the dependent variable imply higher levels of prejudice against homosexuality. The dependent variable is coded as follows: "strongly like" (0); "somewhat like" (1); "don't care" (2); "somewhat dislike" (3); "strongly dislike" (4). The set of controls at the individual, village and ethnic group level is detailed in Section B of the Appendix. Significance levels: + p < 0.15, * p < 0.1, ** p < 0.05, *** p < 0.01.

did not occur for the estimates of sexual prejudice. This reinforces the idea that female-biased sex ratios are the most plausible explanation for the relationship found between the transatlantic slave trade and anti-gay sentiments among women.

6.6 Heterogeneous effects: gender gaps in economic participation

Results so far show an increase in sexual prejudice among women whose ancestors were exposed to the transatlantic slave trade. Moreover, it is highly likely that the effect takes place through the distortion in sex ratios and its impact in the marriage market. Considering this, one might reasonably wonder whether this effect might be heterogeneous according to preexisting conditions in each ethnic group. In this subsection, I provide suggestive evidence about the potential role played by the historical degree of women's economic dependence on men.

The financial risk of staying single. According to the *increase in female intrasexual competition* mechanism, the increase in anti-gay sentiments among women is related to the feeling of rejection as a sexual partner and the struggle to find a mate. In this context, the disutility of staying single would be higher in those cases where women depend more on men to achieve financial security. Therefore, I analyze whether gender gaps in economic participation may mod-

erate the relationship. The African context provides a unique setting to test whether preexisting cultural characteristics moderate the effect of gender-biased sex ratios.

Gender gaps in economic participation. I construct an index for women's economic dependence on men using two sets of ethnic-group variables in Murdock (1967). First, variables 1 to 5 indicate the percentage of the total economic activity represented by each of the five main activities.[31] Second, variables 50 to 54 provide information on gender specialization on each of these five activities.[32]

Using this information, I construct the index for economic dependence on men, ranging from 0 to 1, as follows:

$$Men\ Dependence_{\,e} = \frac{\sum_{a=1}^{5}(Activity\ Share_{\,a,e} \times Men\ Share_{\,a,e})}{\sum_{a=1}^{5} Activity\ Share_{\,a,e}} \tag{3}$$

where $Activity\ Share_{a,e}$ is the percentage that each activity represents of the total economic activity in the ethnic group, and $Men\ Share_{a,e}$ is the share of the activity carried out by men. a denotes the five economic activities considered.[33]

Finally, I split the sample in two halves, above and below the median value for the index across ethnic groups in the sample. This way, I obtain a dummy variable that takes value one for those individuals who descend from ethnic groups that were above the median level of men prevalence in economic activity. In those cases, single women should have been, historically, in a relatively less secure financial situation in comparison to ethnic groups where women had a larger presence in the economic activity.

Specification and results. I use the DID approach employed in Section 6.3. This alternative is the one less likely to produce results driven by endogeneity biases. Thus, I estimate the effect of the transatlantic slave trade on the gender gap in intolerance, allowing an heterogeneous effect across ethnic groups according to gender gaps in economic participation. Column (1) shows, for a sake of comparison, the baseline results for the DID.[34] Column (2) includes the heterogeneous treatment according to gender gaps in economic participation.

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[31] Gathering, hunting, fishing, animal husbandry and agriculture.

[32] Gender differences in each activity are indicated with the following classification: only men participate, men are the majority, men and women equally participate, women are the majority, only women participate. For each of these categories, I assign the following percentage of men prevalence: 100%, 75%, 50%, 25%, 0%, respectively.

[33] I include $\sum_{a=1}^{5} Activity\ Share_{\,a,e}$ in the denominator because the ethnographic atlas also considers other residual activities, which represent a low share of the total activity, for which gender specialization is not provided. In this way, I am able to obtain a bounded index between 0 and 1 for all the ethnic groups, normalized by the total share of economic activity captured by these five main activities.

[34] This column replicates the results for Column (3) in Table 5.

Table 7: Differences in Differences estimates, the effect of the Transatlantic Slave Trade on the gender gap in intolerance, moderated by preexisting gender gaps in economic participation

	(1) Prejudice	(2) Prejudice
Female	−0.029**	−0.034**
	(0.014)	(0.016)
Female × ln Transatlantic Trade	0.023*	0.003
	(0.013)	(0.014)
Female × Men Main Provider		0.006
		(0.024)
Female × ln Transatlantic Trade × Men Main Provider		0.031*
		(0.018)
Observations	33682	31067
R^2	0.207	0.211
Ethnic groups	216	165
Country FE	Yes	Yes
Individual Controls	Yes	Yes
Village Controls	Yes	Yes
Ethnicity Controls	Yes	Yes
Ethnic FE	Yes	Yes
Sample	Complete	Complete

Note: Standard errors in parenthesis, clustered at the ethnicity level. The unit of observation is an individual. *ln Transatlantic Trade* is the natural logarithm of one plus the number of slaves of the ethnic group taken during the transatlantic slave trade, normalized by the area historical inhabited. *ln Indian Ocean Trade* is the natural logarithm of one plus the number of slaves of the ethnic group taken during the Indian Ocean slave trade, normalized by the area historical inhabited. The dependent variable is obtained from the answer to *Question 89C* in the Afrobarometer survey, which asks whether the respondent would like, dislike or don't care having an homosexual as neighbor. Larger values of the dependent variable imply higher levels of prejudice against homosexuality. The dependent variable is coded as follows: "strongly like" (0); "somewhat like" (1); "don't care" (2); "somewhat dislike" (3); "strongly dislike" (4). The set of controls at the individual, village and ethnic group level is detailed in Section B of the Appendix. Significance levels: + p < 0.15, * p < 0.1, ** p < 0.05, *** p < 0.01.

Results in Column (2) suggest that gender gaps in economic participation may play a relevant role in moderating the effect of ancestral exposure to the transatlantic slave trade. First, the main effect of being a women whose ancestors were exposed to the transatlantic slave trade is no longer statistically significant. Secondly, the coefficient associated to the triple interaction between the treatment, the female dummy and the dummy for men being the main provider is significant at 10%, and larger in magnitude that the main effect estimated in Column (1). Thirdly, once I allow for the heterogeneous effect of the transatlantic slave trade according to gender gaps in economic participation, the coefficient that estimates the underlying gender gap in intolerance (the one associated to the female dummy) widens from -0.029 to -0.034.

These results can be taken just as suggestive evidence. It seems that the effect of ancestral exposure to the transatlantic slave trade on the gender gap in intolerance is concentrated among ethnic groups where the cost of being single is a priori higher for women. However, a more exhaustive analysis is required to confirm these results. This should be done using more precise measures and testing for alternative dimensions of gender inequality.

7 Mechanisms of persistence

This section describes potential mechanisms to explain the long-term persistence of the transatlantic slave trade effect on anti-gay sentiments, as well as to discard that interethnic marriage could have been sufficient to overcome the *shortage of men* caused by the transatlantic slave trade.

A temporary shock with persistent effects. Manning (1990) estimates show that the distortion in sex ratios produced by the transatlantic slave trade had already vanished in the second half of the 19th century. As the sex-ratio converged back to 1 after the end of the slave trade, the long-term effects of the transatlantic slave trade can only be observed if there are mechanisms of cultural persistence at play. I argue that vertical cultural transmission, horizontal peer-to-peer socialization and stickiness of social norms can explain how the transatlantic slave trade may have influenced contemporary anti-gay sentiments among women.

Vertical cultural transmission. Evidence by Bisin and Verdier (2001), Yamagata et al. (2016) and Corneo and Jeanne (2009) shed light on how vertical cultural transmission can play a role in the persistence of intolerance. First, the model of cultural evolution by Bisin and Verdier (2001) frames the evolution of preference traits through intergenerational cultural transmission by altruistic parents. Parents cannot perfectly empathize with their children: they evaluate children's actions using their own (the parents') preference evaluations and prefer to transmit to children their own preference traits. If mothers adhere to less progressive attitudes towards homosexuality, they will be more likely to transmit this cultural values to their daughters.

Secondly, mother-daughter relationship is the one with the strongest emotional bond in the family. Yamagata et al. (2016) show that there are more similarities in the part of the brain that regulates emotions between mothers and daughters than between mothers and sons, fathers and sons or fathers and daughters. This reinforces the potential role played by mothers in the transmission of anti-gay sentiments to their daughters, but not to their sons.

Thirdly, the long-term persistence of anti-gay sentiments among women can also be explained according to the theory of tolerance by Corneo and Jeanne (2009). In this model, altruistic parents choose the value system that they transmit to their children intending to maximize the offspring's future expected utility.[35] Tolerance is one of the potential properties of a value system. In a context of *scarcity of men*, anti-gay sentiments will be relevant to improve marriage market outcomes among heterosexual women, but not among heterosexual men. Therefore, parents will

[35] A value system is the way in which an individual allocates value to different sets of judgeable personal characteristics.

transmit intolerant attitudes against homosexuality to their daughters, but no expected benefit arises from transmitting sexual prejudice to sons.

Horizontal peer-to-peer socialization. Socialization outside the family, which includes peer-to-peer transmission of cultural values, is also a relevant feature of the model of cultural evolution by Bisin and Verdier (2001). In this approach, interactions with other members of the same generation reinforce or influence the individual's set of values.

Existing evidence suggests that horizontal peer-to-peer socialization may be relevant in explaining the spread of intolerance. First, List, Momeni, and Zenou (2019) provide evidence on peer-level externalities in non-cognitive skills, such as inhibitory control, among children. Secondly, Radvansky, Copeland, and Hippel (2010) show that declines in the inhibitory function are related to higher reliance on stereotypes among adults. Therefore, horizontal peer-to-peer socialization may play a relevant role in spreading intolerant attitudes, increasing the proportion of intolerant people within a generation. Moreover, as prejudice becomes more prevalent within a generation, the channel of vertical cultural transmission is reinforced: intolerance will be rooted deeper in the set of values transmitted by parents to following generations.

Stickiness of cultural values. Cultural change occurs slowly (Bisin and Verdier, 2001). The effect of an historical event, even if it is a transitory shock, takes time to dissipate. The literature provides numerous examples. First, Alesina, Giuliano, and Nunn (2013) provide evidence on the long term persistence of traditional gender norms. Secondly, Nunn and Wantchekon (2011) illustrate the persistent effects of the slave trade on interpersonal trust. Thirdly, Guiso, Sapienza, and Zingales (2016) show that self-government in Italian cities in the Middle Ages is related to higher levels of civic capital today. With these examples in mind, it is reasonable to think that the effects of the transatlantic slave trade, which lasted for over four centuries, may still persist 100 years later.

Excluding interethnic marriage as a mechanism of persistence. It may be argued that interethnic marriage could have helped to overcome the *shortage of men* caused by the transatlantic slave trade. Recent evidence by Crespin-Boucaud (2020) shows that it is currently a noteworthy practice in sub-Saharan Africa, representing the 20% of marital unions in 2005.

However, it is not likely that this practice could have been sufficient to compensate the historical *shortage of men*. First, the the slave trade was a regional shock, so ethnic groups close to each other faced similar imbalances in sex ratios. Secondly, those areas most affected by the transatlantic slave trade had a higher prevalence of endogamy (see Figure A2 in Section E of the Appendix). Thirdly, the DID estimation accounting for preexisting exogamy (see Table A4

in Section E of the Appendix) shows that the effect of the transatlantic slave trade on anti-gay feelings among women persists even after controlling for this characteristic.

8 Conclusions

Despite accounts showing that homosexuality was tolerated among many African ethnic groups before colonization, homophobia is a salient phenomenon in contemporary Africa. In this thesis, I study this apparent reversal of beliefs by testing whether ancestral exposure to the transatlantic slave trade, which led to the emergence of female-biased sex ratios, affected anti-gay sentiments in contemporary Africa.

The analysis yields three main insights. First, I show that ancestral exposure to the transatlantic slave trade is related to higher levels of anti-gay sentiments among women, but not among men. Secondly, I find that this effect is concentrated among ethnic groups where men were the main economic provider for the family before the slave trade. Thirdly, I show that the transatlantic slave trade may explain why, while women are generally more tolerant than men, this gender gap in intolerance is smaller in Africa than in any other continent of the world.

Moreover, I provide suggestive evidence that the effect of the transatlantic slave trade on anti-gay sentiments takes place through the distortion in sex ratios. Thus, the results are consistent with the mechanism arguing that relative *scarcity of men* leads to an *increase in female intrasexual competition* in the marriage market, which in turns fosters anti-gay sentiments among women and persists in the long run through mechanisms of cultural transmission.

This thesis adds to a nascent literature studying the effects of gender-biased sex ratios on attitudes towards homosexuality. While existing papers study the effects of *scarcity of women*, I study the effects of *scarcity of men* on anti-gay sentiments. To the best of my knowledge, I am the first in doing so. Besides this contribution, I also provide novel evidence by incorporating the role played by preexisting cultural traits in the analysis.

A natural extension of this thesis is to consider the role played by external factors (e.g. institutional environment). To do so, it is necessary to compute a geographical measure of the treatment, matching the current location of the respondent with the ethnic group that historically inhabited that region. This would allow to differentiate between the effect of cultural transmission and the effect of the institutional environment where the individual resides. Moreover, in combination with the set of ethnic-group fixed effects, this would help to alleviate the main endogeneity concern: absence of data on preexisting levels of homosexuality and anti-gay sentiments. I leave this extension for future analysis.

References

Abadie, Alberto et al. (2017). "When Should You Adjust Standard Errors for Clustering?" 2017.

Adena, Maja et al. (July 2015). "Radio and the Rise of The Nazis in Prewar Germany". In: *The Quarterly Journal of Economics* 130.4, 1885–1939.

Afrobarometer (2016). *Afrobarometer: Africans are tolerant of religion, ethnicity, nationality, and HIV, but not of homosexuality.* [online] Available at: `https://afrobarometer.org/fr/press/tolerance-en-afrique` [Accessed 22 June 2020]. 2016.

Aksoy, Cevat Giray et al. (2018). "Gay Glass Ceilings: Sexual Orientation and Workplace Authority in the UK". 2018.

Alesina, Alberto, Paola Giuliano, and Nathan Nunn (2013). "On the Origins of Gender Roles: Women and the Plough". In: *The Quarterly Journal of Economics*. The Quarterly Journal of Economics 128.2, 469–530.

Alix-Garcia, Jennifer et al. (2020). "Country of Women? Repercussions of the Triple Alliance War in Paraguay". 2020.

Antecol, Heather and Michael D. Steinverger (Jan. 2013). "Labor Supply Differences Between Married Heterosexual Women And Partnered Lesbians: A Semi-Parametric Decomposition Approach". In: *Economic Inquiry* 51.1, 783–805.

Bailey, J Michael and Richard C Pillard (Dec. 1991). "A Genetic Study of Male Sexual Orientation". In: *Archives of General Psychiatry* 48.12, 1089–1096.

Balthazart, Jacques (Aug. 2012). "Brain Development and Sexual Orientation". In: *Colloquium Series on The Developing Brain* 3.2, 1–134.

Baranov, Victoria, Ralph De Haas, and Pauline A. Grosjean (2020a). "Men. Roots and Consequences of Masculinity Norms". 2020.

Baranov, Victoria, Ralph De Haas, and Pauline A. Grosjean (2020b). "Queens of the Desert : Convictism and Marital Attitudes". In: *AEA Papers and Proceedings* 110, 457–462.

Baumeister, Roy F. et al. (2017). "Competing for love: Applying sexual economics theory to mating contests". In: *Journal of Economic Psychology* 63, 230–241.

Beck, A. T., G. Emery, and R. L. Greenberg (1985). *Anxiety disorders and phobias: A cognitive perspective*. New York, NY: Basic Books, 1985.

Besley, Timothy and Marta Reynal-Querol (May 2014). "The Legacy of Historical Conflict: Evidence from Africa". In: *The American Political Science Review* 108.2, 319–336.

Bisin, Alberto and Thierry Verdier (2001). "The Economics of Cultural Transmission and the Dynamics of Preferences". In: *Journal of Economic Theory* 97.2, 298–319.

Black, Dan A, Seth G Sanders, and Lowell J Taylor (2007). "The Economics of Lesbian and Gay Families". In: *Journal of Economic Perspectives* 21.2, 53–70.

Borgerhoff, Monique (1987). "On Cultural and Reproductive Success : Kipsigis Evidence". In: *American Anthropologist* 89.3, 617–634.

Brodeur, Abel and Joanne Haddad (2018). "Institutions, Attitudes and LGBT : Evidence from the Gold Rush". 2018.

Burri, Andrea et al. (July 2011). "Genetic and Environmental Influences on Female Sexual Orientation, Childhood Gender Typicality and Adult Gender Identity". In: *PLOS ONE* 6.7, e21982.

Bursztyn, Leonardo et al. (2019). "Social Media and Xenophobia: Evidence from Russia". 2019.

Century Company (1911). *The Century Atlas: Africa*. Buffalo, NY: Matthews-Northrup, 1911.

Chandler, Tertius (1987). *Four thousand years of urban growth : an historical census*. Lewiston, N.Y.: St. David's University Press, 1987.

Coon, Dennis and John Mitterer (2007). *Introduction to Psychology: Gateways to Mind and Behavior*. Belmont, CA: Thomson Wadsworth, 2007.

Corneo, Giacomo and Olivier Jeanne (2009). "A theory of tolerance". In: *Journal of Public Economics* 93.5-6, 691–702.

Cory, Donald Webster (1951). *The homosexual in America: a subjective approach.* Oxford, England: Greenberg, 1951.

Crespin-Boucaud, Juliette (2020). "Interethnic and interfaith marriages in sub-Saharan Africa". In: *World Development* 125, 1046–68.

Dillon, Haley M, Lora E Adair, and Gary L Brase (2017). "Operational sex ratio and female competition: Scarcity breeds intensity". In: *The Oxford handbook of women and competition.* Ed. by Maryanne L Fisher. Oxford library of psychology. New York, NY: Oxford University Press, 2017, 265–280.

Dinh, Khanh T et al. (2014). "The relationship of prejudicial attitudes to psychological, social, and physical well-being within a sample of college students in the United States." In: *Journal of cultural diversity* 21.2, 56–66.

Edlund, Lena and Hyejin Ku (Dec. 2013). "The African Slave Trade and the Curious Case of General Polygyny". Dec. 2013.

Edwards, Bryan (1801). *The History, Civil and Commercial, of the British West Indies*. The History, Civil and Commercial, of the British West Indies. G. / W.B. Whittaker, 1801.

Epprecht, M. (2008). *Heterosexual Africa? The History of an Idea from the Age of Exploration to the Age of AIDS*. New African Histories. Ohio University Press, 2008.

Fenske, James (2015). "African polygamy: Past and present". In: *Journal of Development Economics* 117, 58–73.

Fenske, James and Namrata Kala (2017). "1807: Economic shocks, conflict and the slave trade". In: *Journal of Development Economics* 126, 66–76.

Fernández, Raquel and Alessandra Fogli (2009). "Culture: An Empirical Investigation of Beliefs, Work, and Fertility". In: *American Economic Journal: Macroeconomics* 1.1, 146–177.

Ganna, Andrea et al. (Aug. 2019). "Large-scale GWAS reveals insights into the genetic architecture of same-sex sexual behavior". In: *Science* 365.6456, eaat7693.

Global Legal Research Directorate (2014). *Criminal Laws on Homosexuality in African Nations*. Tech. rep. February. 2014.

Green, Elliott (Oct. 2012). "Explaining African ethnic diversity". In: *International Political Science Review* 34.3, 235–253.

Grosjean, Pauline and Rose Khattar (2019). "It's raining men! Hallelujah? The long-run consequences of Male-biased sex ratios". In: *Review of Economic Studies* 86.2, 723–754.

Guiso, Luigi, Paola Sapienza, and Luigi Zingales (Dec. 2016). "Long-term persistence". In: *Journal of the European Economic Association* 14.6, 1401–1436.

Han, Enze and Joseph O'Mahoney (2014). "British colonialism and the criminalization of homosexuality". In: *Cambridge Review of International Affairs* 27.2, 268–288.

Harris, Joseph E. (1971). *The African Presence in Asia: Consequences of the East African Slave Trade*. Evanston, IL: Northwestern University Press, 1971.

Herek, Gregory M. (2000). "The psychology of sexual prejudice". In: *Current Directions in Psychological Science* 9.1, 19–22.

Herek, Gregory M. and Kevin A. McLemore (2013). "Sexual Prejudice". In: *Annual Review of Psychology* 64.1, 309–333.

IIASA/FAO (2012). *Global Agro-ecological Zones (GAEZ v3.0)*. IIASA, Luxembourg, Austria and FAO, Rome, Italy. 2012.

Inglehart, Ronald F., Eduard Ponarin, and Ronald C. Inglehart (2017). "Cultural change, slow and fast: The distinctive trajectory of norms governing gender equality and sexual orientation". In: *Social Forces* 95.4, 1313–1340.

Inglehart, Ronald et al. (2008). "Development, Freedom, and Rising Happiness". In: *Perspectives on Psychological Science* 3.4, 264–285.

Kiszewski, Anthony et al. (May 2004). "A global index representing the stability of malaria transmission". In: *The American Journal of Tropical Medicine and Hygiene* 70.5, 486–498.

Lewis, Bernard (1990). *Race and Slavery in the Middle East*. Oxford, UK: Oxford University Press, 1990.

List, John A., Fatemeh Momeni, and Yves Zenou (2019). "Are Estimates of Early Education Programs Too Pessimistic? Evidence from a Large-Scale Field Experiment that Causally Measures Neighbor Effects". 2019.

Lovejoy, Paul E (2011). *Transformations in Slavery: A History of Slavery in Africa*. 3rd ed. Cambridge: Cambridge University Press, 2011.

Lowes, Sara et al. (July 2017). "The Evolution of Culture and Institutions: Evidence From the Kuba Kingdom". In: *Econometrica* 85.4, 1065–1091.

Mahalik, James R et al. (2003). "Development of the Conformity to Masculine Norms Inventory." In: *Psychology of Men & Masculinity* 4.1, 3–25.

Manning, Patrick (1990). *Slavery and African Life: Occidental, Oriental, and African Slave Trades*. African Studies. Cambridge University Press, 1990.

Manning, Patrick (2013). "Slavery and Slave Trade in West Africa, 1450–1930". In: *History of African Development Textbook*. Ed. by Ewout Frankema et al. Boydell & Brewer, 2013. Chap. 4, 99–117.

Mendos, Lucas Ramon (2019). *State-Sponsored Homophobia 2019: Global Legislation Overview Update*. Tech. rep. Geneva: ILGA, 2019.

Michalopoulos, Stelios and Elias Papaioannou (2020). "Historical Legacies and African Development". In: *Journal of Economic Literature* 58.1, 53–128.

Murdock, George Peter (1959). *Africa: Its Peoples and Their Culture History*. New York: McGraw-Hill, 1959.

Murdock, George Peter (1967). *Ethnographic atlas*. Pittsburgh: University of Pittsburgh Press, 1967.

Murray, Stephen O. and Will Roscoe (1998). *Boy-wives and female husbands. Studies in African homosexualities*. New York, NY: PALGRAVE, 1998.

Neal, A (2019). *The Oral Presidency of Barack Obama*. Boulder, Lanham (MD), London, and New York: Lexington Books, 2019.

Nunn, Nathan (Feb. 2008). "The Long-Term Effects of Africa's Slave Trades". In: *Quarterly Journal of Economics* 123.1, 139–176.

Nunn, Nathan and Leonard Wantchekon (2011). "The slave trade and the origins of Mistrust in Africa". In: *American Economic Review* 101.7, 3221–3252.

Obikili, Nonso (Nov. 2016). "The trans-Atlantic slave trade and local political fragmentation in Africa". In: *The Economic History Review* 69.4, 1157–1177.

Okoye, Dozie and Roland Pongou (2015). "Sea Change: The Competing Long-Run Impacts of the Transatlantic Slave Trade and Missionary Activity in Africa". 2015.

Oliver, R (2000). *The African Experience: From Olduvai Gorge to the 21st Century*. History of civilization. Bouldier, CO: Phoenix Press, 2000.

Olukya, Godfrey and Jason Straziuso (2010). *Gays in Uganda say they're living in fear*. NBC News, November 19, 2010. [online] Available at: `http://www.nbcnews.com/id/39742685` [Accessed 23 June 2020]. 2010.

Pierce, Lamar and Jason A Snyder (Aug. 2017). "The Historical Slave Trade and Firm Access to Finance in Africa". In: *The Review of Financial Studies* 31.1, 142–174.

Radvansky, Gabriel A, David E Copeland, and William von Hippel (2010). "Stereotype Activation, Inhibition, and Aging". In: *Journal of experimental social psychology* 46.1, 51–60.

Robinson, Amanda Lea and Jessica Gottlieb (2019). "How to Close the Gender Gap in Political Participation: Lessons from Matrilineal Societies in Africa". In: *British Journal of Political Science*, 1–25.

Roome, William R.M. (1924). *Ethnographic Survey of Africa: Showing the Tribes and Languages; Also the Stations of Missionary Societies [Map]*. London: E Stanford, 1924.

Ruck, Damian J., R. A. Bentley, and Daniel J. Lawson (2020). "Cultural prerequisites of socioeconomic development". In: *Royal Society Open Science* 7.2.

Smart, Michael J and Andrew H Whittemore (May 2017). "There goes the gaybourhood? Dispersion and clustering in a gay and lesbian real estate market in Dallas TX, 1986–2012". In: *Urban Studies* 54.3, 600–615.

Smith, Eric Alden (2016). "Status effects on men's reproductive success". In: *Proceedings of the National Academy of Sciences of the United States of America* 113.39, 10739–10741.

Teso, Edoardo (2019). "The long-term effect of demographic shocks on the evolution of gender roles: Evidence from the transatlantic slave trade". In: *Journal of the European Economic Association* 17.2, 497–534.

Whatley, Warren and Rob Gillezeau (May 2011). "The Impact of the Transatlantic Slave Trade on Ethnic Stratification in Africa". In: *American Economic Review* 101.3, 571–576.

World Value Surveys Association (2014). *WVS Wave 6 (2010-2014)*. [online] Available at: `http://www.worldvaluessurvey.org/WVSDocumentationWV6.jsp` [Accessed 24 August 2020]. 2014.

Yamagata, Bun et al. (Jan. 2016). "Female-Specific Intergenerational Transmission Patterns of the Human Corticolimbic Circuitry". In: *The Journal of Neuroscience* 36.4, 1254–1260.

Yanagizawa-Drott, David (Nov. 2014). "Propaganda and Conflict: Evidence from the Rwandan Genocide". In: *The Quarterly Journal of Economics* 129.4, 1947–1994.

Appendix

A Summary of potential mechanisms and existing evidence

Table A1 details potential mechanisms through which gender-biased sex ratios may affect anti-gay sentiments, both among men and among women. The evidence for female-biased sex ratios in this thesis is consistent with the *increase in female intrasexual competition* mechanism, but against the *decrease in Male intrasexual competition* mechanism. The table also includes, for a sake of comparison, the existing evidence for the case of male-biased sex ratios.

	Male-Biased Sex Ratios	**Female-Biased Sex Ratios**
Mens' attitudes towards homosexuality	*Self-selection of gay men*	*Increase in Female intrasexual competition*
	Fosters tolerance through self-selection of gay men in migration to Gold Rush counties	No effect should be observed: men shortage does not turn into more difficulties for men to find a partner
	Increase in Male intrasexual competition	*Decrease in Male intrasexual competition*
	Fosters intolerance: higher prevalence of masculinity norms leads men to subdue those who do not share masculinity traits	Should foster tolerance due to lower prevalence of masculinity norms: symmetric effect to the one of male-biased sex ratios
Womens' attitudes towards homosexuality	*Emergence of pro-LGBT values*	*Increase in Female intrasexual competition*
	Fosters tolerance through cultural transmission of pro-LGBT values (in a context of weak religious institutions)	Should foster intolerance: in a context of men scarcity, gay men are seen as a threat to find a partner
	Increase in Male intrasexual competition	*Decrease in Male intrasexual competition*
	Fosters intolerance, since women also assume strict masculinity norms as the new standard and stick to intolerant attitudes	Should foster tolerance if women also adhere to softer masculinity norms: symmetric effect to the one of male-biased sex ratios

Table A1: Summary of the existing evidence regarding the effect of male-biased sex ratios on sexual prejudice and the priors regarding the potential effects of female-biased sex ratios. The existing evidence for male-biased sex ratios comes from Grosjean and Khattar (2019) and Baranov, De Haas, and Grosjean (2020).

B Control variables used in the regression models

All specifications, starting from the baseline one, defined as follows:

$$\begin{aligned} Prejudice_{\,i,e,v,c} = \alpha_{\,c} + \beta_1\, Transatlantic\, Trade_{\,e} + \beta_2\, Indian\, Ocean\, Trade_{\,e} \\ + X'_{i,e,v,c}\,\Gamma + X'_{v,c}\,\Omega + X'_{e}\,\Phi + \varepsilon_{\,i,e,v,c} \end{aligned} \tag{4}$$

include the following set of covariates at the individual level ($X'_{i,v,d,c}$), the village level ($X'_{v,c}$) and the ethnic group level (X'_{e}).

Individual controls. The vector $X'_{i,v,d,c}$ includes four sets of individuals controls. These controls are introduced to account for several individual characteristics that are correlated with

sexual prejudice. First, previous evidence suggests that higher levels of prejudice against homosexuality are found among individuals who are older, less educated and live in rural areas (Herek, 2000). Therefore, I include a set of five age fixed effects, ten fixed effects according to the level of education and a dummy variable that takes value one if the respondent lives in an urban location. Second, I include a dummy variable that takes value one if the respondent is a female, since higher levels of sexual prejudice are generally found among heterosexual men than among heterosexual women.[36] Third, Herek (2000) also points out that individuals who adhere to more fundamentalist religions or engage more frequently in religious services and practices manifest higher levels of sexual intolerance. Thus, I include five fixed effects for the religion of the respondent and five fixed effects for the frequency to engage in religious practices. Finally, evidence by Inglehart, Ponarin, and Inglehart (2017) suggests that an improvement in existential security contributes to an intergenerational shift in norms, including a transition towards more progressive attitudes towards homosexuality. Then, I proxy the material conditions of the individual using five fixed effects for his/her living conditions and 14 occupation fixed effects.

Village controls. The vector $X'_{v,c}$ of village controls includes 18 dummy variables that account for the access to different facilities and services in the enumeration area where the respondent lives, such as piped water, police protection or paved roads. This allows to further control for characteristics of the external environment of the respondent, that directly influence his/her living conditions and could therefore affect attitudes towards homosexuality (Inglehart, Ponarin, and Inglehart, 2017).

Ethnic controls. The vector X'_e of ethnic group controls includes a set of geographical, cultural and historical characteristics of the ethnic group of the respondent. Ethnic controls are especially relevant for the causal interpretation of the estimates due to the risk of omitted variables bias (OVB). Recent literature on the topic asserts it is very likely that omitted variables at the ethnic group level could be correlated with selection into the slave trade (Nunn and Wantchekon, 2011; Teso, 2019). In that scenario, the OVB would arise if ethnic groups with ex ante more or less tolerant attitudes towards homosexuality were more likely to suffer from the transatlantic slave trade.[37] The potential direction of the bias in β_1 is, a priori, ambiguous.

Absence of data on preexisting levels of homosexuality and sexual prejudice does not allow me to control directly for these characteristics. Therefore, I closely follow the strategy of Nunn and

[36] As stated in Section 4, this is also the case for my sample.

[37] Section D in the Appendix includes a detailed explanation on how the Omitted Variables Bias works, formally, in this case. Moreover, I include, in Section C, a comparison of ethnic-group controls between ethnic groups exposed and not exposed to the transatlantic slave trade, along with a test of differences in means. It briefly illustrates the potential sources of OVB.

Wantchekon (2011) and Teso (2019) to control for those observable ethnic characteristics that could cause the OVB. At the same time, I take several steps to minimize the risk of overfitting the model. First, the total number of ethnicities in the sample (230) clearly exceeds the total number of control variables at the ethnic-group level (26). Secondly, the number of ethnicities included is similar to the number of ethnicities in the sample of the most relevant work using this natural experiment (see Nunn and Wantchekon (2011) and Teso (2019)). Thirdly, the inclusion of these variables is done, in all cases, following theoretical considerations that motivate their relevance to mitigate OVB concerns.

The vector of ethnic-group controls includes proxies for the level of precolonial prosperity, the degree of European influence during colonial times, historical gender inequality, historical warfare and the degree of integration in trade networks.[38]

Precolonial Prosperity. According to Nunn (2008), selection into the slave trade was a relevant feature: societies most affected by the slave trade were those initially more prosperous. Additionally, Inglehart, Ponarin, and Inglehart (2017) suggest that better material conditions are correlated with more progressive attitudes towards homosexuality. In conjunction, these two features imply that not controlling for precolonial prosperity would lead to a negative bias in my estimates: in case that exposure to the transatlantic slave trade led to higher levels of prejudice, the estimates of β_1 would be biased towards zero.

In absence of measures for precolonial population density or urbanization rates, I include five variables to proxy for historical prosperity. First, to account for precolonial levels of urbanization, I introduce the number of cities with more than 20.000 inhabitants that were in the land historically inhabited by the ethnic group (Chandler, 1987). Secondly, to measure the initial population density, I consider the precolonial settlement patterns of the ethnic group. They are introduced using a categorization that orders them according to the degree of complexity in their social and economic organization, ranging from fully nomadic groups to complex settlements (Murdock, 1967). Thirdly, I account for the initial disease environment by introducing the mean of the malaria ecology index for the land inhabited by the ethnic group (Kiszewski et al., 2004). Fourthly, I introduce the number of jurisdictional hierarchies beyond the local community to measure the complexity of an ethnic group's political institutions (Murdock, 1967). Finally, I account for the fraction of land historically inhabited by the ethnic group suitable for agriculture and the fraction of land that had a water source within a radius of 10 km (IIASA/FAO, 2012).

Influence of European colonizers. The role played by European colonizers in shaping attitudes

[38] Data is merged from Nunn and Wantchekon (2011) and Teso (2019), but the original data sources from which they were constructed originally are cited.

towards homosexuality has been widely studied. For instance, Han and O'Mahoney (2014) provide an example on the relationship between British colonialism and the criminalization of homosexuality. Since slave trade exposure may be also correlated with the degree of influence by European colonizers, I introduce three proxies that account for this feature. First, a dummy variable that takes value one if there was a European railway network on the land historically inhabited by the ethnic group (Century Company, 1911). Secondly, another dummy variable that takes value one when a European explorer traveled in the land of the ethnic group, obtained also from Century Company (1911). Finally, a variable that measures the number of missions per squared km in the land of each ethnic group during the colonial period (Roome, 1924).

Historical gender inequality. I introduce several measures to account for gender differences in the economic structure and in the marriage market. In the case of the economic structure, I include five indexes that account for the dependency of an ethnic group on five different activities: gathering, hunting, fishing, animal husbandry and agriculture. Moreover, I include a dummy variable that takes value one for ethnic groups in which there was presence of large domesticated animals. All these six variables are collected from Murdock (1967). In the case of the marriage market, preexisting levels of polygyny may play a relevant role. In those ethnic groups were, prior to the transatlantic slave trade, there was a tradition of polygyny, the pressure in the marriage market among women looking for a mate would be lower. Therefore, I add three fixed effects that account for preexisting monogamy, limited polygyny or general polygyny (Murdock, 1967).

Historical warfare. Another relevant factor that could lead to biased estimates in case of being omitted is historical warfare. On one hand, those ethnicities with a larger history of conflicts prior to the colonial period could be more vulnerable to the slave trade. On the other hand, Besley and Reynal-Querol (2014) point to the association between precolonial conflict and underdevelopment, which may be related to higher levels of intolerance towards homosexuality. In order to account for this, I introduce the number of precolonial conflicts in the area historically inhabited by the ethnic group (Besley and Reynal-Querol, 2014).

Ingtegration in trade networks. Lastly, as Nunn (2008) outlines, exposure to the transatlantic slave trade was negatively correlated with distance from the coast but positively correlated with proximity to trade networks across the Sahara Desert. Being close to trade routes may also be related to lower levels of prejudice through its effect on material conditions (Inglehart, Ponarin, and Inglehart, 2017). Therefore, I also include two variables that measure the distance from the centroid of the land historically inhabited by the ethnic group to the closest Saharan node and the closest Saharan route of trade (Oliver, 2000).

C Omitted Variables Bias (OBV) regarding ethnic characteristics

If the set of ethnic-group controls is not incorporated to the model, and those ethnic characteristics are correlated with individual's intolerance, the estimated model would look like:

$$\begin{aligned} Prejudice_{\,i,e,v,c} &= \alpha_{\,c} + \beta_1\, Transatlantic\, Trade_{\,e} + \beta_2\, Indian\, Ocean\, Trade_{\,e} \\ &\quad + X'_{i,e,v,c}\,\Gamma + X'_{v,c}\,\Omega + u_{\,i,v,d,c} \\ \text{where:} \quad u_{\,i,v,d,c} &= X'_{e}\,\Phi + \varepsilon_{\,i,v,d,c} \end{aligned} \tag{5}$$

In that case, if the ethnic controls are also correlated with the treatment (ethnic exposure to the transatlantic slave trade), then:

$$E\left(Transatlantic\, Trade_{\,e} \cdot X'_{e} \neq 0\right) \Rightarrow E\left(Transatlantic\, Trade_{\,e} \cdot u_{\,i,v,d,c} \neq 0\right) \tag{6}$$

which would violate the assumption of orthogonality, leading to biased estimates.

D Distribution of the outcome variable and summary statistics

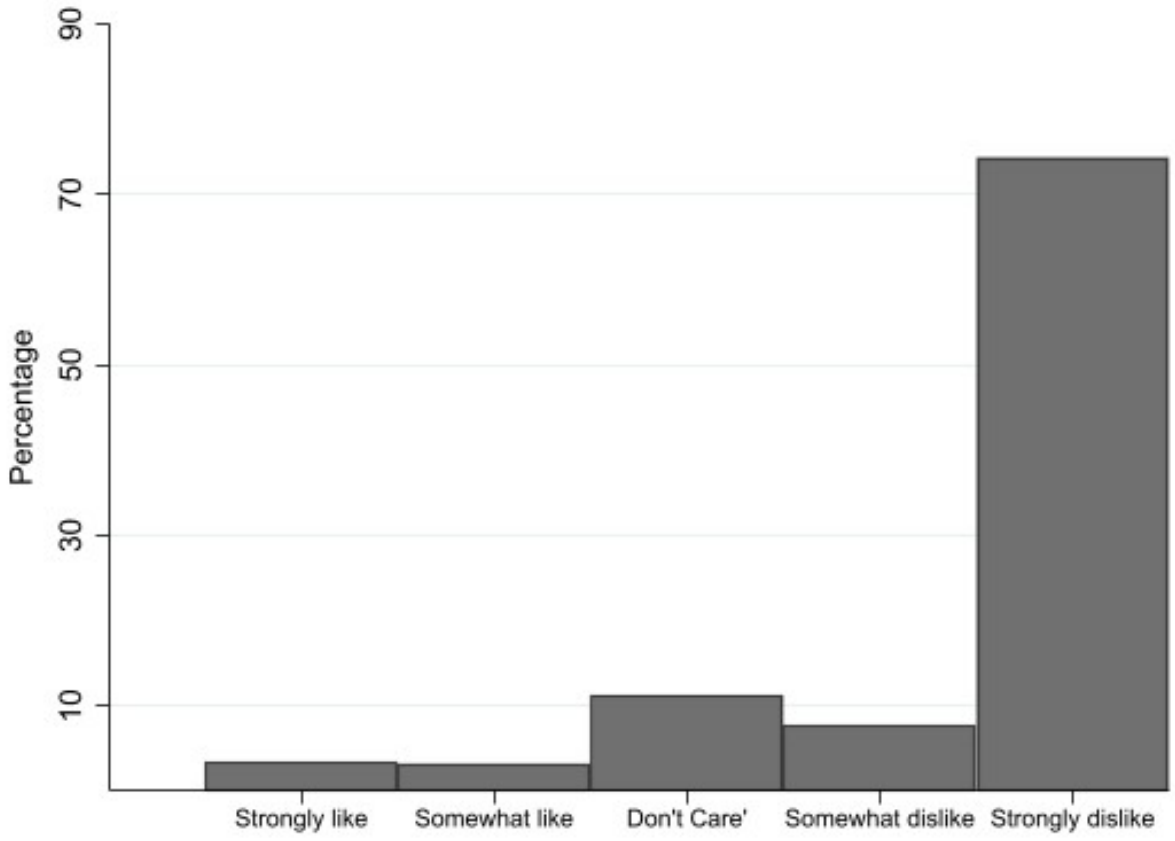

Figure A1: Distribution of answers to Question 89C in the Afrobarometer survey, which asks whether the respondent would like, dislike or don't care having an homosexual as neighbor.

Table A2: Summary Statistics

	Observ.	Mean	Std. Dev.	Min.	Max.
Prejudice Measures					
Prejudice Homosexuals (1 to 5)	33696	3.52	1	0	4
Prejudice Homosexuals (1 to 3)	33696	1.78	0.54	0	2
Prejudice Homosexuals (Dummy)	33626	0.11	0.31	0	1
Prejudice Religion (1 to 5)	33626	1.18	1.20	0	4
Prejudice Ethnicity (1 to 5)	33649	1.08	1.11	0	4
Prejudice HIV/AIDS (1 to 5)	33573	1.89	1.40	0	4
Prejudice Immigrants (1 to 5)	33549	1.52	1.26	0	4
Slave Trade Variables					
ln Transatlantic Trade	33696	0.52	0.97	0	3.64
Transatlantic Trade	33696	1.01	1.86	0	5.34
ln Indian Ocean Trade	33696	0.04	0.16	0	3.32
Indian Ocean Trade	33696	0.03	0.09	0	0.46
Historical Distance from Coast	33696	431.82	293.90	6.94	1499.39
Individual Controls					
Age	33696	37.17	14.53	18	105
Education [0 = No schooling]	33696	3.29	2.15	0	9
Female	33696	0.50	0.50	0	1
Living Cond. [1 = Very Bad]	33696	2.64	1.22	1	5
Catholic	33696	0.19	0.39	0	1
Protestant	33696	0.45	0.50	0	1
Muslim	33696	0.27	0.44	0	1
Ethnic Religion or Other	33696	0.06	0.23	0	1
No religion	33696	0.03	0.17	0	1
Religious Practices [0 = Never]	33696	3.94	1.82	0	7
Urban	33696	0.38	0.48	0	1
Occupation [14 categories]	33696	4.17	3.35	0	13

Table A1: Summary Statistics - (***Continued from previous page***)

	Observ.	**Mean**	**Std. Dev.**	**Min.**	**Max.**
Village Controls					
Electricity Grid	33696	0.59	0.49	0	1
Piped Water System	33696	0.54	0.50	0	1
Sewage System	33696	0.24	0.43	0	1
Cell Phone System	33696	0.94	0.24	0	1
Post Office	33696	0.20	0.40	0	1
School	33696	0.89	0.32	0	1
Police Station	33696	0.34	0.47	0	1
Health Clinic	33696	0.59	0.49	0	1
Market Stalls	33696	0.67	0.47	0	1
Bank	33696	0.25	0.43	0	1
Paid Transport	33696	0.82	0.39	0	1
Police	33696	0.27	0.45	0	1
Soldiers/Army	33696	0.09	0.29	0	1
Roadblocks by Police/Army	33696	0.09	0.28	0	1
Customs Checkpoints	33696	0.04	0.19	0	1
Roadblocks by Private Security	33696	0.04	0.20	0	1
Tarred/Paved road	33696	0.51	0.50	0	1
Impassable Road	33696	0.14	0.35	0	1
Ethnic Controls					
Domesticated Animals	33696	0.97	0.17	0	1
Jurisdictional Hierarchies	33696	1.66	0.94	0	3
Settl. Pattern [1 = Nomadic]	33696	6.28	1.32	1	8
Limited Polygyny	33696	0.06	0.24	0	1
General Polygyny	33696	0.93	0.26	0	1
Explorer Contact	33696	0.50	0.50	0	1
Railway Network	33696	0.42	0.49	0	1
Cities in 1400	33696	0.24	0.52	0	2
Ethnic dependency of Gathering	33696	5.66	4.60	2.50	80
Ethnic dependency of Hunting	33696	8.56	5.28	2.50	60
Ethnic dependency of Fishing	33696	9.76	7.78	2.50	60
Ethnic dependency of Husbandry	33696	22.24	15.51	2.50	90
Ethnic dependency of Agriculture	33696	57.26	12.79	2.50	90
Water Availability Index	33696	15.90	11.09	0	65.28
Malaria Index	33696	13.65	10.06	0	34.64
Agricultural Suitability Index	33696	3.78	0.70	2.02	7.13
Distance to Saharan node	33696	2009.30	1567.15	79.07	5017.60
Distance to Saharan route	33696	2003.42	1573.66	5.68	5017.60
Missions/Area	33696	0.19	0.34	0	2.67
Precolonial Conflicts	33696	1	2.34	0	10

Table A2: Comparison of Historical, Cultural and Geographical Characteristics of Ethnic Groups Exposed and Not Exposed to the Transatlantic Slave Trade (test of mean differences)

	No Trans. Trade		Trans. Trade		Differences	
	Mean	**S.D.**	**Mean**	**S.D.**	**Mean Diff**	**S.D.**
Slave Trade Variables						
ln Transatlantic Trade	0.00	0.00	0.54	0.85	-0.54***	(0.09)
Transatlantic Trade	0.00	0.00	1.05	1.80	-1.05***	(0.18)
ln Indian Ocean Trade	0.09	0.35	0.03	0.12	0.06	(0.03)
Indian Ocean Trade	0.05	0.13	0.03	0.08	0.02	(0.01)
Historical Distance from Coast	587.09	336.68	343.68	299.72	243.41***	(42.14)
Ethnic Controls						
Domesticated Animals	0.97	0.17	0.95	0.22	0.02	(0.03)
Jurisdictional Hierarchies	1.11	0.93	1.32	0.89	-0.20	(0.12)
Settl. Pattern [1 = Nomadic]	5.51	1.74	6.67	0.88	-1.17***	(0.18)
Limited Polygyny	0.11	0.31	0.10	0.30	0.00	(0.04)
General Polygyny	0.85	0.36	0.90	0.30	-0.05	(0.04)
Explorer Contact	0.46	0.50	0.32	0.47	0.15*	(0.06)
Railway Network	0.14	0.35	0.18	0.39	-0.04	(0.05)
Cities in 1400	0.02	0.12	0.13	0.40	-0.12**	(0.04)
Ethnic depend. of Gathering	5.57	8.39	5.48	4.36	0.08	(0.85)
Ethnic depend. of Hunting	9.22	7.11	8.44	5.77	0.78	(0.85)
Ethnic depend. of Fishing	8.94	10.64	11.56	8.43	-2.62*	(1.26)
Ethnic depend. of Husbandry	25.36	16.26	16.05	9.08	9.31***	(1.69)
Ethnic depend. of Agriculture	55.02	16.66	61.73	10.55	-6.72***	(1.80)
Water Availability Index	13.14	15.05	13.22	10.45	-0.08	(1.68)
Malaria Index	12.62	10.24	17.66	8.20	-5.04***	(1.22)
Agricult. Suitability Index	3.87	0.74	3.90	0.81	-0.04	(0.10)
Distance to Saharan node	1821.46	1271.14	1321.60	1294.04	499.87**	(171.25)
Distance to Saharan route	1808.69	1285.67	1318.08	1296.68	490.61**	(172.28)
Missions/Area	0.18	0.39	0.20	0.42	-0.01	(0.05)
Precolonial Conflicts	0.08	0.36	0.31	1.26	-0.23	(0.13)
Ethnicities	132		98		230	

E Robustness Checks

Table A3: OLS estimates, the effect of the Transatlantic Slave Trade on contemporary attitudes towards homosexuality

	(1) Prejudice	(2) Prejudice	(3) Prejudice
Panel A - Dependent variable: 0 to 4 measure [4 = Strongly Dislike]			
ln Transatlantic Trade	0.028*	0.004	0.017
	(0.017)	(0.021)	(0.017)
ln Indian Ocean Trade	−0.099	−0.038	−0.068
	(0.136)	(0.129)	(0.127)
Female			−0.018+
			(0.011)
R^2	0.21	0.178	0.192
Panel B - Dependent variable: 0 to 2 measure [2 = Strongly or Somewhat Dislike			
ln Transatlantic Trade	0.019**	0.004	0.012
	(0.009)	(0.012)	(0.010)
ln Indian Ocean Trade	−0.057	−0.018	−0.037
	(0.073)	(0.066)	(0.066)
Female			−0.007
			(0.006)
R^2	0.183	0.152	0.165
Panel C - Dependent variable: Dummy variable [1 = Strongly or Somewhat Dislike			
ln Transatlantic Trade	0.012**	0.001	0.007
	(0.006)	(0.007)	(0.006)
ln Indian Ocean Trade	−0.034	0.007	−0.012
	(0.044)	(0.038)	(0.038)
Female			−0.006+
			(0.004)
R^2	0.21	0.18	0.192
Observations	16899	16797	33696
Ethnic groups	219	223	230
Country FE	Yes	Yes	Yes
Individual Controls	Yes	Yes	Yes
Village Controls	Yes	Yes	Yes
Ethnicity Controls	Yes	Yes	Yes
Sample	Female	Male	Complete

Note: Standard errors in parenthesis, clustered at the ethnicity level. The unit of observation is an female respondent in Column (1), a male respondent in Column (2) or an individual in Column (3). *ln Transatlantic Trade* is the natural logarithm of one plus the number of slaves of the ethnic group taken during the transatlantic slave trade, normalized by the area historical inhabited. *ln Indian Ocean Trade* is the natural logarithm of one plus the number of slaves of the ethnic group taken during the Indian Ocean slave trade, normalized by the area historical inhabited. The dependent variable is obtained from the answer to *Question 89C* in the Afrobarometer survey, which asks whether the respondent would like, dislike or don't care having an homosexual as neighbor. Larger values of the dependent variable imply higher levels of prejudice against homosexuality. In Panel A, the dependent variable is coded as follows: "strongly like" (0); "somewhat like" (1); "don't care" (2); "somewhat dislike" (3); "strongly dislike" (4). In Panel B, the dependent variable is coded as follows: "strongly or somewhat like" (0); "don't care" (1); "strongly or somewhat dislike" (2). In Panel C, the dependent variable is coded as follows: "strongly like, somewhat like or don't care" (0); "strongly or somewhat dislike" (1). The set of controls at the individual, village and ethnic group level is detailed in Section B of the Appendix. Significance levels: + p < 0.15, * p < 0.1, ** p < 0.05, *** p < 0.01.

Table A4: Differences in Differences estimates, the effect of the Transatlantic Slave Trade on the gender gap in intolerance, moderated by preexisting prevalence of exogamy

	(1) Prejudice	(2) Prejudice
Female	−0.037***	−0.044***
	(0.012)	(0.012)
Female × ln Transatlantic Trade	0.029**	0.031**
	(0.014)	(0.015)
Female × Exogamy		0.018
		(0.025)
Female × ln Transatlantic Trade × Exogamy		0.006
		(0.033)
Observations	32419	32419
R^2	0.227	0.227
Ethnic groups	192	192
Country FE	Yes	Yes
Individual Controls	Yes	Yes
Village Controls	Yes	Yes
Ethnicity Controls	Yes	Yes
Ethnic FE	Yes	Yes
Sample	Complete	Complete

Note: Standard errors in parenthesis, clustered at the ethnicity level. The unit of observation is an individual. *ln Transatlantic Trade* is the natural logarithm of one plus the number of slaves of the ethnic group taken during the transatlantic slave trade, normalized by the area historical inhabited. *Exogamy* is a dummy variable taking value one if the ethnic group was characterized by local exogamy before the slave trade. The dependent variable is obtained from the answer to *Question 89C* in the Afrobarometer survey, which asks whether the respondent would like, dislike or don't care having an homosexual as neighbor. Larger values of the dependent variable imply higher levels of prejudice against homosexuality. The dependent variable is coded as follows: "strongly like" (0); "somewhat like" (1); "don't care" (2); "somewhat dislike" (3); "strongly dislike" (4). The set of controls at the individual, village and ethnic group level is detailed in Section B of the Appendix. Significance levels: + $p < 0.15$, * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

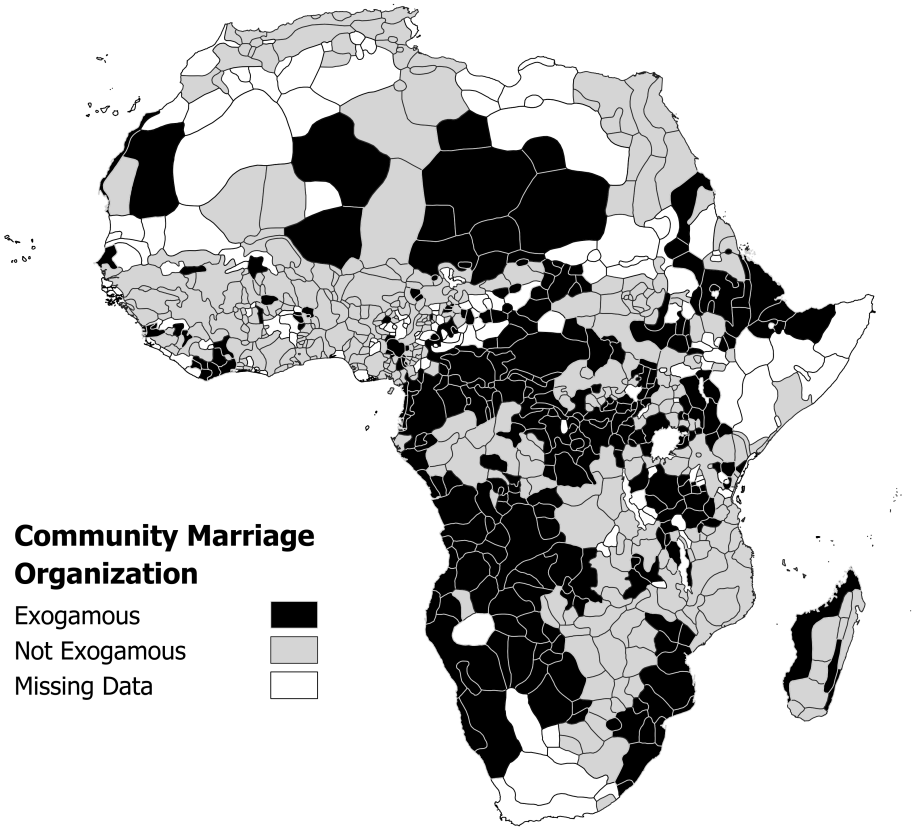

Figure A2: Prevalence of local exogamy at the ethnic group level. The location of ethnic groups is obtained from Murdock (1959), whereas the type of marriage organization is from Murdock (1967). Not exogamous groups include endogamous and agamous groups.