Political Efforts to Eliminate Female Genital Cutting:

Long-term Effects on Women's Health and Marriage in West Africa*

Yuya Kudo†

September 25, 2019

Abstract

Applying a difference-in-differences approach to ethnic homelands partitioned between Burkina Faso and its neighboring countries, I find that Burkina Faso's political efforts to discourage female genital cutting (FGC) reduced its long-term prevalence. However, these efforts did not influence a range of women's health and marital outcomes significantly. In the long term, therefore, women's welfare may not markedly change from the analyzed perspectives, concomitantly along with the decline in FGC. This study also shows a relatively sharp discontinuity in cutting rates across communities while revealing that approximately 63% of FGC variation is attributed to community-level heterogeneity. While not conclusive, all these findings are plausible for negligible FGC health-impairment costs according to a game-theoretical model developed to formalize the well-known theory of marriage convention.

Keywords: Coordination failure, female circumcision, female empowerment, health, marriage, social norm

JEL classification: I12, J12, J16, J18, Z13

*I thank Seiro Ito, Amjad Khan, Stephan Litschig, Michael Poyker, Valeria Rueda, and Kazunari Tsukada, and participants at conferences/workshops at ASREC 2018 (Orange) and CSAE 2019 (Oxford) and seminars at Hitotsubashi, GRIPS, and the IDE-JETRO for insightful comments and suggestions. Financial support from the IDE-JETRO for my field surveys in Wa West, Upper West Region in Ghana and Tarime, Mara region in Tanzania is gratefully acknowledged. My great thanks in the surveys go to Asani Abas, Wilheml Kutah, Alexander Nimo Wiredu in Ghana, Privatus Karugendo in Tanzania, local NGOs, police officers, and rural respondents that provided information on FGC. The author has no relevant or material financial interests that relate to the research described in this paper. The findings, interpretations, and conclusions expressed in this paper are entirely those of the author and do not represent the views of the IDE-JETRO. All errors are my own.

†Development Studies Center, Institute of Developing Economies (IDE-JETRO), 3-2-2 Wakaba, Mihama-ku, Chiba-shi, Chiba 261-8545, Japan, Yuya_Kudo@ide.go.jp, +81-43-299-9674.

1 Introduction

Female genital cutting (FGC) is a traditional practice involving partial or total removal of external female genitalia or other injury to female genital organs for cultural or other nonmedical reasons. Every year, more than 3 million infants and children are exposed to FGC; currently, more than 200 million women are believed to have undergone this procedure in 30 countries across Africa, the Middle East, and Asia (WHO, 2016). This practice is regarded as a fundamental violation of human rights, subjecting girls to both immediate (e.g., pain, hemorrhage, and urinary tract infections) and long-lasting traumatic health risks (e.g., infertility, sexual problems, and labor complications) (e.g., Berg and Underland, 2013; Obermeyer, 2005; Whitehorn et al., 2002). Consequently, since the early 1990s, significant and increasing political efforts have been made at the international, national, and local levels to eliminate FGC (e.g., UNFPA and UNICEF, 2014). The Sustainable Development Goals set by the United Nations General Assembly in 2015 also include a specific call for FGC eradication by 2030 (Goal 5.3).

However, despite this concerted global effort, there are apparently few rigorous empirical grounds for the policy discourse. While it often builds on the unfavorable health consequences of FGC (Shell-Duncan, 2008), such impacts are not well established in prior studies (see Obermeyer, 2005 and Wagner, 2015 for the literature review). In Africa, several anecdotes have also hinted at FGC being required for proper marriage. If FGC indicates bridal qualities that grooms value, such as aesthetics, cleanliness, faithfulness, and virginity, as anthropological and sociological studies often refer to (see Shell-Duncan and Hernlund, 2000 for an overview), then eliminating FGC may cause unintended welfare outcomes by hindering women's search for marital partners. Therefore, this study intends to provide the empirical basis for the policy discussion by evaluating the long-term impact of Burkina Faso's political efforts on FGC, women's health, and marriage. Burkina Faso is widely known as a pioneering African state in the fight against FGC, with a strong political commitment (Colombo, 2013; Diop et al., 2008; UNFPA, 2010).

This study explores the "overall effect of Burkina Faso's political efforts" and not solely the influence of its legal prohibition because, in many countries, political action to reduce FGC includes both criminalization and sensitization campaigns. Criminal laws are often introduced to send a clear message that the state supports FGC eradication rather than to facilitate social change through sanctions (McAdams, 2000). Thus, whether these combined efforts successfully discourage FGC should (arguably) be the foremost consideration for most policymakers.

To identify the impact of interest, this study compares FGC prevalence between Burkina Faso and its neighboring countries before and after Burkina Faso's political efforts to eradicate FGC. It uses data on female respondents aged 15—49 drawn from multiple rounds of the Standard Demographic and Health Surveys (DHS) in Burkina Faso (1998

—99, 2003, 2010) and in four of its bordering countries: Benin (2001, 2011—12), Côte d'Ivoire (1998—99, 2011—12), Mali (2001, 2006, 2012—13), and Togo (2013—14). Because such efforts have been expended since 1990, the data enable the analysis of long-term policy consequences post 20 years.

Taking a conceptually similar approach to the one adopted in Michalopoulos and Papaioannou (2014), this study applies the difference-in-differences (DID) approach within historical ethnic homelands partitioned between Burkina Faso and its neighboring countries. Most African national boundaries were arbitrarily drawn during colonial times and often divide people in one ethnic group; thus, the same culture (e.g., FGC) is often shared by two or more countries (e.g., Herbst, 1989; see also Zartman, 1965 for West Africa). Moreover, similar to prior studies (e.g., Anderson, 2018; Michalopoulos and Papaioannou, 2014), this study exploits insight from a spatial regression discontinuity (RD) design and augments this within-ethnicity-cum-DID by further controlling for a community's distance from Burkina Faso's national border. This identification strategy allows controlling for numerous unobserved cultural, historical, geographical, and ecological factors, among others.

According to the empirical analysis, FGC declined in Burkina Faso because of the country's political efforts. This conclusion is robust to alternative controls (e.g., border conflict, household fixed effects), nonlinear model specifications (i.e., logit, ordered logit), multiple hypothesis testing, selected relocation, etc. The accuracy of self-reported FGC status may also be challenged because people may lie for the fear of legal sanctions (e.g., De Cao and Lutz, 2018). To mitigate this concern, this study—although not powerful enough to detect statistical significance—provides evidence that because of cross-border knowledge spillovers, FGC declined even in the split ethnic homelands of Burkina Faso's neighboring countries. Since FGC is not criminalized in Mali, and anti-FGC laws are hardly enforced by the rest of Burkina Faso's neighbors, this measurement concern is less serious in this spillover analysis compared to the aforementioned main analysis. To the best of my knowledge, the present study is the first to harness Africa's national boundaries in this way; this approach could be applied in other African settings when the examined outcomes are politically sensitive, and hence, the corresponding measurement concern exists.

FGC decline occurs fast; the downward trend of this century-old practice only started in the past two decades. In contrast, Burkina Faso's policy efforts did not influence a range of women's health and marital outcomes significantly; nevertheless, the findings are rich and comprehensive, as they include factors such as height for age, body mass index (BMI), hemoglobin levels, genital problems, terminated pregnancy, child mortality, early marriage, early sexual intercourse, early pregnancy, fertility, polygyny, the husband's education and age, intrahousehold decision-making (DM) power, and intimate-partner violence (IPV).

This study then discusses the theoretical interpretation of the empirical findings. This discussion is increasingly

important because FGC policy interventions have not always resulted in a significant reduction of prevalence (Berg and Denison, 2012, 2013), and different theoretical mechanisms sustaining FGC recommend different strategies to eliminate it (Shell-Duncan et al., 2011). According to the discussion, the aforementioned findings are not inconsistent with the well-known theory of marriage convention, as proposed outside the economics field by Mackie (1996). Mackie (1996) proposed a conceptual game-theoretical framework wherein FGC persists as a social convention in Africa's typical intramarrying communities, where men believe that uncircumcised women are unfaithful and women believe that men will not marry uncircumcised women. The decline of FGC in the well-known Senegalese Tostan Project is seen as proof of this hypothesis and has attracted significant interest from relevant policymakers and practitioners (e.g., Diop and Askew, 2009; Mackie, 2000).

To facilitate this discussion, this study formalizes Mackie (1996)'s theory by developing a normal-form game with two agents—men and women (or their parents)—who play certain roles in an intramarrying community, wherein women compete with each other when searching for marital partners. In this game, when FGC's health-impairment costs are not particularly large, two stable pure-strategy Nash equilibria arise—FGC and no-FGC equilibria—where all (or no) females in a community are circumcised in the former (or latter). The FGC equilibrium is inferior to the no-FGC equilibrium because community members in the former incur the cost of FGC's impairment of women's health, which diminishes a community's total welfare.

Circumcised women solely suffer from costly FGC if they fail to get married. Thus, women usually hesitate to undergo FGC. However, a woman may decide to do so if men provide compensation through more rents (e.g., bride prices) when she marries. This facilitates "all" women's agreement to FGC in the FGC equilibrium. According to the model, FGC abandonment implies a social transition from the FGC to the no-FGC equilibrium. For instance, an increase in FGC costs, as perceived by community members, induces the equilibrium shift. This shift exhibits no relationship with the possibility of woman's marriage or may reduce it if FGC abandonment decreases FGC-induced female mortality, thereby intensifying their competition in the marriage market. Moreover, a decline in the married women's (or their parents') welfare may also be observed because they lose the compensation provided in the FGC equilibrium. On the contrary, if FGC's health-impairment costs are negligible, this equilibrium shift is not expected to significantly affect women's health and marriage.

It can be interpreted that Burkina Faso's political efforts raised people's awareness about FGC's costs and reduced this practice. Unfortunately, this study cannot examine bride wealth payment because this information is absent from the DHS data. However, the analyzed marital outcomes are still likely to correlate with it (e.g., Tertilt, 2005). Therefore, no significant impacts on women's health and marriage, as identified in the present study, are plausible for

negligible FGC health-impairment costs.

Extant economic research on FGC is scarce (e.g., Becker, 2018; Coyne and Coyne, 2014; Vogt et al., 2016). Outside economics, the systematic literature review performed by Berg and Denison (2012) also revealed a scarcity of methodologically robust FGC-related empirical studies. Obermeyer (2005) explains several reasons for this scarcity, in addition to the aforementioned FGC measurement concern. First, ethical considerations often make it difficult to conduct FGC-related randomized controlled trials. Second, large population-based samples are required to statistically identify serious health complications of FGC that may rarely happen. Third, since FGC tends to be a community-wide practice, its research must cover extensive geographical areas to find appropriate comparison groups. Fourth, it is usually challenging in observational studies to make causal inferences without an adequate strategy. The present research overcomes all these issues.

This study makes four notable contributions to scarce FGC-related research. First, it estimates the impacts of political efforts on FGC. Camilotti (2015) found that criminalizing FGC in Senegal reduced girls' age at FGC but did not affect cutting rates. In her study, original household data were used to compare girls who were born before and after the introduction of the "law."[1] The current study relies on DID and explores the total effects of "general political efforts." Burkina Faso's "firm" political commitment to FGC eradication and the resulting FGC decline also imply the significance of political regime stability in inducing cultural change, as highlighted by Poyker (2018).

Second, by estimating the impacts of Burkina Faso's political efforts, this study evaluates FGC's benefits and costs with respect to women's health and marriage. Wagner (2015), which analyzes the DHS data, examines FGC's health consequences. To this end, she made a cross-sectional comparison of circumcised and uncircumcised women after controlling for community fixed effects.[2] This implies that the relatively large fraction of communities with a cutting rate of one or zero, as observed in the DHS data, is not exploited in her identification of relevant estimates; this perspective makes the scope of the analyzed population remarkably different in her and in the present study.[3]

Third, according to Mackie (1996), FGC corresponds to a within-economics concept of "social norms" as defined in Young (2008, 2015) (and adopted in the present study), namely, group-level behavior maintained as one of multiple self-enforcing equilibria in a suitably defined game, as particularly supported by women's motive to coordinate marital transaction. The present study carefully discusses whether FGC is such a normative equilibrium, as addressed within

[1] Camilotti (2015) additionally uses the DHS data on girls born only after FGC criminalization, comparing girls who were born only in the year and in the region wherein legal sanctions were imposed with the remaining ones. Thus, the latter comparison group included girls born after FGC was criminalized, making it less straightforward to interpret estimation results.

[2] Wagner (2015) found that circumcised women were more likely to marry early, have many children, and experience terminated pregnancies. She also found no relation between FGC and general health outcomes (e.g., height, weight, BMI, hemoglobin) and that circumcised women were more likely to suffer from vaginal discharge and genital sores/ulcers than uncircumcised women.

[3] This point should be seriously considered when analyzing any group-level normative behavior by exploiting only cross-sectional data variation.

(e.g., Bellemare et al., 2015; Chesnokova and Vaithianathan, 2010; Efferson et al., 2015) and outside economics (e.g., Hayford, 2005; Shell-Duncan et al., 2011).[4] It cannot conclusively advocate a particular theoretical interpretation from its findings. However, it still encourages relevant future research, as recent empirical studies have increasingly casted doubt on Mackie (1996) (e.g., Bellemare et al., 2015; Efferson et al., 2015).

Fourth, this study formalizes Mackie (1996)'s seminal theory. Its novelty is the inclusion of bride prices, as compensation for the costly FGC, into the model. This perspective makes the present study contribute to the research of dowry and bride prices (e.g., Anderson, 2007; Anderson and Bidner, 2015; Botticini and Siow, 2003) and, more generally, that of marital social institutions (e.g., Jacoby and Mansuri, 2010; Tertilt, 2005). According to its formalization, FGC abandonment may reduce (increase) married women's (men's) welfare in a certain setting. This asymmetric consequence is not highlighted in Mackie (1996) and may serve as an important point of caution for those who believe that FGC eradication improves "all" women's welfare. The theoretical reasoning for FGC may also apply to some, if not all, elements of theoretical mechanisms maintaining different normative, modern or traditional, and health- or gender-related practices (e.g., orthodontic treatment for children, plastic surgery, purdah, veiling), which are common in some countries but not in others, if those practices are related to male or female marriageability or success in life.

More generally, this research also explores the evolution of "culture," including informal institutions (e.g., Anderson, 2003; de la Croix and Mariani, 2015), as defined by Alesina and Giuliano (2015). It particularly focuses on FGC, a likely normative practice (e.g., Bursztyn et al., 2017; Bursztyn et al., 2018; Munshi and Myaux, 2006).

The remainder of the paper is organized as follows. Section 2 describes Burkina Faso's political efforts against FGC. The data overview and empirical strategy are presented in Sections 3 and 4, respectively. Section 5 reports the empirical findings. By developing a simple model that formalizes Mackie (1996)'s marriage convention theory, Section 6 discusses the theoretical interpretation of the empirical findings, with concluding remarks provided in Section 7.

2 Burkina Faso's political efforts to eliminate FGC

Burkina Faso is a landlocked nation in West Africa, with six bordering countries: Benin, Côte d'Ivoire, Ghana, Mali, Niger, and Togo. While FGC prevalence is clearly high, this country has shown a strong desire to eradicate this practice for more than two decades (e.g., Chikhungu and Madise, 2015; Colombo, 2013; UNFPA, 2010; United States Department of State, 2001).

Burkina Faso has progressively addressed FGC eradication. Its radio campaign first raised this issue in 1975 while

[4] Chesnokova and Vaithianathan (2010) modeled FGC as a premarital investment and theoretically analyzed differences in marital outcomes between circumcised and uncircumcised women in a community with inefficiently high levels of cutting rates (i.e., FGC equilibrium according to their definition). In contrast, the present study focuses on a shift from the FGC to the no-FGC equilibrium.

recommending to abolish this practice during "National Week for Women" of 1985 (United States Department of State, 2001). Shortly thereafter, in 1990, the National Committee to Fight against the Practice of Excision (CNLPE) was established through presidential decree. Under the directorship of the permanent secretariat, this body has overseen all countrywide anti-FGC actions since its founding while maintaining autonomy in its activities. To raise public awareness on the harmful health consequences of FGC, CNLPE has conducted various activities (e.g., workshops) involving religious/traditional leaders, police, medical experts, and women's and youth organizations. It has also used public media such as radio and succeeded in introducing an FGC module in the national school curriculum and in training teachers on this practice (28 TOO MANY, 2015). According to the permanent secretary of CNLPE, informing people of FGC complications during childbirth has been seen thus far as more effective in altering Burkinabé people's hearts and minds than emphasizing the FGC's human rights perspective, as they cherish children and are therefore particularly concerned about their reproductive health (UNFPA, 2010).

Burkina Faso also legislated against FGC in 1996. This law—considered one of the toughest in the entire African continent—has been systematically enforced since its enactment (UNFPA, 2014). CNLPE's relevant actions include promoting a national telephone hotline called the "Green Phone: SOS Excision," which was instituted in 1990 to denounce cutters as well as parents and others who force girls to undergo FGC. This hotline was also used by those who detected instances of FGC being forcibly performed and who sought advice in identifying and securing the relevant authoritative interventions. Additionally, to increase its effectiveness, special patrols have been deployed in 17 provinces characterized by a high FGC prevalence. The result was a gradual increase in convictions from 94 in 1997—2005 to 646 in 2005—2009 (28 TOO MANY, 2015).

Because of these strenuous political efforts, Burkina Faso has been recognized as a leader against FGC in Africa (Colombo, 2013; Diop et al., 2008).[5] Indeed, the decline in FGC in this country appears to be greater than in other African countries commonly practicing FGC, such as Benin, the Central African Republic, Côte d'Ivoire, Egypt, Ethiopia, Eritrea, Guinea, Kenya, Mali, Mauritania, Niger, Nigeria, and Sudan (UNICEF, 2005b, p. 18). Of these, Burkina Faso has the smallest fraction of women with at least one circumcised daughter and who believe that this practice should continue (UNICEF, 2005b, p. 19). These findings indicate the country's growing tendency to abandon FGC. Referring to Mackie (1996) and Poyker (2018), Burkina Faso's "nationwide" and "firm" political efforts might have successfully prompted a sufficient number of people crossing a crucial group threshold to stop FGC.

Importantly, this study does not assume that Burkina Faso's neighboring countries have done nothing to eliminate FGC, although the available literature on detailed political efforts is limited. For instance, FGC-specific criminal

[5] In 2008, UNFPA and UNICEF also implemented a joint program aimed at accelerating the FGC abandonment in this country (UNFPA and UNICEF, 2014).

legislation has been adopted in Benin since 2003, Côte d'Ivoire since 1998, Ghana since 1994 (amended since 2007), Niger since 2003, and Togo since 1998 (Shell-Duncan et al., 2013). However, enforcement appears to be weaker in these countries than in Burkina Faso (e.g., see 28 TOO MANY, 2018a for Benin, Côte d'Ivoire for 28 TOO MANY, 2018b, and 28 TOO MANY, 2018d for Togo), and FGC is not legally prohibited in Mali (e.g., 28 TOO MANY, 2014; 28 TOO MANY, 2018c). This study identifies the impact of Burkina Faso's political efforts relative to those of its neighboring countries.

3 Data

This study used repeated cross-sectional data drawn from multiple rounds of the DHS in Benin (2001, 2011—12), Burkina Faso (1998—99, 2003, 2010), Côte d'Ivoire (1998—99, 2011—12), Mali (2001, 2006, 2012—13), and Togo (2013—14). This survey was designed to provide nationally representative information in the fields of population, health, and nutrition.[6] In all the survey rounds, a similar two-stage sampling protocol was followed, including the first-stage selection of communities (clusters) from the population census, followed by the second-stage selection of households from the respective communities. Since all women aged between 15 and 49 in each selected household were interviewed, this sample design enabled the present study to effectively analyze 117,191 female respondents from 73,758 households located in 4,146 communities (see Table S.1 in the supplemental appendix for a country-round breakdown). Figure 1 shows the location of these DHS communities. While the initial strategy was to use the three most recent rounds of the standard DHS in all the six countries surrounding Burkina Faso, this approach was abandoned because of availability issues in relation to the required data (i.e., the respondents' engagement in FGC, a community's GPS coordinates). Therefore, Ghana and Niger were completely excluded from the present analysis. In the dataset, women's birth years range from 1948 to 1999.

Figure 2 demonstrates the trend of FGC according to the respondents' birth year (five-year cohort). After regressing an indicator of one if the respondents are circumcised on community fixed effects, the mean regression residuals for Burkina Faso (solid line) and its neighboring countries (long dashed line) are plotted. This figure presents the post-1970 fraction because the annual population of females born before 1970 was relatively small.[7] Two findings are observed: the first is a declining trend in regression residuals in both Burkina Faso and its neighboring countries and the second is that this tendency has become more pronounced in Burkina Faso since around 1980.

The latter finding appears inconsistent with the fact that Burkina Faso's political efforts to discourage FGC have

[6] Data and relevant documents are publicly available at `http://dhsprogram.com/data/available-datasets.cfm`.

[7] The mean circumcised proportion is approximately 14%, 77%, 44%, 90%, and 9% in Benin, Burkina Faso, Côte d'Ivoire, Mali, and Togo, respectively.

been made since its radio campaign raised the FGC issue in 1975. Additionally, the declining trend preceding 1990 also appears to be implausible if such efforts have been stronger since CNLPE was established in 1990. However, in the present context, there is no a priori year threshold for Burkina Faso's efforts to become effective. Several reasons explain this. First, its efforts have gradually and increasingly been made since 1975. Second, it takes a time for such efforts to see the first behavioral change. Third, age at FGC varies across societies and, thus, birth cohorts affected by its efforts differ across regions. In the data, approximately 41% (41%), 47% (43%), and 10% (14%) of the circumcised females in Burkina Faso (and its neighboring countries) undergo FGC between ages 0—5, 6—10, and 11—15 years, respectively; almost all women underwent FGC before reaching age 15. Considering these points, therefore, the FGC decline accelerating from around 1980 is not surprising and can plausibly be attributed to Burkina Faso's efforts. According to Chikhungu and Madise (2015)'s conjecture, Burkina Faso's sharp FGC decline starting from 1980 may be attributed even to legislation against FGC introduced in 1996.

For the sample of females born before 1980, Table 1 shows summary statistics for several variables, along with tests for equality of means between those residing in Burkina Faso (886 communities) and the remaining respondents (496 communities) "within" the historical ethnic homelands partitioned between Burkina Faso and its neighboring countries (see Table S.2 in the supplemental appendix for similar summary statistics corresponding to respondents born in or after 1980). This study relies on Murdock (1959)'s classification in identifying these homelands.[8] Out of 94 homelands mapped on the analyzed countries, 18 ethnic groups (one located over the Benin—Togo border, one over the Côte d'Ivoire—Mali border, one in Benin, six in Côte d'Ivoire, six in Mali, and three in Togo) crossed the national border to Burkina Faso (see Figure 1). The number of observations in Table 1 varies across the reported variables primarily because the collected information somewhat differs as per round and country.

Some ethnic homelands lie in multiple countries because Africa's national borders were drawn during colonial periods by Europeans with limited knowledge of or concern for social and linguistic groups (e.g., Herbst, 1989). While certain sections of national boundaries in West Africa consist of river segments (e.g., Black Volta between Burkina Faso and Côte d'Ivoire), most of them are still based on the colonial administrative divisions of French West Africa, which were determined without precise knowledge of human or physical geography (e.g., Zartman, 1965; see also Brownie, 1979 for details of the respective national boundaries). The partitioned measure of "artificial states," which highlights ethnic features of state artificiality, is also large in countries bordering Burkina Faso (see Alesina et al., 2011).

As Table 1 shows, the circumcised proportion of respondents born before 1980 is 84% and 78% in the partitioned homelands of Burkina Faso and its neighboring countries, respectively; this difference is statistically insignificant. The

[8] A map of Murdock (1959)'s ethnic homelands is available from `https://scholar.harvard.edu/nunn/pages/data-0` through a contribution by Nunn (2008).

radical form of FGC, known as infibulation or pharaonic circumcision ("sewn closed"), is not particularly common in the surveyed areas, and FGC is predominantly performed by traditional cutters, leaving limited space for healthcare professionals for this operation.[9] For instance, before 1980, approximately 1% ($\approx \frac{0.01}{0.84}$) of circumcised females in Burkina Faso's split homelands were infibulated, with approximately 95% ($\approx \frac{0.80}{0.84}$) of this practice performed by traditional cutters. The mean age of the respondents during FGC in the corresponding areas is 6.96 years. As already mentioned, nearly all circumcised females undergo FGC before reaching age 15. Therefore, since the DHS respondents are 15 years old and above, this study's FGC analysis is unlikely to encounter relevant censoring issues.

[Here, Figure 1, Figure 2, and Table 1]

4 Empirical strategy

As Figure 2 indicates, Burkina Faso's political efforts against FGC have influenced the respondents born in or after 1980. To estimate this policy consequence, this study compared changes in FGC and the relevant outcomes for those born before and after 1980 between Burkina Faso and its neighboring countries. Precisely, for a female i who was born in year t living in community j, this study estimates the following equation through ordinary least squares (OLS):

$$y_{ijt} = \alpha_1 + \alpha_2 D_{ijt} \cdot B_j + \alpha_3 D_{ijt} \cdot S_j + \alpha_4 D_{ijt} \cdot f(Z_j) + \alpha_5 \mathbf{x_{ijt}} + v_j + \rho_{ijt} + \epsilon_{ijt}, \tag{1}$$

where y_{ijt} corresponds to the outcomes of interest (e.g., FGC, health, marriage); D_{ijt} is a dummy variable that equals one for respondents born in or after 1980 and zero otherwise; B_j is an indicator that equals one for communities in Burkina Faso and zero otherwise; S_j takes one if the community j is located in historical ethnic homelands split between Burkina Faso and its neighboring countries and zero otherwise; the function $f(Z_j)$ represents a second-order polynomial of a community j's distance Z_j to Burkina Faso's national border (in particular, this study allows coefficients of the polynomial terms to differ between Burkina Faso and its neighboring countries); $\mathbf{x_{ijt}}$ contains other determinants of outcomes specific to a respondent and her household (i.e., birth order, religion, and country-ethnicity indicators categorized into 40 groups), including year-of-interview fixed effects;[10] v_j is a dummy for each community; ρ_{ijt} is the year-of-birth fixed effects; and ϵ_{ijt} represents stochastic error. Ethnic groups in the DHS are not necessarily

[9] Since 1996, the World Health Organization (WHO) has identified four types of FGC. Type I is the "partial or total removal of the clitoris and/or the prepuce" (clitoridectomy). Type II is the "partial or total removal of the clitoris and the labia minora, with or without excision of the labia majora" (excision). Type III is the "narrowing of the vaginal orifice with creation of a covering seal by cutting and appositioning the labia minora and/or the labia majora, with or without excision of the clitoris" (infibulation). Type IV is "all other harmful procedures to the female genitalia for nonmedical purposes" (e.g., pricking, piercing, incising, scraping, and cauterization).

[10] Information on respondents' birth order was unavailable in all rounds of the Benin DHS and the 1998—99 DHS of Côto d'Ivoire. For these rounds, the sample average was applied.

categorized consistently across countries and even across survey rounds within the same country. Therefore, for each country, ethnic groups were categorized for consistency across survey rounds, which resulted in 10 groups for Benin, 12 groups for Burkina Faso, two groups for Côte d'Ivoire, 10 groups for Mali, and six groups for Togo; this study used the relevant fixed effects at the country-ethnicity level. The community fixed effects subsume the level effects of B_j, S_j, and $f(Z_j)$ whereas the year-of-birth fixed effects do so for D_{ijt}.

The specification (1) takes a conceptually similar approach to the one in Michalopoulos and Papaioannou (2014) and identifies the main DID estimate, α_2, by considering data variation within the same ethnic homeland. This control is important, as "[n]ational boundaries (in Africa) are not all important, . . . as the distribution of genital cutting is better understood by ethnic groups, and groups practicing genital cutting often straddle national boundaries," according to Shell-Duncan and Hernlund (2000, p. 7). By including the $D_{ijt} \cdot S_j$ in regressors, this study controls for the time-varying influence of unobserved geographical, ecological, cultural, and historical attributes specific to areas where particular ethnic groups reside.

Furthermore, this study uses insights from a spatial RD design adopted in prior studies (e.g., Anderson, 2018; Michalopoulos and Papaioannou, 2014, 2016) and controls for $D_{ijt} \cdot f(Z_j)$. As a result, the local effects of Burkina Faso's political efforts are identified at its national border. Two intentions exist for this control. First, it prevents the estimated α_2 from solely capturing general border effects resulting from ethnic partitioning. Second, political efforts are likely to be more influential in the vicinity of the capital than in the hinterlands (e.g., Michalopoulos and Papaioannou, 2014), and policy effects may gradually decline toward the latter. Because the capital of Burkina Faso, Ouagadougou, is at the heart of this country, this study attempts to control for this gradation by allowing the polynomial term coefficients to differ between Burkina Faso and its neighbors. Referring to Gelman and Imbens (forthcoming), third or higher-degree polynomials of distance Z_j are not controlled for.

Since the DHS provides locational information only on respondents' present communities, this study needs to assume that respondents currently live in places near their residential areas (likely in childhood/puberty), wherein FGC might have taken place. Women's relocation to "nearby" villages during marriage is common in patrilineal African societies, which does not critically invalidate this assumption. Additionally, the identification strategy is still robust to this concern provided that the relevant measurement error does not systematically differ between Burkina Faso and its neighboring countries within a particular homeland of the same ethnicity. Moreover, if the measured exposure to Burkina Faso's political influence is completely noise, the subsequent empirical analysis would not reveal any meaningful results; however, the yielded findings diminish the importance of this concern, which will, nevertheless, be more carefully addressed in subsection 5.3.3.

Previous studies on FGC such as Bellemare et al. (2015) focusing on West Africa tend to use standard errors clustered at the (DHS) community level. However, FGC-related standard errors are likely to be correlated within ethnic homelands (Shell-Duncan and Hernlund, 2000, p. 7). Political attitudes toward FGC may also vary across countries: a perspective that needs attention, considering West Africa's decentralized political system (e.g., Boko, 2002; Dickovick and Wunsch, 2014). Therefore, referring to Cameron et al. (2011), the present study primarily clusters standard errors at the ethnic-homeland (94 groups) and country-region levels (56 groups).[11] This two-way clustering method would increase the reliability of statistical inference while avoiding issues arising from using a negligible number of clusters (Cameron and Miller, 2015).

5 Empirical findings

5.1 Main results

5.1.1 FGC

By interacting B_j, S_j, and $f(Z_j)$ with different five-year birth cohorts (the reference group consists of respondents born before 1970), the most flexible specification of equation (1) was estimated for an indicator for circumcised women, and the coefficients corresponding to each birth cohort are reported with 95% confidence intervals in the upper-left panel of Figure 3 (see α_2). First, the coefficients corresponding to respondents born before 1980 are insignificantly different from zero, which supports the parallel-trend assumption of cutting rates during this period. Second, compared to those living in the same ethnic homelands of its neighboring countries, a significant decline in cutting rates was observed for Burkinabé respondents born in or after 1980.

Using a single dummy for respondents born in or after 1980, the estimated impacts on FGC are reported in Table 2. The significant FGC-discouraging effect estimated in column (a) implies that in Burkina Faso's split homelands, approximately 96 ($\approx$ 886 communities $\times$ 0.108) of approximately 748 communities ($\approx$ 886 communities $\times$ 0.844; recall Table 1) that had practiced FGC before 1980 stopped this practice, assuming that FGC is a normative equilibrium, as claimed by Mackie (1996) (and discussed in Section 6).

In columns (b)—(e), this study used data from Burkina Faso and one of its neighboring countries. All the estimates are negative, and hence it is unlikely that the significant decline in Burkina Faso's cutting rates is artificially driven

[11] These 56 groups include 12 departments in Benin, 13 regions in Burkina Faso, 18 districts in Côte d'Ivoire, nine regions in Mali, and four regions in Togo. To identify a region corresponding to each DHS community, this study matched a community's GPS latitude/longitude coordinates with these countries' maps sourced from the World Bank (`https://datacatalog.worldbank.org/dataset/burkina-faso-administrative-boundaries-2017`) for Burkina Faso and DIVA-GIS (`http://www.diva-gis.org/datadown`) for the remaining countries.

by the observations of a particular neighboring country.

The FGC-discouraging effects are robust. First, because Africa's national borders are often especially vulnerable to armed conflict and its effects, the study attempted to control for this influence. To this end, it adopted the Uppsala Conflict Data Program (UCDP) Georeferenced Event Dataset (GED) global version 5.0 (Croicu and Sundberg, 2015; Sundberg and Melander, 2013), which contains information regarding the timing and locations of worldwide organized violence from 1989 to 2015. In column (f), the number of conflict events within a 40-km radius of each community (interacting with D_{ijt}) was included as an additional regressor.[12] Second, community fixed effects were replaced with household fixed effects (73,758 groups) in column (g).[13] The exercise in column (h) restricted the sample to communities within 150 km to Burkina Faso's national border, which likens the present analysis to a spatial RD design (although this study does not assume cutting rate discontinuity owing to cross-border knowledge spillovers, as analyzed in subsection 5.3.2). This study also excluded $D_{ijt} \cdot f(Z_j)$ in column (i) and this variable and $D_{ijt} \cdot S_j$ in column (j) from regressors.

A dummy for respondents circumcised before age five is also estimated in column (k).[14] A tendency of declining age at FGC is reported in several countries such as Senegal (Shell-Duncan et al., 2011) and the Gambia (Hernlund, 2000). As young children raise less suspicion about and speak out less against criminal activities, the introduction of an anti-FGC law, along with the resulting incentives for parents to secretly seek FGC, has been argued to facilitate this tendency toward a lower age (Camilotti, 2015; Shell-Duncan et al., 2013). If such a tendency has become more pronounced because of Burkina Faso's political efforts, the likelihood of a girl being circumcised at a younger age is likely to increase (even if the overall cutting rate declines). However, no evidence supports this possibility.

This study also estimated an indicator of one if genital parts are sewn closed and zero otherwise (notably, this indicator took a value of zero for uncircumcised respondents), as shown in column (l). While statistically insignificant, the estimated coefficient was positive. With the significant decline in the overall cutting rate shown in previous columns, this finding implies that Burkina Faso's political efforts primarily discouraged a less radical form of FGC. A dummy denoting whether respondents were circumcised by traditional cutters was also estimated in column (m) (this indicator was also set to zero for uncircumcised respondents). The estimated coefficient is insignificantly different from that in column (a), indicating that the type of cutters did not significantly change with the decline in FGC.

[Here, Figure 3 and Table 2]

[12] Alternatively, controlling for the number of people who died within a 40-km radius of each community also yielded similar implications.
[13] When controlling for household fixed effects, respondents' ethnicity and religion were excluded from the regressors because such factors show only limited intrahousehold variation.
[14] The age at FGC was assumed to be five years when respondents referred to "during infancy" as the timing of circumcision.

5.1.2 Health

To explore whether FGC abandonment translated into women's improved health, in Table 3, a range of health-related outcomes such as height for age (column (a)), BMI (column (b)), hemoglobin levels (column (c)), an indicator for genital problems (column (d)), and terminated pregnancies (column (e)) are estimated.[15] The indicator for genital problems is one if the respondents had genital sores/ulcers or discharge in the last 12 months. Because relevant information pertaining to analyzed outcomes is not collected in all DHS rounds, the adopted sample is reported at the bottom of the table.[16]

The DHS also provides the history of children born to all the female respondents (up to 20 births).[17] Using this information about the children as the analytical unit (their birth years range from 1962 to 2014), this study also estimated an indicator of one if the children died within 15 years after birth and zero otherwise (note that almost all women underwent FGC before age 15) after controlling for "mother" fixed effects. To avoid any censoring issue, this analysis used data on children born more than 15 years prior to the year of the DHS interview. The results for girls and boys are presented in columns (f) and (g), respectively. The examination of male mortality can be seen as a placebo test because there is no a priori reason for an association between FGC abandonment and a decline in male mortality. More flexibly, the estimated mortality effect and its 95% confidence interval are also graphically reported in Figure S.1 in the supplemental appendix. In this figure, the estimate corresponding to age M, which varies from one to 15, in the horizontal axis stems from the regression of an indicator of one if the child died within M years after birth, as per data on children born more than M years before the year of the DHS interview.

These results show no significant health consequences. Admittedly, the effects on adult health include two forces. First, FGC avoidance may result in women's improved health. Second, the possible decline in child mortality attributed to FGC abandonment may enable women with certain health characteristics to survive until the present, i.e., a selection effect. However, the no-mortality effect may suggest that such a selection effect is absent in the analysis here.[18]

[Here, Table 3]

[15] Admittedly, the likelihood of terminated pregnancies may decline even without women's health improvement if Burkina Faso's political efforts reduced their fertility. However, no fertility response was found in Table 4.

[16] In the 2011—12 DHS in Benin, 1998—99 DHS and 2010 DHS in Burkina Faso, 2011—12 DHS in Côte d'Ivoire, and 2012—13 DHS in Mali, anthropometric information is available for a 50% subsample of surveyed households. Similarly, information regarding hemoglobin levels was collected only from a subsample (i.e., 50% or one-third) of the surveyed households, depending on the country and round.

[17] In the relevant data set, more than 17 births for a woman were not recorded.

[18] Nevertheless, mothers with certain health characteristics may still deliver children with similar characteristics, which may, in turn, generate a selection effect even in the mortality analysis. However, the mother fixed effects used in this mortality analysis arguably control for the influence of the respondents' unobserved characteristics relevant to their survival.

5.1.3 Marriage

The DHS provides information on whether the respondents have been married, had sexual intercourse, and had given birth to children as well as their age when they first experienced these events. Using this information and data pertaining to those aged 18 years or above, when the DHS interview was conducted, the likelihoods of getting married, having sexual intercourse, and giving birth to children by age 18 were analyzed in columns (a)—(c) in Table 4. This age limit was selected because the committee of the United Nations Convention on the Rights of the Child sets the legal threshold of marriageable age at 18 years. No significant effects were found on these likelihoods. The results in column (d) also show no impact on the number of children delivered by women aged 18 years or above. The "no impact on marriage probability" could be the total effect of two conflicting forces, that is, FGC abandonment decreasing women's marriage prospects and alternative premarital investment improving such prospects. Accordingly, the estimation in column (e) explored effects on education, a likely substitute for FGC in rural settings. No educational improvement was found. While the rule differs by round and country, male household members aged 15—64 (for Benin), 15—59 (for Burkina Faso), or 15—54 (for all remaining countries) belonging to approximately 40% of the selected households were interviewed in the DHS (see Table S.1 in the supplemental appendix for the country-round breakdown). The birth years of these male members range from 1936 to 1999. The estimation results in column (f) (as reported as a placebo test) also revealed no educational effects on this male sample aged 18 years or above.

In Table 5, other marriage-related outcomes were estimated for currently married women at or above age 18 at the time of the DHS interview. The adopted sample is shown at the bottom of the table. Burkina Faso's political efforts had no statistically significant influence on age at first marriage (column (a)), at first sexual intercourse (column (b)), and at first birth (column (c)); the probability of engaging in polygynous relationships (column (d)); and husband's education (column (e)) and age (column (f)).

Column (g) shows an estimation of a dummy for women's intrahousehold DM power. This indicator takes a value one for women who can independently decide about their healthcare, large household purchases, or visits to their family or relatives. Similarly, a dummy for women who suffered from emotional, physical, or sexual violence by their spouses (i.e., IPV) was also estimated in column (h). No significant changes were found in these outcomes.[19]

Using data pertaining to females aged M years or above at the point of the DHS interview, this study conducted exercises similar to those performed in Tables 4 and 5. The estimated α_2 is reported in Figure S.2 in the supplemental appendix, with 95% confidence intervals wherein the horizontal axis corresponds to the M years varying from 15 to

[19]Estimation results for each item relevant to women's DM power and for each type of IPV are also reported in Table S.3 in the supplemental appendix.

30. Overall, no significant marriage effects were found.[20]

[Here, Table 4 and Table 5]

5.2 Robustness checks

Several robustness checks were performed. First, the findings reported in Tables 3, 4, and 5 are robust to conflict proximate to a given community, household fixed effects, and RD design samples, as explored in Tables S.4, S.5, and S.6 in the supplemental appendix, respectively. Second, logit and ordered logit models, as estimated for several outcomes in Table S.7 in the supplemental appendix, yielded similar implications to those previously obtained.[21] Third, this study considered multiple hypothesis testing using Bonferroni's, Holm (1979)'s step-down, and Hochberg (1988)'s step-up adjustment procedures in Table S.8 in the supplemental appendix. An FGC-discouraging effect was detected even in these tests with low statistical power.

Fourth alternative standard errors were attempted in Table S.9 in the supplemental appendix. In columns (b) and (c), the standard errors were clustered at the DHS community and ethnic-homeland levels, respectively (i.e., one-way clustering). The former approach is identical to that of Bellemare et al. (2015)'s study of FGC in West Africa. In columns (d) and (e), this study clustered the standard errors along the country (rather than country-region, as in the main analysis) and ethnic-homeland dimensions (i.e., two-way clustering), respectively. To this end, the wild cluster bootstrap (with 999 replications) was adopted for the country dimension (i.e., only five countries) (Cameron et al., 2008). Notably, the restricted wild cluster bootstrap test tends to severely under-reject the null when the number of (treated) clusters is considerably small (Mackinnon and Webb, 2017, 2018).[22] The results in column (h) rely on Conley (1999)'s spatial heteroskedasticity and autocorrelation consistent (HAC) standard errors, which allow for both cross-sectional spatial correlation (500 km) and location-specific serial correlation (20 years), although no a priori reason exists to assume the cross-cluster dependence that decays with the spatial or temporal distance.[23] In some

[20]For married women aged 30 years or above, Figure S.2 shows the increased likelihood of IPV. However, as reported at the bottom of Table 5, information on IPV is available only from limited rounds of the DHS. Additionally, increasing the M value excludes more respondents born in or after 1980 from the estimated "married" sample. Therefore, such a result should be treated with caution.

[21]To avoid an incidental parameter problem, this study estimated these models after replacing community and year-of-birth fixed effects with dummies for Burkinabé communities and for respondents born in or after 1980 (while keeping the remaining previously used regressors). Table S.7 shows the (proportional) odds ratio of interest; that is, how much Burkina Faso's policy effects on the expected odds, as normalized by the baseline odds of their own categories, differ between Burkina Faso and its neighboring countries in a proportional sense (see also Buis, 2010 for the interpretation). A ratio of less than one indicates that the negative (or positive) policy impacts on Burkinabé respondents are greater (or smaller) than those for the remaining ones in a multiplicative sense. In general, a conditional logit model (Chamberlain, 1980) or a fixed-effects ordered logit model (Baetschmann et al., 2015) enables controlling for community fixed effects. However, a (quasi-)discontinuity in cutting rates across the surveyed communities, as later shown in Figure 4, diminishes these models' suitability for FGC analysis because all respondents in a community are computationally excluded from the estimated sample in these models when a community's cutting rate is either one or zero.

[22]This study calculated the bootstrap p-values with (restricted p-values) or without (unrestricted p-values) the null imposed. Because the estimated p-values were not always close to each other, the test results should be treated with caution (Roodman et al., 2019).

[23]The present study used a Stata command, `reg2hdfespatial.ado`, developed by Thiemo Fetzer based on Hsiang et al. (2011) (`ols_spatial_HAC.ado`). To avoid computation difficulty, this exercise excluded country-ethnicity and year-of-interview fixed effects from regressors while still keeping year-of-birth and community fixed effects. Table S.9 reports relevant estimates with corresponding p-values.

results based on alternative, less conservative standard errors, statistically significant increases in ages at first marriage and first childbirth were detected.[24] However, this estimated delay in the first marriage is only six months, and the estimates become much smaller (i.e., less than two months) when controlling for household fixed effect (see Table S.6). Overall, the aforementioned implications remained unchanged.

Fifth, exploiting the number of the surveyed communities (rather than that of the DHS respondents) within the partitioned ethnic homelands (i.e., 886 in Burkina Faso and 496 in its neighboring countries), the pre-1980 values of the sample mean and standard deviation of the analyzed outcomes in Burkina Faso's neighboring countries, and the intracommunity correlation conservatively assumed to be one, this study estimated the power needed to detect K% (K = 5, 10, 15, or 20) change from this mean value with 5% statistical significance; this power calculation does not rely on the observed, possibly noisy, effect size (e.g., Hoenig and Heisey, 2001). As reported in Table S.10 in the supplemental appendix, the estimated power is not necessarily low for several outcomes (e.g., BMI, hemoglobin). In contrast, the power might have been low to detect a 10% decrease in the likelihoods of early marriage and early childbirth. Indeed, this may be a concern because the standard errors used in the main analysis rely on two-way clustering.

However, it does not necessarily invalidate the overall implication of the present study. First, stopping FGC alone with no (expected) employment and educational gains is unlikely to generate such remarkable behavioral changes, referring to previous studies. For instance, after an experimental intervention in rural India, which provided information on female employment opportunities "throughout" three years, Jensen (2012) found decreased likelihoods of marriage and childbirth of women aged 15—21 years by approximately 5—6 percentage points compared to the control mean likelihoods of 71% of marriage (i.e., 7% reduction) and 43% of childbirth (i.e., 13% reduction). In Kenya, Duflo et al. (2015) provided education subsidies for schoolgirls enrolled in the sixth grade at the onset of their experimental study and showed that the likelihoods of their marriage and pregnancy declined from 27% to 24% (i.e., 11% reduction) and from 33% to 29% (i.e., 13% reduction) after five years, respectively. Second, the delayed marriage and childbirth appear to have occurred only during the unavoidable adjustment periods in social transition. Recalling Figure S.2 (as explained in subsection 5.1.3), marriage and childbirth effects on the likelihoods disappear if the data used is relevant to much older females (e.g., women aged 30 and more). All taken together, it is surmised that Burkina Faso's political efforts might have temporarily affected (not all but) some outcomes relevant to women's health and marriage, but its effect size appears not to be fairly large.

[24] On the one hand, these consequences may appear to be favorable from a public health perspective (e.g., Marphatia et al., 2017). On the other hand, since women's fertility was unchanged, women might have reduced their birth intervals. The median birth interval in Burkina Faso was 34.5 months in 2003, which is longer than WHO's 33-month recommendation (Rutstein, 2011). Thus, shortening the spacing intervals might have increased mothers' and fetuses' health risk; additionally, the number of single women with children might also have temporarily increased, which is unlikely to favor mothers' and their children's welfare.

5.3 Threats to identification

Three major threats to the previous findings are discussed here.

5.3.1 Just a trend or policy impacts?

This study applied a similar exercise performed in the upper-left panel of Figure 3 (see α_2) on all the previously analyzed outcomes. The estimates are reported in Figure S.3 in the supplemental appendix with 95% confidence intervals. No clear trend of Burkina Faso's policy effects was observed regarding women's health and marital outcomes. Therefore, the observed FGC decline is unlikely to be driven by general "modernization" factors. Notably, even if this is still a concern, it does not invalidate one aim of this research, which is to assess FGC's benefits and costs from the analyzed perspectives. This purpose can be achieved irrespective of the sources of the FGC decline.

5.3.2 Reporting bias: Cross-border knowledge spillover

There is a concern pertaining to the accuracy of self-reported FGC status. Since Burkina Faso strictly criminalizes FGC, its citizens may not report their FGC status truthfully. While some prior studies support its reliability (e.g., Morison et al., 2001), others found inconsistencies between self-reported and clinically determined FGC while casting doubt on self-reported information regarding FGC status (e.g., Jackson et al., 2003; Klouman et al., 2005; Snow et al., 2002), FGC types (e.g., Elmusharaf et al., 2006), and attitudes toward FGC (e.g., De Cao and Lutz, 2018). Thus, this measurement issue has often compelled researchers to acknowledge the limitation of their studies (e.g., Bellemare et al., 2015) or devise an innovative means to measure FGC status (e.g., Efferson et al., 2015).[25]

To mitigate this concern, this study explores the influence of Burkina Faso's political efforts on respondents living in partitioned homelands "on the side of Burkina Faso's neighboring countries." The partition of ethnic groups reasonably normalizes cross-border social interactions (e.g., marriage, market meetings) in Africa (e.g., Lesser and Moisé-Leeman, 2009; Meagher, 2003); thus, this social interaction might have enabled a body of FGC-related health and political knowledge acquired by Burkinabé people to be introduced into the split homelands of Burkina Faso's neighbors, thereby raising those residents' perceived cost of FGC while reducing the area's cutting rate; see also Section S.1 in the supplemental appendix for the possibility of such knowledge spillovers, as confirmed in my field survey.

This exploration of spillover effects offers a striking advantage. Since FGC is not legally prohibited in Mali and the remainder of Burkina Faso's neighbors only ineffectively enforce anti-FGC laws, self-reported FGC status is more

[25] Efferson et al. (2015)'s study of Sudan relied on henna applied to circumcised girls' feet to assess respondents' FGC status.

reliable in these neighboring countries compared to that in Burkina Faso.[26] Accordingly, this study estimates

$$y_{ijt} = \beta_1 + \sum_k \beta_2^k D_{ijk} \cdot B_j + \sum_k \beta_3^k D_{ijk} \cdot \hat{S}_j + \beta_4 \mathbf{x_{ijt}} + v_j + \rho_{ijt} + \epsilon_{ijt}, \tag{2}$$

where D_{ijk} is one if the respondent was born in a five-year birth cohort k (the reference group consists of respondents born before 1970) and zero otherwise, and $\hat{S}_j$ is an indicator for communities that belong to ethnic homelands partitioned between Burkina Faso and its neighbors and are located on the neighbors' side. Similar to α_2 (the reference group comprises those living in the split ethnic homelands of Burkina Faso's neighboring countries), β_2^k still represents Burkina Faso's policy impacts, but its reference group is now those living in the non-split ethnic homelands of its neighboring countries. Compared to this reference group, β_3^k captures the aforementioned spillover effects.

Before showing the estimation results, for the split (long-dash dot) and non-split (short dash) ethnic homelands of Burkina Faso's neighboring countries, Figure 2, through the respondents' year of birth (five-year cohort), reports the mean residuals arising from regressing an FGC indicator on community fixed effects. A declining tendency of FGC residuals is clearly seen in the split homelands. Compared with the trend in Burkina Faso (solid line), a time lag is observed as the residuals start to decline in the split homelands, and such tendency is less evident. These findings support the existence of cross-border knowledge spillovers.

Equation (2) was estimated, and the two bottom panels of Figure 3 (see β_2 and β_3) report the estimates corresponding to each birth cohort with 95% confidence intervals. In the split homelands of Burkina Faso's neighbors, cutting rates started to fall in or after 1990, a ten-year lag from Burkina Faso. The estimated β_3 referring to respondents born between 1990 and 1994 (-0.038), and those born in or after 1995 (-0.116) have p-values of 0.363 (0.007) and 0.147 (0.000), respectively, using standard errors based on two-way clustering (one-way clustering at the DHS community level, as used in Bellemare et al., 2015's study of FGC in West Africa). These estimated values are, in the absolute, smaller than the estimated β_2 relevant to respondents born during the corresponding birth cohorts. Together, these findings suggest that Burkina Faso's policy effect is actual and is spilled over to the partitioned ethnic homelands of its neighboring countries.

5.3.3 Selected relocation

As respondents might have previously resided in locations other than their present DHS communities, the dummy B_j can be seen as a proxy for exposure to Burkina Faso's political influence measured with noise. This subsection discusses two major concerns pertaining to inflows to and outflows from Burkina Faso's partitioned ethnic homelands.

[26] Following prior studies (e.g., Michalopoulos and Papaioannou, 2014), this study presumes law enforcement restricted "within" a country.

First, Burkina Faso's non-split ethnic groups that do not practice FGC might have married into its partitioned homelands of ethnic groups that traditionally do so, as FGC is no longer required in those homelands. Then, intensified marriage market competition might have generated a significant decline in the area's (early) marriage probability. However, the analysis in column (a) in Table 6, which estimated a dummy that takes one if a couple does not share the same ethnicity, shows no impact on the likelihood of interethnic marriage.[27]

Another concern is that the strong law implementation in Burkina Faso might have encouraged Burkinabé parents to send their daughters to other countries to undergo FGC and marry; here, anti-FGC laws either do not exist or are enforced loosely. However, the present study considers this possibility as unlikely to undermine the previously obtained implications for several reasons. First, if this is the case, FGC rates should show an increasing trend in the split homelands of Burkina Faso's neighboring countries, which is not indicated in Figure 2. Second, since this possibility diminishes the marriage market competition in Burkina Faso's split homelands, female marriage prospects should improve in those areas, which the previous analysis does not support. Third, this possibility may also impair women's health (due to FGC) in the destination communities; however, this finding was absent in the previous health analysis. Fourth, this concern lowers the likelihood that married women in Burkina Faso's split homelands become permanent residents of their current DHS communities, compared with those residing in the partitioned homelands of its neighboring countries. To check this, in column (b) in Table 6, an indicator of one if the respondents were not born in their current DHS communities was estimated for married women although only the limited DHS rounds, that is, Benin (2001), Burkina Faso (1998—99, 2003), and Mali (2001, 2006), includes this information. No significant difference exists. Including unmarried women in the estimated sample did not alter this implication (column (c)).

Fifth, using the insight obtained from Lee (2009) as well as Altonji et al. (2005) and Oster (forthcoming), this study also evaluated the proportion of respondents who reside in the partitioned ethnic homelands of Burkina Faso's neighboring countries with a great propensity to undergo FGC, which is required to eliminate the identified effects of Burkina Faso's political efforts. More precisely, first, this study used data pertaining only to respondents born "before" 1980 and regressed an FGC indicator on birth order, religion dummies, country-ethnicity fixed effects, year-of-interview fixed effects, and ethnic-homeland fixed effects. Second, based on the estimated coefficients, predicted FGC indicator values were calculated for all the respondents; these may be seen as the respondents' propensity to undergo FGC in the absence of Burkina Faso's political efforts. Third, this study reestimated equation (1) by excluding from the

[27]Notably, the sample size in this estimation is smaller than that in previous estimations because a husband's ethnicity is available only for the subsample of respondent females. More precisely, in the DHS, male household members were interviewed in some of the selected households. Data on interethnic marriage are only available when the interviewed man had wives within the household, who were the female sample of the DHS. When constructing the relevant dummy, a couple consisting of both members under "others" was assumed to share the same ethnicity. However, this case corresponds to only approximately 3% of the total sample.

sample the respondents who were born in or after 1980, reside in the split homelands of Burkina Faso's neighbors, and belong to the top Q percentiles of the predicted value distribution (within the neighbors' split homelands). The results are reported in Table 7, where the value of Q varies from zero (i.e., full sample) to 40. As expected, the magnitude of the FGC-discouraging effects decreases as the Q value increases. Excluding the top 20 (40) percentiles of the predicted value distribution eliminates the FGC-discouraging effects statistically (and economically). These results imply that for the selected relocation to explain the previous findings, it must be assumed that approximately 20%—40% of respondents who are born in or after 1980, likely to undergo FGC, and reside in the split homelands of Burkina Faso's neighboring countries migrated into these areas from Burkina Faso's same homelands.

However, the scale of this relocation is remarkably large, referring to the available data, making such possibility unlikely. For example, while only the limited DHS data, that is, Benin (2001) and Mali (2001, 2006), provide this information, approximately 39% of respondents born in or after 1980 and reside in the split homelands of Burkina Faso's neighbors are not permanent residents of the surveyed communities. This had been approximately 49% even before 1980. Furthermore, this study also obtained Benin's (1979, 1992, 2002, and 2013) and Mali's (1998 and 2009) population census data, which refer to 10% of the total population and are available from the "Integrated Public Use Microdata Series (IPUMS), International: Version 7.0" (Minnesota Population Center, 2018).[28] In this census data, women 15 years old or above and whose previous residence belonged to a different major administrative unit or abroad constituted only 12% in administrative units located within 100 km (in terms of the units' centroid) to Burkina Faso's national border (i.e., 33 out of 124 total units).[29]

Sixth, as Table 7 demonstrates, varying the Q value hardly affected the magnitude of Burkina Faso's policy impacts on women's health and marriage, which further alleviates the concern of selected relocation.

Seventh, this study appended Burkina Faso's population census data (1996 and 2006), as sourced from the IPUMS project,[30] to the aforementioned Benin and Mali censuses. After defining the census conducted in or after 1999 as a "later cohort census" (so that all these countries could have a "before" and "after" census), this study explored whether the likelihood that the respondents relocated to the current residential areas from a different major administrative unit or abroad differently evolved over time between Burkina Faso and the remaining countries while using a similar

[28] See https://international.ipums.org/international-action/sample_details/country/bj#bj1979a, https://international.ipums.org/international-action/sample_details/country/bj#bj1992a, https://international.ipums.org/international-action/sample_details/country/bj#bj2002a, and https://international.ipums.org/international-action/sample_details/country/bj#bj2013a for the details of Benin's census 1979, 1992, 2002, and 2013, respectively. See also https://international.ipums.org/international-action/sample_details/country/ml#ml1998a and ttps://international.ipums.org/international-action/sample_details/country/ml#ml2009a for details of Mali's census in 1998 and 2009, respectively. The IPUMS project provided no census data for Côte d'Ivoire and Togo at the time of the present study (see https://international.ipums.org/international-action/samples).

[29] The IPUMS project also provides a map of the administrative units (https://international.ipums.org/international/gis.shtml).

[30] See https://international.ipums.org/international-action/sample_details/country/bf#bf1996a and https://international.ipums.org/international-action/sample_details/country/bf#bf2006a for details.

specification to equation (1). The results, as reported in Table S.11 in the supplemental appendix, show no significant differences; see coefficients on "Burkina Faso × Later cohort census."

[Here, Table 6 and Table 7]

6 Discussion: Marriage convention?

FGC has long been understood as a marriage convention since Mackie (1996); he asserted that FGC persists in Africa's typical intramarrying communities wherein men believe that uncircumcised women are unfaithful and women believe that men will not marry uncircumcised women. He regarded FGC as a social convention supported by a coordination failure and claimed that assembling a critical mass of people who publicly pledge to stop FGC (e.g., creation of an anti-FGC association) is important to eradicate this practice (i.e., tipping-point theory).

The findings yielded by the present study are not inconsistent with Mackie (1996)'s theory. To see this, in Section S.2 in the supplemental appendix, this study formalized his theory by developing a normal-form game that describes an intramarrying community, wherein women compete with each other when seeking their marital partners without any search friction. Here, I only briefly explain it. In this community, two marriage-related customs—FGC and something else—exist, along with men and women having homogeneous preferences. In this game, a man decides whether to propose and to whom, and if he does, what will be the amount of rents (e.g., bride prices) that he will provide to the woman (or her parents). Regardless of whether the marriage-related custom is FGC, men are assumed to believe that women conforming to a community's major custom are faithful and obtain larger utility by marrying such women. In contrast, a woman (or her parents) decides whether to undergo circumcision and then selects her response to the proposal (i.e., accept or reject). FGC and its resulting health impairments make women less productive, thereby reducing their utility during both a married or a single life.

In this game, two stable pure-strategy Nash equilibria arise when the health-impairment cost of FGC is not particularly large, whereby all women in a community are circumcised (FGC equilibrium) or no woman is circumcised (no-FGC equilibrium). The FGC equilibrium is inferior to the no-FGC equilibrium because shifting from the former to the latter eliminates the FGC health-impairment cost and improves the total welfare enjoyed by all community members. Therefore, the existence of both the FGC and the no-FGC equilibria reflects a coordination problem. Additionally, when the fraction of circumcised women in a community is just below (above) a certain threshold value, a community converges to the no-FGC equilibrium (FGC equilibrium) in a self-enforcing manner.[31]

[31]Therefore, following Schelling (2006), Mackie (1996) claims that organizing a group with a critical minimum number of people who refuse FGC and making it publicly visible is necessary to eradicate this practice. This group does not necessarily have to include most

Presumably, Burkina Faso's political efforts increase FGC's utility cost perceived by the residents. In response to this, all women refrain from undergoing FGC. In reality, only a fraction of the community members may obtain new knowledge on FGC and update their perception of its cost. Nevertheless, if the majority of people exceeding the critical threshold refuse FGC, a community tips over to the no-FGC equilibrium in a self-enforcing manner.

Transitioning to a new equilibrium would keep the likelihood of women's marriage constant. However, this transition could reduce married women's (or their parents') utility. The reasoning goes as follows: In competitive marriage markets wherein women fail to wed with a positive probability, they solely suffer from costly FGC unless they successfully find marital partners. Then, to encourage "all" women to undergo FGC, men in the FGC equilibrium would have to give married women more rents than those provided by men in the no-FGC equilibrium to compensate for FGC's health-impairment costs. Thus, the aforementioned prediction that married women's utility may decline because of the equilibrium shift is ascribed to the disappearance of this compensation, which, in turn, raises married men's welfare. Additionally, FGC can also be assumed to involve mortality risk at its operation. Thus, FGC abandonment may reduce the likelihood of women's marriage because a decline in female mortality produces a more competitive marriage market (while keeping the remaining theoretical predictions, as described above).

However, when the cost of FGC is negligible, any influence on women's health and marriage can be marginal. Therefore, the empirical findings of this study are theoretically plausible because FGC is a marriage convention, and its health-impairment costs were previously negligible. In fact, the no-health-undermining impacts of FGC are plausible because its radical form is rare in the studied areas. It is also puzzling why this practice has persisted for so long if it crucially undermines human health, in which case the FGC equilibrium is less likely to arise in the first instance. Moreover, in the adopted DHS data, the fraction of respondents who believed that FGC would improve women's marriage prospects is small.[32] Since marriage matching at the FGC equilibrium is random with respect to this practice, they might not have identified a discernible marriage premium from this practice and therefore might not have answered that FGC improves women's marriageability.

Furthermore, according to the model, a community tends to reveal the cutting rate as either one (FGC equilibrium) or zero (no-FGC equilibrium). Additionally, FGC depends less on underlying fundamentals than would otherwise be expected, as it is one of the population-level multiple equilibria. These features are called "local conformity and global diversity" and "compression," respectively, as summarized by Young (2015) as two of four notable features of social norms. The remaining features indicate that social norms show a tendency to "persist" for long periods, but norm

female community members.

[32]Table S.12 in the supplemental appendix reports background information on FGC; see both women's (panel(A)) and men's (panel(B)) perceived benefits of FGC. The reported information, collected through a yes-no question for each item, is based only on answers provided by circumcised women (panel(A)) or men residing in a community with at least one recorded circumcised woman (panel(B)).

shifts tend to occur suddenly, which is called "tipping."

The analyzed data supports all these social norm features. First, as already analyzed, the "centuries-long" practice of FGC has "swiftly" declined in Burkina Faso. To obtain descriptive support for the remaining features, Figure 4 (left-hand panel) shows a histogram of the fraction of respondents circumcised in their community. Another histogram of the corresponding fraction in their administrative unit is presented in the right-hand panel, where the surveyed communities are categorized into 990 groups, resulting in an average of about four DHS communities in each administrative unit.[33][34] This analysis is conceptually similar to that conducted in Efferson et al. (2015). The cutting rates are either one or zero in a significant proportion of the surveyed communities although those that revealed their interior cutting rates may suggest some sort of heterogeneity in people's preferences for this practice within and across communities (see Section S.3 in the supplemental appendix for more detailed interpretation of the interior cutting rates).[35] Taking an approach similar to that in Bellemare et al. (2015), this study also regressed an indicator for FGC on community fixed effects only. Because the resulting R-squared value is 0.633, a significant proportion of FGC variability is attributed to the community-level factor. The corresponding exercise, which examined administrative-unit fixed effects rather than community fixed effects, also yielded a sizable R-squared value (0.572).

On the contrary, a growing body of empirical research has recently rejected Mackie (1996)'s theory (e.g., Efferson et al., 2015), or even doubted the idea of social convention (e.g., Bellemare et al., 2015). These studies have done so by showing the existence of the within- and across-community heterogeneity in preferences for FGC. However, in contrast to Bellemare et al. (2015), who analyzed people's willingness to continue FGC in West Africa, the current study examines the actual behavior. FGC is often continued by the offspring(s) of mothers who oppose this practice (e.g., Carr, 1997, p. 55—56), and according to UNICEF (2005a, p. 8), actual prevalence is the most important indicator for a situational analysis of FGC. While Efferson et al. (2015) conducted a cross-sectional survey in Sudan, covering 45 communities, the present study examines social changes in more than 4,000 West African communities. In an area studied in Efferson et al. (2015), people may, in fact, be more heterogeneous than those of the present study.

Despite the reported findings, however, this study does not conclude that FGC is a marriage or social convention because it was not designed to explore this particular aspect. Rather, it aims to encourage future research to

[33]These groups include 76 communes in Benin, 259 departments in Burkina Faso, 140 departments in Côte d'Ivoire, 495 communes in Mali, and 20 prefectures in Togo. DHS data alone does not identify administrative units corresponding to each community. Therefore, this study matched a community's GPS latitude/longitude coordinates with a country's map sourced from DIVA-GIS (`http://www.diva-gis.org/datadown`).

[34]According to Mackie (1996)'s theory, an intramarrying community that shares a marriage market is the relevant community. Because women are typically circumcised during childhood or puberty and often marry out of their original village, some respondents' natal communities may differ from DHS communities. Moreover, because the intramarrying communities are likely to include both the natal and destination villages of married women, the right-hand panel, which presumes that the relevant "community" encompasses more extensive areas than those of the DHS communities, may be more relevant to the present discussion.

[35]This tendency is also more pronounced in rural than in urban areas, as seen in Figure S.5 in the supplemental appendix.

address this important policy-relevant question more carefully. For example, Young (2008, 2015) enumerate several mechanisms that sustain social norms such as a motive to "coordinate" with others in a particular transaction (e.g., marriage as claimed in Mackie, 1996), "peer pressure" involving social punishment inflicted on deviants and possible screening of conformists (e.g., Iannaccone, 1992), and "symbolic signaling" of retaining certain values or particular group membership. Regarding the third mechanism, it may be worth assessing an educated conjecture raised by Shell-Duncan et al. (2011) more rigorously. According to their study conducted in Senegal and the Gambia, FGC signals respect for a hierarchical social system among women, which provides circumcised women access to the community's network-based social capital, which may also be maximized by excluding uncircumcised women through peer pressure, such as harassment and ostracism. In Meru, Kenya, Thomas (2000) also links FGC to the maintenance of elders' authority among women of different age groups. Similarly, elderly women in Mali were reported to advocate FGC to maintain control over the gendered sphere of power (e.g., Gosselin, 2001).[36]

[Here, Figure 4]

7 Conclusion

This study examined the long-term impacts of Burkina Faso's political efforts to eradicate FGC on the practice itself, on women's health, and on their marital outcomes. To this end, it used the most promising setting available to date; it compared Burkina Faso and its neighboring countries before and after Burkina Faso undertook anti-FGC political efforts within the partitioned historical ethnic homelands. This within-ethnicity-cum-DID approach was applied along with insight from a spatial RD design.

As the empirical analysis demonstrated, FGC swiftly declined in Burkina Faso. In contrast, the long-term impacts of the country's political efforts on a range of women's health and marital outcomes were not significant. This study, although weakly powered in a statistical sense, also showed that FGC declined even in the partitioned ethnic homelands of Burkina Faso's neighboring countries. This finding is consistent with the view that health and political knowledge, the acquisition of which was facilitated by Burkina Faso's political efforts, spread to the split homelands of its neighboring countries, suggesting that the FGC-discouraging effects of Burkina Faso's political efforts are real.

According to these findings, women's welfare is unlikely to change markedly in the long term, in step with the decline in FGC. As a result, this study may seem to oppose (too) costly political efforts (only) to eliminate FGC.

[36] Consistent with these findings, in Table S.12 (see footnote 32), a relatively large fraction of respondents considered FGC as a requirement for social acceptance, and this is true more for women than for men. While the religious requirement is also an important agreed-upon benefit among the sample respondents, this finding may also suggest the significance of religion-based social networks. For example, in Mali, it is reported that uncircumcised Muslim women are not clean and therefore would not be able to pray and fast (Gosselin, 2000a).

However, infibulation, which may most seriously undermine women's health, is rare in the studied areas. Additionally, marital outcomes examined here may not necessarily be optimal measures of married women's intrahousehold welfare. Moreover, there are other welfare outcomes that have not been addressed in this study (e.g., mental health, mortality and morbidity of children born to mothers refusing FGC, self-esteem, social capital), particularly if FGC is not a marriage convention. Therefore, it is still important to explore relevant welfare consequences.

In contrast to recent empirical studies, the reported findings do not necessarily reject the view that FGC is a marriage convention. To show this, this study formalized Mackie (1996)'s theory, which has been much publicized in anthropology and sociology, and theoretically clarified the long-term association between the analyzed outcomes. It also showed a relatively sharp discontinuity in cutting rates across communities while revealing that approximately 63% of FGC variation is attributed to community-level heterogeneity.

Despite the descriptive support, this study still takes a neutral stance on whether FGC is a marriage convention. However, if FGC is a normative equilibrium, community-based interventions would be more effective to eliminate it than strategies providing each community member with an individual (e.g., monetary) incentive. Additionally, identifying norm-supporting mechanisms (e.g., coordination, peer pressure, and symbolic signaling), and the corresponding key players (e.g., males, females, elders, and peers) would help optimize such policy interventions;[37] this may be a viable consideration for future research. On the contrary, as the underlying mechanisms may not be mutually exclusive, it would be practical to implement "community-wide" experimental interventions (e.g., education programs) with particular target groups and materials to raise awareness (e.g., welfare consequences, human rights, or others' views on FGC as in Bursztyn et al., 2018). Targeted groups would also have to include those who place a high intrinsic value on FGC when substantial heterogeneity in preferences/values for this practice exists within and across communities.

Last but not the least, the aforementioned findings cannot necessarily be generalized to wider spatial and temporal contexts. FGC varies across societies and ethnic groups in terms of circumcision age and the manner of performance (e.g., Ahmadu, 2000; Gosselin, 2000b). The mechanisms sustaining FGC may also change over time. Nevertheless, the areas and time periods studied in the present research are still larger and longer than those in prior case studies; thus, the reported findings possess certain external validity. The high prevalence of FGC in West Africa also increases the economic significance of research focusing on this area (e.g., Sipsma et al., 2012).

[37] In relation, two major ongoing demand-side policy interventions include creating an anti-FGC association that facilitates a public declaration to abandon the practice, as put forth by Mackie (1996), and organizing alternative initiation rituals. The latter strategy is proposed, as FGC often occurs as a rite of passage into adulthood (see Mackie, 2000, for example). Both approaches may eliminate FGC if enough people crossing a crucial group threshold agree to its abandonment as a result of these interventions. Importantly, if FGC is a social norm that coordinates women's marriage, it may be prudent to form a public association with a significant number of potential grooms and brides (and their parents) who pledge not to practice FGC. Similarly, if social pressure from circumcised women of the same generation facilitates FGC, the relevant association would have to include such peers as key members. If FGC is sustained by signaling the subordination of young girls to female elders, alternative initiation rites may halt FGC only when elders interpret young girls' participation in these rituals as a sign of respect.

References

28 TOO MANY, September 2014. Country profile: FGM in Mali.

28 TOO MANY, December 2015. Country profile: FGM in Burkina Faso.

28 TOO MANY, September 2018a. Benin: The law and FGM.

28 TOO MANY, September 2018b. Côte d'ivoire : The law and FGM.

28 TOO MANY, September 2018c. Mali: The law and FGM.

28 TOO MANY, September 2018d. Togo: The law and FGM.

Ahmadu, F., 2000. Rites and Wrongs: An Insider/Outsider Reflects on Power and Excision. Lynne Rienner Publishers, Inc., Chapter 14 (pp. 283 - 312) in "Female "Circumcision" in Africa: Culture, Controversy, and Change" edited by Bettina Shell-Duncan and Ylva Hernlund.

Alesina, A., Easterly, W., Matuszeski, J., April 2011. Artificial states. Journal of the European Economic Association 9 (2), 246–277.

Alesina, A., Giuliano, P., 2015. Culture and institutions. Journal of Economic Literature 53 (4), 898–944.

Altonji, J. G., Elder, T. E., Taber, C. R., February 2005. Selection on observed and unobserved variables: Assessing the effectiveness of catholic schools. Journal of Political Economy 113 (1), 151–184.

Anderson, S., April 2003. Why dowry payments declined with modernization in Europe but are rising in India? Journal of Political Economy 111 (2), 269–310.

Anderson, S., Fall 2007. The economics of dowry and brideprice. Journal of Economic Perspectives 21 (4), 151–174.

Anderson, S., June 2018. Legal origins and female HIV. American Economic Review 108 (6), 1407–1439.

Anderson, S., Bidner, C., May 2015. Property rights over marital transfers. Quarterly Journal of Economics 130 (3), 1421–1484.

Baetschmann, G., Staub, K. E., Winkelmann, R., June 2015. Consistent estimation of the fixed effects ordered logit model. Journal of Royal Statistical Society: Series A (Statistics in Society) 178 (3), 685–703.

Becker, A., October 2018. On the economic origins of constraints on women's sexuality. mimeo.

Bellemare, M. F., Novak, L., Steinmetz, T. L., September 2015. All in the family: Explaining the persistence of female genital cutting in west Africa. Journal of Development Economics 116, 252–265.

Berg, R. C., Denison, E., June 2012. Effectiveness of interventions designed to prevent female genital mutilation/cutting: A systematic review. Studies in Family Planning 43 (2).

Berg, R. C., Denison, E., 2013. Interventions to reduce the prevalence of female genital mutilation/cutting in African countries. 3ie Systematic Review 9, International Initiative for Impact Evaluation (3ie).

Berg, R. C., Underland, V., 2013. The obstetric consequences of female genital mutilation/cutting: A systematic review and meta-analysis. Obstetrics and Gynecology International 2013, Article ID 496564.

Boko, S. H., 2002. Decentralization and Reform in Africa, 2nd Edition. Springer.

Botticini, M., Siow, A., September 2003. Why dowries? American Economic Review 93 (4), 1385–1398.

Brownie, I., 1979. African Boundaries: A Legal and Diplomatic Encyclopaedia. C. Hurst & Company, London.

Buis, M. L., 2010. Stata tip 87: Interpretation of interactions in nonlinear models. The Stata Journal 10 (2), 305–308.

Bursztyn, L., Egorov, G., Fiorin, S., May 2017. From extreme to mainstream: How social norms unravel. NBER Working Paper Series 23415.

Bursztyn, L., González, A. L., Yanagizawa-Drott, D., June 2018. Misperceived social norms: Female labor force participation in Saudi Arabia. NBER Working Paper Series 24736.

Cameron, A. C., Gelbach, J. B., Miller, D. L., 2008. Bootstrap-based improvements for inference with clustered errors. Review of Economics and Statistics 90 (3), 414–427.

Cameron, A. C., Gelbach, J. B., Miller, D. L., 2011. Robust inference with multiway clustering. Journal of Business and Economic Statistics 29 (2), 238–249.

Cameron, A. C., Miller, D. L., 2015. A practitioner's guide to cluster-robust inference. Journal of Human Resources 50 (2), 317–372.

Camilotti, G., 2015. Interventions to stop female genital cutting and the evolution of the custom: Evidence from age at cutting in Senegal. Journal of African Economies 25 (1), 133–158.

Carr, D., September 1997. Female Genital Cutting: Findings from the Demographic and Health Surveys Program. Macro International Inc., Calverton, Maryland, USA.

Chamberlain, G., January 1980. Analysis of covariance with qualitative data. Review of Economic Studies 47 (1), 225–238.

Chesnokova, T., Vaithianathan, R., July 2010. The economics of female genital cutting. BE Journal of Economic Analysis & Policy 10 (1), 1–28.

Chikhungu, L. C., Madise, N. J., 2015. Trends and protective factors of female genital mutilation in Burkina Faso: 1990 to 2010. International Journal for Equity in Health 14 (42), 1–10.

Colombo, J., March 2013. Burkina Faso as a leader in the elimination of female genital mutilation. Consultancy Africa Intelligence (CAI), http://www.consultancyafrica.com/index.php?option=com_content&view=article&id=1243:burkina-faso-as-a-leader-in-the-elimination-of-female-genital-mutilation-&catid=91:rights-in-focus&Itemid=296.

Conley, T. G., September 1999. GMM estimation with cross sectional dependence. Journal of Econometrics 92 (1), 1–45.

Coyne, C. J., Coyne, R. L., Spring 2014. The identity economics of female genital mutilation. Journal of Developing Areas 48 (2), 137–152.

Croicu, M., Sundberg, R., 2015. UCDP geo codebook version 2.0. Department of Peace and Conflict Research, Uppsala University.

De Cao, E., Lutz, C., October 2018. Sensitive survey questions: Measuring attitudes regarding female genital cutting through a list experiment. Oxford Bulletin of Economics and Statistics 80 (5), 871–892.

de la Croix, D., Mariani, F., April 2015. From polygyny to serial monogamy: A unified theory of marriage institutions. Review of Economic Studies 82 (2), 565–607.

Dickovick, J. T., Wunsch, J. S., 2014. Decentralization in Africa: The Paradox of State Strength. Lynne Rienner Publishers, Inc.

Diop, N. J., Askew, I., December 2009. The effectiveness of a community-based education program on abandoning female genital mutilation/cutting in Senegal. Studies in Family Planning 40 (4), 307–318.

Diop, N. J., Congo, Z., Ouédraogo, A., Sawadogo, A., Saloucou, L., Tamini, I., January 2008. Analysis of the evolution of the practice of female genital mutilation/cutting in Burkina Faso. FRONTIERS Program.

Duflo, E., Dupas, P., Kremer, M., 2015. Education, HIV, and early fertility: Experimental evidence from Kenya. American Economic Review 105 (9), 2757–2797.

Efferson, C., Vogt, S., Elhadi, A., Ahmed, H. E. F., Fehr, E., September 2015. Female genital cutting is not a social coordination norm. Science 349 (6225), 1446–1447.

Elmusharaf, S., Elhadi, N., Almroth, L., 2006. Reliability of self reported form of female genital mutilation and WHO classification: Cross sectional study. BMJ 333, 124–127.

Gelman, A., Imbens, G., forthcoming. Why high-order polynomials should not be used in regression discontinuity designs. Journal of Business and Economic Statistics.

Gosselin, C., 2000a. Feminism, anthropology and the politics of excision in mali: Global and local debates in a postcolonial world. Anthropologica 42 (1), 43–60.

Gosselin, C., 2000b. Handing over the Knife: Numu Women and the Campaign Against Excision in Mali. Lynne Rienner Publishers, Inc., Chapter 10 (pp. 193 - 214) in "Female "Circumcision" in Africa: Culture, Controversy, and Change" edited by Bettina Shell-Duncan and Ylva Hernlund.

Gosselin, C., 2001. Campaigning against excision in Mali: Global and local hierachies, hegemony and knowledge, PhD Thesis, Graduate Department of Anthropology, University of Toronto.

Hayford, S. R., June 2005. Conformity and change: Community effects on female genital cutting in Kenya. The Journal of Health and Social Behavior 46 (2), 121–140.

Herbst, J., Autumn 1989. The creation and maintenance of national boundaries in Africa. International Organization 43 (4), 673–692.

Hernlund, Y., 2000. Cutting Without Ritual and Ritual Without Cutting: Female "Circumcision" and the Re-ritualization of Initiation in the Gambia. Lynne Rienner Publishers, Inc., Chapter 12 (pp. 235 - 251) in "Female "Circumcision" in Africa: Culture, Controversy, and Change" edited by Bettina Shell-Duncan and Ylva Hernlund.

Hochberg, Y., 1988. A sharper Bonferroni procedure for multiple tests of significance. Biometrika 75 (4), 800–802.

Holm, S., 1979. Simple sequentially rejective multiple test procedure. Scandinavian Journal of Statistics 6 (2), 65–70.

Hoenig, J. M., Heisey, D. M., 2001. The abuse of power: The pervasive fallacy of power calculations for data analysis. The American Statistician 55 (1), 19–24.

Hsiang, S. M., Meng, K. C., Cane, M. A., 2011. Civil conflicts are associated with the global climate. Nature 476 (438-441).

Iannaccone, L. R., April 1992. Sacrifice and stigma: Reducing free-riding in cults, communes, and other collectives. Journal of Political Economy 100 (2), 271–291.

Jackson, E. F., Akweongo, P., Sakeah, E., Hodgson, A., Asuru, R., Phillips, J. F., 2003. Inconsistent reporting of female genital cutting status in northern ghana: Explanatory factors and analytical consequences. Studies in Family Planning 34 (3), 200–210.

Jacoby, H. G., Mansuri, G., September 2010. "watta satta": Bride exchange and women's welfare in rural Pakistan. American Economic Review 100 (4), 1804–1825.

Jensen, R., 2012. Do labor market opportunities affect young women's work and family decisions? experimental evidence from India. Quarterly Journal of Economics 127 (2), 753–792.

Klouman, E., Manongi, R., Klepp, K.-I., January 2005. Self-reported and observed female genital cutting in rural Tanzania: Associated demographic factors, HIV and sexually transmitted infections. Tropical Medicine and International Health 10 (1), 105–115.

Lee, D. S., 2009. Training, wages, and sample selection: Estimating sharp bounds on treatment effects. Review of Economic Studies 76 (3), 1071–1102.

Lesser, C., Moisé-Leeman, E., 2009. Informal cross-border trade and trade facilitation in sub-Saharan Africa. OECD Trade Policy Papers 86, OECD Publishing, Paris.

Mackie, G., December 1996. Ending footbinding and infiburation: A convention account. American Sociological Review 61 (6), 999–1017.

Mackie, G., 2000. Female Genital Cutting: The Beginning of the End. Lynne Rienner Publishers, Inc., Chapter 13 (pp. 253-281) in "Female "Circumcision" in Africa: Culture, Controversy, and Change" edited by Bettina Shell-Duncan and Ylva Hernlund.

Mackinnon, J. G., Webb, M. D., March 2017. Wild bootstrap inference for wildly different cluster sizes. Journal of Applied Econometrics 32 (2), 233–254.

Mackinnon, J. G., Webb, M. D., 2018. The wild bootstrap for few (treated) clusters. Econometrics Journal 21 (2), 114–135.

Marphatia, A. A., Ambale, G. S., Reid, A. M., October 2017. Women's marriage age matters for public health: A review of the broader health and social implications in south Asia. Frontiers in Public Health 5 (269), 1–23.

McAdams, R. H., 2000. An attitudinal theory of expressive law. An Attitudinal Theory of Expressive Law 79, 339–390.

Meagher, K., 2003. A back door to globalisation? structural adjustment, globalisation & transborder trade in west Africa. Review of African Political Economy 95, 57–75.

Michalopoulos, S., Papaioannou, E., 2014. National institutions and subnational development in Africa. Quarterly Journal of Economics 129 (1), 151–213.

Michalopoulos, S., Papaioannou, E., 2016. The long-run effects of the scramble for Africa. American Economic Review 106 (7), 1802–1848.

Minnesota Population Center, 2018. Integrated public use microdata series. international: Version 7.0 [dataset]. Tech. rep., Minneapolis, MN: IPUMS, `http://doi.org/10.18128/D020.V70`.

Morison, L., Scherf, C., Ekpo, G., Paine, K., West, B., Coleman, R., Walraven, G., August 2001. The long-term reproductive health consequences of female genital cutting in rural Gambia: A community-based survey. Tropical Medicine and International Health 6 (8), 643–653.

Munshi, K., Myaux, J., 2006. Social norms and the fertility transition. Journal of Development Economics 80 (1), 1–38.

Murdock, G. P., 1959. Africa: Its Peoples and their Culture History. McGraw-Hill Inc., New York.

Nunn, N., 2008. The long-term effects of Africa's slave trades. Quarterly Journal of Economics 123 (1), 139–176.

Obermeyer, C. M., 2005. The consequences of female circumcision for health and sexuality: An update on the evidence. Culture, Health & Sexuality: An International Journal for Research, Intervention and Care 7 (5), 443–461.

Oster, E., forthcoming. Unobservable selection and coefficient stability: Theory and validation. Journal of Business and Economic Statistics.

Poyker, M., May 2018. Regime stability and persistence of traditional practices. mimeo.

Roodman, D., MacKinnon, J. G., Nielsen, M. O., Webb, M. D., January 2019. Fast and wild: Bootstrap inference in stata using `boottest`. mimeo.

Rutstein, S. O., September 2011. Trends in birth spacing. DHS Comparative Reports 28, USAID, Calverton, Maryland, USA, ICF Macro.

Schelling, T. C., 2006. Micromotives and Macrobehavior. W. W. Norton & Company, Inc., Revised edition.

Shell-Duncan, B., June 2008. From health to human rights: Female genital cutting and the politics of intervention. American Anthropologist 110 (2), 225–236.

Shell-Duncan, B., Hernlund, Y., 2000. Female "Circumcision" in Africa: Dimension of the Practice and Debates. Lynne Rienner Publishers, Inc., Chapter 1 (pp. 1 - 40) in "Female "Circumcision" in Africa: Culture, Controversy, and Change" edited by Bettina Shell-Duncan and Ylva Hernlund.

Shell-Duncan, B., Hernlund, Y., Wander, K., Moreau, A., 2013. Legislating change? responses to criminalizing female genital cutting in Senegal. Law & Society Review 47 (4), 803–835.

Shell-Duncan, B., Wander, K., Hernlund, Y., Moreau, A., October 2011. Dynamics of change in the practice of female genital cutting in Senegambia: Testing predictions of social convention theory. Social Science & Medicine 73 (8), 1275–1283.

Sipsma, H. L., Chen, P. G., Ofori-Atta, A., Ilozumba, U. O., Karfo, K., Bradley, E. H., February 2012. Female genital cutting: Current practices and beliefs in western Africa. Bulletin of the World Health Organization 90 (2), 120–127F.

Snow, R. C., Slanger, T. E., Okonofua, F. E., Oronsaye, F., Wacker, J., January 2002. Female genital cutting in southern urban and peri-urban Nigeria: Self-reported validity, social determinants, and secular decline. Tropical Medicine and International Health 7 (1), 91–100.

Sundberg, R., Melander, E., 2013. Introducing the UCDP georeferenced event dataset. Journal of Peace Research 50 (4), 523–532.

Tertilt, M., December 2005. Polygyny, fertility, and savings. Journal of Political Economy 113 (6), 1341–1371.

Thomas, L., 2000. "Ngaitana (I Will Circumcise Myself)": Lessons from Colonial Campaigns to Ban Excision in Meru, Kenya. Lynne Rienner Publishers, Inc., Chapter 7 (pp. 129 - 150) in "Female "Circumcision" in Africa: Culture, Controversy, and Change" edited by Bettina Shell-Duncan and Ylva Hernlund.

UNFPA, October 2010. Burkina Faso has a strong law against FGM/C, but winning hearts and minds remains crucial.

UNFPA, November 2014. Implementation of the international and regional human rights framework for the elimination of female genital mutilation.

UNFPA and UNICEF, 2014. UNFPA-UNICEF joint programme on female genital mutilation/cutting: Accelerating change. Summary Report of Phase I 2008-2013.

UNICEF, 2005a. Changing a harmful social convention: Female genital mutilation/cutting. Innocent Digest. Florence, Italy: UNICEF.

UNICEF, November 2005b. Female genital mutilation/cutting: A statistical exploration.

United States Department of State, June 2001. Burkina faso: Report on female genital mutilation (FGM) or female genital cutting (FGC). Office of the Senior Coordinator for International Women's Issues, http://2001-2009.state.gov/g/wi/rls/rep/crfgm/10047.htm.

Vogt, S., Zaid, N. A. M., Ahmed, H. E. F., Fehr, E., Efferson, C., October 2016. Changing cultural attitudes towards female genital cutting. Nature 538, 506–509.

Wagner, N., 2015. Female genital cutting and long-term health consequences - nationally representative estimates across 13 countries. Journal of Development Studies 51 (3), 226–246.

Whitehorn, J., Ayonrinde, O., Maingay, S., 2002. Female genital mutilation: Cultural and psychological implications. Sexual and Relationship Therapy 17 (2), 161–170.

WHO, February 2016. Female genital mutilationFact Sheet, N°241, http://www.who.int/mediacentre/factsheets/fs241/en/.

Young, H. P., August 2015. The evolution of social norms. Annual Review of Economics 7, 359–387.

Young, P. H., 2008. Social Norms. Palgrave Macmillan, in "The New Palgrave Dictionary of Economics," Second Edition, edited by Steven N. Durlauf and Lawrence E. Blume.

Zartman, I., August 1965. The politics of boundaries in north and west Africa. The Journal of Modern African Studies 3 (2), 155–173.

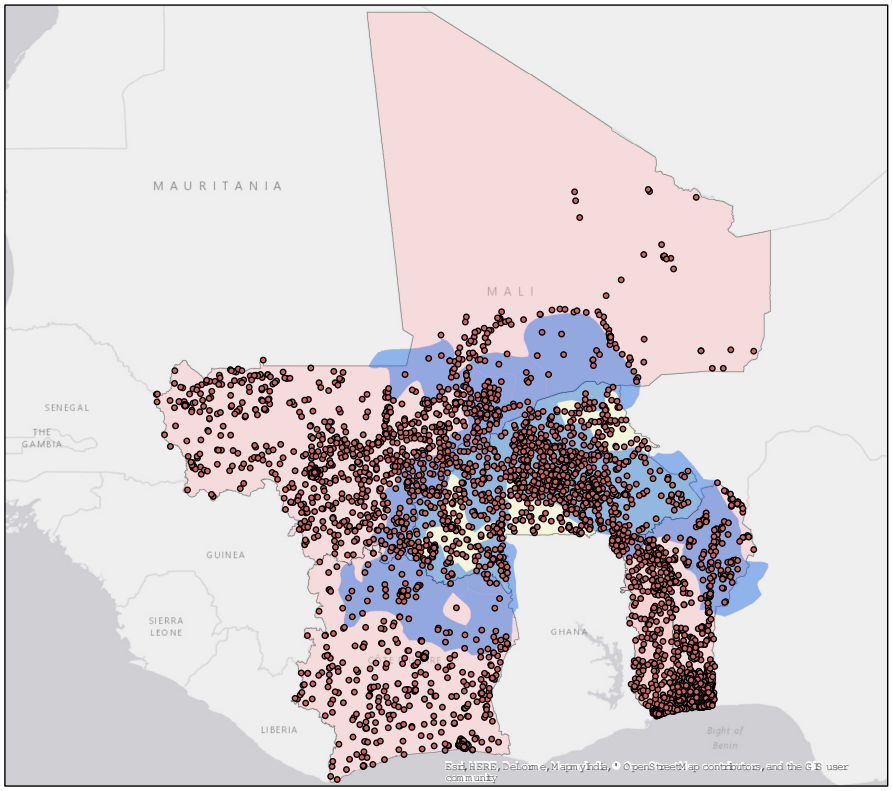

Figure 1: Position of DHS communities (red circle), Burkina Faso (yellow polygon), its analyzed neighboring countries (red polygon), and ethnic homelands partitioned between Burkina Faso and those neighbors (blue polygon)

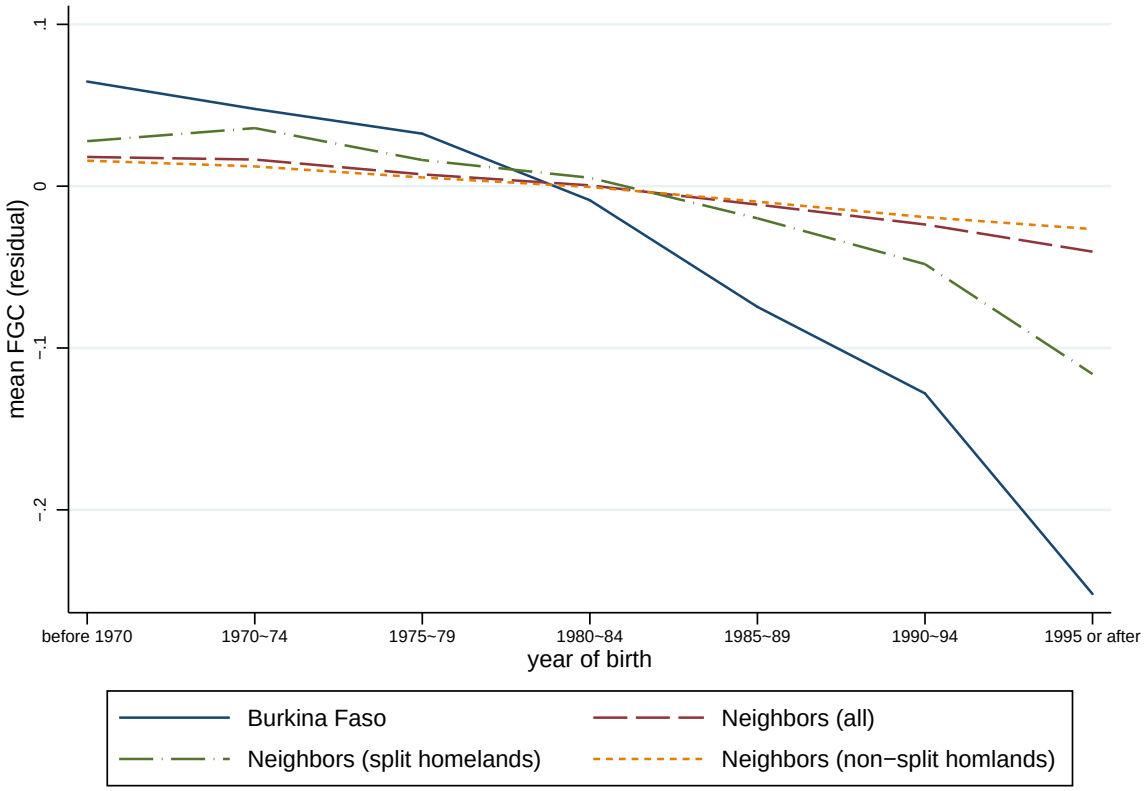

Figure 2: A trend of cutting rates

Note: After regressing an FGC indicator on community fixed effects, this figure plots the the mean regression residuals by the year of birth.

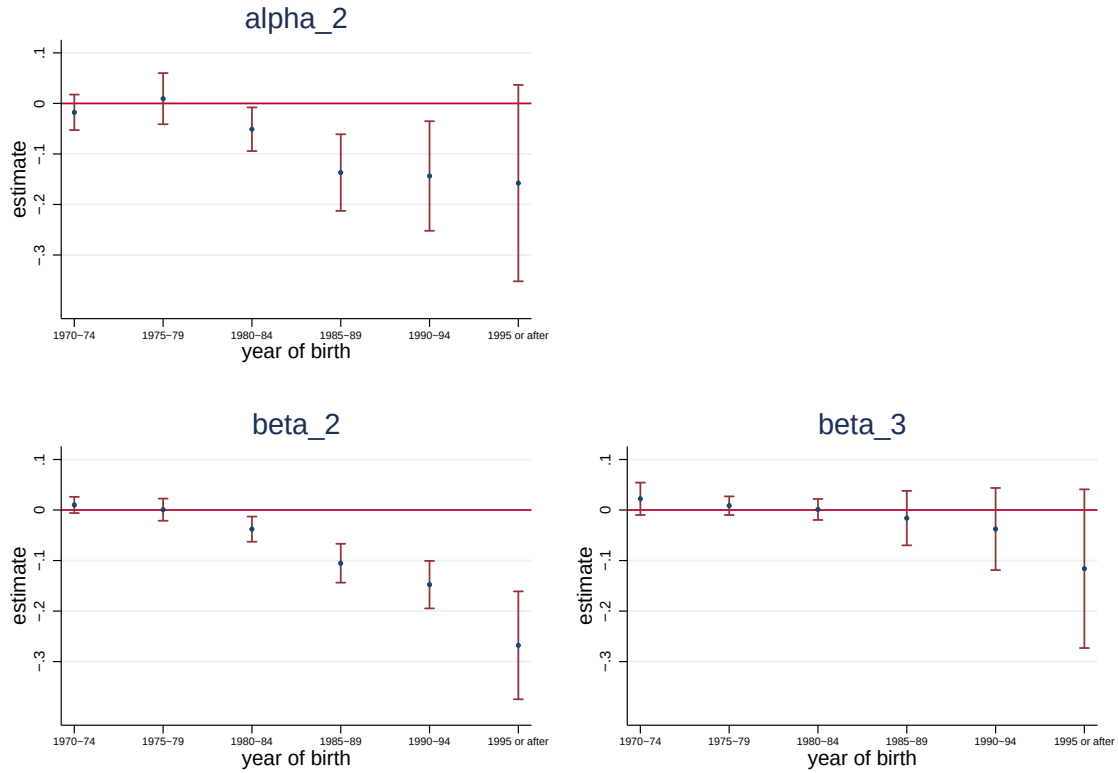

Figure 3: A trend of policy consequences for FGC (OLS)

Notes: (1) This figure reports α_2 (equation (1)) and β_2 and β_3 (equation (2)) with 95% confidence intervals. (2) Standard errors are clustered at the ethnic-homeland and country-region levels.

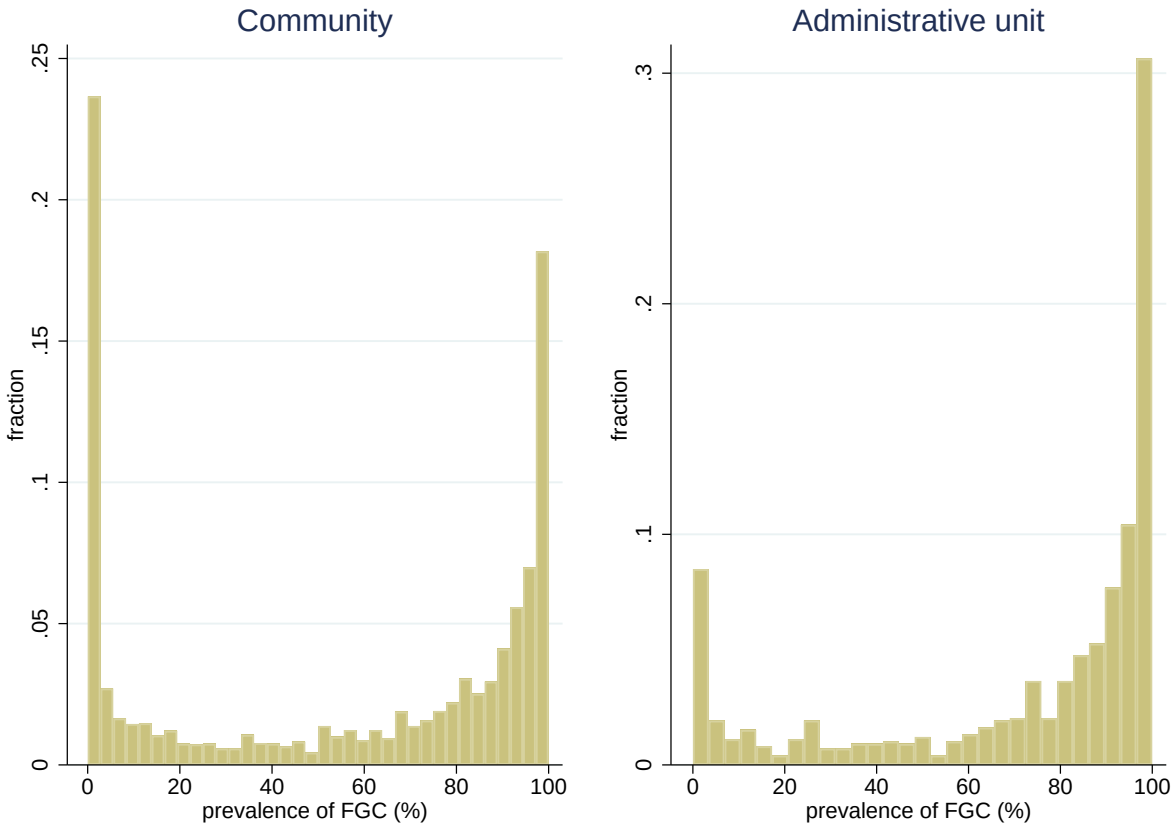

Figure 4: Distribution of cutting rates across spaces

Table 1: Summary statistics: Respondents born before 1980

	Split homelands (BF) (886 communities)			Split homelands (neighbors) (496 communities)			Non-split homelands (2764 communities)		
	Mean	Std.	No. of obs.	Mean	Std.	No. of obs.	Mean	Std.	No. of obs.
One if cut	0.84	0.36	14391	0.78	0.41	6799	0.59	0.48	33284
One if sewn closed (zero if not cut)	0.01***	0.10	13207	0.05	0.23	5843	0.03	0.19	30098
One if cut by traditional cutters (zero if not cut)	0.80	0.39	13918	0.72	0.44	6754	0.53	0.49	32935
Age at FGC if cut	6.96	3.61	7185	7.60	3.80	2657	6.87	4.61	9677
Height for age (z-scores)	-0.31***	1.00	11231	-0.54	1.02	6135	-0.43	1.07	30875
BMI $\times$ 10	211.97***	34.50	11235	224.75	37.64	6143	232.92	45.55	30903
Hemoglobin (g/dl)	11.74	1.74	4438	11.50	1.82	2586	11.51	1.83	12736
One if had genital problems	0.09**	0.28	6983	0.15	0.35	6530	0.16	0.37	29197
One if had terminated pregnancy	0.18	0.38	10991	0.17	0.37	7089	0.19	0.39	33491
One if die by age 15: Female#	0.30	0.46	2255	0.35	0.47	807	0.30	0.45	4124
One if die by age 15: Male#	0.32**	0.46	2411	0.37	0.48	911	0.31	0.46	4503
One if married by age 18†	0.66	0.47	15025	0.65	0.47	7229	0.58	0.49	36775
One if had sex by age 18†	0.74	0.43	15003	0.77	0.41	7165	0.76	0.42	36277
One if gave birth by age 18†	0.43	0.49	15025	0.47	0.49	7229	0.43	0.49	36775
No. of children by age 18†	5.00**	2.68	15025	5.54	2.83	7229	4.80	2.81	36775
Education (years) by age 18†	1.08	2.93	15024	0.70	2.16	7218	1.72	3.40	36752
Age at first marriage‡	17.71	2.90	13919	17.77	4.25	6842	18.20	4.52	32652
Age at first sex‡	17.24**	2.43	13893	16.72	3.32	6781	16.76	3.18	32240
Age at first birth‡	19.25	3.28	13611	19.23	4.18	6672	19.54	4.25	31626
One if polygyny‡	0.53*	0.49	13919	0.48	0.49	6842	0.44	0.49	32652
A husband's education (years)‡	0.99	2.90	13592	1.26	3.21	6549	2.47	4.38	29984
A husband's age‡	47.12	11.79	11690	46.21	10.56	6659	46.71	10.75	30065
One if have DM power‡	0.30***	0.46	10265	0.24	0.42	6718	0.29	0.45	30155
One if had any IPV‡	0.15	0.36	3042	0.23	0.42	2233	0.28	0.45	8353
One if inter-ethnic marriage§	0.09**	0.29	4158	0.19	0.39	1918	0.22	0.41	8181
One if not living in places of birth§	0.65**	0.47	9237	0.49	0.50	4475	0.55	0.49	18131
Birth order	3.10**	1.95	15001	3.23	1.93	7229	3.26	1.77	36773
One if Muslim	0.56**	0.49	15003	0.74	0.43	7218	0.57	0.49	36726
One if Christian	0.30***	0.45	15003	0.12	0.32	7218	0.28	0.45	36726
Urban (dummy)	0.24	0.42	15025	0.19	0.39	7229	0.35	0.47	36775
No. of battles ($\div$ 10)	0.01*	0.12	15025	0.12	0.31	7229	0.76	2.26	36775
Distance to BF (km)	99.97	54.47	15025	87.91	71.11	7229	322.70	182.97	36775

Notes: (1) The equality of means between those residing in Burkina Faso (BF) and the remaining respondents "within" the historical ethnic homeland partitioned between BF and its neighboring countries is tested by OLS. *** denotes significance at 1%, ** at 5%, and * at 10%. Standard errors are clustered at the ethnic-homeland and country-region levels. (2) The information is relevant only to the respondents aged 18 or above for †, married respondents aged 18 or above for ‡, children born to the respondents for #, and married respondents for §.

Table 2: Policy consequences for FGC (OLS)

Dependent variables:	One if cut	One if cut	One if cut	One if cut	One if cut	One if cut	One if cut	One if cut	One if cut	One if cut	One if cut by age 5	One if sewn closed (zero if not cut)	One if traditional cutters (zero if not cut)
Sample:	All	Benin & BF	Côte d'Ivoire & BF	Mali & BF	Togo & BF	All	All	$<$ 150 km to BF's border	All	All	All	All	All
	(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(l)	(m)
Burkina Faso (BF)	-0.108***	-0.029	-0.072*	-0.131***	-0.101**	-0.105***	-0.174**	-0.100**	-0.093***	-0.105***	-0.117***	0.020	-0.084**
× Born in or after 1980	(0.036)	(0.124)	(0.042)	(0.030)	(0.045)	(0.036)	(0.071)	(0.046)	(0.024)	(0.017)	(0.037)	(0.013)	(0.038)
Split ethnic homelands	-0.011	0.000	0.016	0.006	0.018	-0.010	-0.016	0.001	-0.021	-	0.004	-0.003	0.001
× Born in or after 1980	(0.028)	(0.025)	(0.022)	(0.018)	(0.026)	(0.029)	(0.046)	(0.021)	(0.024)		(0.021)	(0.006)	(0.024)
Distance to BF's border (km)	-0.000	-0.000	0.000	0.000	-0.000	0.000	-0.000	0.001	-	-	-0.000	0.000	0.000
× Born in or after 1980	(0.000)	(0.001)	(0.000)	(0.000)	(0.001)	(0.000)	(0.000)	(0.001)			(0.000)	(0.000)	(0.000)
Squared distance to BF's border (km)	0.000	0.000	-0.000	-0.000	0.000	0.000	0.000	-0.000	-	-	0.000	-0.000	0.000
× Born in or after 1980	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)			(0.000)	(0.000)	(0.000)
BF × Distance to BF's border	0.001	0.001	0.000	0.001	0.001	0.001	0.001	0.001	-	-	0.001	-0.000*	0.000
× Born in or after 1980	(0.000)	(0.001)	(0.001)	(0.000)	(0.001)	(0.000)	(0.001)	(0.001)			(0.001)	(0.000)	(0.001)
BF × Squared distance to BF's border	-0.000*	-0.000**	-0.000**	-0.000**	-0.000**	-0.000*	-0.000	-0.000	-	-	-0.000	0.000	-0.000
× Born in or after 1980	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)			(0.000)	(0.000)	(0.000)
No. of battles (÷10) $<$ 40 km	-	-	-	-	-	-0.005**	-		-	-	-	-	-
× Born in or after 1980						(0.003)							
Birth order	0.002***	0.001	0.002*	0.002***	0.001	0.002***	0.002**	0.002**	0.002***	0.002***	-0.001	0.000	0.002***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Muslim	0.082***	0.041**	0.080**	0.025**	0.061**	0.082***	-	0.026*	0.083***	0.083***	0.059***	0.011**	0.072***
	(0.023)	(0.017)	(0.035)	(0.010)	(0.024)	(0.023)		(0.015)	(0.023)	(0.023)	(0.019)	(0.005)	(0.019)
Christian	-0.048***	-0.036**	-0.074***	-0.073***	-0.041**	-0.048***	-	-0.057***	-0.048***	-0.048***	-0.044***	0.000	-0.042***
	(0.016)	(0.018)	(0.014)	(0.014)	(0.017)	(0.016)		(0.015)	(0.016)	(0.016)	(0.014)	(0.003)	(0.014)
Predicted values $\in [0, 1]$ (proportion)	0.981	0.997	0.998	0.661	0.997	0.980	1.000	0.999	0.980	0.980	0.998	0.743	0.989
R-squared	0.664	0.610	0.435	0.407	0.525	0.664	0.898	0.491	0.664	0.664	0.457	0.276	0.579
No. of obs.	104948	50822	45108	68916	40437	104948	105384	45702	104948	104948	104948	95198	103417
Country-ethnicity FE	YES	YES	YES	YES	YES	YES	NO	YES	YES	YES	YES	YES	YES
Year-of-birth FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Community FE	YES	YES	YES	YES	YES	YES	NO	YES	YES	YES	YES	YES	YES
Household FE	NO	NO	NO	NO	NO	NO	YES	NO	NO	NO	NO	NO	NO
Year-of-interview FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES

Notes: (1) Figures ( ) are standard errors. *** denotes significance at 1%, ** at 5%, and * at 10%. (2) Standard errors are clustered at the ethnic-homeland and country-region levels.

Table 3: Policy consequences for health (OLS)

Dependent variables:	Height for age (z-scores)	BMI (× 10)	Hemoglobin (g/dl)	One if had genital problem in the last 12 months	One if ever terminated pregnancy	One if die by age 15	One if die by age 15
Sample:	Female	Female	Female	Female	Female	Female	Male
	(a)	(b)	(c)	(d)	(e)	(f)	(g)
Burkina Faso (BF)	0.042	-0.154	0.176	0.012	-0.020	-0.054	-0.044
× Born in or after 1980	(0.076)	(4.129)	(0.107)	(0.027)	(0.022)	(0.093)	(0.073)
Split ethnic homelands	0.002	-0.432	0.010	0.006	0.010	-0.015	-0.020
× Born in or after 1980	(0.022)	(2.317)	(0.055)	(0.009)	(0.011)	(0.039)	(0.028)
Distance to BF's border (km)	-0.000	-0.068**	0.001	0.000	-0.000	-0.000	-0.000
× Born in or after 1980	(0.000)	(0.031)	(0.001)	(0.000)	(0.000)	(0.000)	(0.000)
Squared distance to BF's border (km)	0.000	0.000*	-0.000	-0.000	0.000	0.000	0.000
× Born in or after 1980	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
BF × Distance to BF's border	0.000	0.014	-0.003	-0.000	-0.000	-0.000	0.001
× Born in or after 1980	(0.001)	(0.094)	(0.002)	(0.001)	(0.000)	(0.002)	(0.002)
BF × Squared distance to BF's border	0.000	0.000	0.000	-0.000	0.000	0.000	-0.000
× Born in or after 1980	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Birth order	0.014***	0.312***	0.005	0.002*	0.003***	-0.010	-0.026
	(0.003)	(0.087)	(0.005)	(0.001)	(0.001)	(0.013)	(0.016)
Muslim	0.068***	5.496***	-0.111**	0.002	0.005	-	-
	(0.023)	(0.740)	(0.048)	(0.008)	(0.007)		
Christian	0.052***	3.926***	-0.020	0.004	0.007	-	-
	(0.014)	(0.534)	(0.037)	(0.008)	(0.006)		
Single birth (dummy)	-	-	-	-	-	-0.239***	-0.295***
						(0.036)	(0.034)
Mother's age at birth (years)	-	-	-	-	-	-0.003	-0.002
						(0.004)	(0.004)
Predicted values $\in [0, 1]$ (proportion)	-	-	-	0.966	0.954	1.000	0.999
R-squared	0.144	0.271	0.210	0.138	0.117	0.555	0.548
No. of obs.	89334	89465	42773	95099	107308	45739	49919
Unit of obs.	Woman	Woman	Woman	Woman	Woman	Child	Child
Country-ethnicity FE	YES	YES	YES	YES	YES	NO	NO
Year-of-birth FE	YES	YES	YES	YES	YES	YES	YES
Community FE	YES	YES	YES	YES	YES	NO	NO
Mother FE	NO	NO	NO	NO	NO	YES	YES
Year-of-interview FE	YES	YES	YES	YES	YES	YES	YES
Sample DHS							
Benin 2001	YES	YES	YES	YES	YES	YES	YES
Benin 2011-12	YES	YES	YES	YES	YES	YES	YES
Burkina Faso 1998-99	YES	YES	NO	NO	NO	YES	YES
Burkina Faso 2003	YES	YES	YES	YES	YES	YES	YES
Burkina Faso 2010	YES	YES	YES	YES	YES	YES	YES
Côte d'Ivoire 1998-99	YES	YES	NO	NO	NO	YES	YES
Côte d'Ivoire 2011-12	YES	YES	YES	YES	YES	YES	YES
Mali 2001	YES	YES	YES	YES	YES	YES	YES
Mali 2006	YES	YES	YES	YES	YES	YES	YES
Mali 2012-13	YES	YES	YES	YES	YES	YES	YES
Togo 2013-14	YES	YES	YES	YES	YES	YES	YES

Notes: (1) Figures ( ) are standard errors. *** denotes significance at 1%, ** at 5%, and * at 10%. (2) Standard errors are clustered at the ethnic-homeland and country-region levels.

Table 4: Policy consequences for marital outcomes of those aged 18 years or above (OLS)

Dependent variables:	One if married by age 18	One if had sex by age 18	One if gave birth by age 18	No. of children	Education (years)	Education (years)
Sample:	Female	Female	Female	Female	Female	Male
	(a)	(b)	(c)	(d)	(e)	(f)
Burkina Faso (BF)	-0.050	-0.014	-0.045	0.106	-0.144	0.030
× Born in or after 1980	(0.042)	(0.034)	(0.050)	(0.277)	(0.169)	(0.456)
Split ethnic homelands	0.012	0.005	0.000	0.026	0.011	-0.158
× Born in or after 1980	(0.020)	(0.016)	(0.023)	(0.104)	(0.101)	(0.226)
Distance to BF's border (km)	-0.000**	-0.000	-0.000	0.004**	0.002	-0.001
× Born in or after 1980	(0.000)	(0.000)	(0.000)	(0.001)	(0.001)	(0.003)
Squared distance to BF's border (km)	0.000*	0.000	0.000	-0.000	-0.000	0.000
× Born in or after 1980	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
BF × Distance to BF's border	-0.001	-0.001	-0.000	-0.003	0.007**	0.001
× Born in or after 1980	(0.001)	(0.001)	(0.001)	(0.004)	(0.003)	(0.008)
BF × Squared distance to BF's border	0.000	0.000	0.000	0.000	-0.000**	0.000
× Born in or after 1980	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Birth order	0.003**	0.002**	0.004***	0.015***	-0.020	-
	(0.001)	(0.001)	(0.001)	(0.006)	(0.013)	
Muslim	0.015	0.006	-0.010	-0.016	-0.002	-0.185
	(0.012)	(0.010)	(0.011)	(0.038)	(0.097)	(0.242)
Christian	-0.081***	-0.042***	-0.066***	-0.271***	1.269***	1.763***
	(0.009)	(0.012)	(0.008)	(0.042)	(0.118)	(0.135)
Predicted values $\in [0, 1]$ (proportion)	1.000	0.997	1.000	-	-	-
R-squared	0.199	0.127	0.111	0.611	0.419	0.525
No. of obs.	101977	100830	101977	101977	101913	36577
Country-ethnicity FE	YES	YES	YES	YES	YES	YES
Year-of-birth FE	YES	YES	YES	YES	YES	YES
Community FE	YES	YES	YES	YES	YES	YES
Year-of-interview FE	YES	YES	YES	YES	YES	YES

Notes: (1) Figures ( ) are standard errors. *** denotes significance at 1%, ** at 5%, and * at 10%. (2) Standard errors are clustered at the ethnic-homeland and country-region levels. (3) Information on birth order was unavailable for male respondents.

Table 5: Policy consequences for marital outcomes of married women aged 18 years or above (OLS)

Dependent variables:	Age at first marriage	Age at first sex	Age at first birth	One if polygyny	A husband's education (years)	A husband's age (years)	One if have DM power	One if had any IPV
	(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)
Burkina Faso (BF)	0.518	0.122	0.535	0.058	-0.123	0.128	-0.002	0.045
× Born in or after 1980	(0.326)	(0.248)	(0.444)	(0.037)	(0.185)	(0.648)	(0.027)	(0.039)
Split ethnic homelands	-0.195	-0.106	-0.083	0.007	-0.086	0.025	0.007	-0.009
× Born in or after 1980	(0.131)	(0.117)	(0.195)	(0.019)	(0.126)	(0.213)	(0.012)	(0.024)
Distance to BF's border (km)	-0.001	-0.000	0.001	0.000	-0.001	0.001	-0.000*	0.000**
× Born in or after 1980	(0.002)	(0.001)	(0.002)	(0.000)	(0.001)	(0.003)	(0.000)	(0.000)
Squared distance to BF's border (km)	0.000	0.000	-0.000	-0.000	0.000	0.000	0.000	-0.000**
× Born in or after 1980	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
BF × Distance to BF's border	0.004	0.002	0.001	-0.002**	0.004	-0.002	0.000	-0.000
× Born in or after 1980	(0.005)	(0.004)	(0.006)	(0.001)	(0.004)	(0.013)	(0.001)	(0.001)
BF × Squared distance to BF's border	-0.000	-0.000	-0.000	0.000**	-0.000	0.000	-0.000	-0.000
× Born in or after 1980	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Birth order	-0.022**	-0.016**	-0.035***	0.003**	0.010	0.023	0.001	0.002
	(0.009)	(0.008)	(0.009)	(0.001)	(0.010)	(0.023)	(0.001)	(0.002)
Muslim	-0.011	0.065	0.014	0.046***	-0.106	-0.112	-0.026**	-0.074***
	(0.075)	(0.057)	(0.086)	(0.012)	(0.131)	(0.280)	(0.010)	(0.021)
Christian	0.571***	0.328***	0.429***	-0.112***	1.450***	-1.809***	-0.003	-0.034*
	(0.075)	(0.060)	(0.083)	(0.018)	(0.150)	(0.306)	(0.007)	(0.017)
Predicted values $\in [0,1]$ (proportion)	-	-	-	0.985	-	-	0.989	0.999
R-squared	0.223	0.188	0.186	0.220	0.448	0.557	0.219	0.231
No. of obs.	86082	85116	81141	86082	81743	80511	79569	28986
Country-ethnicity FE	YES	YES	YES	YES	YES	YES	YES	YES
Year-of-birth FE	YES	YES	YES	YES	YES	YES	YES	YES
Community FE	YES	YES	YES	YES	YES	YES	YES	YES
Year-of-interview FE	YES	YES	YES	YES	YES	YES	YES	YES
Sample DHS								
Benin 2001	YES	YES	YES	YES	YES	YES	YES	NO
Benin 2011-12	YES	YES	YES	YES	YES	YES	YES	NO
Burkina Faso 1998-99	YES	YES	YES	YES	YES	YES	NO	NO
Burkina Faso 2003	YES	YES	YES	YES	YES	YES	YES	NO
Burkina Faso 2010	YES	YES	YES	YES	YES	YES	YES	YES
Côte d'Ivoire 1998-99	YES	YES	YES	YES	NO	NO	NO	NO
Côte d'Ivoire 2011-12	YES	YES	YES	YES	YES	YES	YES	YES
Mali 2001	YES	YES	YES	YES	YES	YES	YES	NO
Mali 2006	YES	YES	YES	YES	YES	YES	YES	YES
Mali 2012-13	YES	YES	YES	YES	YES	YES	YES	YES
Togo 2013-14	YES	YES	YES	YES	YES	YES	YES	YES

Notes: (1) Figures ( ) are standard errors. *** denotes significance at 1%, ** at 5%, and * at 10%. (2) Standard errors are clustered at the ethnic-homeland and country-region levels.

Table 6: Selected relocation: Interethnic marriage and relocation (OLS)

Dependent variables:	One if inter-ethnic marriage	One if not living in places of birth	One if not living in places of birth
Sample:	Married	Married	All
	(a)	(b)	(c)
Burkina Faso (BF)	0.015	0.032	-0.005
× Born in or after 1980	(0.034)	(0.034)	(0.043)
Split ethnic homelands	-0.013	0.017	-0.014
× Born in or after 1980	(0.013)	(0.016)	(0.018)
Distance to BF's border (km)	0.000	-0.000	-0.000
× Born in or after 1980	(0.000)	(0.000)	(0.000)
Squared distance to BF's border (km)	-0.000	0.000	0.000
× Born in or after 1980	(0.000)	(0.000)	(0.000)
BF × Distance to BF's border	-0.000	-0.001	-0.002**
× Born in or after 1980	(0.001)	(0.001)	(0.001)
BF × Squared distance to BF's border	-0.000	0.000	0.000*
× Born in or after 1980	(0.000)	(0.000)	(0.000)
Birth order	0.000	0.003*	0.001
	(0.002)	(0.002)	(0.001)
Muslim	0.037**	0.034*	0.043**
	(0.015)	(0.020)	(0.019)
Christian	0.035***	0.056***	0.054***
	(0.011)	(0.018)	(0.019)
R-squared	0.429	0.217	0.200
No. of obs.	25276	41512	51761
Country-ethnicity FE	YES	YES	YES
Year-of-birth FE	YES	YES	YES
Community FE	YES	YES	YES
Year-of-interview FE	YES	YES	YES
Sample DHS			
Benin 2001	YES	YES	YES
Benin 2011-12	YES	NO	NO
Burkina Faso 1998-99	YES	YES	YES
Burkina Faso 2003	YES	YES	YES
Burkina Faso 2010	YES	NO	NO
Côte d'Ivoire 1998-99	NO	NO	NO
Côte d'Ivoire 2011-12	YES	NO	NO
Mali 2001	YES	YES	YES
Mali 2006	YES	YES	YES
Mali 2012-13	YES	NO	NO
Togo 2013-14	YES	NO	NO

Notes: (1) Figures ( ) are standard errors. *** denotes significance at 1%, ** at 5%, and * at 10%. (2) Standard errors are clustered at the ethnic-homeland and country-region levels.

Table 7: Selected relocation: Trimmed sample (OLS)

Sample:	$Q = 0$ (i.e., full sample)		$Q = 10$		$Q = 20$		$Q = 30$		$Q = 40$	
	Coefficient	P-values	Coefficient	P-values	Coefficient	P-values	Coefficient	P-values	Coefficient	P-values
Dependent variables:	(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)
(A) FGC										
One if cut	-0.108***	(0.003)	-0.078*	(0.064)	-0.060	(0.177)	-0.030	(0.556)	0.000	(0.998)
One if cut by age 5	-0.117***	(0.002)	-0.094**	(0.021)	-0.081*	(0.059)	-0.063	(0.191)	-0.040	(0.423)
One if sewn closed (zero if not cut)	0.020	(0.117)	0.024	(0.116)	0.027*	(0.089)	0.029*	(0.093)	0.032*	(0.075)
One if traditional cutters (zero if not cut)	-0.084**	(0.026)	-0.058	(0.166)	-0.042	(0.340)	-0.015	(0.763)	0.011	(0.829)
(B) Health										
Height for age (z-scores)	0.042	(0.586)	0.046	(0.549)	0.051	(0.509)	0.058	(0.459)	0.061	(0.437)
BMI × 10	-0.154	(0.970)	-0.289	(0.944)	-0.011	(0.998)	0.193	(0.965)	-0.117	(0.979)
Hemoglobin (g/dl)	0.176	(0.102)	0.182*	(0.087)	0.175	(0.108)	0.170	(0.133)	0.173	(0.147)
One if had genital problems	0.012	(0.668)	0.009	(0.728)	0.010	(0.712)	0.014	(0.628)	0.012	(0.687)
One if had terminated pregnancy	-0.020	(0.357)	-0.022	(0.321)	-0.021	(0.360)	-0.022	(0.367)	-0.025	(0.299)
(C) Marital outcomes										
One if married by age 18	-0.050	(0.241)	-0.048	(0.264)	-0.038	(0.357)	-0.037	(0.359)	-0.040	(0.330)
One if had sex by age 18	-0.014	(0.686)	-0.012	(0.743)	-0.005	(0.896)	-0.004	(0.915)	-0.004	(0.902)
One if gave birth by age 18	-0.045	(0.363)	-0.045	(0.370)	-0.035	(0.462)	-0.034	(0.474)	-0.038	(0.448)
No. of children by age 18	0.106	(0.703)	0.114	(0.684)	0.179	(0.499)	0.183	(0.490)	0.194	(0.487)
Education (years) by age 18	-0.144	(0.397)	-0.189	(0.296)	-0.228	(0.210)	-0.209	(0.299)	-0.201	(0.342)
Age at first marriage	0.518	(0.113)	0.518	(0.118)	0.451	(0.156)	0.454	(0.136)	0.470	(0.139)
Age at first sex	0.122	(0.623)	0.109	(0.667)	0.050	(0.834)	0.043	(0.853)	0.056	(0.816)
Age at first birth	0.535	(0.229)	0.544	(0.221)	0.453	(0.274)	0.459	(0.255)	0.463	(0.260)
One if polygyny	0.058	(0.122)	0.066*	(0.066)	0.077**	(0.028)	0.082**	(0.022)	0.086**	(0.024)
A husband's education (years)	-0.123	(0.508)	-0.137	(0.480)	-0.179	(0.354)	-0.191	(0.364)	-0.245	(0.232)
A husband's age	0.128	(0.843)	0.143	(0.824)	0.259	(0.681)	0.263	(0.681)	0.294	(0.649)
One if have DM power	-0.002	(0.939)	-0.000	(0.990)	-0.002	(0.949)	-0.002	(0.942)	-0.005	(0.859)
One if had any IPV	0.045	(0.256)	0.045	(0.254)	0.043	(0.293)	0.049	(0.267)	0.050	(0.264)

Notes: (1) Figures ( ) are standard errors. *** denotes significance at 1%, ** at 5%, and * at 10%. (2) Standard errors are clustered at the ethnic-homeland and country-region levels.

Supplemental appendix

S.1 My field survey: External influence on neighboring countries

The partition of ethnic groups makes cross-border social interactions reasonably common in Africa (e.g., Lesser and Moisé-Leeman, 2009; Meagher, 2003); therefore, this social interaction might have enabled a body of FGC-related health and political knowledge acquired by Burkinabé people to be introduced into the split ethnic homelands of its neighboring countries, thus raising the cost of FGC (relative to its benefit) as perceived by the residents of those areas.

To assess whether such knowledge spillovers are possible, in February 2016, I conducted a semi-structured questionnaire-based survey in 13 villages (including one sub-village) in Wa West, a district in northwest Ghana located very close to the Burkina Faso border, although the DHS data drawn from Ghana is not exploited for the reason explained in Section 3. The decision to select Ghana for the field survey was informed by several concerns including security, research budget, and translation.[38] The surveyed communities were primarily settled by the Dagaaba and Lobi, ethnic groups that spread over Burkina Faso and Ghana and used to practice FGC.

While the nature of convenience sampling precludes generalizing findings from this field survey, three points are still noted. First, the interviews revealed that people in a community on one side of the two countries frequently had contact with those in a community on the other side through marriage and market meetings.[39] Second, interviewees often noted how FGC had declined in the surveyed area because people had learned that this practice complicated childbirth (although they had previously believed that the opposite was true). This view is consistent with that held by the permanent secretary of CNLPE (UNFPA, 2010). According to the secretary, informing people of the complications during childbirth attributable to FGC has thus far been seen as more effective in altering Burkinabé people's hearts and minds, rather than emphasizing the human rights perspective of the practice. This is because they cherish children and, thus, are particularly concerned about their reproductive health.[40]

Third, one Dagaaba ex-cutter mentioned that she received an offer to perform FGC from Burkinabé parents (one year before the interview), although she rejected this offer. This finding indicates that the strong law in Burkina Faso could have conceivably served to encourage Burkinabé parents to take their daughters to other countries for the purpose of FGC, in which laws prohibiting FGC do not exist or the enforcement of such laws is not so strict. Consistently,

[38] In this survey, I collected qualitative information on people's practices relevant to FGC, marriage, and sexual behavior. While neither villages nor respondents were randomly selected (i.e., convenience sampling), this approach nevertheless secured 26 effective interviews conducted with 11 male and 15 female adult respondents. Among the respondents were members of four ethnic groups (the Dagaaba, Lobi, Senu, and Wala); four respondents were ex-traditional cutters for girls and five respondents (including three ex-traditional cutters for girls) were either ex- or present cutters for boys. The duration of each interview was approximately 30—60 minutes. To ensure confidentiality and to maximize data reliability, the interviews were conducted in an environment where the respondent was alone with two research assistants (for translation to and from local languages) and me.

[39] For example, one Burkinabé woman who had married into Ghana returned to her natal home at least three times per month to take care of her elderly mother. Burkinabé women may also visit markets and utilize health-care services in Ghana. People simply crossed the border by boat (rainy season) or on foot (dry season) without formal immigration procedures.

[40] Similarly, an elderly Burkinabé woman residing in Wa West informed me that cross-border social interactions and the resultant knowledge spillovers might have succeeded in making FGC obsolete in the surveyed communities before penalties for FGC prescribed in Ghana's law became more serious in 2007.

it is reported that the following ethnic groups moved across national boundaries to get their daughters circumcised while avoiding Burkina Faso's law enforcement (Sayagues, 2009): the Dagaaba and Lobi spread between Burkina Faso and Ghana; the Mossi and Yagse moved across Burkina Faso and Mali; and the Fulani and Gourmantché distributed between Burkina Faso and Niger. On the one hand, these findings suggest that FGC is so deeply entrenched in society that it is difficult to eradicate this practice. On the other hand, due to social interaction, people living outside Burkina Faso might be aware and concerned that FGC is a costly practice involving criminalization and legal punishment.[41][42]

S.2 Mackie (1996)'s marriage convention theory

In this section, a simple model is developed to formalize Mackie (1996)'s seminal theory of marriage convention to clarify the relation between FGC abandonment and women's health and marriage. The relevant propositions are proved in subsection S.2.2.

S.2.1 Model

Mackie (1996) asserted that FGC persists in Africa's typical intramarrying communities wherein men believe that uncircumcised women are unfaithful and women believe that men will not marry uncircumcised women. He regarded FGC as a social convention supported by a coordination failure and claimed that assembling a critical mass of people who publicly pledge to stop FGC (e.g., creation of an anti-FGC association) is important to eradicate this practice (i.e., tipping-point theory). However, he discussed these two issues separately, by referring to a simple normal-form game matrix (Mackie, 1996, p. 1006) for the former and by exploiting Schelling (2006)'s (Chapter 7) coordination diagram (Mackie, 1996, p. 1011) for the latter. However, the coordination diagram does not necessarily elucidate how circumcised women coordinate their marriage. The following model attempts to unify these two perspectives into a single framework as simply as possible.[43]

Consider a normal-form game describing an intramarrying community, wherein women compete with each other

[41] In my interview, one ex-cutter (for girls) heard of cases where the police had arrested Burkinabé cutters practicing FGC.

[42] The FGC-induced influx of Burkinabé people to the borderlands of Burkina Faso's neighboring countries might also have increased the perceived cost of FGC in these borderlands for two other reasons. First, as people pay fees for cutting, local prices of FGC might have risen due to increasing demand for the service. Second, increasing demand for the services provided by cutters in neighboring countries may have raised the local cost of searching for available cutters. In my field survey, I found one Ghanaian male cutter (for boys), who regularly stayed in Burkina Faso for a month and practiced male circumcision in several communities, because Burkinbé people requested his skills. When he is away, Ghanaian people would have to identify alternative cutters. Despite these possibilities, however, in the survey, I did not find any current (for boys) or ex-cutters (for girls) who had charged higher prices for cutting in response to increasing demand for their services. Rather, they sometimes gave a discount to poor parents. In addition, it would not be particularly bothersome for people to postpone cutting for a short period of time because of the transient unavailability of cutters.

[43] It would also be possible to show multiple equilibria regarding FGC, which will be shown below, by utilizing a signaling model (e.g., Spence, 1973). Nevertheless, this complication is avoided here, as this section aims to more formally replicate Mackie (1996)'s original idea, which relies on a normal-form game and does not assume any heterogeneity and the associated imperfect information, and to generate useful theoretical implications for this study's empirical analyses. Relatedly, if pure coordination maintains FGC, as proposed in Mackie (1996), social pressure by community members on those who reject FGC is not required to sustain this practice.

when seeking their marital partners without any search friction, as presumed by Mackie (1996). To consider this competition in the simplest manner, the (exogenous) men-to-women ratio is $p \in (0, 1)$, and the male population size is normalized as one. Men (agent m) and women (agent w) are assumed to have homogeneous preferences. Additionally, two marriage-related customs—FGC and something else—exist in this community.

In this game, a man decides whether to propose and to whom, and if he does, what will be the amount of rents $g \geq 0$ (e.g., bride prices) that he will provide to the woman (or her parents). If he decides to propose to a circumcised (or uncircumcised) woman, he chooses endogenously determined g_c (g_0). When he makes no proposal, he chooses exogenously determined g_s ($= 0$), which retains his (and thereby the women's) single status. In contrast, a woman (or her parents) decides whether to undergo circumcision (action k)—where $k = k_c$ if she is circumcised and $k = k_0$ otherwise—and then selects her response z to the proposal; this response includes either "accept and marry (m)" or "reject and stay single (s)." Consequently, both men's and women's strategy profiles can be characterized as (g, k, z).

Regardless of whether the marriage-related custom is FGC, men are assumed to believe that women conforming to a community's major custom are faithful and obtain γb ($(1-\gamma)b$) by marrying circumcised (or uncircumcised) women, where $b > 0$ is exogenous, and γ is the fraction of circumcised women in a community.[44] This fraction is endogenously determined by women's choice of k. For instance, when $\gamma = 0.8$, men who marry circumcised women obtain higher utility than those who marry uncircumcised women by $0.6b$ ($= 0.8b - 0.2b$). This utility premium is zero if there is no majority custom (i.e., $\gamma = 0.5$). Married men are assumed to receive no utility other than this premium, which simplifies the analysis. Both men and women obtain reservation utility normalized at the level of zero when they remain single. FGC and its resulting health impairments make women less productive, thereby reducing their utility by the exogenous amount of $c > 0$ during both a married or a single life.[45] The corresponding payoffs $v_i(\cdot, \cdot, \cdot)$ of an agent i (either m or w) are demonstrated as follows:

$$v_m(g_s, k_c, m) = v_m(g_s, k_c, s) = v_m(g_c, k_c, s) = v_m(g_0, k_c, m) = v_m(g_0, k_c, s) = 0, \tag{S.2.1}$$

$$v_m(g_s, k_0, m) = v_m(g_s, k_0, s) = v_m(g_0, k_0, s) = v_m(g_c, k_0, m) = v_m(g_c, k_0, s) = 0, \tag{S.2.2}$$

$$v_m(g_c, k_c, m) = \gamma b - g_c, \tag{S.2.3}$$

$$v_m(g_0, k_0, m) = (1 - \gamma)b - g_0, \tag{S.2.4}$$

[44] More generally, a social custom's benefit is felt more strongly with an increase in people adhering to such a custom, as presupposed in prior studies (e.g. Lindbeck, 1997; Lindbeck et al., 1999). See also Rege (2004) for the validity of this assumption.

[45] This reduced productivity may also decrease men's utility in marital life when they marry circumcised women. Explicitly considering this cost in the model does not affect the key theoretical implications.

$$v_w(g_s, k_c, m) = v_w(g_s, k_c, s) = v_w(g_c, k_c, s) = v_w(g_0, k_c, m) = v_w(g_0, k_c, s) = -c, \tag{S.2.5}$$

$$v_w(g_s, k_0, m) = v_w(g_s, k_0, s) = v_w(g_0, k_0, s) = v_w(g_c, k_0, m) = v_w(g_c, k_0, s) = 0, \tag{S.2.6}$$

$$v_w(g_c, k_c, m) = g_c - c, \tag{S.2.7}$$

$$v_w(g_0, k_0, m) = g_0, \tag{S.2.8}$$

Assuming $c = c_0$ and defining $\tilde{c}_0 \equiv \frac{c_0}{p}$, it can be shown that

Proposition S.1 *When the cost of FGC is not particularly large (i.e., $b > \tilde{c}_0$), the strategy profiles $(g_c = \tilde{c}_0, k_c, m)$ and $(g_0 = 0, k_0, m)$ are stable Nash equilibria, with the equilibrium levels of utility $v_m = b - \tilde{c}_0$, $v_w = \tilde{c}_0 - c_0$ for married women and $v_w = -c_0$ for unmarried women in the former, while $v_m = b$ and $v_w = 0$ for both married and unmarried women in the latter.*

In the two stable pure-strategy Nash equilibria, all women are circumcised in the profile $(g_c = \tilde{c}_0, k_c, m)$ (FGC equilibrium achieving the circumcised fraction of $\gamma = 1$) and uncircumcised in the profile $(g_0 = 0, k_0, m)$ (no-FGC equilibrium achieving the circumcised fraction of $\gamma = 0$); see also Figure S.4.

Once the FGC equilibrium arises as a social norm because of historical accident (e.g., Mackie, 1996), it becomes a uniquely salient or focal solution to the relevant game. In the FGC equilibrium, a man has no incentive to marry uncircumcised women because he believes that they are unfaithful; therefore, such a marriage provides him with lower utility than the current marriage of the man. A woman also has no incentive to refuse FGC because (as she believes) no man will propose to uncircumcised women. The FGC equilibrium is inferior to the no-FGC equilibrium because shifting from the former to the latter improves the total welfare enjoyed by all community members from $b - \tilde{c}_0$ to b.[46] Therefore, the existence of both the FGC and the no-FGC equilibria reflects a coordination problem. Proposition S.1 also implies that a community tends to reveal the cutting rate as either one or zero.

Additionally, when γ is just below (above) $\frac{b+\tilde{c}_0}{2b}$, as indicated from the proof of proposition S.1, a community converges to the no-FGC equilibrium (FGC equilibrium). Thus, if more than $\frac{b-\tilde{c}_0}{2b}$ $(= 1 - \frac{b+\tilde{c}_0}{2b})$ fraction of women do not undergo FGC, a shift from the FGC to the no-FGC equilibrium occurs in a self-enforcing manner. Therefore, following Schelling (2006), Mackie (1996) claims that organizing a group with a critical minimum number of people who refuse FGC and making it publicly visible is necessary to eradicate this practice. Because $\frac{b-\tilde{c}_0}{2b} < \frac{1}{2}$, this group does not necessarily have to include most female community members.

This study's empirical analysis presumes that Burkina Faso's political efforts increase FGC's utility cost perceived

[46] The total welfare in the FGC equilibrium is $(b - \tilde{c}_0) + \left(\frac{1}{p}\right)(p(\tilde{c}_0 - c_0) + (1-p)(-c_0)) = b - \tilde{c}_0$. The total welfare in the no-FGC equilibrium would be easily checked in the same way.

by the residents from c_0 to $c_1 > c_0$. Accordingly,

Proposition S.2 *When $b < \tilde{c}_1 \equiv \frac{c_1}{p}$, the strategy profile $(g_c = 0, k_0, m)$ is a stable Nash equilibrium, with the equilibrium levels of utility $v_m = b$ and $v_w = 0$ for both married and unmarried women.*

In response to the increase in the perceived utility cost, all women refrain from undergoing FGC. However, in reality, only a fraction of the community members might have obtained new knowledge on FGC and updated their perception of its cost. Nevertheless, if the majority of people exceeding the critical threshold refuse FGC, a community tips over to the no-FGC equilibrium in a self-enforcing manner.

Transitioning to a new equilibrium would keep the likelihood of women's marriage at p. However, this transition could reduce married women's (or their parents') utility from $\tilde{c}_0 - c_0 = \frac{(1-p)c_0}{p}$ to zero. The reasoning goes as follows: In competitive marriage markets wherein women fail to wed with a positive probability, they solely suffer from costly FGC unless they successfully find marital partners. Then, to encourage "all" women to undergo FGC, men in the FGC equilibrium would have to give married women more rents than those provided by men in the no-FGC equilibrium to compensate for FGC's health-impairment costs. Thus, the aforementioned prediction that married women's utility may decline because of the equilibrium shift is ascribed to the disappearance of this compensation, which, in turn, raises married men's welfare from $b - \tilde{c}_0$ to b. While unmarried women's welfare increases from $-c_0$ to zero because of FGC avoidance, and the total welfare enjoyed by all community members also improves from $b - \tilde{c_0}$ to b, the asymmetric consequence of FGC abandonment on married men's and women's welfare is not highlighted in Mackie (1996) and may serve as an important point of caution for those who believe that FGC eradication improves "all" women's welfare. In contrast, when the cost of FGC is negligible (i.e., $c_0 \approx 0$), any influence on women's marriage can be marginal. Additionally, FGC can also be assumed to involve mortality risk at its operation. Thus, FGC abandonment may reduce the likelihood of women's marriage because a decline in female mortality produces a more competitive marriage market (while keeping the remaining theoretical predictions, as described above).[47][48]

[47] To consider this point more formally, assume that the men-to-women ratio is $p + \delta\gamma$, where $\delta > 0$ is an exogenous parameter such that $p + \delta \in (0, 1)$. Because this ratio increases with γ, the marriage market becomes less competitive as FGC becomes more common. The aforementioned propositions S.1 and S.2 hold true with $\tilde{c}_0$ ($\tilde{c}_1$) redefined as $\frac{c_0}{p+\delta}$ ($\frac{c_1}{p+\delta}$). In this case, women's marriage probability declines from $p + \delta$ to p because of FGC avoidance. However, with the negligible FGC health-impairment costs (i.e., $c_0 \approx 0$ and $\delta \approx 0$), the FGC abandonment would not influence women's (both intensive and extensive) marital outcomes significantly.

[48] Admittedly, the actual marriage market response may go beyond Mackie (1996). For instance, introducing search frictions into the process of finding a spouse, female marriage can be interpreted as a bride's parents' (or a bride's) decision to accept the first proposal that provides them with higher utility than their reservation payoff. If a daughter stops undertaking FGC and the resulting health improvement increases her contribution to a household's earning capacity and, consequently, the reservation utility, her parents may delay her marriage. According to public health research (e.g., Marphatia et al., 2017), this delay may improve women's health (e.g., anemia, BMI), which may again influence their marriage timing. Additionally, FGC abandonment may enable women to receive more proposals from men who belong to different ethnic groups that do not practice FGC. The increased frequency of marriage offers has two conflicting forces on early marriage: encouraging effects attributed to marriage facilitation and discouraging effects resulting from the increase in reservation utility (Ermisch, 2003). Moreover, if women's health improvement resulting from their FGC avoidance increases their marginal contribution to agricultural production, thereby lowering the cost incurred by men by having an additional wife (i.e., the shadow price of wives), it may prompt the incidence of polygyny (Jacoby, 1995).

S.2.2 Proof

Proof of proposition S.1:

Note that men choose $g_0 = 0$ to encourage uncircumcised women to accept a marital offer, resulting in $v_m(g_0, k_0, m) = (1-\gamma)b$ and $v_w(g_0, k_0, m) = 0$. Since $(1-\gamma)b \geq 0$, men always have an (weak) incentive to make a marital offer to uncircumcised women rather than staying single. To consider an equilibrium where women choose FGC while accepting a marital offer, it must be the case that $g_c - c_0 \geq 0$ as well as $p(g_c - c_0) + (1-p)(-c_0) \geq pg_0 + (1-p) \cdot 0 = 0$, resulting in $g_c \geq \frac{c_0}{p} \equiv \tilde{c}_0$. So, men choose $g_c = \tilde{c}_0$, resulting $v_m(g_c, k_c, m) = \gamma b - \tilde{c}_0$ and $v_w(g_c, k_c, m) = \tilde{c}_0 - c_0 > 0$.

Now, consider the following three cases. First, assume the equilibrium fraction of the circumcised women in a community $\gamma^* = \underline{\gamma} \leq \frac{\tilde{c}_0}{b}$. Since $\underline{\gamma}b - \tilde{c}_0 \leq 0$ and $(1-\underline{\gamma})b > 0$ in this case, men prefer to marry uncircumcised women and uncircumcised women accept the proposal. For this outcome to be realized at equilibrium, women have to choose $k = k_0$, which leads to $\underline{\gamma} = 0 < \frac{\tilde{c}_0}{b}$ (no-FGC equilibrium). Second, assume $\gamma^* = \overline{\gamma} > \frac{b+\tilde{c}_0}{2b}$. Since $\overline{\gamma} > \frac{b+\tilde{c}_0}{2b} > \frac{\tilde{c}_0}{b}$, it becomes that $\overline{\gamma}b - \tilde{c}_0 > 0$ and $\overline{\gamma}b - \tilde{c}_0 > (1-\overline{\gamma})b$. Therefore, men prefer to marry circumcised women and circumcised women accept the proposal. For this outcome to be realized at equilibrium, women have to choose $k = k_c$, which leads to $\overline{\gamma} = 1 > \frac{b+\tilde{c}_0}{2b}$ (FGC equilibrium). Third, assume $\frac{\tilde{c}_0}{b} < \gamma^* = \hat{\gamma} \leq \frac{b+\tilde{c}_0}{2b}$. In this case, it becomes that $(1-\hat{\gamma})b \geq \hat{\gamma}b - \tilde{c}_0 > 0$. When $(1-\hat{\gamma})b > \hat{\gamma}b - \tilde{c}_0$, men prefer to marry uncircumcised women and uncircumcised women accept the proposal. For this outcome to be realized at equilibrium, women have to choose $k = k_0$, which leads to $\hat{\gamma} = 0 \leq \frac{\tilde{c}_0}{b}$. This is a contradiction to the definition of $\hat{\gamma}$. When $(1-\hat{\gamma})b = \hat{\gamma}b - \tilde{c}_0$ (i.e., $\hat{\gamma} = \frac{b+\tilde{c}_0}{2b}$), men are indifferent to the practice of FGC. In this case, it is possible that women randomize the cutting decision at equilibrium and choose $k = k_c$ with the probability $\frac{b+\tilde{c}_0}{2b}$ and $k = k_0$ with the remaining probability (In this equilibrium, men choose $g_c = \tilde{c}_0$ and $g_0 = 0$). However, this equilibrium is not stable because just a small deviation from this fraction leads to either the FGC or no-FGC equilibrium.

Proof of proposition S.2:

As before, men choose $g_c = \tilde{c}_1$ (or $g_0 = 0$) to encourage circumcised (or uncircumcised) women to accept a marital offer. Assume the equilibrium fraction $\gamma^* = \tilde{\gamma} \leq 1 < \frac{b+\tilde{c}_1}{2b} < \frac{\tilde{c}_1}{b}$. Since $\tilde{\gamma}b - \tilde{c}_1 < 0$ and $\tilde{\gamma}b - \tilde{c}_1 < (1-\tilde{\gamma})b$, men prefer to marry uncircumcised women and uncircumcised women accept the proposal. For this outcome to be realized at equilibrium, women have to choose $k = k_0$, which leads to $\tilde{\gamma} = 0 \leq 1$.

S.3 Interior cutting rates

Several communities with cutting rates between zero and one, as shown in Figure 4, are worth explaining. At least three reasons account for the interior cutting rates. First, these cutting rates might pertain to communities that are shifting from an FGC to a no-FGC equilibrium and thus are not in steady state. Second, such communities may be cohabited by two ethnic groups, one that traditionally practices FGC and one that does not, and the stable equilibrium may be achieved in a marriage market of the respective ethnic groups that does not overlap between them.

Third, within-community heterogeneity may also point toward the interior cutting rates, as analyzed by Efferson et al. (2015). For example, assume that a community includes two (publicly known) types of men, i.e., those who place a high intrinsic value on a community's marriage-related custom (i.e., conformists) and those who do not (i.e., reformists), whereby the former type is characterized as having $b = b_h$, along with the latter type of $b = b_l$ ($< b_h$). In this case, it would be possible that the equilibrium fraction of circumcised women lies between $\frac{b_h+\tilde{c}_0}{2b_h}$ and $\frac{b_l+\tilde{c}_0}{2b_l}$ (i.e., interior equilibria).[49]

The presence of the interior equilibria provides two related implications. First, cutting rates existing (and varying) between zero and one, as shown in Figure 4, may suggest that a plausible amount of heterogeneity exists in terms of the within-community distribution of the types across communities. Second, refinements that consider heterogeneous preferences within and across communities are needed when organizing an anti-FGC association, as proposed by Mackie (1996). For example, both the FGC and the no-FGC equilibrium (in addition to the interior equilibria) can still arise even when allowing for heterogeneous preferences within a community.[50] Then, consider a shift from the FGC equilibrium. The threshold value to stop FGC is $\frac{b_l+\tilde{c}_0}{2b_l}$ for the reformists. However, inducing $\frac{b_l-\tilde{c}_0}{2b_l}$ ($= 1 - \frac{b_l+\tilde{c}_0}{2b_l}$) fraction of women to refrain from FGC may not completely eliminate this practice. This is because the conformists still prefer to marry circumcised women provided more than $\frac{b_h+\tilde{c}_0}{2b_h}$ fraction of women practice FGC. While these discussions were based on the marriage coordination model, the logic is quite general and applies to any mechanisms supporting the normative equilibrium.

[49] Regardless of the fraction of the respective types, both types of men can choose $g_c = \tilde{c}_0$ and $g_0 = 0$ at equilibrium, which encourages women to accept a proposal while making them indifferent to the practice of FGC. Assume the equilibrium fraction of circumcised women in a community $\gamma^* = \gamma_H \in [\frac{b_h+\tilde{c}_0}{2b_h}, \frac{b_l+\tilde{c}_0}{2b_l}]$. Because $\gamma_H b_h - \tilde{c}_0 \geq (1-\gamma_H)b_h$ and $\gamma_H b_l - \tilde{c}_0 \leq (1-\gamma_H)b_l$, the conformists (reformists) prefer to marry circumcised (uncircumcised) women. In response to this choice, some women may choose $k = k_c$ and others may choose $k = k_0$. It is possible that γ_H is achieved at equilibrium.

[50] When the circumcised fraction is above $\frac{b_l+\tilde{c}_0}{2b_l}$ (below $\frac{b_h+\tilde{c}_0}{2b_h}$), the FGC equilibrium (no-FGC equilibrium) arises in a self-enforcing manner.

(For the supplemental appendix)

References

Conley, T. G., September 1999. GMM estimation with cross sectional dependence. Journal of Econometrics 92 (1), 1–45.

Efferson, C., Vogt, S., Elhadi, A., Ahmed, H. E. F., Fehr, E., September 2015. Female genital cutting is not a social coordination norm. Science 349 (6225), 1446–1447.

Ermisch, J. F., 2003. An Economic Analysis of the Family. Princeton University Press.

Hochberg, Y., 1988. A sharper Bonferroni procedure for multiple tests of significance. Biometrika 75 (4), 800–802.

Holm, S., 1979. Simple sequentially rejective multiple test procedure. Scandinavian Journal of Statistics 6 (2), 65–70.

Hsiang, S. M., Meng, K. C., Cane, M. A., 2011. Civil conflicts are associated with the global climate. Nature 476 (438-441).

Jacoby, H. G., October 1995. The economics of polygyny in sub-Saharan Africa: Female productivity and the demand for wives in Côte d'ivoire. Journal of Political Economy 103 (5), 938–971.

Lesser, C., Moisé-Leeman, E., 2009. Informal cross-border trade and trade facilitation in sub-Saharan Africa. OECD Trade Policy Papers 86, OECD Publishing, Paris.

Lindbeck, A., May 1997. Incentives and social norms in household behavior. American Economic Review 87 (2), 370–377.

Lindbeck, A., Nyberg, S., Weibull, J. W., February 1999. Social norms and economic incentives in the welfare state. Quarterly Journal of Economics 114 (1), 1–35.

Mackie, G., December 1996. Ending footbinding and infibulation: A convention account. American Sociological Review 61 (6), 999–1017.

Marphatia, A. A., Ambale, G. S., Reid, A. M., October 2017. Women's marriage age matters for public health: A review of the broader health and social implications in south Asia. Frontiers in Public Health 5 (269), 1–23.

Meagher, K., 2003. A back door to globalisation? structural adjustment, globalisation & transborder trade in west Africa. Review of African Political Economy 95, 57–75.

Rege, M., Rebruary 2004. Social norms and private provision of public goods. Journal of Public Economic Theory 6 (1), 65–77.

Sayagues, M., 2009. West africa: Female genital mutilation knows no borders. Inter Press Service News Agency6 February, http://www.google.co.jp/url?sa=t&rct=j&q=&esrc=s&source=web&cd=1&ved=0ahUKEwjK4Zu_zL3PAhVEqJQKHY7TBGwQFggcMAA&url=http\%3A\%2F\%2Fwww.ipsnews.net\%2F2009\%2F02\%2Fwest-africa-female-genital-mutilation-knows-no-borders\%2F&usg=AFQjCNE66LlzDwaF5Veo3AYTsnCPi82oSw&sig2=78kA3k4tXah6hSETQZzEMQ&bvm=bv.134495766,d.dGo.

Schelling, T. C., 2006. Micromotives and Macrobehavior. W. W. Norton & Company, Inc., Revised edition.

Spence, M., August 1973. Job market signaling. Quarterly Journal of Economics 87 (3), 355–374.

UNFPA, October 2010. Burkina faso has a strong law against FGM/C, but winning hearts and minds remains crucial.

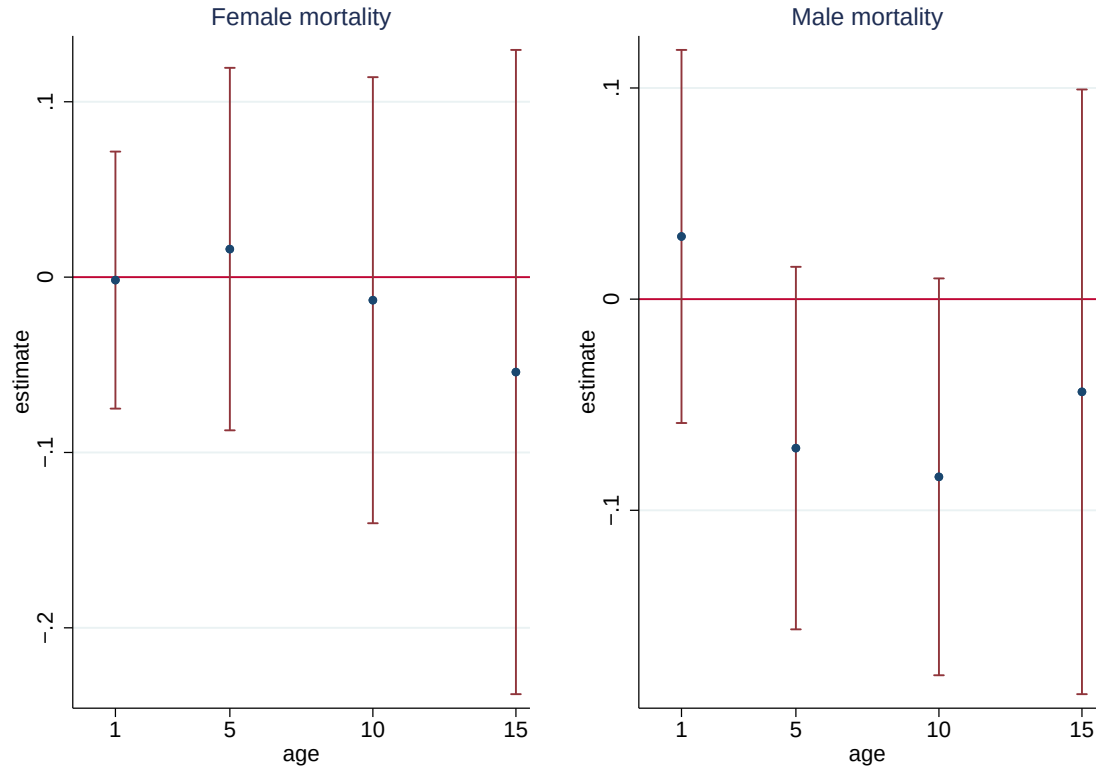

Figure S.1: Policy consequences for mortality (one if die by age M) (OLS)

Notes: (1) This figure reports α_2 with 95% confidence intervals. (2) Standard errors are clustered at the ethnic-homeland and country-region levels.

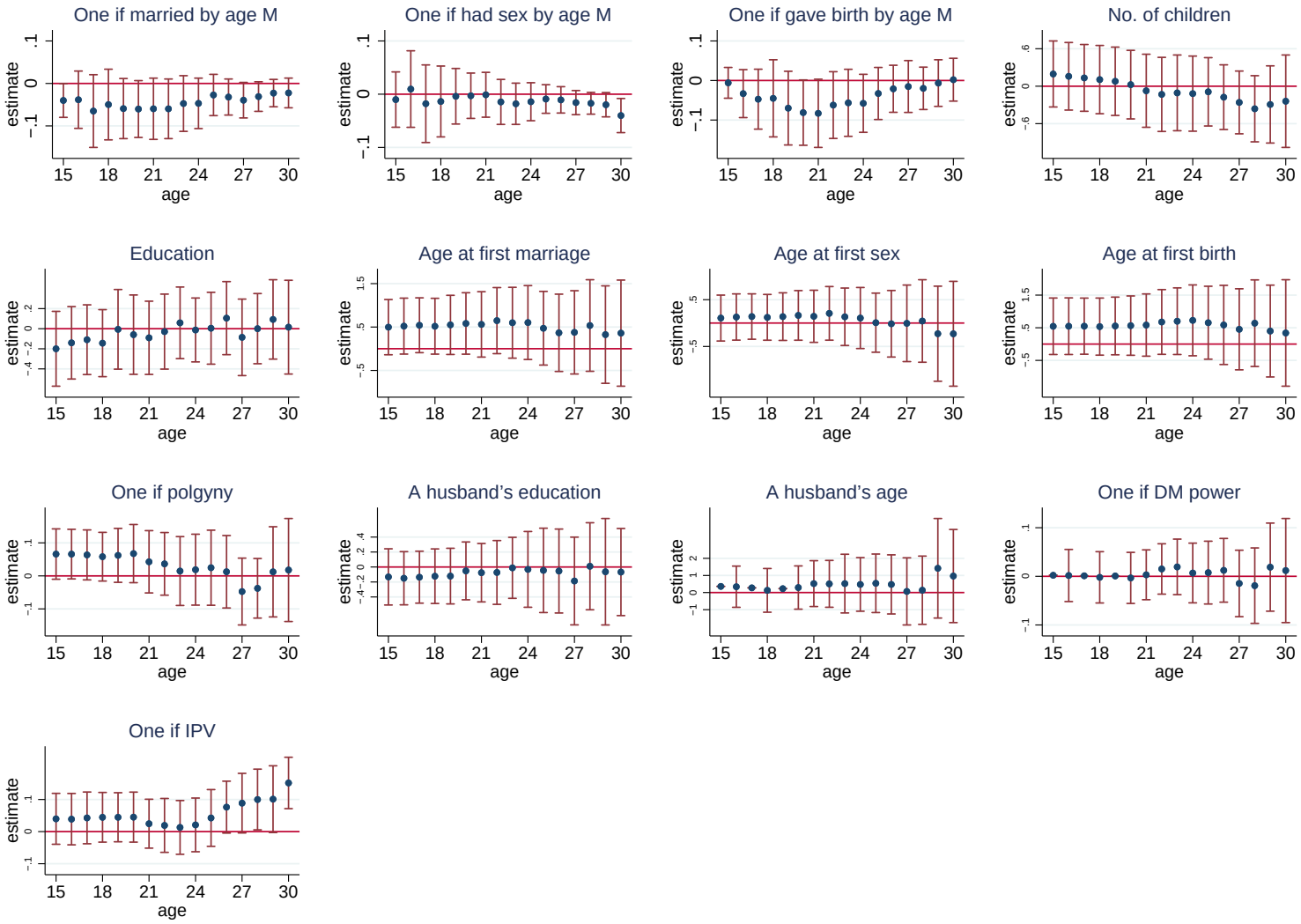

Figure S.2: Policy consequences for women aged M years or above: Marriage-related outcomes (OLS)

Notes: (1) This figure reports α_2 with 95% confidence intervals. (2) Standard errors are clustered at the ethnic-homeland and country-region levels. (3) Confidence intervals corresponding to some estimates are not reported due to computational difficulties.

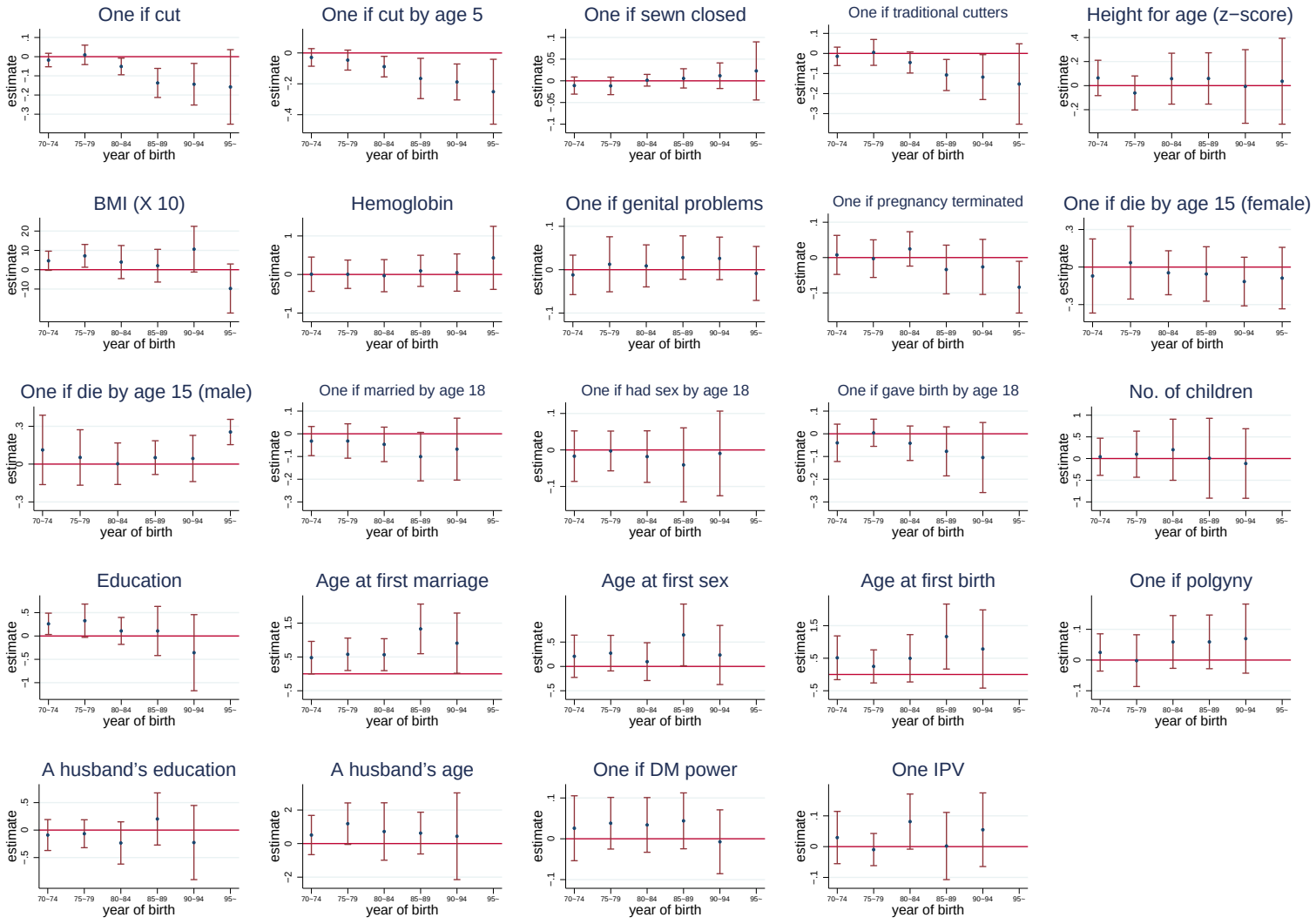

Figure S.3: A trend of policy consequences for all outcomes (OLS)

Notes: (1) This figure reports α_2 with 95% confidence intervals. (2) Standard errors are clustered at the ethnic-homeland and country-region levels. (3) The estimates corresponding to the respondents born in or after 1995 are not presented when exploiting data pertaining only to women aged 18 years or above because the estimated sample does not include Burkinabé respondents born during that cohort.

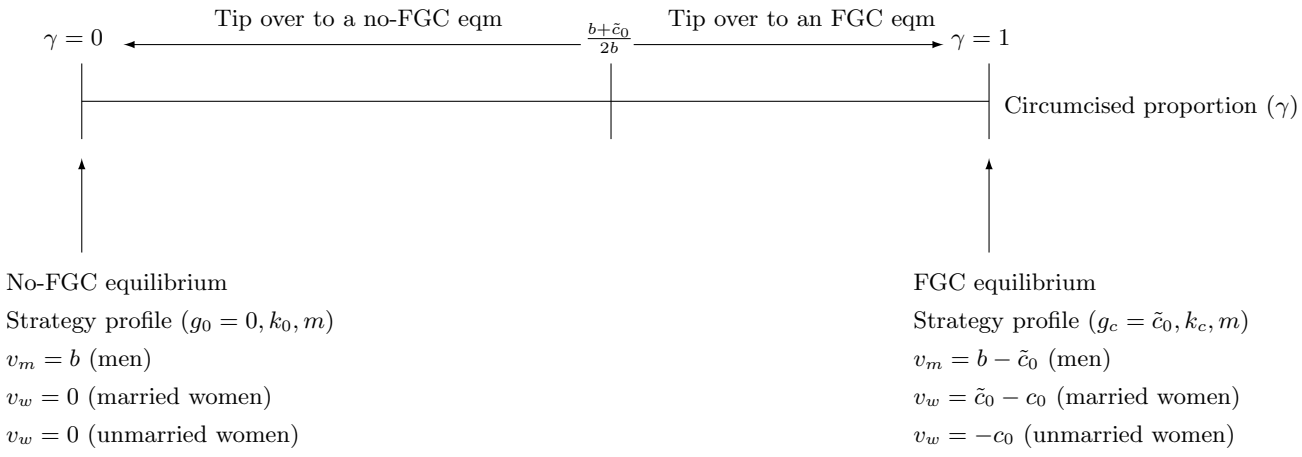

Figure S.4: Graphical description of equilibria

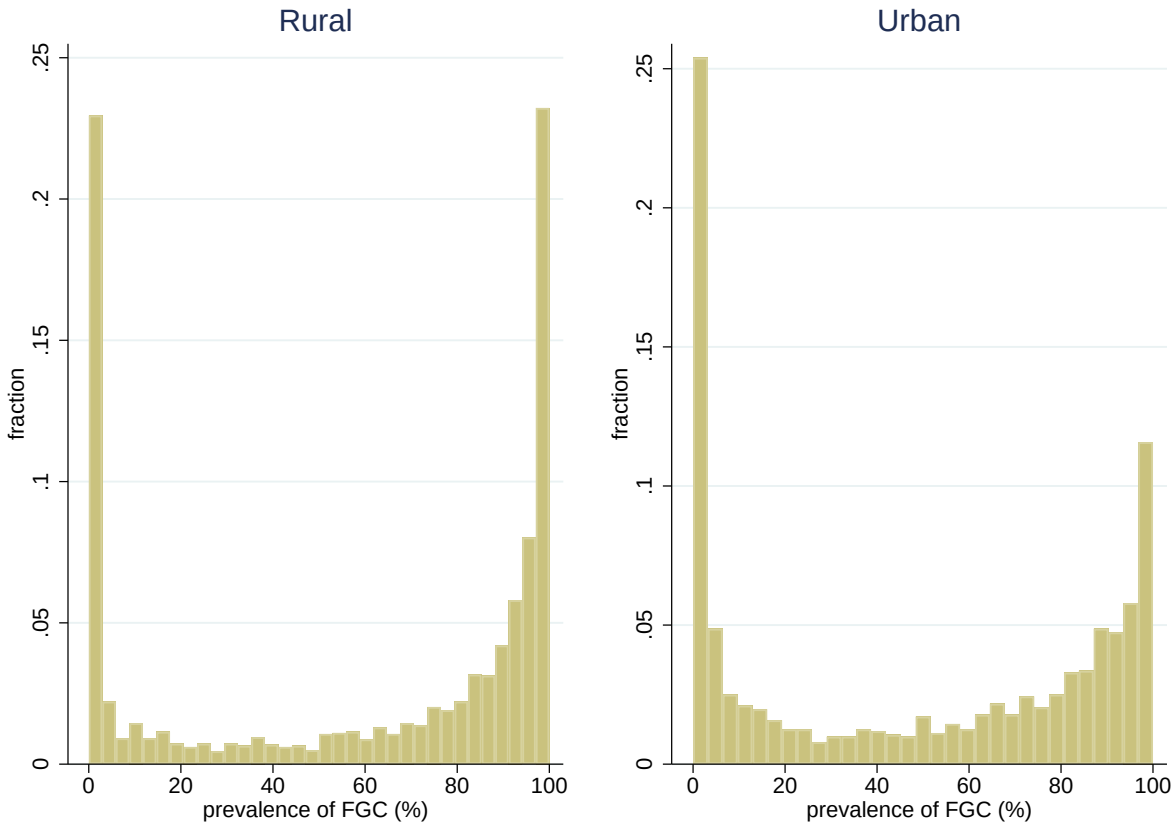

Figure S.5: Distribution of cutting rates across communities: Rural and urban areas

Table S.1: Sample composition

	DHS round	No. of respondents	No. of households	No. of communities
(A) Female sample				
Benin	2001	6209	4248	246
	2011–12	16522	12365	746
Burkina Faso	1998–99	6379	3867	208
	2003	12393	7276	397
	2010	16124	10874	541
Côte d'Ivoire	1998–99	2936	1537	133
	2011–12	9461	6242	329
Mali	2001	12774	2105	399
	2006	14506	10447	405
	2012–13	10407	7960	412
Togo	2013–14	9480	6837	330
Total		117191	73758	4146
(B) Male sample				
Benin	2001	2695	2054	246
	2011–12	5153	3983	746
Burkina Faso	1998–99	2612	1820	208
	2003	3582	2419	397
	2010	6911	5262	541
Côte d'Ivoire	1998–99	860	515	133
	2011–12	4836	3269	329
Mali	2001	3394	1221	398
	2006	4183	3089	405
	2012–13	4395	3510	412
Togo	2013–14	4476	3327	330
Total		43097	30469	4145

Table S.2: Summary statistics: Respondents born in or after 1980

	Split homelands (BF) (883 communities)			Split homelands (neighbors) (496 communities)			Non-split homelands (2754 communities)		
	Mean	Std.	No. of obs.	Mean	Std.	No. of obs.	Mean	Std.	No. of obs.
One if cut	0.70	0.45	11435	0.64	0.47	6564	0.51	0.49	32966
One if sewn closed (zero if not cut)	0.00***	0.08	10945	0.06	0.23	5665	0.04	0.20	29885
One if cut by traditional cutters (zero if not cut)	0.67	0.46	11065	0.57	0.49	6529	0.44	0.49	32701
Age at FGC if cut	6.32	3.33	4313	6.56	3.60	1790	5.93	4.32	6628
Height for age (z-scores)	-0.43***	0.97	7132	-0.69	1.04	5482	-0.62	1.07	28897
BMI $\times$ 10	207.35***	28.08	7134	215.93	30.44	5502	221.28	37.70	28966
Hemoglobin (g/dl)	11.72	1.76	4826	11.64	1.76	2874	11.64	1.74	15522
One if had genital problems	0.07***	0.26	9278	0.14	0.34	6914	0.15	0.36	36684
One if had terminated pregnancy	0.06	0.23	10820	0.06	0.24	7157	0.07	0.26	38273
One if die by age 15: Female#	0.22	0.41	9524	0.25	0.43	5086	0.20	0.40	23943
One if die by age 15: Male#	0.24	0.42	10162	0.26	0.44	5991	0.21	0.41	25941
One if married by age 18†	0.61	0.48	8138	0.64	0.47	5527	0.52	0.49	29749
One if had sex by age 18†	0.72**	0.44	8134	0.80	0.39	5423	0.76	0.42	29295
One if gave birth by age 18†	0.40*	0.49	8139	0.49	0.50	5527	0.41	0.49	29749
No. of children by age 18†	1.68***	1.55	8139	2.26	1.80	5527	1.88	1.71	29749
Education (years) by age 18†	2.12	3.70	8132	1.58	3.39	5518	3.07	4.35	29736
Age at first marriage‡	17.18	2.32	6390	16.82	3.17	4652	17.38	3.44	22042
Age at first sex‡	16.82***	2.10	6383	16.22	2.65	4564	16.37	2.67	21670
Age at first birth‡	18.42	2.39	5613	17.96	3.07	4243	18.33	3.18	19766
One if polygyny‡	0.33	0.47	6390	0.35	0.47	4652	0.26	0.44	22042
A husband's education (years)‡	1.57	3.39	6294	1.60	3.58	4566	3.19	4.67	21165
A husband's age‡	34.86	9.93	6221	34.23	8.34	4616	34.59	8.81	21667
One if have DM power‡	0.31***	0.46	6263	0.18	0.38	4643	0.22	0.41	21936
One if had any IPV‡	0.12***	0.33	3760	0.28	0.44	2032	0.31	0.46	9724
One if inter-ethnic marriage§	0.09*	0.29	2535	0.17	0.38	1596	0.24	0.42	7017
One if not living in places of birth§	0.66***	0.47	1845	0.45	0.49	1708	0.49	0.50	6404
Birth order	3.53	2.18	11764	3.46	1.99	7197	3.45	1.93	39169
One if Muslim	0.59	0.49	11775	0.69	0.45	7184	0.51	0.49	39129
One if Christian	0.32***	0.46	11775	0.15	0.36	7184	0.35	0.47	39129
Urban (dummy)	0.33	0.47	11796	0.25	0.43	7197	0.43	0.49	39169
No. of battles ($\div$ 10)	0.01*	0.13	11796	0.11	0.29	7197	0.90	2.30	39169
Distance to BF (km)	99.32	52.46	11796	88.94	73.32	7197	338.00	178.70	39169

Notes: (1) The equality of means between those residing in Burkina Faso (BF) and the remaining respondents "within" the historical ethnic homeland partitioned between BF and its neighboring countries is tested by OLS. *** denotes significance at 1%, ** at 5%, and * at 10%. Standard errors are clustered at the ethnic-homeland and country-region levels. (2) The information is relevant only to the respondents aged 18 or above for †, married respondents aged 18 or above for ‡, children born to the respondents for #, married respondents for §.

Table S.3: Decision making power and intimate partner violence (OLS)

Dependent variables:	One if have DM power			One if had IPV		
	Health care	Large household purchases	Visit family or relatives	Any emotional	Any physical	Any sexual
	(a)	(b)	(c)	(d)	(e)	(f)
Burkina Faso (BF)	-0.005	-0.006	-0.005	0.019	0.066*	0.024
× Born in or after 1980	(0.019)	(0.020)	(0.021)	(0.035)	(0.035)	(0.021)
Split ethnic homelands	0.008	-0.000	0.010	0.005	-0.006	0.007
× Born in or after 1980	(0.007)	(0.008)	(0.009)	(0.017)	(0.022)	(0.007)
Distance to BF's border (km)	-0.000	-0.000	-0.000	0.000***	0.000**	0.000**
× Born in or after 1980	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Squared distance to BF's border (km)	0.000	0.000	0.000	-0.000***	-0.000**	-0.000**
× Born in or after 1980	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
BF × Distance to BF's border	0.000	0.000	0.000	0.001	-0.001	-0.000
× Born in or after 1980	(0.000)	(0.000)	(0.000)	(0.001)	(0.000)	(0.000)
BF × Squared distance to BF's border	-0.000	-0.000	-0.000	-0.000	0.000	0.000
× Born in or after 1980	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Birth order	0.001	0.001	-0.001	0.002*	0.002	0.001
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Muslim	-0.014***	-0.011	-0.011	-0.062***	-0.051***	-0.020**
	(0.005)	(0.008)	(0.008)	(0.019)	(0.016)	(0.010)
Christian	-0.007	-0.005	0.002	-0.038**	-0.025*	-0.009
	(0.005)	(0.006)	(0.006)	(0.015)	(0.014)	(0.008)
R-squared	0.149	0.162	0.241	0.239	0.186	0.188
No. of obs.	79624	79603	79600	29003	28999	29003
Country-ethnicity FE	YES	YES	YES	YES	YES	YES
Year-of-birth FE	YES	YES	YES	YES	YES	YES
Community FE	YES	YES	YES	YES	YES	YES
Year-of-interview FE	YES	YES	YES	YES	YES	YES
Sample DHS						
Benin 2001	YES	YES	YES	NO	NO	NO
Benin 2011-12	YES	YES	YES	NO	NO	NO
Burkina Faso 1998-99	NO	NO	NO	NO	NO	NO
Burkina Faso 2003	YES	YES	YES	NO	NO	NO
Burkina Faso 2010	YES	YES	YES	YES	YES	YES
Côte d'Ivoire 1998-99	NO	NO	NO	NO	NO	NO
Côte d'Ivoire 2011-12	YES	YES	YES	YES	YES	YES
Mali 2001	YES	YES	YES	NO	NO	NO
Mali 2006	YES	YES	YES	YES	YES	YES
Mali 2012-13	YES	YES	YES	YES	YES	YES
Togo 2013-14	YES	YES	YES	YES	YES	YES

Notes: (1) Figures ( ) are standard errors. *** denotes significance at 1%, ** at 5%, and * at 10%. (2) Standard errors are clustered at the ethnic-homeland and country-region levels.

Table S.4: Robustness checks: Health (OLS)

Dependent variables:	Height for age (z-scores)	BMI (× 10)	Hemoglobin (g/dl)	One if had genital problems in the last 12 months	One if had ever terminated pregnancy	One if die by age 15	One if die by age 15
Sample:	Female	Female	Female	Female	Female	Female	Male
	(a)	(b)	(c)	(d)	(e)	(f)	(g)
(A) With a control of battle events							
Burkina Faso (BF)	0.034	0.274	0.174	0.010	-0.019	-0.053	-0.044
× Born in or after 1980	(0.076)	(4.095)	(0.108)	(0.027)	(0.022)	(0.093)	(0.073)
R-squared	0.144	0.271	0.210	0.138	0.117	0.555	0.548
No. of obs.	89334	89465	42773	95099	107308	45739	49919
	(h)	(i)	(j)	(k)	(l)	(m)	(n)
(B) With a control of household fixed effects							
Burkina Faso (BF)	0.023	1.660	0.277	0.065	-0.044	-	-
× Born in or after 1980	(0.171)	(7.959)	(0.412)	(0.069)	(0.060)		
R-squared	0.699	0.741	0.723	0.685	0.669	-	-
No. of obs.	89725	89856	42955	95529	107763	-	-
	(o)	(p)	(q)	(r)	(s)	(t)	(u)
(C) Distance to BF's border < 150 km							
Burkina Faso (BF)	0.032	4.252	0.390***	-0.007	-0.034	0.085	0.147
× Born in or after 1980	(0.101)	(4.158)	(0.143)	(0.041)	(0.031)	(0.157)	(0.131)
R-squared	0.112	0.226	0.195	0.127	0.106	0.560	0.545
No. of obs.	35924	35956	18011	36628	43875	21757	23789
Unit of obs.	Woman	Woman	Woman	Woman	Woman	Child	Child
Individual controls	YES	YES	YES	YES	YES	YES	YES
Country-ethnicity FE, (a) to (e) & (o) to (s)	YES	YES	YES	YES	YES	-	-
Community FE, (a) to (e) & (o) to (s)	YES	YES	YES	YES	YES	-	-
Household FE, (h) to (l)	YES	YES	YES	YES	YES	-	-
Mother FE, (f), (g), (t) and (u)	-	-	-	-	-	YES	YES
Year-of-birth FE	YES	YES	YES	YES	YES	YES	YES
Year-of-interview FE	YES	YES	YES	YES	YES	YES	YES
Sample DHS							
Benin 2001	YES	YES	YES	YES	YES	YES	YES
Benin 2011-12	YES	YES	YES	YES	YES	YES	YES
Burkina Faso 1998-99	YES	YES	NO	NO	NO	YES	YES
Burkina Faso 2003	YES	YES	YES	YES	YES	YES	YES
Burkina Faso 2010	YES	YES	YES	YES	YES	YES	YES
Côte d'Ivoire 1998-99	YES	YES	NO	NO	NO	YES	YES
Côte d'Ivoire 2011-12	YES	YES	YES	YES	YES	YES	YES
Mali 2001	YES	YES	YES	YES	YES	YES	YES
Mali 2006	YES	YES	YES	YES	YES	YES	YES
Mali 2012-13	YES	YES	YES	YES	YES	YES	YES
Togo 2013-14	YES	YES	YES	YES	YES	YES	YES

Notes: (1) Figures ( ) are standard errors. *** denotes significance at 1%, ** at 5%, and * at 10%. (2) Standard errors are clustered at the ethnic-homeland and country-region levels. (3) The individual controls in columns (f)—(g) and (t)—(u) include birth order, a single birth indicator, and mothers' age at birth; those in columns (h)—(l) include birth order; and those in columns (a)—(e) and (o)—(s) include birth order and religion dummies.

Table S.5: Robustness checks: Marital outcomes of those aged 18 years or above (OLS)

Dependent variables:	One if married by age 18	One if had sex by age 18	One if gave birth by age 18	No. of children	Education (years)	Education (years)
Sample:	Female	Female	Female	Female	Female	Male
	(a)	(b)	(c)	(d)	(e)	(f)
(A) With a control of battle events						
Burkina Faso (BF)	-0.044	-0.011	-0.040	0.070	-0.161	0.051
× Born in or after 1980	(0.042)	(0.034)	(0.049)	(0.273)	(0.168)	(0.460)
R-squared	0.200	0.127	0.111	0.612	0.419	0.525
No. of obs.	101977	100830	101977	101977	101913	36577
	(g)	(h)	(i)	(j)	(k)	(l)
(B) With a control of household FE						
Burkina Faso (BF)	-0.023	-0.007	0.027	0.440	-0.203	0.022
× Born in or after 1980	(0.098)	(0.092)	(0.121)	(0.563)	(0.472)	(1.224)
R-squared	0.773	0.747	0.729	0.875	0.834	0.900
No. of obs.	102391	101244	102391	102391	102327	37439
	(m)	(n)	(o)	(p)	(q)	(r)
(C) Distance to BF's border < 150 km						
Burkina Faso (BF)	-0.046	-0.003	-0.050	0.062	-0.281	-0.471
× Born in or after 1980	(0.043)	(0.040)	(0.044)	(0.285)	(0.373)	(0.549)
R-squared	0.138	0.105	0.089	0.635	0.367	0.467
No. of obs.	42619	42305	42619	42619	42592	15360
Individual controls	YES	YES	YES	YES	YES	YES
Country-ethnicity FE, panels (A) and (C)	YES	YES	YES	YES	YES	YES
Community FE, panels (A) and (C)	YES	YES	YES	YES	YES	YES
Household FE, panel (B)	YES	YES	YES	YES	YES	YES
Year-of-birth FE	YES	YES	YES	YES	YES	YES
Year-of-interview FE	YES	YES	YES	YES	YES	YES

Notes: (1) Figures ( ) are standard errors. *** denotes significance at 1%, ** at 5%, and * at 10%. (2) Standard errors are clustered at the ethnic-homeland level (due to computational difficulty) in column (g) and at the ethnic-homeland and country-region levels in the remaining columns. (3) The individual controls in columns (g)—(k) include birth order; those in columns (a)—(e) and (m)—(q) include birth order and religion dummies; and those in columns (f) and (r) include religion dummies.

Table S.6: Robustness checks: Marital outcomes of married women aged 18 years or above (OLS)

Dependent variables:	Age at first marriage	Age at first sex	Age at first birth	One if polygyny	A husband's education (years)	A husband's age (years)	One if have DM power	One if had any IPV
	(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)
(A) With a control of battle events								
Burkina Faso (BF)	0.515	0.114	0.527	0.055	-0.130	0.094	-0.002	0.044
× Born in or after 1980	(0.327)	(0.248)	(0.444)	(0.037)	(0.185)	(0.645)	(0.027)	(0.039)
R-squared	0.223	0.188	0.186	0.220	0.448	0.557	0.219	0.231
No. of obs.	86082	85116	81141	86082	81743	80511	79569	28986
	(i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)
(B) With a control of household FE								
Burkina Faso (BF)	0.131	-0.240	0.100	0.133*	-0.420	2.614	0.010	-
× Born in or after 1980	(0.815)	(0.739)	(1.236)	(0.072)	(0.364)	(3.460)	(0.057)	
R-squared	0.832	0.817	0.812	0.878	0.922	0.910	0.826	-
No. of obs.	86456	85490	81492	86456	82110	80877	79939	-
	(q)	(r)	(s)	(t)	(u)	(v)	(w)	(x)
(C) Distance to BF's border < 150 km								
Burkina Faso (BF)	0.596*	0.046	0.550	0.055	0.138	-0.090	0.007	0.119**
× Born in or after 1980	(0.356)	(0.266)	(0.477)	(0.058)	(0.250)	(0.813)	(0.034)	(0.057)
R-squared	0.154	0.152	0.148	0.198	0.357	0.562	0.244	0.236
No. of obs.	38099	37823	36201	38099	37302	34919	34264	13584
Individual controls	YES	YES	YES	YES	YES	YES	YES	YES
Country-ethnicity FE, panels (A) and (C)	YES	YES	YES	YES	YES	YES	YES	YES
Community FE, panels (A) and (C)	YES	YES	YES	YES	YES	YES	YES	YES
Household FE, panel (B)	YES	YES	YES	YES	YES	YES	YES	YES
Year-of-birth FE	YES	YES	YES	YES	YES	YES	YES	YES
Year-of-interview FE	YES	YES	YES	YES	YES	YES	YES	YES
Sample DHS								
Benin 2001	YES	YES	YES	YES	YES	YES	YES	NO
Benin 2011-12	YES	YES	YES	YES	YES	YES	YES	NO
Burkina Faso 1998-99	YES	YES	YES	YES	YES	YES	NO	NO
Burkina Faso 2003	YES	YES	YES	YES	YES	YES	YES	NO
Burkina Faso 2010	YES	YES	YES	YES	YES	YES	YES	YES
Côte d'Ivoire 1998-99	YES	YES	YES	YES	NO	NO	NO	NO
Côte d'Ivoire 2011-12	YES	YES	YES	YES	YES	YES	YES	YES
Mali 2001	YES	YES	YES	YES	YES	YES	YES	NO
Mali 2006	YES	YES	YES	YES	YES	YES	YES	YES
Mali 2012-13	YES	YES	YES	YES	YES	YES	YES	YES
Togo 2013-14	YES	YES	YES	YES	YES	YES	YES	YES

Notes: (1) Figures ( ) are standard errors. *** denotes significance at 1%, ** at 5%, and * at 10%. (2) Standard errors are clustered at the ethnic-homeland level (due to computational difficulty) in column (m) and at the ethnic-homeland and country-region levels in the remaining columns. (3) The individual controls in panel (B) include birth order, and those in panels (A) and (B) include birth order and religion dummies. (4) The result in column (p) is not available because of computational difficulty (i.e., an insufficient number of observations).

Table S.7: Robustness checks on non-linear models

Dependent variables:	Estimation	Odds ratio $\exp(\alpha_2)$	Standard errors	R-sqd.	No. of obs.
(A) FGC					
One if cut	Logit	0.543**	(0.147)	0.486	104948
One if cut by age 5	Logit	0.503***	(0.071)	0.295	104948
One if sewn closed (zero if not cut)	Logit	1.407	(0.673)	0.157	92078
One if traditional cutters (zero if not cut)	Logit	0.712*	(0.144)	0.388	103417
(B) Health					
One if had genital problems	Logit	1.068	(0.242)	0.051	95099
One if had terminated pregnancy	Logit	1.131	(0.190)	0.061	107303
One if die by age 15: Female	Logit	0.931	(0.235)	0.043	45739
One if die by age 15: Male	Logit	0.715*	(0.124)	0.041	49919
(C) Marital outcomes					
One if married by age 18	Logit	0.790	(0.145)	0.073	101977
One if had sex by age 18	Logit	0.921	(0.145)	0.035	100830
One if gave birth by age 18	Logit	0.896	(0.146)	0.027	101977
No. of children	Ordered logit	0.974	(0.140)	0.092	101977
Education (years) by age 18	Ordered logit	0.929	(0.189)	0.071	101913
Age at first marriage	Ordered logit	1.382***	(0.145)	0.021	86082
Age at first sex	Ordered logit	1.161	(0.136)	0.020	85116
Age at first birth	Ordered logit	1.267**	(0.150)	0.013	81141
One if polygyny	Logit	1.076	(0.153)	0.061	86082
A husband's education (years)	Ordered logit	1.142	(0.217)	0.076	81743
A husband's age	Ordered logit	0.827*	(0.088)	0.055	80511
One if have DM power	Logit	0.765	(0.136)	0.035	79569
One if had any IPV	Logit	1.273	(0.313)	0.077	28986

Notes: (1) Figures ( ) are standard errors. *** denotes significance at 1%, ** at 5%, and * at 10%. (2) Standard errors are clustered at the ethnic-homeland level. (3) The regressors include all controls exploited in Table 2, Table 3, and Table 4, and Table 5.

Table S.8: Robustness checks on multiple hypothesis testing (OLS)

	Coefficient	Original	Adjusted p-values		
		p-values	Bonferroni	Holm (1979)	Hochberg (1988)
Dependent variables:	(a)	(b)	(c)	(d)	(e)
(A) FGC					
One if cut	-0.108***	(0.003)	(0.072)	(0.069)	(0.069)
One if cut by age 5	-0.117***	(0.002)	(0.043)	(0.043)	(0.043)
One if sewn closed (zero if not cut)	0.020	(0.117)	(1.000)	(1.000)	(0.970)
One if traditional cutters (zero if not cut)	-0.084**	(0.026)	(0.621)	(0.569)	(0.569)
(B) Health					
Height for age (z-scores)	0.042	(0.586)	(1.000)	(1.000)	(0.970)
BMI × 10	-0.154	(0.970)	(1.000)	(1.000)	(0.970)
Hemoglobin (g/dl)	0.176	(0.102)	(1.000)	(1.000)	(0.970)
One if had genital problems	0.012	(0.668)	(1.000)	(1.000)	(0.970)
One if had terminated pregnancy	-0.020	(0.357)	(1.000)	(1.000)	(0.970)
One if die by age 15: Female	-0.054	(0.562)	(1.000)	(1.000)	(0.970)
One if die by age 15: Male	-0.044	(0.546)	(1.000)	(1.000)	(0.970)
(C) Marital outcomes					
One if married by age 18	-0.050	(0.241)	(1.000)	(1.000)	(0.970)
One if had sex by age 18	-0.014	(0.686)	(1.000)	(1.000)	(0.970)
One if gave birth by age 18	-0.045	(0.363)	(1.000)	(1.000)	(0.970)
No. of children by age 18	0.106	(0.703)	(1.000)	(1.000)	(0.970)
Education (years) by age 18	-0.144	(0.397)	(1.000)	(1.000)	(0.970)
Age at first marriage	0.518	(0.113)	(1.000)	(1.000)	(0.970)
Age at first sex	0.122	(0.623)	(1.000)	(1.000)	(0.970)
Age at first birth	0.535	(0.229)	(1.000)	(1.000)	(0.970)
One if polygyny	0.058	(0.122)	(1.000)	(1.000)	(0.970)
A husband's education (years)	-0.123	(0.508)	(1.000)	(1.000)	(0.970)
A husband's age	0.128	(0.843)	(1.000)	(1.000)	(0.970)
One if have DM power	-0.002	(0.939)	(1.000)	(1.000)	(0.970)
One if had any IPV	0.045	(0.256)	(1.000)	(1.000)	(0.970)

Notes: (1) *** denotes significance at 1%, ** at 5%, and * at 10%, corresponding to the original p-values based on the main estimation results reported in Table 2, Table 3, and Table 4, and Table 5. (2) The regressors include all controls exploited in Table 2, Table 3, and Table 4, and Table 5.

Table S.9: Robustness checks on standard errors clustered at different levels (OLS)

Levels of clustering	Coefficient	One-way clustering		Two-way clustering at country- and ethnic-homeland (Wild cluster bootstrap)		No. of obs	Conley (1999)'s spatial HAC		
		DHS communities	Ethnic homelands						
		p-values	p-values	Restricted p-values	Unrestricted p-values		Coefficient	p-values	No. of obs
Dependent variables:	(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)
(A) FGC									
One if cut	-0.108	(0.000)	(0.002)	(0.250)	(0.062)	104948	-0.111	(0.000)	105238
One if cut by age 5	-0.117	(0.000)	(0.000)	(0.083)	(0.071)	104948	-0.118	(0.000)	105238
One if sewn closed (zero if not cut)	0.020	(0.013)	(0.095)	(0.437)	(0.375)	95198	0.020	(0.001)	95457
One if traditional cutters (zero if not cut)	-0.084	(0.000)	(0.019)	(0.250)	(0.000)	103417	-0.087	(0.000)	103707
(B) Health									
Heigh for age (z-scores)	0.042	(0.453)	(0.460)	(0.000)	(0.000)	89334	0.045	(0.262)	89600
BMI × 10	-0.154	(0.929)	(0.964)	(0.866)	(0.800)	89465	-0.167	(0.926)	89731
Hemoglobin (g/dl)	0.176	(0.149)	(0.051)	(0.375)	(0.000)	42773	0.187	(0.080)	42879
One if had genital problems	0.012	(0.474)	(0.608)	(0.687)	(0.625)	95099	0.013	(0.315)	95382
One if had terminated pregnancy	-0.020	(0.179)	(0.260)	(0.312)	(0.500)	107308	-0.021	(0.220)	107612
One if die by age 15: Female	-0.054	(0.509)	(0.586)	(0.250)	(0.250)	45739	-0.033	(0.433)	45739
One if die by age 15: Male	-0.044	(0.607)	(0.652)	(0.666)	(0.111)	49919	-0.097	(0.002)	49919
(C) Marital outcomes									
One if married by age 18	-0.050	(0.053)	(0.192)	(0.250)	(0.000)	101977	-0.047	(0.000)	102253
One if had sex by age 18	-0.014	(0.540)	(0.624)	(0.500)	(0.375)	100830	-0.013	(0.340)	101106
One if gave birth by age 18	-0.045	(0.110)	(0.290)	(0.333)	(0.500)	101977	-0.044	(0.071)	102253
No. of children	0.106	(0.342)	(0.631)	(0.666)	(0.625)	101977	0.110	(0.305)	102253
Education (years) by age 18	-0.144	(0.249)	(0.406)	(0.437)	(0.500)	101913	-0.154	(0.178)	102189
Age at first marriage	0.518	(0.002)	(0.023)	(0.125)	(0.000)	86082	0.509	(0.001)	86325
Age at first sex	0.122	(0.411)	(0.503)	(0.562)	(0.500)	85116	0.124	(0.318)	85359
Age at first birth	0.535	(0.009)	(0.078)	(0.312)	(0.187)	81141	0.527	(0.003)	81367
One if polygyny	0.058	(0.033)	(0.062)	(0.437)	(0.062)	86082	0.059	(0.002)	86325
A husband's education (years)	-0.123	(0.333)	(0.440)	(0.625)	(0.500)	81743	-0.141	(0.199)	81981
A husband's age	0.128	(0.799)	(0.786)	(0.562)	(0.500)	80511	0.149	(0.647)	80748
One if have DM power	-0.002	(0.932)	(0.931)	(0.785)	(0.857)	79569	-0.002	(0.899)	79811
One if had any IPV	0.045	(0.181)	(0.241)	(0.285)	(0.000)	28986	0.042	(0.111)	29020

Note: To estimate the spatial HAC standard errors, this study used a Stata command, `reg2hdfespatial.ado`, developed by Thiemo Fetzer based on Hsiang et al. (2011) (`ols_spatial_HAC.ado`). To avoid computation difficulty, this exercise excluded country-ethnicity and year-of-interview fixed effects from regressors while still keeping year-of-birth and community fixed effects. Therefore, this table reports relevant estimates with corresponding p-values.

Table S.10: Robustness checks on power calculation

	Pre-1980 values (BF's neighbors)		Estimated power			
Outcomes:	Mean	Std.	$K = 5$	$K = 10$	$K = 15$	$K = 20$
(A) FGC						
One if cut	0.78	0.41	0.390	0.919	0.999	1.000
One if cut by age 5	0.50	0.49	0.148	0.441	0.776	0.952
One if sewn closed (zero if not cut)	0.05	0.23	0.055	0.072	0.101	0.143
One if traditional cutters (zero if not cut)	0.72	0.44	0.299	0.817	0.990	0.999
(B) Health						
Height for age (z-scores)	-0.54	1.02	0.076	0.157	0.294	0.472
BMI × 10	224.75	37.64	0.999	1.000	1.000	1.000
Hemoglobin (g/dl)	11.50	1.82	0.999	1.000	1.000	1.000
One if had genital problems	0.15	0.35	0.066	0.116	0.203	0.324
One if had terminated pregnancy	0.17	0.37	0.068	0.127	0.227	0.365
One if die by age 15: Female	0.35	0.47	0.102	0.264	0.514	0.758
One if die by age 15: Male	0.37	0.48	0.105	0.278	0.538	0.783
(C) Marital outcomes						
One if married by age 18	0.65	0.47	0.229	0.682	0.954	0.998
One if had sex by age 18	0.77	0.41	0.361	0.905	0.998	1.000
One if gave birth by age 18	0.47	0.49	0.136	0.398	0.723	0.925
No. of children by age 18	5.54	2.83	0.413	0.936	0.999	1.000
Education (years) by age 18	0.70	2.16	0.059	0.089	0.141	0.214
Age at first marriage	17.77	4.25	0.960	1.000	1.000	1.000
Age at first sex	16.72	3.32	0.994	1.000	1.000	1.000
Age at first birth	19.23	4.18	0.983	1.000	1.000	1.000
One if polygyny	0.48	0.49	0.140	0.413	0.742	0.935
A husband's education (years)	1.26	3.21	0.064	0.108	0.183	0.289
A husband's age	46.21	10.56	0.973	1.000	1.000	1.000
One if have DM power	0.24	0.42	0.079	0.173	0.330	0.526
One if had any IPV	0.23	0.42	0.079	0.169	0.322	0.515

Note: Exploiting the number of communities within the partitioned ethnic homelands (i.e., 886 in Burkina Faso and 496 in its neighboring countries), the pre-1980 values of the sample mean and standard deviation of the analyzed outcomes in Burkina Faso's neighboring countries, and the intracommunity correlation conservatively assumed to be one, this figure reports the estimated power needed to detect K% change from this mean value with 5% statistical significance.

Table S.11: Selected relocation: Women aged 15 years or above, Census data (OLS)

Dependent variable:	One if previous location = different major administrative units or abroad	One if previous location = different major administrative units or abroad
	(a)	(b)
Burkina Faso (BF)	-0.001	-0.007
× Later cohort census	(0.014)	(0.013)
One if administrative unit < 100 km to BF's border	-0.015	0.010
× Later cohort census	(0.013)	(0.014)
Distance to BF's border (km)	-0.000	0.000
× Later cohort census	(0.000)	(0.000)
Squared distance to BF's border (km)	0.000	-0.000
× Later cohort census	(0.000)	(0.000)
BF × Distance to BF's border	0.000	-0.000
× Later cohort census	(0.000)	(0.000)
BF × Squared distance to BF's border	-0.000	0.000
× Later cohort census	(0.000)	(0.000)
Muslim	-	0.022***
		(0.007)
Christian	-	0.049***
		(0.009)
R-squared	0.185	0.209
No. of obs.	2032671	1667742
Year-of-birth FE	YES	YES
Administrative-unit FE	YES	YES
Year-of-census FE	YES	YES
Sample Census		
Benin 1979	YES	NO
Benin 1992	YES	YES
Benin 2002, as considered to be "Later cohort census"	YES	YES
Benin 2013, as considered to be "Later cohort census"	YES	YES
Burkina Faso 1996	YES	YES
Burkina Faso 2006, as considered to be "Later cohort census"	YES	YES
Mali 1998	YES	NO
Mali 2009, as considered to be "Later cohort census"	YES	YES

(1) Figures ( ) are standard errors. *** denotes significance at 1%, ** at 5%, and * at 10%. (2) Standard errors are clustered at the level of each administrative unit (169 groups).

Table S.12: Background information on FGC

Country:	Burkina Faso (BF)			BF's neighbors		
	Mean	Std	No. of obs	Mean	Std	No. of obs
(A) Female sample						
One if cut	0.77	0.41	33593	0.56	0.49	71846
Age at FGC†‡	6.58	3.66	14451	6.74	4.41	17799
One if any flesh removed at FGC†	0.89	0.30	20660	0.89	0.31	33715
One if sewn closed	0.01	0.11	23931	0.09	0.28	32788
One if cut by traditional cutters	0.96	0.18	24746	0.88	0.31	40220
Support FGC if cut (dummy)†	0.16	0.36	25043	0.72	0.44	39238
Benefits of FGC if cut (dummy)						
Better hygiene/cleanliness	0.06	0.23	9210	0.21	0.41	24597
Social acceptance	0.28	0.45	9210	0.40	0.49	23905
Better marriage	0.02	0.16	9210	0.08	0.28	24597
Keep virginity/morality	0.04	0.20	9210	0.09	0.28	24597
For male pleasure	0.00	0.06	9210	0.04	0.21	24597
Religious requirement†	0.22	0.41	20157	0.71	0.45	35242
(B) Male sample						
Support FGC if FGC prevalence > 0 (dummy)†	0.12	0.32	11987	0.46	0.49	19542
Benefits of FGC if FGC prevalence > 0 (dummy)						
Better hygiene/cleanliness	0.02	0.16	3352	0.13	0.34	7974
Social acceptance	0.08	0.28	3352	0.22	0.41	7828
Better marriage	0.01	0.13	3352	0.04	0.21	7974
Keep virginity/morality	0.04	0.19	3352	0.14	0.35	7974
For male pleasure	0.00	0.09	3352	0.04	0.20	7974
Religious requirement†	0.16	0.37	9565	0.49	0.60	16705

Note: (1) Those who answered "don't know" were excluded when estimating the statistics characterized as †. (2) Those who answered "during infancy/neonatal periods" were excluded when estimating the statistics characterized as ‡.