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LEGALLY EMPOWERING WOMEN: THE CASE OF MOZAMBIQUE

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Abstract

Legally empowering women promotes women's participation in the economy, drives macroeconomic benefits, and entails the opportunity to change the position of women in society. This study explores whether laws that strengthen women's physical integrity and self-determination can elevate female empowerment in a least developed country. I use the Penal Code of Mozambique of December 31, 2014, which legalizes abortions and criminalizes marital rape, to perform a Difference-in-Discontinuities analysis. Utilizing Demographic and Health Survey data from Mozambique, Malawi, and Zimbabwe, I find a significant decline in reported sexual violence and clear indications of increased female empowerment.

Keywords: Female Empowerment, Abortion, Sexual Violence, Difference-in-Discontinuities

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I. Introduction

Female empowerment and the protection of women's rights have emerged as a global agenda. In 2015, the United Nations (UN) declared gender equality and female empowerment¹ as one of the Sustainable Development Goals (UN 2022a). However, as of 2022, gaps in women's rights persist and are anticipated to prevail for another 268 years if progress continues at its current speed (UN 2022b). Especially in developing and least developed countries, gender inequality remains high (UN 2022b). At the same time, literature found that economic development and women's empowerment mutually reinforce each other (e.g., Diebolt and Perrin (2013); Doepke, Tertilt and Voena (2012); Duflo (2012)). Legally empowering women promotes the participation of women in the economy, brings along macroeconomic benefits, and entails the opportunity to send an empowering signal, ultimately changing the position of women in society (Christopherson et al. 2022). Specifically, the literature suggests that protecting women's sexual integrity and abortion rights generates an improved economic outlook: Experiences of sexual violence are found to exacerbate women's already existing disadvantage in labor market outcomes (Sabia, Dills and DeSimone 2013). Liberalized access to abortion allows women to delay marriage and motherhood, advancing young women's educational attainment, employment, and earnings (Knowles Myers 2017). Consequently, during the last decades, many countries relaxed their abortion laws and several states established laws against domestic violence (Council for Reproductive Rights 2022; Tavares and Wodon 2018). In contrast, the share of women in least developed countries exposed to physical and/or sexual intimate partner violence is still amongst the highest worldwide (WHO 2021a). Women's access to safe abortions is limited, leading to high rates of maternal mortality (UNDP 2022; WHO 2021b).

¹ I use the terms "female empowerment" and "women's empowerment" interchangeably.

In this thesis, I investigate whether progressive laws in a least developed country² can change women's experiences and empowerment in the short run. Such trends entail the potential to advance the economy. Thereby, I use the Mozambican Penal Code (PC) of December 31, 2014³, that legalizes abortions and tightens sexual offenses law (Barnes and Procopiak 2021; Republica de Moçambique 2014)⁴. Applying a geographical Difference-in-Discontinuities (Diff-in-Disc) design following Grembi, Nannicini and Troiano (2016) and Giambona and Ribas (2021), I examine whether the PC affected females' fertility and experiences of intimate partner sexual violence. Additionally, I assess whether the PC translated into further empowerment by looking at changes in women's acceptance of domestic violence and women's autonomous decision-making. I use individual-level, georeferenced Demographic and Health Survey (DHS) data of Mozambican, Malawian, and Zimbabwean women in reproductive age (15 to 49) before and after the enactment of the Mozambican PC. I find that fertility did not decline despite the legalization of abortion. In contrast, my results indicate a significant decrease in sexual violence, a lower acceptance of domestic abuse, and an increase in independently made decisions.

I contribute to the literature by complementing the empirical work on women's legal empowerment. Bose and Das (2017) and Roy (2015) examine the effect of the Hindu Succession Act of 2005 in India, improving women's access to hereditary land and property. They find that the law was not effective in increasing women's likelihood to inherit, but parents were more eager to compensate daughters for withholding their property rights. Women affected by the law in the first generation received more years of schooling. Corradini and Buccione (2023) study the impact of the introduction of women's right to file for unilateral, no-

² As of 2014, Mozambique was categorized as one of the 48 Least Developed Countries (UNCTAD 2014).

³ In the following, 'PC' refers to the PC of December 31, 2014, in Mozambique except otherwise mentioned.

⁴ The PC also decriminalizes same-sex relationships and stipulates domestic violence as gender-neutral. I.e., it can be seen as an overall progressive piece of law, not only for women.

fault, divorce in Egypt in 2000 and observe a subsequent decrease in domestic violence and an increase in female decision-making power. McGavock (2021) shows that raising the legal minimum age of marriage from 15 to 18 in Ethiopia led to a delay in marriage for girls under 16 but not for ethnic groups with powerful norms on early marriage. She finds no effect on females' perceived decision-making ability. Christopherson et al. (2022) assess legal impediments to female economic empowerment and suggest that legal reforms function as a tool to promote women's economic participation, motivate higher growth and other macroeconomic benefits. Guarnieri and Rainer (2021) use the colonial partitioning of today's Cameroon into a French and a British colony to investigate the long-term effects of colonial ruler's policies. Under British rule, women could earn cash wages like men, resulting in higher economic empowerment and property rights today.

Additionally, I contribute to the expanding literature on the Diff-in-Disc approach. Grembi, Nannicini and Troiano (2016) formulize a linear regression framework, stipulating local identifying assumptions, to find the effect of fiscal rules that apply above a population cutoff. Giambona and Ribas (2021) use a geographical Diff-in-Disc setup to study people's willingness to pay to live with on-site prostitution in Amsterdam, using canals as natural border of the red-light district. Butts (2021) develops identifying assumptions for a geographical Diff-in-Disc approach with panel data. Other papers, such as the studies of Bruijn and Ribas (2022) and He, Wang and Zhang (2020), primarily employ Diff-in-Disc estimates as robustness-checks.

To my knowledge, this study is the first to examine women's rights and female empowerment using a Diff-in-Disc approach. Further, it is the first to apply the Diff-in-Disc design using contemporary national boundaries.

The rest of this thesis is structured as follows. In Section II, I provide background information on the PC of December 31, 2014, in Mozambique. Section III describes the data. Section IV

gives insights on my methodology. Results are presented in Section V. A discussion is outlined in Section VI. I conclude in Section VII.

II. Background

Barnes and Procopiak (2021) provide a detailed outline of the process leading to the Mozambican PC enacted on December 31, 2014, entering into force on July 1, 2015: The civil war lasting almost two decades after Mozambique's independence in 1975 impeded the progression of the legal system. Only the subsequent democratization and subordination to the rule of law enabled a transition. The dedication of women's rights, human rights and LGBT rights organizations ultimately pushed the PC to its form.

Prior to 2014, abortion in Mozambique was permitted only to preserve the woman's health or if gestation occurred due to the failure of an intrauterine device (Hardy et al. 1997). With the PC, if performed by a medical professional, the procedure was legalized up to twelve weeks after gestation and up to sixteen weeks if the pregnancy resulted from incest or rape (Republica de Moçambique 2014). Despite considerable de jure prison sentences for illegal abortions before 2014, the law was interpreted generously and neither doctors nor women faced serious consequences for performing induced abortions (Agadjanian 1998; Hardy et al. 1997). The transition from "quasi-legal" to formally legal status was made in the hope of reducing maternal deaths due to the high number of clandestine abortions (Ipas Mozambique 2020; Mocumbi 2014; Republica de Moçambique 2017)⁵. However, cost remission and specific measures and standards for abortion care after the 2014 law change had not been commenced before 2017 (Republica de Moçambique 2017)⁶. Moreover, the PC significantly tightened sexual offenses law (Barnes and Procopiak 2021; Republica de Moçambique 2014). It criminalized marital rape

⁵ According to the Avaliação de Necessidades em Saúde Materna e Neonatal em Moçambique, maternal mortality accounted 473 deaths per 100,000 births in 2007/08, 6.7% of which were caused by complications of abortion (Chavane et al. 2009).

⁶ Reported cost per abortion in Mozambique before 2014 ranged between 13 and 24 USD, imposing another obstacle to access safe abortion care (Bay Ustá et al. 2008; Frederico et al. 2020).

and established additional and more appropriate preconditions and consequences for rape (Barnes and Procopiak 2021; Republica de Moçambique 2014)⁷: The new PC expanded the forms of penetration considered rape and increased the associated prison sentences from a maximum of eight to twelve years. Further, for the first time, sexual harassment was classified as a criminal offense. Therefore, the Mozambican PC of December 2014 stipulates a landmark in the legal empowerment of females in Mozambique.

III. Data

My analysis is based on repeated cross-sectional Demographic and Health Surveys (DHS) in Mozambique, Malawi, and Zimbabwe before and after 2014, including the DHS cycles of 2010/11 and 2015/16⁸. Said surveys contain nationally representative, georeferenced survey data on socio-economic topics and are typically conducted every five years (MEASURE DHS 2012). Malawi and Zimbabwe qualify as comparison groups for several reasons. First, because of similar DHS fieldwork periods. All data has been collected within twelve months in relation to Mozambique. Second, a sufficient number of survey clusters, i.e., homogenous subgroups of the population (MEASURE DHS 2012), is located close to the Mozambican border (see Appendix, Figure (Fig.) A1). Third, there is abundant overlap in ethnic groups with Mozambique. For robustness checks, I limit the data to ethnic groups split by the national borders of Mozambique and Malawi or Zimbabwe. To obtain ethnic groups' homelands, I draw upon the “Geo-referencing of ethnic groups” (GREG) dataset by Weidmann, Ketil Rod and Cederman (2010) (see Appendix, Fig. A2.1 & A2.2). Finally, to my knowledge, no laws or

⁷ While since 2009, marital rape had already been categorized as a crime, it was not classified as rape and entailed lesser penalty than rape (Republica de Moçambique 2009).

⁸ DHS surveys used: Mozambique DHS, 2011 (MISAU/Mocambique, INE/Mocambique, and ICF International 2013); Malawi DHS, 2010 (NSO/Malawi and ICF Macro 2011); Zimbabwe DHS, 2010-11 (ZIMSTAT and ICF International 2012); Mozambique AIS, 2015 (MISAU/Mocambique, INE/Mocambique, and ICF 2018); Malawi DHS, 2015-16 (NSO/Malawi and ICF 2017); Zimbabwe DHS, 2015 (ZIMSTAT and ICF International 2016).

Whenever referring to the DHS, I speak of the data sources given in this footnote.

Survey Periods: Mozambique DHS, 2011: 05-12/2011; Malawi DHS, 2010: 06-10/2010; Zimbabwe DHS, 2010-11: 09/2010-03/2011; Mozambique AIS, 2015: 06-11/2015, Malawi DHS, 2015-16: 10/2015-02/2016; Zimbabwe DHS, 2015: 07-12/2015.

policies concerning intimate partner sexual offenses or abortion have been put into place in Malawi or Zimbabwe between the DHS surveys before and after the PC.

Given the fieldwork period of the Mozambican DHS started only six months after the PC was amended and at the same time as it came into force, I use outcome variables I assume are responsive in the short run and receptive to changes in legislation, even without it having come into force.

I implement four outcome variables. First, to measure if the abortion law had an impact on fertility, I use a dummy variable indicating whether a woman reported to be pregnant⁹. Although the main goal of the liberalization of the abortion law was to reduce the number of maternal deaths, an indicator of maternal mortality is not available in the 2015 Mozambique DHS. However, Ishola et al. (2021) find that reforms from restrictive to liberal abortion laws are linked to both reductions in fertility and maternal mortality. Thus, I use fertility as a suggestive measure, yet being aware that robust inference on mortality is not possible. Second, to study the effect of the sexual offenses law, I investigate whether women reported to have experienced sexual violence by their husband or partner¹⁰. Third, and fourth, to examine whether the laws have led to further empowerment of women, I look at changes in the number of reasons women see as justification for a man beating his wife (what I will refer to as domestic violence)¹¹, and at the number of decisions women say they make autonomously rather than with their partner, or not at all¹². All variables are obtained from the women's individual recode of the DHSs, covering females in reproductive age, 15 to 49. A list of variables and descriptions can be found in the Appendix, Section A. Table A1 of the Appendix contains descriptive statistics of the

⁹ Dummy = 1 if woman reports to be currently pregnant, = 0 if not or she does not know (DHS, see Footnote 8).

¹⁰ Dummy = 1 if woman replies yes to “[Have you] ever been physically forced to perform sexual acts by [your] husband/partner” and/or “[...] into unwanted sex [...]” and/or “[...] into other unwanted sexual acts [...]” (DHS, see Footnote 8).

¹¹ Times woman answers yes to: Beating justified if wife goes out without telling husband; ...neglects the children; ...argues with husband; refuses to have sex with husband; ...burns the food (DHS, see footnote 8).

¹² Times woman reports to make the following decisions independently: Decisions on respondent's health care; ...large household purchases; ...visits to family or relatives (DHS, see Footnote 8).

outcome variables. It refers to country-level data in comparison to data within 80 km from the Mozambican border. Overall, women at the border seem to experience less sexual violence. Further, women closer to the border seem to be more fertile and accepting of domestic violence in Mozambique and Zimbabwe. The picture concerning autonomously made decisions is ambiguous.

I obtain the national borders of Mozambique, Malawi, and Zimbabwe from the USAID Spatial Data Repository (USAID 2022a). To calculate the shortest distance of a woman's homeplace to the Mozambican border in a geo-information software for the Diff-in-Disc analysis¹³, I use the DHS georeferencing: Individuals' location is given at the center point of the cluster they inhabit (USAID 2022b). Due to confidentiality reasons, these center points are randomly displaced. Urban clusters within a two-kilometer radius, rural clusters within a five-kilometer radius, and one percent of random rural clusters within a ten-kilometer radius (USAID 2022b). Though clusters are not displaced beyond survey region or country borders, the random relocation still introduces a measurement error, potentially biasing my results.

IV. Methodology

A. Setup

There is no indication that the implementation of the Mozambican PC, i.e. the treatment of interest, was staggered throughout Mozambican provinces. For identification, I thus turn to two countries bordering Mozambique as comparison group: Malawi and Zimbabwe. I cannot employ a geographical Regression Discontinuity (RD) design because there are multiple institutions¹⁴, i.e., treatments, varying along the border (Grembi, Nannicini and Troiano 2016, 2). First, there are contemporary differences in legal frameworks and policies¹⁵. Second, an

¹³ I use the 'shortest line between features' tool in QGIS.

¹⁴ Meaning established laws or practices.

¹⁵ Exemplary, as of 2010, abortion in Mozambique was permitted only to preserve the woman's health or if gestation occurred due to the failure of an intrauterine device (Hardy et al. 1997). In Malawi, abortions were allowed only to save the woman's life (Republic of Malawi 2000). In Zimbabwe, termination of pregnancy was permitted to preserve the woman's health, if the fetus had a physical or mental defect, or if the gestation resulted

extensive body of research established that institutions put in place in colonial times stipulated the heterogeneity of African nations’ development, whether it in terms of economic outcomes, gender equality, or conflict (e.g. Acemoglu, Johnson and Robinson 2001; 2002; Guarnieri and Rainer 2021; Huillery 2009; Michalopoulos and Papaioannou 2016)¹⁶. Thus, following Grembi, Nannicini and Troiano (2016) and Giambona and Ribas (2021), I remove the discontinuity introduced by differing institutions by applying a Difference-in-Discontinuities (Diff-in-Disc) approach.

In general, the underlying intuition of discontinuity designs is that in a small neighborhood around a cutoff value in a continuous assignment variable, individuals are very similar. More on the similarity of Mozambique and its neighboring countries is presented in Section V. The cutoff value, beyond which treatment is received, is arbitrarily determined. Thus, providing a setting in which treatment is essentially random (Angrist and Pischke 2009, 251; Cameron and Trivedi 2005, 879-883). In context of a geographical discontinuity design like the one I am using, the assignment variable is the distance to the relevant border, while the border itself functions as cutoff.

Using the notation of Grembi, Nannicini and Troiano (2016), the assignment mechanism for the treatment of interest in the Diff-in-Disc design is given by:

$$A_{it} = \begin{cases} 1 & \text{if } d_{it} \geq 0 \text{ and } t \geq t_0 \\ 0 & \text{otherwise} \end{cases} \quad (1.1)$$

A is a dummy indicating whether individual i lives in Mozambique and is hence treated. Time t indicates pre- or post-treatment period with t_0 representing the date of the law change.

from unlawful intercourse (Republic of Zimbabwe 2001a). The Zimbabwean Sexual Offences Act of 2001 (Republic of Zimbabwe 2001b) had already been more far-reaching as the sexual offenses law enacted in Mozambique in 2014: Rape was more broadly specified, marital rape criminalized. These are just two legal areas that differ between the nations and are not exhaustive.

¹⁶ While the British colonial enterprise’s approach was ‘segregation’, i.e., to preserve natives’ tribal connections and conserve separate native institutions under indirect rule, the Portuguese followed the scheme of ‘assimilation’, i.e., the goal of full incorporation of the colony to Portugal (Fry 2007).

Assignment variable d is the shortest distance to the Mozambican border and coded to be positive on the treated, Mozambican side and negative on the other side.

The assignment mechanism for the confounding treatment B , capturing all other institutions that differ between the countries, is given by:

$$B_{it} = \begin{cases} 1 & \text{if } d_{it} \geq 0 \\ 0 & \text{otherwise} \end{cases} \quad (1.2)$$

With $A_i = a$ and $B_i = b$, where $a = 0,1$ and $b = 0,1$. Then, potential outcomes can be defined as $Y_{it}(a, b)$ and the observed outcome Y is given by:

$$Y_{it} = A_{it}B_{it}Y_{it}(1,1) + A_{it}(1 - B_{it})Y_{it}(1,0) + (1 - A_{it})B_{it}Y_{it}(0,1) + (1 - A_{it})(1 - B_{it})Y_{it}(0,0) \quad (2)$$

A post-treatment RD estimate would capture not only the relevant estimate, i.e., the impact of the law changes in Mozambique, $Y(1,1) - Y(0,1)$, but also the confounding impact of other institutions changing at the border:

$$\tau_{RD} = Y^+ - Y^- = Y(1,1) - Y(0,0) \quad (3.1)$$

With $Y^+ = \lim_{d \rightarrow 0^+} E(Y_{it}|d_{it} = d, t \geq t_0)$ and $Y^- = \lim_{d \rightarrow 0^-} E(Y_{it}|d_{it} = d, t \geq t_0)$.

The discontinuity existent prior to the PC is used to extract the relevant treatment effect. The pre-treatment period RD is given by:

$$\tilde{\tau}_{RD} = \tilde{Y}^+ - \tilde{Y}^- = \tilde{Y}(0,1) - \tilde{Y}(0,0) \quad (3.2)$$

With $\tilde{Y}^+ = \lim_{d \rightarrow 0^+} E(Y_{it}|d_{it} = d, t < t_0)$ and $\tilde{Y}^- = \lim_{d \rightarrow 0^-} E(Y_{it}|d_{it} = d, t < t_0)$.

B. Identification

Under local assumptions, taking the difference of the pre- and post-treatment discontinuities identifies the local average treatment effect in Mozambique (LATE) (Grembi, Nannicini and Troiano 2016) (see Appendix, Fig. A3):

Assumption 1: The potential outcomes for treatment and comparison group are continuous at $d_{it} = 0$.

$$\Rightarrow Y^- = Y^+ = Y; \tilde{Y}^- = \tilde{Y}^+ = \tilde{Y} \quad (4)$$

This assumption implies that, if treated, untreated individuals close to the border would react very similarly to their treated counterparts. The assumption also requires that no other laws or policies come into effect that would cause an additional discontinuity in the outcome variables at the border.

Assumption 2: The impact of the confounding treatments in absence of the treatment of interest is constant over time at $d_{it} = 0$.

$$\Rightarrow Y(0,1) - Y(0,0) = \tilde{Y}(0,1) - \tilde{Y}(0,0) \quad (5)$$

This assumption ensures that in absence of the relevant treatment, confounding treatments are on a local parallel trend. Their effect on either side at the border should develop constantly over time. A violation, if for example a previously introduced policy's effect was not fully developed in the pre-treatment period, would cause an additional gap in the discontinuity and be mistaken for the treatment effect (Butts 2021).

Under the beforementioned Assumptions 1 and 2, the Diff-in-Disc estimator, τ_{DD} , identifies the average treatment effect of the PC at the border, $d_{it} = 0$, in Mozambique:

$$\begin{aligned} \tau_{DD} = \tau_{RD} - \tilde{\tau}_{RD} &= (Y^+ - Y^-) - (\tilde{Y}^+ - \tilde{Y}^-) = Y(1,1) - Y(0,0) - [Y(0,1) - Y(0,0)] \\ &\Rightarrow \widehat{\tau_{DD}} = E[Y(1,1) - Y(0,1)|d_{it} = 0] \end{aligned} \quad (6)$$

Adding a third assumption, the results can be extrapolated to Malawian and Zimbabwean women at the border:

Assumption 3: There is no impact of the confounding treatments on the effect of the treatment of interest at $d_{it} = 0$.

$$\Rightarrow Y(1,1) - Y(0,1) = Y(1,0) - Y(0,0) \quad (7)$$

The third assumption requires the effect of the relevant treatment not to be affected by any other institution dissimilar at the border. For example, in case of fertility, a higher modern contraceptive prevalence in Mozambique as compared to the other countries would hinder the extrapolation of Diff-in-Disc results to Malawi and Zimbabwe.

C. Estimation

Using the recommendations of Gelman and Imbens (2019) and following Grembi, Nannicini and Troiano (2016), the Diff-in-Diff estimator can be represented using local linear regressions captured by the following model:

$$Y_{it} = \alpha_0 + \alpha_1 \cdot d_{it} + M_i(\beta_0 + \beta_1 \cdot d_{it}) + T_t[(\gamma_0 + \gamma_1 \cdot d_{it}) + M_i(\delta_0 + \delta_1 \cdot d_{it})] + \varepsilon_{it} \quad (8)$$

$$\Rightarrow \widehat{\tau_{DD}} = \delta_0$$

where T_t is a dummy that indicates the post-treatment period. M_i is a dummy that indicates whether an individual lives Mozambique. The relevant Diff-in-Disc coefficient is given by δ_0 and refers to the effect of the abortion law in Mozambique, $A_{it} = M_i \cdot T_t$. The null hypothesis is that treatment has no effect on the outcome variable, $H_0: \delta_0 = 0$, with the alternative hypothesis $H_a: \delta_0 \neq 0$. Empirical results are discussed in the next Section ¹⁷.

V. Empirical Results

A. Baseline Discontinuities in Fertility, Sexual Violence, and Female Empowerment

Baseline discontinuities in the outcome variables before the PC was enacted, i.e., RD estimates of the pre-treatment period, are presented in Table 1. Women in Mozambique are significantly more fertile than women in Malawi and Zimbabwe, experience significantly less sexual violence, but also make significantly fewer decisions autonomously. There is no indication of different attitudes between the countries concerning acceptance of justifications for domestic

¹⁷ For estimation, I use the command ‘mdrd’ written by Ribas (2016) based on the command ‘rdrobust’. In contrast to the study of Grembi, Nannicini and Troiano (2016), Bannedsen et al. (2022), and others, with the ‘mdrd’ command, the specification of an arbitrary bandwidth becomes redundant. It allows conveniently introducing kernel weights as well as control variables (See for example Giambona and Ribas (2021) and He, Wang and Zhang (2020)). I use a triangular kernel and the optimal bandwidth determined based on the Mean Squared Error following Calonico, Cattaneo and Titiunik (2014a). For details, please consult Giambona and Ribas (2021), Ribas (2016), and Calonico, Cattaneo and Titiunik (2014a).

violence. In essence, the level of the outcome variables is heterogeneous on different sides of the border. This is likely founded in the dissimilar institutions between the countries mentioned above. To identify the effect of the Mozambican PC, I hence exploit the pre-treatment period and remove the baseline discontinuities by using a Diff-in-Disc design.

Table 1: Baseline Discontinuities in Fertility, Sexual Violence, and Female Empowerment

	Fertility	Sexual Violence	Beating Justified	Decision-Making
Mozambique– Malawi/Zimbabwe	0.023** (0.010)	-0.081*** (0.013)	0.055 (0.034)	-0.111*** (0.027)
Bandwidth (km)	100.3	121.1	47.14	85.38
Observations	44950	16149	43318	28716

Standard errors in parentheses; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Notes: Discontinuities of outcome variables in pre-treatment period. Results for Malawi and Mozambique as comparison group conjointly. The shorter distance to Malawi or Zimbabwe is used per Mozambican cluster to avoid duplicate observations. Pre-treatment period refers to the DHS cycles of 2010 and 2011 in Mozambique, Malawi, and Zimbabwe.

To avoid duplicating Mozambican observations, I use only the shorter distance from Mozambique to Malawi versus Zimbabwe. Using Malawi and Zimbabwe as comparison conjointly delivers broader variation in outcomes and a higher number of observations vis-a-vis using the countries individually. This likely delivers more robust and precise estimates. Consequently, the limit distribution of the outcome variables is computed as an average of Malawian and Zimbabwean observations (for Table including Malawi and Zimbabwe individually see Appendix, Table A2).

B. Effect of the Penal Code on Fertility, Sexual Violence, and Female Empowerment

Table 2 contains the empirical results for the Diff-in-Disc estimation comparing Mozambique as treatment group to Malawi and Zimbabwe conjointly as comparison group (Figure A4 of the Appendix represents the results visually. Results for Malawi and Zimbabwe individually are reported in the Appendix, Table A3.1 & A3.2). Concerns that changing compositions of the dataset before and after treatment could alter and thus bias the results are likely unfounded. The share of Malawian and Zimbabwean observations in the dataset, especially closer to the border, remains very similar throughout the periods (see Appendix, Table A4.1 & A4.2).

Table 2: Effect of the Penal Code on Fertility, Sexual Violence, and Female Empowerment

	Fertility	Fertility	Sexual Violence	Beating Justified	Decision-Making
Control	No	Yes	-	-	-
(i) Conventional	0.034* (0.019)	0.030 (0.019)	-0.079*** (0.019)	-0.211*** (0.054)	0.116* (0.065)
(ii) Bias-corrected	0.038** (0.019)	0.034* (0.019)	-0.079*** (0.019)	-0.225*** (0.054)	0.102 (0.065)
(iii) Robust	0.038* (0.021)	0.034* (0.020)	-0.079*** (0.021)	-0.225*** (0.060)	0.102 (0.071)
Bandwidth (km)	91.78	91.58	88.69	43.30	58.95
Observations	50184	50126	14324	30646	26583

Standard errors in parentheses; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Notes: Controls: Modern Contraception, Fertility Preference.

(i): Estimates based on local linear regression (see Equation (8)) with conventional variance estimator.

(ii): Bias-corrected estimates computed as proposed in Calonico, Cattaneo and Titiunik (2014a) based on a local quadratic regression with conventional variance estimator.

(iii): Bias-corrected estimates with the nearest-neighbor variance-covariance estimator, using six nearest-neighbor matches. See Calonico, Cattaneo and Titiunik (2014b).

The two outcome variables to determine the effectiveness of the 2014 Mozambican PC are fertility and sexual violence. Contrary to expectation, the coefficient of fertility is significantly positive and suggests that the share of women who reported to be currently pregnant increased by 3.4 to 3.8 percentage points (pp) in response to the new PC. Other studies find a decline in fertility after the relaxation of abortion laws (see Ishola et al. 2021). To check whether my finding is driven by other determinants of fertility, I control for the use of modern contraception and fertility preferences^{18,19}. Estimates with and without controls are similar. Except for the conventional estimate with controls, (i), the coefficients are still significantly positive. Lauro (2011) and Kulczycki, Potts and Rosenfield (1996) put forward a possible explanation: As there are fewer obstacles to ending an unwanted pregnancy, Mozambican women at the border could substitute contraceptives or abstinence with abortions. Consequently, more women should

¹⁸ See Appendix A. Modern contraceptive use: Dummy =1, if a woman reports to use a modern method of contraception. No use and use of a folkloric or traditional method are coded as 0. Modern methods comprise: Pill, intrauterine device, injections, male condom, female sterilization, male sterilization, implants/Norplant, female condom, emergency contraception, standard days method (DHS, see Footnote 8).

Fertility Preference: 1 = woman wants another child, 2= undecided, 3= no more children, 4= respondent or partner is sterilized, 5= respondent declared infecund.

¹⁹ E.g., according to USAID (2020), Mozambique committed to increase coverage in contraceptive needs in 2012.

report to be pregnant. A missing decline in fertility is generally plausible: The cost of abortion prevailed until 2017 (Republica de Moçambique 2017). Access to clinical abortions without repercussions had been prevalent before, abortion stigma was likely present and not necessarily remedies by the new law, and some women did not consider legal abortions necessary in the first place (Frederico et al. 2020; Moseson et al. 2020). The estimates still indicate a reaction of Mozambican women to the abortion law. I conclude that fertility, measured by current pregnancy status, did not decrease at the border. The findings are, however, not suitable to infer whether the abortion law affected maternal mortality²⁰.

Women's experiences of sexual violence through their partners significantly decreased by 7.9 pp at the border in Mozambique. This result indicates the effectiveness of the PC concerning sexual offenses. Nevertheless, a concern with the validity of the estimates is that various studies suggest differences between reports of intimate partner violence and actual experiences (e.g., Agüero and Frisanco (2017); Guarnieri and Rainer (2021); Kishor and Johnson (2004)). First, there might be a negative correlation between experienced violence and reporting behavior. Out of fear of social stigma or repercussions for or from their partners, women exposed to sexual violence might underreport their experiences. Second, it is plausible that women have different interpretations of what qualifies as sexual violence. Questions in the DHS, like "[Have you] ever been physically forced to perform sexual acts" leave room for subjective interpretation that could be correlated to previous experiences²¹. However, such effects should cancel out in the Diff-in-Disc setting if not affected by the PC. Third, self-reported sexual violence could be correlated to female empowerment. Following the intuition of Guarnieri and Rainer (2021), it is possible that, on the one hand, if females feel more empowered, their attitudes towards sexual

²⁰ The Maternal Mortality Ratio from 2000 to 2017 suggests that the growth rate was more negative in 2015 as compared to prior years (UNFPA; World Health Organization; UNICEF; World Bank Group; the United Nations Population Division 2019), hinting on the law's effectiveness. Note, however, that these are country-level estimates and might not apply to people at the border.

²¹ For example, if a female dully towards sexual offenses because of a consistent exposure.

offenses change. The probability of reporting sexual violence increases, even without a change in prevalence. On the other hand, if increasingly empowered women face rising disutility from exposing themselves as a victim, they could underreport experiences of sexual violence, thereby overstating the estimate. Nevertheless, I find just a weak correlation between sexual violence and female empowerment in my data. In general, disentangling this mechanism is outside of the scope of this work and should be the subject of further research. Note that the DHS program has strict standards to protect the privacy of respondents (USAID 2022c). While at best, this encourages women to answer truthfully and openly, they might still doubt the anonymity of their answers.

Regarding female empowerment, I find that the number of reasons women indicate as justification for domestic violence decreases significantly by around 0.2 within the range of the five proposed vindications. This suggests that through the 2014 Mozambican PC, women at the border could have experienced a shift in mindset towards higher empowerment, putting increased value on females' physical integrity. Because the acceptance of domestic violence is likely related to de facto experiences of violence, I cannot unravel whether a change in experiences in response to the PC and/or the legal signal drove the coefficient. However, ultimately, judging by the acceptance of domestic violence, it is likely that PC has empowered women at the border.

This result is partially affirmed by looking at decisions made by women independently. The conventional result, (i), in Table 2 indicates that Mozambican women decide significantly more after the introduction of the PC. However, the null of no impact of the PC cannot be rejected with the bias-corrected and robust result, (ii) and (iii).

The literature on female empowerment and decision-making primarily deals with policies and laws that improve the bargaining power of women, leading to a mitigating effect on domestic violence (e.g., Aizer (2010); Corradini and Buccione (2023); Heath and Tan (2020); Kandpal

and Baylis (2019); Stevenson and Wolfers (2006); Voena (2015))²². I assume that the 2014 PC had the potential to incentivize more autonomous decision-making as well: It provides leverage, a threat, to impose on abusive spouses, increasing females' bargaining power. Note that the decision to abort is now dependent on the wish of the woman, only. A woman can now sue her partner if he forces her to have sex (Republica de Moçambique 2014). However, I cannot unambiguously conclude that this assumption holds. Possibly, surrounding factors or details of the legislation stripped women of a credible threat and physical autonomy. Especially if women live in remote places, access to law enforcement unities and health clinics is rare. Additionally, according to the PC, to pursue a prosecution of rape, the victim is required to denounce the crime to authorities, not the police, complicating reporting (Barnes and Procopiak 2021).

Altogether, my results indicate a decrease in sexual violence and a positive effect on women's empowerment in response to the Mozambican PC. However, the new abortion law did not have a reducing effect on fertility.

C. Validity Checks

The underlying intuition of discontinuity designs is that in a small neighborhood around a cutoff, individuals are very similar. Even though I compare different countries, history indicates compliance of my setting with this intuition. In the 1870s to early 1900s, European leaders defined arbitrary borders in Africa that partially remain to this day, not considering geographical or peoples' affiliation features (E. Heath 2010; Michalopoulos und Papaioannou 2016; Young 2010). A considerable share of the African population belongs to ethnic groups split by national borders, in several countries surmounting 80 percent, suggesting just minor cultural, religious, linguistic, and geographical differences at boundaries (Alesina, Easterly and Matuszeski 2011). Equally, the common borders of Mozambique, Malawi, and Zimbabwe were

²² The mechanism is studied as initiated through economic empowerment, divorce laws and peer effects. Most studies examine the effect of females' economic, not legal, empowerment on women's bargaining power and decision-making (e.g., Armand et al. (2020); Bose and Das (2017); Menon (2020)).

determined by the British and Portuguese in 1981 (Bureau of Intelligence and Research 1971; Sheldon and Penvenne 2022).

Following Guarnieri und Rainer (2021), I draw upon the GREG dataset by Weidmann, Ketil Rod und Cederman (2010) to assess discontinuities within ethnic groups stretching across the Mozambican border (see Table 3)²³. Limiting the data to females with shared ethnic origin should go along with increased similarity of the observational units. It also allows to draw inferences on the validity of Assumption 1. The more similar individuals are, the more likely they react similarly in case of treatment, ensuring the continuity of potential outcomes.

Table 3: Effect of the Penal Code on Fertility, Sexual Violence, and Female Empowerment - Restricting the Sample to Multinational Ethnic Groups

	Fertility	Fertility	Sexual Violence	Beating Justified	Decision-Making
Control	No	Yes	-	-	-
(i) Conventional	0.083** (0.034)	0.074** (0.032)	-0.054* (0.029)	-0.100 (0.065)	0.194** (0.098)
(ii) Bias-corrected	0.092*** (0.034)	0.082** (0.032)	-0.046 (0.029)	-0.106 (0.065)	0.218** (0.098)
(iii) Robust	0.092** (0.036)	0.082** (0.035)	-0.046 (0.033)	-0.106 (0.074)	0.218** (0.108)
Bandwidth (km)	40.61	40.89	45.79	43.65	40.62
Observations	13455	13531	4431	13722	8956

Standard errors in parentheses; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Notes: Controls: Modern Contraception, Fertility Preference. ‘Multinational ethnic groups’ refers to ethnic groups spreading over neighboring countries, split by the border. Multinational ethnic groups for Mozambique and Malawi: Maravi (in GREG dataset called Malavi) and Wayao; For Mozambique and Zimbabwe: Shona (in GREG dataset called Mashona).

(i): Estimates based on local linear regression (see Equation (8)) with conventional variance estimator.

(ii): Bias-corrected estimates computed as proposed in Calonico, Cattaneo and Titiunik (2014a) based on a local quadratic regression with conventional variance estimator.

(iii): Bias-corrected estimates with the nearest-neighbor variance-covariance estimator, using six nearest-neighbor matches. See Calonico, Cattaneo and Titiunik (2014b).

Table 3 affirms a significant increase in fertility for Mozambican women. However, within ethnic groups, the null hypothesis of no effect of the PC on sexual violence cannot unambiguously be rejected and a significant impact of women’s attitudes towards domestic

²³ The Ethnographic Atlas by Murdock (1967) used by Guarnieri und Rainer (2021) provides detailed distinctions between ethnic groups based on political, economic, and cultural traits. The GREG categorizes more roughly, based on linguistic differences. Despite the broader categorization and being based on 1964 maps, the GREG is sufficient in providing a more homogenous set of observations as compared to mere nationality.

violence is not confirmed. Nonetheless, within ethnic groups, women make significantly more decisions independently. The result is significant. While the significance of my findings differs between country-level and ethnic group-level estimates, the direction of the results is confirmed. Considering the much smaller number of observations within multinational ethnic groups, the lack of significance is not surprising. The robustness in the effects' signs asserts the similarity of observations at the border and the continuity of potential outcomes on the country-level.

To further assess compliance with Assumption 1, I check whether individuals just at the border respond differently to the PC by assessing whether well-known determinants of female empowerment, age, educational attainment, and religion (e.g. Jejeebhoy and Sathar (2001); Kabeer (1999)), follow differential trends pre-and post-treatment that would likely impact the continuity of potential outcomes. Thereby, I also indirectly test for manipulative sorting. If women with certain characteristics would migrate to another country to improve their conditions, this should be reflected as discontinuity in the abovementioned variables.

I find consistently insignificant, small Diff-in-Disc estimates for age, educational attainment and religion, indicating that the composition of women at the border has not changed, making manipulative sorting and a differential response of women at the border unlikely. This suggests that Assumption 1 is complied with (see Appendix, Table A5).

Despite the support for compliance with Assumption 1, a review of law changes and constitutional amendments within pre- and post-treatment DHS cycles reveals developments in Malawi and Zimbabwe that impose possible threats to the validity of my measures of female empowerment. Since 2013, the Constitution of Zimbabwe states that “Every woman has full and equal dignity of the person with men and [...] equal opportunities in political, economic and social activities.” (Republic of Zimbabwe 2013). Malawi enacted the Gender Equality Act to “promote gender equality, equal integration, influence, empowerment, dignity and

opportunities, for men and women” (Republic of Malawi 2013). While a detailed examination of these potential confounding factors is beyond the scope of this work, a look at the estimates for the acceptability of domestic violence in Malawi and Zimbabwe can provide valuable insights (see Appendix, Table A3.1 & A3.2): While with Malawi as comparison group, acceptance of domestic violence significantly decreased²⁴, it significantly increased with Zimbabwe. This puts forward that the constitutional change in Zimbabwe could have elevated female empowerment to an extent surmounting that of the Mozambican PC, while the Malawian Gender Equality Act did not have an extensive impact. Even if it did, the true coefficient would be even more negative than my estimates. This interpretation is affirmed by the development of the Gender Inequality Indices of the countries between 2010 and 2016 that show noticeable improvement for Zimbabwe in 2013, but not for Malawi (see Appendix, Fig. A5). Focusing solely on Malawi as comparison group does ultimately not change the key findings. I find no decrease in fertility in reaction to the 2014 PC, a decrease in sexual violence and elevated female empowerment (see Appendix, Table A3.1).

To check Assumption 2, Grembi, Nannicini and Troiano (2016) test for the absence of any differential response to treatment in pre-treatment periods. Since the similarity of DHS fieldwork periods for Mozambique, Malawi, and Zimbabwe is a unique occurrence of the cycles before and after the PC, I do not have this opportunity. I thus again turn to review potential threats to identification. The Mozambican PC of September 29, 2009, first-time addressed and punished domestic violence and is thus of particular interest when unveiling possible violations to Assumption 2 (Republica de Moçambique 2009, Barnes and Procopiak 2021). If the 2009 PC’s effect was not fully developed before the pre-treatment DHS in Mozambique, it would cause an additional gap in the discontinuity of the outcomes and be mistaken for a treatment effect. While I cannot rule this out, I use outcome variables that are likely to be responsive in

²⁴ Improvements in autonomous decision-making are found in neither case.

the short run to the changes in the 2014 PC. If I transfer this assumption to the 2009 PC, a violation of Assumption 2 becomes unlikely.

D. Heterogeneity Analysis

To examine whether my results differ within certain subsamples of the data, I conduct a heterogeneity analysis. I assess estimates for women's characteristics that are known to affect female empowerment: Age, educational attainment, economic development, and remoteness (e.g., Duflo (2012); Sell and Minot (2018)). Following Guarnieri and Rainer (2018), I explore the relationship between female empowerment and economic development pointed out in Duflo (2012) using household wealth as a proxy. Results are reported in the Appendix, Tables A6.1 to A6.4.

The analysis shows that fertility increased only among rural women and women with lower household wealth. Since the majority of Mozambican women at the border live in rural areas and are poorer, my overall estimates are likely driven by women with those characteristics. Given the prevalence of abortion cost and the remoteness of health clinics, the theory that women substitute contraceptives or abstinence with abortions becomes doubtful. Possibly, perhaps through natural disasters like floods that frequently hit Mozambique, physical access to abortions aggravated for women in rural areas around the post-treatment DHS fieldwork. Local economic disruptions could have played a role in the affordability of abortion. The reproductive role of women could be too entrenched to react on the PC in the short run. Health and nutrition programs could have increased fertility. The coefficient could also be driven by chance.

Looking at three age groups separately (15 to 24, 25 to 34, and 35 to 49), I find that sexual violence significantly decreased for women 25 and older. This finding is consistent with the positive relationship between age and empowerment. Females could require a baseline level of a empowerment to be receptive to the PC. Considering that the sexual violence indicator refers

to women's lifetime experiences, it is also plausible that older women underreport their experiences with sexual violence because they face higher disutility from victim stigma (see Guarnieri and Rainer (2021)). The overall retrograde in women's acceptance for domestic violence justifications seems to be driven by women aged 25 to 34. The null of no effect of the PC cannot be rejected for women younger or older than that. Again, suggesting that younger women possibly need to achieve a higher level of empowerment to experience an effect, whereas older women could be stuck to inherit norms and thus not react to the PC. The latter theory is affirmed by the insignificant effect of the PC on autonomous decision-making for women aged 35 and older, while it is significantly positive for women aged 15 to 34.

For women that did not attend school or had primary education, both experienced sexual violence and acceptance of domestic violence significantly decreased. The coefficients suggest that while women who received primary education made more decisions autonomously, the null of no effect cannot be rejected for women with no education. Regarding the empowering effect of education, this feeds the theory that a certain baseline level of empowerment is necessary for women to experience changes in response to the PC²⁵.

Turning to women with varying levels of economic development, proxied by household wealth, I find that for richer women none of the coefficients are significant, while poorer and medium-wealth women experience significantly less sexual violence, display significantly less acceptance of domestic violence, and show significantly expanding independent decision-making. The above results are in line with the findings for remoteness. Women living in rural areas experience significant improvements in terms of sexual violence, acceptance of domestic violence and decision-making, while urban women do not²⁶.

²⁵ A low number of observations and the visual representation of results suggests that for secondary and higher education, the Diff-in-Disc estimates are not reliable.

²⁶ The conventional measure for the acceptance of excuses for domestic violence is even significantly positive for urban women. This result is most likely due to imprecisions caused by a lack of observations at the border.

Given the positive correlation between economic development and the negative correlation of remoteness with women's empowerment, respectively, these estimates suggest that the PC only affected less empowered subgroups. This does not contrast with the beforementioned idea that a baseline level of a woman's empowerment is required for the PC to prove effective. I hypothesize that on average, in contrast to rural women and women with lower wealth, urban and wealthier women have already reached a higher level of empowerment that is no longer receptive to the legal empowerment in the PC. In contrast, at an individual-level, age and education can impact a woman's personal empowerment, incentivizing her to use the leverage of the PC. Potentially leaving younger, uneducated females without the means to translate legal empowerment into their own benefit.

Heterogeneous effects of legal empowerment on women with different characteristics is not new in the literature. For example, Corradini and Buccione (2023) study the impact of women's right to file for unilateral, no-fault, divorce and observe that domestic violence decreased more intensely for women with lower education and with higher wealth²⁷.

VI. Discussion

Although this study suggests that the Mozambican PC of 2014 led to an overall decrease in sexual violence and a strengthening of female empowerment, limitations to my analysis remain. First, data availability and quality could be an obstacle to the validity of my results. The random relocation of survey clusters in the DHS georeferencing could bias my findings. Additionally, a lack of observations close to the border could impact the precision and susceptibility to outliers of my results, especially within multinational ethnic groups and in the heterogeneity analysis. Further, the DHS surveys could be afflicted with reporting and experimenter bias. It is also possible that missing observations are not random. Women could have altered their

²⁷ Other examples: Bose and Das (2017), Guarnieri and Rainer (2018), McGavock (2021), Roy (2015).

reporting behavior between periods. Although Guarnieri and Rainer (2021) do not raise those concerns in their closely related study, they should be assessed in extension of this work.

Second, while I assume that my outcome variables are all receptive to the enactment of the PC in the short run, the applicability of this assumption should be confirmed in further research.

Third, despite extensive research, I cannot rule out other threats to the validity of my identification strategy apart from those mentioned in Section V. Other laws, constitutional amendments, and development projects or strategies could have impaired identification. Also note that Mozambique is a country that is frequently exposed to natural disasters, eventually impacting the outcome variables.

In general, the estimates are highly local and identify the LATE for women at the border in Mozambique. A country-wide extrapolation for Mozambique or extrapolation to other least developed countries is not possible without further examination of external validity. However, compliance with Assumption 3 theoretically allows the extrapolation of my results to women in Malawi and Zimbabwe. Since I control for modern contraception and fertility preference, the fertility estimates can likely be transferred to those countries. Concerning the other outcome variables, further investigation is needed to assess whether institutions dissimilar at the border could hinder extrapolation or not.

Apart from the abovementioned, a possible concern with my study is a lack of knowledge about the PC at the border. Barnes and Procopiak (2021) and Frederico et al. (2020) propound that a considerable share of the Mozambican population was not aware of the progressions in the PC. However, post-treatment, almost 60% of women in Mozambique within 80 km of the border had access to a radio or television, and the new PC was presented in newspapers, radio and on television²⁸.

²⁸ E.g., broadcast of the national TV station, Televisão de Moçambique TVM (2015); radio broadcast of DW (Da Silva 2015; Issufo 2015); article in journal *Jornal Domingo* (Venâncio 2015).

Not covered in this study, but an interesting direction for future research is to explore the role of male backlash and reception in context with the PC. Further work should investigate reasons for the significant increase in fertility and assess the possibility that women substitute contraceptives or abstinence with abortions. Additionally, an ancillary investigation is required to validate the theories about the individual empowerment needed to use the leverage of legal reforms, and the level of empowerment beyond which subgroups are no longer receptive to additional empowerment.

VII. Conclusion

The underlying study explores whether laws that strengthen women's physical integrity and self-determination can elevate female empowerment in a least developed country. I assess the short-term effectiveness of the Mozambican Penal Code of December 31st, 2014, which legalizes abortions and criminalizes marital rape, using a Difference-in-Discontinuities approach.

I find that the legalization of abortion did not have a decreasing effect on fertility. My estimates suggest a decline in intimate partner sexual violence in response to tightening the sexual offenses law and an empowering effect on women's mindsets. Receptiveness seems to depend on women's individual characteristics.

Legally empowering women promotes the participation of women in the economy and entails macroeconomic benefits (Christopherson et al. 2022). Consequently, further studies should track whether and to what extent the legal empowerment of women in Mozambique contributed to the country's economic development. While it remains unclear whether the findings for Mozambique extrapolate to other least developed countries, in general, governments and policy-makers interested in strengthening the position and physical integrity of women in society should consider enacting and enforcing legislation following or expanding on the example of Mozambique.

References

- Acemoglu, Daron, Simon Johnson, and James A. Robinson. 2001. "The Colonial Origins of Comparative Development: An Empirical Investigation." *American Economic Review* 91 (5): 1369-1401. <https://doi.org/10.1257/aer.91.5.1369>.
- Acemoglu, Daron, Simon Johnson, and James A. Robinson. 2002. "Reversal of Fortune: Geography and Institutions in the Making of the Modern World Income Distribution." *The Quarterly Journal of Economics* 117 (4): 1231–1294. <https://doi.org/10.1162/003355302320935025>.
- Agadjanian, Victor. 1998. "'Quasi-Legal' Abortion Services in a Sub-Saharan Setting: Users' Profile and Motivations." *International Family Planning Perspectives* 24 (3): 111-116. <https://doi.org/10.2307/3038207>.
- Agüero, Jorge, and Veronica Frisancho. 2017. "Misreporting in Sensitive Health Behaviors and its Impact on Treatment Effects: An Application to Intimate Partner Violence." *IDB Working Paper No. IDB-WP-853*. <http://dx.doi.org/10.2139/ssrn.3103802>.
- Aizer, Anna. 2010. "The Gender Wage Gap and Domestic Violence." *American Economic Review* 100 (4): 1847-1859. <http://www.aeaweb.org/articles.php?doi=10.1257/aer.100.4.1847>.
- Alesina, Alberto, William Easterly, and Janina Matuszeski. 2011. "Artificial States." *Journal of the European Economic Association* 9 (2): 246-277. <https://doi.org/10.1111/j.1542-4774.2010.01009.x>.
- Angrist, Joshua D., and Jörn-Steffen Pischke. 2009. "Getting a Little Jumpy: Regression Discontinuity Designs." In *Mostly Harmless Econometrics: An Empiricist's Companion*, by Joshua D. Angrist and Jörn-Steffen Pischke, 251 - 268. Princeton: Princeton University Press. <https://doi.org/10.1515/9781400829828>.
- Armand, Alex, Orazio Attanasio, Pedro Carneiro, and Valérie Lechene. 2020. "The Effect of Gender-Targeted Conditional Cash Transfers on Household Expenditures: Evidence from a Randomized Experiment." *The Economic Journal* 130 (631): 1875–1897. <https://doi.org/10.1093/ej/ueaa056>.
- Barnes, Victoria, and Maria Claudia Procopiak. 2021. "Reform of Discriminatory Sexual Offences Laws in the Commonwealth and Other Jurisdictions: Case Study of Mozambique." Human Dignity Trust. https://www.humandignitytrust.org/wp-content/uploads/resources/HDT-Mozambique-Report_web.pdf.
- Bay Ustá, Momade, Ellen Mitchell, Hailemichael Gebreselassie, Brookman-Amissah Eunice, and Amata Kwizera. 2008. "Who is Excluded When Abortion Access is Restricted to Twelve Weeks? Evidence from Maputo, Mozambique." *Reproductive Health Matters* 16 (31): 14-17. [https://doi.org/10.1016/S0968-8080\(08\)31386-X](https://doi.org/10.1016/S0968-8080(08)31386-X).
- Bennedsen, Morten, Elena Simintzi, Margarita Tsoutsoura, and Daniel Wolfenzon. 2022. "Do Firms Respond to Gender Pay Gap Transparency?" *Journal of Finance* 77 (4): 2051-2091. <https://doi.org/10.1111/jofi.13136>.

- Bose, Nayana, and Shreyasee Das. 2017. "Women's Inheritance Rights, Household Allocation, and Gender Bias." *American Economic Review* 107 (5): 150–153. <https://doi.org/10.1257/aer.p20171128>.
- Bruijn, L. Michelle, and Rafael P. Ribas. 2022. "'No drugs in my back yard:' The ambivalent reception of cannabis retailers." *Journal of Economic Behavior & Organization* 199: 103-121. <https://doi.org/10.1016/j.jebo.2022.05.005>.
- Bureau of Intelligence and Research. 1971. *International Boundary Study: Malawi – Mozambique Boundary*. No. 112. Washington DC: Office of the Geographer. <http://library.law.fsu.edu/Digital-Collections/LimitsinSeas/pdf/ibs112.pdf>.
- Butts, Kyle. 2021. "Geographic difference-in-discontinuities." *Applied Economic Letters*. <https://doi.org/10.1080/13504851.2021.2005236>.
- Calonico, Sebastian, Matias D. Cattaneo, and Rocio Titiunik. 2014a. "Robust Nonparametric Confidence Intervals for Regression-Discontinuity Designs." *Econometrica* 82 (6): 2295-2326. <https://doi.org/10.3982/ECTA11757>.
- Calonico, Sebastian, Matias D. Cattaneo, and Rocio Titiunik. 2014b. "Robust data-driven inference in the regression-discontinuity design." *The Stata Journal* 14 (4): 703-997. <https://doi.org/10.1177/1536867X1401400413>.
- Cameron, A. Colin, and Pravin K. Trivedi. 2005. "Treatment Evaluation." In *Microeconometrics: Methods and Applications*, by A. Colin Cameron and Pravin K. Trivedi, 860-898. New York: Cambridge University Press. <https://doi.org/10.1017/CBO9780511811241>.
- Chavane, Leonardo António, Martinho do Carmo Dgedge, Aida Theodomira Nobreza Libombo, Mouzinho Saide, Maria da Luz Vaz, Pilar de la Corte, Lidia Chongo, Alicia Carbonell, Daisy Trovoada, and Averting Maternal Death and Disability Program. 2009. *Avaliação de Necessidades em Saúde Materna e Neonatal em Moçambique*. Maputo: República de Moçambique: Ministério da Saúde, Direcção Nacional de Saúde Pública.
- Christopherson, Katharine, Audrey Yiadom, Juliet Johnson, Francisca Fernando, Hanan Yazid, and Clara Thiemann. 2022. "Tackling Legal Impediments to Women's Economic Empowerment." *IMF Working Paper No. 2022/037*. <https://www.imf.org/en/Publications/WP/Issues/2022/02/18/Tackling-Legal-Impediments-to-Womens-Economic-Empowerment-513392>.
- Corradini, Viola, and Giulia Buccione. 2023. "Unilateral divorce rights, domestic violence and women's agency: Evidence from the Egyptian Khul reform." *Journal of Development Economics* 160: Article 102947. <https://doi.org/10.1016/j.jdeveco.2022.102947>.
- Council for Reproductive Rights. 2022. "The World's Abortion Laws." Council for Reproductive Rights. September 29. Accessed November 21, 2022. <https://reproductiverights.org/maps/worlds-abortion-laws/>.
- Da Silva, Romeu. 2015. "Despenalização do aborto em Moçambique continua a desgradar." DW. January 19. Accessed November 29, 2022. <https://www.dw.com/pt-002/legaliza%C3%A7%C3%A3o-do-aborto-em-mo%C3%A7ambique-continua-a-desagradar-algumas-camadas-da-sociedade/a-18200424>.

- Diebolt, Claude, and Faustine Perrin. 2013. "From Stagnation to Sustained Growth: The Role of Female Empowerment." *American Economic Review* 103 (3): 545–549. <http://dx.doi.org/10.1257/aer.103.3.545>.
- Doepke, Matthias, Michele Tertilt, and Alessandra Voena. 2012. "The Economics and Politics of Women's Rights." *The Annual Review of Economics* 4 (1): 339–372. <http://dx.doi.org/10.1146/annurev-economics-061109-080201>.
- Duflo, Esther. 2012. "Women Empowerment and Economic Development." *Journal of Economic Literature* 50 (4): 1051–1079. <http://dx.doi.org/10.1257/jel.50.4.1051>.
- Frederico, Mónica, Carlos Arnaldo, Peter Decat, Adelino Juga, Elizabeth Kemigisha, Oliver Degomme, and Kristien Michielsen. 2020. "Induced abortion: a cross-sectional study on knowledge of and attitudes toward the new abortion law in Maputo and Quelimane cities, Mozambique." *BMC Women's Health* 20 (129). <https://doi.org/10.1186/s12905-020-00988-6>.
- Fry, Peter. 2007. "Cultures of difference. The aftermath of Portuguese and British colonial policies in southern Africa." *Social Anthropology* 8 (2): 117–143. <https://doi.org/10.1111/j.1469-8676.2000.tb00125.x>.
- Gelman, Andrew, and Guido Imbens. 2019. "Why High-Order Polynomials Should Not Be Used in Regression Discontinuity Designs." *Journal of Business & Economic Statistics* 37 (3): 447–456. <https://doi.org/10.1080/07350015.2017.1366909>.
- Giambona, Erasmo, and Rafael P. Ribas. 2021. "The Price of Obscenity in Housing Markets: Evidence from Closing Prostitution Windows." SSRN. <http://dx.doi.org/10.2139/ssrn.2994037>.
- Grembi, Victoria, Tommaso Nannicini, and Ugo Troiano. 2016. "Do Fiscal Rules Matter?" *American Economic Journal: Applied Economics* 8 (3): 1–30. <http://dx.doi.org/10.1257/app.20150076>.
- Guarnieri, Eleonora, and Helmut Rainer. 2021. "Colonialism and female empowerment: A two-sided legacy." *Journal of Development Economics* 151: Article 102666. <https://doi.org/10.1016/j.jdeveco.2021.102666>.
- Guarnieri, Eleonora, and Helmut Rainer. 2018. "Female Empowerment and Male Backlash." CESifo Working Paper Series No. 7009, Center for Economic Studies and ifo Institute (CESifo), Munich. <http://hdl.handle.net/10419/180271>.
- Hardy, Ellen, António Bugalho, Anibal Faúndes, Alves Duarte Graciana, and Bique Cassimo. 1997. "Comparison of women having clandestine and hospital abortions: Maputo, Mozambique." *Reproductive Health Matters* 5:108–115. [https://doi.org/10.1016/S0968-8080\(97\)90012-4](https://doi.org/10.1016/S0968-8080(97)90012-4).
- He, Guojun, Shaoda Wang, and Bing Zhang. 2020. "Watering Down Environmental Regulation in China." *The Quarterly Journal of Economics* 135 (4): 2135–2185. <https://doi.org/10.1093/qje/qjaa024>.
- Heath, Elizabeth. 2010. "Berlin Conference of 1884–1885." In *Encyclopedia of Africa*. Accessed November 24, 2022. <http://dx.doi.org/10.1093/acref/9780195337709.001.0001>.

Heath, Rachel, and Xu Tan. 2020. "Intrahousehold Bargaining, Female Autonomy, and Labor Supply: Theory and Evidence from India." *Journal of the European Economic Association* 18 (4): 1928–1968. <https://doi.org/10.1093/jeea/jvz026>.

Huillery. 2009. "History Matters: The Long-Term Impact of Colonial Public Investments in French West Africa." *American Economic Journal: Applied Economics* 1 (2): 176-215. <http://www.aeaweb.org/articles.php?doi=10.1257/app.1.2.176>.

Ipas Mozambique. 2020. "Ipas, Mozambique". Ipas. June 28. Accessed October 26, 2022. <https://www.ipas.org/where-we-work/mozambique/>.

Ishola, Foluso, U. Vivian Ukah, Babatunde Y. Alli, and Arijit Nandi. 2021. "Impact of abortion law reforms on health services and health outcomes in low- and middle-income countries: a systematic review." *Health Policy and Planning* 36 (9): 1483–1498. <https://doi.org/10.1093/heapol/czab069>.

Issufo, Nádia. 2015. "Jurista elogia novo Código Penal moçambicano." DW. July 7. Accessed November 29, 2022. <https://www.dw.com/pt-002/jurista-elogia-novo-c%C3%B3digo-penal-mo%C3%A7ambicano-apesar-de-contradi%C3%A7%C3%B5es/a-18558642>.

Jejeebhoy, Shireen, and Zeba A. Sathar. 2001. "Women's Autonomy in India and Pakistan: The Influence of Religion and Region." *Population and Development Review* 27 (4): 687-712. <https://doi.org/10.1111/j.1728-4457.2001.00687.x>.

Kabeer, Naila. 1999. "Resources, agency, achievements: reflections on the measurement of women's empowerment." *Development and Change* 30 (3): 435-464. <https://doi.org/10.1111/1467-7660.00125>.

Kandpal, Eeshani, and Kathy Baylis. 2019. "The social lives of married women: Peer effects in female autonomy and investments in children." *Journal of Development Economics* 140: 26-43. <https://doi.org/10.1016/j.jdeveco.2019.05.004>.

Kishor, Sunita, and Kiersten Johnson. 2004. *Profiling Domestic Violence – A Multi-Country Study*. Calverton, Maryland: ORC Macro. <https://dhsprogram.com/pubs/pdf/od31/od31.pdf>.

Knowles Myers, Caitlin. 2017. "The Power of Abortion Policy: Reexamining the Effects of Young Women's Access to Reproductive Control." *Journal of Political Economy* 125 (6): 2178-2224. <https://doi.org/10.1086/694293>.

Kulczycki, Andrzej, Malcolm Potts, and Allan Rosenfield. 1996. "Abortion and fertility regulation." *Lancet* 347 (9016): 1663-8. [https://doi.org/10.1016/S0140-6736\(96\)91491-9](https://doi.org/10.1016/S0140-6736(96)91491-9).

Lauro, Don. 2011. "Abortion and contraceptive use in sub-Saharan Africa: how women plan their families." *African Journal of Reproductive Health* 15 (1): 13-23. <https://www.jstor.org/stable/41329770>.

Lowes, Sara, and Eduardo Montero. 2021. "Concessions, Violence, and Indirect Rule: Evidence From Congo Free State." *The Quarterly Journal of Economics* 136 (4): 2047-2091. <https://doi.org/10.1093/qje/qjab021>.

McGavock, Tamara. 2021. "Here waits the bride? The effect of Ethiopia's child marriage law." *Journal of Development Economics* 149: Article 102580. <https://doi.org/10.1016/j.jdeveco.2020.102580>.

- MEASURE DHS. 2012. *Demographic and Health Survey Sampling and Household Listing Manual*. Calverton: ICF International.
https://www.dhsprogram.com/pubs/pdf/DHSM4/DHS6_Sampling_Manual_Sept2012_DHSM4.pdf.
- Menon, Seetha. 2020. "The effect of marital endowments on domestic violence in India." *Journal of Development Economics* 143: Article 102389.
<https://doi.org/10.1016/j.jdeveco.2019.102389>.
- Michalopoulos, Stelios, and Elias Papaioannou. 2016. "The Long-Run Effects of the Scramble for Africa." *American Economic Review* 106 (7): 1802-1848.
<http://dx.doi.org/10.1257/aer.20131311>.
- MISAU/Moçambique, INE/Moçambique and ICF. 2018. *Inquérito de Indicadores de Imunização, Malária e HIV/SIDA em Moçambique - IMASIDA, 2015*. Maputo: MISA/Moçambique, INE/Moçambique and ICF.
<https://dhsprogram.com/publications/publication-AIS12-AIS-Final-Reports.cfm>.
- MISAU/Moçambique, INE/Moçambique and ICF International. 2013. *Moçambique Inquérito Demográfico e de Saúde 2011*. Calverton, Maryland: MISA/Moçambique, INE/Moçambique and ICF International. <https://dhsprogram.com/publications/publication-FR266-DHS-Final-Reports.cfm>.
- Mocumbi, Sonia Paindana. 2014. "Mozambique May Legalize Abortion to Protect Mothers." ISGlobal. January 9. Accessed October 26, 2022. <https://www.isglobal.org/en/healthisglobal/-/custom-blog-portlet/mozambique-podria-legalizar-el-aborto-para-proteger-a-las-madres/90352/0>.
- Moseson, Heidi, Stephanie Herold, Sofia Filippa, Jill Barr-Walker, Sarah E. Baum, and Caitlin Gerds. 2020. "Self-managed abortion: A systematic scoping." *Best Practice & Research Clinical Obstetrics and Gynaecology* 63: 87-110.
<https://doi.org/10.1016/j.bpobgyn.2019.08.002>.
- Murdock, George Peter. 1967. "Ethnographic Atlas: A Summary." *Ethnology* 6 (2): 109-236.
<https://doi.org/10.2307/3772751>.
- NSO/Malawi and ICF Macro. 2011. *Malawi Demographic and Health Survey 2010*. Zomba: NSO/Malawi and ICF Macro. <https://dhsprogram.com/publications/publication-FR247-DHS-Final-Reports.cfm>.
- NSO/Malawi and ICF. 2017. *Malawi Demographic and Health Survey 2015-16*. Zomba: NSO and ICF. <https://dhsprogram.com/publications/publication-FR319-DHS-Final-Reports.cfm>.
- Republic of Malawi. 2013. *Gender Equality Act [Chapter 25:06]*. Lilongwe: Republic of Malawi. <https://commons.laws.africa/akn/mw/act/2013/3/eng@2014-12-31.pdf>.
- Republic of Malawi. 2000. *Penal Code: Chapter [7:01]*. Lilongwe: Republic of Malawi. https://acjr.org.za/resource-centre/Malawi_penal_code_pdf_14611.pdf.
- Republic of Zimbabwe. 2001a. *Termination of Pregnancy Act [Chapter 15:10]*. Harare: Republic of Zimbabwe.

<https://learningpartnership.org/sites/default/files/resources/pdfs/Zimbabwe-Termination-of-Pregnancy-Act-2001-English.pdf>.

Republic of Zimbabwe. 2001b. *Sexual Offences Act [Chapter 9:21]*. Harare: Republic of Zimbabwe. <https://evaw-global-database.unwomen.org/-/media/files/un%20women/vaw/full%20text/africa/zimbabwe%20-%20sexual%20offenses%20act%202001.pdf?vs=1842>.

Republic of Zimbabwe. 2013. *Constitution of Zimbabwe Amendment (No. 20)*. Harare: Republic of Zimbabwe. https://www.ilo.org/dyn/natlex/natlex4.detail?p_lang=en&p_isn=93498&p_country=ZWE&p_classification=01.01.

Republica de Moçambique. 2009. *Boletim da República: Lei n.º. 29/2009 de 29 de Setembro*. Maputo: Imprensa Nacional de Mocambique. https://www.wlsa.org.mz/wp-content/uploads/2014/11/Lei_VD_2009.pdf.

Republica de Moçambique. 2014. *Boletim da República: Lei n.º. 35/2014 de 31 de Dezembro*. Maputo: Imprensa Nacional de Mocambique. https://www.wlsa.org.mz/wp-content/uploads/2014/11/Lei-35_2014Codigo_Penal.pdf.

Republica de Moçambique. 2017. *Boletim da República: Lei n.º 60/2017 de 20 de Setembro*. Maputo: Imprensa Nacional de Mocambique. https://www.wlsa.org.mz/wp-content/uploads/2017/11/Diploma_Ministerial_60-2017.pdf.

Ribas, Rafael P. 2016. "Multidimensional Regression Discontinuity and Regression Kink Designs with Difference-in-Differences." *Stata Conference, Chicago, July 28*. Chicago: Stata. https://www.stata.com/meeting/chicago16/slides/chicago16_ribas.pdf.

Roy, Sanchari. 2015. "Empowering women? Inheritance rights, female education and dowry payments in India." *Journal of Development Economics* 114: 233-251. <https://doi.org/10.1016/j.jdeveco.2014.12.010>.

Sabia, Joseph J., Angela K. Dills, and Jeffrey DeSimone. 2013. "Sexual Violence against Women and Labor Market Outcomes." *American Economic Review* 103 (3): 274-278. <http://dx.doi.org/10.1257/aer.103.3.274>.

Sell, Mila, and Nicholas Minot. 2018. "What factors explain women's empowerment? Decision-making among small-scale farmers in Uganda." *Women's Studies International Forum* 71: 46-55. <https://doi.org/10.1016/j.wsif.2018.09.005>.

Sheldon, Kathleen Eddy, and Jeanne Marie Penvenne. 2022. "Mozambique." In *Encyclopedia Britannica*. Accessed November 12, 2022. <https://www.britannica.com/place/Mozambique>.

Stevenson, Betsey, and Justin Wolfers. 2006. "Bargaining in the Shadow of the Law: Divorce Laws and Family Distress." *The Quarterly Journal of Economics* 121 (1): 267-288. <https://doi.org/10.1093/qje/121.1.267>.

Sukhtankar, Sandip. 2016. "Does firm ownership structure matter? Evidence from Sugar Mills in India." *Journal of Development Economics* 122: 46-62. <https://doi.org/10.1016/j.jdeveco.2016.04.002>.

Tavares, Paula, and Quentin Wodon. 2018. *Ending Violence Against Women: Global and Regional Trends in Women's Legal Protection Against Domestic Violence and Sexual Harassment*. Washington, DC: Worldbank.
<https://thedocs.worldbank.org/en/doc/679221517425064052-0050022018/original/EndingViolenceAgainstWomenandGirlsGBVLawsFeb2018.pdf>.

Televisão de Moçambique TVM. 2015. "Codigo Penal". July 02. YouTube video, 4:59. Accessed November 29, 2022. <https://www.youtube.com/watch?v=pn0kf2jN1NE>.

UNCTAD. 2014. *The Least Developed Countries Report 2014*. Geneva: United Nations Conference on Trade and Development. https://unctad.org/system/files/official-document/ldc2014_en.pdf.

UNDP. 2022. *Human Development Report 2021-22: Uncertain Times, Unsettled Lives: Shaping our Future in a Transforming World*. New York: United Nations Development Programme. https://hdr.undp.org/system/files/documents/global-report-document/hdr2021-22pdf_1.pdf.

UNFPA; World Health Organization; UNICEF; World Bank Group; the United Nations Population Division. 2019. *Trends in maternal mortality 2000 to 2017: estimates by WHO, UNICEF, UNFPA, World Bank Group and the United Nations Population Division*. Geneva: World Health Organization. https://www.unfpa.org/sites/default/files/pub-pdf/Maternal_mortality_report.pdf.

UN. 2022a. "Transforming our world: the 2030 Agenda for Sustainable Development." United Nations. November 21. Accessed November 21, 2022. <https://sdgs.un.org/2030agenda>.

—. 2022b. *Progress on the Sustainable Development Goals: The Gender Snapshot 2022*. New York: UN. https://www.unwomen.org/sites/default/files/2022-09/Progress-on-the-sustainable-development-goals-the-gender-snapshot-2022-en_0.pdf.

USAID. 2020. *Landscape Analysis of Family Planning in Mozambique*. USAID. https://pdf.usaid.gov/pdf_docs/PA00WPFN.pdf.

—. 2022a. "Spatial Data Repository, Boundaries." USAID. November 24. Accessed November 24, 2022. <https://spatialdata.dhsprogram.com/boundaries/#view=table&countryId=AF>.

—. 2022b. "GPS Data, GPS Data Collection." USAID. October 8. Accessed October 29, 2022. <https://dhsprogram.com/Methodology/GPS-Data.cfm>.

—. 2022c. "Protecting the Privacy of DHS Survey Respondents." USAID. December 1. Accessed December 5, 2022. <https://dhsprogram.com/Methodology/Protecting-the-Privacy-of-DHS-Survey-Respondents.cfm>.

Venâncio, Bento. 2015. "Principais alterações do Código Penal." domingo. July 4. Accessed November 29, 2022. <https://www.jornaldomingo.co.mz/em-foco/principais-alteracoes-do-codigo-penal/>.

- Voena, Alessandra. 2015. "Yours, mine, and ours: Do divorce laws affect the intertemporal behavior of married couples?" *American Economic Review* 105 (8): 2295-2332. <http://dx.doi.org/10.1257/aer.20120234>.
- Weidmann, Nils B., Jan Ketil Rod, and Lars-Erik Cederman. 2010. "Representing Ethnic Groups in Space: A New Dataset." *Journal of Peace Research* 47 (4): 491-499. <https://doi.org/10.1177/0022343310368352>.
- WHO. 2021a. *Violence Against Women Prevalence Estimates, 2018*. Geneva: World Health Organization (WHO). <https://www.who.int/publications/i/item/9789240022256>.
- WHO. 2021b. "World Health Organization, Abortion." World Health Organization. November 25. Accessed November 21, 2022. <https://www.who.int/news-room/fact-sheets/detail/abortion#:~:text=Around%2045%25%20of%20all%20abortions,women%2C%20communities%20and%20health%20systems>.
- Young, Eric. 2010. "Scramble for Africa." In *Encyclopedia of Africa*. Accessed November 24, 2022. <http://dx.doi.org/10.1093/acref/9780195337709.001.0001>.
- ZIMSTAT and ICF International. 2012. *Zimbabwe Demographic and Health Survey 2010-11*. Calverton, Maryland: ZIMSTAT and ICF International. <https://dhsprogram.com/publications/publication-FR254-DHS-Final-Reports.cfm>.
- . 2016. *Zimbabwe Demographic and Health Survey 2015: Final Report*. Rockville, Maryland: ZIMSTAT and ICF International. <https://dhsprogram.com/publications/publication-FR322-DHS-Final-Reports.cfm>.

Appendix

A. Variables

All variables are produced or adopted from the DHS.

border	Indicator of belonging to Mozambican-Malawian or Mozambican-Zimbabwean border 1 Mozambican-Malawian border 3 Mozambican-Zimbabwean border
country-cluster	Identifier for cluster and country
d108	Experienced any sexual violence by husband/partner 0 No 1 Yes
dec	Number of decisions made by woman independently Number of times respondent reported to make the following decisions autonomously: 1) Decisions on respondent's health care 2) Decisions on large household purchases 3) Decisions on visits to family or relatives
distance	Distance of survey cluster to the Mozambican-Malawian or Mozambican-Zimbabwean border
fert_pref	Fertility preference 1 Have another 2 Undecided 3 No more 4 Sterilized (respondent or partner) 5 Declared infecund
group	Ethnic group
infoacc	Has access to information device (television and/or radio) 0 Household has no television or radio 1 Household has television and/or radio
just	Number of reasons woman agrees justify Domestic Violence Number of times respondent answered yes to the following questions: 1) Beating justified if wife goes out without telling husband 2) Beating justified if wife neglects the children 3) Beating justified if wife argues with husband 4) Beating justified if wife refuses to have sex with husband 5) Beating justified if wife burns the food
LATNUM	Latitude of respondent's survey cluster
LONGNUM	Longitude of respondent's survey cluster

modern	Woman uses modern method of contraception
0	No, folkloric, or traditional method
1	Yes
religion	Religion
1	Catholic
2	Islamic/ Muslim
3	None
share	Share of girls in children born within the past year
v000	Country code and phase
MW5	Malawi DHS 2010
MW7	Malawi DHS 2015/16
MZ6	Mozambique DHS
ZW6	Zimbabwe DHS 2010/11
ZW7	Zimbabwe DHS 2015
v001	Cluster number
v002	Household number
v006	Month of interview
v007	Year of interview
v012	Respondent's current age (15 to 49)
v025	Type of place of residence
1	Urban
2	Rural
v106	Highest attended educational level
0	No Education
1	Primary
2	Secondary
3	Higher
v190	Wealth index
1	Poorest
2	Poorer
3	Middle
4	Richer
5	Richest
v213	Currently pregnant
0	No or unsure
1	Yes

year	Indicator of pre-and post-treatment period	
	0	Pre-treatment period
	1	Post-treatment period

B. Tables

Table A1: Descriptive Statistics of Outcome Variables

		Mozambique		Malawi		Zimbabwe	
Fertility	Mean	0.098	0.116	0.084	0.084	0.070	0.094
	SD	0.297	0.320	0.278	0.277	0.254	0.291
	Min	0	0	0	0	0	0
	Max	1	1	1	1	1	1
	Observations	20514	5062	46324	39076	18814	3422
Sexual Violence	Mean	0.066	0.058	0.179	0.171	0.131	0.161
	SD	0.248	0.235	0.384	0.376	0.337	0.368
	Min	0	0	0	0	0	0
	Max	1	1	1	1	1	1
	Observations	8677	2346	10532	8930	10894	2229
Number of Reasons to Justify Domestic Violence	Mean	0.334	0.354	0.329	0.275	0.796	1.096
	SD	0.907	0.896	0.959	0.871	1.274	1.448
	Min	0	0	0	0	0	0
	Max	5	5	5	5	5	5
	Observations	19234	4698	45673	38565	18119	3329
Decisions Made by Wife Independently	Mean	0.572	0.424	0.471	0.443	0.784	0.822
	SD	0.909	0.804	0.807	0.793	1.002	0.984
	Min	0	0	0	0	0	0
	Max	3	3	3	3	3	3
	Observations	12925	3564	30148	25228	11185	2273
Bandwidth: 80 km		No	Yes	No	Yes	No	Yes

Notes: Descriptive statistics of outcome variables for the DHS cycles of 2010/11 and 2015/16 in Mozambique, Malawi, and Zimbabwe, with no bandwidth and bandwidth of 80 km. 80 km is an arbitrary value to illustrate changes in variables close to the border. For details about variables refer to Appendix Section A.

Sources: DHS.

Table A2: Baseline Discontinuities in Fertility, Sexual Violence, and Female Empowerment – Including Malawi and Zimbabwe Individually

	Fertility	Sexual Violence	Beating Justified	Decision-Making
Mozambique– Malawi/Zimbabwe	0.023** (0.010)	-0.081*** (0.013)	0.055 (0.034)	-0.111*** (0.027)
Bandwidth (km)	100.3	121.1	47.14	85.38
Observations	44950	16149	43318	28716
Mozambique - Malawi	0.022 (0.013)	-0.078*** (0.015)	0.151*** (0.040)	-0.179*** (0.036)
Bandwidth (km)	78.85	86.64	62.90	47.38
Observations	36207	11064	34999	23494
Mozambique - Zimbabwe	-0.000 (0.015)	-0.121*** (0.025)	-0.815*** (0.085)	-0.249*** (0.064)
Bandwidth (km)	190.7	147.5	63.13	100.1
Observations	22586	10910	21233	13964

Standard errors in parentheses; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Notes: Discontinuities of outcome variables in pre-treatment period. Results for Malawi and Mozambique as comparison group conjointly and Malawi and Zimbabwe as comparison group individually. For conjoint result, the shorter distance to Malawi or Zimbabwe is used per Mozambican cluster to avoid using duplicate observations. Pre-treatment period refers to the DHS cycles of 2010 and 2011 in Mozambique, Malawi, and Zimbabwe.

Sources: DHS.

**Table A3.1: The Effect of the PC on Fertility, Sexual Violence, and Female Empowerment
- Restricting the Sample to Mozambique and Malawi**

	Fertility	Fertility	Sexual Violence	Beating Justified	Decision-Making
Control	No	Yes	-	-	-
(i) Conventional	0.024 (0.023)	0.016 (0.023)	-0.115*** (0.025)	-0.202*** (0.072)	0.092 (0.089)
(ii) Bias-corrected	0.030 (0.023)	0.021 (0.023)	-0.124*** (0.025)	-0.194*** (0.072)	0.068 (0.089)
(iii) Robust	0.030 (0.026)	0.021 (0.025)	-0.124*** (0.029)	-0.194** (0.084)	0.068 (0.100)
Bandwidth (km)	83.47	82.40	50.43	47.07	40.18
Observations	43001	42796	8081	30204	17400

Standard errors in parentheses; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Notes: Controls: Modern Contraception, Fertility Preference. Empirical results using Malawi as comparison group.

(i): Estimates based on local linear regression (see Equation (8)) with conventional variance estimator.

(ii): Bias-corrected estimates computed as proposed in Calonico, Cattaneo and Titiunik (2014a) based on a local quadratic regression with conventional variance estimator.

(iii): Bias-corrected estimates with the nearest-neighbor variance-covariance estimator, using six nearest-neighbor matches. See Calonico, Cattaneo and Titiunik (2014b).

Sources: DHS.

**Table A3.2: The Effect of the PC on Fertility, Sexual Violence, and Female Empowerment
- Restricting the Sample to Mozambique and Zimbabwe**

	Fertility	Fertility	Sexual Violence	Beating Justified	Decision-Making
Control	No	Yes	-	-	-
(i) Conventional	0.040 (0.027)	0.054** (0.026)	0.022 (0.032)	0.169* (0.091)	0.139 (0.113)
(ii) Bias-corrected	0.041 (0.027)	0.055** (0.026)	0.030 (0.032)	0.190** (0.091)	0.167 (0.113)
(iii) Robust	0.041 (0.031)	0.055* (0.030)	0.030 (0.036)	0.190* (0.099)	0.167 (0.126)
Bandwidth (km)	184.0	183.7	138.9	122.6	117.6
Observations	15941	15933	5916	8664	5862

Standard errors in parentheses; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Notes: Controls: Modern Contraception, Fertility Preference. Empirical results using Zimbabwe as comparison group.

(i): Estimates based on local linear regression (see Equation (8)) with conventional variance estimator.

(ii): Bias-corrected estimates computed as proposed in Calonico, Cattaneo and Titiunik (2014a) based on a local quadratic regression with conventional variance estimator.

(iii): Bias-corrected estimates with the nearest-neighbor variance-covariance estimator, using six nearest-neighbor matches. See Calonico, Cattaneo and Titiunik (2014b).

Sources: DHS.

Table A4.1: Share of Malawian and Zimbabwean Observations

	Pre-Treatment Share (%)		Post-Treatment Share (%)	
Malawi	72	92	71	92
Zimbabwe	28	8	29	8
Bandwidth (80 km)	No	Yes	No	Yes

Notes: Refers to observations excluding Mozambique.

Sources: DHS.

Table A4.2: Share of Distances Used from Mozambique to Malawi or Zimbabwe

	Pre-Treatment Share (%)		Post-Treatment Share (%)	
Malawi	41	64	45	65
Zimbabwe	59	36	55	35
Bandwidth (80 km)	No	Yes	No	Yes

Notes: Refers only to observations from Mozambique.

Table A5: Changes in Age, Educational Attainment, and Religion

	Age of Respondent	Education	Religion
(i) Conventional	0.521 (0.516)	0.002 (0.044)	-0.022 (0.047)
(ii) Bias-corrected	0.562 (0.516)	-0.013 (0.044)	-0.012 (0.047)
(iii) Robust	0.562 (0.566)	-0.013 (0.047)	-0.012 (0.054)
Bandwidth (km)	114.6	42.60	67.07
Observations	54848	30966	14779

Standard errors in parentheses; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Notes: For variable details refer to Appendix A. Empirical results for Malawi and Zimbabwe as comparison group conjointly.

(i): Estimates based on local linear regression (see Equation (8)) with conventional variance estimator.

(ii): Bias-corrected estimates computed as proposed in Calonico, Cattaneo and Titiunik (2014a) based on a local quadratic regression with conventional variance estimator.

(iii): Bias-corrected estimates with the nearest-neighbor variance-covariance estimator, using six nearest-neighbor matches.

See Calonico, Cattaneo and Titiunik (2014b).

Sources: DHS.

Table A6.1: Heterogeneity Analysis – Age

		15 - 24	25 - 34	35 - 49
Fertility	(i) Conventional	0.036 (0.030)	0.034 (0.034)	0.017 (0.025)
	(ii) Bias-corrected	0.041 (0.030)	0.038 (0.034)	0.019 (0.025)
	(iii) Robust	0.041 (0.032)	0.038 (0.037)	0.019 (0.028)
	Bandwidth (km)	105.0	122.1	152.0
	Observations	22069	17755	15487
Fertility - Controls	(i) Conventional	0.030 (0.031)	0.027 (0.033)	0.015 (0.025)
	(ii) Bias-corrected	0.036 (0.031)	0.030 (0.033)	0.017 (0.025)
	(iii) Robust	0.036 (0.033)	0.030 (0.036)	0.017 (0.028)
	Bandwidth (km)	103.4	120.2	150.4
	Observations	21903	17703	15443
Sexual Violence	(i) Conventional	-0.018 (0.038)	-0.096*** (0.029)	-0.098*** (0.031)
	(ii) Bias-corrected	-0.008 (0.038)	-0.095*** (0.029)	-0.103*** (0.031)
	(iii) Robust	-0.008 (0.041)	-0.095*** (0.032)	-0.103*** (0.034)
	Bandwidth (km)	80.92	93.29	112.1
	Observations	3940	6011	4874
Beating Justified	(i) Conventional	-0.113 (0.083)	-0.337*** (0.081)	-0.124 (0.082)
	(ii) Bias-corrected	-0.114 (0.083)	-0.360*** (0.081)	-0.122 (0.082)
	(iii) Robust	-0.114 (0.093)	-0.360*** (0.088)	-0.122 (0.093)
	Bandwidth (km)	70.10	46.11	55.34
	Observations	18254	10495	10233
Decision-Making	(i) Conventional	0.221** (0.091)	0.182* (0.099)	-0.007 (0.104)
	(ii) Bias-corrected	0.210** (0.091)	0.174* (0.099)	-0.034 (0.104)
	(iii) Robust	0.210** (0.100)	0.174 (0.112)	-0.034 (0.117)
	Bandwidth (km)	105.3	80.97	67.29
	Observations	10297	12278	8952

(i): Estimates based on local linear regression (see Equation (8)) with conventional variance estimator.

(ii): Bias-corrected estimates computed as proposed in Calonico, Cattaneo and Titiunik (2014a) based on a local quadratic regression with conventional variance estimator.

(iii): Bias-corrected estimates with the nearest-neighbor variance-covariance estimator, using six nearest-neighbor matches. See Calonico, Cattaneo and Titiunik (2014b).

Sources: DHS.

Table A6.2: Heterogeneity Analysis – Education

		Attended No Education	Attended Primary Education
Fertility	(i) Conventional	0.020 (0.031)	0.020 (0.024)
	(ii) Bias-corrected	0.022 (0.031)	0.021 (0.024)
	(iii) Robust	0.022 (0.034)	0.021 (0.027)
	Bandwidth (km)	120.0	131.1
	Observations	8448	32830
Fertility - Controls	(i) Conventional	0.019 (0.030)	0.007 (0.024)
	(ii) Bias-corrected	0.023 (0.030)	0.007 (0.024)
	(iii) Robust	0.023 (0.034)	0.007 (0.027)
	Bandwidth (km)	119.5	129.3
	Observations	8435	32753
Sexual Violence	i) Conventional	-0.078** (0.036)	-0.086*** (0.027)
	(ii) Bias-corrected	-0.081** (0.036)	-0.086*** (0.027)
	(iii) Robust	-0.081** (0.041)	-0.086*** (0.030)
	Bandwidth (km)	73.04	103.9
	Observations	2569	8767
Beating Justified	(i) Conventional	-0.429*** (0.097)	-0.160** (0.078)
	(ii) Bias-corrected	-0.451*** (0.097)	-0.154** (0.078)
	(iii) Robust	-0.451*** (0.110)	-0.154* (0.088)
	Bandwidth (km)	47.25	48.99
	Observations	5775	20964
Decision-Making	(i) Conventional	0.140 (0.112)	0.148* (0.080)
	(ii) Bias-corrected	0.110 (0.112)	0.146* (0.080)
	(iii) Robust	0.110 (0.123)	0.146 (0.092)
	Bandwidth (km)	61.28	68.48
	Observations	5350	17801

(i): Estimates based on local linear regression (see Equation (8)) with conventional variance estimator.

(ii): Bias-corrected estimates computed as proposed in Calonico, Cattaneo and Titiunik (2014a) based on a local quadratic regression with conventional variance estimator.

(iii): Bias-corrected estimates with the nearest-neighbor variance-covariance estimator, using six nearest-neighbor matches. See Calonico, Cattaneo and Titiunik (2014b).

Sources: DHS.

Table A6.3: Heterogeneity Analysis – Household Wealth

		Poorest/Poorer/Middle	Richer/Richest
Fertility	(i) Conventional	0.043* (0.023)	0.019 (0.030)
	(ii) Bias-corrected	0.048** (0.023)	0.021 (0.030)
	(iii) Robust	0.048* (0.025)	0.021 (0.033)
	Bandwidth (km)	83.78	140.9
	Observations	29169	23115
Fertility - Controls	(i) Conventional	0.033 (0.023)	0.025 (0.029)
	(ii) Bias-corrected	0.039* (0.023)	0.026 (0.029)
	(iii) Robust	0.039 (0.025)	0.026 (0.033)
	Bandwidth (km)	85.02	143.3
	Observations	29274	23207
Sexual Violence	(i) Conventional	-0.090*** (0.023)	-0.041 (0.037)
	(ii) Bias-corrected	-0.092*** (0.023)	-0.041 (0.037)
	(iii) Robust	-0.092*** (0.025)	-0.041 (0.041)
	Bandwidth (km)	73.08	132.3
	Observations	8659	5681
Beating Justified	(i) Conventional	-0.274*** (0.067)	0.022 (0.078)
	(ii) Bias-corrected	-0.288*** (0.067)	0.025 (0.078)
	(iii) Robust	-0.288*** (0.077)	0.025 (0.084)
	Bandwidth (km)	47.75	109.8
	Observations	21213	21339
Decision-Making	(i) Conventional	0.149** (0.068)	0.162 (0.121)
	(ii) Bias-corrected	0.134** (0.068)	0.173 (0.121)
	(iii) Robust	0.134* (0.075)	0.173 (0.133)
	Bandwidth (km)	62.65	112.2
	Observations	17457	13580

(i): Estimates based on local linear regression (see Equation (8)) with conventional variance estimator.

(ii): Bias-corrected estimates computed as proposed in Calonico, Cattaneo and Titiunik (2014a) based on a local quadratic regression with conventional variance estimator.

(iii): Bias-corrected estimates with the nearest-neighbor variance-covariance estimator, using six nearest-neighbor matches. See Calonico, Cattaneo and Titiunik (2014b).

Sources: DHS.

Table A6.4: Heterogeneity Analysis – Remoteness

		Urban	Rural
Fertility	(i) Conventional	-0.012 (0.033)	0.054** (0.023)
	(ii) Bias-corrected	-0.014 (0.033)	0.060*** (0.023)
	(iii) Robust	-0.014 (0.038)	0.060** (0.025)
	Bandwidth (km)	139.5	78.82
	Observations	11134	38282
Fertility - Controls	(i) Conventional	-0.009 (0.034)	0.048** (0.023)
	(ii) Bias-corrected	-0.012 (0.034)	0.055** (0.023)
	(iii) Robust	-0.012 (0.039)	0.055** (0.025)
	Bandwidth (km)	137.3	75.20
	Observations	11064	37475
Sexual Violence	(i) Conventional	0.055 (0.051)	-0.113*** (0.021)
	(ii) Bias-corrected	0.067 (0.051)	-0.118*** (0.021)
	(iii) Robust	0.067 (0.056)	-0.118*** (0.023)
	Bandwidth (km)	119.5	65.02
	Observations	2858	10136
Beating Justified	(i) Conventional	0.169* (0.100)	-0.251*** (0.063)
	(ii) Bias-corrected	0.156 (0.100)	-0.261*** (0.063)
	(iii) Robust	0.156 (0.110)	-0.261*** (0.071)
	Bandwidth (km)	106.6	44.00
	Observations	9896	26605
Decision-Making	(i) Conventional	0.126 (0.123)	0.195*** (0.072)
	(ii) Bias-corrected	0.130 (0.123)	0.192*** (0.072)
	(iii) Robust	0.130 (0.138)	0.192** (0.083)
	Bandwidth (km)	137.5	63.15
	Observations	6468	23260

(i): Estimates based on local linear regression (see Equation (8)) with conventional variance estimator.

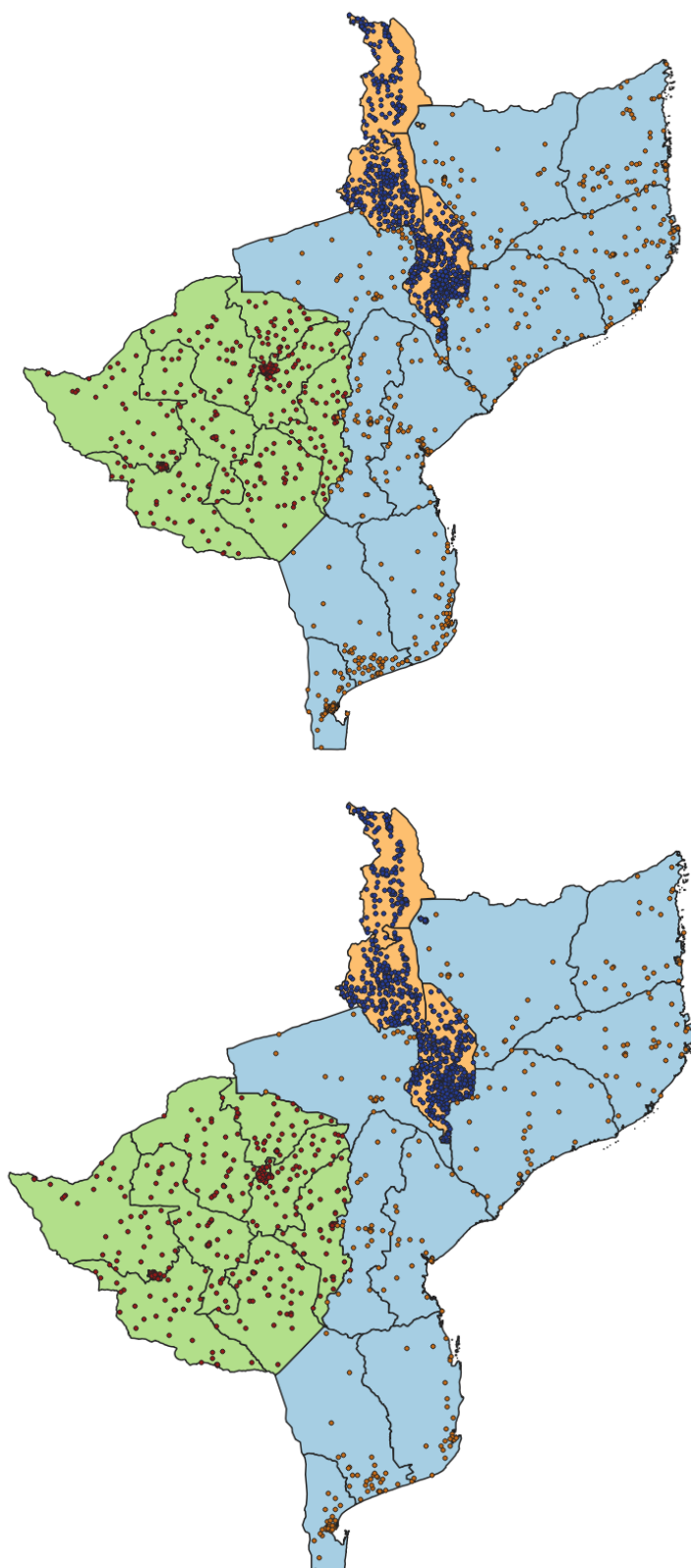
(ii): Bias-corrected estimates computed as proposed in Calonico, Cattaneo and Titiunik (2014a) based on a local quadratic regression with conventional variance estimator.

(iii): Bias-corrected estimates with the nearest-neighbor variance-covariance estimator, using six nearest-neighbor matches. See Calonico, Cattaneo and Titiunik (2014b).

Sources: DHS.

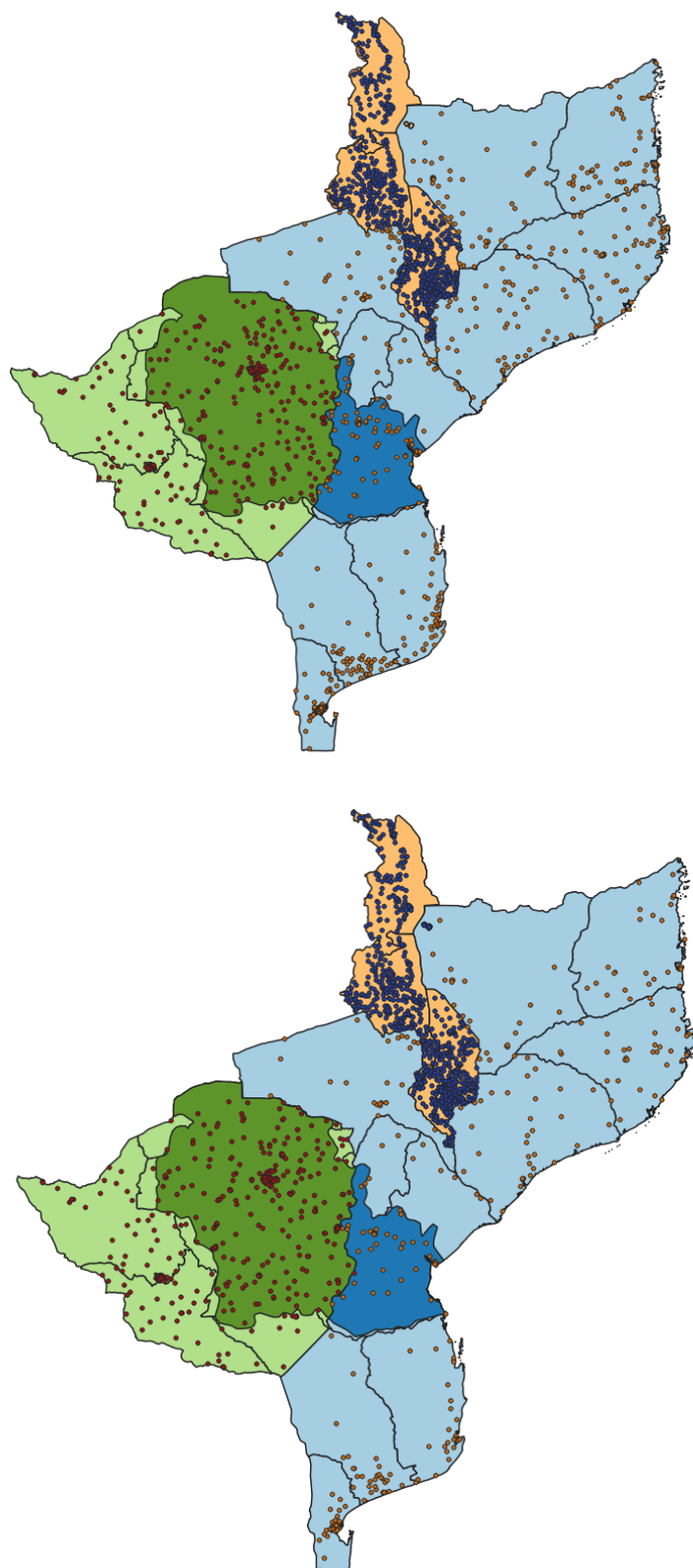
C. Figures

Figure A1: Data Availability in Mozambique, Malawi, and Zimbabwe



Notes: National borders, subnational boundaries of the DHS and observational clusters (dots) in Mozambique (blue area), Malawi (orange area) and Zimbabwe (green area). Upper panel: Pre-treatment period; Lower panel: Post-treatment period. Sources: DHS; Spatial Data Repository (USAID 2022b). Figure produced in QGIS.

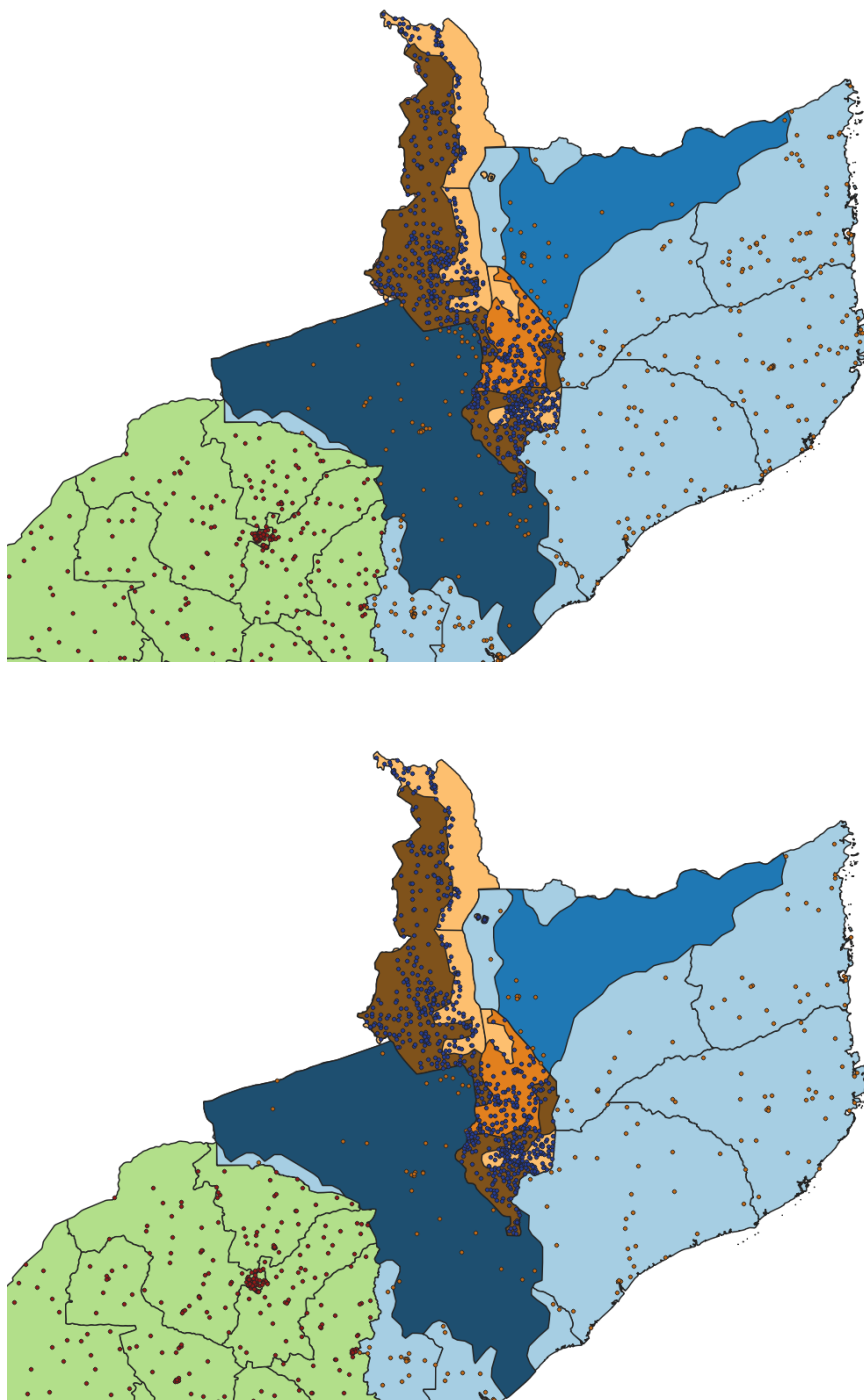
Figure A2.1: Data Availability and Multinational Ethnic Groups - Shona



Notes: National borders, subnational borders and observational clusters (dots) in Mozambique (blue area), Malawi (orange area) and Zimbabwe (green area). Shona ethnic group in Mozambique (dark blue) and Zimbabwe (dark green). Upper panel: Pre-treatment period; Lower panel: Post-treatment period.

Sources: DHS; Spatial Data Repository (USAID 2022b); GREG Dataset (Weidmann, Ketil Rod and Cederman 2010). Figure produced in QGIS.

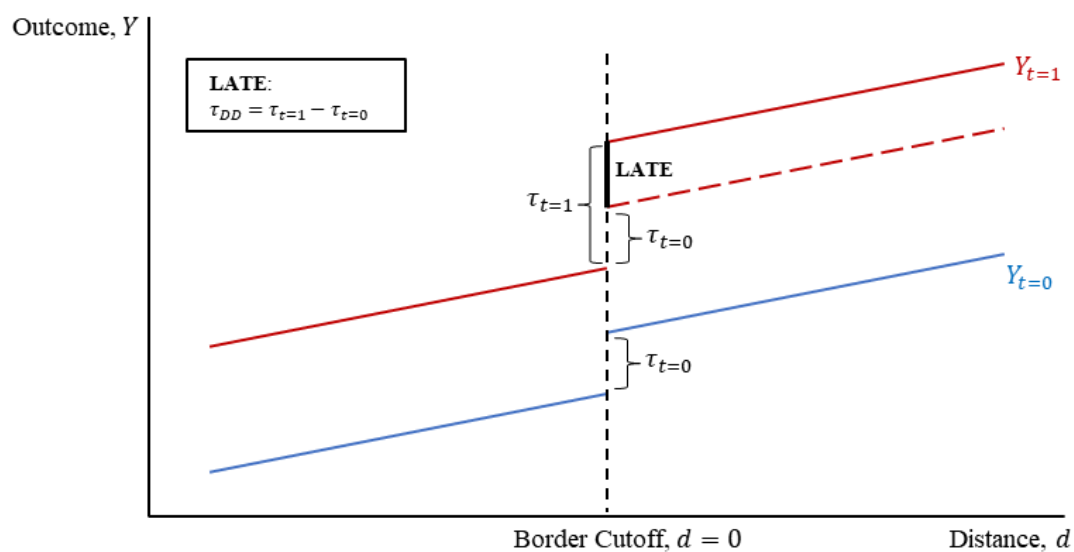
Figure A2.2: Data Availability and Multinational Ethnic Groups – Maravi & Wayao



Notes: National borders, subnational borders and observational clusters (dots) in Mozambique (blue area), Malawi (orange area) and Zimbabwe (green area). Maravi ethnic group in Mozambique (darkest blue) and Malawi (brown). Wayao ethnic group in Mozambique (middle blue) and Malawi (darker orange). Upper panel: Pre-treatment period; Lower panel: Post-treatment period.

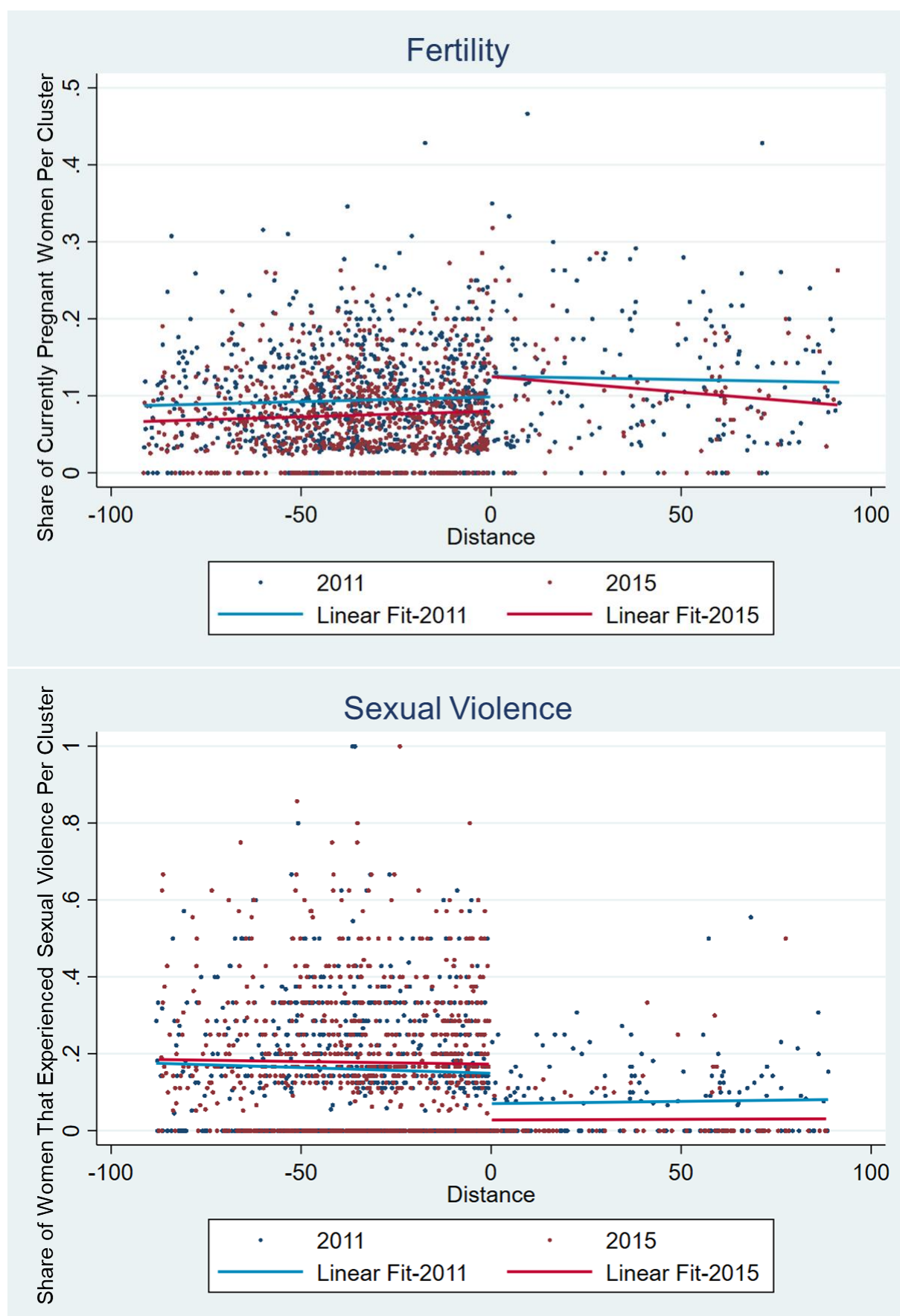
Sources: DHS, Spatial Data Repository (USAID 2022b); GREG Dataset (Weidmann, Ketil Rod and Cederman 2010). Figure produces in QGIS.

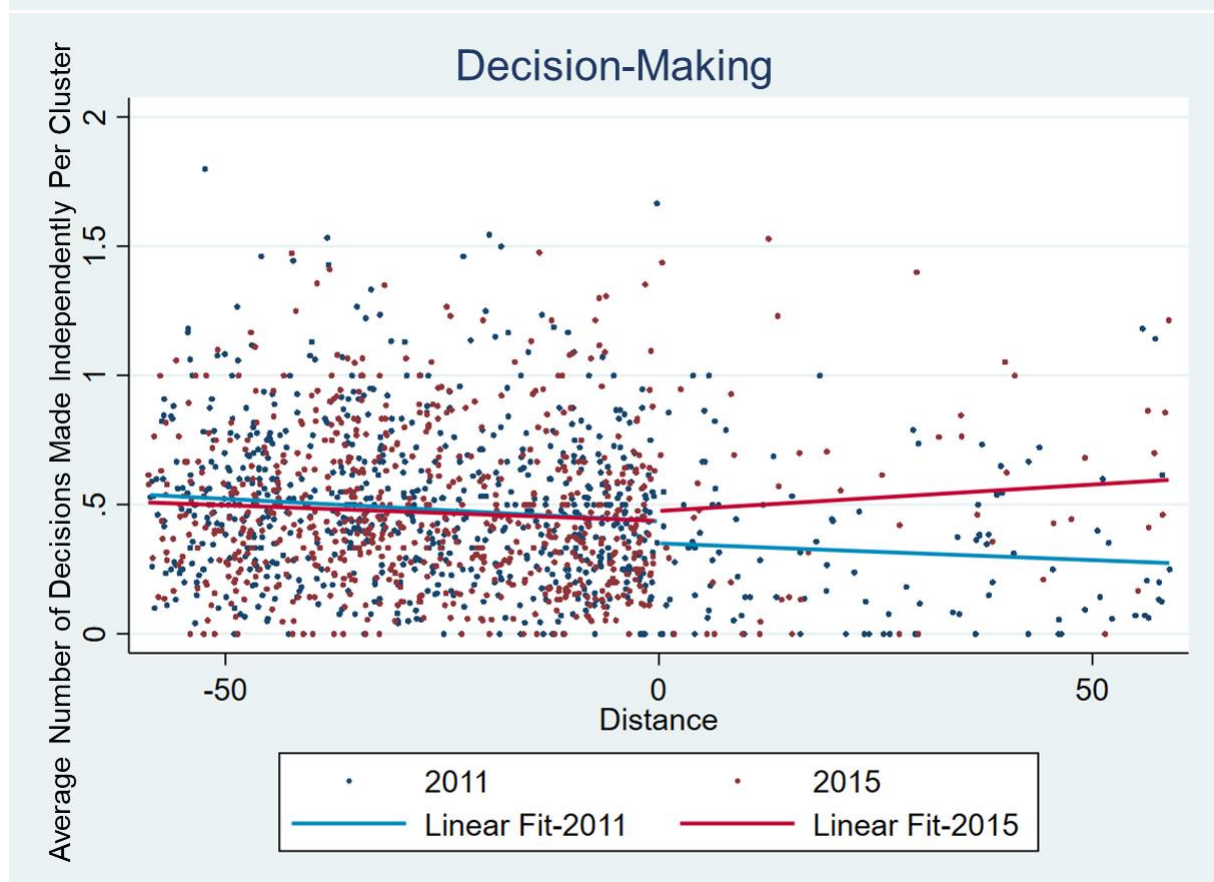
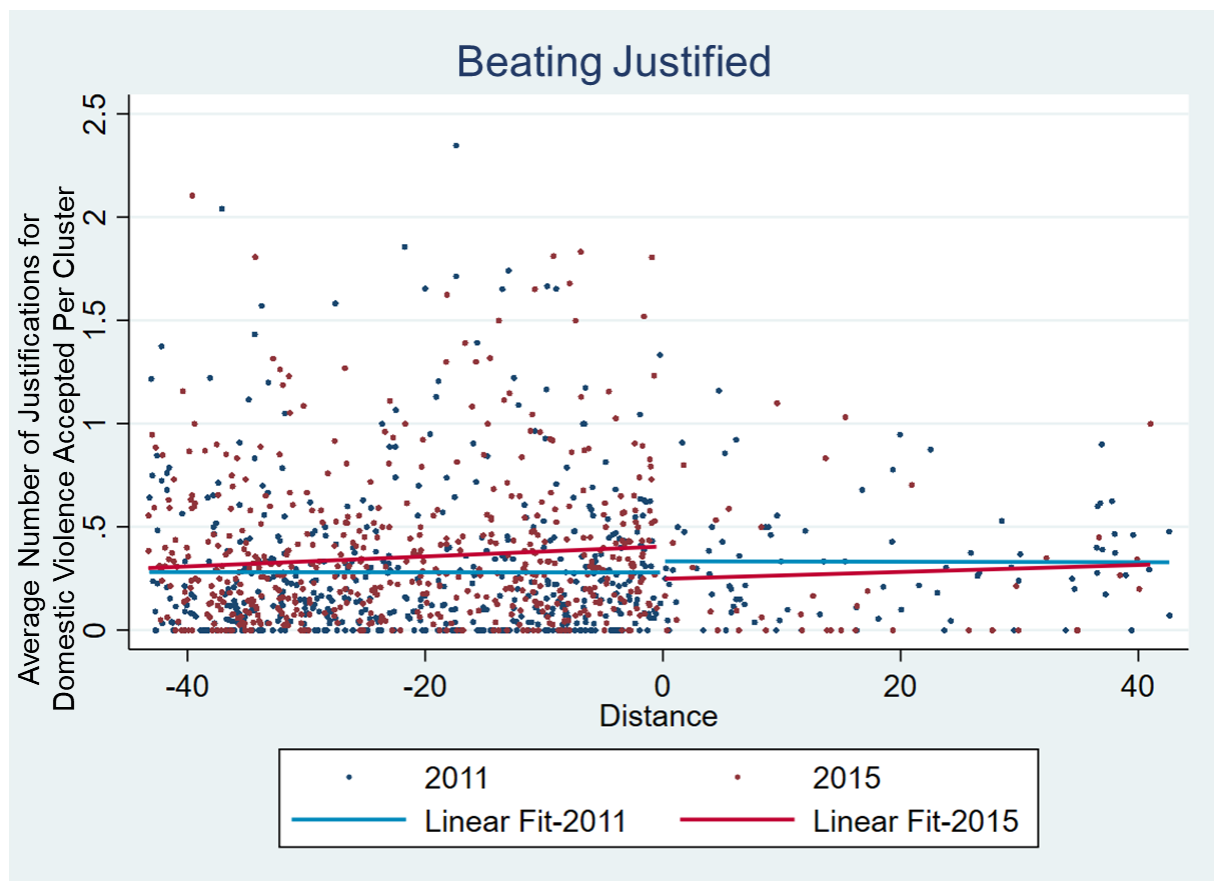
Figure A3: Difference-in-Discontinuities - Visual Representation of the Methodology



Notes: Stylized illustration of identification in Diff-in-Disc setting. See Butts (2021).

Figure A4: The Effect of the PC on Fertility, Sexual Violence, and Female Empowerment





Notes: '2011' and '2015' refer to pre-and post-treatment period, respectively. Dots refer to cluster averages. Linear fits refer to individual observations.

Sources: DHS.

Figure A5: Gender Inequality Index



Notes: A higher Gender Inequality Index indicates lower gender equality.

Source: UNDP (2022).