Do Domestic Violence Laws Protect Women From Domestic Violence? Evidence From Rwanda

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Abstract

This paper provides causal evidence that domestic violence laws protect women in violent marriages. In 2008, Rwanda became the first country in Sub-Saharan Africa to criminalize all forms of domestic violence, and allow women to divorce their husbands unilaterally if their husbands are violent towards them. Theory suggests that the law protects women in abusive marriages via two possible channels. First, it enables women to divorce men unable to curb their violent behavior (divorce effect). Second, for couples who remain married, the law deters men's violence (deterrent effect). To study the impact of the law on women in violent marriages, I exploit the geographical variation in the intensity of The Rwandan Genocide (1994). The context provides variation in where violent marriages are more likely to be located before the law's adoption. In the genocide intense areas where there was male scarcity in the marriage market, women settled down for men who were more likely to be violent-types. I first show that after the law, divorce rates *increase more* in the formerly genocide-intense areas, where women are more likely to be in violent marriages. This is consistent with the divorce effect. Then, I show that after the law, sexual domestic violence rates *increase less* in the formerly genocide-intense areas. I provide support that this is not only due to the dissolution of violent marriages but also to the deterrent effect of the law.

Keywords: Law, domestic violence, divorce, male scarcity, conflict, Rwanda
JEL Codes: J12, K38, D74

1 Introduction

Violence against women is a violation of human rights and a global health problem of epidemic proportions (WHO, 2013). It is estimated that approximately one-third of women worldwide have experienced either physical and/or sexual violence from their partners at some point in their lives (World Bank, 2015). Domestic violence is found to negatively impact women's health, employment, earnings, productivity and their children's human capital (Lloyd 1997, Campbell 2002, Farmer and Tiefenthaler 2004, Tolman and Wang 2005, Aizer 2011). In the mid-1990s, governments began to adopt laws to protect women from domestic violence and its negative consequences. From 1990 to 2019, the number of countries introducing domestic violence laws has risen slowly from close to zero, to 155 (World Bank 2019). Yet, there is very limited causal evidence about their impact.[1]

Some reason to expect an impact of domestic violence laws is that previous literature shows that the reforms in women's legal rights from the 1970s to 1990s have an impact on a wide range of outcomes. These reforms include changes in divorce laws and marital property rights, legalized access to female contraceptives and abortion, introduction of job-protected paid maternity leave, and gender quotas in parliments (Chiappori et al. 2002, Wolfers 2006, Rasul 2006, Field 2007, Bronson 2015, Voena 2015, Anderson and Genicot 2015, Anderson 2018; Goldin and Katz 2002, Bailey 2006, Myers 2017; Ruhm 1998, Rossin-Slater et al. 2013; Chattopadhyay and Duflo 2004, Beaman et al. 2009, Beaman et al. 2012).[2] Adoption of unilateral no-fault divorce is found to decrease domestic violence in the United States (US) and Spain (Stevenson and Wolfers 2006, Brassiolo 2016), but increase it in Mexico (García-Ramos 2021). What is the impact of domestic violence laws on women? Do domestic violence laws protect women from domestic violence?

This paper provides causal evidence that domestic violence laws do protect women in violent marriages. Using a simple theoretical model, I first show that domestic violence laws may decrease domestic violence via two possible channels. First, at one extreme, if men behave violently due to lack of self-control, the law may enable women to divorce

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[1] See Iyengar (2009) and Chin and Cunningham (2019) for the impact of domestic violence arrest laws on intimate partner homicide and Beleche (2019) for the impact of criminalization of domestic violence on suicide rates.

[2] See Doepke et al. (2012) for a detailed review of the economics and politics of women's rights, Chiappori and Mazzocco (2017) for a detailed review of household decisions, Rossin-Slater (2017) and Olivetti and Petrongolo (2017) for a detailed review of the impact of paid parental leave laws and Ford and Pande (2011) for a detailed review of the impact of gender quotas.

men who are unable to curb their violent behavior. This is the divorce effect. Second, at the other extreme, if men inflict violence due to their choice, the law may deter men's violence among the couples who remain married. This is the deterrent effect. I provide empirical support for both channels for the Rwandan context, where, as of 2010, 49.5% of married women reported experiencing domestic violence in the preceding twelve months (Thomson et al., 2015).

In 2008, Rwanda became the first country in Sub-Saharan Africa to pass a comprehensive domestic violence law (Hebert, 2015). All forms of domestic violence, including marital rape are criminalized.[3] The punishment is 6 months to 2 years of imprisonment. Moreover, domestic violence became grounds for a fault-divorce, which allows women to divorce their husbands unilaterally, if their husbands are violent towards them. This is a major change. Before the law, if a woman experienced domestic violence, she needed her husband's consent to divorce.

The introduction of the law yields a time variation for my analysis. The Rwandan context is also unique in that there is also variation in where violent marriages were more likely to be located before the law. La Mattina (2017) shows that in Rwanda, women who married after the Rwandan Genocide (1994) experienced more domestic violence in 2005 than women who were married before the genocide. This effect was greater for women in genocide intense areas.[4] The paper suggests genocide-induced male scarcity in the marriage market as a potential mechanism. I build on La Mattina (2017) and exploit geographical variation in the intensity of the Rwandan Genocide. I employ a difference-in-differences (DiD) strategy to investigate whether the law affects the change in divorce and domestic violence rates disproportionately in the areas with a high level of genocidal violence, where women are more likely to have been in violent marriages before the law's adoption.

To guide my empirical analysis, I build a simple model which links genocide-induced

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[3]Although criminalization of domestic violence is usually one of the first steps in introducing a domestic violence legislation, legally recognizing marital rape as a crime is not common among developing countries. There are currently many developing countries where marital rape remains legal, like India, China, Iran and the Democratic Republic of Congo.

[4]In a recent paper, Rogall and Zarate-Barrera (2020) shows that in the areas were armed genocide violence was intense, women's outcomes are better in 2010 and 2015, but positive effects of armed-group violence are not yet present in 2005. The authors also provide evidence that among women who were aged between 12 to 18 at the time of the genocide, those who live in areas with high levels of armed-group violence are more likely to experience domestic violence, specifically severe domestic violence, in 2005.

male scarcity, the likelihood of being in a violent marriage and the law. The model consists of two stages. In the first stage, the woman receives proposals from men in the marriage market. The probability of receiving a proposal is equal to male-to-female sex-ratio in the marriage market. When the sex-ratio decreases in the marriage market (male scarcity), a woman's probability of receiving a proposal is low. There are two types of men in the market, violent and non-violent. The woman can not observe the man's type. It is more costly for a woman to reject a proposal in a male-scarce area since it is less likely for her to receive another proposal. This makes her less selective in the marriage market and she accepts a proposal from a man who is more likely to be the violent-type. Thus, she is more likely to be in a potentially violent marriage in a male-scarce/genocide-intense area.

In the second stage, the couple is married and the man's type is revealed. I analyze the interaction between women and violent men under two hypotheses concerning the ability of men to control their violence. Under the lack of self-control hypothesis, a violent-type man lacks self-control and he is violent irrespective of the legal context. Under the choice hypothesis, he has the ability to control his violent behavior and chooses a level of violence that maximizes his utility. The model predicts that the higher the likelihood of being in a violent marriage in an area (the higher the male scarcity at the time of the marriage), the higher the decrease in the domestic violence rates after the law. Under the lack of self-control hypothesis, this is due to women divorcing their husbands who are unable to curb their violent behavior (divorce effect). Under the choice hypothesis, it is due to men reducing their level of violence to avoid the consequences of the law (deterrent effect).[5]

To test the predictions of the model, I combine multiple datasets for my analysis. First, I use multiple geo-coded data cycles of the Rwandan Demographic Health Surveys (DHS). Each cycle has information on the women's current divorce status and self-reported domestic violence experience in the past 12 months. Second, I use genocide court records to exploit the geographical variation in the intensity of the genocide. Using the court records, I create a commune[6] level genocide intensity index following Verpoorten (2012) and La Mattina (2017). Using GPS coordinates in the DHS, I match women with the communes in which they were married.

Among women who were ever-married and married after the genocide, I find that one

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[5]The law introduces a participation constraint to the woman that is binding.

[6]Communes were the geographical units existing at the time of the genocide. The average area of the 145 communes is 174 km^2.

standard deviation increase in the genocide intensity in a commune leads to a 1 percentage point increase in the divorce rates after the introduction of the law. The estimated impact represents an increase of 14% with respect to the sample mean (0.07). Also, among the married women who married after the genocide, one standard deviation increase in the genocide intensity in a commune leads to 5 percentage points decrease (p-value= 0.04) in sexual domestic violence after the law. The estimated impact represents a decrease of 38% with respect to the sample mean (0.13).[7]

To test the deterrent effect, I estimate the impact of the law on sexual domestic violence in the past 12 months for married and recently divorced women combined. I perform a bounds analysis following Horowitz and Manski (2000), assuming either that all divorced women in the post-law data cycle did or did not experience sexual domestic violence in the past 12 months. Among married and recently divorced women, one standard deviation increase in the genocide intensity in a commune leads to approximately 5 percentage points decrease in sexual domestic violence after the law. The estimates represent a sizeable decline of between 31% and 38% which provides support for the deterrent effect. I also show that the impact of the law on sexual violence persists in 2014, six years after the law. It is also more precisely estimated (p-value= 0.01) than the 2010 estimate.

I provide supporting evidence that male scarcity is the potential mechanism behind the variation in the location of violent marriages before the law and the results. First, there is no statistically significant change in divorce and domestic violence after the law for women who married right before the genocide. Moreover, I exploit the variation in reception of the state-sponsored radio station (RTLM) that induced participation in the genocide (Yanagizawa-Drott, 2014). In the communes with better reception, radio-induced killings were mostly women and children that led to a surplus of men (Rogall and Zarate-Barrera 2020, Rogall 2021). I found that women who married in the areas with good radio reception (male abundant areas) are less likely to get divorced after the law. There is no change in their domestic violence experience as well. These tests provide supporting evidence in favor of the male scarcity channel. The results are also robust to different measures of genocide intensity and specifications.

Contribution to the Literature. The paper contributes to several strands of the literature.

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[7]The effect on physical or sexual domestic violence is statistically significant and negative in only one of the two violence measures I used. The effect on physical domestic violence is although negative, is statistically insignificant.

First, it contributes to the large literature on the impact of expanding women's rights that is mentioned in the introduction. Much of the literature has focused on the impact of divorce laws, property laws, labor laws, reproductive laws and gender quota laws (Doepke et al., 2012). I focus on the most recent group of reforms on women's rights, domestic violence laws, and provide causal evidence that they protect women from domestic violence via divorce and deterrence.

The limited number of studies which investigate the impact of unilateral no-fault divorce on domestic violence either exploit variation in the staggered timing of the adoption of laws (Stevenson and Wolfers 2006, García-Ramos 2021) or use cohabitating couples as a control group (Brassiolo, 2016). Due to the uniqueness of the Rwandan context, my identification strategy allows me to show that a comprehensive domestic violence legislation -that fundamentally aims to protect citizens who are victims of domestic violence-protects *women who are more likely to be in violent marriages*. I also provide evidence that suggests the mechanisms behind the results.

Second, my results add to the literature on the motives for domestic violence. Several motives for domestic violence are incorporated into economic models. First, where a man is violent because it contributes to his utility directly, via a release of stress, frustration or a loss of self-control, then the violence is understood as *expressive* (Tauchen et al. 1991, Farmer and Tiefenthaler 1997, Aizer 2010, Card and Dahl 2011, Anderberg et al. 2016 and Haushofer et al. 2019). Second, where a man is violent to extract resources from his wife to increase his consumption of goods or control the woman's allocation, then the violence is *instrumental* (Tauchen et al. 1991, Bloch and Rao 2002, Eswaran and Malhotra 2011, Bobonis et al. 2013, Erten and Keskin 2018, Haushofer et al. 2019, Calvi and Keskar 2021). Third, where a man behaves violently to reinstate his traditional gender role, then the violence is defined as *male backlash* (Macmillan and Gartner 1999, Angelucci 2008, Guarnieri and Rainer 2018, Bhalotra et al. 2019).[8] The increase in the divorce rates provides some support for lack of self-control as a male motive for violence. This suggests that the legal recognition of domestic violence as grounds for divorce can be an effective policy for women in violent marriages.[9]

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[8]See Tur-Prats (2017) and Alesina et al. (2020) for the relationship between cultural factors and domestic violence.

[9]There are two possible explanations for the dissolved marriages. Presumably, for the violent men who lacks self-control, domestic violence continued to exist after the law, and this led their wives to initiate a divorce. For the violent men who can control themselves, men did not find it worthwile to remain married in a marriage with a lower level of domestic violence than before the law, leading couples to divorce via mutual

Lastly, this paper adds to the conflict literature, specifically that on the Rwandan Genocide (Verpoorten 2005, Verpoorten 2012, Yanagizawa-Drott 2014, La Mattina 2017, Blouin and Mukand 2019, Heldring 2020, Rogall and Zarate-Barrera 2020, Rogall 2021) and shows that conflict-induced domestic violence can be alleviated by the adoption of domestic violence laws. My results provide insights to the lawmakers in post-conflict countries.

The organization of the paper is as follows. I begin by providing background information on the history of domestic violence laws and an overview of the Rwandan context (Section 2). Then I introduce the model which gives two testable predictions (Section 3). I then introduce the multiple data sources I use (Section 4). Then I test the theoretical predictions using data and present results (Section 5). Section 6 provides robustness checks. The last section concludes (Section 7).

2 Background and Context

2.1 History of Domestic Violence Laws

Legal reforms on domestic violence are a recent phenomenon. When domestic violence came into the spotlight in the legal and policy debate in the late 1970s, governments were at first resistant to passing legislation on the issue. They defended that domestic violence as a private matter within the family in which the government should not intervene. The mid-1990s saw a slow increase in the number of domestic violence laws adopted globally (firstly in developed nations); this increase has been driven by international and regional human rights conventions and campaigns (World Bank, 2015). As of September 1, 2019, 155 countries in the world have domestic violence laws in place (World Bank, 2020).

2.2 2008 Domestic Violence Legislation in Rwanda

In 2008, Law No. 59/2008 of 2008 on the Prevention and Punishment of Gender-Based Violence was passed by the Rwandan parliament. With this law, Rwanda became the first country in Sub-Saharan Africa to pass a comprehensive law to address gender-based vio-

consent.

lence (Hebert, 2015).[10] All forms of domestic violence, including marital rape, are criminalized. The penalty for domestic violence is six months to two years of imprisonment.[11] Additionally, domestic violence became grounds for fault divorce, which enabled legally married women to divorce their abusive husbands unilaterally. Upon divorce, child custody will be given to the spouse innocent of violence. Given that most marriages in Rwanda, 59%, are legal or civil marriages according to the 2002 Census, the divorce provision applies to the majority of married couples.

Before the adoption of the domestic violence legislation, if a woman experienced domestic violence in Rwanda, she needed her husband's consent to get divorced. Both before and after the law, mutual consent and fault are the only recognized types of divorce; unilateral no-fault divorce is not an option. The law recognizes domestic violence as one of the possible faults in a fault divorce. According to the 1988 Civil Code, other faults that ground a fault divorce are a conviction for an offense that brings considerable disgrace to the family (e.g., participation in the genocide), adultery, three years of de facto separation, abandonment of the marital home for more than one year, and infliction of serious injury. Divorce cases are handled in the primary courts. Primary courts constitute the lowest level of the judiciary of Rwanda, and they have civil and criminal jurisdiction.

The law came into effect in April 2009 and is unique for a developing country. First, beyond divorce being taboo in many developing countries, women are often not formally protected by laws upon divorce and face the possibility of losing assets and custody of their children (Duflo (2012), Anderson (2018)). Second, although criminalization of domestic violence is usually one of the first steps in introducing domestic violence legislation, legally recognizing marital rape as a crime is not very common for a developing country. As of today, there are still many developing countries where marital rape is still legal, including India, China, Iran, and the Democratic Republic of Congo.

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[10]Since I focus on violence against married women, I use the term "domestic violence" rather than "gender-based violence" throughout the paper, although domestic violence is a form of gender-based violence.

[11]According to the 2011 US Department of State's Country Report on Human Rights Practices for Rwanda, Rwandan prosecutors received 363 domestic violence cases of which 177 were filed in court, 18 were dropped, one was reclassified, and 167 were pending investigation. Unfortunately, conviction statistics are not available (US Department of State, 2010).

2.3   The Rwandan Genocide (1994) and Male Scarcity

La Mattina (2017) shows that in Rwanda, women who were married after the genocide experience more domestic violence than women married before that time, with a greater effect for women in genocide-intense areas. The author suggests genocide-induced male scarcity as a potential mechanism for this effect and highlights that male scarcity in the marriage market may lead women to marry potentially violent men.

The Rwandan Genocide took place between April 7 and July 15, 1994. In fewer than one hundred days, between 500,000 and 1,000,000 people, mostly from the Tutsi ethnic group, were killed(Verpoorten, 2005). Moderate Hutus who spoke out against the genocidal violence by Hutus against Tutsis were also killed (Yanagizawa-Drott, 2014). The intensity of the genocide varied by commune, which is the geographical unit as defined at the time of the genocide. The geographical variation can be seen in Figure 1.

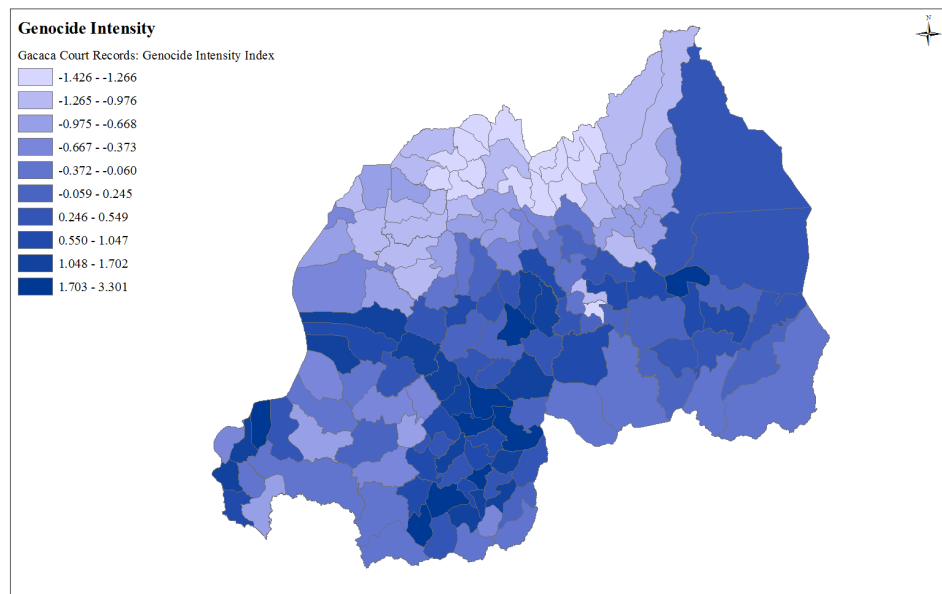Figure 1: Genocide Intensity

Due to the high number of men killed during the genocide and incarcerated thereafter, Rwanda's marriage market after the genocide has a distorted sex ratio (the number of males per number of females is low)[12] Figure A.9 visualizes the geographical variation in the

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[12]After the genocide, perpetrators were incarcerated, and a majority of them were male (La Mattina,

marriage-market sex ratio.[13] Males are scarcer in the communes where genocide was more intense.

Marriage Market Sex-Ratio After The Genocide Across Communes

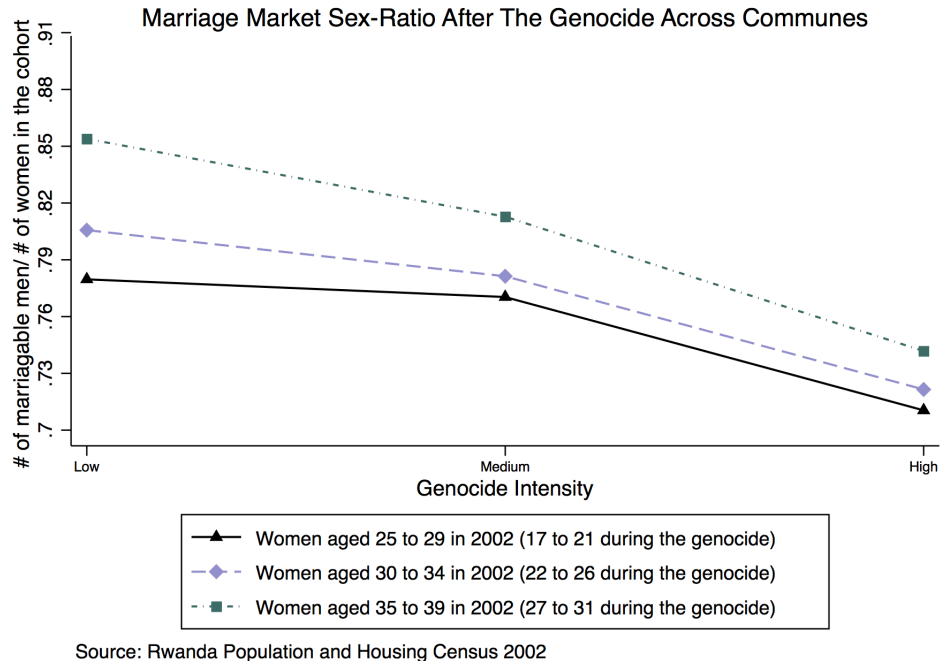Source: Rwanda Population and Housing Census 2002

Figure 2: Cohort specific marriage market sex-ratio across different genocide intensities

Figure 2 shows the negative relationship between genocide intensity and the sex-ratios in the marriage market across different cohorts. I calculated the sex ratios for the cohort-specific marriage markets using the 2002 census across different genocide-intensity levels. These cohort-specific sex ratios are the number of marriageable men divided by the number of women in a given cohort. Marriageable men are defined with respect to age. As an example, the marriage-market sex ratio for women aged between 26 and 30 years old is calculated by dividing the number of men aged 26–30 years over the number of women aged 26–30 years. Intervals of five years are chosen since there is a five-year mean age difference between wives and husbands in Rwanda. In all cohorts, there is a negative rela-

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2017). According to the 1991 and 2002 Rwandan Census, the share of incarcerated individuals in the population increased from 0.11 in 1991 to 1.3 in 2002, and more than 95% of those incarcerated in 2002 were male (La Mattina, 2017). After the genocide, the Rwanda Census does not ask for ethnicity information, which makes it impossible to see whether the majority of perpetrators are Hutu. However, since the genocide is against the Tutsis by Hutus, it is assumed that most perpetrators are from the Hutu ethnic group. Thus, sex ratios are distorted not just for the Tutsis but also for Hutus.

[13]Number of males divided by females aged between 16 and 50.

tionship between genocide intensity and the sex ratio. When genocide intensity increases, the marriage-market sex ratio decreases.[14]

In order to summarize the order of the events discussed in this section, I provide a timeline of the events in Figure 3.
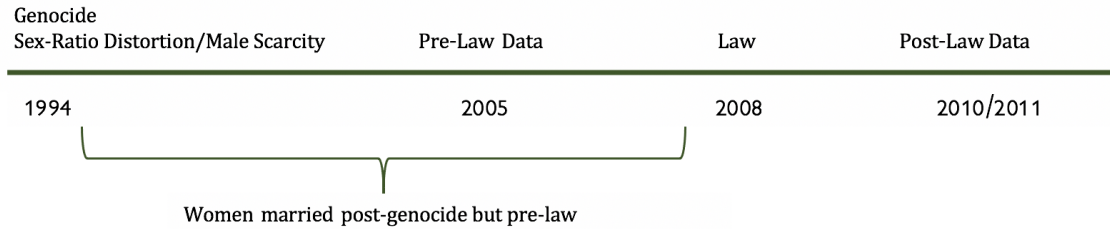
Figure 3: Timeline of Events

3   Model

To guide my empirical analysis, I introduce a simple theoretical framework below that links genocide-induced sex-ratio distortion (make scarcity), the likelihood of being in a violent marriage and the domestic violence legislation.

3.1   Setup

There are two stages in the model, one before and one after the marriage. Before the marriage, I model the marriage market in discrete time with infinitely lived single women who discounts the future by a discount factor β.[15] Every period, a single woman receives a proposal with probability λ, from a man of type $\alpha \in \{0,1\}$. There are two types of men in the market, violent ($\alpha = 1$) and non-violent ($\alpha = 0$). The violent type man commits domestic violence in the marriage where a non-violent man does not. Thus, the expected utility from a marriage with a non-violent man will be higher. The probability of receiving

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[14]To provide more information on the context, I also show in Figure A.10 how the sex ratios changed before and after the genocide. I am not exploiting the time variation (married before and after the genocide) since women married before are much older than those who married after. It will be hard to disentangle whether older women are less likely to divorce after the law because they are married to non-violent men or due to their age. Older women are less likely to divorce in Rwanda according to data.

[15]I model the marriage market as a one-sided matching market. Men do not behave strategically.

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a proposal, λ, is monotonic in the male-to-female sex-ratio. The probability of receiving a proposal is low when the sex-ratio is low (male scarcity).[16]

A woman does not observe the man's type, but she observes a signal $\sigma \in (0,1)$ on his type. The signal is drawn from $f(\sigma|\alpha)$ which satisfies the monotonic likelihood ratio property (MLRP): The higher the signal, the more likely the man is a violent type. Thus, high signals are bad news. At the extreme, these signals are almost perfectly informative.[17] The associated cumulative density is denoted as $F(.)$. After observing the signal, she updates her belief about the man's type and then she decides whether to accept or reject his proposal. Belief updating follows the Bayes rule and the posterior probability of a man being the violent type given the signal is denoted as π_σ.[18] She strictly prefers being married to the man who is least likely to be violent over being single forever. She prefers being single forever to being married to the man who is most likely to be violent.

If the woman rejects the proposal of a man, she obtains per-period utility of being single and continues to search. If she accepts, the couple is married. The man's type and the benefit from the marriage are realized and the woman obtains the per-period utility of being married. Marriage is an absorbing state. Thus, the woman will not be able to get divorced once married. This captures the decision making process of the women who married before the legal reform. Before the law, the divorce rate in Rwanda was very low, 0.01, although divorce was legal. Thus, I assume that women are making a marriage decision thinking that they will be married forever. They are myopic in the sense that they do not anticipate a legal change about concerning divorce in the future.

The preferences of the man and the woman depend on their marital status. If they are married, I assume that the preferences can be represented by the utility functions

$$U_m^{married} = \alpha + \xi_m \ \text{ and } \ U_w^{married} = -\alpha + \xi_w, \tag{1}$$

where $\alpha \in \{0,1\}$ is the man's type and $\xi_j \in (0,1]$ for $j \in \{m,w\}$ indicates the non-monetary benefit from marriage for women and men. The man's type, α, captures the man's propensity for domestic violence. If $\alpha = 1$, he is the violent type and he derives positive utility from committing violence against his wife. Men and women's non-monetary benefit are

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[16]I use low sex-ratio and male scarcity interchangeably throughout the paper

[17]$\lim_{\sigma \uparrow 1} \frac{f(\sigma|\alpha=0)}{f(\sigma|\alpha=1)} = 0$ and $\lim_{\sigma \downarrow 0} \frac{f(\sigma|\alpha=1)}{f(\sigma|\alpha=0)} = 0$

[18]$\pi_\sigma = P(\alpha=1|\sigma) = \frac{pf(\sigma|\alpha=1)}{pf(\sigma|\alpha=1)+(1-p)f(\sigma|\alpha=0)}$, where p is the prior belief.

independent and ξ_j follows distribution Q_j with support $[\underline{\xi_j}, \overline{\xi_j}]$. $\underline{\xi_j}$ is high enough for the marriage to take place with the man. $U_w^{married}$ is decreasing in domestic violence and U_m and $U_w^{married}$ are increasing in non-monetary benefit from marriage. If they are single, I assume that their preferences can be represented by the utility functions

$$U_m^{single} = s_m \ \ and \ \ U_w^{single} = s_w \tag{2}$$

where $s_j \in (0,1]$ for $j \in \{m,w\}$. These represent the outside options. For now, assume that in the absence of domestic violence, both the woman and the man are better off remaining married than being single as in $\xi_w > s_w$ and $\xi_m > s_m$.[19]

When a single woman receives a proposal from a man, she compares the lifetime expected value of marrying today, V_M, with the lifetime expected value of remaining single at least one period, V_S:

$$\max_{Accept, \, Reject} \{V_M, V_S\} \tag{3}$$

where

$$V_M = \frac{-\pi_\sigma + \mathbb{E}[\xi_w]}{1 - \beta} \tag{4}$$

$$V_S = s_w + \beta \left[\lambda \, \mathbb{E}_\sigma[\max\{V_M, V_S\}] + (1 - \lambda)V_S \right]. \tag{5}$$

V_M is dependent on the posterior probability of the man being the violent type and the woman's expected benefit from the marriage. V_S depends on λ, the probability of receiving a proposal or the sex-ratio in the marriage market at the time of the marriage.

There exists a reservation signal $\sigma^*(\lambda, s_w)$, where $V_M(\sigma^*) = V_S(\sigma^*)$. Given that high signals are bad news, she will accept any proposal with a signal below the reservation signal, since those men will be less likely to be the violent type.

$$\sigma^*(\lambda, s_w) = \begin{cases} Accept & \text{if } \sigma(\lambda, s_w) \leq \sigma^*(\lambda, s_w) \\ Reject & \text{if } otherwise. \end{cases} \tag{6}$$

The relationships between the reservation signal, male scarcity and the utility of being single are as follows:

$$\frac{\partial \sigma^*(\lambda, s_w)}{\partial \lambda} < 0 \tag{7}$$

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[19]I relax this assumption at the end of Section 3.3.1

$$\frac{\partial \sigma^*(\lambda, s_w)}{\partial s_w} < 0 \tag{8}$$

Observation 1: *The higher the male scarcity in the marriage market, the less selective women are.*

Proof. See Appendix B.1.

The reservation signal increases if male scarcity increases. When there is male scarcity in the marriage market, women settle down for men who are more likely to be violent-types.

Observation 2: *The better the outside options, the more selective women are in the marriage market.*

Proof. See Appendix B.2.

The reservation signal decreases if the utility of being single increases. When the utility of being single is higher, it is less costly for women to wait for one more proposal, which makes them more selective in the marriage market.

If the woman accepted the proposal of a violent type man, $\alpha = 1$, in the marriage market, she experiences domestic violence in her marriage and receives $-1 + \xi_w$. Before the law, she cannot divorce her husband unilaterally. Thus, she is stuck in the violent marriage. After the law, domestic violence becomes grounds for divorce. Now, she can unilaterally divorce her husband if he behaves violently towards her. She can either remain married forever, or divorce the violent type man and go back to the single pool forever, as represented with the maximization below:

$$\max_{Married,\, Divorced} \left\{ \frac{-\alpha + \xi_w}{1 - \beta}, \frac{s_w}{1 - \beta} \right\}. \tag{9}$$

By assumption, remarriage is not allowed in the model.[20] After the law, the woman will divorce the violent type man if $-1 + \xi_w \leq s_w$.[21] It is important to highlight that according to the law, the woman can initiate divorce *if* her husband behaves violently. Thus, in order to investigate the impact of the law, I model man's violent behavior in the next subsection.

There remain two types of men, violent ($\alpha = 1$) and non-violent ($\alpha = 0$), where the

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[20]This assumption is based on the data. According to DHS 2014 and recent marriage statistics, rates of formal remarriage are very low in Rwanda.

[21]If the woman accepted the proposal of a non-violent type man, $\alpha = 0$, her optimal decision is to remain married, assuming $\xi_w > s_w$.

violent type man derives positive utility from wielding violence against the woman. However, now I distinguish between two hypotheses on men's ability to control their violent behavior. Under the lack of self-control hypothesis, the violent type man always behave violently irrespective of the legal context he lives in, because he lacks self-control. Under the choice hypothesis, the violent type man can control his violent impulses and *can choose to inflict violence or not* by maximizing his utility with respect to the woman's outside option. Under both hypotheses, non-violent types do not behave violently either before or after the law's adoption.

3.2 Lack of Self-Control Hypothesis

3.2.1 Predictions: Divorce Effect

Recall that the cumulative distribution function of ξ_w is given by Q_w. The probability of divorce conditional on being married to a violent man is thus $Q_w(s_w + 1)$.[22] The divorce rate post law, *DivorceRate*, consists of the posterior probability that the man to whom the woman is married is the violent type, π_σ, multiplied by $Q_w(s_w + 1)$. Accordingly, *DivorceRate* is given by

$$DivorceRate = \int_0^{\sigma^*(\lambda, s_w)} \pi_\sigma Q_w(s_w + 1) dF(\sigma). \tag{10}$$

This is the divorce rate among all couples since the divorce rate for the couples in which husbands are non-violent types is zero. The divorce rate depends on the reservation signal, $\sigma^*(\lambda, s_w)$, since the reservation signal affects women's marriage decisions. Lastly, since there is no divorce before the law in the model, $DivorceRate = \Delta DivorceRate$.[23] The relationship between the $\Delta DivorceRate$ and male scarcity is as follows:

$$\frac{\partial \Delta DivorceRate}{\partial \lambda} < 0. \tag{11}$$

Proof. See Appendix B.3.

Prediction 1a (Divorce Effect): *The higher the male scarcity at the time of the marriage,*

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[22]Given that Q_w is monotonicly increasing in s_w, the probability of divorce is increasing in women's outside option.

[23]This assumption is based on the data. The divorce rate before the law is 0.02 in Rwanda.

the higher the increase in the divorce rates after the law.

The higher the male scarcity, the more likely it is that a woman will settle down with a violent husband. This increases the divorce rate more after the law. Mechanically, the increase in the divorce rate should translate into a decline in the rate of domestic violence committed after the law's introduction for couples who remained married; a group of people in abusive marriages are no longer in the married sample due to divorce. This direct effect of the law can be easily seen if the rates of violence before and after the legal reform are compared. The violence rate before the legal reform, $VarianceRate_{Pre}$, consists of posterior probability that the man is the violent type. Accordingly,

$$VarianceRate_{Pre} = \int_0^{\sigma^*(\lambda, s_w)} \pi_\sigma dF(\sigma). \tag{12}$$

After the law, the violence rate is calculated for the remaining married couples. The rate will be dependent on the probability of remaining married, $[1 - Q(s_w + 1)]$. The violence rate after the law, $VarianceRate_{Post}$, consists of the posterior probability of the man being the violent type multiplied by the probability of remaining married. Accordingly,

$$VarianceRate_{Post} = \int_0^{\sigma^*(\lambda, s_w)} \pi_\sigma [1 - Q_w(s_w + 1)] dF(\sigma). \tag{13}$$

When we subtract the pre and post legal reform violence rates from each other, we see that $\Delta VarianceRate = -\Delta DivorceRate$, which highlights the law's impact via divorce as in

$$\frac{\partial \Delta VarianceRate}{\partial \lambda} > 0. \tag{14}$$

Proof. See Appendix B.3.

Prediction 1b (Divorce Effect): *The higher the male scarcity at the time of the marriage, the higher the decrease in domestic violence rates after the law. This is due to the higher increase in divorce rates.*

The domestic violence rate is calculated among the married couples. Since women divorce violent men, the composition of married couples changes after the law. Violent type men being divorced leads to a decline in the domestic violence rate.[24] Prediction 1b, the divorce effect, shows the first possible mechanism of how a domestic violence law

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[24]Since non-violent type men will never be violent and a woman's optimal strategy is to remain married in the absence of violence, divorce and violence rates among those couples are zero before and after the law.

can protect women from future domestic violence. Before the law, if a woman accepted the proposal of a violent type man, she experiences violence in the marriage, but cannot divorce her husband. After the law, the violent type man continues to behave violently since he lacks self-control, but now the woman can divorce him and avoid future violence.

3.3 Choice Hypothesis

Under the choice hypothesis, the violent type man can control his violent impulses and *can choose to be violent or not* by maximizing his utility with respect to the woman's outside option. Before the law, the maximization problem of the man is as follows:

$$\max_{d} \; \alpha d + \xi_m. \tag{15}$$

As before α and ξ_m are the man's type and non-monetary benefit from marriage respectively as before. For the self-control hypothesis, I introduce $d \in \{0,1\}$ to the man's preference, which represents the level of domestic violence he chooses. Before the law, the woman cannot divorce her husband without his consent. Based on the legal context, I assume that divorce can take place only if the utility of being married for both the man's and woman is smaller than their utility of being single, $U_w^{married} < s_w$ and $U_m^{married} < s_m$. In the absence of the law, the violent man is solving an unconstrained maximization problem. Since the violent man, $\alpha = 1$, derives positive utility from violence, he will inflict the maximum possible violence, which is equal to 1.[25] This will be the equilibrium level of violence before the law, $d_{Pre}^* = 1$. Although it is possible for $U_w = -1 + \xi_w < s_w$, as long as $U_m = 1 + \xi_m > s_m$, the couple will remain married and the woman continues to be in a violent marriage.

After the law, the woman is subject to a participation constraint, $P_w = -\alpha d + \xi_w > s_w$. Thus, the man's maximization problem becomes

$$\max_{d} \; \alpha d + \xi_m \tag{16}$$

$$P_w = -\alpha d + \xi_w > s_w. \tag{17}$$

If the violent-type man chooses to behave violently, his wife will divorce him if $-d + \xi_w \le$

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[25]The non-violent man chooses to not behave violently both before and after the law since he receives disutility from violence.

s_w. The condition highlights that the woman's maximum tolerable level of violence is $d_w = \xi_w - s_w$ and she will be indifferent between remaining married and initiating divorce at this level. If $\xi_m > s_m$ and $\xi_w > s_w$, the violent man will shift his violence downward from 1 to $\xi_w - s_w$ so that she will not divorce him. This is the case where a woman's maximally tolerated level of violence binds in equilibrium after the law's introduction, $d_{Post}^* = d_w = \xi_w - s_w$. This can be seen more clearly with the following equality: $d_{Post}^* = min\{d_m, d_w\}$. The violent man's choice of d without P_w is 1, $d_m = 1$, and $d_w = \xi_w - s_w < 1$. Thus, $d_{Post}^* = d_w$.

At d_{Post}^*, the violent man's utility within the marriage is $\xi_w - s_w + \xi_m$. If $\xi_m > s_m$ and $\xi_w > s_w$, $\xi_w - s_w + \xi_m > s_m$, meaning that for the violent man, the utility of being married exceeds the utility of being single for the violent man. At this level of violence, the woman is indifferent between remaining married and initiating divorce. Thus, the couple will remain married where the level of violence in the marriage is lower than before the law. The law deters domestic violence in the marriage.

3.3.1 Predictions: Deterrent Effect

Accordingly, post law violence rate becomes $ViolenceRate_{Post} = \int_0^{\sigma^*(\lambda, s_w)} \pi_\sigma(d_{Post}^*) dF(\sigma)$, where $d_{Post}^* = \xi_w - s_w$. Subtracting $ViolenceRate_{Pre}$ from $ViolenceRate_{Post}$, the change in the domestic violence rate becomes:

$$\Delta ViolenceRate = \int_0^{\sigma^*(\lambda, s_w)} \pi_\sigma(d_{Post}^* - 1) dF(\sigma). \tag{18}$$

The relationship between $\Delta ViolenceRate$ and the sex-ratio is as follows:

$$\frac{\partial \Delta ViolenceRate}{\partial \lambda} > 0. \tag{19}$$

Proof. See Appendix B.4

Prediction 2 (Deterrent Effect): *The higher the male scarcity at the time of the marriage, the higher the decrease in domestic violence rates after the law. This is not dependent on the higher increase in the divorce rates.*

Since under the choice hypothesis, the law deters the violent-type man from violence, and it is more likely that violent-type men will be observed in the areas of male scarcity, the

violence rate deecrease more after the law in formerly male-scarce areas than in other areas. Prediction 2a, the effect of the law via deterrence, shows the second possible way that a domestic violence law can protect women from future domestic violence. After the law, women can walk out of their marriage, which deters the violent-type man from exercising violence. The deterrence effect of the law highlights the fact that a change in domestic violence rates is possibly independent of an increase in the divorce rate.

What would happen if $\xi_m < s_m$ and $\xi_w < s_w$? Then, it would be possible to observe divorce after the law under the self-control hypothesis. Recall that at d^*_{Post}, the violent man's utility within the marriage is $\xi_w - s_w + \xi_m$. If $\xi_m < s_m$ and $\xi_w < s_w$, $\xi_w - s_w + \xi_m < s_m$, his utility of being single exceeds his utility of being married for the violent man. At this level of violence, the woman is indifferent between remaining married and initiating divorce. Thus, the couple will divorce via mutual consent. This is a case where the violent type man will not find it worthwhile to remain married if he has to inflict a lower level of domestic violence, d^*_{Post}, compared to before the law. This case is developed in detail in Appendix B.5, I show in detail that there is an increase in the divorce rate also exists under the choice hypothesis as well.

4 Data

I combined three different data sets for my analysis: The Rwandan Gacaca Court Records, the 2005 and 2010/2011 Rwandan DHS and the 1991 Rwandan Census for the main specification. I create the genocide intensity index using The Rwandan Gacaca Court Records. I use DHS to measure divorce and domestic violence variables before and after the law. I also use DHS 2014/2015 to investigate the long run impact of the law, DHS 2000 for checking parallel trends and the 2002 Rwandan Census for robustness checks. The DHS and the census data are both nationally representative.

Each dataset is collected at different administrative levels: sector, commune, and district. Among the three, the district is the largest unit in size, and the sector is the smallest. A commune can be thought of as a US county. The Gacaca Court records are collected at the sector and 2006 district levels. DHS cycles are geo-referenced. The 1991 Census is collected at the commune level. I compile all the datasets at the commune level for my analysis.

4.1 Genocide Court Records

I use Gacaca Court records to exploit the geographical variation in the intensity of the genocide. The Gacaca courts are a transitional community justice system, that is responsible for the prosecution of the perpetrators of the Rwandan Genocide at the domestic level. The court's records contain detailed information on the number of accused perpetrators and genocide survivors, including the number of perpetrators who organized the genocide, killed and looted during the genocide as well as the number of people widowed, orphaned and disabled at the sector level. I followed Verpoorten (2012) and La Mattina (2017) and created a commune level genocide-intensity index. The index is a principal component analysis of the six categories above and captures the intensity of the genocidal violence in a given commune.[26] Table A.1 reports the summary statistics on the index and its components. The index is standardized to mean zero and standard deviation one. It takes values between -1.4 and 3.3 where a commune with -1.4 has the lowest genocide intensity and one with 3.3 has the highest genocide intensity. I used the commune level index as a proxy for male scarcity at the time of the marriage where a commune constitutes the marriage market for a single woman. Table A.2 displays the relationship between the index and the sex ratio/male scarcity. The male-to-female sex-ratio is the lowest (males are scarce) in the high intensity communes in 2002. Other 2002 commune level variables remain mostly unchanged as the genocide intensity increases.

4.2 Divorce and Domestic Violence Data

In order to investigate the impact of the law on divorce and domestic violence, I use the Rwandan DHS. The surveys collect demographic and health information from women aged 15-49. Such information includes marital status, domestic violence, employment, earnings, education, fertility and household decision-making power.

DHS data do not include information on communes.[27] However, since the data cycles are geo-referenced, I match a woman's current GPS location to the commune she was in at the time of the marriage. This process is equivalent to matching the women to the marriage market in which she was married. Figure 4 shows the matched data on the Rwanda map.

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[26]See Verpoorten (2012) and La Mattina (2017) for more detail on the data and the genocide intensity index.

[27]Communes are replaced by districts and municipalities in 2002.

My sample consists of ever-married women who married (once) after the genocide but before the law. I exclude from my sample the women who married after the law to rule out the impact of the law on matching in the marriage market.[28]
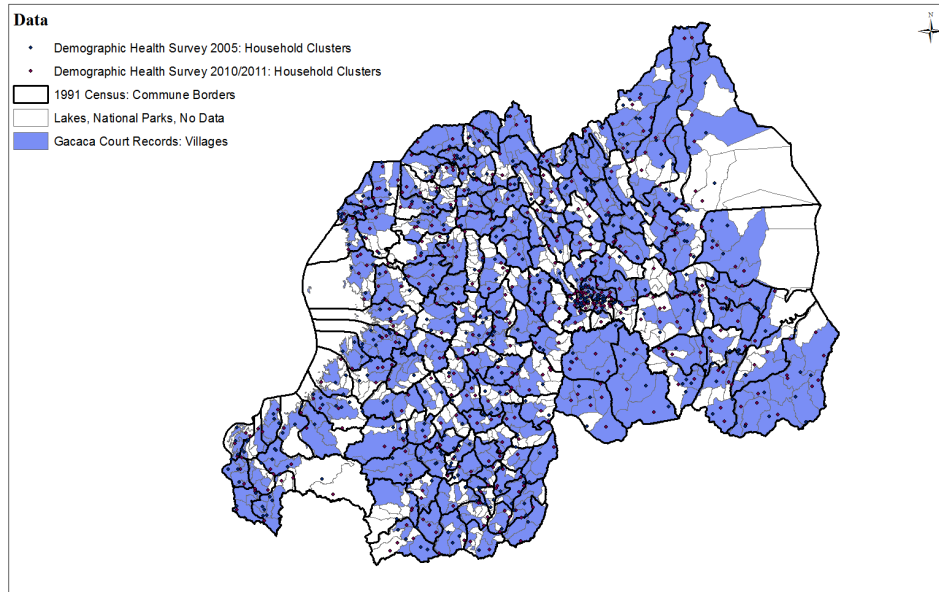
Figure 4: Matched Data

I focus on two main outcome variables in the DHS: marital status and incidence of domestic violence in the past 12 months. I created a binary variable that takes the value of one if a woman's current marital status is divorced and zero if her current marital status is married. The data also contains information on whether married (divorced) women experienced domestic violence in their current (most recent) marriage in the past 12 months. Information on women's domestic violence experiences is collected via a domestic violence module. Only one randomly selected woman per household is questioned for the module.

I created a binary variable that takes the value one if a woman experienced domestic violence in the past 12 months in her current or most recent marriage. The domestic violence variable includes physical and sexual domestic violence. The classification of dif-

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[28]It is less costly to marry a violent-type man after the law compared to marrying him before. After the law, in the case of domestic violence, the woman has a chance to leave her marriage without her husband's consent, which will make her less selective at the time of the marriage.

ferent types of domestic violence is made by DHS according to World Health Organization guidelines. Physical domestic violence consists of being pushed, shaken, having thrown something at, slapped, kicked, dragged, strangled, or burned. Sexual domestic violence consists of being physically forced to perform unwanted sex and sexual acts. I created a domestic violence index (z-scores) following Kling et al. (2007) to show that my results are robust to different measures of violence. The index is calculated by subtracting the control group (genocide not intense) mean and dividing by the control group standard deviation. There has been a recent increase in the number of papers that use z-scores to report domestic violence (Haushofer et al. 2019, Bhalotra et al. 2019, Erten and Keskin 2018).

In total, there are four cycles of the DHS data: 2000, 2005, 2010, and 2014 cycles. I use the 2005 and 2010 cycles for the main specification. The 2005 survey is used for the pre-law data cycle, and the 2010 survey is the post-law data cycle. I also use the 2014 cycle to investigate the long-run impact of the law and the 2000 cycle to check pre-trends. Table A.3 shows the summary statistics for the main outcome variables before and after the law across different genocide intensities. Tables A.4 and A.5 show the summary statistics of the sample across areas of different genocide intensities before and after the law.

Figure 5 is a visual representation of the changes after the law in rates of divorce and domestic violence across different genocide intensities. The higher the genocide intensity, *the higher the increase* in the divorce rate and the *lower the increase* in the sexual domestic violence rate after the law.[29] In contrast, the higher the genocide intensity, the higher the increase in the physical domestic violence rates after the law.

Divorce and sexual domestic violence trends are in line with the theoretical predictions. However, it should be noted that the graphs represent raw means and do not reflect my identification strategy. The main empirical specification will be proposed in the next section.

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[29]In Figure A.11, I plot the change in the share of women who do not live with their husbands. The higher the genocide intensity, the higher the decrease in the share of women who are not living with their husbands after the law is introduced. Figures on rates of divorce and couples not living together suggest that before the law's passage, women in abusive marriages were using de facto separation to get divorced. They use the law to dissolve their marriages once it is introduced.
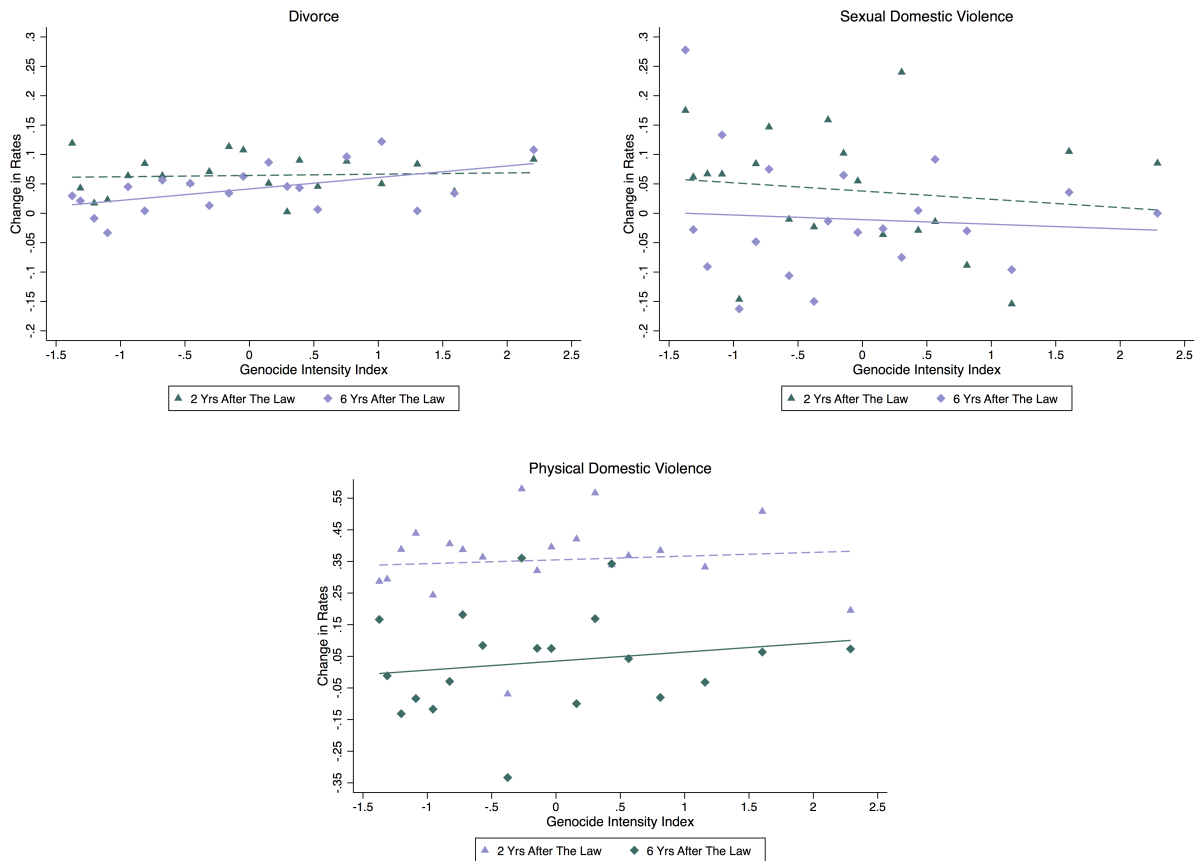
Figure 5: Change in marital status and domestic violence rates after the law
Note: Binned scatter plots of change in divorce and sexual domestic violence rates across different genocide intensities after the law with a linear fit. The changes are relative to before the law.

4.3 Additional Data

Census Data I use 1991 Census data to construct commune-level literacy and population-density variables to control for pre-genocide trends in my main empirical specification. Table A.2 shows the descriptive statistics for various commune-level variables including literacy and population density. In total, there are three cycles of the Rwandan Census. The 1991 Census is the census before the genocide. The 2002 Census is the census after the genocide but before the law's passage. Lastly, the 2012 Census is the census after the genocide and after the law. I use the 2002 and 2012 censuses for various robustness checks

Access to Court Data I also collected data on the number of primary courts from the Judiciary of Rwanda's website, *https://www.judiciary.gov.rw/index.php?id=44*, (last access

on 12/03/2020). The data has information on the number of primary courts in each district. In total, there are 41 primary courts in Rwanda, and they are not evenly distributed. I create a binary variable that takes the value one if a woman lives in a district that has primary courts. As seen in Table A.4 and A.5, the share of women who lives in a district with a primary court is less than 50%. I use the variable in my specifications to control for women's access to courts.

5   Empirical Analysis

My main empirical specification is as follows:

$$Y_{ict} = \beta_0 + \beta_1 Post_t + \beta_2 GenocideIntensity_c \times Post_t + \mathbf{X}'_{\mathbf{it}}\phi + \mathbf{X}'_{\mathbf{c1991}} \times Post_t \lambda + \alpha_c + \omega_m + \varepsilon_{ict}.$$

This is a DiD specification with a continuous treatment variable. The dependent variable is a dummy variable which is equal to 1 if a woman in commune c, in year t, is currently divorced or experienced domestic violence in the past 12 months. Besides measuring domestic violence with dummy variables, I also measure it using z-scores following Kling et al. (2007). $Post_t$ variable is a dummy for the post-reform data cycle (2010/2011). *GenocideIntensity* is the genocide intensity index which is the proxy for the male scarcity at the time of the marriage. The coefficient of its interaction with the *Post* variable, β_2, is the parameter of interest, which is the DiD estimator. I have two sets of control variables. First is a rich set of individual controls, $\mathbf{X}'_{\mathbf{it}}$, which includes information on woman's age, education, employment, number of children, year and duration of the marriage, residence (rural/urban), access to court and household wealth. Second is pre-genocide commune level characteristics, $\mathbf{X}'_{\mathbf{c1991}}$, which are the 1991 male literacy rate[30] and population density. I interacted these with the Post variable and included them in my specification to make sure that pre-genocide commune level variables are not driving my divorce and domestic violence results. I also included commune and year of marriage fixed effects (FE) in the main specification which are denoted as α_c and ω_c respectively. Commune FE controls for the commune characteristics that varies across communes but does not change over time. Social norms as well as the commune level propensity for violence constitutes are examples. Since the genocide intensity of a commune, $GenocideIntensity_c$, does not change over time

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[30]The number of literate men divided by all men in a commune

in my data, it is captured by the commune FE and is not included in the specification. Year of marriage FE controls for time trends in the marriage markets in Rwanda. I clustered standard errors at the commune level (Bertrand et al., 2004).

5.1 Testing the Predictions

5.1.1 The impact of the law on divorce and domestic violence

The estimates are reported in Table 1. The coefficient on *GenocideIntensityPost*, β_2, is statistically significant and positive when the dependent variable is being divorced. Among ever married women who married after the genocide, one standard deviation increase in the genocide intensity in a commune leads to 1 percentage points increase in the divorce rate after the law. The estimated impact represents an increase of 14% with respect to the sample mean (0.07). In the communes where there was male scarcity in the marriage market at the time of the marriage, divorce rates increase more after the law.[31]

I used three different dependent variables for experiencing domestic violence in the past 12 months; experiencing physical or sexual, physical only and sexual domestic violence only. Among the married women who married after the genocide, one standard deviation increase in the genocide intensity in a commune leads to 6 percentage points decrease in physical or sexual domestic violence rate after the law. The estimated impact represents a decrease of 15% with respect to the sample mean (0.39). The z-score measure estimate is negative but statistically insignificant.

Among the married women who married after the genocide, one standard deviation increase in the genocide intensity in a commune leads to 5 percentage points decrease

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[31]I also replicated my results using two cycles of The Rwandan Census (2002 and 2012) with 80,626 women. Estimates are reported in Table A.9. Among the ever married women who married after the genocide, one standard deviation increase in the genocide intensity in a district leads to no change in the rates of divorce or separation after the law. The 2012 Census does not provide commune information, so I used data for the larger geographical unit, the district. A district can be thought of as a unit lying between a county and a state in the US. The combined "divorced or separated" is available as a response to the current marital status question in the 2002 Census. Although the divorce status is available on its own in the 2012 Census, because I estimate a DiD model with two data cycles, I combine the divorced and separated statuses in the 2012 Census and run the econometric model with the combined dependent variable. The 2012 Census is the first Rwandan census in 20 years that has "divorced" as a separate response option to the question of current marital status. This suggests that the 2008 legislation had an impact on the divorce rates. Combined with my main results, these results suggest that women are using divorce rather than separation to protect themselves from domestic violence.

Table 1: Impact of the law on divorce and domestic violence

		Dummy dependent var			z-score dependent var		
	(1) Divorce	(2) Violence	(3) Physical Only	(4) Sexual Only	(5) Violence	(6) Physical Only	(7) Sexual Only
GenocideIntensity x Post	0.01*	-0.06*	-0.01	-0.05**	-0.03	0.01	-0.17**
	(0.01)	(0.03)	(0.03)	(0.03)	(0.06)	(0.06)	(0.09)
Post	✓	✓	✓	✓	✓	✓	✓
Individual Controls	✓	✓	✓	✓	✓	✓	✓
1991 Commune Controls x Post	✓	✓	✓	✓	✓	✓	✓
Cohort FE	✓	✓	✓	✓	✓	✓	✓
Commune FE	✓	✓	✓	✓	✓	✓	✓
Year of Marriage FE	✓	✓	✓	✓	✓	✓	✓
N	3497	1424	1424	1423	1424	1424	1423
Dependent variable mean	0.07	0.39	0.37	0.13	0.01	0.01	0.02
Adjusted R^2	0.10	0.11	0.15	0.03	0.02	0.01	0.02
p-value for $H_0 : \beta_2 = 0$	0.10	0.09	0.73	0.04	0.57	0.85	0.05

Note: Divorce prediction sample consists of currently married and divorced women who married after the genocide but before the law. Violence prediction consists of currently married women who married after the genocide but before the law. In all samples, women who married more than once are excluded. Robust standard errors are reported in parenthesis. *** p<0.01, ** p<0.05, * p<0.1

in the sexual violence rate after the law. The estimated impact represents a decrease of 38% with respect to the sample mean (0.13), which is a substantial effect. I run the same specification using z-scores as the measure for violence and the estimates are in line with the dummy measure estimates. Among the married women, one standard deviation increase in the genocide intensity in a commune leads to 0.17 standard deviations decrease in the sexual violence rate after the law. The effect on the physical violence only is although both negative, statistically insignificant.

The sample of analysis for the domestic violence results are women who are married and the increase in the divorce rate directly contributes to the decline in the domestic violence rates. This supports Prediction 1b and shows that the divorce effect exists. In the next subsection, I investigate whether the law deters men from exerting domestic violence.

5.1.2 Disentangling the divorce and deterrent effect

The impact of the law on domestic violence is estimated among married women. Some of the abusive marriages dissolve after the law which leads to a change in the composition of married couples (number of abusive marriages declined). Did domestic violence rates increase less in genocide intense areas after the law only due to the increase in the number of dissolved violent marriages? Among the couples who remained married, did the law deter some husbands from inflicting violence on their wives?

In order to disentangle whether the decline in the violence rates is only due to the divorce effect or also due to the deterrent effect, I include the women who got divorced after the law into the sample of analysis. What is crucial here is knowing whether the women who got divorced after the law experienced violence after the law but before they got divorced, when they were married. If the coefficient of *GenocideIntensityPost*, β_2, is still negative when the sample consists of women who remained married and recently divorced, then there is a deterrent effect.

DHS 2010/2011 surveyed divorced women about their violence experience in their most recent marriages,[32] however, it did not ask divorced women when they got divorced. If a

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[32]Having data on whether divorced women had domestic violence experience before they got divorced is not easy in the domestic violence literature. In their influential paper, Stevenson and Wolfers (2006), the authors highlight that they do not have the domestic violence experience of the divorced women and thus they cannot directly disentangle whether the decline in the domestic violence rates after the introduction of unilateral divorce in the US is due to increase in the divorce rate or the perpetrator is less incentivized to

divorced woman reported that she experienced violence in the past 12 months, this means that she got divorced in the last year and experienced violence during her former marriage, before her divorce.[33] Thus, this is not a problematic case for estimation. But, if a divorced woman said that she did not experience violence in the past 12 months, either she did not experience violence in the past year and she got divorced for to another reason, or she actually did experienced violence but divorced more than a year ago after the law. In order to overcome this problem, I did a bounds analysis following Horowitz and Manski (2000). For the divorced women who did not experience violence in the past 12 months, I imputed all the data points as either 0 or 1, which are the minimum and maximum possible data points respectively. According to Horowitz and Manski (2000), the average treatment effect of the law should be between the lower and upper bound estimates, which are reported in Tables 2, A.6 and A.7. For sexual violence, the lower and upper bounds estimates are very close to each other, negative and statistically significant for both measures of violence, dummy and z-score. The tightness of the bounds highlights that the number of couples who got divorced after the law is very small. According to the results, among the married and recently divorced women, one standard deviation increase in the genocide intensity in a commune leads to approximately 5 percentage points or 0.15 standard deviations decrease in the sexual violence rate after the law. The dummy measure estimates represents a decline of between 31% and 38%. The bounds analysis provides support for Prediction 2, which shows that the law deters some men from sexual domestic violence. The effect on physical and physical or sexual domestic violence combined remain to be negative but insignificant.

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behave violently. In Brassiolo (2016), the author has the domestic violence experience of the divorced women and he shows whether the decline in the domestic violence rates after the introduction of unilateral divorce in Spain is just due to the increase in the divorce rate or not. He finds support that men are less incentivized to inflict violence after the law.

[33]I am assuming that divorced husbands did not inflict violence after the divorce.

Table 2: Manski bounds for the impact of the law on sexual domestic violence

	Dummy dependent var		z-score dependent var	
	(1) Lower Bound	(2) Upper Bound	(3) Lower Bound	(4) Upper Bound
GenocideIntensity x Post	-0.0490* (0.03)	-0.0489* (0.03)	-0.1613* (0.09)	-0.1585* (0.09)
Post	✓	✓	✓	✓
Individual Controls	✓	✓	✓	✓
1991 Commune Controls x Post	✓	✓	✓	✓
Cohort FE	✓	✓	✓	✓
Commune FE	✓	✓	✓	✓
Year of Marriage FE	✓	✓	✓	✓
N	1499	1499	1499	1499
Dependent variable mean	0.13	0.16	0.03	0.01
Adjusted R^2	0.024	0.056	0.019	0.047

Note: Sample consists of women who are currently married and recently divorced (after the law). In all samples, women who married more than once are excluded. Robust standard errors are reported in parenthesis. *** $p<0.01$, ** $p<0.05$, * $p<0.1$

5.1.3 Long-run impact of the law

I also investigated the long-run impact of the law on divorce and domestic violence by using the 2014 Rwandan DHS. Empirical specification for the long-run impact is as follows:

$$Y_{ict} = \beta_0 + \sum_{t=2010,2014} \beta_{1,t} Year_t + \sum_{t=2010,2014} \beta_{2,t} (GenocideIntensity_c \times Year_t) + \mathbf{X'_{it}} \phi$$

$$+ \sum_{t=2010,2014} (\mathbf{X'_{c1991}} \times Year_t) \lambda_t + \alpha_c + \omega_m + \varepsilon_{ict}.$$

The specification is the dynamic version of the main specification. $Year_t$ is the year of the data cycle. The set of controls are the same as those in the main specification. $\beta_{2,2014}$ captures the long-run impact of the law. The year 2005, before the law, is the base year. Estimates are shown in Table 3. The impact of the law on sexual domestic violence remains to be statistically significant and negative in 2014 (-0.17 SD), six year after the law's introduction. The estimate is also more precise than the 2010 estimate (p-value= 0.01). Additionally, the effect of the law on divorce remains to be positive and statistically significant. The effect on physical domestic violence continues to be statistically insignificant. Figure 6 plots the impact of the law on divorce and sexual domestic violence in the short and long-run using dummy measure estimates.

5.2 Discussion

Among ever married women who married after the genocide, one standard deviation increase in the genocide intensity in a commune leads to a 1 percentage point increase in the divorce rate after the law. This impact represents an increase of 14% with respect to the sample mean (0.07). Among the married women who married after the genocide, one standard deviation increase in the genocide intensity in a commune leads to 5 percentage points decrease in the sexual domestic violence rate after the law. The estimated impact represents a decrease of 38% with respect to the sample mean (0.13). Finding an increase in the divorce rate with a decline in the violence rate provides support for the divorce effect.

Among the married and recently divorced women, one standard deviation increase in the genocide intensity in a commune leads to approximately 5 percentage points or 0.17

Table 3: Long-Run Impact of the law on divorce and domestic violence using DHS 2014

	Dummy dependent var				z-score dependent var		
	(1) Divorce	(2) Violence	(3) Physical Only	(4) Sexual Only	(5) Violence	(6) Physical Only	(7) Sexual Only
GenocideIntensity x 2010	0.01	-0.04	0.00	-0.04*	-0.01	0.03	-0.13*
	(0.01)	(0.03)	(0.03)	(0.02)	(0.05)	(0.05)	(0.08)
GenocideIntensity x 2014	0.02*	-0.02	0.02	-0.05**	0.02	0.07	-0.17***
	(0.01)	(0.03)	(0.03)	(0.02)	(0.04)	(0.05)	(0.06)
Time FE	✓	✓	✓	✓	✓	✓	✓
Individual Controls	✓	✓	✓	✓	✓	✓	✓
1991 Commune Controls x Time FE	✓	✓	✓	✓	✓	✓	✓
Cohort FE	✓	✓	✓	✓	✓	✓	✓
Commune FE	✓	✓	✓	✓	✓	✓	✓
Year of Marriage FE	✓	✓	✓	✓	✓	✓	✓
N	5657	1903	1903	1902	1903	1903	1902
Dependent variable mean	0.07	0.35	0.32	0.12	0.01	0.01	0.01
Adjusted R^2	0.10	0.12	0.15	0.02	0.02	0.03	0.02
p-value for $H_0 : \beta_{2,2014} = 0$	0.07	0.46	0.54	0.04	0.72	0.15	0.00

Note: Divorce prediction sample consists of currently married and currently divorced women who married after the genocide but before the law. The violence prediction sample consists of currently married women who married after the genocide but before the law. In all samples, women who married more than once are excluded. Robust standard errors are reported in parenthesis. *** p<0.01, ** p<0.05, * p<0.1
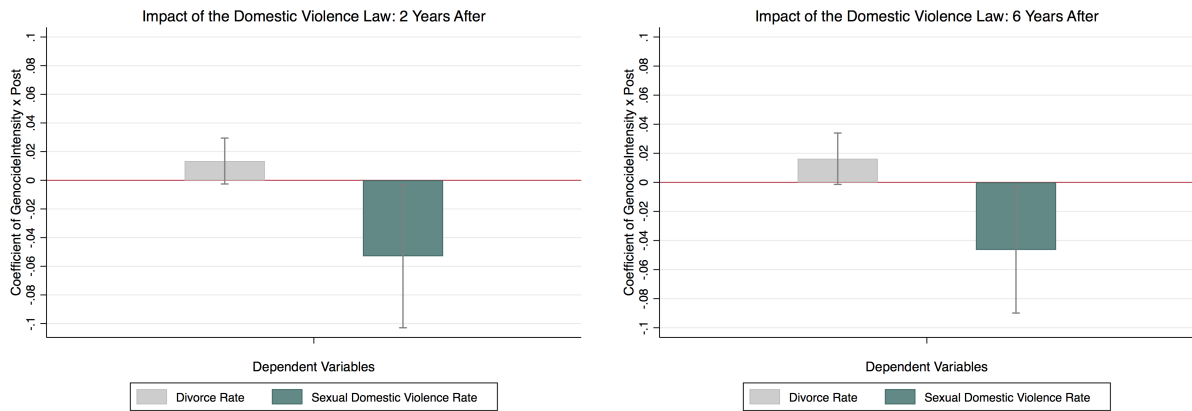
Figure 6: Impact of the domestic violence law in the short and long run
Note: The plot on the left shows the coefficient on the DiD estimator, GenocideIntensity×Post, for divorce and sexual domestic violence (dummy measure) variables. The coefficients are based on the main specification. The plot on the right shows the coefficient on GenocideIntensity×2014 for the same dependent variables. The coefficients are based on the specification in Section 5.1.3 which explores the long-run impact of the law.

standard deviations decrease in sexual violence rates after the law.[34] The dummy measure estimates represents a sizeable decline between 31% and 38%. The bounds analysis shows that the deterrent effect exists beyond the divorce effect. The sample size of my bounds analysis is 1499 women, where the sample consists of married women and women who presumably got divorced after the law. The sample size of my main domestic violence specification is 1424, where the sample consists of married women only. The small difference, 75, is the maximum possible number of women who got divorced after the law. The small size of the number of divorced women and finding a sizable negative and statistically significant estimate for the impact of the law on sexual domestic violence in the bounds analysis provide support that the impact is not only due to the divorce effect, but also due to deterrent effect.

There are two possible scenarios for the dissolved marriages. Presumably, the violent men who lack self-control continued to be violent after the law, which led women to initiate divorce. The violent men with self-control did not find it worthwhile to remain in a marriage with a lower level of domestic violence, which led couples to divorce via mutual consent. The first possible scenario provides some support for the lack of self-control

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[34]The estimates are a combined effect of domestic violence being grounds for divorce and criminalization of domestic violence.

hypothesis as a motive for men perpetrating domestic violence.

I also investigate whether the law impacts women heterogeneously across different education levels (educated versus uneducated) using a triple-DiD specification. The rationale for dividing women based on their education is to establish a proxy for women's outside options in the case of divorce, s_w. I do not find a heterogenous effect across educated and uneducated women.[35] Presumably, this is mostly due to the fact that most Rwandan women have very few years of education as seen in Figures A.12 and A.13 and education does not constitute a good proxy for the outside option.[36]

It is also worth commenting on the case of sexual domestic violence results being significant where physical domestic violence results are not. According to the 2010 country report on Rwanda by the US Department of State, physical domestic violence cases are handled within the context of the extended family. In contrast, the government handles rape cases (including marital rape) as a priority within its courts and tribunals (US Department of State, 2010). The extent of law enforcement for different types of domestic violence could be a reason for the difference in results.[37]

Comparing results with evidence from the literature. My results are in line with both Stevenson and Wolfers (2006) and Brassiolo (2016), who find roughly a 30% decline in domestic violence rates after the introduction of unilateral divorce in the US and Spain, respectively. There are multiple studies in the development literature that show that improving women's legal protection either increases domestic violence, or it does not have any impact at all (Anderson and Genicot 2015, Beleche 2019, Hoehn-Velasco and Silverio-Murillo 2020, García-Ramos 2021). Recently, Bobonis et al. (2020) finds that in Mexico, the reduction in domestic violence following the cash-transfer program Oportunidades is largely concentrated in the states that recognize domestic violence as grounds for divorce. The author notes that the reduction in domestic violence is due to the increase in divorce rates. My paper provides support for the divorce effect as well as the deterrence effect for

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[35]The results are available upon request from the author.

[36]Working for pay is a potentially endogenous variable, and I thus do not use it as a proxy for outside options. A man may or may not allow his wife to work for pay, and this is a widely accepted phenomenon in developing countries (Field et al., 2019).

[37]I exploit the variation in access to primary courts in Rwanda to test this. I find that the decline in sexual domestic violence rates in genocide-intense areas is higher for the women who live in a district with a primary court. There is no impact on physical domestic violence of living in such a district. Results (based on a DiD specification) are available upon request. Results are in line with recent research that shows that law enforcement reduces gender-based violence (Sviatschi and Trako, 2021).

sexual violence in the Rwandan context.

I would like to highlight that comparing my results with La Mattina (2017) is useful in terms of policy recommendations. La Mattina (2017) finds that one standard deviation increase in the genocide intensity, increased the probability of domestic violence for women married after the genocide compared to before the genocide by 28% in 2005 (before the law). My results shows that the law has the potential to alleviate the domestic violence induced by the Rwandan Genocide.

A recent paper, Rogall and Zarate-Barrera (2020), shows that in the areas were armed genocide violence was intense, women are healthier, better educated, more empowered and less likely to experience domestic violence both in 2010 and 2014.[38] The paper suggests that genocide-induced gender imbalances caused a power vacuum that women filled as household heads and local politicians. Rogall and Zarate-Barrera (2020) notes that the positive effects of armed-group violence are not yet present in 2005. In the appendix, the authors also provide evidence that among women who are aged between 12 and 18 at the time of the genocide, those who live in areas with high levels of violence by armed-groups are more likely to experience domestic violence, specifically severe domestic violence, in 2005.[39] First of all, given that women who are aged between 12 to 18 at the time of the genocide are women who married after the genocide, Rogall and Zarate-Barrera (2020)'s results further support my source of variation. Genocide intense areas are places where violent marriages are more likely to be located. Second, our results for 2010 and 2014 complements each other in the sense that women in genocide intense areas are in better circumstances in 2010, the post-law period as compared to the pre-law period.[40] Unlike thesee studies, my identification strategy exploits the time variation in Rwanda (before/after the law), and my results shed light on how domestic violence rates evolve specifically

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[38]This paper, La Mattina (2017) and Rogall and Zarate-Barrera (2020) all use the same data to measure genocide and women's outcomes, The Gacaca Court Records and the DHS respectively. Rogall and Zarate-Barrera (2020) exploits exogenous variation in armed groups' transport costs induced by weather fluctuations, which is used in Rogall (2021). The logic is that the areas with high transport costs received less armed genocide violence.

[39]They define severe domestic violence as women being strangled or burned, threatened with knife or gun, forced into unwanted sex, or unwanted sexual acts. Thus, it is a measure that combines severe physical violence and sexual violence.

[40]La Mattina (2017) also investigates women's outcomes in 2010. She finds that the impact of the genocide on domestic violence is statistically insignificant in 2010, but woman's decision-making power is still negatively affected. This means that although both La Mattina (2017) and Rogall and Zarate-Barrera (2020) provide evidence that there is not a reversal of fortune in genocide-intense areas in 2005; they produce opposite results for the impact of the genocide in 2010.

between 2005 and 2010, and respond to changes in formal institutions. Thanks to the law adopted between 2005 and 2010, women who are in violent marriages are protected from domestic violence.

Lastly, I highlight that observing a higher increase in the divorce rates in male-scarce areas is surprising based on prior evidence from the literature on family economics. The literature suggests that the marriage-market sex ratio affects remarriage probabilities and thus affects the bargaining power of women within marriage (Chiappori and Mazzocco, 2017). Based on previous literature, if an area has male scarcity, the probability of remarriage is low. Thus, women have less incentive to initiate divorce (because they are more likely to remain single than women in non-scarce areas) and have less bargaining power within the marriage. According to this conjecture, a lower increase in divorce rates is expected in these areas after the law than in male-scarce areas. It is important to note that in this setting, the possible trade-off for women in male-scarce areas is not just staying in the marriage or not when the remarriage probability is low, but whether to stay in a *violent* marriage. The sex ratio affects both the marriage market at the time of the marriage as well as the potential marriage market upon divorce. My empirical results suggest that the first impact dominates the divorce decision in this context. For violent marriages, it is utility maximizing to initiate divorce in a male-scarce area rather than staying in the marriage. This shows that context matters, and more research should be done to understand the trade-offs faced by women in violent marriages.

6 Robustness Checks

6.1 Different Specifications

As an alternative specification, I interact the actual post-genocide sex ratio from the 2002 Census with the Post variable to validate the finding that male scarcity at the time of marriage is the mechanism behind the results. Unfortunately, I only have the 2002 sex ratio data. Thus, in estimation, women who married in 1995 and 2002 are both matched with the same sex ratio. To better capture the sex ratio at the time of the marriage, I create cohort-specific sex ratios. As an example, by using the 2002 Census, I create the sex ratio for the cohort-specific marriage market for women aged between 20–24 as (number of men aged 20 to 24)/(number of women aged 20 to 24) in a commune. Then I match the cohort-

specific sex ratio with DHS data for women whose age at their first marriage is between 20 and 24 years. There are five cohorts in total: 15–19, 20–24, 25–29, 30–34, 35–39 years old.

Having results that are in line with my main specification will confirm that a distorted sex-ratio at the time of the marriage is the reason for being in a potentially violent marriage. Thus, the plausibility of my source of variation will be confirmed. In my main specification, I replace $GenocideIntensity_c$ with $SexRatio2002_c$ and as a difference from the main specification, I include τ_n, marriage market cohort FE. The new specification is given below:

$$Y_{ict} = \beta_0 + \beta_1 Post_t + \beta_2 SexRatio2002_c Post_t + \mathbf{X}'_{\mathbf{it}}\phi + \mathbf{X}'_{\mathbf{c1991}}\lambda + \alpha_c + \omega_m + \tau_n + \varepsilon_{ict}.$$

The sex ratio is a potentially endogenous variable due to non-random migration (Angrist, 2002). To illustrate its possible endogeneity, let non-monetary benefits from marriage be a part of the error term. After the genocide, before being matched in the marriage market, if women with high non-monetary gain from marriage in male-scarce communes migrate to non-scarce communes, then non-scarce communes become male scarce. Since those women are less likely to divorce their husbands, I, therefore, expect a downward bias in the divorce-rate estimates in this scenario. I apply an IV-strategy and instrument $SexRatio2002_c Post_t$ with $GenocideIntensity_c Post_t$ to overcome endogeneity.

I report the first-stage results in Table 4. Second-stage results are reported in Table 5. I define $SexRatio2002_c$ as the inverse of the male-to-female cohort-specific sex ratio and standardize it. In this way, the coefficient of $SexRatio2002_c Post_t$ captures the impact of an increase in male scarcity in 2002 on divorce and domestic violence after the law. I standardize $SexRatio2002_c$ to make the results comparable with my main specification, where the treatment variable is a standardized genocide-intensity index that captures an increase in male scarcity. The signs of the second-stage results are in line with the results from my main specification. The greater the male scarcity, the higher the divorce rates and the lower the sexual domestic violence rates after the law.[41]

The first stage F-statistic is 23.5 for the divorce outcome and around 10.2 for the domestic violence outcome, which is above the weak instrument threshold. The relationship between genocide intensity and male scarcity is also confirmed with the strongly signif-

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[41]Dummy measure estimates are in line with the z-score measure estimates and provided in Table A.8.

icant coefficient of the instrument in the first stage. When the genocide-intensity index increases, male scarcity in 2002 increases. The number of observations in the IV specification is smaller than those in the main specification. This is because the 2002 Census is a restricted dataset and does not have the sex-ratio information for all the communes in the DHS.[42]

I also note that the results are higher in magnitude than those from the main specification, and they are sensitive to how the sex ratio is defined. It is plausible to expect sensitivity to different sex-ratio definitions. If I define the marriage market of women aged between 25–29 years as (number of men aged 35 to 39)/(number of women aged 25 to 29) rather than (number of men aged 25 to 29)/(number of women aged 25 to 29), although men aged 25 to 29 constitute the marriage market for those women, then variation in (number of men aged 25 to 29) will be part of the error term. According to the data, genocide affected the number of men aged 25 to 29 in the population. In this scenario, the genocide-intensity index (Z) is correlated with the error term (ε), which violates the exogeneity $(cov(Z, \varepsilon) \neq 0)$, and thus impacts the validity of my instrument. Before creating the sex-ratio variable, I perform a detailed analysis of who marries whom and of the age differences between members of couples within cohorts. For all cohorts except women aged between 15 and 19, the marriage market of women aged between x–y is (number of men aged x to y)/(number of women aged x to y). Only for the cohort of those aged 15–19, the cohort-specific marriage market is (number of men aged 15 to 24)/(number of women aged 15 to 19). This is because, within the 15–19 cohort, the mean age difference within couples is higher than in other cohorts.[43] I defend the current definition of the sex ratio as correctly capturing the marriage market for women, and satisfying the validity of my instrument.

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[42]The number of observations was originally even smaller. Using ArcGIS software, I find the neighboring communes of the communes for which I do not know the sex ratio. I take the mean of the sex ratios of all such neighboring communes of those with a missing sex ratio. I impute the missing sex ratio of a commune with the mean sex ratio of its neighbors. After this procedure, there are still some communes with a missing sex ratio. These are the communes where no neighboring communes have sex-ratio information.

[43]As an example, women who marry when they are 15–19 years old tend to marry older men relative to women who marry when they are 20–24 years old.

Table 4: First stage results of the IV estimation

	(Sex-Ratio in 2002 x Post) is the dep var	
	(1) Divorce Sample	(2) Violence Sample
GenocideIntensity x Post	0.23*** (0.05)	0.19*** (0.06)
Post	✓	✓
Individual Controls	✓	✓
Commune Controls in 1991 x Post	✓	✓
Cohort FE	✓	✓
Commune FE	✓	✓
Year of Marriage FE	✓	✓
N	3248	1419
Dependent variable mean	-0.02	0.01
Adjusted R^2	0.696	0.709

Note: Results for IV-2SLS First Stage.The dependent variable of the first stage regression is Sex-Ratio in 2002 x Post. I standardize this to make it easier to interpret the results (given that the genocide intensity is also standardized). The divorce-prediction sample consists of ever-married and divorced women who married after the genocide but before the law was adopted. The violence prediction sample consists of married women who married after the genocide but before the law. In all samples, women who married more than once are excluded. Robust standard errors are reported in parenthesis. *** p<.01, ** p<.05, * p<.1

Table 5: Impact of the law on divorce and domestic violence using genocide intensity index as an IV for 2002 Sex-Ratio

	Dummy dependent var	z-score dependent var		
	(1) Divorce	(2) Violence	(3) Physical Only	(4) Sexual Only
Sex-Ratio in 2002 x Post	0.07*	-0.34	-0.01	-1.38**
	(0.04)	(0.39)	(0.41)	(0.68)
Post	✓	✓	✓	✓
Individual Controls	✓	✓	✓	✓
1991 Commune Controls x Post	✓	✓	✓	✓
Cohort FE	✓	✓	✓	✓
Commune FE	✓	✓	✓	✓
Year of Marriage FE	✓	✓	✓	✓
N	3247	1340	1340	1339
Dependent variable mean	0.07	0.01	0.01	0.01
First Stage F-stat	24.01	10.85	10.85	10.51

Note: Results for IV-2SLS Second Stage. Sex Ratio in 2002, to capture male scarcity in 2002, is from the 2002 Census and is the inverse of the male-to-female sex ratio. I standardize it to make it easier to interpret the results (given that the genocide intensity is also standardized). It is cohort-specific and calculated at the commune level. I create a cohort-specific sex ratio to capture women's marriage market prospects more accurately. The mean age difference between a women and her husband in Rwanda is five years, according to all the data sets used. The divorce prediction sample consists of ever-married and divorced women who married after the genocide but before the law. The violence prediction sample consists of married women who married after the genocide but before the law. In all samples, women who married more than once are excluded. Robust standard errors are reported in parenthesis. *** $p<.01$, ** $p<.05$, * $p<.1$

6.2 Parallel Trends

To check whether my results are driven by previous divorce patterns, I run my main empirical specification using two pre-reform cycles, 2000 and 2005. I run the specification falsely, assuming that the reform took place between those two cycles. I find a statistically insignificant estimate for the interaction term in this placebo regression, which suggests that my results are not driven by previous divorce patterns. I report the results in Table 6.

Table 6: Placebo Difference in Differences using DHS 2000 and 2005

	(1) Divorce
GenocideIntensity x Post	0.007
	(0.01)
Post	✓
Individual Level Controls	✓
1991 Province Level Controls x Post	✓
Cohort FE	✓
Province FE	✓
N	1712
Dependent variable mean	0.02
Adjusted R^2	0.033

Note: The sample consists of ever married and divorced women who married after the genocide but before the law. Women who married more than once are excluded. Robust standard errors are reported in parenthesis. *** p<0.01, ** p<0.05, * p<0.1

I also plot the divorce trends across different genocide intensities in Figure 7. To visually mimic a DiD framework with a discrete treatment variable, I create two groups (treatment and control) based on the continuous measure of genocide intensity. In the top figure, I compare the divorce trends for communes with a genocide intensity in the 25th percentile (control group) and 50th percentile (treatment group). The trends are parallel. To provide more support for the parallel trends assumption, I create nine groups using the genocide-intensity index where each group represents a decile (10th–90th percentile). Most of the lines between 2000 and 2005 are parallel with a few exceptions, which suggests support for the parallel trends assumption.
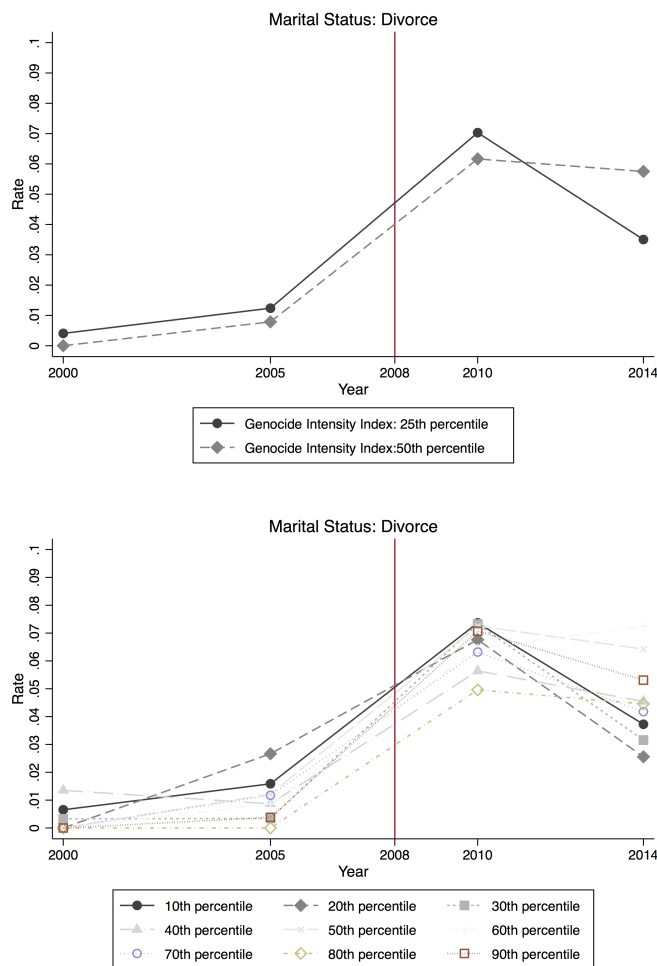
Figure 7: Divorce trends

Unfortunately, DHS 2000 does not include a specific domestic violence module. Thus, I cannot employ a placebo regression for domestic violence. However, I plot trends for two characteristics for women that affect their probability of experiencing domestic violence: education and employment (Erten and Keskin 2018, Heath 2014). Figure 8 shows the share of women who completed elementary school and the share of women who are currently working over several years and across different genocide intensities. As for the figure on divorce, I create nine groups using the genocide-intensity index where each group represents a decile (10th–90th percentile). Again, most of the lines between 2000 and 2005 are parallel with a few exceptions. Thus, the figures provide support for parallel trends in women's characteristics that are relevant to the likelihood of experiencing domestic vio-

lence.
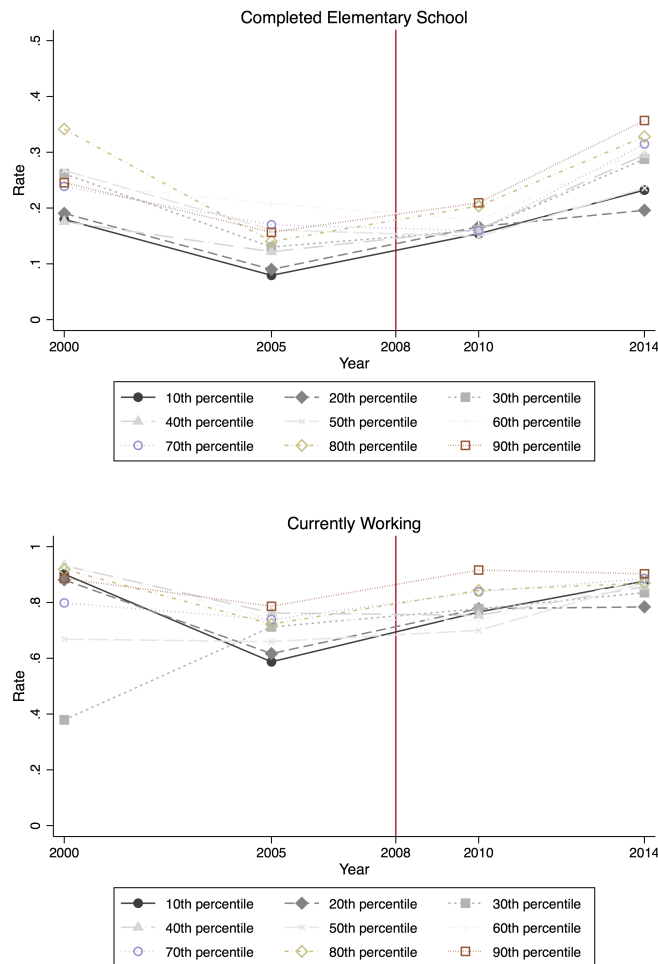
Figure 8: Education and employment trends

6.3 Male Scarcity Mechanism behind the Source of Variation

6.3.1 Violence Begets Violence?

In the paper, I argue that male scarcity at the time of the marriage is the mechanism behind the variation in the location of violent marriages before the law. One can also argue that "exposure to genocide" is a potential mechanism. It is possible that the divorce rate is higher in the genocide-intense areas since exposure to violence makes men more violent

in their marriages than those in the non-intense areas (violence begets violence). To show that this is not the case, I run my empirical specification on an alternative sample: women who married right before the genocide. Such women did not face a sex-ratio distortion at the time of the marriage. However, they were exposed to the genocide, as were their husbands. DHS 2005 asks women the number of years they lived in their current residence and 63% had lived in their place of residence since before the genocide. I take a sample of women who married between 1989 and 1994. If exposure to genocidal violence is the main mechanism in the likelihood of violent marriages, the divorce rate after the law should increase in the areas with a high genocide intensity. This means that running the main empirical specification using the sample of women married immediately before the genocide should lead to a statistically significant and positive coefficient on the interaction term, *GenocideIntensityPost*. The estimates are reported in Table 7. The coefficient of the interaction term is statistically insignificant.[44] This provides support for my results resulting from changes in the marriage market rather than exposure to genocidal violence.

Figure A.14 provides more information on the marriage markets in Rwanda before and after the genocide. The marriage rates in 2005 (before the law) is lower in genocide-intense areas for the women who are in the marriage market during and after the genocide (women aged 20-25 at the time of the genocide). For the women who are older than 25 at the time of the genocide (more likely to be married before the genocide), the marriage rates in 2005 do not differ across different genocide intensities. This suggests that male scarcity was a pressing issue in the marriage market for the women who were at a marriagable age during the genocide.

6.3.2 RTLM Reception

To further support male scarcity as the potential channel for my source of variation, I also exploit exogenous variation in radio reception of the state-sponsored station – Radio Télévision Libre des Mille Collines (RTLM) – that encouraged the genocide against the Tutsis (Yanagizawa-Drott, 2014). Yanagizawa-Drott (2014) finds that the communes which had better radio reception experienced more killings during the genocide.[45] Rogall

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[44]I did not take a sample of women who married before 1989 since those women will be much older than women in my main sample. Older women are less likely to divorce in Rwanda, according to data. It would not be possible to disentangle whether those women are likely to not get divorced after the law because they are married to non-violent types or due to their age.

[45]There is exogenous variation in reception due to Rwanda's hilly topography.

Table 7: Impact of the law on divorce rates using sample of women who married right before the genocide

	(1) Divorce
GenocideIntensity x Post	0.01
	(0.02)
Post	✓
Individual Level Controls	✓
1991 Commune Level Controls x Post	✓
Cohort FE	✓
Commune FE	✓
Year of Marriage FE	✓
N	986
Dependent variable mean	0.08
Adjusted R^2	0.193

Note: The sample consists of ever married and divorced women who married right before the genocide. Violence prediction is not shown due to the very small sample size. Women who married more than once are excluded. Robust standard errors are reported in parenthesis. *** p<0.01, ** p<0.05, * p<0.1

and Zarate-Barrera (2020) highlights that RTLM-induced killings were mostly of women and children and documents that RTLM-induced violence led to a surplus of men.[46] Based on this evidence, if male scarcity is the potential channel behind my source of variation, the divorce rates should increase less after the law in the areas with better RTLM reception in 1994. I run my main empirical specification with the treatment variable being RTLM reception in 1994 (at the commune level) from Yanagizawa-Drott (2014). Estimates are reported in Table 8. As expected, the interaction term is negative and statistically significant for the divorce outcome. Additionally, there is no longer a statistically significant decline in the domestic violence rates. These results combined provide supporting evidence in favor of the male scarcity channel.[47]

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[46]Rogall (2021) shows that armed-group violence, rather than local RTLM-induced violence, targeted adult men.

[47]This robustness check originates from Rogall and Zarate-Barrera (2020), which exploits the RTLM reception as a robustness check to support gender imbalance as behind the improvement in women's outcomes in 2010 and 2014 in Rwanda.

Table 8: Impact of the law on divorce and domestic violence using RTLM reception in 1994

	Dummy dependent var				z-score dependent var		
	(1) Divorce	(2) Violence	(3) Physical Only	(4) Sexual Only	(5) Violence	(6) Physical Only	(7) Sexual Only
RTLM Reception in 1994 x Post	-0.09*	-0.06	-0.21	-0.00	-0.01	-0.04	0.04
	(0.05)	(0.21)	(0.18)	(0.14)	(0.29)	(0.33)	(0.40)
Post	✓	✓	✓	✓	✓	✓	✓
Individual Controls	✓	✓	✓	✓	✓	✓	✓
1991 Commune Controls x Post	✓	✓	✓	✓	✓	✓	✓
Cohort FE	✓	✓	✓	✓	✓	✓	✓
Commune FE	✓	✓	✓	✓	✓	✓	✓
Year of Marriage FE	✓	✓	✓	✓	✓	✓	✓
N	2030	848	848	848	848	848	848
Dependent variable mean	0.07	0.39	0.37	0.12	-0.00	-0.01	0.01
Adjusted R^2	0.11	0.14	0.17	0.06	0.02	0.01	0.02
p-value for $H_0 : \beta_2 = 0$	0.08	0.77	0.27	0.97	0.96	0.90	0.91

Note: The divorce prediction sample consists of currently married and divorced women who married after the genocide but before the law. The violence prediction sample consists of currently married women who married after the genocide but before the law. In all samples, women who married more than once are excluded. Robust standard errors are reported in parenthesis. *** p<.01, ** p<.05, * p<.1

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6.3.3 Armed versus Civilian Violence

Rogall (2021) shows that armed-group violence targeted adult men where local, civilian violence induced by the RTLM radio station targeted women, children and elderly in the Rwandan Genocide. Rogall and Zarate-Barrera (2020) shows that former type of genocide violence resulted in male scarcity where the latter type resulted in male surplus in Rwanda. The paper argues that genocide-induced gender imbalances led to an improvement in women's outcomes in the long run. It shows that in the areas were armed genocide violence was intense, women are empowered both in 2010 and 2014.

La Mattina (2017) also investigates women's outcomes in 2010. She finds that the impact of the genocide on domestic violence is statistically insignificant in 2010, but woman's decision-making power is still negatively affected. This means that La Mattina (2017) and Rogall and Zarate-Barrera (2020) have opposite results for the long run impact of the genocide in 2010 although they use the same data sources.[48] Rogall and Zarate-Barrera (2020) argues that this may be due to the following reason. The genocide measure used in La Mattina (2017), the genocide intensity index, aggregates armed-group violence and local/civilian violence. Rogall and Zarate-Barrera (2020) argues that La Mattina (2017) may be picking up the impact of a weighted average of the two types of violence. Since my paper uses the genocide intensity index La Mattina (2017) uses, I create a new index which differentiates the two types of violence as a robustness check.

The genocide intensity index is the result of a PCA of 6 proxies. The first three proxies are on genocide perpetrators and the remaining ones are on genocide survivors. Rogall (2021) highlights that the Category I perpetrators in the Gacaca Court Records, the category of perpetrators which is used to create the first proxy of the genocide intensity index, reflects armed violence in the Rwandan Genocide. Thus, the first proxy of my genocide intensity index is a proxy for armed violence where the remaining perpetrator proxies are for civilian violence (See Table A.1 for all the proxies and information on the genocide data). I create a new genocide intensity index which is the result of a PCA of the armed violence proxy and proxies for survivors and run my main specification with this new index. This way, the index captures armed genocide violence only -rather than armed and civilian violence combined- which is documented to result in male scarcity. Results are reported in Table A.10. They remain to be in line with my main results. The dummy measure estimates

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[48]I also use the Gacaca Court Records and DHS like La Mattina (2017) and Rogall and Zarate-Barrera (2020).

are statistically significant at the 5% level.

6.4 Expansion of the Coffee Sector

Sanin (2021) shows that the Rwandan coffee sector expanded rapidly between 2005 and 2010, which created wage (cash) employment opportunities for women living in coffee-suitable areas. Access to wage employment can also increase the divorce rates and decrease the sexual domestic violence rates since it improves women's outside options. To make sure that the results are driven not by changes in the agricultural labor market but by the adoption of the domestic violence law, I run my main specification on two variables: working for pay and working for cash. Women who work for pay either work for cash only, cash and in-kind contributions combined, or in-kind contributions only. Women who work for cash, work for cash only or cash and in-kind contributions combined. Both variables are measured for the last 12 months. The estimates are reported in Table 9. The coefficient on the interaction term is both statistically insignificant and close to zero for both variables. This suggests that women's access to wage employment due to the rapid expansion of the coffee sector is not driving the results on divorce and domestic violence.

6.5 Domestic Violence Reporting

One possible reason of a decline in the domestic violence rates in the genocide intense areas is that women may be less incentivized to self-report domestic violence to the DHS surveyor after the law. This is because the law recognizes domestic violence as a crime and thus women may be more uncomfortable to self-report domestic violence. It is possible that women, specifically who are dependent on their husbands financially (which is usually the case in the Rwandan context), may want to hide experiencing domestic violence due to make sure that their husbands are not sent to jail.

In order to rule out the mechanism, I investigate the impact of the law on women's help seeking behavior. I use the DHS question which asks whether the responsant seeks for help from someone (friend, family, in laws, doctor, lawyer) after experiencing domestic violence. If women are less likely to self-report domestic violence after the law, they would also less likely to seek help from outside. The estimates are reported in Table A.11. I show that the coefficient on the interaction term is statistically insignificant which suggests that

Table 9: Employment before and after the law

	(1) Worked for pay	(2) Worked for cash
GenocideIntensity x Post	-0.001	0.014
	(0.04)	(0.03)
Post	✓	✓
Individual Controls	✓	✓
1991 Commune Controls x Post	✓	✓
Cohort FE	✓	✓
Commune FE	✓	✓
Year of Marriage FE	✓	✓
N	3497	3258
Dependent variable mean	0.74	0.41
Adjusted R^2	0.37	0.29
p-value for $H_0 : \beta_2 = 0$	0.97	0.66

Note: The sample consists of ever married women who married after the genocide. Both variables are measured for the past 12 months. Robust standard errors are reported in parenthesis. *** p<0.01, ** p<0.05, * p<0.1

the decline in domestic violence rates are not due to women being less likely to self-report violence after the law.[49]

7 Conclusion

In this paper, I show two possible channels of which domestic violence laws can protect women from future violence: Divorce and deterrent effect. I investigate the impact of Rwanda's domestic violence legislation (2008), which criminalize all forms of domestic violence and enable women to divorce their husbands unilaterally if their husbands behave violently My empirical results provide support for the both channels in the Rwandan context. Overall, my results suggest that domestic violence laws have the potential to protect women from future domestic violence.

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[49]This robustness check is originated from Calvi and Keskar (2021).

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Appendix

A   Additional Tables and Figures

Table A.1: Summary statistics of The Gacaca Court Records at the commune level

	Mean	SD
Panel A: Genocide Intensity Index and its Components		
Perpetrator Proxy: Category 1 (armed violence)	0.010	0.008
Perpetrator Proxy: Category 2 (civilian violence)	0.059	0.038
Perpetrator Proxy: Category 3 (civilian violence)	0.043	0.030
Survivor Proxy: Widowed	0.004	0.004
Survivor Proxy: Orphaned	0.011	0.009
Survivor Proxy: Disabled	0.002	0.002
Genocide Intensity Index (standardized)	0.000	1.000
Genocide Intensity Index based on armed violence (standardized)	-0.000	1.000
Panel B: Number of Perpetrators and Survivors		
Number of Perpetrators: Category 1 (armed violence)	565.0	503.3
Number of Perpetrators: Category 2 (civilian violence)	3196.7	2606.5
Number of Perpetrators: Category 3 (civilian violence)	2293.9	1929.4
Number of Survivors: Widowed	206.8	193.9
Number of Survivors: Orphaned	552.0	483.0
Number of Survivors: Disabled	89.6	106.4

Note: Summary statistics of the genocide gacaca court records. Category 1 perpetrators are accused of planning, organizing or supervising the genocide, or committing sexual torture. Category 2 perpetrators are accused of killings or other serious physical assaults. Category 3 perpetrators are accused of looting or other offences against property. Genocide intensity index is the result of a principal component analysis (PCA) using the 6 proxies in Panel A (perpetrator and survivor proxies). Genocide intensity index based on armed violence is the result of a principal component analysis (PCA) using the 4 proxies in Panel A: perpetrator proxy which reflects armed violence and survivor proxies. For more details on the data and the proxies see Verpoorten (2012).

Table A.2: Summary statistics of the commune level variables across different genocide intensities using Census 1991 and 2002

	All		Low		Medium		High	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Panel A: Commune Level Sex-Ratio								
Male-to-Female Sex-Ratio in 1991	0.82	0.12	0.86	0.17	0.81	0.10	0.79	0.04
Male-to-Female Sex-Ratio in 2002	0.60	0.12	0.64	0.15	0.61	0.11	0.55	0.05
Panel B: Other Commune Level Variables								
Literacy Rate in 1991	0.5	0.1	0.5	0.1	0.5	0.1	0.6	0.1
Female Literacy Rate in 1991	0.4	0.1	0.4	0.2	0.4	0.1	0.5	0.1
Male Literacy Rate in 1991	0.6	0.1	0.6	0.1	0.6	0.1	0.6	0.1
Employment Rate in 1991	0.9	0.1	0.8	0.1	0.9	0.1	0.9	0.0
Female Employment Rate in 1991	0.9	0.1	0.8	0.1	0.9	0.1	0.9	0.1
Male Employment Rate in 1991	0.9	0.0	0.8	0.0	0.9	0.0	0.9	0.0
Population Density in 1991	475.3	472.6	589.9	466.6	436.4	508.8	470.2	144.2
Literacy Rate in 2002	0.6	0.1	0.6	0.1	0.6	0.1	0.6	0.1
Female Literacy Rate in 2002	0.5	0.1	0.5	0.1	0.5	0.1	0.5	0.1
Male Literacy Rate in 2002	0.6	0.1	0.6	0.0	0.6	0.1	0.6	0.1
Employment Rate in 2002	0.7	0.1	0.7	0.1	0.7	0.1	0.7	0.1
Female Employment Rate in 2002	0.7	0.1	0.7	0.1	0.7	0.1	0.7	0.1
Male Employment Rate in 2002	0.7	0.1	0.7	0.1	0.7	0.1	0.7	0.1
Population Density in 2002	822.4	1675.6	806.7	1044.2	912.6	2011.2	495.3	233.3

Note: Summary statistics of the commune level variables across different genocide intensities. Column "All" represents the mean of the commune level variable among all communes, where "Low/Medium/High" represents the mean of the commune level variable among communes with a low/medium/high intensity. Low intensity communes have a genocide intensity index $<= -1$, medium intensity commune have a genocide intensity between -1 and 1 and high genocide intensity communes have a genocide intensity ≥ 1.

Table A.3: Summary statistics of the outcome variables across different genocide intensities

	All		Low		Medium		High	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Panel A: Variables from the 2005 DHS								
Marital status: Divorced	0.02	0.15	0.05	0.21	0.02	0.13	0.01	0.08
Physical or sexual domestic violence in the past 12 months	0.17	0.38	0.16	0.37	0.17	0.37	0.23	0.42
Physical domestic violence in the past 12 months	0.13	0.33	0.14	0.35	0.12	0.32	0.15	0.36
Sexual domestic violence in the past 12 months	0.08	0.28	0.06	0.23	0.09	0.28	0.12	0.33
Panel B: Variables from the 2010 DHS								
Marital status: Divorced	0.09	0.29	0.10	0.29	0.09	0.29	0.08	0.27
Physical or sexual domestic violence in the past 12 months	0.49	0.50	0.45	0.50	0.50	0.50	0.51	0.50
Physical domestic violence in the past 12 months	0.48	0.50	0.44	0.50	0.49	0.50	0.50	0.50
Sexual domestic violence in the past 12 months	0.15	0.36	0.13	0.33	0.16	0.37	0.13	0.34

Note: Summary statistics for the sample of analysis. Column "All" represents the mean of the commune level variable among all communes, where "Low/Medium/High" represents the mean of the commune level variable among communes with a low/medium/high intensity. Low intensity communes have a genocide intensity index $\leq= -1$, medium intensity commune have a genocide intensity between -1 and 1 and high genocide intensity communes have a genocide intensity ≥ 1. The sample consists of married and divorced women who married after the genocide but before the law. Women who married more than once are excluded.

Table A.4: Summary statistics across different genocide intensities: Before the law

	All		Low		Medium		High	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Variables from the 2005 DHS								
Marital status: Married	1.0	0.1	1.0	0.2	1.0	0.1	1.0	0.1
Age	27.4	4.1	27.0	4.1	27.4	4.1	28.6	4.0
Age at first marriage	21.3	3.4	20.8	3.6	21.3	3.3	22.6	3.5
Age at genocide	16.8	4.1	16.4	4.1	16.7	4.1	17.9	4.0
Year of first marriage	1998.9	3.1	1998.8	3.1	1998.9	3.1	1998.9	3.1
Years since marriage	5.5	3.1	5.6	3.0	5.5	3.1	5.4	3.2
Education in years	5.3	3.5	5.3	4.0	5.2	3.4	5.6	2.9
Currently working	0.7	0.5	0.6	0.5	0.7	0.4	0.7	0.5
Works for pay	0.4	0.5	0.5	0.5	0.4	0.5	0.4	0.5
Works for cash	0.3	0.5	0.4	0.5	0.3	0.5	0.2	0.4
Works for all year	0.8	0.4	0.7	0.4	0.8	0.4	0.8	0.4
Occupation is agricultural	0.7	0.5	0.6	0.5	0.7	0.5	0.7	0.5
Total children ever born	2.5	1.4	2.5	1.4	2.4	1.4	2.5	1.4
Has children aged 5 and under	0.9	0.3	0.9	0.3	0.9	0.3	0.9	0.3
Has minimum 2 children aged 5 and under	0.6	0.5	0.6	0.5	0.6	0.5	0.6	0.5
Place of residence: Urban	0.2	0.4	0.3	0.5	0.2	0.4	0.2	0.4
Lives in a district that has primary courts	0.4	0.5	0.6	0.5	0.3	0.5	0.3	0.5
Household's main floor material is cement	0.2	0.4	0.2	0.4	0.2	0.4	0.2	0.4
Household has electricity	0.1	0.3	0.2	0.4	0.1	0.3	0.1	0.2

Note: Summary statistics for the sample of analysis. Column "All" represents the mean of the commune level variable among all communes, where "Low/Medium/High" represents the mean of the commune level variable among communes with a low/medium/high intensity. Low intensity communes have a genocide intensity index $<= -1$, medium intensity commune have a genocide intensity between -1 and 1 and high genocide intensity communes have a genocide intensity ≥ 1. The sample consists of married and divorced women who married after the genocide but before the law. Women who married more than once are excluded.

Table A.5: Summary statistics across different genocide intensities: After the law

	All		Low		Medium		High	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Variables from the 2010 DHS								
Marital status: Married	0.9	0.3	0.9	0.3	0.9	0.3	0.9	0.3
Age	31.0	4.6	30.8	4.7	30.9	4.5	32.1	4.5
Age at first marriage	21.0	3.4	20.6	3.5	20.9	3.4	22.0	3.4
Age at genocide	15.0	4.6	14.7	4.7	14.8	4.5	16.0	4.5
Year of first marriage	2000.4	3.7	2000.3	3.7	2000.4	3.7	2000.4	3.7
Years since marriage	9.6	3.7	9.7	3.7	9.6	3.7	9.7	3.7
Education in years	4.8	3.4	5.2	4.2	4.6	3.2	4.9	2.8
Currently working	0.8	0.4	0.7	0.4	0.8	0.4	0.9	0.3
Works for pay	0.9	0.3	0.9	0.4	0.9	0.3	0.9	0.3
Works for cash	0.7	0.4	0.7	0.4	0.7	0.4	0.7	0.5
Works for all year	0.8	0.4	0.8	0.4	0.8	0.4	0.8	0.4
Occupation is agricultural	0.8	0.4	0.7	0.5	0.8	0.4	0.8	0.4
Total children ever born	3.4	1.6	3.4	1.6	3.4	1.5	3.5	1.5
Has children aged 5 and under	0.9	0.3	0.9	0.3	0.9	0.3	0.9	0.3
Has minimum 2 children aged 5 and under	0.5	0.5	0.5	0.5	0.5	0.5	0.6	0.5
Place of residence: Urban	0.1	0.4	0.2	0.4	0.1	0.3	0.1	0.3
Lives in a district that has primary courts	0.4	0.5	0.5	0.5	0.3	0.5	0.3	0.4
Household's main floor material is cement	0.2	0.4	0.3	0.4	0.2	0.4	0.2	0.4
Household has electricity	0.1	0.3	0.2	0.4	0.1	0.3	0.0	0.2

Note: Summary statistics for the sample of analysis. Column "All" represents the mean of the commune level variable among all communes, where "Low/Medium/High" represents the mean of the commune level variable among communes with a low/medium/high intensity. Low intensity communes have a genocide intensity index $<= -1$, medium intensity commune have a genocide intensity between -1 and 1 and high genocide intensity communes have a genocide intensity ≥ 1. The sample consists of married and divorced women who married after the genocide but before the law. Women who married more than once are excluded.

Table A.6: Manski bounds for the impact of the law on physical domestic violence

	Dummy dependent var		z-score dependent var	
	(1) Lower Bound	(2) Upper Bound	(3) Lower Bound	(4) Upper Bound
GenocideIntensity x Post	-0.003 (0.03)	-0.003 (0.03)	0.027 (0.06)	0.027 (0.06)
Post	✓	✓	✓	✓
Individual Controls	✓	✓	✓	✓
1991 Commune Controls x Post	✓	✓	✓	✓
Cohort FE	✓	✓	✓	✓
Commune FE	✓	✓	✓	✓
Year of Marriage FE	✓	✓	✓	✓
N	1500	1500	1500	1500
Dependent variable mean	0.37	0.40	0.02	0.00
Adjusted R^2	0.134	0.172	0.011	0.037

Note: Sample consists of women who are currently married and recently divorced (after the law). In all samples, women who married more than once are excluded. Robust standard errors are reported in parenthesis. *** $p<0.01$, ** $p<0.05$, * $p<0.1$

Table A.7: Manski bounds for the impact of the law on physical or sexual domestic violence

	Dummy dependent var		z-score dependent var	
	Lower Bound	Upper Bound	Lower Bound	Upper Bound
GenocideIntensity x Post	-0.049	-0.049	-0.018	-0.018
	(0.03)	(0.03)	(0.06)	(0.06)
Post	✓	✓	✓	✓
Individual Controls	✓	✓	✓	✓
1991 Commune Controls x Post	✓	✓	✓	✓
Cohort FE	✓	✓	✓	✓
Commune FE	✓	✓	✓	✓
Year of Marriage FE	✓	✓	✓	✓
N	1500	1500	1500	1500
Dependent variable mean	0.39	0.42	0.02	0.00
Adjusted R^2	0.102	0.138	0.017	0.048

Note: Sample consists of women who are currently married and recently divorced (after the law). In all samples, women who married more than once are excluded. Robust standard errors are reported in parenthesis. *** p<0.01, ** p<0.05, * p<0.1

Table A.8: Impact of the law on divorce and domestic violence using genocide intensity index as an IV for 2002 Sex-Ratio

	Dummy dependent var			
	(1) Divorce	(2) Violence	(3) Physical Only	(4) Sexual Only
Sex-Ratio in 2002 x Post	0.07*	-0.51**	-0.15	-0.39**
	(0.04)	(0.25)	(0.20)	(0.19)
Post	✓	✓	✓	✓
Individual Controls	✓	✓	✓	✓
1991 Commune Controls x Post	✓	✓	✓	✓
Cohort FE	✓	✓	✓	✓
Commune FE	✓	✓	✓	✓
Year of Marriage FE	✓	✓	✓	✓
N	3247	1340	1340	1339
Dependent variable mean	0.07	0.40	0.37	0.13
First Stage F-stat	24.01	10.85	10.85	10.51

Note: Results for IV-2SLS Second Stage. Sex-Ratio in 2002 is from the 2002 Census and it is the inverse of the male-to-female sex-ratio to capture male scarcity in 2002. I standardize it to make it easier to interpret the results (given that the genocide intensity is also standardized). It is cohort specific and calculated at the commune level. I create a cohort specific sex-ratio to capture woman's marriage market prospects more accurately. The mean age difference between the wife and the husband is five years in Rwanda according to all the data sets I used. Divorce prediction sample consists of ever married and divorced women who married after the genocide but before the law. Violence prediction consists of married women who married after the genocide but before law. In all samples, women who married more than once are excluded. Robust standard errors are reported in parenthesis. *** $p<0.01$, ** $p<0.05$, * $p<0.1$

Table A.9: Impact of the law on divorce and being separated using the Population and Housing Census 2002 and 2012

	(1) Divorce or Being Separated
GenocideIntensityPost	0.004
	(0.003)
Post	✓
Individual Level Controls	✓
1991 District Level Controls x Post	✓
District FE	✓
N	80762
Dependent variable mean	0.06
Adjusted R^2	0.028

Note: The sample consists of ever married, divorced and separated women who married after the genocide but before the law. Women who married more than once are excluded. Robust standard errors are reported in parenthesis. *** $p<0.01$, ** $p<0.05$, * $p<0.1$

Table A.10: Impact of the law on divorce and domestic violence using a genocide intensity index based on armed violence rather than armed and civilian violence combined

	Dummy dependent var				z-score dependent var		
	(1) Divorce	(2) Violence	(3) Physical Only	(4) Sexual Only	(5) Violence	(6) Physical Only	(7) Sexual Only
GenocideIntensity x Post	0.01*	-0.06*	-0.02	-0.05*	-0.03	0.01	-0.15
	(0.01)	(0.04)	(0.03)	(0.03)	(0.06)	(0.07)	(0.10)
Post	✓	✓	✓	✓	✓	✓	✓
Individual Controls	✓	✓	✓	✓	✓	✓	✓
1991 Commune Controls x Post	✓	✓	✓	✓	✓	✓	✓
Cohort FE	✓	✓	✓	✓	✓	✓	✓
Commune FE	✓	✓	✓	✓	✓	✓	✓
Year of Marriage FE	✓	✓	✓	✓	✓	✓	✓
N	3497	1424	1424	1423	1424	1424	1423
Dependent variable mean	0.07	0.39	0.37	0.13	0.01	0.01	0.02
Adjusted R^2	0.10	0.11	0.15	0.03	0.02	0.01	0.02
p-value for $H_0 : \beta_2 = 0$	0.10	0.10	0.65	0.10	0.61	0.93	0.11

Note: Genocide intensity index based on armed *violence* is the result of principal component analysis (PCA) using the 4 proxies: The perpetrator proxy which reflects armed violence and survivor proxies. The sample consists of ever married, divorced and separated women who married after the genocide but before the law. Women who married more than once are excluded. Robust standard errors are reported in parenthesis. *** p<0.01, ** p<0.05, * p<0.1

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Table A.11: Impact of the law on help seeking behavior using DHS 2005 and 2010

	(1) Women sought help to stop domestic violence
GenocideIntensity x Post	-0.06
	(0.06)
Post	✓
Individual Controls	✓
1991 Commune Controls x Post	✓
Cohort FE	✓
Commune FE	✓
Year of Marriage FE	✓
N	724
Dependent variable mean	0.34
Adjusted R^2	0.04
p-value for $H_0 : \beta_2 = 0$	0.37

Note: The sample consists of ever married, divorced and separated women who married after the genocide but before the law. Women who married more than once are excluded. Robust standard errors are reported in parenthesis. *** p<0.01, ** p<0.05, * p<0.1
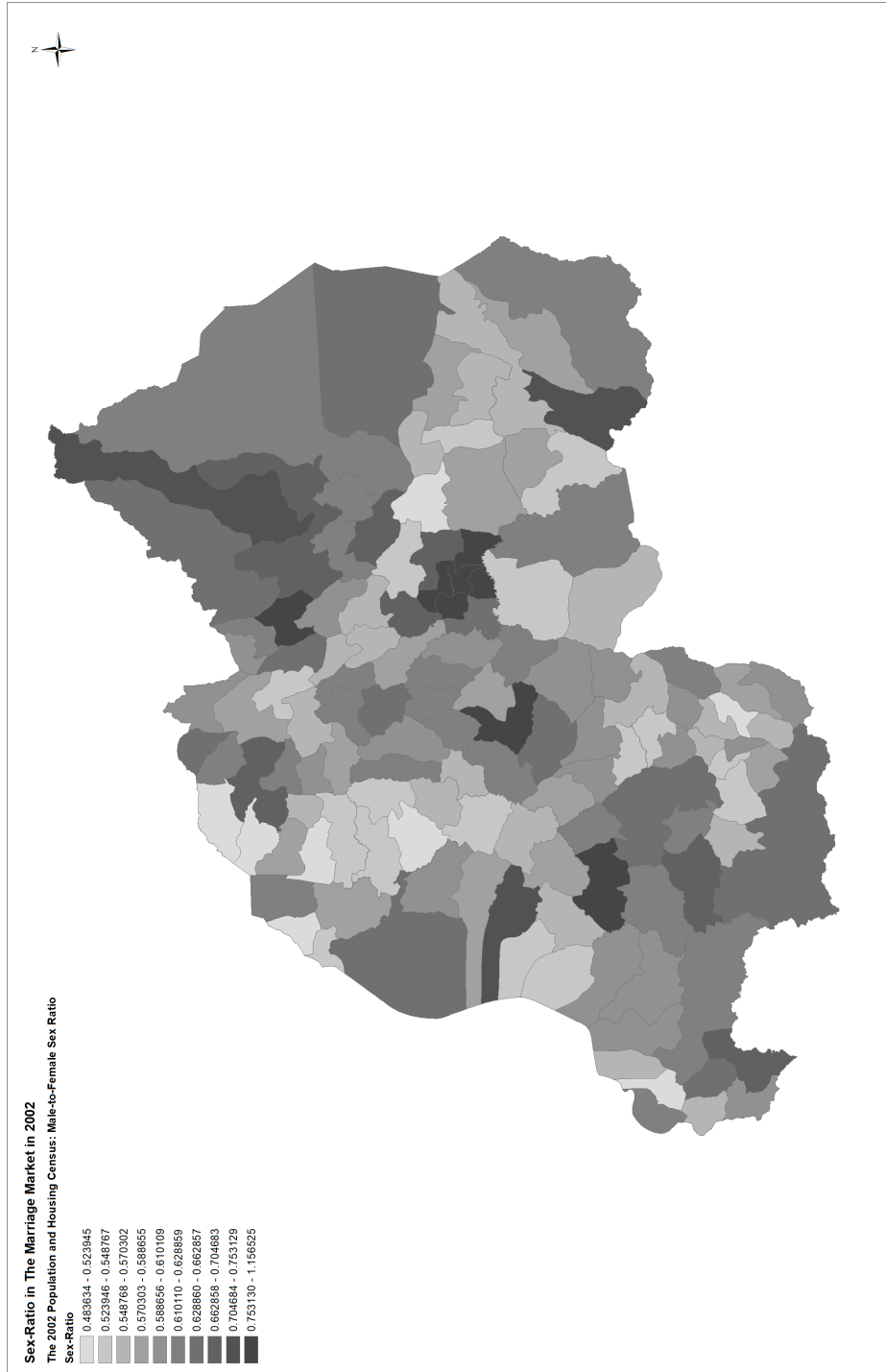
Figure A.9: Sex-Ratio After The Genocide
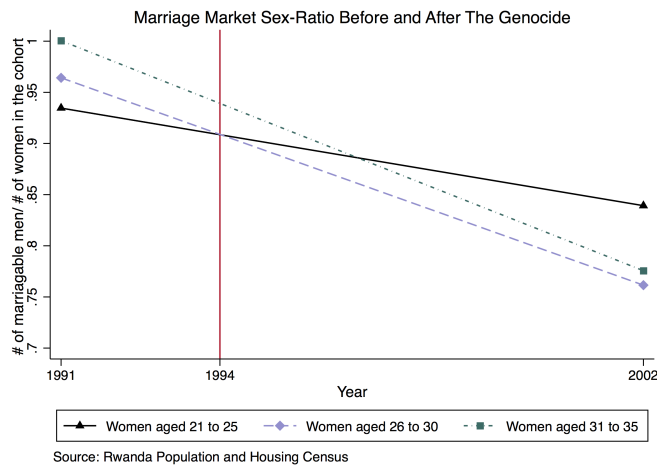
Figure A.10: Cohort Specific Marriage Market Sex-Ratio Before and After the Genocide
Note: 1991 is the pre-genocide census year where 2002 is the post-genocide census year.
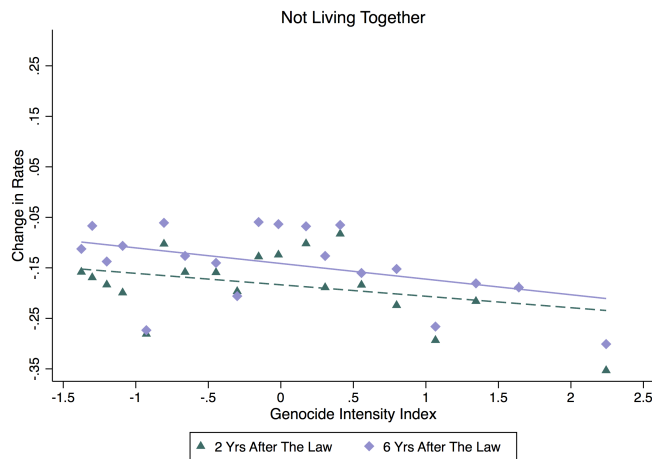
Figure A.11: Change in not living together rates after the law
Note: Binned scatter plot of change in not living together rates across different genocide
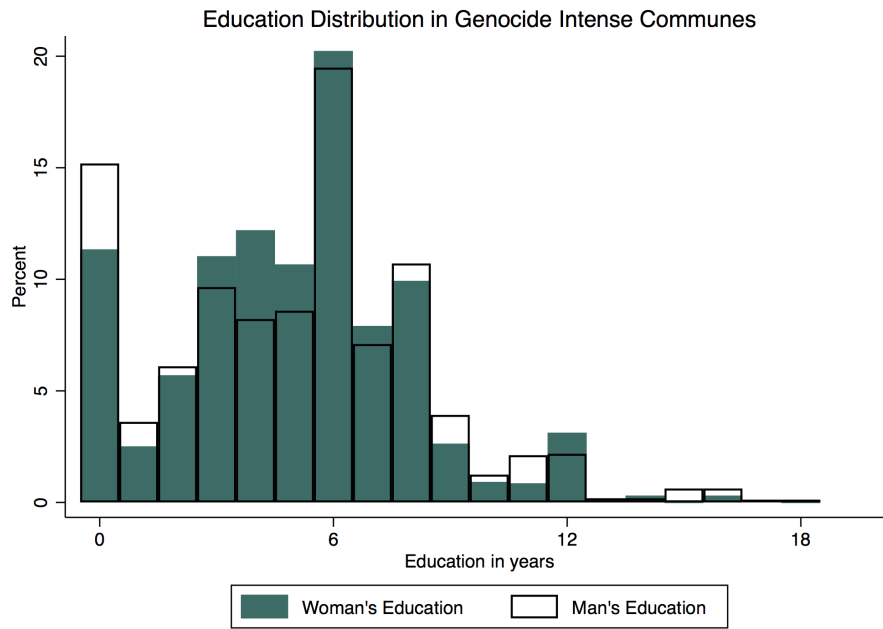intensities after the law with a linear fit. The changes are relative to before the law.

Figure A.12: Education Distribution in the Genocide Intense Communes
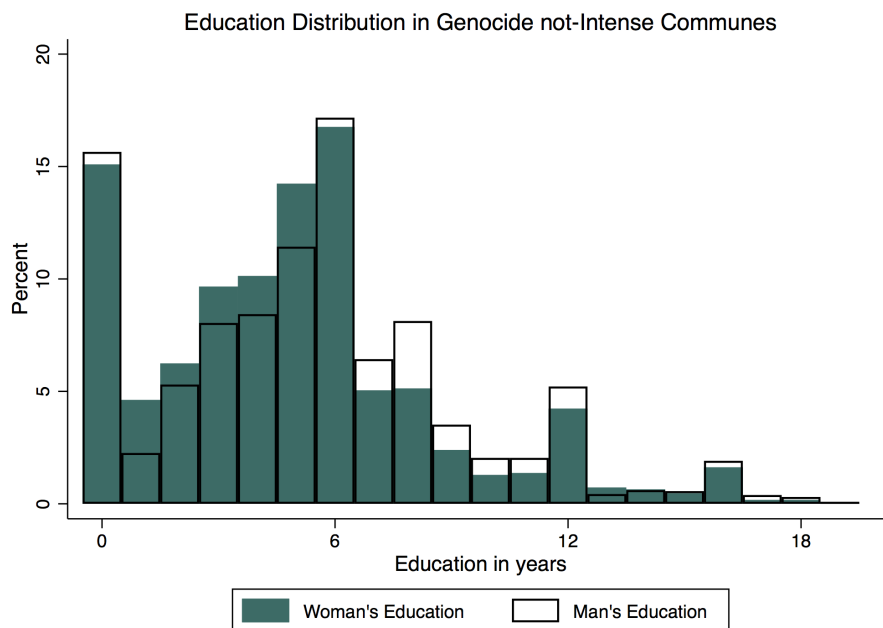
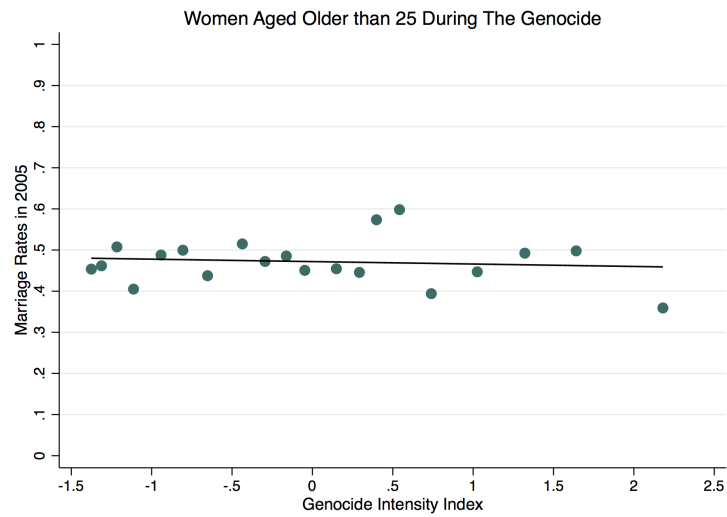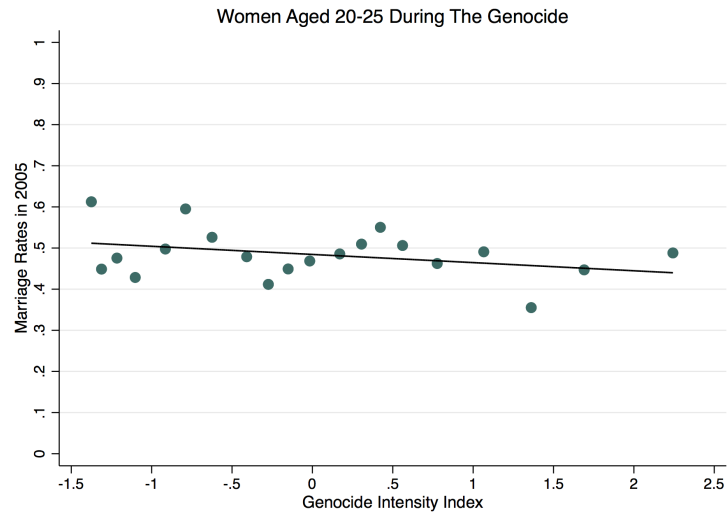Figure A.13: Education Distribution in the Genocide not-Intense Communes

Figure A.14: Marriage Rates in 2005

Note: Binned scatter plots of the marriage rates in 2005 across different genocide intensities. I only use the 2005 cycle to calculate the rates. Women aged 20-25 are the those who were in the marriage market right after the genocide. Women who are older than 25 are those who are more likely to be married before the genocide.

B Theoretical Appendix

In the theoretical appendix, I provide the proofs of observations and predictions in Section 3. Observation 1 and 2 are outlined in 3.1, Prediction 1 is outlined in 3.2.1, Predictions 2 is outlined in 3.3.1. Throughout the proofs, an increase in the sex-ratio, λ, means a decline in male-scarcity.

B.1 Proof of Observation 1

The equality below characterize the solution to the maximization problem in Equation 3. $\sigma^*(\lambda, s_w)$ is the equilibrium reservation signal at which the woman is indifferent between accepting and rejecting a proposal as in

$$\underbrace{\frac{-\pi_{\sigma^*} + \mathbb{E}[\xi_w]}{1-\beta}}_{V_M(\sigma^*)} = \underbrace{\frac{s + \beta\lambda \int_0^{\sigma^*} \frac{-\pi_\sigma + \mathbb{E}[\xi_w]}{1-\beta} dF(\sigma)}{1 - \beta[1 - \lambda F(\sigma^*)]}}_{V_S(\sigma^*)}.$$

Given that σ^* is a function of λ and s_w, denote V_S as $V_S(\sigma^*, \lambda, s_w)$. According to law of total derivative,

$$\frac{\partial V_M(\sigma^*, \lambda, s_w)}{\partial \lambda} = \frac{\partial V_M(\sigma^*, \lambda, s_w)}{\partial \sigma^*(\lambda, s_w)} \frac{\partial \sigma^*(\lambda, s_w)}{\partial \lambda},$$

$$\frac{\partial V_S(\sigma^*, \lambda, s_w)}{\partial \lambda} = \frac{\partial V_S(\sigma^*, \lambda, s_w)}{\partial \lambda} + \frac{\partial V_S(\sigma^*, \lambda, s_w)}{\partial \sigma^*(\lambda, s_w)} \frac{\partial \sigma^*(\lambda, s_w)}{\partial \lambda}.$$

Since $V_M(\sigma^*) = V_S(\sigma^*)$ at σ^*, $\frac{\partial V_M(\sigma^*, \lambda, s_w)}{\partial \lambda} = \frac{\partial V_S(\sigma^*, \lambda, s_w)}{\partial \lambda}$. Thus,

$$\frac{\partial V_M(\sigma^*, \lambda, s_w)}{\partial \sigma^*(\lambda, s_w)} \frac{\partial \sigma^*(\lambda, s_w)}{\partial \lambda} = \frac{\partial V_S(\sigma^*, \lambda, s_w)}{\partial \lambda} + \frac{\partial V_S(\sigma^*, \lambda, s_w)}{\partial \sigma^*(\lambda, s_w)} \frac{\partial \sigma^*(\lambda, s_w)}{\partial \lambda}.$$

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Rearranging gives,

$$\frac{\partial \sigma^*(\lambda, s_w)}{\lambda} = \frac{\overbrace{\dfrac{\partial V_S(\sigma^*, \lambda, s_w)}{\partial \lambda}}^{>0}}{\underbrace{\dfrac{\partial V_M(\sigma^*, \lambda, s_w)}{\partial \sigma^*(\lambda, s_w)}}_{<0} - \underbrace{\dfrac{\partial V_S(\sigma^*, \lambda, s_w)}{\partial \sigma^*(\lambda, s_w)}}_{0}} = 0.$$

The negativity of the left hand side of the denominator is due to MLRP. When σ^* increases, it is more likely for the woman to accept the proposal of a violent-type man. So, lifetime expected value of marrying today decreases. The right hanf side of the denominator is equal to 0 since σ^* is the solution to the single woman's maximization problem. The numerator is positive after applying chain rule to get the derivative and assuming that ξ_w is large enough.[50]

B.2 Proof of Observation 2

Since $\frac{\partial V_M(\sigma^*, \lambda, s_w)}{\partial s_w} = \frac{\partial V_S(\sigma^*, \lambda, s_w)}{\partial s_w}$ and $\frac{\partial V_M(\sigma^*, \lambda, s_w)}{\partial s_w} = 0$, $\frac{\partial V_S(\sigma^*, \lambda, s_w)}{\partial s_w} = 0$. By the law of total derivative,

$$\frac{\partial V_S(\sigma^*, \lambda, s_w)}{\partial s_w} = \frac{\partial V_S(\sigma^*, \lambda, s_w)}{\partial s_w} + \frac{\partial V_S(\sigma^*, \lambda, s_w)}{\partial \sigma^*(\lambda, s_w)} \frac{\partial \sigma^*(\lambda, s_w)}{\partial s_w}.$$

Thus, $\frac{\partial V_M(\sigma^*, \lambda, s_w)}{\partial s_w} = \frac{\partial V_S(\sigma^*, \lambda, s_w)}{\partial s_w}$ yields to

$$0 = \frac{\partial V_S(\sigma^*, \lambda, s_w)}{\partial s_w} + \frac{\partial V_S(\sigma^*, \lambda, s_w)}{\partial \sigma^*(\lambda, s_w)} \frac{\partial \sigma^*(\lambda, s_w)}{\partial s_w}$$

Since I know that $\frac{\partial V_S(\sigma^*, \lambda, s_w)}{\partial \sigma^*(\lambda, s_w)} = 0$, I can rewrite it as $\frac{\partial V_S(\sigma^*, \lambda, s_w)}{\partial s_w}$ in the above expression as in

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[50]If ξ_w is very small, the single woman will not want to marry. I also exclude the case where s_w is so high that the woman does not want to get married. Both are plausible assumption for the Rwandan context. Non-monetary benefit of marriage is not low due to social norms and on average women's outside options are not very high due to low levels of female education.

$$0 = \frac{\partial V_S(\sigma^*, \lambda, s_w)}{\partial s_w} + \frac{\partial V_S(\sigma^*, \lambda, s_w)}{\partial s_w} \frac{\partial \sigma^*(\lambda, s_w)}{\partial s_w}.$$

Thus,

$$\frac{\partial \sigma^*(\lambda, s_w)}{\partial s_w} = -1 < 0.$$

B.3   Proof of Prediction 1

B.3.1   Proof of Prediction 1a

$$\frac{\partial \Delta DivorceRate}{\partial \lambda} = \frac{\partial \int_0^{\sigma^*(\lambda, s_w)} \pi_\sigma Q(s_w + 1) dF(\sigma)}{\partial \lambda}$$

$$= \pi_{\sigma^*} Q_w(s_w + 1) \frac{\partial \sigma^*(\lambda, s_w)}{\partial \lambda} + \int_0^{\sigma^*(\lambda, s_w)} \frac{\partial \pi_\sigma Q_w(s_w + 1)}{\partial \lambda} dF(\sigma) < 0$$

$\pi_{\sigma^*} Q_w(s_w + 1) > 0$ and $\frac{\partial \sigma^*(\lambda, s_w)}{\partial \lambda} < 0$ due to Observation 1, which makes the left hand side of the summation negative. Since the right hand side of the summation is negative due to Observation 1, $\Delta DivorceRate$ decreases if λ increases. Negativity of $\frac{\partial \pi_{\sigma^*}}{\partial \lambda}$, which makes right hand side of the summation negative is coming from the fact that $\frac{\partial \sigma^*(\lambda, s_w)}{\partial \lambda} < 0$ due to Observation 1 and π_{σ^*} is an increasing function of $\sigma^*(\lambda, s_w)$.

B.3.2   Proof of Prediction 1b

Since $\Delta DVRate = -\Delta DivorceRate$, the proof Prediction 1, $\frac{\partial \Delta DVRate}{\partial \lambda} > 0$, follows from the proof of Prediction 1a.

B.4   Proof of Prediction 2

$$\frac{\partial \Delta DVRate}{\partial \lambda} = \frac{\partial \int_0^{\sigma^*(\lambda, s_w)} \pi_\sigma (\xi_w - s_w - 1) dF(\sigma)}{\partial \lambda}$$

$$= \pi_{\sigma^*}(\xi_w - s_w - 1)\frac{\partial \sigma^*(\lambda, s_w)}{\partial \lambda} + \int_0^{\sigma^*(\lambda, s_w)} \frac{\partial \pi_\sigma(\xi_w - s_w - 1)}{\partial \lambda} dF(\sigma) > 0$$

Left hand side of the summation is positive since $\pi_{\sigma^*} > 0$, $(\xi_w - s_w - 1) < 0$ and $\frac{\partial \sigma^*(\lambda, s_w)}{\partial \lambda} < 0$. Right hand side of the summation is positive since $\frac{\partial \pi_{\sigma^*}}{\partial \lambda} < 0$ and $(\xi_w - s_w - 1) < 0$. $(\xi_w - s_w - 1) < 0$ due to $(\xi_w - s_w) < 1$.

B.5 Divorce under the Choice Hypothesis

The divorce rate after the law is as follows:

$$DivorceRate = \int_0^{\sigma^*(\lambda, s_w)} \pi_\sigma Q_m(s_m - d^*_{Post}) Q_w(s_w + d^*_{Post}) dF(\sigma). \tag{20}$$

$Q_m(s_m - d^*_{Post})$ is probability of divorce of the violent man and $Q_w(s_w + d^*_{Post})$ is the probability of divorce of the woman where $d^*_{Post} = \xi_w - s_w$. Since there is no divorce before the law, $DivorceRate = \Delta DivorceRate$.

$$\frac{\partial \Delta DivorceRate}{\partial \lambda} = \frac{\int_0^{\sigma^*(\lambda, s_w)} \pi_\sigma Q_m(s_m - d^*_{Post}) Q_w(s_w + d^*_{Post}) dF(\sigma)}{\partial \lambda}$$

$$= \pi_{\sigma^*} Q_m(s_m - d^*_{Post}) Q_w(s_w + d^*_{Post})\frac{\partial \sigma^*(\lambda, s_w)}{\partial \lambda} + \int_0^{\sigma^*(\lambda, s_w)} \frac{\partial \pi_\sigma Q_m(s_m - d^*_{Post}) Q_w(s_w + d^*_{Post})}{\partial \lambda} dF(\sigma) < 0$$

$\pi_{\sigma^*} Q_m(s_m - d^*_{Post}) Q_w(s_w + d^*_{Post}) > 0$ and $\frac{\partial \sigma^*(\lambda, s_w)}{\partial \lambda} < 0$ due to Observation 1, which makes the left hand side of the summation negative. Since the right hand side of the summation is negative due to Observation 1, $\Delta DivorceRate$ decreases if λ increases. Negativity of $\frac{\partial \pi_{\sigma^*}}{\partial \lambda}$, which makes right hand side of the summation negative is coming from the fact that $\frac{\partial \sigma^*(\lambda, s_w)}{\partial \lambda} < 0$ due to Observation 1 and π_{σ^*} is an increasing function of $\sigma^*(\lambda, s_w)$. Thus, the relationship between the $\Delta DivorceRate$ and the sex-ratio is again

$$\frac{\partial \Delta DivorceRate}{\partial \lambda} < 0.$$

C Data Appendix

I compiled different data sources for my empirical analysis. Below I give detailed information on the content of the data and how each data is used for analysis.

C.1 Datasets

C.1.1 Rwanda Population and Housing Census (1991, 2002, 2012)

The censuses provide detailed information about age, marital status, education, fertility, employment and socioeconomic status of the Rwandan women. I restricted the sample of analysis to 15-49 years old women since that is the sample used in Demographic Health Surveys (DHS). The 1991 Census is the census before the genocide and the only dataset that has the ethnicity question. After the genocide, the Rwandan Government prohibited the collection of ethnicity information. Thus, 2002 and 2012 censuses do not have the ethnicity question. 2002 is the census before the legal reform and 2012 is the census after the legal reform.

The 1991 Census has the information on which commune households lived. Commune is the administrative unit at the time of the genocide and can be thought as a U.S. county. There are 145 communes in total. The 2002 Census from National Institute of Statistics of Rwanda (NISR) has information on which sector and district households lived. Sector is one administrative unit lower than the commune where district is one administrative unit above. The name and boundaries of the sectors were mostly unchanged since 1994. However, in 2002, communes were displaced by districts as administrative units. At first there were 106 districts. In 2006, with the decentralization law, the number of the districts was reduced to 30.[cite, wiki] NISR version of the 2002 Census includes which sector corresponds to which 2006 district.[51] 2002 Census from IPUMS do not have the sector and the 2006 district information. The 2012 Census from IPUMS has information on 2006 district.

Rwandan censuses can be downloaded from IPUMS' website.

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[51]Last edited date of the census in NISR's website is after 2006. I suspect that NISR edited the census according to the 2006 decentralization law. The sectors names in the census corresponds to the sector names in the 2006 administrative sector boundary map.

C.1.2 The Gacaca Court Records

I downloaded the Gacaca court records dataset from Marijke Verpoorten's website[52]. Since the courts took place in 2000s, the records has information on the district which the sector was under in 2006. I calculated genocide intensity index following Verpoorten (2012) at the commune and the 2006 district level.

C.1.3 Demographic Health Survey (DHS) 2000, 2005, 2010, 2014

Starting from 2005, DHS are geo-referenced. Each grouping of households, cluster, has a GPS location. Urban clusters have a maximum of 2 km error where the rural clusters have 5.

C.2 Linking Datasets for Difference in Differences

C.2.1 DiD using DHS

I used 2005 and 2010/2011 DHS for my analysis since the legal reform happened in 2008. The treatment variable in this DiD, genocide intensity index, is at the 1991 commune level. Since both DHS are geo-referenced, I was able to match the women in the DHS with where they were located after the genocide but before the law. This is equivalent to matching the women to the marriage market they were married in. The administrative unit I used is the commune. Thus, the commune the women were married in can be thought as her marriage market. There are two main reasons why the commune is chosen over sector as the level of treatment. First, by allowing commune to be the marriage market rather than the sector, I am allowing the neighboring sector to be part of her marriage market. Second, the smallest administrative unit of the 1991 Census is commune. By choosing commune as the level of treatment, I am able to add commune level time varying controls like literacy and population density to my specification. Matching across different datasets and administrative units are done via ArcGIS, mainly spatial join tool.

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[52]https://www.uantwerpen.be/en/staff/marijke-verpoorten/my-website/data/

C.2.2 DiD using Census

I used 2002 and 2012 Census for my analysis since the legal reform happened in 2008. I chose the 2002 Census from the NISR rather than 2002 Census from IPUMS since the NISR version has the 2006 district information like the 2012 Census and the gacaca court records. The treatment variable in this DiD, genocide intensity index, is at the 2006 district level. I calculated the genocide intensity index at the 2006 district level following Verpoorten (2012) and La Mattina (2017).