Civil Conflict and Domestic Violence

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Abstract

This paper presents evidence that a national domestic violence law provides effective protection to women in a post-conflict country. In 2008, Rwanda passed a national domestic violence law that gave a woman the right to divorce her husband unilaterally if he was violent toward her. It also criminalized all forms of domestic violence, including marital rape. The Rwandan Genocide, which took place in 1994 and varied spatially in intensity, produced male scarcity and led more women to marry violent men. I show, using a difference-in-differences (DID) approach, that after the law passed in 2008 and among women who married post-genocide, divorce rates increased, and domestic violence rates decreased in the genocide-intense regions. The decline operated through the dissolution of violent marriages and the deterrence of violence within the marriages that remain intact. I developed a model that predicts that the increased likelihood of being married to a violent husband due to male scarcity in the post-genocide marriage market, not exposure to genocide, explains the results. I empirically show that couples who did not experience male scarcity in the marriage market but were exposed to genocidal violence -couples married right before the genocide- did not experience a change in outcomes after the law. Using novel monthly administrative records on the universe of hospitalizations for domestic violence and post-traumatic stress disorder (PTSD), I also rule out conflict-induced PTSD as a mechanism. If the law had not been passed, many women would have been trapped in violent marriages today.

JEL Codes: J12, J16, D74, K36, K38
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1 Introduction

Domestic violence and civil conflict are both prevalent globally. About one in every three women worldwide has experienced physical and/or sexual violence from their partners in their lifetime (WorldBank, 2015). Since 1960, twenty percent of nations have experienced at least ten years of civil war (Blattman and Miguel, 2010). Civil conflict and domestic violence also intertwine: African countries that experienced civil conflict between 1950-2011 had higher rates of domestic violence during the 2000s compared to the countries that did not (LaMattina, 2017).[1] During the same period, African post-conflict countries also enacted national domestic violence laws at much higher rates to address this problem (Tripp, 2010). Does national domestic violence laws decrease domestic violence in formerly post-conflict regions? If so, what are the mechanisms behind the decline? Moreover, does the effect of the law shed light on why domestic violence is prevalent in formerly conflict-intense regions?

This paper provides evidence that the introduction of a national domestic violence law in Rwanda, which allows women to divorce their husbands unilaterally if their husbands are violent towards them and criminalize all forms of domestic violence, decreases domestic violence in formerly conflict-intense regions. The decline operates through the dissolution of violent marriages and deterrence of violence within the marriages that remain intact. Moreover, the increased likelihood of being matched with a violent husband due to male scarcity in the post-conflict marriage market, not exposure to armed conflict or conflict-induced post-traumatic stress disorder (PTSD), appears to explain why domestic violence was prevalent in post-conflict regions before the law.

I use a difference-in-differences (DID) strategy to examine the differential effect of Rwanda's introduction of the national domestic violence law in 2008 on domestic violence across regions more and less exposed to the 1994 Rwandan Genocide. Due to the high number of men killed and incarcerated thereafter, the Rwandan Genocide produced male scarcity that varied spatially and led more women to marry violent men. First, among the women who married after the genocide, I compare the divorce and domestic violence outcomes before and after the law across different genocide intensities. I further provide evidence that the male scarcity in the post-genocide marriage market was the primary reason why domestic violence was more prevalent in genocide-intense regions before the law's adoption and, thus, why regions with different genocide intensities respond differently to the law. I find little response in samples that did not experience male scarcity in the marriage market. Using novel data on the universe of monthly hospitalizations for domestic violence and PTSD, I also rule out PTSD as a mechanism.

I use two features of the Rwandan context for identification. First, the introduction of the

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[1]See Guarnieri and Tur-Prats (2023) for how (non-domestic) conflict-related sexual violence and gender norms intertwine.

national domestic violence law in 2008 created a time variation (before-after the law). The law is a major change in Rwanda given that before the law, if a woman experienced domestic violence, she needed her husband's consent to divorce.[2] The 2008 law criminalizes all forms of domestic violence, including marital rape. The punishment for domestic violence ranges from six months to two years of imprisonment.[3] Second, the intensity of the Rwandan Genocide varied by region in the country, which led to spatial variation in conflict intensity before the law's adoption. Males were scarcer in the post-genocide marriage market in the regions where genocide was intense.

Rwandan Demographic Health Surveys (DHS) before and after the law's adoption provide information on women's self-reported current marital status and domestic violence experience in the past 12 months. I use genocide court records to measure the geographical variation in the intensity of the genocide. Using the court records, I create a commune level (the geographical unit at the time of the genocide) genocide intensity index following Verpoorten (2012) and LaMattina (2017).[4] DHS cycles are geocoded, which enables me to match women with the communes they were married in (their marriage market).

To guide my empirical analysis, I built a simple two-stage model that incorporates the sex-ratio in the marriage market, the couple's decisions within the marriage, and the effect of the law. In the first stage, the woman receives proposals from men, where the probability of receiving a proposal equals the male-to-female sex-ratio in the marriage market. There are two types of men in the market, violent and non-violent, and the woman cannot observe the man's type. It is more costly for the woman to reject a proposal in a male-scarce area since it is less likely for her to receive another proposal. Thus, when there is male scarcity in the marriage market at the time of the marriage, women become less selective and become more likely to be in violent marriages. The model predicts that the law affects couples differently across genocide intensities via two effects. First, under the hypothesis that men cannot control their impulses to be violent, the higher the male scarcity at the time of the marriage, the higher the increase (decrease) in the divorce rates (domestic violence rates) after the law (divorce effect). The decrease in domestic violence rates is due to the higher increase in the divorce rates only. Second, under the hypothesis that men choose to be violent or not, the higher the male scarcity at the time of the marriage, the higher the decrease in the domestic violence rates after the law independent of a change in the divorce rates (deterrent effect).

I find that, among ever married women who married after the genocide, a one standard devia-

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[2]Community marital property regime is the default regime in Rwanda where divorce legally leads to splitting marital property equally among spouses.

[3]The law states that the penalty for distorting tranquility of your spouse on sexual grounds shall be liable to a fine between 50,000 Rwandan francs ($39) and 200,000 Rwandan francs ($155) beyond imprisonment. Average annual income is $780 in Rwanda in 2018.

[4]The average area of the 145 communes is 174 km^2.

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tion increase in the genocide intensity in a commune leads to a 5 percentage points (p-value=0.0003) (or 71%) increase in the divorce rate after the law. Among married women only, one standard deviation increase in the genocide intensity in a commune leads to 11 percentage points (p-value=0.02) (or 33%) decrease in the domestic violence rate after the law. These results provide support for the divorce effect. To investigate the deterrent effect, I do the same analysis using the ever married sample that includes women who are currently divorced and reported whether they experienced domestic violence in the past 12 months by their most recent partner, plausibly before the divorce.[5] I find that among married and currently divorced women, one standard deviation increase in the genocide intensity in a commune leads to 12 percentage points (p-value=0.008) (or 38%) decrease in the domestic violence rate after the law. This suggests that the deterrent effect exists beyond the divorce effect. The results are robust to a range of specifications and different measures of genocide intensity.

I also empirically test whether the male scarcity in the post-genocide marriage market explains why regions with different genocide intensities respond differently to the law. I first show that among the women who married right before the genocide, where there was no male scarcity in the marriage market, an increase in the genocide intensity in a commune has no effect on the divorce and domestic violence rates after the law. The majority of those women had lived in their place of residence since before the genocide. Thus, the husbands in the genocide-intense areas are exposed to genocidal violence. This suggests that the main results are not driven by exposure to genocide but a sex-ratio distortion in the post-genocide marriage market. To further test this, I exploit exogenous variation in radio reception of the state-sponsored station – Radio Television Libre des Mille Collines (RTLM) – that encouraged the genocide against the Tutsis (Yanagizawa-Drott, 2014).[6] It has been documented that armed-group violence by the militiamen during the genocide, rather than local RTLM-induced civilian violence, targeted adult men. RTLM-induced killings were mostly women and children, and it led to a male surplus (Rogall and Zarate-Barrera 2020, Rogall 2021). I find that a one standard deviation increase in the RTLM reception in a commune has no effect on the divorce and domestic violence rates after the law. This further suggests that male scarcity in the marriage market was the underlying mechanism behind the results. Consistently with the model and the empirical evidence supporting the male scarcity channel, using data on couples' education

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[5]Since I restricted the sample to women who ever had only one union, the most recent partner is the partner the woman is divorced from. Thus, plausibly, the woman is reporting her domestic violence experience when she was married, before the divorce.

[6]This mechanism check originates from Rogall and Zarate-Barrera (2020), which exploits the RTLM reception as a robustness check to support that post-genocide and gender imbalance induced (local) female political participation leads to improvement in many women's empowerment outcomes (including domestic violence) in 2010 and 2015 (post-law period) in Rwanda. In contrast, I focus on the effect of a domestic violence legislation (enacted by lawmakers, not local politicians) on domestic violence by comparing before and after-the-law outcomes and support gender imbalances in the marriage market before the law's adoption as a mechanism behind the differences in outcomes across different genocide intensities.

levels, I also show that women become less selective in the post-genocide marriage market.

Using the universe of monthly hospitalizations for domestic violence and PTSD, I also show that the results cannot be explained by one or both of the spouse's mental health conditions (in particular, PTSD). Every year, a national mourning to commemorate victims of the genocide occurs in Rwanda, which overlaps with the actual months of the genocide. Recent medical research suggests that the period triggers PTSD symptoms in Rwanda (Kayiteshonga et al., 2022). Using a DID event-study design, I find that it is not more likely for a hospital in a formerly genocide-intense area to have a domestic violence patient during the national mourning period compared to one month before the onset of the mourning, March. I also find that it is not more likely for a hospital in a formerly genocide-intense area to have a female or male PTSD patient aged between 20-39 years old (approximates my sample from DHS) during the national mourning period compared to one month before the onset of the mourning. Given that the onset of the national mourning period leads to no changes in hospitalizations for domestic violence and PTSD concurrently in the genocide-intense areas relative to the non-intense areas, PTSD is plausibly not the dominant mechanism behind the main results.[7]

It has also been documented that the government-induced rapid expansion of the coffee mills in Rwanda in the 2000s enabled women's transition to paid employment and decreased domestic violence within its catchment area (Sanin, 2023). To test whether the mill-induced increase in women's economic opportunities (thus her outside option/utility of being divorced) drives the results, I restricted the main sample to women who lived in the catchment area of a mill both before and after the law. I find that among the women who married after the genocide and resided within the catchment area of a mill, an increase in the genocide intensity still increases the divorce rates. This suggests that keeping women's economic opportunities fixed, male scarcity in the marriage market matters, and women's economic opportunities do not drive the main results.

In developing countries, a law can stay on paper rather than being implemented in practice. I use two subsamples to provide insights into the factors that strengthen the law's implementation. Using the universe of geocoded locations of district hospitals and 2011 election results at the local level, I find that women who reside close to the district hospitals (which provide health and legal services related to gender-based violence in Rwanda), as well as women who reside in areas with a high share of female local-level politicians, are more likely to get divorced in genocide-intense areas after the law. Institutionally, local-level female politicians did not build the district hospitals and are part of a network supervised by government bodies that hold information on public policies and services related to gender-based violence. When women are more likely to have continuous

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[7]One may argue that it is possible for individuals to not go to the hospital for PTSD for a particular reason and that is why I am finding statistically insignificant results. Yet, I find that it is likely for a hospital in a formerly genocide-intense area to have a female PTSD patient aged older than 40, an age group that constitutes a minority of my DHS sample and plausibly represents genocide widows based on statistics.

access to information on how they can benefit from the law and have access to related public services, they are more likely to benefit from the law.[8]

This paper makes two main contributions. First, it provides causal evidence that the introduction of a comprehensive domestic violence law decreases domestic violence in a post-conflict context where domestic violence is prevalent. Much of the literature on the impact of expanding women's rights has focused on the effects of divorce and property laws (Wolfers 2006, Rasul 2006, Field 2007, Bronson 2015, Voena 2015, Anderson and Genicot 2015, Anderson 2018), labor laws (Myers 2017, Ruhm 1998, Rossin-Slater et al. 2013), reproductive laws (Goldin and Katz 2002, Bailey 2006) and gender quota laws (Chattopadhyay and Duflo 2004, Beaman et al. 2009, Beaman et al. 2012) and study outcomes other than domestic violence.[9] I focus on the most recent group of reforms on women's rights, domestic violence laws, and its effects on domestic violence. A limited number of studies analyze the effect of unilateral no-fault divorce (Stevenson and Wolfers 2006, Brassiolo 2016, García-Ramos 2021, Corradini and Buccione 2023) or criminalization of domestic violence (Gulesci et al. 2024) on domestic violence in non-post-conflict contexts. Beyond the difference in contexts, they either use variation in the staggered timing of the law's adoption or use cohabiting couples as a control group. In this paper, I show that the introduction of a national domestic violence legislation -that fundamentally aims to protect citizens who are more likely to be domestic violence victims- protects its intended beneficiaries, women who reside in the formerly conflict-intense regions and thus are more likely to be in violent marriages.

Second, my results shed light on the determinants of domestic violence, especially in post-conflict contexts, and its interaction with a national policy. A growing empirical literature on domestic violence provides evidence for the increase in women's outside options (Aizer 2010, Anderberg et al. 2016, Hidrobo et al. 2016, Haushofer et al. 2019, Adams-Prassl et al. 2023, Lowes 2023), reduction in financial stress (Angelucci 2008, Bhalotra et al. 2019, Heath et al. 2020, Arenas-Arroyo et al. 2021, Bhalotra et al. 2021), exposure reduction (Chin, 2011), extractive/instrumental violence (Bloch and Rao 2002, Eswaran and Malhotra 2011, Bobonis et al. 2013, Heath 2014, Anderson and Genicot 2015, Erten and Keskin 2018, Bhalotra et al. 2019, Calvi and Keskar 2021, Erten and Keskin 2021, Erten and Keskin 2022), male backlash (Angelucci 2008, Luke and Munshi 2011, Tur-Prats 2021, Alesina et al. 2020, Guarnieri and Rainer 2021), unexpected emotional cues (Card and Dahl, 2011) and economic costs of women's incapacitation (Sanin, 2023) as determinants of domestic violence. A limited number of papers study the determinants of domestic violence in post-conflict contexts (LaMattina 2017, Stojetz and Brück 2023).[10] My results reinforce LaMattina (2017), which uses DHS 2005 and provides evidence that

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[8]The result related to local female politicians is in line with Rogall and Zarate-Barrera (2020).

[9]See Goldin (2023) for how, when, and why did women in the US obtain legal rights regarding the workplace, marriage and family.

[10]Stojetz and Brück (2023) studies the determinants of domestic violence in post-conflict Angola among war

changes in local marriage market sex ratios after the Rwandan Genocide is a mechanism behind why women married after 1994 are more likely to experience domestic violence relative to women who married before.[11] By developing a model and using different samples, variations, and novel administrative data, I study the male scarcity channel in detail and rule out exposure to violence and PTSD as mechanisms. Moreover, my results also complement the growing evidence which suggests that different groups within a developing country may respond to national legislation or policy differently (Ashraf et al. 2020, Bau 2021, Moscona and Seck 2021). My results show that the persistent negative effects of conflict on households may operate through the sex ratio in the marriage market at the time of the marriage and can be alleviated via national policy. To the best of my knowledge, this is the first paper that studies how determinants of domestic violence and a national legislation/policy on domestic violence interact.[12]

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). Section 5 presents the main identification strategy. Then, I test the theoretical predictions using data and present results (Section 6). Section 7 study the underlying mechanisms. Section 8 discusses the implementation of the law. Section 9 provides robustness checks. The last section concludes (Section 10).

2 Institutional Context

In this section, after providing a very brief history of domestic violence laws in the world, I first provide information on the 2008 national domestic violence legislation in Rwanda. Then, I provide background information on the Rwandan Genocide, that took place in 1994, and its effects on male scarcity in the marriage market.

2.1 A Brief History of Domestic Violence Laws in the World

Legal reforms on domestic violence are a recent phenomenon in the world. When domestic violence came into the spotlight in the legal and policy debate in the late 1970s, governments were at

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veterans and find that exposure to wartime collective gender-based violence causes intimate partner violence. Stojetz and Brück (2023) and my results combined suggest that participation in wartime violence can affect domestic violence differently compared to being exposed to wartime violence.

[11]LaMattina (2017) highlights that when more recent data (DHS 2010) is used, the magnitude and statistical significance of the effect attenuated over time. My results suggest that the law's introduction explains why the effect of the genocide was less persistent in 2010.

[12]See Angrist (2002), Chiappori et al. (2002), Abramitzky et al. (2011) and Grosjean and Khattar (2019) for the effects of sex-ratios on different outcomes.

first resistant to passing legislation on the issue. They defended that domestic violence is 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 (WorldBank, 2015). As of September 1, 2019, 155 countries in the world have domestic violence laws in place (WorldBank, 2020). It has also been documented that African post-conflict countries have adopted legislation regarding domestic violence at significantly higher rates than compared to the non post-conflict countries (Tripp, 2010).

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 violence (Hebert, 2015).[13] All forms of domestic violence, including marital rape, are criminalized. The penalty for domestic violence is six months to two years of imprisonment.[14] The law states that the penalty for distorting tranquility of your spouse on sexual grounds shall be liable to a fine between 50,000 Rwandan francs ($39) and 200,000 Rwandan francs ($155) beyond imprisonment.[15]

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.[16] Given that 59% of the marriages in Rwanda 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.[17]

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[13]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.

[14]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 (USDepartmentofState, 2010).

[15]Average annual income is $780 in Rwanda in 2018.

[16]Community marital property regime is the default regime where mutual consent divorce legally leads to splitting marital property equally among spouses.

[17]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

The law came into effect in April 2009 and is unique for a developing country. First, beyond divorce being a 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 many developing countries where marital rape is still legal, including India, China, Iran, and the Democratic Republic of Congo.

2.3   The Rwandan Genocide (1994) and Male Scarcity

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 genocide 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.

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)[18]. Figure 1 also visualizes the geographical variation in the marriage-market sex ratio.[19] Males are scarcer in the communes where genocide was more intense.

Figure 2 shows the negative relationship between genocide intensity and the sex ratios in the marriage market across different cohorts. To see the relationship in detail, 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

handled in the primary courts. Primary courts constitute the lowest level of the judiciary of Rwanda, and they have civil and criminal jurisdiction.

[18]After the genocide, perpetrators were incarcerated, and the majority of them were male (LaMattina, 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 (LaMattina, 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 Hutu, it is assumed that most perpetrators are from the Hutu ethnic group. Thus, the marriage market sex ratios (unincarcerated) are distorted not just for the Tutsis but also for Hutus.

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

husbands in Rwanda. In all cohorts, there is a negative relationship between genocide intensity and the sex ratio. When genocide intensity increases, the marriage-market sex ratio for the women who marry after the genocide decreases. In order to summarize the order of the events discussed in this section, I provide a timeline of the events in Figure 3.

3 Model

To guide my empirical analysis, I introduce a simple two-stage model that investigates how male scarcity in the marriage market before the marriage affects the impact of a domestic violence legislation on divorce and domestic violence after the law. For simplicity, I focus only on the divorce aspect of the law in the model.

3.1 Setup

There are two stages in the model, one before and one during 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.[20] 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 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).[21]

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.[22] 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.[23] 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

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

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

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

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

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 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

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

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 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 $U_m^{married}$ 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

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

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 $\xi_m > s_m$.[24]

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

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

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 relationship between the reservation signal and male scarcity is as follows:

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

Observation 1: *The higher the male scarcity in the marriage market, the less selective women are.*
Proof. See Appendix A3.1.

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.

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:

$$\max_{Married, Divorced} \left\{ \frac{-\alpha + \xi_w}{1 - \beta}, \frac{s_w}{1 - \beta} \right\}. \tag{8}$$

By assumption, remarriage is not allowed in the model. (This assumption is based on the data. According to DHS and recent marriage statistics, rates of remarriage are very low in Rwanda.) After the law, the woman will divorce the violent type man if $-1 + \xi_w \leq s_w$.[25] 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 violent type man derives positive utility from exercising violence against the woman. However, now I distinguish between two hypotheses on men's ability to control their violent behavior. Under the

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

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 $Q_w(s_w + 1)$.[26] 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

$$DivorceRate = \int_0^{\sigma^*(\lambda, s_w)} \pi_\sigma Q_w(s_w + 1) dF(\sigma). \tag{9}$$

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, $DivorceRate = \Delta DivorceRate$.[27] The relationship between the $\Delta DivorceRate$ and male scarcity is as follows:

$$\frac{\partial \Delta DivorceRate}{\partial \lambda} < 0. \tag{10}$$

Proof. See Appendix A3.2.

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

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[26]Given that Q_w is monotonicly increasing in s_w, the probability of divorce is increasing in women's outside option.
[27]This assumption is based on the data. The divorce rate before the law is 0.02 in Rwanda.

the legal reform, $Vic lenceRate_{Pre}$, consists of posterior probability that the man is the violent type. Accordingly,

$$Vic lenceRate_{Pre} = \int_0^{\sigma^*(\lambda, s_w)} \pi_\sigma dF(\sigma). \tag{11}$$

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, $Vic lenceRate_{Post}$, consists of the posterior probability of the man being the violent type multiplied by the probability of remaining married. Accordingly,

$$Vic lenceRate_{Post} = \int_0^{\sigma^*(\lambda, s_w)} \pi_\sigma [1 - Q_w(s_w + 1)] dF(\sigma). \tag{12}$$

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

$$\frac{\partial \Delta Vic lenceRate}{\partial \lambda} > 0. \tag{13}$$

Proof. See Appendix A3.2.

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.[28] Prediction 1b, the divorce effect, shows the first possible mechanism of how a domestic violence 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

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[28]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.

the law, the maximization problem of the man is as follows:

$$\max_{d} \ \alpha d + \xi_m. \tag{14}$$

As before α and ξ_m are the man's type and non-monetary benefit from marriage respectively as before. For the choice 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.[29] 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

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

$$P_w = -\alpha d + \xi_w > s_w. \tag{16}$$

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

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

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:

$$\Delta ViolenceRate = \int_0^{\sigma^*(\lambda,s_w)} \pi_\sigma(d^*_{Post} - 1)dF(\sigma). \tag{17}$$

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

$$\frac{\partial \Delta ViolenceRate}{\partial \lambda} > 0. \tag{18}$$

Proof. See Appendix A3.3

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 2, 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 that is independent of an increase in the divorce rate is possible.[30]

Using data, I will be testing the **Prediction 1a, b (Divorce Effect)** and **Prediction 2 (Deterrent Effect)**. After the law, in the genocide-intense areas, observing i) an increase in the divorce rates and ii) a decrease in the domestic violence rates among currently married women will support the predictions regarding the divorce effect and suggest that there exist men who engage in domestic

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[30]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 choice 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 A3.4.

violence due to lack of self-control. Observing a decrease in the domestic violence rates among ever-married women (rates among currently married and recently divorced women, which captures the domestic violence experience of divorced women when they were married) in the genocide-intense areas after the law will support the deterrent effect. Moreover, this suggests that, although men can choose to be violent in the household, when a law makes it costly to engage in violence for the husband, the law deters the violence. In the mechanisms section, using information on couple's education levels, I also provide evidence supporting **Observation 1**, which highlights that women become less selective when there is male scarcity in the marriage market at the time of the marriage.

4   Data

The paper uses the Rwandan Gacaca court records and individual and household level data to measure the effect of the law on divorce and domestic violence outcomes across different genocide intensities. The paper also uses administrative, hospital level data on domestic violence and mental health and RTLM radio reception data from Yanagizawa-Drott (2014) to explore the mechanisms.

4.1   Data Related to Rwandan Genocide

Gacaca Court Records. I use Gacaca Court records to use 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.

I followed Verpoorten (2012) and LaMattina (2017) and created a commune level genocide-intensity index.[31] The index is a principal component analysis of the six categories above and captures the intensity of the genocidal violence in a given commune.[32] Table A1 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. A commune with 3.3 has the highest genocide intensity. Table A2 displays the relationship between the index and the sex ratio/male scarcity at the time of the marriage in a commune.[33] The male-to-female sex-ratio in 2002 (calculated based on census data) decreases

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

[32]See Verpoorten (2012) and LaMattina (2017) for more detail on the data and the genocide intensity index.

[33]A commune can be thought of a marriage market. I choose commune over sector (a smaller administrative unit)

as the genocide intensity index increases. Other 2002 commune level variables remain mostly unchanged.

RTLM Reception Data. Yanagizawa-Drott (2014) finds that a radio station, Radio Télévision Libre des Mille Collines (RTLM), led to participation in killings by both militia groups and ordinary civilians. To measure exposure to radio, Yanagizawa-Drott (2014) exploits the mountainous topography of Rwanda and constructed a variable measuring predicted radio coverage of RTLM at the commune level.[34] Rogall and Zarate-Barrera (2020) shows that armed-group violence, rather than local RTLM-induced violence during the genocide, targeted adult men. Moreover, Rogall (2021) highlights that RTLM-induced killings were mostly of women and children and documents that RTLM-induced violence led to a surplus of men. In light of these evidence, I use RTLM reception data to test whether differences in sex ratios is the mechanism behind my results.

Additional Data: Census. I use 1991 Census data to construct commune-level variables to control for pre-genocide trends in my main empirical specification. Table A2 shows the descriptive statistics for various commune-level characteristics including literacy, population density, ethnicity and employment. The 1991 Census is the census before the genocide and the only census that includes ethnicity.

4.2 Individual and Household Level Data

In order to investigate the impact of the law on divorce and domestic violence, I use the Rwandan Demographic Health Surveys (DHS). DHS is a nationally representative, cross-section individual and household-level survey conducted in developing countries every five years. I use 2005, 2010/11, 2014/15 and 2019/2020 cycles for my analysis.[35] The surveys collect demographic and health information from women aged 15-49 and men aged 18-59.

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.

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as the marriage market since it captures a marriage market better. By choosing commune over sector, I allow for a woman to marry a man from a neighboring sector, that is approximately just 50 km away.

[34]See Yanagizawa-Drott (2014) for more details on the dataset.

[35]In the 2019/2020 cycle, I use 2019 observations only to avoid the results being affected by COVID-19.

DHS classifies domestic violence categories (physical, sexual and emotional) with respect to World Health Organization (WHO) guidelines. I create a binary variable that takes the value of one if a partnered woman experienced physical or sexual domestic violence in the last 12 months. The domestic violence variable does not include emotional violence since it is not collected in every DHS cycle during my study period. According to data, 34% of women self-reported experiencing domestic violence in the past 12 months.

DHS data do not include information on communes.[36] 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 woman to the marriage market in which she was married. Figure A1 shows the matched data on the Rwanda map using pre and one post-data cycles. 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 law's impact on matching in the marriage market.[37] I also exclude the couples who live within the four km catchment area of a coffee mill from the sample, given that a mill opening is documented to affect domestic violence in itself (Sanin, 2023).

4.3   Administrative Hospital Level Data

To study the mechanisms behind the results, I also use confidential, administrative, geocoded data on the universe of public/district hospitals from the Rwandan Ministry of Health (MOH).[38] Rwandan Health Management Information System (HMIS) data is a monthly district hospital-level data on hospitalizations between January 2012 to July 2019.[39]

The data collects information on the number of individuals (both women and men) who show symptoms of physical and sexual violence for different age groups (10-18, older than 18). Unfortunately, the data does not provide information on the patient's marital status. To create a measure of domestic violence, I focus on the gender-based violence reports of individuals who are older than 18 years old. This is because 70% of women over 18 are married in Rwanda.

I constructed a binary variable coded as 1 if a hospital had hospitalizations due to physical or sexual violence for women older than 18 in a month and 0 otherwise. This creates a non-self-reported measure of domestic violence. Table A6 provides descriptive statistics for the hospitals. 93% of the hospitals have hosted at least a domestic violence patient (GBV patient older than 18)

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[36]Communes were replaced by districts and municipalities in 2002.

[37]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.

[38]There are, in total, 42 district hospitals in Rwanda.

[39]Since I have only post law hospitalizations, unfortunately, I am unable to do a pre and post law DID using the hospital records.

in a given month.

The data also collects information on the number of individuals (both women and men) who show symptoms of PTSD (aged 20-39, older than 40). Unfortunately, the data does not provide information on the patient's marital status. 86% (68%) of the women (husbands) in my main sample (from DHS) is aged between 20-39. Thus, PTSD hospitalizations for women and men aged 20-39 better capture the mental health of the individuals in my main sample compared to the hospitalizations for women and men aged 40 years and above. I have the mental health records starting from 2016. Thus, I will focus on the years between 2016-2019 when I am using the monthly hospital records in my analysis.

I constructed a binary variable coded as 1 if a hospital had hospitalizations due to PTSD for women/men aged 20-39/older than 40 and 0 otherwise. 20% (40%) of the hospitals have hosted at least a 20-39 years old (40 years old or older) female PTSD patient in a given month. The rates are lower for men.

5 Empirical Specification

In order to investigate the impact of the law on divorce and domestic violence across different genocide-intensities, I estimate the specification below:

$$Y_{ict} = \beta_0 + \beta_1 Post_t + \beta_2 GenocideIntensity_c \times Post_t + \mathbf{X}'_{ict}\phi + \mathbf{X}'_{c1991} \times Post_t \lambda + \alpha_c + \eta_k + \omega_m + + \gamma_{ct} + \varepsilon_{ict}.$$
(19)

The dependent variable Y_{ict} is the outcome of interest of woman i, in commune c and at year t. $Post_t$ variable is a dummy for the post-reform data cycles. $GenocideIntensity_c$ is the genocide intensity index which is the proxy for the male scarcity in the marriage market at the time of the marriage. I have two sets of control variables. The first is the set of individual controls, $\mathbf{X}_{ict}$, which includes information on women's age at genocide, religion, residence (rural/urban), household wealth and whether the husband is living in the household.[40] The second is pre-genocide commune level characteristics, $\mathbf{X}'_{c1991}$, which are the 1991 male literacy rate, self-employment rate, rate of Tutsis and Hutus and population density. I interact these with the *Post* variable and include them in the specification to make sure that pre-genocide commune level characteristics are not driving the divorce and domestic violence results. α_c is the commune fixed effects and controls for time-invariant local observable and unobservable characteristics, such as social norms related to divorce, domestic violence, gender roles and propensity for violence. Since the genocide intensity

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[40]I did not include more control variables to avoid "bad control" problem given that genocide can affect many aspects of women's lives.

of a commune, *GenocideIntensity$_c$*, does not change over time in my data, it is captured by the commune fixed effect and is not included in the specification. η_k is the cohort fixed effects and controls for factors that vary across cohorts. As an example, compared to younger cohorts, older cohorts grew up when Rwanda did not have pro-women laws, which may affect their propensity to divorce and acceptance of domestic violence. ω_m is the year of marriage fixed effects. It controls for time-variant shocks to the marriage market after the genocide but before the law.

γ_{ct} is the district-by-year fixed effects. This controls factors that change over time and across districts and may determine both being treated by the law and divorce and domestic violence outcomes. Law enforcement, especially regarding women's issues constitute an example. As of 2008, Rwanda is the first country in the world with a female majority in parliament. The share of women in local government varies across districts and increases over time. Districts (akarere) are the geographical units with the highest tier in local government. District councils are the policy-making bodies at the district level and determine the development of the district. As a possible concern, after an increase in female political representation in a district council, the local government may invest in law enforcement regarding pro-women laws which affect being treated by the law. District-by-year fixed effects control for such a scenario.

The main dependent variables for this specification are currently being divorced and experiencing domestic violence in the past 12 months. All outcomes are indicator variables. For example, currently being divorced variable takes the value one if the respondent's current marital status is being divorced and 0 otherwise. Domestic violence in the past 12 months variable takes the value one if a partnered woman experienced physical or sexual domestic violence in the past 12 months and 0 otherwise. If the woman is currently divorced, she answers the question for the partner she has been divorced.

The coefficient of interest is β_2, which identifies the impact of the law in formerly genocide intense areas on the outcome variables relative to the areas that are formerly not genocide-intense. I cluster standard errors at the commune level (Bertrand et al., 2004).

6 Results

6.1 Divorce and Self-Reported Domestic Violence

Table 1 presents the results of estimating the impact of the law on women's probability of currently being divorced and self-reporting domestic violence in the past 12 months across different genocide intensities using different samples. Results suggest that among the women who married after the genocide but before the law, women who reside in the formerly genocide-intense areas are more likely to get divorced and less likely to experience domestic violence in the past 12 months after

the law.

In Table 1, the first column represents estimating equation 19 when the sample consists of women who are either currently married or divorced at the time of the survey where they married only once after the genocide but before the law. Columns 2 and 3 represent estimating equation 19 when the sample is women in the DHS violence sample who are either currently married or divorced at the time of the survey where they married only once after the genocide but before the law. As it is mentioned in the data section, in DHS, only one randomly selected woman per household is questioned for the module. Column 4 includes women who started to live with their partners (not legally married) after the genocide but before the law in the sample described in Column 2 and 3. I included women who are not legally married into the sample in Column 4 to analyze whether the criminalization aspect of the law has an effect on women. Although cohabitating women cannot benefit from the divorce aspect of the law, they benefit from its criminalization aspect.

For all samples, the coefficient on $GenocideIntensity_c \times Post_t$, β_2, is statistically significant and positive when the dependent variable is being currently divorced. β_2, is statistically significant and negative when the dependent variable is self-reporting domestic violence in the past 12 months. Among ever married women who married after the genocide but before the law, one standard deviation increase in the genocide intensity in a commune leads to 5 percentage points (p-value=0.0003) increase in the divorce rate after the law. The estimated impact represents an increase of 71% with respect to the sample mean (0.07). Among married women, one standard deviation increase in the genocide intensity in a commune leads to 11 percentage points (p-value=0.02) decrease in the domestic violence rate after the law. The estimated impact represents a decrease of 33% with respect to the sample mean (0.33). Among the ever married women (married and currently divorced), one standard deviation increase in the genocide intensity in a commune leads to 12 percentage points (p-value=0.008) decrease in the domestic violence rate after the law. The estimated impact represents a decrease of 38% with respect to the sample mean (0.32). Among the ever married and cohabitating women, one standard deviation increase in the genocide intensity in a commune leads to 8 percentage points (p-value=0.02) decrease in the probability of experiencing domestic violence (in the past 12 months) after the law. The estimated impact represents a decrease of 26% with respect to the sample mean (0.31).

6.2 Testing the Predictions: Divorce and Deterrence Effects

According to the **Prediction 1a: Divorce Effect**, the higher the male scarcity at the time of the marriage, the higher the increase in the divorce rates after the law. Results on divorce rates are in line with this prediction. According to the **Prediction 1b: Divorce Effect**, the higher the male scarcity at the time of the marriage, the higher the decrease in domestic violence rates (among

married women) after the law. This is due to the higher increase in the divorce rates. The result in Column 2 shows that there is a decline in the domestic violence rates (in the past 12 months) among married women. This supports Prediction 1b and suggests that the divorce effect of the law exists in this context.

Does the deterrence effect exists? According to the **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. To investigate the deterrent effect, I estimate equation 19 using the ever married sample (rather than married). Ever married sample includes women who are currently divorced and they reported whether they experienced domestic violence in the past 12 months by their most recent partner. Since I restricted the sample to women who ever had only one union, the most recent partner is the partner the woman is divorced from. Thus, plausibly, the woman is reporting her domestic violence experience when she is married, before the divorce. Result in Column 3 shows that there is a decline in the domestic violence rates even among ever married women. This suggests that the deterrent effect of the law exists beyond the divorce effect.

One may argue that since data cycles 2014 and 2019 are way later than the 2008 law, divorced women may be reporting that they did not experience domestic violence from their ex-partners, not due to the law deterring the husband from violence, but because they are already divorced and not seeing their ex-partners. To tackle this issue, I restricted the post law samples to the 2010 sample only. This way, when the woman reports experiencing domestic violence in the past 12 months, only 12 months have passed since the law was in effect (September 2009). Thus, the woman was married to her partner for a sizeable portion of those 12 months, even though she divorced him at some point. Her domestic violence experience was captured when she was married, before the divorce. Although the sample size shrinks in this exercise, the sign of the effect and effect size are similar to the main result. The coefficient also remains statistically significant.

Additionally, Column 4 suggests that divorce is an important aspect of the law. As I mentioned in the former subsection, in order to analyze whether the criminalization aspect of the law has an effect, I included women who are not legally married into the ever married sample. This is because although cohabitating women cannot benefit from the divorce aspect of the law, they benefit from its criminalization aspect. According to the result in Column 4 (estimating equation 19 with ever married and cohabitating couples) , the effect size shrinks and the coefficient becomes statistically less significant (although the sample size gets bigger). This suggests that divorce is a crucial aspect of the legal design.

7 Mechanisms

In this section, I empirically disentangle the potential mechanisms behind why divorce and domestic violence rates respond differently to the introduction of the national domestic violence legislation across different genocide intensities. As in line with the model, I provide evidence for male scarcity in the post-genocide marriage market as a mechanism. I also provide evidence that economic shocks during the marriage and exposure to genocide (either via observing violent behavior or PTSD) are not the dominant mechanisms behind the results.

Exposure to Genocide or Male Scarcity in the Post-Genocide Marriage Market? One can argue that "exposure to genocide" is a potential mechanism. It is possible that the divorce rates increased more in the genocide-intense areas after the law since former exposure to genocide makes men more violent in their marriages than those in the non-intense areas (violence begets violence). To test this, I run my empirical specification on an alternative sample: women who married right before the genocide. Those 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. 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 2. The coefficient of the interaction term is statistically insignificant and close to zero.[41] This provides support that the main results are not driven by exposure to genocide but changes in the post-genocide marriage market.[42]

In the model, I argue that male scarcity at the time of the marriage is the mechanism behind why couples respond differently to the introduction of the law. To test this, I 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 with better radio reception experienced more killings during the genocide.[43] Rogall and Zarate-Barrera (2020) highlights that RTLM-induced killings were

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[41]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. According to data, older women are less likely to divorce in Rwanda. It would not be possible to disentangle whether those women are not likely to get divorced after the law because they are married to non-violent types or due to their age.

[42]See HernandezdeBenito (2023) for the impacts of exposure to violent crime on intra-household resource allocation and bargaining power where the violent crime do not alter the sex-ratio of the marriage market.

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

mostly women and children and documents that RTLM-induced violence led to a surplus of men.[44] Based on this evidence, if male scarcity is the potential channel behind why divorce and domestic violence rates respond differently to the introduction of the national domestic violence legislation across different genocide intensities, first, the divorce rates should not increase more after the law in the areas with better RTLM reception in 1994 as in the case of main results. I ran 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 3. As expected, the interaction term is not positive and statistically insignificant for the divorce outcome. This provides supporting evidence in favor of the male scarcity channel.[45] Although I do not report here due to the small sample size, the domestic violence estimates are also no longer negative and statistically significant when I run my main empirical specification with the treatment variable being RTLM reception in 1994.

The model highlights that the higher the male scarcity in the marriage market, the less selective women are (Observation 1). The model makes the observation based on a reservation signal where higher the signal, the more likely the man is a violent type. Is there empirical evidence supporting that women are less selective in a male scarce marriage market? I test this using women whose age of first marriage were 20-26 (women in the marriage market at the time of the marriage in Rwanda). I use a difference-in-differences (DID) strategy to examine the effect of marrying after the genocide compared to before on marital matching across genocide intense and not intense regions.[46] Table 4 reports the results. I find that it is 25% more likely for a woman who married after the genocide with completed primary education to marry a man with less than primary education in the genocide-intense areas relative to women who married before the genocide.[47]

Exposure to Genocide: PTSD. One can also argue that "exposure to genocide" can affect individuals not just through observing and learning violent behavior but also by affecting their mental health outcomes. Research suggests that the psychological effects of the Rwanda Genocide include PTSD (Rieder and Elbert, 2013). Exposure to violence in genocide-intense areas may lead to PTSD for either or each spouse, which in turn leads to escalation of violence in the household. This may be the underlying channel behind the higher increase in the divorce rates in the genocide

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

[45]This mechanism 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.

[46]The sample approximates the ages when women are in the marriage market. Median age of first marriage is 20, 26 is the 95% for the age of first marriage among the women who married before the law.)

[47]Additionally, Figure A2 visualizes the education distribution of the married and recently divorced couples across genocide-intense and not-intense areas using the data cycles right before and after the law among the couples who married post-genocide only. A higher stock of uneducated ever married men in the genocide-intense areas is also in line with my model. See Abramitzky et al. (2011) for male scarcity and assortative matching in post-war France.

intense areas after the law, rather than the male scarcity in the marriage market. Using the universe of monthly administrative records on domestic violence and PTSD, I test whether PTSD is the dominant mechanism behind the results.

Every year, between April 7 and July 4, a national mourning to commemorate victims of the genocide occurs in Rwanda. Multiple ceremonies take place by government officials during the 100 days, which overlaps with the actual months of the genocide. Recent medical research suggests that the period triggers PTSD symptoms, including excessive anxiety and hypervigilance (Kayiteshonga et al., 2022). Using the specification below, I test whether the onset of the national mourning period leads to a (higher) increase in hospitalizations for domestic violence and PTSD concurrently in the genocide-intense areas. If that is not the case, then, this will suggest that PTSD is not the dominant mechanism behind the results, at least at the extensive margin (severe domestic violence and PTSD cases).

$$Y_{hdtm} = \beta_0 + \sum_{m=1}^{12} GenocideIntense_{hd} \times \beta_m \mathbb{1}[\tau = m] + \lambda_h + \alpha_d + \sigma_m + \gamma_{pt} + (\mathbf{X_d} \times t)\theta + \varepsilon_{hdtm}. \quad (20)$$

The dependent variable, Y_{hdtm}, is the monthly hospitalization outcome either due to domestic violence or PTSD in hospital h, in district d, in year t and at event-time m. $GenocideIntense_{hd}$ is a binary variable coded as 1, if hospital h is within a formerly genocide intense district and zero otherwise. For this specification (for simplicity), I use a binary indicator to measure genocide intensity where the genocide intense district is defined as a district higher than the mean genocide intensity in the sample.

$GenocideIntense_{hd}$ is interacted with event-month dummies, $\mathbb{1}[\tau = m]$, to investigate the dynamic impact of the onset of the national mourning period that lasts for 100 days (April-July) and coincides with the Rwandan Genocide. τ denotes the event-month. $\tau = 4$, April, represents the month the mourning period begins. For $4 \leq m \leq 7$, April-July, $\tau = m$ represents the mourning months. For $m < 4$, $\tau = m$ represents the months before the mourning period. The omitted category is $\tau = -1$, March, which means that the dynamic impact of the mourning period is estimated with respect to one month prior to the onset of the national mourning. λ_h is the hospital fixed effects which control for any hospital-specific characteristic that is fixed over time including its location. α_d is the district fixed effects. The district is chosen for the level of geographical unit since the unit of observation is a district hospital. σ_m is the month fixed effects and controls for month-specific trends. γ_{dt} is the province-by-year fixed effects. I allow year fixed effects to differ by province, one unit higher than the district.[48] This way, I am comparing the hospitals who are

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[48]Unfortunately, there is not enough observations/hospitals to have district-by-year fixed effects. Adding district-by-year fixed effects mean comparing the hospitals in the catchment area of a mill to those not within the same district. Most of the districts have only one district hospital.

in formerly genocide-intense areas to the ones that are not, within the same province. Hospitals who are not in genocide-intense areas within the same province constitute a more accurate control group. $\mathbf{X_d}$ is the vector of district-level baseline geographical variables that interacted with linear time trends. I cluster standard errors at the district level.

The main dependent variables for this specification are whether the hospital had hospitalizations due to gender-based violence for women older than 18 and hospitalizations due to mental health (PTSD) for women and men aged 20-39 years old and older than 40 years old. Women's gender-based violence hospitalizations older than 18 capture domestic violence. This is because, according to DHS and census data, the majority of the individuals who are older than 18 are married in Rwanda. 86% (68%) of the women (husbands) in my main sample (from DHS) is aged between 20-39. Thus, PTSD hospitalizations for women and men aged 20-39 better capture the mental health of the individuals in my main sample compared to the hospitalizations for women and men aged 40 years and above.[49]

Figures 4 plots the coefficient of the interaction terms for every month in a calendar year (β_m's). First, I find that it is *not* more likely for a hospital in a formerly genocide-intense area to have a domestic violence patient during the national mourning period compared to one month before the onset of the mourning, March. Second, I find that it is again *not* more likely for a hospital in a formerly genocide-intense area to have a female or male PTSD patient aged between 20-39 years old during the national mourning period compared to one month before the onset of the mourning, March.

One may argue that it is possible for individuals to not go to the hospital for PTSD for a particular reason and that is why I am finding statistically insignificant results. Yet, I find that it is likely for a hospital in a formerly genocide-intense area to have a female PTSD patient aged older than 40 during the beginning of the national mourning period compared to one month before the onset of the mourning, March. This sample plausibly represents genocide widows based on statistics. There is no statistically significant change in PTSD hospitalizations during the mourning period for men aged older than 40. I find that it is likely for a hospital in a formerly genocide-intense area to have a male PTSD patient aged older than 40 at the end of (also after) the national mourning period compared to one month before the onset of the mourning, March.[50]

No statistically significant changes in the domestic violence hospitalizations combined with statistically significant changes in PTSD hospitalizations only for women older than 40, not younger (aged 20-39), and no statistically significant changes in PTSD hospitalizations for men aged 20-39

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[49]All outcomes are indicator variables. For example, monthly hospitalizations due to gender-based violence for women older than 18 take the value of 1 if a hospital had a hospitalization due to gender-based violence for a female victim older than 18 in a given month and 0 otherwise. Dummy variables rather than the logarithm of hospitalizations are used since the number of hospitalizations for gender-based violence is low in a month (close to 1).

[50]To capture genocide-driven PTSD, I focus on PTSD patients who went to the hospital for PTSD before.

suggest that PTSD is not the dominant mechanism behind the main results.

Economic Shocks During the Marriage: Expansion of the Coffee Mills in Rwanda. Sanin (2023) studies the government-induced rapid expansion of the coffee mills in Rwanda in the 2000s, which increased the value of coffee farmer couples' output and provided wage employment for women. She finds that a mill opening enabled the wife's transition to paid employment, increased the husband's earnings, and decreased domestic violence within its catchment area. Can the effects after the law be driven by the rapid expansion of the coffee mills rather than male scarcity in the post-genocide marriage market? After the law is in place, women's access to wage employment can also increase the divorce rates and decrease the domestic violence rates since it improves women's outside option (utility of being divorced).

As mentioned in the data section, all of the previous results are based on samples where the couples reside outside of a mill's catchment area to ensure that mill exposure is not driving the results. To test whether the rapid expansion of the coffee mills can still be a driver of the results, I do a subsample analysis. I run equation 19 only among women who live in the catchment area of a mill both before and after the law where the mill they are exposed to was opened before the law. This way, I am plausibly keeping women's economic opportunities constant before and after the law. Table 5 reports the results. After the law, among the women who married after the genocide but before the law and resided within the catchment area of a mill, an increase in the genocide intensity index still led to an increase in the divorce rates after the law. This suggests that keeping women's economic opportunities fixed, male scarcity in the marriage market at the time of the marriage matters for the divorce rates after the law. The changes in women's economic opportunities do not drive the main results.

Mechanisms and Domestic Violence. The results suggest that the increased likelihood of being married to a violent husband due to male scarcity in the post-genocide marriage market, not exposure to genocide, explains the differential impact of the law across genocide-intense and not-intense regions in Rwanda. My theoretical and empirical analysis are in line with Becker et al. (1977), which highlights that "*When one accepts an offer closer to the minimum acceptable offer, she generally accepts a greater "mismatch", a greater deviation between her actual and her "optimal" matching trait. An increase in search costs alone lowers one's minimum acceptable offer and widens the boundaries of her acceptable set of traits. Consequently, an increase in search costs can be said to increase the frequency of dissolutions because it increases the incidence of mismatches.*". In this paper, I show how civil conflict, matching in the marriage market, and domestic violence interact and how a national law can protect women from marital mismatch-induced domestic violence. The results also suggest that changes in the (marriage) markets before the mar-

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riage can affect domestic violence beyond the changes in the (labor) markets during the marriage, where the former link is understudied in the literature.

8   De Jure versus De Facto: Why did the law work in Rwanda?

In developing countries, a law, especially related to gender and violence against women, can stay on paper rather than being implemented in practice. Legal studies discuss this notion as the duality of de jure and de facto. As an example, although dowry is outlawed in India, the practice continues to be prevalent and has led to violence against women for decades (Bloch and Rao, 2002).

Social norms around the law matter significantly as to why the law persistently goes unimplemented or unenforced (Acemoglu and Jackson, 2017). Based on the results, the domestic violence legislation in Rwanda protected women who are more likely to be in violent marriages, in a context where domestic violence is reported to be acceptable at high rates both by women and men. Why did the law work in Rwanda? I use two subsamples that provide suggestive evidence on the factors that strengthened the law's implementation in the country.

Using the universe of geocoded locations of district hospitals and 2011 election results at the local level, I find that women who reside close to the district hospitals (which provide health and legal services related to gender-based violence in Rwanda), as well as women who reside in areas with a high share of female local-level politicians, are more likely to get divorced in genocide intense areas after the law. Tables 6 and 7 report the results respectively. I estimate the results running the main specification, equation 19, using different subsamples related to proximity to a hospital and residing in a locality with different shares of female local-level politicians.

The district hospitals are not built by the local-level politicians (hospitals were already built by the time the politicians are elected in 2011). Rogall and Zarate-Barrera (2020) finds that not only more women are selected as politicians in the genocide intense areas, but those are also likely to be members of the National Women's Council (a government organ responsible for advocacy, capacity building, and social mobilization regarding maintaining gender equality and supported by the Ministry of Gender and Family Promotion). These two points suggest the following. When women are more likely to have continuous access to information on how they can benefit from the law and have access to related public services, either via hospitals or female local-level politicians, the law gets practiced and women are more likely to benefit from the law.[51]

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[51]See Iyer et al. (2012), Anukriti et al. (2022) and Erten and Stern (2024) for the relationship between female political participation in various forms and violence against women and Sviatschi and Trako (2021) for the effects of improved access to public services related to gender based violence.

9   Robustness Checks

9.1   Placebo Difference-in-Differences

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 (support for parallel trends assumption). I report the results in Table 8.

Unfortunately, DHS 2000 does not include a domestic violence module. Thus, I cannot employ a placebo regression for domestic violence. However, I plot trends for education for women given that it affects their probability of experiencing domestic violence (Erten and Keskin 2018). Figure A3 shows the share of women who completed elementary school across different genocide intensities. 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. Thus, the figure provides support for parallel trends in a women's characteristic that is relevant to the likelihood of experiencing domestic violence.

As a final note, there is no variation in treatment timing and equation 19 is not a twoway fixed effects difference-in-differences (TWFEDD). Thus, treatment effect heterogeneity is not a concern for the validity of the estimates and I do not perform robustness checks related to TWFEDD.

9.2   Measuring Genocide Intensity

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.

LaMattina (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 LaMattina (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.[52] Rogall and Zarate-Barrera (2020) argues that this may be due to the following

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

reason. The genocide measure used in LaMattina (2017), the genocide intensity index, aggregates armed-group violence and local/civilian violence. Rogall and Zarate-Barrera (2020) argues that LaMattina (2017) may be picking up the impact of a weighted average of the two. Since this paper also uses the genocide intensity index LaMattina (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 principal component analysis (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 A1 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 it. This way, the index captures armed genocidal violence only -rather than armed and civilian violence combined- which is documented to result in male scarcity. Results are reported in Table 9 and in line with my main results.

10   Conclusion

This paper provides evidence that the introduction of a national domestic violence legislation, which allows women to divorce their husbands unilaterally if their husbands are violent towards them and criminalize all forms of domestic violence, decreases domestic violence in formerly conflict-intense regions. The decline operates via the rise in the dissolution of violent marriages and deterrence of violence within the marriages that remain intact. Moreover, the increased likelihood of being matched with a violent husband due to male scarcity in the post-conflict marriage market, not conflict-induced post-traumatic stress disorder (PTSD) or witnessing armed conflict, appears to explain why domestic violence is prevalent in post-conflict regions before the law.

To establish results, I use a natural experiment, the introduction of a national domestic violence legislation in 2008 in post-genocide Rwanda. I do my analysis in three main steps. As a first step, to guide my empirical analysis, I built a simple two-stage model that incorporates the sex ratio in the marriage market, the couple's decisions within the marriage, and the effect of the law. The model predicts that the law affects couples differently across genocide intensities via two effects. First, under the hypothesis that men cannot control their impulses to be violent, the higher the male scarcity at the time of the marriage, the higher the increase (decrease) in the divorce rates (domestic violence rates) after the law (divorce effect). Here, the decrease in domestic violence rates is due to the higher increase in the divorce rates only. Second, under the hypothesis that men

choose to be violent or not, the higher the male scarcity at the time of the marriage, the higher the decrease in the domestic violence rates after the law independent of a change in the divorce rates (deterrence effect).

In the second step, I provide causal evidence that among ever married women who married after the genocide, an increase in the genocide intensity in a commune leads to an increase in the divorce rates and a decrease in the domestic violence rates after the law. I provide evidence that the decline in the domestic violence rates is based on both the dissolution of violent marriages as well as the deterrent effect of the law.

In the third step, I provide empirical evidence that the male scarcity in the post-conflict marriage market explains why domestic violence was more prevalent in genocide-intense regions before the law's adoption and thus why regions with different genocide intensities respond differently to the law. To provide such evidence, I use samples that did not experience male scarcity in the marriage market: i) women who married right before the genocide, and ii) regions with strong hate-radio reception during the genocide based on Rwanda's mountainous topography and thus experienced civilian violence (targeted women, children, the elderly) rather than armed violence (targeted adult men). Using novel data on the universe of monthly hospitalizations on domestic violence and PTSD, I also rule out PTSD as a mechanism.

As for policy implications, the results suggest that in post-conflict societies, enacting domestic violence laws, especially with legal designs which allow women to unilaterally divorce their husbands if their husbands are violent towards them, has the potential to alleviate domestic violence. For the Rwandan context, if the law had not been passed, many women would have been trapped in violent marriages for more than a decade.

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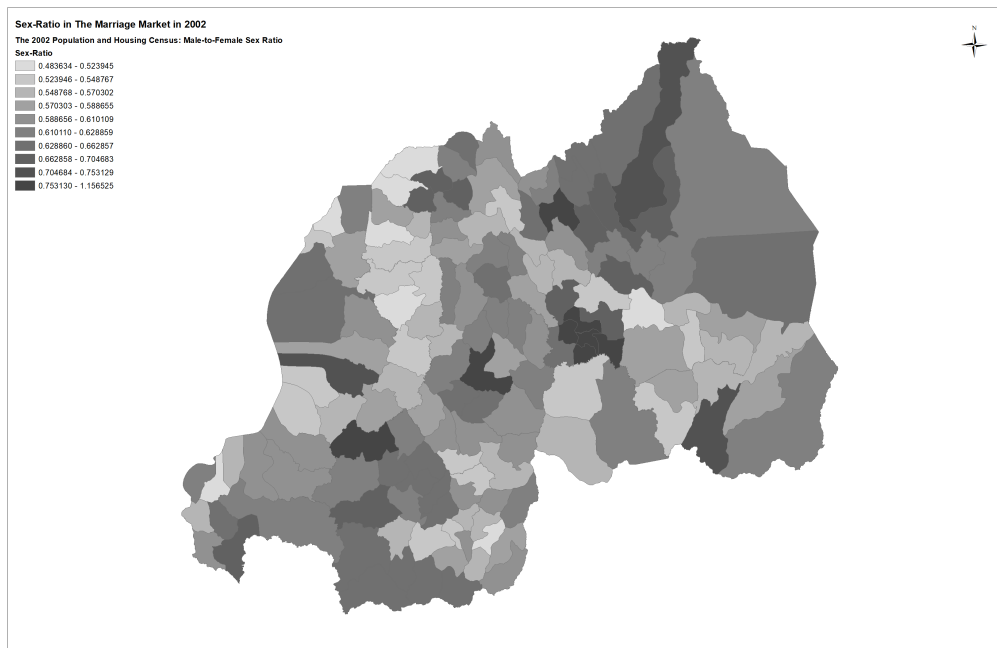Figure 1: Genocide Intensity and Post-Genocide Sex Ratio
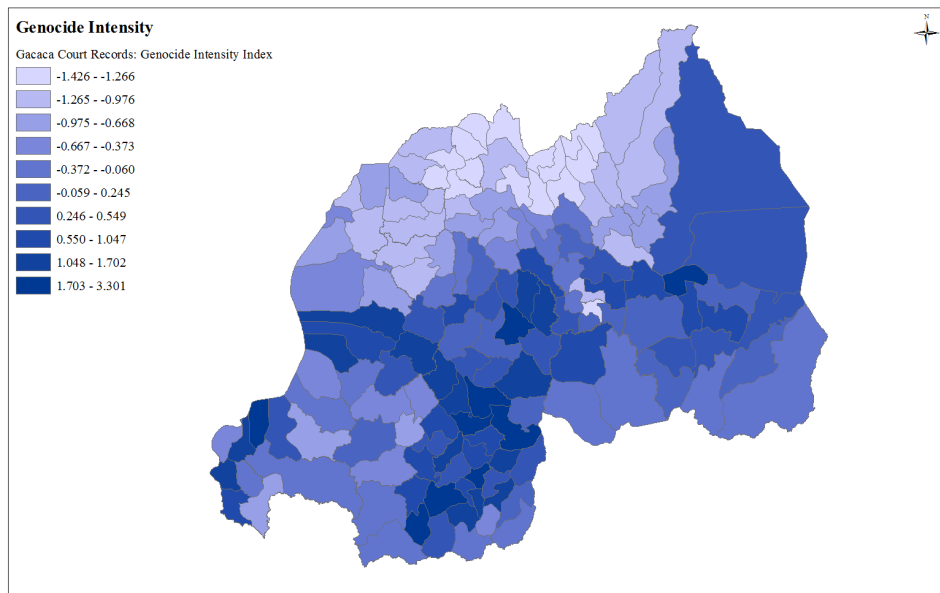
Figure 2: Cohort specific marriage market sex-ratio across different genocide intensities
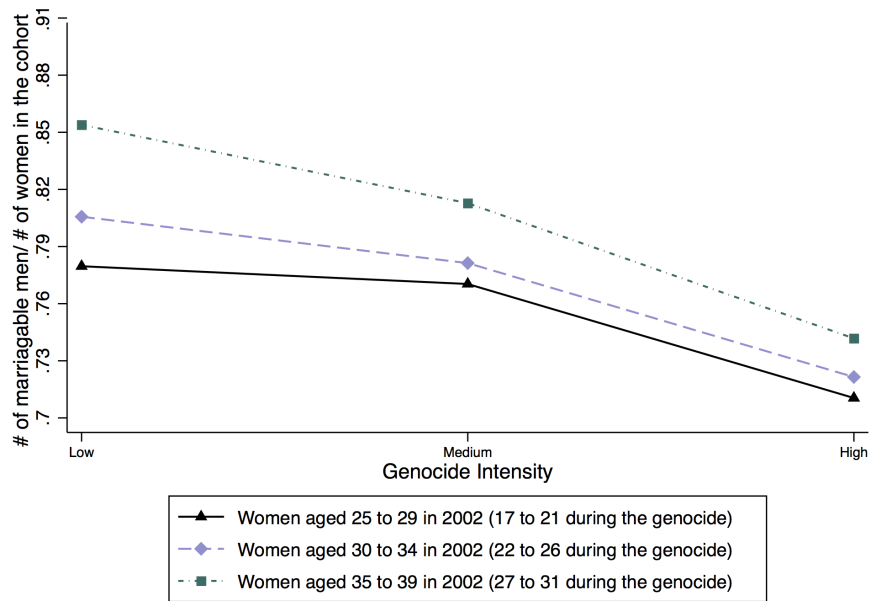
Source: Rwanda Population and Housing Census 2002

Figure 3: Timeline of Events

39
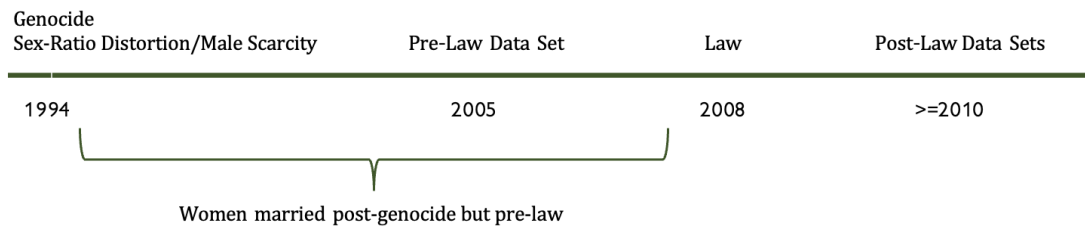
Figure 4: Dynamic Impact of the National Mourning Period on Hospitalizations for Domestic Violence (Women) and Post-Traumatic Stress Disorder (PTSD) among Women and Men
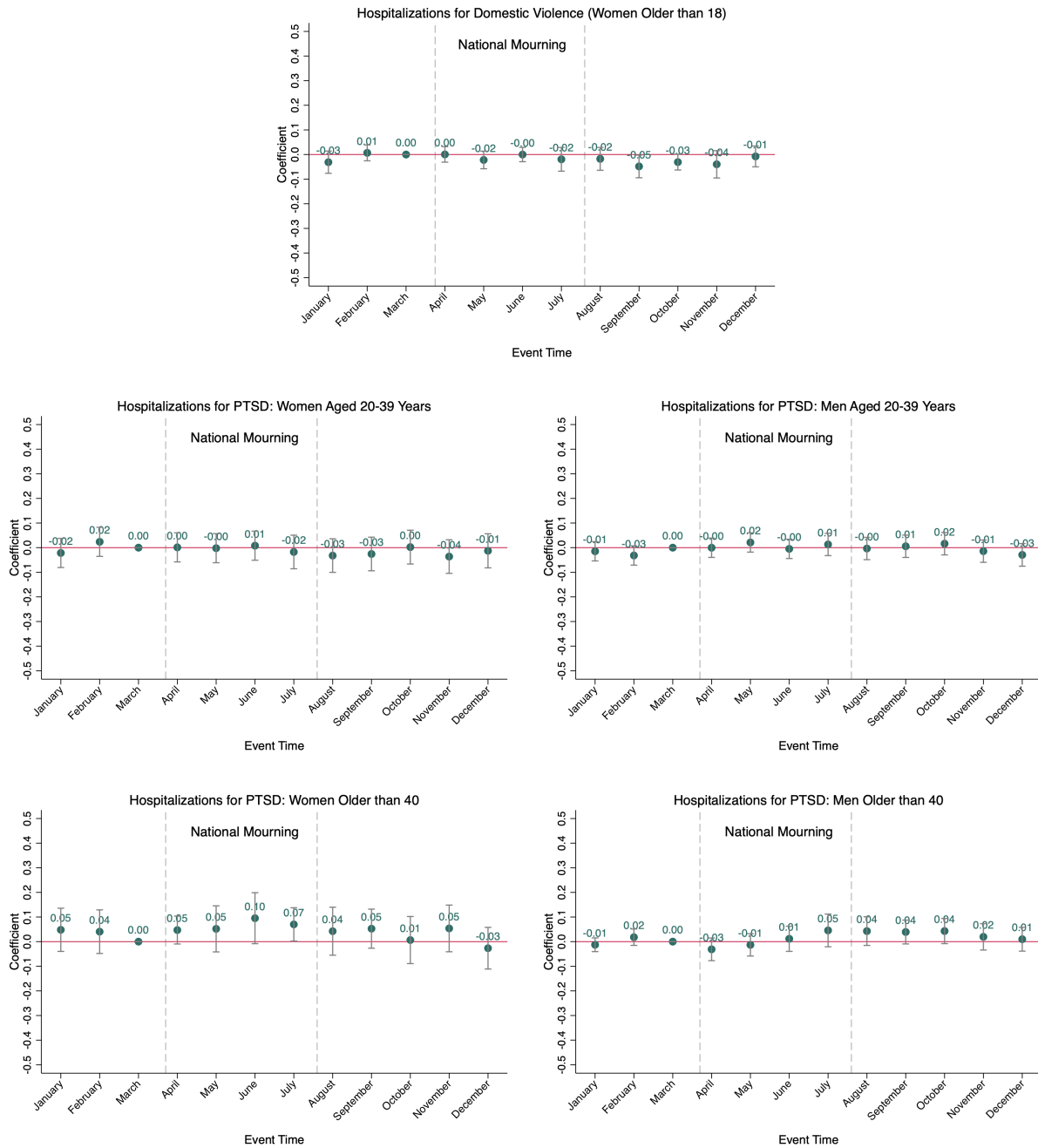
Notes: Robust standard errors clustered at the district level. Estimation include hospital controls, hospital fixed effects, district fixed effects, province-by-year fixed effects, linear time trends interacted with baseline district level characteristics. *** p<.01, ** p<.05, * p<.1.

Table 1: Effect of the Law on Women's Current Marital Status Being Divorced and Self-Reported Domestic Violence in the Past 12 Months

	Currently Divorced (Full Sample)	Experienced Domestic Violence (Violence Sample)		
	(1) Ever Married	(2) Married	(3) Ever Married	(4) Ever Married, Cohabitating
GenocideIntensity x Post	0.05***	-0.11**	-0.12***	-0.08**
	(0.01)	(0.05)	(0.04)	(0.04)
Observations	5903	1891	2016	3014
Dependent variable mean	0.07	0.33	0.32	0.31

Notes: Divorce prediction sample consists of currently married and divorced women who married after the genocide but before the law. Violence prediction sample either consists of currently married women who married after the genocide but before the law (Column 1), currently married women who married after the genocide but before the law (Column 2), currently married and divorced women who married after the genocide but before the law (Column 3) or ever married, and cohabitating women who married after the genocide but before the law (Column 4). 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 2: Effect of the Law on Women's Current Marital Status Being Divorced among Women who Married Right Before the Genocide

	Currently Divorced
	(1) Sample: Married within 5 Years Before the Genocide (1989-1994)
GenocideIntensity x Post	0.01
	(0.03)
Observations	1954
Dependent variable mean	0.06

Notes: The sample consists of 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<.01, ** p<.05, * p<.1

Table 3: Effect of the Law on Women's Current Marital Status Being Divorced using RTLM Reception in 1994)

	Currently Divorced (Full Sample)
	(1) Ever Married
RTLM Reception in 1994 x Post	-0.05
	(0.06)
Observations	4829
Dependent variable mean	0.07

Notes: The divorce prediction sample consists of currently 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<.01, ** p<.05, * p<.1

Table 4: Effect of Being Married after the Genocide but before the Law on Women's Marital Mismatch (Based on Education)

	Being Married to a Man with Incomplete Primary Education as a Woman with Primary Education
	(1) Sample: Women whose Age of First Marriage was 20-26 Years Old
GenocideIntensity x Married Post-Genocide, Pre-Law	0.02**
	(0.01)
Observations	6777
Dependent variable mean	0.08

Notes: The sample consists of married and divorced women who married before the law and whose age of first marriage are between 20-26 years old. Women who married more than once are excluded. Robust standard errors are reported in parenthesis. *** p<.01, ** p<.05, * p<.1

Table 5: Effect of the Law on Women's Current Marital Status Being Divorced inside the Catchment Area of Mills

	(1) Currently Divorced
GenocideIntensity x Post	0.03**
	(0.01)
Observations	2442
Dependent variable mean	0.06

Notes: The divorce prediction sample consists of currently married and divorced women who married after the genocide but before the law in the catchment area of a mill. Women who married more than once are excluded. Robust standard errors are reported in parenthesis. *** p<.01, ** p<.05, * p<.1

Table 6: Heterogeneous Impact of the Law with respect to Different Distance to Hospital Measures

	Currently Divorced wrt. Different Distance to Hospital Measures		
	(1) 5 km Buffer around Hospital	(2) 5-10 km Donut around Hospital	(3) 10-15 km Donut around Hospital
GenocideIntensity x Post	0.08***	0.05**	0.05**
	(0.03)	(0.02)	(0.02)
Observations	2320	3015	2325
Dependent variable mean	0.09	0.05	0.05

Notes: In each distance measure, the sample consists of currently married and divorced women who married after the genocide but before the law. In column 1, the aforementioned sample is restricted to women who reside within the 5 km radius buffer around a district hospital. In column 2, the sample is restricted to women who reside within the donut area between 5 and 10 km from the district hospital. In column 3, the sample is restricted to women who reside within the donut area between 10 and 15 km from the district hospital. Women who married more than once are excluded. Robust standard errors are reported in parenthesis. *** p<.01, ** p<.05, * p<.1

Table 7: Heterogeneous Impact of the Law with respect to Different Shares of Local-Level Women Politicians

	Currently Divorced wrt. Different Shares of Local-Level Women Politicians	
	(1) <50%	(2) ≥50%
GenocideIntensity x Post	0.03***	0.08***
	(0.01)	(0.03)
Observations	5913	2698
Dependent variable mean	0.06	0.06

Notes: In each distance measure, the sample consists of currently married and divorced women who married after the genocide but before the law. In column 1, the aforementioned sample is restricted to women who reside within the 5 km radius buffer around a district hospital. In column 2, the sample is restricted to women who reside within the donut area between 5 and 10 km from the district hospital. In column 3, the sample is restricted to women who reside within the donut area between 10 and 15 km from the district hospital. Women who married more than once are excluded. Robust standard errors are reported in parenthesis. *** $p<.01$, ** $p<.05$, * $p<.1$

Table 8: Placebo Difference in Differences using DHS 2000 and 2005

	(1) Currently Divorced
GenocideIntensity x Post	0.01
	(0.00)
Observations	2162
Dependent variable mean	0.02

Notes: 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. *** $p<0.01$, ** $p<0.05$, * $p<0.1$

Table 9: Effect of the Law on Women's Current Marital Status Being Divorced and Self-Reported Domestic Violence in the Past 12 Months using a Genocide Intensity Index Based on Armed Violence Only

	Currently Divorced (Full Sample)	Experienced Domestic Violence (Violence Sample)		
	(1) Ever Married	(2) Married	(3) Ever Married	(4) Ever Married, Cohabiting
GenocideIntensity x Post	0.04***	-0.10*	-0.11**	-0.08**
	(0.01)	(0.05)	(0.04)	(0.04)
Observations	5903	1891	2016	3014
Dependent variable mean	0.07	0.33	0.32	0.31

Notes: Divorce prediction sample consists of currently married and divorced women who married after the genocide but before the law. Violence prediction sample either consists of currently married women who married after the genocide but before the law (Column 1), currently married and divorced women who married after the genocide but before the law (Column 2) or currently married, and cohabiting women who married after the genocide but before the law (Column 3). In all samples, women who married more than once are excluded. Robust standard errors are reported in parenthesis. Only armed violence is used in the genocide intensity index. *** p<.01, ** p<.05, * p<.1

Online Appendix

for "Civil Conflict and Domestic Violence"

by Deniz Sanin

A1   Additional Tables

Table A1: 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

Notes: 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 A2: 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

Notes: 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 A3: 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

Notes: 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 A4: 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

Notes: 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 A5: 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

Notes: 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 A6: Summary Statistics for Hospitals: HMIS

	All		Genocide Not-Intese		Genocide Intense	
	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
Panel A: Main dependent variables						
Has a GBV Patient: Women aged older than 18	0.93	0.25	0.94	0.25	0.93	0.26
Has a PTSD Patient: Women aged 20-39 yrs	0.20	0.40	0.21	0.41	0.20	0.40
Has a PTSD Patient: Men aged 20-39 yrs	0.08	0.27	0.08	0.27	0.08	0.26
Has a PTSD Patient: Women aged 40 and older	0.36	0.48	0.29	0.45	0.44	0.50
Has a PTSD Patient: Men aged 40 and older	0.11	0.32	0.09	0.29	0.14	0.35
Panel B: Breakdown of dependent variables in numbers						
Patients w. physical GBV symptoms: Women aged older than 18	7.06	8.38	7.64	10.19	6.35	5.32
Patients w. sexual GBV symptoms: Women aged older than 18	2.27	2.43	2.39	2.61	2.13	2.17
Panel C: Controls for GBV						
Patient is referred to the hospital by police	0.89	0.31	0.89	0.31	0.90	0.31
Patient is referred to the hospital by community health worker	0.45	0.50	0.49	0.50	0.40	0.49
Patient is referred for care to higher level health facility	0.16	0.37	0.15	0.36	0.17	0.38
Observations	1673		921		752	

Notes: GBV stands for gender based violence. PTSD stands for post traumatic stress disorder. PTSD cases are not new cases in the sense that the patient previously came to the hospital for PTSD before her current visit. Variables in Panel A and C are dummy variables. Panel B reports the monthly hospitalizations for GBV. Variables reported in Panel B are used to construct the "has a GBV patient" dummy variable for a specific age group. "Patient" in Panel C is a gender based violence patient. Sample consists of hospitals. HMIS is a panel data. There are 42 hospitals which are observed for every month for 4 years (2016-2019). Thus, the number of observations is a product of the number of hospitals, 12 and 4. "Genocide intense" represents hospital being in a district where the genocide was intense in the past. Intense is defined as the genocide intensity index of the district is higher than the mean genocide intensity index of the sample.

A2 Additional Figures

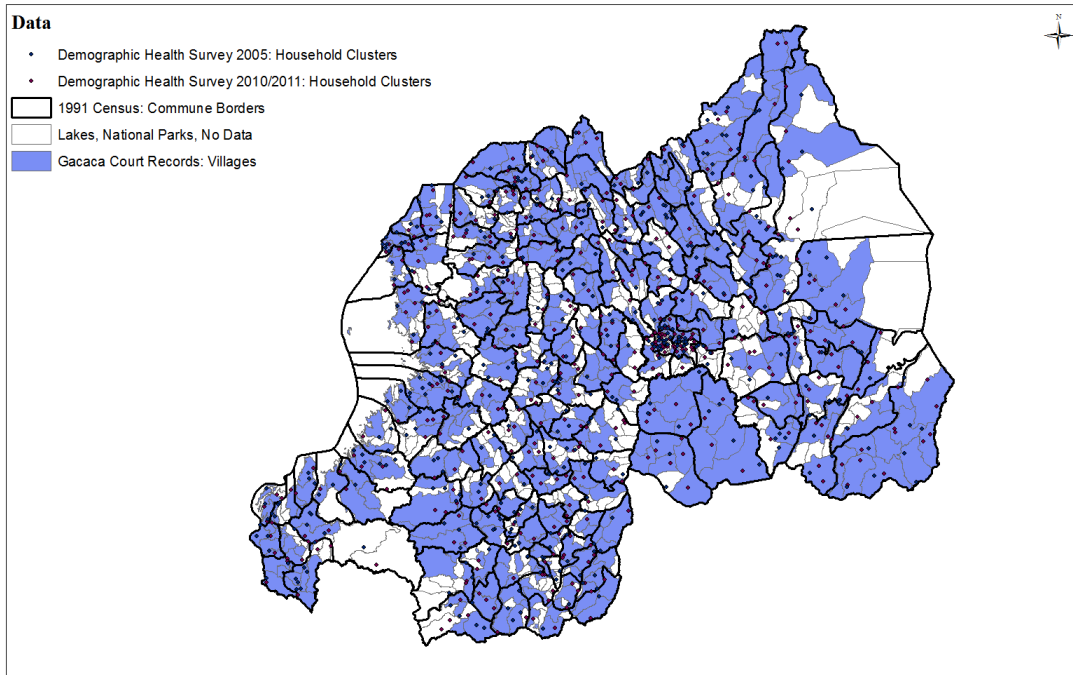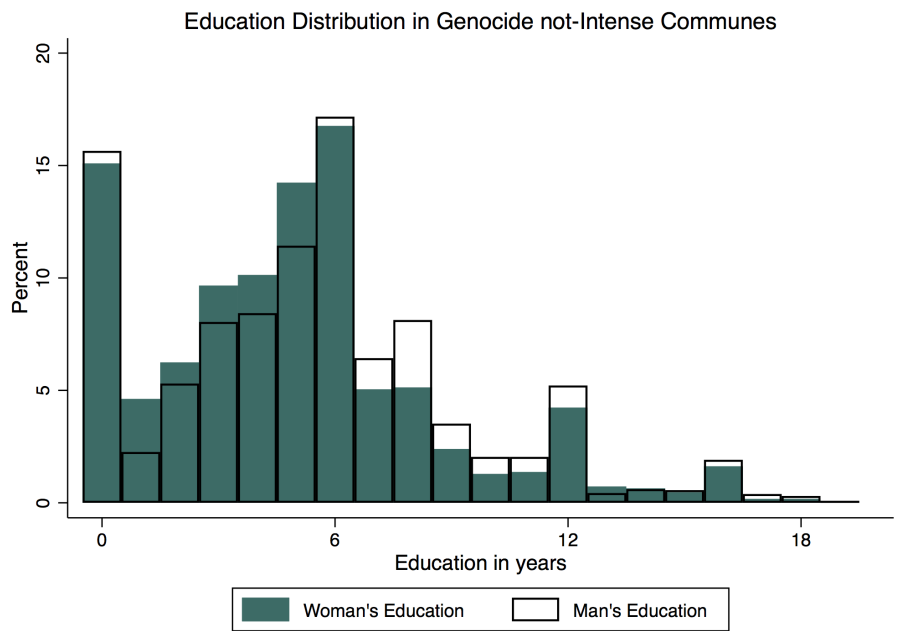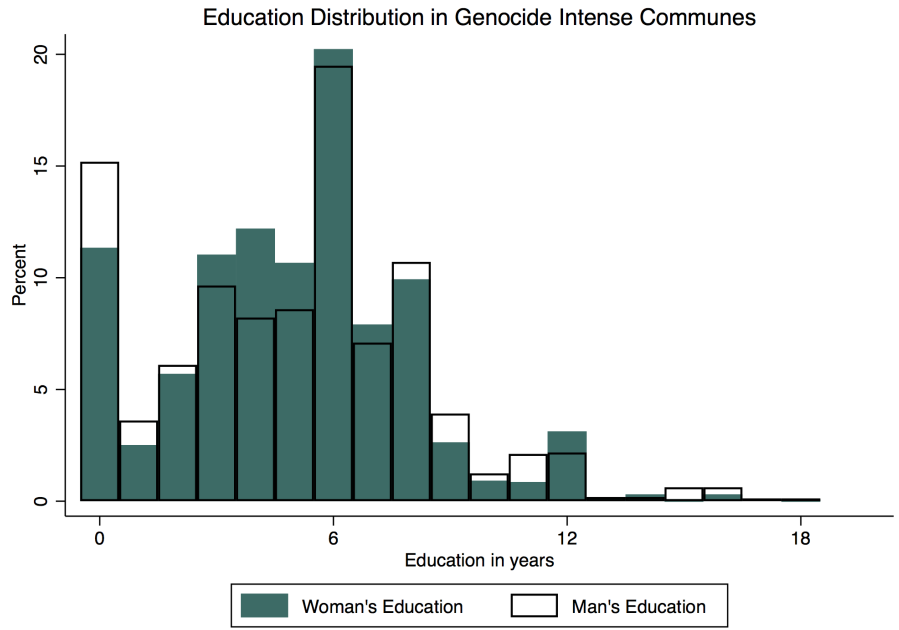## A2.1 Additional Figures for Section 3: Data

Figure A1: Matched Data

Figure A2: Education Distribution of Ever Married Women and Men across Communes
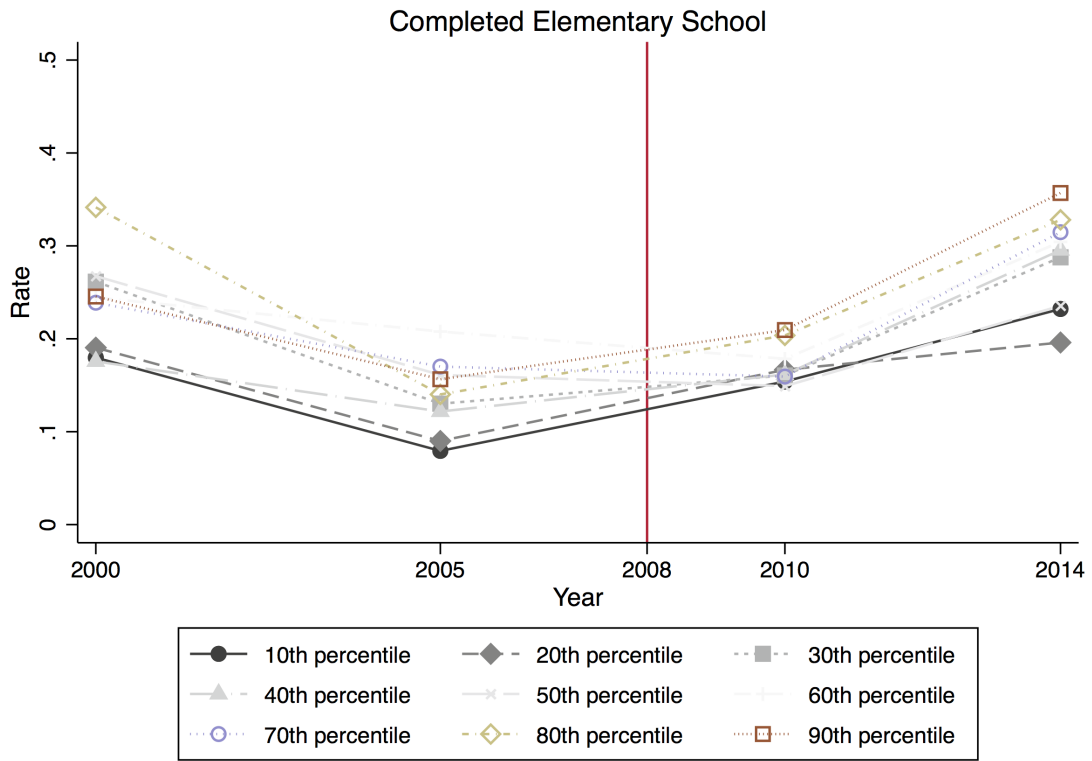
Figure A3: Trends in Women's Education

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.

A2.2   Datasets

A2.2.1   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.[1] 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.

A2.2.2   The Gacaca Court Records

I downloaded the Gacaca court records dataset from Marijke Verpoorten's website[2]. 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.

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[1]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.

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

A2.2.3 Demographic Health Survey (DHS) 2000, 2005, 2010, 2014, 2019

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.

A2.3 Linking Datasets for Difference in Differences

A2.3.1 DiD using DHS

I used 2005 and post 2005 DHS cycles 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 including ethnicity, literacy and population density to my specification. Matching across different datasets and administrative units are done via ArcGIS, mainly spatial join tool.

A3 Proofs

In the theoretical appendix, I provide the proofs of the observation and predictions in Section 3. Observation 1 is 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.

A3.1 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,

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

Rearranging gives,

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

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

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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.[3]

A3.2 Proof of Prediction 1

A3.2.1 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 $\sigma^*(\lambda,s_w)$.

A3.2.2 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.

A3.3 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 $(\xi_w-s_w) < 1$.

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[3]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.

A3.4 Divorce under the Choice Hypothesis

The divorce rate after the law is as follows:

$$DivorceRate = \int_0^{\sigma^*(\lambda,s_w)} \pi_\sigma Q_m(s_m - d^*_{Post})Q_w(s_w + d^*_{Post})dF(\sigma). \tag{1}$$

$Q_m(s_m - d^*_{Post})$ 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

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