Essays in Development and Gender Economics

A Thesis Submitted to Trinity College Dublin, the University of Dublin in Application for the Degree of Doctor of Philosophy

By

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Eugenia Maria Frezza
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Summary

This thesis consists of three essays at the intersection of development and gender economics. Each chapter addresses significant questions that aim to understand the origins of harmful practices and norms that impact girls and women. The thesis mainly employs empirical methods within a causal inference framework.

Chapter 1 studies the high tolerance towards intimate partner violence (IPV) in a setting where women have limited outside options. It tests whether tolerance of violence acts as a coping mechanism for IPV victims and survivors and how this mechanism may differ in short-term and long-term exposure to abuse. First, it theoretically shows that in settings where exiting a marriage is very costly, it becomes optimal for victims and survivors to increase their tolerance towards IPV as a coping mechanism, but only after prolonged exposure to violence. It tests this hypothesis in the context of India, using a Regression-Discontinuity-Design and an Event Study approach to study the causal link between IPV and tolerance thereof in the short and long term. The context of this study is India. High rates of IPV and alcohol-related abuse characterise India, and its acceptance is also widespread. To uncover the causal effect of experiencing violence on attitudes, it exploits the variation in the legal drinking age within and across Indian states. There are three main takeaways from this study. First, the attainment of the legal drinking age by husbands significantly increases their wives' probability of being abused by 4-5 percentage points. Second, a rise in the prevalence of domestic violence in the short term does not lead to a shift in the victims' attitudes toward violence. Instead, the length of exposure to abuse is a crucial factor. Third, evidence indicates that long-term exposure to violence shifts women's attitudes towards violence by up to 0.3 standard deviations. This suggests that over time, victims may normalise and rationalise the violence inflicted on them as a coping mechanism if they do not have an outside option.

Chapter 2 studies whether the internet is a tool for women's empowerment or whether it exacerbates discriminatory gender norms. It answers this question by exploiting the gradual arrival of fast internet between 2008-2012 on African coasts via submarine cables from Europe. In doing so, the causal effect of the

internet on gender norms around attitudes towards intimate partner violence (IPV) is retrieved. Specifically, employing a difference-in-differences strategy, this study compares individuals' attitudes towards violence in locations with high internet penetration and those without, exploiting differences in the timing of the high-speed internet arrival. Results show that fast internet leads to more regressive gender norms, especially among men. It then explores the potential mechanisms behind this result. The most likely channel in this setting operates via the internet changing the balance of power within the household by affecting labour market opportunities more for men than for women.

Chapter 3 assesses whether a law prohibiting and criminalizing child marriage is an effective tool to curtail this practice. We extend our analysis to investigate whether the policy has unintended consequences on other harmful practices. Specifically, we study whether policies increasing the cost of child marriage might generate an unintended increase in female genital cutting (FGC). To this end, it employs survey data and it exploits the staggered adoption of laws banning child marriages across Nigerian states between 2003-2022. The findings show that, while these policies were effective in reducing child marriage, they had unintended consequences and increased the prevalence of female genital cutting. The results suggest that child marriage and FGC are substitute traits in the marriage market.

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Introduction

Gender inequality is pervasive in every society. Compared to men and boys, women and girls face fewer educational opportunities, more obstacles in the labour market, less agency in their reproductive and marriage autonomy, and they are more likely to be subjected to gender-based-violence. These disparities are particularly pronounced in developing countries. Despite the progress which has been made in terms of economic development, these inequalities have not narrowed. This imbalance is often rooted in harmful social norms around gender roles. Through three chapters, the present thesis investigates how harmful norms and behaviours shape, interact, and change. The first two chapters study the factors influencing attitudes towards intimate partner violence. The third chapter investigates the relationship between two harmful practices, child marriage and female genital cutting.

In Chapter 1, *Accepting the Unacceptable: Does intimate partner violence shape the tolerance of violence?*, I study the causal effect of IPV on victims' attitudes, and I explore whether tolerance of violence can act as a coping strategy, particularly under prolonged exposure to abuse and in contexts where divorce is not a viable option. Psychology suggests that victims adjust their attitudes to make sense of their experiences and maintain consistency between their attitudes and behaviours. This coping defence mechanism becomes even more salient when divorce – a potential avenue to escape – is socially stigmatised. Traditionally, violence prevention strategies emphasise the role of shifting attitudes in order to reduce IPV. However, the factors influencing attitudes towards these harmful practices remain unexplained.

The main challenge in addressing this question is that the victims' experience and tolerance of violence may mutually reinforce each other. For instance, in settings where leaving a relationship is too costly, victims might justify their partners' aggressive behaviours as a coping strategy. Conversely, those with a higher tolerance of violence might self-select into abusive relationships. As a result of such simultaneity bias, the relationship between violence and its tolerance is endogenous. Moreover, the relationship between experiencing violence and

its tolerance may vary depending on whether we consider violence an isolated event or a recurrent issue.

Assuming violence can be a recurrent issue, I identify the causal effect of IPV both theoretically and empirically. I use a simple conceptual framework to explain how, in settings where divorce is not an option, the relationship between IPV and attitudes may vary depending on the length of exposure to abuse. The model shows that only after prolonged exposure to violence, and in settings with limited outside options, victims may opt to internalize the violence they experience, in order to decrease the disutility they receive from violence.

I empirically test this hypothesis in the context of India, where 31.7% of women experience IPV, and 46% consider it acceptable in certain situations, according to the National Family and Health Survey. Additionally, divorce rates are notably low, with only 0.24% of the ever married population divorced (Jacob and Chattopadhyay, 2016). To isolate the causal effect of IPV on tolerance towards it, I leverage variations in the minimum legal drinking age (MLDA), employing a regression discontinuity design and an event study approach. The rationale behind leveraging the MLDA variation is that alcohol consumption often results in altered cognitive and physical capacities, potentially escalating the risk of inflicting violence due to reduced self-regulation. By leveraging the variation in the legal drinking age, I exploit a shock on alcohol consumption that is likely to increase the perpetration of violence, which, in turn, may affect the tolerance towards it. The findings show that in the short-run, higher prevalence of violence does not lead to a change in wives' IPV tolerance. In the long-run, results suggest that the longer the exposure to violence, the more the victims may normalise and justify violence inflicted on them as a coping mechanism.

This chapter makes several important contributions to the literature. First, I contribute to the literature on IPV by shedding light on whether there is a causal link between the prevalence of violence and the tolerance of it from the victims' standpoint. Second, this chapter speaks to the literature in economics that focuses on how gender norms originate and persist. This paper is the first to study if and to what extent attitudes about harmful norms can be affected by the experience of harmful behaviours. Lastly, this chapter is related to the strand of the literature that focuses on policies' externalities on women's well-being. This paper deepens our understanding of how policies might affect gender norms in the short and long term.

In Chapter 2, *Fast Internet and Gender Norms: Evidence from Sub-Saharan Africa*, I study whether the internet can transform gender norms around intimate-partner-violence (IPV) acceptability. The net effect of the internet on gender norms

is an open empirical question. On the one hand, the internet may open new opportunities for women to gain social, political, and economic power and increase women's awareness of gender equality (e.g., the MeToo movement). On the other hand, the internet could exacerbate existing gender disparities, especially if access to the internet benefits more men compared to women. Moreover, the internet could create yet another platform for abuse or violence targeting women.

I identify a causal link between the acceptability of IPV and internet penetration, exploiting the gradual arrival of fast Internet on African coasts via submarine cables from Europe between 2008-2012. My findings suggest that individuals exposed to the internet are more likely to find IPV justifiable. This effect is stronger for males.

There are many possible explanations behind these findings. One possible explanation is that the benefits of the internet are felt more strongly by men relative to women, potentially widening the gender wage gap. My findings suggest that the internet increases the likelihood of men being employed relative to the likelihood of women being employed. This, in turn, might impact the balance of power within the household. Consistent with existing theories, when husbands become more economically powerful, they may engage in violence to assert their dominance (Tauchen et al., 1991; Farmer and Tiefenthaler, 1997). As a second channel is that there exists a gender gap in the access to the internet. I find suggestive evidence that fast internet makes men are more likely to use the internet at the intensive margin. More use of internet could proxy an higher income, but also more access to the information. However, the data do not allow me to disentangle which of these channels prevail. Another potential channel is that the internet and the information embedded in it might reinforce and amplify pre-existing regressive gender norms, in line with the concept of *pluralistic ignorance* (Katz et al., 1931). This latter potential explanation is worth exploring in future research, as the data which is currently available do not allow to test this channel. Chapter 2's main contribution highlights that increased internet connectivity alone may not improve gender equality. Without other gender-improving policies, the internet can replicate existing societal norms.

Chapter 3, *Child Marriage and Female Genital Cutting* (joint work with Suzanna Khalifa), we study how two harmful practices, such as child marriage and female genital cutting (FGC), interact. To this end, we assess a policy that raises the cost of child marriage by prohibiting and criminalizing it, in the context of Nigeria, where both child marriage and FGC are extremely prevalent. In regions where these practices are prevalent, policymakers and governments have enacted legislation aimed at their reduction. Yet, the effectiveness of these measures

in enhancing women's welfare remains uncertain, particularly if the potential relationship between these practices is overlooked.

If the practices are complementary, increasing the cost of one could lead to a decline in both, amplifying the beneficial effects on women's welfare. However, if they are substitutes, raising the cost of one practice could have unintended consequences on the prevalence of the other.

Our study uncovers two main findings. First, we find that the Child Right Act laws decrease the annual marriage hazard among at-risk girls by 21%, compared to young women in the same cohort and age, residing in states where the laws either did not pass or where they were not yet to be passed. Second, we find that the Child Right Act laws increase the annual FGC hazard among at-risk girls by 45%, compared to young girls in the same cohort and age group, residing in states where the laws were not in place.

The main contribution of this paper is to show that child marriage and female genital cutting are two potentially subtitute traits in the marriage market.

Chapter 1

Accepting the Unacceptable: Does intimate partner violence shape the tolerance of violence?

1.1 Introduction

Tolerance towards intimate partner violence is widespread. Globally, 34% of women and 27% of men find intimate partner violence justifiable under certain circumstances (Demographic and Health Survey, DHS).[1] In many settings, violence is often justified as a strategy to *discipline* female partners who do not fulfil their expected roles. For example, 25% of women and 17% of men deem wife-beating justifiable if the woman neglects her children (DHS). Notably, previous research in economics shows a significant correlation between being a victim or survivor of intimate partner violence and accepting wife-beating (Heise and Kotsadam, 2015; García-Moreno et al., 2005).[2] However, little is known about the causal link between the experience of intimate partner violence and the tolerance towards it.

The interplay between harmful behaviours and the attitudes towards them is complex. While tolerant attitudes towards harmful norms can lead to the normalisation of these practices, thereby increasing their prevalence, such behaviours can also reinforce tolerant attitudes, perpetuating a cycle that exacerbates inequalities (Akerlof and Kranton, 2000; Alesina, Giuliano, et al., 2013).[3] Extensive literature in

[1] Own calculations using surveys from 50 countries to calculate the women's indicator and surveys from 45 countries to calculate the men's indicator. For more details, see Tables 1.A.1, 1.A.2, and Figures 1.A.1 and 1.A.2 in the Appendix. Figure 1.A.3 shows a correlation between the tolerance of violence and the prevalence of IPV at the country level.

[2] In this paper, when I refer to victims, I include both victims and survivors of intimate partner violence. Indeed, many women who experienced IPV from their partner do not identify as victims (Ferraro, 2015).

[3] See, among others, (Baldiga, 2014; Bertrand, Kamenica, et al., 2015; Bursztyn, González, et al., 2020; Fernández and Fogli, 2009; Giuliano and Nunn, 2021; Jayachandran, 2015; Lowes et al., 2017)

economics has explored how harmful norms and behaviours originate (Anderson, 2007; Aguilar et al., 2021; Becker, 2022; Ashraf, Bau, et al., 2020; Bishai and Grossbard, 2010; Corno, La Ferrara, et al., 2020; Corno, Hildebrandt, et al., 2020; Corno and Voena, 2023). However, the factors influencing attitudes towards these harmful practices remain unexplained. This paper aims to fill this gap, analysing the causal relationship between the experience of intimate partner violence and tolerance towards it.

I study whether a harmful behaviour, such as intimate partner violence, has a causal effect on victims' attitudes towards it. Specifically, I investigate whether victims' tolerance towards violence could act as a strategy to reduce the net disutility victims receive from violence in contexts where women have limited outside options (i.e., the cost of divorce is too high). The main challenge in addressing this question is that the experience of violence and the tolerance of violence may mutually reinforce each other. For instance, if women cannot leave the relationship, they might cope with their partners' aggressive behaviours by justifying them (i.e., *coping* mechanism). Conversely, women who a priori find violence acceptable might be at higher risk of being in an abusive relationship (i.e., *risk factor* mechanism). These mechanisms may intertwine, forming a vicious cycle. As a result of such simultaneity bias, the relationship between violence and its tolerance is endogenous. Moreover, the relationship between experiencing violence and its tolerance may vary depending on whether we consider violence an isolated event or a recurrent issue.

To understand the nature of attitudes towards intimate partner violence in the short- and long-term, I adapt a model from Anderberg, Mantovan, et al., 2023. In this simple conceptual framework, I study the dynamic relationship between exposure to intimate partner violence and tolerance towards it in a setting where exercising the outside option (i.e., divorce) is extremely costly for individuals. The model assumes two types of partners: violent types who are abusive with a high probability and non-violent types who have a small but positive probability of inflicting abuse. Violence is non-strategic, and the probability of abuse is contingent upon the type of partner. When the individual enters the marriage, they do not observe the type of partner they have been matched to. The individual updates their beliefs on whether their partner is a violent type based on the number of *violent signals* they receive. The realised violence decreases the individual's expected utility within the marriage. At each period within the marriage, the individual decides the level of violence to tolerate. Changing their tolerance is costly as it generates disutility and is irreversible. As

for examples of how norms can affect the economic development.

a result, the individual only changes their tolerance when they have received enough signals of their partner being a violent type. Interpreting these signals and adjusting their perceptions — or updating her Bayesian priors — based on their experience is gradual and requires time. As a result, the tolerance towards violence in the short- and long-term can differ. In particular, the individual's tolerance of violence may increase the longer their exposure to violence.

I investigate the causal relationship between violence and its tolerance in the context of India. This context is characterised by some of the highest rates of IPV and tolerance thereof. 31.7% of Indian women report having experienced IPV in their lifetime, and 46% deem domestic violence acceptable in some circumstances (NFHS, 2021).[4] Furthermore, the National Family and Health Survey indicates that 96% of these women remain married to their perpetrator, given the rarity and social stigma of divorce in India.

Additionally, alcohol-related abuse is widespread (Silva Maia et al., 2022). There is a strong positive correlation between experience of abuse and having a partner who drinks (NFHS, 2021). To isolate the causal effect of the experience of violence on tolerance of IPV, I exploit variation in the minimum legal drinking age (MLDA) within and across a subset of Indian states. I combine the variation in the legal drinking age with three waves of the National Family and Health Survey (NFHS, 2005-2015-2020). These surveys report information about the prevalence of violence (both over the lifetime and in the past 12 months), its onset, and the wife's justifiability of violence in different scenarios, the age and the age at marriage (in months) of both partners, as well as the husband's alcohol consumption. The rationale behind leveraging the minimum legal drinking age variation is straightforward. Alcohol consumption often results in altered cognitive and physical capacities, potentially escalating the risk of inflicting violence due to reduced self-regulation (Hustad et al., 2009; Walters et al., 2018). Luca et al., 2015, 2019 explore alcohol bans and the MLDA policies in India, suggesting that men legally permitted to drink are more prone to violence. This paper builds on these studies, showing how alcohol-related policies might influence violence and, subsequently, attitudes towards such behaviour.[5]

To analyse the causal relationship between intimate partner violence and

[4]Men's tolerance towards wife-beating is still extremely high but lower than women's. 27% of men report that wife-beating is justifiable in some cases (NFHS, 2021). Note that these figures differ from those presented in 1.A.1 and 1.A.2 because in India, respondents are also asked whether wife-beating is acceptable if the wife disrespects the in-laws and if she is unfaithful. In 1.A.1 and 1.A.2, I use the questions asked in every survey worldwide.

[5]My first-stage results corroborate and reinforce Luca et al., 2015 and Luca et al., 2019 's findings by using a different identification strategy and a larger dataset. Moreover, I contribute both theoretically and empirically by separating the short-term and long-term effects of IPV on victims' tolerance of it.

attitudes in the short term, I use a regression discontinuity (RD) design. Specifically, I study the impact of the prevalence of violence in the last 12 months on victims' tolerance of it. I compare observationally equivalent couples who differ on whether their husband's age is above or below the minimum legal drinking age at the month of the interview. I employ both a local non-parametric approach (Calonico, Cattaneo, and Titiunik, 2014) and parametric approaches. The NFHS data collect the respondents' month and year of birth and the month and year individuals were surveyed. This information allows me to compute the age in months of the individuals and identify those legally allowed to drink during the interview. I restrict the analysis to Indian states where the minimum legal drinking age was 25 from 2005 to 2020.[6]

To study the long-term effects of IPV on attitudes, I analyse how the length of exposure to violence changes attitudes towards it. To measure the length of exposure to abuse, I take advantage of a specific question collected by the NFHS. Women who reported having been a victim of IPV are also asked about the timing of the onset of violence in *years after marriage*. I assume that once IPV starts, then it lasts for the whole duration of marriage.[7] I implement an event study design where I compare observationally equivalent couples living in states where the minimum legal drinking age is 21 to couples in states where the minimum is 25 years old.[8] The hypothesis is that husbands who are allowed to drink after 21 years old are also more likely to start drinking earlier compared to husbands residing in states where the MLDA is 25. Thus – holding constant the duration of marriage – this would affect the timing of the onset of violence. As a result, the duration of abuse is likely to be higher among couples residing in states where the partners are legally allowed to drink at a younger age. This variation in MLDA across states allows me to investigate how the length of exposure to violence in the long term affects the attitudes towards it.

The short-term (regression discontinuity design) findings show that men above the minimum legal age are 12 percentage points more likely to consume alcohol. As hypothesised, the likelihood that their wives experienced abuse in the past 12 months increases by 4-5 percentage points. In the short-term, this surge in

[6]This choice is motivated by two key reasons. Firstly, the average age of marriage for Indian men in the sample is 23.5 years old, ensuring an adequate number of married men below the 25-year cutoff. Secondly, states with an MLDA of 21 (which could provide more statistical power) are not considered since 21 is also the legal age for marriage, posing a potential confounder.

[7]This is a reasonable assumption to make, as IPV is the crime category with the highest rate of recurrent victimisation (Flatley et al., 2010; Aizer and Dal Bo, 2009; Amaral, Bhalotra, et al., 2021).

[8]In order to make couples comparable I control for: duration of marriage, age of the husband, year of marriage, age of the husband interacted with the caste he belongs to, and cohort fixed effects allow me to compare women and men of the same age with the same marriage experience (same age of marriage and duration) in states where individuals are legally allowed to drink at 21 years old, compared to those living in states where the MLDA is 25 years old.

violence does not lead to a change in its tolerance. I further exploit an additional source of variation, considering the differences between upper and lower caste, for which the MLDA is less likely to be enforced. While MLDA policies are enforced more stringently in restaurants and bars, primarily frequented by the upper caste, individuals from the lower caste tend to consume cheaper spirits, often brewed at home (Jolad and Ravi, 2022; Kamei, 2014). I find negligible and statistically insignificant effects on alcohol consumption, violence and attitudes among couples belonging to the lower caste. In contrast, I document that husbands from the upper caste aged over the MLDA increase alcohol consumption by 23 percentage points, and their wives report a much higher occurrence of IPV (10 percentage points increase in the frequency of violence) compared to couples whose husbands' age is just below the age threshold. Nevertheless, even within the upper caste, where the MLDA's impact on men's alcohol consumption and intimate partner violence is large in magnitude and statistically significant, I still observe no short-term change in women's attitudes.

The long-term (event-study) findings show that in states where MLDA is lower, women report having experienced violence for 6 months more on average. I also find that wives' exposure to violence can increase their tolerance towards intimate partner violence (IPV) by up to 0.3 standard deviations four years after the partner has been legally allowed to drink. These findings suggest that the longer the duration of violence, the more the victims can find violence acceptable as a coping mechanism.

The contribution of this paper is threefold. First, I contribute to the literature on intimate partner violence by shedding light on whether there is a causal link between the prevalence of violence and the tolerance of it from the victims' standpoint. Economic research has consistently investigated determinants of intimate partner violence. Cross-cultural research suggests that the prevalence of violence can be explained by historical legacies on gender roles (Tur-Prats, 2019; Alesina, Brioschi, et al., 2021), and by current gender norms (González and Rodríguez-Planas, 2020; Heise and Kotsadam, 2015). Furthermore, several studies analysed the impact of labour market conditions and education on domestic abuse (Aizer, 2010; Anderberg, Rainer, et al., 2016; Tur-Prats, 2017; Bhalotra, Kambhampati, et al., 2021; Erten and Keskin, 2021, 2018). The literature has further focused on understanding what triggers the prevalence of violence. One interpretation is that violence is a means to increase the perpetrator's bargaining power in the household (Bloch and Rao, 2002; Bobonis et al., 2013; Eswaran and Malhotra, 2011). An alternative view is that violence generates direct utility to the perpetrator (Farmer and Tiefenthaler, 1997; Tauchen et al., 1991; Card and Dahl,

2011). Nevertheless, despite those contributions, it remains unclear whether experiencing IPV has a causal effect on the attitudes towards it. Psychology research explains this link with the theory of cognitive dissonance, which posits that victims adjust their attitudes to achieve consistency between their attitudes and experiences (Cash, 2012; Goodfriend and Arriaga, 2018).[9] However, this research lacks the establishment of a causal link. I fill this gap by testing this theory empirically with causal inference methods.

Moreover, contrary to most IPV literature that perceives violence statically, this paper leans on recent works recognizing its dynamic nature. For example, Adams-Prassl et al., 2023 develop a new dynamic model of abusive relationships where women have incomplete information about their partner's type (violent vs non-violent type), and abusive men have an incentive to use economic suppression to sabotage women's outside options and their ability to exit the relationship. Anderberg, Mantovan, et al., 2023 develop a dynamic model centred on women's decisions regarding partnership, fertility, and labour amidst abusive relationships, where knowledge of their partner's nature accrues over time. This paper adapts the latter model developed by Anderberg, Mantovan, et al., 2023 and proposes a simple conceptual framework that studies the dynamic relationship between exposure to intimate partner violence and the tolerance towards it in a setting where exiting abusive relationships is constrained.

Second, this paper speaks to the literature in economics that focuses on how gender norms originate and persist. Several studies provide evidence that ancestral and cultural characteristics can shape the evolution of norms and beliefs (Alesina, Giuliano, et al., 2013; Ashraf, Bau, et al., 2020; Giuliano and Nunn, 2021; Becker, 2022; Corno, Hildebrandt, et al., 2020). Similarly, existing evidence indicates that restrictive norms impose direct costs on those who deviate from them, reinforcing the persistence of these norms (Andrew, Krutikova, et al., 2022; Guarnieri and Rainer, 2018). This paper is the first to study if and to what extent attitudes about harmful norms can be affected by the experience of harmful behaviours.

Third, this paper is related to the strand of the literature that focuses on policies' externalities on women's well-being. Recent works show the importance of the interaction between culture and institutions and how policies might impact women in a non-obvious way (Ashraf, Bau, et al., 2020; Bau, 2021; Bhalotra, Brulé, et al., 2020; Ebenstein, 2014; La Ferrara and Milazzo, 2017; Schoellman

[9] "The idea of a loving partner is dissonant with the idea that one's partner is aggressive and violent. To manage these clashing cognitions, victims may (consciously or unconsciously) engage in cognitive processes that minimise the apparent occurrence or impact of aggressive acts, reinterpret their perceptions of the perpetrator, and justify remaining in the relationship despite the aggression" Goodfriend and Arriaga, 2018.

and Tertilt, 2006; Tertilt, 2006; Erten and Keskin, 2018). This paper deepens our understanding of how policies might affect gender norms in the short and long term.[10]

The rest of the paper is organised as follows. In Section 1.2, I propose a simple conceptual framework to understand the relationship between IPV and the tolerance thereof, in the short- and long-term. In Section 1.3, I document the prevalence of violence and the tolerance towards it, and I describe the alcohol regulation in India. In Section 1.4, I discuss the data used for the estimation. In Section 1.5, I describe how I overcame the challenge of establishing a causal link between IPV and its tolerance in the short and long term, employing two different empirical strategies. In Section 1.6, I present and discuss the main results. Lastly, I conclude in Section 1.7.

1.2 Conceptual Framework

This section outlines a conceptual framework that models the relationship between the experience of intimate partner violence and victims' tolerance towards it in contexts where individuals have limited outside options. The model shows that when outside options are scarce and with prolonged exposure to violence, individuals may increase their tolerance of violence as a coping mechanism.

1.2.1 Set-up

Following Anderberg, Mantovan, et al., 2023, I develop a framework of the behaviour of individuals in a setup where there is heterogeneity among partners in their propensity to engage in abuse, and individuals have limited outside options, notably when the cost of separation is extremely high. I assume two types of spouses: violent and non-violent; the latter has a small but positive probability of inflicting abuse. A partner's propensity to abuse is modeled as non-strategic, meaning it is taken as given, contingent upon the partner's type.

[10]This paper also contributes to the literature in economics that studies the role of alcohol regulation policies on gender-based violence. For instance, Barron et al., 2022 found that in South Africa, for every single week of the ban on alcohol during the COVID-19 pandemic, there were 105 fewer rapes. In India, Luca et al., 2015 find that in states that banned alcohol, men were less likely to consume alcohol and domestic violence was 50% lower. In Luca et al., 2019, the authors study the minimum legal drinking age in India, and they find that men who are legally allowed to drink are more likely to commit violence against their partners.By employing a different empirical strategy and more data, my paper builds on Luca et al., 2015 and Luca et al., 2019 and confirms their results on alcohol regulation on IPV. Kumar and Prakash, 2016 discusses the decision of Bihar of banning alcohol in 2016 and how this policy risks to be ineffective in fighting violence against women. Chaudhuri et al., 2018 using a DiD design show that alcohol prohibition in Bihar dicreased violent crimes, but had no significant impact on non-violent crimes.

The partner's type, a fixed characteristic, remains unobservable to the other spouse upon marriage entry. The marriage match is assumed to be exogenous to the spouses' knowledge of each other's propensity for violence. This assumption is consistent with contexts, such as the Indian one, where arranged marriages are widespread, and the spouses often meet only around the time of the wedding.[11] When encountering violent signals, an individual revises their prior about their partner's nature. They can decide their level of tolerance towards violence. Changing this tolerance is costly (as it generates disutility) and is irreversible. Consequently, only after accumulating substantial evidence (through signals) of their partner's type does an individual recalibrate their tolerance levels, resulting in a gradual, albeit costly, shift in attitude towards violence.

1.2.1.1 Bayesian Learning

Consider a population of married couples, facing an infinite time horizon T = 0, 1... Each couple consists of two spouses (I refer to them as *spouse J* and *spouse K*). At time 0, the couple gets married. Any spouse K can be of two possible types, $v \in [0, 1]$: either *violent* ($v = 1$) or *non-violent* ($v = 0$). The spouse K's type is a fixed characteristic. When the spouse J gets married, they do not observe the type of their spouse. They update their beliefs about the type of spouse they have been matched to, based on the information they receive (violent and non-violent signals).[12] Both types of spouse K might be abusive. Spouses K with a violent nature commit intimate partner violence with a high frequency, whereas spouses K with a non-violent nature commit violence rarely. The conditional probability that the spouse J receives a violent signal given that their partner is of violent type is greater than the conditional probability that the spouse J receive a violent signal given that their partner is non-violent. Linking this model to my empirical approach, which draws upon variations in the minimum legal drinking age, we can interpret alcohol as a catalyst, leading to diminished control and inhibitions. This alcohol-induced effect is especially intensified for *violent* spouses.

Let P_0 be the spouse J's prior that their partner is violent. $P(\theta|v = 1)$ is the probability that the spouse J receives a violent signal (θ), given that their partner is of a violent type. Whereas $P(n\theta|v = 0)$ is the probability that the spouse J receives a non-violent signal ($n\theta$) given that their partner is of non-violent type. Signals are symmetric, meaning that the likelihood of receiving a signal is the

[11] According to the Survey of Status of Women and Fertility, 70% of spouses meet on the day of the wedding or the month before.

[12] The match is assumed to be random.

same for both types of signals, conditional on the spouse K's true type.[13] This is to say that the probability that the spouse J receives a violent signal given their partner being violent is equal to the probability that the spouse J receives a non-violent signal given their partner being non-violent. Thus, for the sake of simplicity, we can write: $P(\theta|v=1) = P(n\theta|v=0) = P_\theta$.

Bayesian Learning at Time T-1 Suppose that up to time $T-1$, spouse J has received $k-1$ violent signals (i.e., θ) and $T-k$ non-violent signals (i.e., $n\theta$).[14] The individual updates their beliefs about their partner being of violent-type under standard Bayesian updating:

$$P_{T-1}(\theta^{k-1}, n\theta^{T-k}) = \frac{1}{1+(\frac{1-P_0}{P_0})(\frac{P_\theta}{1-P_\theta})^{(T-1)-2(k-1)}},$$

where $P_{T-1}(\theta^{k-1}, n\theta^{T-k})$ is the posterior probability that the partner is of violent type at time $T-1$ after the spouse J observed $k-1$ violent signals and $T-k$ non-violent signals.

Bayesian Learning at Time T At time T, they observe an additional signal (either violent or not), and their beliefs that their partner is of violent type update again:

$$P_T(\theta^k, n\theta^{T-k}) = \frac{1}{1+(\frac{1-P_0}{P_0})(\frac{P_\theta}{1-P_\theta})^{(T-2k)}},$$

where P_T is the posterior probability that their spouses' partner is of violent type at time T after observing k violent signals and $T-k$ non-violent signals.
See Appendix 1.D for futher details and derivations of these calculations.

1.2.1.2 Victim's Expected Disutility

The individual's expected disutility from violence is as follows:

$$\pi = -\gamma \cdot [P_T \cdot P_\theta + (1-P_T)\cdot(1-P_\theta)] \cdot \tau - \beta(\tau' - \tau)^2,$$

where experiencing abuse is associated with a disutility $\gamma > 0$. $[P_T \cdot P_\theta + (1-P_T)\cdot(1-P_\theta)]$ captures the spouse J's perceived likelihood of experiencing violence based on their beliefs. τ' is the individual's initial level of intolerance of violence, such that $\tau' \in (0,1)$, where $\tau' = 1$ means that the individual is extremely intolerant towards violence. The higher their intolerance towards violence, the

[13] The symmetric assumption is not strictly needed, but it simplifies the mathematical expressions.
[14] Note that the exponentials $(k-1)$ and $(T-k)$ in the formulas are counts of occurrences of the signals.

more disutility they suffer from violence. Based on their current beliefs about the type of partner they are matched to, they decide the level of intolerance of violence. Specifically, the individual can opt for a new level of intolerance τ, where $\tau < \tau'$. The cost associated with opting for a new level of intolerance towards violence is given by: $\beta(\tau' - \tau)^2$. Changing their level of tolerance towards violence is costly because it generates disutility and is irreversible. $\beta > 0$ is a weight that determines how costly is for an individual to adapt their initial level of tolerance.

The individual faces the following optimisation problem:

$$\min_{\tau} \pi = -\gamma \cdot [P_T \cdot P_\theta + (1 - P_T) \cdot (1 - P_\theta)] \cdot \tau - \beta(\tau' - \tau)^2$$

Based on their current beliefs about their type of partner, the individual chooses their optimal level of intolerance:

$$\tau = \tau' - \frac{\gamma}{2\beta}[P_T \cdot P_\theta + (1 - P_T) \cdot (1 - P_\theta)]$$

This indicates that the more the spouse believes their partner is violent, the more inclined they might be to adjust their tolerance. However, this adjustment is offset by the cost of adjusting (parameterised by β). The conceptual framework presented suggests that the individual might take some time to update their beliefs about the type of partner they are married to, based on the number of signals (violence) they receive. Once they update their beliefs, the spouse can decide to (i) leave the relationship if the cost of divorce is low or, (ii) remain in the relationship if the cost of divorce is high (stigma, legal barriers, etc.) as in the setting of this study. If the spouse remains in the relationship, after they update their beliefs about the partner, they might decrease their intolerance about intimate partner violence threshold, as a coping device.

1.3 Background

1.3.1 Women's condition in India: IPV, tolerance of violence and divorce

Globally, one in four women report experiencing intimate partner violence (IPV) in their lifetime (WHO, 2021). In India, the country studied in this paper, the prevalence of violence is even higher. The most recent National Family and Health Survey (NFHS, 2021) indicates that 31.7% of ever-married Indian women

have experienced IPV during their lifetime.[15] Less severe physical violence is the most prevalent (27.7%), followed by emotional psychological violence (14%), severe violence (8.7%), and sexual violence (6.1%).[16] Furthermore, alcohol-related abuse is pervasive in India. Indian women with spouses who consume alcohol have a 3.11 times higher risk of experiencing intimate partner violence than those whose spouses abstain from alcohol (Silva Maia et al., 2022). Tolerance towards wife-beating is also very high. The NFHS 2021 shows that 46% of Indian ever-married and never-married women deem wife-beating justifiable under certain conditions. Notably, while high, men's tolerance towards wife-beating is less than that of women, with 27% believing it acceptable in specific situations.[17]

Based on data from NFHS 2021, Figure 1.1(a) shows the age distribution at marriage for both genders. Women's average marriage age is 18.6 years old. Over 90% of women marry by age 25. Men generally marry later, with an average marriage age of 23.6. Divorce and separation are rare in India, as shown in Figure 1.1(b). The 2011 Census of India records 1.36 million divorced individuals, constituting 0.24% of the married and 0.11% of the total adult population (Jacob and Chattopadhyay, 2016). The NFHS 2021 states that 0.34% of women have divorced, and 0.78% are separated. Indeed, the termination of a marriage is socially sanctioned and perceived as detrimental to a woman's reputation (Ragavan et al., 2015).[18]

[15] Calculations based on Individual Data Survey of the National Family and Health, 2019-2021. The application of domestic sample weights (provided by the NFHS) ensures representativeness. Only one married woman per household is eligible to respond to the Domestic Violence Module.

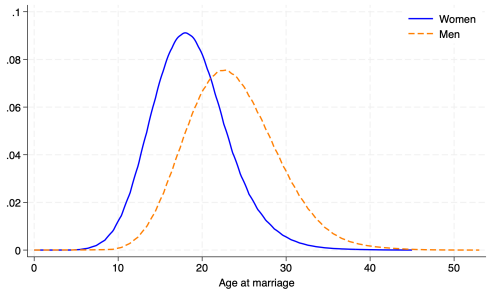
[16] Less Severe Physical Violence: actions like slapping, punching, twisting,pushing. Severe Physical Violence: actions causing notable harm such as kicking, strangling, burning, and weapon threats. Emotional/Psychological Violence: acts causing mental distress, e.g., humiliation, violent threats, insults. Sexual violence: non-consensual sexual acts, including forced intercourse or related actions

[17] Calculations based on Individual Data Survey of the National Family and Health, 2019-2021. The application of sample weights (provided by the NFHS) ensures representativeness.

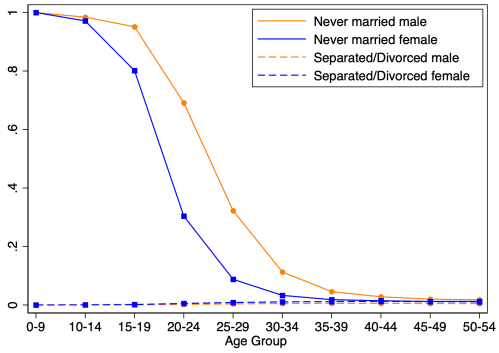
[18] According to the Survey of Status of Women and Fertility, 90% of women would not contemplate leaving their husbands if the husband was beating her or was a drunkard/ drug-addict.

Figure 1.1: Age at Marriage, Marriage, Divorce/Separation in India

((a)) Age at Marriage



((b)) Marriage and Dissolution of Marriage Rates



Note: Panel (a) shows the age at marriage for women and men in India. Panel (b) shows the share of never-married women and men by age group, and the share of divorced and separated women and men. *Source:* Panel (a): National Family Health Survey 2019. Panel (b): Census of India 2011. These charts are a replication of Figure 1 of Beauchamp et al., 2021, using different data sources.

1.3.2 Alcohol regulation in India

Alcohol regulation in India is a prerogative of state governments. As a result, alcohol regulation policies vary across states, ranging from prohibition to different minimum legal drinking ages. Differences in alcohol regulation date back to the colonialism period and independence in 1947.

During the British colonial occupation, alcohol production and consumption gradually increased and became a central component of Indians' lives. During the period of British occupation, together with the promotion of alcohol consumption, the first prohibitionary organisation (the Anglo-Indian Temperance Association, AITA) was founded in 1888 by the British MP William S. Caine (Luca et al., 2019). The success of the AITA, together with the protests against alcohol consumption, led the British rulers to establish the Excise Committee (1905) to control alcohol consumption through heavy taxation. This measure, however, restricted the local manufacture of alcoholic beverages and led to some replacement of traditional low-alcohol beverages by mass-produced, factory-made beverages (Sharma et al., 2010). Under British colonial rule, the upper classes embraced the consumption of foreign spirits, while socially and economically disadvantaged sectors of Indian society continued to rely on locally-produced country liquors (Sharma et al., 2010). The temperance movement gained strength with the nationalist movement and Gandhi, who transformed it into mass movements against alcohol seen as a symbol of colonial oppression (Benegal, 2005). They evolved a demand for total prohibition that led to the inclusion of a statement in favour of prohibition under Article 47 of the Directive Principles in the Constitution. However, the

Constitution also provided that the liquor industry (and all aspects associated with it) fell within the spheres of the single states (Benegal, 2005). By independence, many Indian states had alternately prohibited, relaxed, and repealed alcohol laws.

Following independence, some states initially attempted to enforce alcohol bans, but most ultimately relaxed prohibition due to the significant revenue generated by alcohol taxation. Gujarat is the only state with a continuous history of prohibition of alcohol. Bihar recently (2016) introduced a ban on alcohol. Additionally, alcohol is prohibited in Nagadland, in some districts of Manipur and in the period 1995-2014 (that is part of the study period) in the state of Mizoram (Jolad and Ravi, 2022). Where it is legal, alcohol is taxed heavily at the state level, and major states derive 15% of their revenue from alcohol excise duties (Jolad and Ravi, 2022). In states where alcohol sale is allowed, the minimum legal drinking age ranges from 18 to 25. According to Jolad and Ravi, 2022, individuals belonging to the lower caste usually consume cheap distilled local spirits, and they are more likely to brew at home (Kamei, 2014). Thus, the minimum legal drinking age policy is likely to be unenforced among this particular group of individuals. The MLDA is more likely to be enforced in restaurants and bars, venues which are typically frequented by the upper caste. I will exploit this heterogeneity for my identification strategy.

1.4 Data and Descriptive Statistics

1.4.1 Prevalence of IPV and tolerance towards violence

I use data from the 2005, 2015 and 2020 cycles of the National Family and Health Survey (NFHS) to measure the prevalence of intimate partner violence and the attitudes towards it.[19] The NFHS is a nationally representative repeated cross-sectional survey that collects information on individual's economic and demographic background. The NFHS identifies the men and women who both declared being married/living together with each other. For the purpose of the analysis, I use the couple datasets, where the unit of observation is the couple in which both partners were interviewed.

Respondents are asked extensively about their health, alcohol consumption, and their attitudes towards violence. To measure the respondents' tolerance towards violence, I rely on some questions about tolerance towards wife-beating. Specifically, respondents are asked whether a husband is justified to beat his wife if she (i) goes out without his permission, (ii) neglects the children, (iii)

[19]The National Family and Health Survey corresponds to the Indian Demographic and Health Survey

argues with the husband, (iv) burns food and (v) refuses sexual intercourse, vi) is unfaithful, vii) disrespects the in-laws. Figure 1.A.4 shows the variation of violence justifiability in the different scenarios. The situation in which IPV is the most accepted is when the wife disrespects the in-laws, with 38% of women reporting that violence is justified in that scenario and when the wife neglects the children, with 32% of women in the sample reporting that violence is tolerated in that context. Violence is much less tolerated when the spouse refuses sexual intercourse with the partner, with 13% of women reporting that spousal violence is acceptable in that circumstance. Since my research question is focused on the relationship between IPV and tolerance of violence from the victims' perspective, I only focus on female respondents' attitudes towards IPV.

The NFHS collects information on actual experience of IPV from a subsample of eligible women. Only one married woman of reproductive age (age range 15-49) per household is asked about her experience of emotional, physical, and sexual violence. Measuring intimate partner violence can present challenges related to reporting. However, the NFHS addresses this issue by giving special attention to the domestic violence module questionnaire. The NFHS takes steps to ensure the safety and privacy of women by conducting the survey separately from the household survey and assigning trained female interviewers. The questionnaire is designed to encourage the full disclosure of violence, aligning with the guidelines provided by the World Health Organization (WHO). Figure 1.A.5 shows that 27% of women reported having experienced some form of IPV in the last 12 months. 11% of women in the sample reported being victims of some form of emotional violence, and 32% reported to be victims of physical and/or sexual violence in the last 12 months. Importantly for my identification strategy, information on the month and year of the interview, as well as respondents' month and year of birth is collected.

1.4.2 Minimum Legal Drinking Age policies

Data on the Minimum Legal Drinking age in the period of this study (2005-2020) have been shared by Luca et al., 2019 and complemented by manually checking amendments to the laws using a digital repository named India Code which encompasses all Central, State, and Union Territory enactments and legislations. Luca et al., 2019 compiled a dataset of state-level laws on the minimum legal drinking age to consume alcohol in India. The MLDA varies significantly across Indian states. In some states the MLDA is 18 years old, the majority imposes the minimum age at 21 years old and between 2005-2021 the territory of Delhi and the states of Haryana, Himachal Pradesh, Maharashtra and Punjab set the MLDA

at the age of 25 years (see Table 1.1). Note that not all Indian states are listed in Table 1.1, because information on alcohol regulation policies was not available for all states.

Table 1.1: Minimum-Legal-Drinking Age in India between 2005-2020

Alcohol-Regulation Policies between 2005-2021	Indian States
MLDA at 18	Kerala (until 2010), Rajasthan, Himachal Pradesh (after 2006)
MLDA at 21	Andhra Pradesh, Bihar (until 2016), Goa, Jammu and Kashmir, Jharkhand, Karnataka, Kerala (2010-2017) Maharashtra (in 2005 only), Madhya Pradesh, Tamil Nadu, Uttar Pradesh, West Bengal
MLDA at 25	Delhi, Haryana, Himachal Pradesh (only 2005-6), Maharashtra and Punjab
Ban on Alcohol	Bihar (after 2016), Gujarat, Mizoram, Nagaland

Source: Data on alcohol regulation policies in 2005 was shared by Luca et al., 2019 and Luca et al., 2015. Information on amendments to the policies was manually checked through the *Indian Codes* repository. *Note*: This table presents the alcohol regulation policies (minimum-legal-drinking age and ban) that were implemented in the period between 2005-2020.

1.5 Empirical Strategy

In this section, I show the causal link between the experience of intimate partner violence and the victims' tolerance towards it. The causal identification exploits the variation generated by the minimum-legal-drinking age in a subset of Indian states and the age of the husband at the time of interview.

1.5.1 Identification of Short Term effects: Regression Discontinuity Design

In order to estimate the causal effect of intimate partner violence on attitudes towards it, I need to account for two different sources of endogeneity. First, there might be some unobserved characteristics that correlate both with intimate partner violence and the tolerance of it (omitted variable bias). Second, when studying the link between IPV and attitudes towards it, separating correlation from causation is very challenging because of the simultaneity bias. Indeed, women might select into abusive relationships if they find violence acceptable a priori, or they might learn to cope with aggressive behaviours from their partners when they are themselves victims. The aim of this identification is to break the reverse causality and isolate the effect of IPV on its tolerance.

To deal with sources of omitted variable bias and reverse causality, I identify the effect of violence on its tolerance by taking advantage of the Minimum Legal Drinking Age (MLDA) in states which set the minimum at 25 years old, in a Regression Discontinuity Design (RDD). I implement an RDD based on the age of the male partner within the couple. In the RDD analysis, I focus on couples living

in states where the MLDA is 25; states with MLDA at 18 and 21 are not considered because 18 and 21 are also the legal age for marriage in the period considered (respectively for women and men), posing a potential confounder.[20] Employing a Regression Discontinuity Design, I therefore compare couples where the husband is legally allowed to drink (age beyond 25 yo) to those whose partner is not legally allowed to consume alcohol (age below 25 yo). In the absence of manipulation around the cut-off, husbands who are just above 25 should be similar to those who are just below 25. Therefore, if I observe any systematic difference in behaviour around the threshold after the legal minimum to drink, I can attribute it to the policy. I use a local non-parametric approach, with triangular kernel density function in the optimal bandwidth proposed by Calonico, Cattaneo, and Titiunik, 2014. I also allow for the optimal bandwidth to vary to the right and the left of the cutoff (Calonico, Cattaneo, Farrell, et al., 2017).

In particular, I estimate the following equation:

$$Y_{ist} = \alpha + \beta D_{ist} + \gamma f(x_{ist} - MLDA) + \delta D_{ist} \times f(x_{ist} - MLDA) + \gamma_s + \eta_t + \epsilon_{ist} \quad (1.1)$$

$$\text{for all } x_i \in (MLDA + h_r, MLDA + h_l),$$

where the Y_{ist} outcome of interest (husband's alcohol use/IPV/Attitudes) of respondent i in state s at time t. D_{ist} is dummy which takes the value of 1 the male partner's age is above the MLDA (25 years old, in months) and 0 otherwise; a linear function of the age (in months) centred on the discontinuity cut-off; a set of time-wave fixed effects η_t and locations (states) fixed effects γ_s. The key parameter of interested is β, that identifies the intention-to-treat (ITT) estimate. I present the robust bias corrected standard errors, clustered at the running variable level, as prescribed by Lee and Lemieux, 2010.[21]

Because I am interested in the effect of violence on attitudes towards it, it is important to verify that:

- the MLDA policy is enforced and that there is a change in the alcohol consumption at the cut-off

[20] Prohibition of Child Marriage (Amendment) Bill raised the age at marriage for women at 21 in 2021.

[21] Given that my empirical strategy relies on the age of the male partner in months at the time of the interview, it is important that the reported month of birth is accurate. However, when comparing the monthly birth rate distribution in the DHS data with the monthly birth rate distribution from administrative data, it appears that the month of January is over-represented in the former. To address this, I estimate the main specification using a sample that does not include couples whose male partner was born in January (see Table 1.C.3). The coefficients are very similar in magnitude and precision to those estimated using the full sample.

- there is a change in the prevalence of violence among women whose husbands are legally allowed to drink

1.5.1.1 Sample selection

In the Regression Discontinuity Design analysis, I restrict the sample to Indian states that, during the period from 2005 to 2020, enforced a legal minimum drinking age of 25 years old. This choice is motivated by two key reasons. Firstly, the average age of marriage for Indian men in the sample is 23.6 years old, ensuring an adequate number of married men below the 25 years old cutoff. Secondly, states with an MLDA of 21 (which could provide more statistical power) are not considered since 21 is also the legal age for marriage, posing a potential confounder. To mitigate selection bias, the analysis focuses specifically on couples where the husband was married before reaching the age of 25. The final estimation sample for the Regression Discontinuity Design consists of 12803 married couples. In 9697 couples, the woman was selected to answer the domestic violence module.

1.5.1.2 Validity Assumptions

The identification assumption is that individuals did not manipulate their treatment status. Lee and Lemieux, 2010 suggest two strategies to test this assumption. First, there should be no discontinuity in the density of the running variable at the cut-off. Second, pre-determined couples' characteristics of the couples should be balanced around the cut-off.

Figure 1.B.1 shows the histogram of the age of the husbands in months (the score), and there is no visual evidence of a kink at the threshold. I then formally test the no discontinuity hypothesis using the Frandsen, 2017 test for discrete variables; with a p-value = 0.3 I fail to reject the null hypothesis that the there is no discontinuity of the running variable around the cut-off. Table 1.B.1 provides evidence of the continuity on the pre-determined characteristics. The Table shows the point estimates obtained by estimating equation 2.1 the pre-determined characteristics. All the pre-determined characteristics are balanced around the cut-off.

1.5.2 Identification of Long-term effects: Event Study Design

In this section I study how the relationship between the experience of intimate partner violence and the tolerance towards it may vary depending on the length of exposure of violence.

In line with the conceptual framework presented in Section 1.2, I empirically test whether the coping mechanism may lead to more tolerance if women have limited outside options.

1.5.2.1 Empirical Intuition

In order to investigate whether the length of exposure to an abusive partner affects women's tolerance of violence, I exploit the variation generated by the Minimum-Legal-Drinking-Ages across different Indian states. I implement an Event Study Design to compare observationally couples living in states where the Minimum Legal Drinking Age is 21 to couples residing in states where the minimum is 25. My hypothesis is that husbands who are legally allowed to drink after 21, are more likely to start drinking *earlier* compared to husbands residing in states where the MLDA is 25. Thus, I would expect that - keeping constant the duration of marriage - men who are legally allowed to drink at 21, are more likely to start to beat their wives *earlier* compared to those living in states where the minimum is set at 25. Therefore, I would expect that duration of abuse is higher in states where the partner starts to be legally allowed to drink at an earlier age.

To compute the duration of abuse (in years) for each woman, I take advantage of an information collected by the DHS: women who reported to have been victim of IPV are also asked about the timing of the onset of violence. I assume that once IPV starts, it lasts for the whole duration of marriage. Indeed, domestic violence is the crime-category with the highest rate of recurrent victimisation Anderberg, Mantovan, et al., 2023.

I compare couples whose husband is younger and older than 21 years old, in states where the MLDA is 21 and states where the MLDA is 25. The couples are considered treated if they reside in states where the MLDA = 21 and if the husband's age is higher than 21 (i.e. the husband is legally allowed to drink). The control group consists of couples who reside in states where the MLDA = 25 years old. The identifying strategy relies on the assumption that couples residing in states with MLDA =21 and states with MLDA =25 would have had parallel trends concerning the duration of abuse and attitudes towards violence before the husbands are legally allowed to drink (i.e. before the age of 21 years old).

1.5.2.2 Sample selection

The Event Study approach only considers couples where the husband's age at the time of the interview falls between 19 and 25 years. Couples where the husband is under 19 are excluded due to lack of data, while those where the husband is over 25 are omitted as control group members beyond this age may start drinking,

which could affect the analysis. Moreover, the sample is limited to marriages that took place after 2005, when Minimum Legal Drinking Age (MLDA) policy data became available. As a result, the sample includes 5,941 married couples residing in states where the MLDA is either 21 or 25.[22]

1.5.2.3 Estimating Equation

In order to investigate whether the length of exposure to IPV affects women's tolerance of violence, I estimate the following equation:

$$Y_{ist} = \alpha + \sum_{m=-2}^{4} \beta_\tau \mathbb{1}(\tau = m) \times MLDA_s^{21} + \lambda_s + \delta_{ist} + \phi_{ist} + \zeta_{ist} + \kappa_{ist} + \mu_{ist} + \varepsilon_{ist}, \quad (1.2)$$

where the dependent variable y_{ist} is the outcome variable for a woman i, in state s, at age t. $MLDA_s^{21}$ takes value 1 if in the state the MLDA is 21, and 0 if 25. $MLDA_s^{21}$ is interacted with event-year dummies, τ. τ denotes the event-year, defined so that $\tau = 0$ if the age of the husband is lower than 21 (when individuals are legally allowded to drink in states where the MLDA = 21), $\tau = 1$ if the husbands have been legally allowded to drink for one year, and so on. The policy should have an impact on men who are older than 21 at the time of the survey (leads) and should not affect individuals who are under-aged to consume alcohol (age<21yo). The omitted category is 20 years old. Thus, the dynamic impact of the policy is estimated with respect to the age at which men become legally allowed to drink in the treated states. Therefore, each estimate of β provides the change in outcomes in treated states relative to not-treated states. δ is duration of marriage fixed effect, and μ year of marriage fixed effects. ϕ is the age of the husband FE interacted with the caste he belongs to, ζ and κ are respectively men's and women's cohort fixed effect. Adding these fixed effects allow me to compare women and men of the same age, with the same marriage experience (same age of marriage and duration) in states where individuals are legally allowed to drink earlier on. The term λ indicates the state of residence fixed effect and control for time invariant characteristics that may be correlated with the outcome. Standard errors are clustered at state and age of the interview level.

[22] See Table 1.A.3 for descriptive statistics of the estimating sample. As shown in Table 1.A.3 the average age of the husband is 23.3 years old, and the wives are on average 20.7 years old. The average age of marriage for men is 20.3 yo, and for women is 17.7 yo. In this sample the average duration of marriage is 2.6 years. The average length of violence in couples that on average have been married for 2 years is of 0.64 years. If we condition the duration of abuse on couples where the wife has been victim of IPV in her lifetime, then the duration of abuse is 2.5 years.

1.6 Results

1.6.1 Correlation between IPV Prevalence and Tolerance of violence

Table 1.2 shows the simple correlation between the experience of intimate partner violence and the tolerance of it.[23]

The first column of Table 1.2 shows that the experience of violence is associated with an increase of the tolerance towards violence by 0.29 standard deviations. This correlation is statistically significant at 1 percent level. The second column of Table 1.2 shows the correlation between women's attitudes around wife-beating and instances where wives have reported abuse in the past year by husbands who are usually or often drunk. The experience of abuse by husbands who are usually/often drunk is associated with an increase in wives' tolerance towards wife-beating by 0.26 standard deviations. There may be concerns that perceptions of wife-beating based on the reasons presented in the NFHS do not align with views on wifebeating attributed to alcohol-induced abuse. The former is potentially deemed 'justifiable' under specific circumstances, while the latter might be universally perceived as a violent act. Consequently, the correlations might be less distinct than if the data captured incidents of wifebeating unrelated to alcohol. However, the similarity of the coefficients presented in Table 1.2 helps to alleviate concerns regarding a weaker correlation in case of alcohol-induced violence.

[23] Coefficients derived estimating the following OLS equation:

$$Tolerance_{ist} = \alpha + IPV_{ist} + \mathbf{Z_{ist}} + \eta_s + \theta_t + \epsilon_{ist},$$

where dependent variable tolerance index of woman i, in district s at time t. I combine the 7 gender attitude variables as presented in Figure 1.A.4 into a variance-weighted index, following Anderson, 2008. The explanatory variable IPV, takes value 1 if the respondent reports having experienced any form of violence from her partner in the last 12 months. I include district fixed effects η_s to control for any time invariant characteristics that might be correlated with the dependent variable. θ_t controls for time of the survey fixed effects and $\mathbf{Z_{ist}}$ includes a set of individuals' characteristics (age gap, spouses' caste, and spouses' education in years). Standard errors clustered at the district level.

Table 1.2: Correlation between attitudes towards violence and IPV

	Tolerance towards IPV [Index]	
Any violence (12 months)	0.291***	
	(0.012)	
Any violence (12 months) by a husband who is often drunk		0.259***
		(0.015)
Controls	Yes	Yes
District FE	Yes	Yes
Year of Interview FE	Yes	Yes
Clusters	718	718
Observations	43430	43430

Note: Table 1.2 represents the correlation between the experience of Intimate Partner Violence (IPV) on the woman's tolerance of violence. *Any violence (12 months)* takes value one if the woman reports to have experienced IPV in the last 12 months. *Any violence (12 months) by a husband who is often drunk* takes value one if the woman reports to have experienced IPV in the last 12 months and her husband is usually/often drunk. *Attitudes towards IPV* is a variance-weighted index following Anderson, 2008 that combines women's tolerance of violence in different scenarios, namely if the wife: (i) argues with the husband, (ii) neglects kids, (iii) goes out without permission, (iv) burns food, (v) refuses sexual intercourse, (vi) is unfaithful and (vii) disrespects the in-laws. Controls include: age gap in the couple, caste, and education in years. *Source*: Own estimations using the National Family and Health Survey (NFHS 2015-2020). Note that NFHS-2005 was excluded from this analysis as it does not provide district identifiers.

1.6.2 Short term Results

Since I am interested in estimating the effect of IPV on tolerance towards it, exploiting the age variation generated by the MLDA in some Indian states, it is important to test whether the policy on the minimum legal drinking age has been enforced. First, I provide visual evidence of the discontinuity at the cut-off in a 60 months bandwidth to ensure comparability across the outcomes. Then, in the Tables, I analyse the discontinuity at the cut-off in the optimal bandwidth, following equation 1.1.[24]

I begin my analysis by looking at the effect of the minimum-legal-age on the husband's alcohol consumption. Figure 1.2(a) summarises the relationship between husband's age in months (i.e. the running variable) and the reported alcohol consumption, in a 60 months bandwidth around the cut-off. The blue circles represent the average alcohol consumption in 6-months-size bins.[25] The

[24]Figures 1.C.8 and 1.C.9 provide visual evidence of the discontinuity at the cut-off, in the optimal bandwidth as recommended by Calonico, Cattaneo, and Titiunik, 2014.

[25]Alcohol consumption is coded as one if either the wife reports that the husband is drinking and/or if the husband self-report that he drinks alcohol. As a robustness, I run the same specification using as dependent variable the alcohol consumption as reported by the men and the women separately, as shown in Table 1.C.1. The magnitude of the coefficients is consistent, in all the specifications the probability of consuming alcohol increases by 40% with respect to the average. When I use as dependent variable the alcohol consumption as reported by the women,

dotted line represents the cutoff (25 years old and 0 months), and the horizontal lines represent the linear fit of the outcome variable, with the corresponding 95% confidence intervals. Visually, the existence of a jump at the cut-off is clear.

Table 3.1 presents the results of estimating Equation (4), within the optimal bandwidth. The first column of Table 3.1 shows that husbands at the cut-off are 12.6 percentage points more likely to consume compared to the control group. This corresponds to a 40 percent increase in alcohol consumption. The estimate is statistically significant at five percent level. A plausible concern is the under-reporting of drinking habits just before reaching the legal age. However, based on the laws and regulations, sanctions apply to those who sell alcohol to underage individuals. Therefore, respondents should not feel disincentivised to under-report. Notwithstanding substantial law evasion, men are actually more likely to drink after the 25 years old threshold.

As a second step, I check if the minimum-legal-age policy has an impact on the occurrence of intimate partner violence. Figure 1.2(b) summarises the relationship between husbands age in months and the probability that the respondent reports experiencing any IPV during the last year, in a 60 months bandwidth around the cut-off. The blue circles represent the average alcohol consumption in 6-monthly bins. The dotted line represents the cutoff (25 years old and 0 months), and the horizontal lines represent the linear fit of the outcome variable, with the corresponding 95% confidence intervals. Visually, violence seems to increase at the cut-off, suggesting that women whose partner is legally allowed to drink are also more likely to experience any form of violence occurred in the last 12 months.

Table 3.1 (Columns 2, 3, 4) presents the estimates from equation 4, within the optimal bandwidth and the effect of MLDA for each form of IPV experienced during the last year. Women whose husbands are legally allowed to drink are 5.6 percentage points more likely to experience violence in the year prior the interview; however the estimate is not precisely estimated at conventional levels. The effect of MLDA on physical and sexual violence in the last 12 months is positive, but not statistically significant. Women whose husband is legally allowed to drink are 5.2 percentage points more likely to experience emotional violence (i.e. threat, humiliations and insults). Therefore, it seems that the emotional form of IPV is the one driving the main results.

Columns 5, 6, 7 of Table 3.1 present the results of the effect of MLDA on the frequency of violence. The outcome variable takes value one if the respondent reports at least one of the form of violence listed in the DHS to occur *often* in the last 12 months. This measure should proxy for the intensity of violence. Table

however, the coefficient is not precisely estimated.

3.1 shows that the MLDA increased the likelihood of being abused frequently for women whose husbands are allowed to drink at the cut-off by 4.2 percentage points and it is significant at 5 percent level.[26]

The results so far confirm that (i) men who are legally allowed to drink are actually more likely to drink at the cutoff and that (ii) women whose husbands are legally allowed to drink are more at risk to experience IPV.

Given these findings, I now test the relationship between IPV and the tolerance towards it. Figure 1.2(c) summarises the relationship between husbands' age in months and the spouses' violence tolerance index, in a 60 months bandwidth around the cut-off. The blue circles represent the average alcohol consumption in 6-months-size bins. The dotted line represents the cutoff (25 years old and 0 months), and the horizontal lines represent the linear fit of the outcome variable, with the corresponding 95% confidence intervals. Visually, there is no evidence of breaks in the tolerance towards IPV around the cut-off.

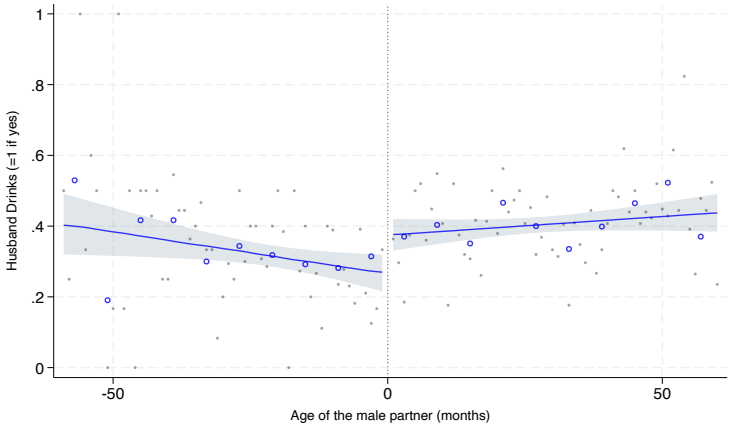
The no-effect on attitudes is confirmed in the last column Table 3.1 , that presents the ITT estimates based on estimating equation 4.[27] The last column of Table 3.1 shows no significant effect of violence on the tolerance of it. This result suggests that in the short-run, a higher prevalence of violence does not translate into a change in the tolerance of it, in line with the conceptual framework presented in Section 1.2.

[26]Using a different identification, and a largest dataset these results are in line with the findings of Luca et al., 2019 on the effectiveness of the MLDA policies on alcohol consumption and intimate partner violence.

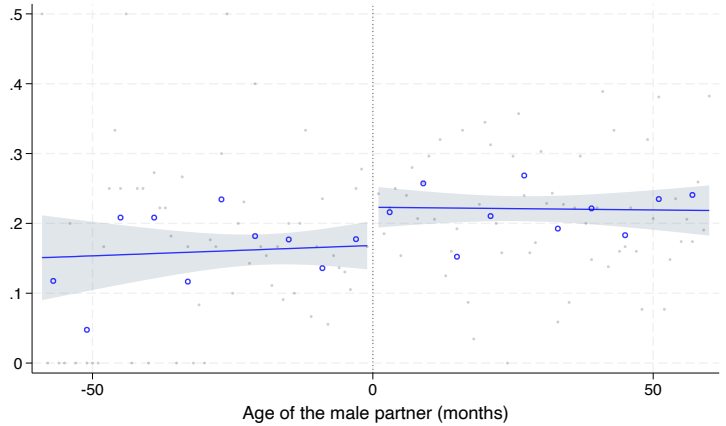
[27]Table 1.C.2 presents the ITT estimates based on estimating equation 4, when instead of the tolerance index, a simple binary indicator is used. The indicator takes value one if the respondent deems wife-beating justifiable in at least one scenario, as presented in 1.4.

Figure 1.2: MLDA Discontinuity

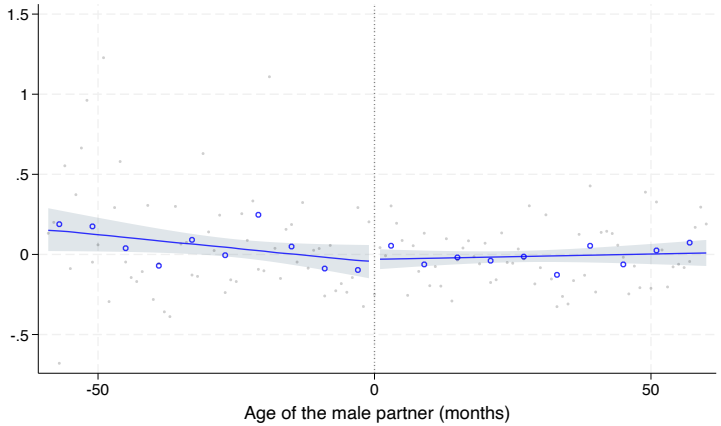
((a)) MLDA discontinuity: Husband's alcohol cosumption



((b)) MLDA discontinuity: IPV in the last 12 months



((c)) MLDA discontinuity: Women's tolerance towards wife-beating



Note: The Figure 1.2 presents huband's alcohol consumption/wives' prevalence of IPV/ tolerance towards violence (following Anderson, 2008) against the age of the husband in months (X-axis), in a -60-60 months bandwidth. The blue circles represent the average of the outcome at score bins of size 6. In Figure 1.2(a) the outcome variable is a dummy taking value one if the husband consumes alcohol. In Figure 1.2(b) the outcome variable is a dummy taking value one if the wife reports to have been victim of IPV in the last 12 months. In Figure 1.2(c) the outcome variable is a variance-weighted index following Anderson, 2008 that combines women's justifiability of wife-beating in 7 scenarios: (i) if she goes out without permission; (ii) if she neglects the children; (iii) if the argues with the husband; (iv) if she burns food; (v) if she refuses sex; (vi) if she is unfaithful; (vii) if she disrespects the in-laws *Source:* Own estimation using the National Family Health Survey (NFHS 2005-2015-2020).

Table 1.3: Short-term effects

	Husband Drinks	IPV in the past year			Frequent IPV in the past year			Tolerance index
		Any	Phys. & Sex.	Emotional	Any	Phys. & Sex.	Emotional	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Above MLDA	0.126**	0.056	0.025	0.052***	0.042**	0.027	0.020	0.071
SE	(0.059)	(0.033)	(0.034)	(0.021)	(0.022)	(0.018)	(0.015)	(0.142)
Left BW	35	40	35	33	35	39	37	35
Right BW	93	109	109	97	74	100	68	118
N	3,237	3,857	3,773	3,372	2,637	3,527	2,432	5,100
Mean of control	0.318	0.171	0.145	0.079	0.052	0.041	0.024	0.027

Notes: Table 3.1 reports the estimated coefficients based estimating a local non-parametric regression-discontinuity design specification in the Calonico, Cattaneo, and Titiunik, 2014 optimal bandwidth, with a triangular kernel and a linear polynomial of the score, as presented in equation 2.1. The regression-discontinuity design exploits the within states variation generated by the MLDA, comparing couples whose husband's age is just below and above the minimum age at drinking. The sample consists of couples residing in states where the MLDA is 25. All specifications include wave and state fixed effects. The dependent variable of column (1) is measured as a binary variable coded as one if either the wife reports that the husband is drinking and/or if the husband self-report that he drinks alcohol. The dependent variables of columns (2), (3), and (4) are measured as a binary variable coded as one if the reported experiencing any form of IPV, any physical or sexual violence, and any emotional violence in the last 12 months. The dependent variables of columns (5), (6), and (7) are measured as a binary variable coded as one if the reported experiencing frequently any form of IPV, any physical or sexual violence, and any emotional violence in the last 12 months. The dependent variable of column (8) is a variance weighted index following Anderson, 2008 that combines women's justifiability of wife-beating in 7 scenarios: (i) if she goes out without permission; (ii) if she neglects the children; (iii) if the argues with the husband; (iv) if she burns food; (v) if she refuses sex; (vi) if she is unfaithful; (vii) if she disrespects the in-laws. Robust bias corrected standard errors clustered at the running variable level in parentheses. * p < 0.1; ** p <0.05; *** p <0.01. Figure 1.C.8 presents the relationship between the husband's age and his alcohol consumption, his partner's IPV and tolerance graphically, in the optimal bandwidth. *Source*: Own estimations based on National Family Health Survey (NFHS 2005-2015-2020).

1.6.3 Heterogeneity by Caste

As described in Section 1.3, lower castes usually consume cheap distilled local spirits, which are typically home-made. Therefore, one might expect that individuals belonging to the lower caste are less likely to attend venues like restaurants or bars where the policy on the minimum legal drinking age (MLDA) is more likely to be enforced, compared to informal venues like habitations. Consequently, the effect of MLDA could have a heterogeneous impact between lower and higher castes.[28]

Figures 1.3(a) and 1.3(d) illustrate the relationship between husbands' age in months and their alcohol consumption among the lower caste (Figure 1.3(a)) and the upper caste (Figure 1.3(d)). The figures demonstrate the differential effect of the MLDA policy on the two groups of individuals. Visually, we observe that the jump at the cut-off is much larger and more evident in the upper caste sample.

[28] Before showing the results, I present two standard validity checks for the RD design restricting the sample to individuals belonging to the lower caste and to the upper caste separately. First, there should be no discontinuity in the density of the running variable at the cut-off. I formally test the no discontinuity hypothesis using the Frandsen (2017) test for discrete variables. With a p-value= 0.473 in the low-caste sample, and a p-value= 0.887, I fail to reject the null hypothesis that the there is no discontinuity of the running variable around the cut-off in both samples (see 1.B.4). Figure 1.B.2 and 1.B.3 provide evidence of the continuity of the main pre-determined characteristics in the sample of couples where the husband belongs to the lower caste and those where the husband belongs to the upper caste. The figures show the point estimates obtained by estimating the equation 1 on the pre-determined characteristics. All the pre-determined characteristics are not statistically significant and I can conclude that the predetermined covariates appear balanced around the threshold.

In Figures 1.3(b) and 1.3(e), I repeat an analogous exercise as before. The figures illustrate the differential effect of the MLDA policy on the prevalence of intimate partner violence on low versus upper caste. We notice that the upper caste group display a large and clear jump at the cutoff, whereas there is no visual evidence of a break among the lower caste group.

Finally, Figures 1.3(c) and 1.3(f) show the relationship between husbands' age in months and attitudes towards violence. In both figures there is no jump at the cut-off. Thus, also when we look at the upper caste group, where the effect of the MLDA on violence is very significant, we do not find any statistically significant effect on tolerance towards it.

Table 1.4 summarises the results and present the estimates of equation 2.1 on husbands' alcohol consumption, IPV and attitudes towards violence splitting the sample in low and upper caste. The effect of MLDA on husbands' alcohol consumption is much bigger (23.5 percentage points) and statistically significant for those belonging to the upper caste. At the cut-off the prevalence of violence increases in the upper caste wives sample. The effect of the MLDA is not statistically significant in the sample of the low caste respondents. When we look at the intensity of violence, respondents among the upper caste report to experience often any form of IPV when their husbands is legally allowed to drink. The tolerance coefficient is not statistically significant, confirming that a higher prevalence of violence in the short run does not reflect in a change of attitudes towards it.

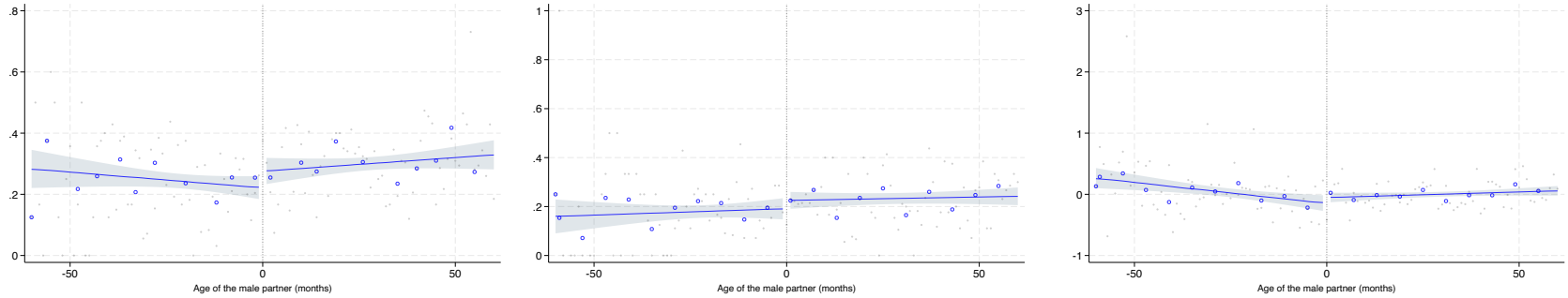
These findings are in line with the idea that MLDA is more likely to be better enforced in restaurants and bars, venues which are typically frequented by the upper caste. Lower caste individuals, on the other hand, usually consume cheap distilled local spirits (Jolad and Ravi, 2022) and in some states are more likely to brew at home (Kamei, 2014).

Figure 1.3: MLDA discontinuity, Heterogenous Effect by Caste

((a)) Husband's alcohol consumption - Lower Caste

((b)) Any violence in the last 12 months - Lower Caste

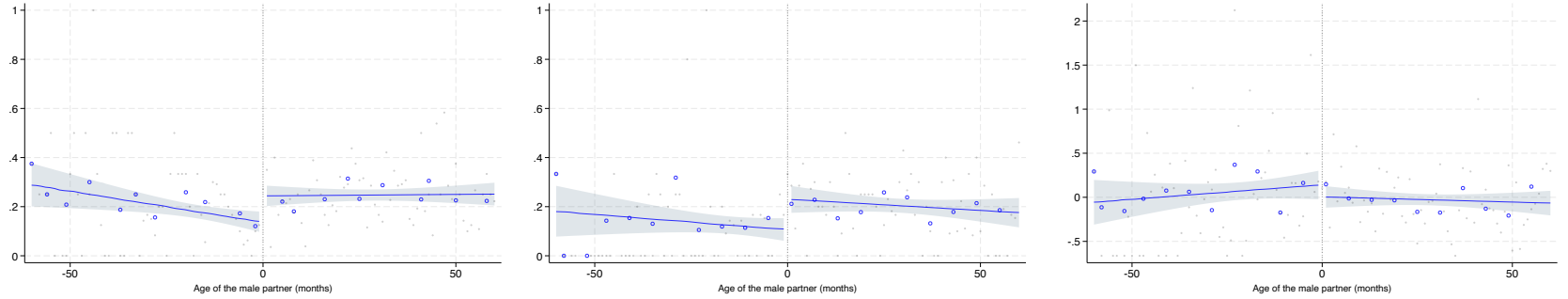
((c)) Tolerance towards wife-beating - Lower Caste



((d)) Husband's alcohol consumption - Upper Caste

((e)) Any violence in the last 12 months - Upper Caste

((f)) Tolerance towards wife-beating - Upper Caste



Note: Figure 1.3 presents the outcomes *alcohol consumption*, *prevalence of violence in the last 12m*, *women's tolerance towards wife-beating* against the age of the husband in months (X-axis), in a -60-60 months bandwidth, for the Lower (Figures: 1.3(a), 1.3(b), 1.3(c)) and Upper Caste Sample (Figures: 1.3(d), 1.3(e), 1.3(f)). The blue circles represent the average of the outcome at score bins of size 6. *Source*: Own estimations based on National Family Health Survey (NFHS 2005-2015-2020).

Table 1.4: Short-term Effects – Heterogeneity by Caste

	Husband Drinks	IPV in the past year			Frequent IPV in the past year			Tolerance index
		Any	Phys. & Sex.	Emotional	Any	Phys. & Sex.	Emotional	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Panel A: Lower Caste								
Above MLDA	0.103	0.017	-0.006	0.031	0.017	0.009	0.003	0.156
SE	(0.085)	(0.039)	(0.039)	(0.029)	(0.027)	(0.024)	(0.021)	(0.170)
Left BW	37	39	37	34	38	40	35	36
Right BW	74	107	104	140	114	121	102	133
N	1,645	2,334	2,256	3,030	2,466	2,583	2,201	3,583
Mean of control	0.337	0.190	0.157	0.093	0.055	0.043	0.024	0.015
Panel B: Upper Caste								
	Husband Drinks	IPV in the past year			Frequent IPV in the past year			Tolerance index
		Any	Phys. & Sex.	Emotional	Any	Phys. & Sex.	Emotional	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Above MLDA	0.235***	0.111	0.076	0.103***	0.098***	0.072**	0.053***	-0.099
SE	(0.085)	(0.054)	(0.053)	(0.030)	(0.032)	(0.030)	(0.017)	(0.159)
Left BW	29	20	20	30	29	30	34	41
Right BW	85	66	64	88	64	75	69	89
N	1,035	769	739	1,084	784	939	872	1,514
Mean of control	0.290	0.140	0.126	0.053	0.048	0.039	0.024	0.056

Notes: Table 1.4 reports the estimated coefficients based estimating a local non-parametric regression-discontinuity design specification in the Calonico, Cattaneo, and Titiunik, 2014 optimal bandwidth, with a triangular kernel and a linear polynomial of the score, as presented in equation 2.1. The regression-discontinuity design exploits the within states variation generated by the MLDA, comparing couples whose husband's age is just below and above the minimum age at drinking. The sample consists of couples residing in states where the MLDA is 25. All specifications include wave and state fixed effects. The dependent variable of column (1) is measured as a binary variable coded as one if either the wife reports that the husband is drinking and/or if the husband self-report that he drinks alcohol. The dependent variables of columns (2), (3), and (4) are measured as a binary variable coded as one if the reported experiencing any form of IPV, any physical or sexual violence, and any emotional violence in the last 12 months. The dependent variables of columns (5), (6), and (7) are measured as a binary variable coded as one if the reported experiencing frequently any form of IPV, any physical or sexual violence, and any emotional violence in the last 12 months. The dependent variable of column (8) is a variance weighted index following Anderson, 2008 that combines women's justifiability of wife-beating in 7 scenarios: (i) if she goes out without permission; (ii) if she neglects the children; (iii) if the argues with the husband; (iv) if she burns food; (v) if she refuses sex; (vi) if she is unfaithful; (vii) if she disrespects the in-laws. Panel A displays the results restricting the sample to individuals belonging to the Lower Caste. Panel B displays the results restricting the sample to individuals belonging to the Upper Caste. Robust bias corrected standard errors clustered at the running variable level in parentheses. * p < 0.1; ** p <0.05; *** p <0.01.
Figure 1.C.9 presents the relationship between the husband's age and his alcohol consumption, his partner's IPV and tolerance graphically, in the optimal bandwidth by castes.
Source: Own estimations using the National Family Health Survey (NFHS 2005-2015-2020).

1.6.4 Robustness Checks

In this section, I carry out several sensitivity analyses and alternative specifications to address the robustness of my results.

1.6.4.1 Sensitivity to the bandwidth choice

Figure 1.C.1 assesses the sensitivity of the results with respect to the choice of alternative bandwidth. I address the issue of alternative bandwidth by plotting the estimates of regressions where the bandwidth is increased by 10% on the left of the cut-off and decreased by 10% on the right of the cut-off. The figures also show estimates in the optimal bandwidth marked in blue, using the algorithm proposed by Calonico, Cattaneo, and Titiunik, 2014. The point estimates of the treatment effect are very stable and do not vary dramatically with the bandwidth

size. Figure 1.C.2 shows the sensitivity to the coefficients, restricting the sample to couples belonging to the Upper Caste.

Figure 1.C.3 shows the treatment effects estimated in a 12, 24, 36 and 48-months bandwidths. Figure 1.C.4 shows the treatment effects estimated in a 12, 24, 36 and 48-months bandwidths, restricting the sample to couples belonging to the Upper Caste. The magnitude of the coefficients is stable across the board. However, as expected the smaller the window around the cut-off the larger the magnitude of the coefficient but the lower the precision.

1.6.4.2 Exclusion of Delhi

In the estimating sample I include the couples residing in the National Capital Territory of Delhi, because in the period considered the legal minimum to drink was 25 years old.[29] Being a city, it is much easier to access alcohol in neighbouring states where the minimum legal to drink is lower (for instance, Uttar Pradesh has the MLDA at 21 years old). Therefore, I expect that including Delhi in my analysis might introduce some noise. Tables 1.C.7 and 1.C.8 present the results without including the couples who reside in Delhi. The results are stronger in magnitude with respect to the main specification presented in the main results and statistically significant.

1.6.4.3 Past exposure to abuse

Pollak, 2004 analyses a model of intergenerational domestic violence, suggesting that individuals who grew up in violent homes tend to marry individuals who grew up in violent contexts. Given this, there might be concerns that the results are biased due to a selection effect, driven by those who grew up with abusive fathers. The NFHS asks both male and female respondents whether their father inflicted violence to their mothers. I therefore run the main specification based on equation 2.1 by excluding respondents who either reported having a violent father or responded with "I don't know." Tables 1.C.9, 1.C.11, 1.C.10 present results after excluding couples where either the husband's or the wife's father was abusive towards their mother. These results align with the main findings, suggesting that my conclusions are not driven by a selected sample with a history of familial abuse.

[29] In March 2021, Delhi set the MLDA at 21 years old, https://www.hindustantimes.com/cities/delhi-news/old-drinking-age-despite-new-excise-policy-in-place-101642630447547.html

1.6.4.4 Alternative Specifications

While controlling for covariates is not essential in RD designs, their incorporation can be beneficial in mitigating bias from observations further away from the cut-off. Additionally, if these covariates are correlated with the outcome, their inclusion can enhance precision and identify potential issues in the empirical strategy. Notably, substantial changes in the estimated effects due to covariate inclusion may compromise the credibility of the identification strategy. Therefore, the inclusion of covariates serves as an additional test of internal validity. Tables 1.C.12, 1.C.13 and 1.C.14 show the estimated coefficients of the treatment effect, after the inclusions of individual characteristics and the results are in line with the main ones presented in Table 3.1.

Tables 1.C.4, 1.C.5 1.C.6 show that the results are robust when controlling for a local quadratic function of the forcing variable.

1.6.4.5 Placebo Tests

Table 1.C.15 provides a placebo check, confirming that there are no jumps in the likelihood of alcohol consumption, the prevalence of violence, or attitudes towards it at the 25-year-old threshold in states with an alcohol ban. As additional robustness check, I use a method similar to the Randomisation Inference, following Young, 2019. In particular, I construct fake hypothetical cut-offs and I estimate the main specifications. If I find significant results, then this might indicate that I am not capturing the effect of being above the minimum legal drinking age. To implement this test, the following steps have been undertaken: 1) I create a dummy Above MLDA, using a random number generator, assigning 1 to 90% of the overall sample (mimicking the ratio of treated individuals in the original sample), 2) I run the specification based on equation 2.1 and record the t-statistics from each estimation. 3) I then repeated the steps 1000 times for all the main outcomes and plot the distribution of t-statistics to see the percentage of times I find a significant effect.

I present the distribution of t-statistics for all results in Figures 1.C.5, 1.C.6, 1.C.7. Across all outcomes, I identify a significant treatment effect in less than 3.3% of the models. This outcome suggests a minimal likelihood that the effects I have detected could be ascribed to random fluctuations or chance. Instead, the evidence provides substantial support that the effects detected are indeed coming from the variation generated by the minimum-legal-drinking age.

1.6.4.6 Inference

Kolesár and Rothe, 2018 demonstrate that the practice of clustering by the running variable may not effectively resolve specification bias problems in discrete RDD setting. Recent papers such as Canaan, 2020 and Takaku and Yokoyama, 2021 propose to use the conventional robust standard error to the results of Kolesár and Rothe, 2018. Table 1.C.16 presents the estimates using the conventional robust standard error. In an additional specification, presented in table 1.C.19, I cluster the standard error at district level. However, the information on the districts in available only for the 2015 and 2020 wave, therefore the survey conducted in 2005 is not included.

1.6.5 Long term Effects

In order to investigate whether the length of exposure to violence impacts the tolerance of violence, I compare couples living in states where the husbands can start to legally drink at 21 (treated) to couples living in states where the husbands are legally allowed to drink at 25. To do so, I estimate equation 1.2. Figure 1.4 displays the estimates of the outcome variables along with 90% confidence intervals. Estimates in Figure 1.4(a) show that when the husbands become legally allowed to drink in states with the MLDA at 21, men's alcohol consumption is higher compared to the counterparts in states where the MLDA is at 25. The estimated coefficient before the partner is legally allowed to drink is insignificant and close to zero, suggesting that there is not significant statistical difference in terms of alcohol consumption in states with MLDA at 21 and 25 among couples whose husband is 19. After 4 years in which the partner is legally allowed to drink, husbands in states where the MLDA is 21 are 20 percentage points more likely to drink with respect to their counterparts in states where the MLDA is 25.

Figure 1.4(b) shows the coefficients corresponding to the estimates for equation 1.2, where the outcome variable is the duration of abuse (in years). The coefficient in the pre-treatment period is not significant and close to zero. This suggests that the difference in duration of abuse between women living in states with MLDA 21 and states with MLDA 25 is close to zero at any point in time before 21 years old. After the partner becomes legally allowed to drink, the length of exposure to violence increases with respect to women living in states where the partner can drink after 25. After 4 years in which the partner is legally allowed to drink, the women report a duration of abuse which is approximately 6 months higher (0.56 years) with respect to their counterparts in states where the MLDA is 25.

Figure 1.4(c) shows the coefficients corresponding to the estimates for equation 2, where the outcome variable is the variance-weighted index of tolerance of

violence. In the pre-treatment period, the coefficient is close to zero and not significant. This suggests that the difference in tolerance towards violence between women living in states with MLDA 21 and states with MLDA 25 is small at any point in time before 21 years old. In the first three post-treatment periods, we do not see a change on women's tolerance of violence, whereas, after four years in which the partner is legally allowed to drink, we notice a larger difference in the tolerance of violence among women whose husbands are legally allowed to drink for a longer time (0.3 standard deviations).[30]

These figures suggest that the longer the women are in an abusive relationship, the more likely they are to become tolerant towards violence if they have limited outside options.

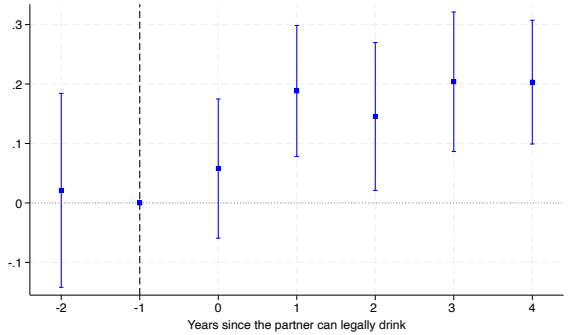
Figure 1.5 illustrates the long-term outcomes for individuals after reaching 25 years of age in states with a Minimum Legal Drinking Age (MLDA) of 25. This is aligned with the findings in Figure 1.4. Data suggests that in states with an MLDA of 25, the initial differences in alcohol consumption, duration of domestic violence incidents, and related attitudes diminish over time as compared to states with an MLDA of 21. The gap narrows as husbands in states with MLDA at 25 start consuming alcohol.[31]

[30]There might be concerns of selection of couples who formed after 21 years old, when they were legally allowed to drink. Figure 1.C.10 displays the estimates of the outcomes, when I estimate equation 5, restricting the sample to couples who got married before 21. The coefficients are less precisely estimated but in line with the main results presented in Figure 1.4.

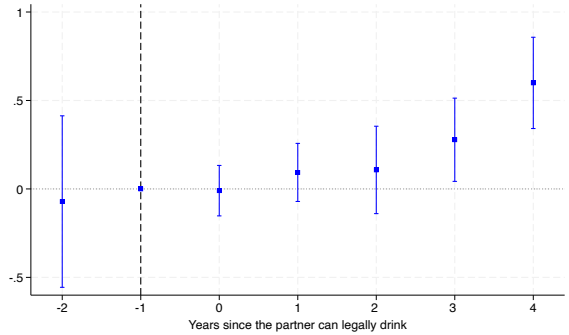
[31]Note that the coefficients between τ =0 and τ = 4 are slightly different with respect to those presented in Figure 1.4. The reason is because my events are the years within the marriage in which the partner can drink. Therefore, husbands aged 26 could potentially have gotten married at age 23 and therefore been drinking within the marriage for 3 years (and therefore be in the group t+3).

Figure 1.4: Long-term effects

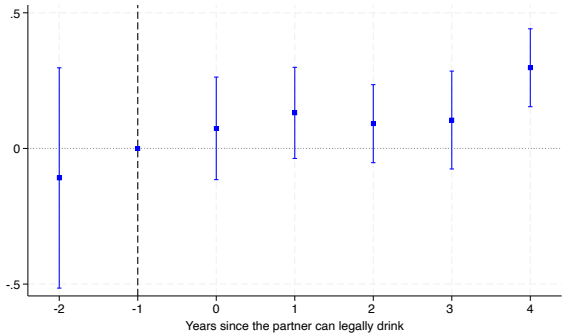
((a)) Husband's alcohol cosumption



((b)) Duration of abuse (years)



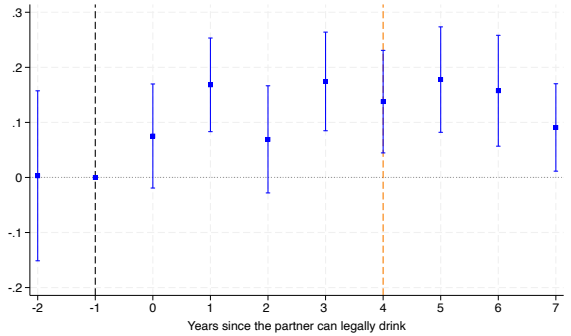
((c)) Women's tolerance towards wife-beating



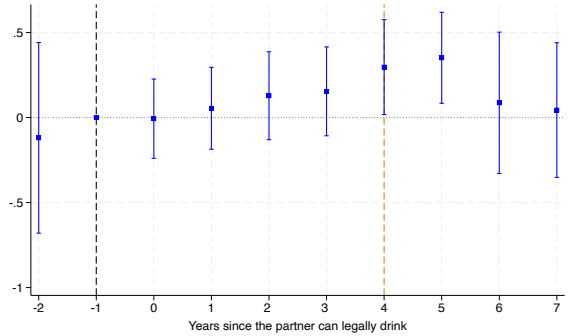
Note: Figure 1.4 reports the coefficient of the β from equation 1.2. The y-axis reports the estimated coefficient of the interaction between the years within marriage in which the partner can legally drink in states where the MLDA is 21 vs MLDA at 25. The event is identified as the years of being legally allowed to drink within the marriage. The x-axis represents years within the marriage the partner can legally drink. Omitted category: individuals aged 20 at the time of the interview. The sample is restricetd to couples whose husbands' age is between 19 and 25. The capped vertical bars show 90% confidence intervals calculated using robust standard errors clustered at the at the state and age at the interview level. *Source*: Own estimations based on National Family Health Survey (NFHS 2005-2015-2020).

Figure 1.5: Long-term effects – After 25

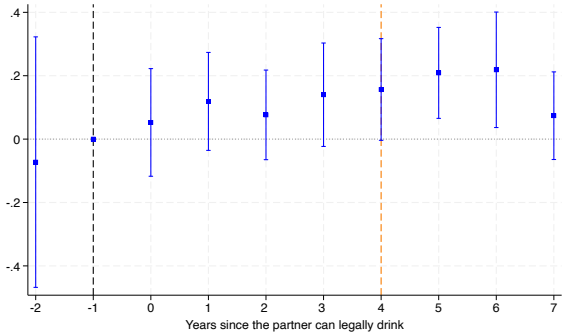
((a)) Husband's alcohol cosumption



((b)) Duration of abuse (years)



((c)) Women's tolerance towards wife-beating



Note: Figure 1.5 reports the coefficient of the β from equation 1.2. The y-axis reports the estimated coefficient of the interaction between the years within marriage in which the partner can legally drink in states where the MLDA is 21 vs MLDA at 25. The event is identified as the years of being legally allowed to drink within the marriage. The x-axis represents years within the marriage the partner can legally drink. Omitted category: individuals aged 20 at the time of the interview. The sample is restricetd to couples whose husbands' age is between 19 and 28. The orange dashed line identifies when husband can legally drink in states there the MLDA is 25. The capped vertical bars show 90% confidence intervals calculated using robust standard errors clustered at the at the state and age at the interview level. *Source*: Own estimations based on National Family Health Survey (NFHS 2005-2015-2020).

1.6.5.1 Alternative mechanisms

In the following paragraphs, I discuss alternative mechanisms through which the legal drinking age may have affected women's tolerance towards violence, aside from a direct change in the prevalence of violence.

First, women's attitudes towards violence might be affected by a change in men's attitudes. Once they reach the legal drinking age, men might be more likely to attend bars/restaurants and create new social networks. Such interactions might subsequently shape their own attitudes towards violence and lead to a change in their wives' attitudes. I examine this potential channel by testing whether being legally allowed to drink affects men's attitudes towards wife-beating. Column (1) of Table 1.5 shows that being above the legal drinking age has no significant effect on men's attitudes towards wife-beating. Figure 1.6(a) shows long-term effects on men's attitudes towards wife-beating. The coefficients are insignigficant and imprecisely estimated. The signs of the coefficients are negative, in the opposite direction to women's attitudes. Thus it is unlikely that women's attitudes are affected by a change in their husbands' view. Thus I conclude that this mechanism is unlikely to be at work in this setting.

Second, women's attitudes towards violence could be affected by an increase in men's unemployment. If, for example, men face more unemployment after reaching the MLDA due to increased alcohol consumption, the resulting household stress might influence women's tolerance of violence or aggression. To examine this channel, I test whether the minimum legal drinking age increases the likelihood of men being unemployed. In the data, I find insignificant effects in the short run, as shown by Column (2) of Table 1.5. Figure 1.6(b) shows men's unemployment in the long-run. After three years in which the husband has been legally allowed to drink, the effect on unemployment is close to zero and not statistically significant. After four years in which the husband can legally drink, the coefficient indicates that the husbands' probability of being unemployed decreases. The sign of this coefficient goes against the hypothesis that higher unemployment should lead to a change in women's attitudes. Therefore, I conclude that, in this context, this channel is unlikely to be the one driving the effect.

Third, women's attitudes might be affected by migration. For instance, if men migrate to states with different alcohol regulations, their interactions with women of diverse cultural backgrounds can subsequently shape women's perspectives on violence. To test this potential mechanism, I examine whether the being above the MLDA increases men's likelihood to migrate.[32] Column (3) of Table 1.5 indicates

[32]The NFHS asks how many years the respondent has been living in the place in which he has been interviewed. I created an indicator variable taking value one if the respondent answered to

that there is no significant effect on the probability of the husband to migrate. Figure 1.6(c) confirms the short-term effect; the coefficients are all close to zero and insignificant. Thus, I can rule out the migration mechanism too.

Table 1.5: Alternative Mechanisms, Short-term

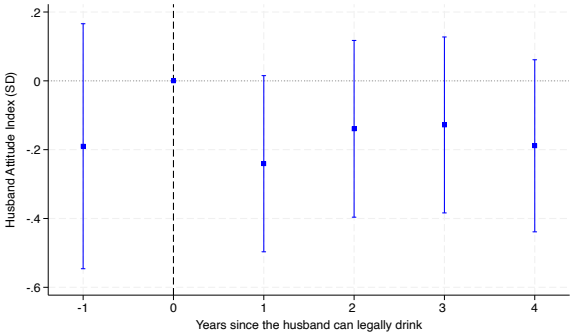
	Husband's attitudes (1)	Husband's unemployment (2)	Husband ever migrate (3)
Above MLDA	0.018	0.020	-0.039
SE	0.116	0.018	0.035
P-Value	0.543	0.176	0.353
Left BW	30	34	30
Right BW	117	124	117
N	5,010	5,463	5,015
Mean of control	0.134	0.920	0.686

Notes: Table 1.5 reports the estimated coefficients based estimating a local non-parametric regression-discontinuity design specification in the Calonico, Cattaneo, and Titiunik, 2014 optimal bandwidth, with a triangular kernel and a linear polynomial of the score, as presented in equation 1. The regression-discontinuity design exploits the within states variation generated by the MLDA, comparing couples whose husband's age is just below and above the minimum age at drinking. The sample consists of couples residing in states where the MLDA is 25. All specifications include wave and state fixed effects. The dependent variable of column (1) is a variance weighted index following Anderson, 2008 that combines husbands' justifiability of wife-beating in 7 scenarios: (i) if she goes out without permission; (ii) if she neglects the children; (iii) if the argues with the husband; (iv) if she burns food; (v) if she refuses sex; (vi) if she is unfaithful; (vii) if she disrespects the in-laws. The dependent variable of column (2) is a binary variable coded as one if the husband is unemployed. The dependent variable of column (3) is a binary variable coded as one if the husband has ever migrated. Robust bias corrected standard errors clustered at the running variable level in parentheses. * p < 0.1; ** p <0.05; *** p <0.01. *Source*: Own estimations based on National Family Health Survey (NFHS 2005-2015-2020).

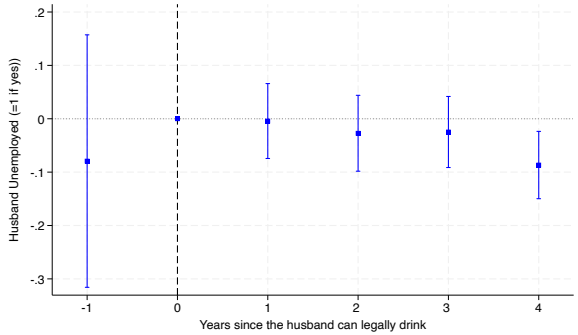
not have been living in the same location, and 0 if he answers that he has always been living in the same location.

Figure 1.6: Alternative Mechanisms, Long-term

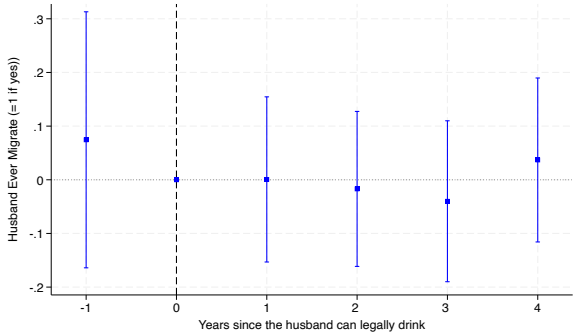
((a)) Husbands' Attitudes towards violence



((b)) Husbands' unemployment



((c)) Husbands' migration



Note: Figure 1.6 reports the coefficient of the β from equation 1.2. The y-axis reports the estimated coefficient of the interaction between the years within the marriage in which the partner can legally drink in states where the MLDA is 21 vs MLDA at 25. The x-axis represents the years since the husband can legally drink relative to 21 years old, and consequently the years in which the husband was legally allowed to drink. Omitted category: individuals aged 20 at the time of the interview. The capped vertical bars show 90% confidence intervals calculated using robust standard errors clustered at the at the state and age at the interview level. *Source*: Own estimations based on National Family Health Survey (NFHS 2005-2015-2020).

1.7 Conclusions

This paper studies the relationship between intimate partner violence and victims' tolerance towards it in India, where women's external exit options are very restricted or costly. Specifically, I investigate if victims' tolerance of violence serves as a coping mechanism, and how this mechanism may differ from short-term to prolonged abuse exposure. To understand the dynamics of attitudes towards intimate partner violence in the short- and long-term effect, I propose a simple conceptual framework that analyses how women in settings with constrained outside options, adjust their tolerance to violence based on their husbands' potential abusive behaviour. By exploiting the variation within and across Indian States and combining it with the date of birth of the husbands, I explore whether women who are abused by their intimate partners are more likely to condone violence, and to explore whether this potential coping mechanism evolves over time.

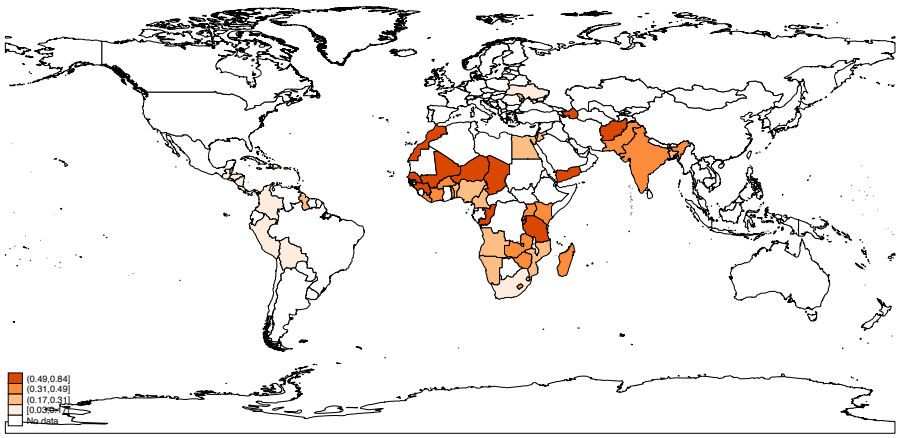
There are three main take-aways from this study. First, the attainment of the legal drinking age by husbands significantly increases their wives' probability of being abused. Second, a rise in the prevalence of intimate partner violence in the short term does not lead to a shift in the victims' attitudes toward violence. Instead, the duration of abuse is a key factor. Third, evidence indicates that long term exposure to violence shifts women's attitudes towards violence. This suggests that over time, victims may normalise and rationalise the violence inflicted to them as a coping mechanism, if they do not have an outside option.

The paper identifies several potential avenues for future research. First, this study suggests that in contexts where outside options like divorce are stigmatised, tolerance of violence might act as coping mechanism for intimate partner violence victims. However, examining this relationship in settings where divorce, for instance, is less stigmatised remains an unexplored area, that deserves further investigation. Second, this paper highlights two potential main mechanisms behind women's tolerance of violence: the coping mechanism, and the risk factor mechanism (i.e., women with prior higher tolerance of violence tend to select into abusive relationships). An exploration of the interplay of the two mechanisms and their quantification can further advance our understanding of victims' attitude formation.

Appendix 1.A Descriptives

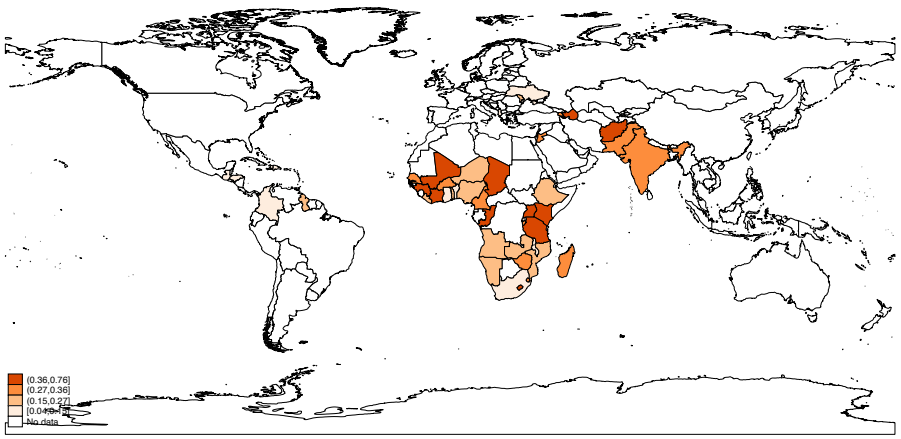
1.A.0.1 Women's and Men's tolerance of wife-beating across the world

Figure 1.A.1: Women's Tolerance



Note: The map shows the country average women's tolerance towards violence f the wife: i) goes out without permission, ii) neglects the children, iii) argues with the husband, iv) burns food, v) refuses sexual intercourse. *Source:* Demographic and Health Survey (DHS - last survey rounds).

Figure 1.A.2: Men's Tolerance



Note: The map shows the country average men's tolerance towards violence f the wife: i) goes out without permission, ii) neglects the children, iii) argues with the husband, iv) burns food, v) refuses sexual intercourse. *Source:* Demographic and Health Survey (DHS - last survey rounds).

Table 1.A.1: Women's tolerance towards wife-beating in 5 scenarios

Country Round	Goes out w/out permission	Neglects the Children	Argues with the husband	Burns food	Refuses sex	Indicator
Afghanistan 2015	0.72	0.53	0.64	0.20	0.38	0.84
Albania 2017-2018	0.04	0.05	0.02	0.01	0.01	0.07
Angola 2015	0.15	0.17	0.16	0.11	0.12	0.25
Armenia 2015-2016	0.05	0.09	0.06	0.01	0.00	0.11
Azerbajan	0.46	0.37	0.34	0.16	0.13	0.53
Bangladesh 2014	0.14	0.15	0.20	0.04	0.07	0.28
Benin 2017-18	0.21	0.23	0.21	0.14	0.13	0.31
Bolivia 2008	0.06	0.12	0.05	0.02	0.03	0.16
Burkina faso 2010	0.30	0.30	0.31	0.10	0.20	0.43
Burundi 2016	0.39	0.52	0.30	0.22	0.42	0.59
Cameroon 2018	0.16	0.23	0.15	0.09	0.11	0.28
Chad 2014	0.62	0.63	0.53	0.51	0.44	0.75
Colombia 2015-2016	0.01	0.02	0.01	0.01	0.01	0.03
Congo democratic republic 2013-14	0.50	0.53	0.59	0.25	0.46	0.73
Cote d'ivoire 2011	0.27	0.33	0.35	0.17	0.22	0.47
Dominican republic 2013	0.01	0.02	0.01	0.00	0.01	0.02
Egypt 2014	0.26	0.24	0.13	0.07	0.20	0.32
Eswatini 2006	0.09	0.11	0.17	0.03	0.03	0.23
Guatemala 2014-2015	0.04	0.08	0.03	0.02	0.04	0.10
Guinea 2018	0.55	0.54	0.51	0.24	0.50	0.66
Guyane 2009	0.06	0.12	0.07	0.05	0.04	0.17
Haiti 2016-2017	0.11	0.10	0.02	0.05	0.04	0.16
Honduras 2011-2012	0.04	0.10	0.05	0.02	0.04	0.12
India 2019-2021	0.19	0.28	0.22	0.11	0.14	0.37
Jordan 2017-18	0.07	0.07	0.06	0.02		0.14
Kenya 2014	0.22	0.34	0.21	0.07	0.15	0.41
Lesotho 2014	0.11	0.22	0.25	0.06	0.10	0.33
Liberia 2013	0.29	0.32	0.33	0.07	0.11	0.42
Madagascar 2008	0.20	0.29	0.06	0.07	0.09	0.32
Malawi 2016	0.07	0.09	0.07	0.06	0.08	0.15
Mali 2018	0.54	0.52	0.69	0.23	0.64	0.77
Moldova 2004	0.07	0.19	0.05	0.03	0.04	0.22
Morocco 2003	0.50	0.50	0.51	0.24	0.45	0.62
Mozambique 2011	0.09	0.08	0.13	0.06	0.06	0.21
Namibia 2013	0.13	0.20	0.12	0.10	0.08	0.29
Nicaragua 2001	0.08	0.13	0.06	0.04	0.06	0.16
Niger 2012	0.44	0.43	0.51	0.35	0.52	0.58
Nigeria 2018	0.21	0.22	0.20	0.15	0.20	0.27
Pakistan 2017-18	0.32	0.28	0.32	0.19	0.28	0.41
Peru 2012	0.01	0.02	0.01	0.01	0.01	0.03
Rwanda 2014	0.22	0.30	0.21	0.09	0.25	0.36
Senegal 2017	0.33	0.36	0.36	0.22	0.36	0.44
South africa 2016	0.02	0.04	0.02	0.01	0.01	0.05
Tanzania 2015	0.42	0.49	0.43	0.20	0.32	0.58
Togo 2013	0.18	0.19	0.20	0.11	0.10	0.29
Uganda 2016	0.30	0.39	0.26	0.14	0.18	0.48
Ukraine 2009	0.00	0.03	0.01	0.01	0.00	0.04
Yemen 2013	0.36	0.31	0.20	0.34	0.10	0.50
Zambia 2018	0.27	0.32	0.33	0.22	0.31	0.44
Zimbabwe 2015	0.23	0.22	0.17	0.08	0.15	0.37
Average	0.22	0.25	0.22	0.12	0.17	0.34

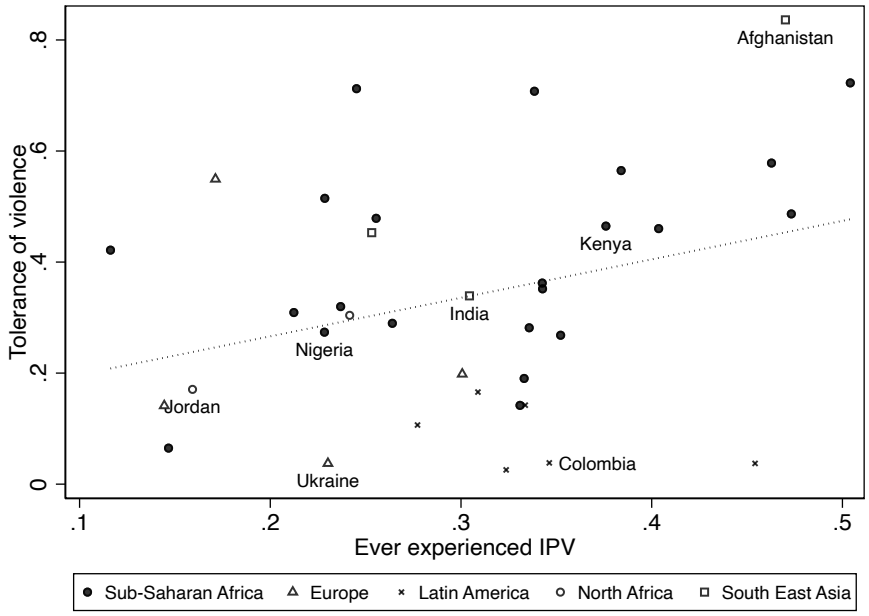
Notes: Table 1.A.1 shows the average tolerance of wife-beating at country level. The first column in the table refers to the country round used. Subsequent columns show the country's average women's tolerance towards wife-beating in various scenarios involving. Specifically if the wife: i) goes out without permission, ii) neglects the children, iii) argues with the husband, iv) burns food, v) refuses sexual intercourse. The application of sample weights ensures representativeness. *Source:* Demographic and Health Survey (DHS - last survey rounds).

Table 1.A.2: Men's tolerance towards wife-beating in 5 scenarios

Country Round	Goes out w/out permission	Neglects the Children	Argues with the husband	Burns food	Refuses sex	Indicator
Afghanistan 2015	0.63	0.28	0.48	0.09	0.21	0.74
Albania 2017-2018	0.07	0.08	0.04	0.01	0.02	0.12
Angola 2015	0.08	0.12	0.11	0.06	0.06	0.19
Armenia 2015-2016	0.12	0.18	0.17	0.01	0.02	0.24
Azerbajan	0.42	0.38	0.57	0.07	0.12	0.64
Benin 2017-18	0.09	0.09	0.10	0.07	0.07	0.14
Burkina faso 2010	0.17	0.19	0.20	0.07	0.11	0.32
Burundi 2016	0.17	0.25	0.10	0.05	0.13	0.32
Cameroon 2018	0.15	0.23	0.14	0.06	0.08	0.28
Chad 2014	0.29	0.38	0.23	0.28	0.25	0.50
Colombia 2015-2016	0.02	0.03	0.02	0.01	0.01	0.04
Congo democratic republic 2013-14	0.33	0.39	0.42	0.15	0.24	0.58
Cote d'ivoire 2011	0.22	0.28	0.25	0.12	0.12	0.41
Dominican republic 2013	0.02	0.02	0.01	0.01	0.01	0.04
Eswatini 2006	0.15	0.15	0.23	0.04	0.04	0.31
Ethiopia 2016	0.17	0.19	0.16	0.12	0.13	0.27
Ghana 2014	0.07	0.08	0.06	0.03	0.05	0.12
Guatemala 2014-2015	0.02	0.04	0.02	0.01	0.01	0.07
Guinea 2018	0.38	0.43	0.33	0.17	0.26	0.53
Guyane 2009	0.07	0.14	0.08	0.04	0.04	0.20
Haiti 2016-2017	0.06	0.05	0.01	0.02	0.02	0.09
Honduras 2011-2012	0.03	0.07	0.04	0.03	0.02	0.09
India 2019-2021	0.15	0.22	0.20	0.10	0.10	0.33
Jordan 2017 2018	0.19	0.13	0.18	0.08		0.31
Kenya 2014	0.19	0.27	0.21	0.05	0.10	0.36
Lesotho 2014	0.16	0.26	0.25	0.06	0.09	0.38
Liberia 2013	0.14	0.15	0.18	0.03	0.04	0.24
Madagascar 2008	0.18	0.24	0.09	0.06	0.08	0.29
Malawi 2016	0.05	0.06	0.05	0.02	0.05	0.12
Mali 2018	0.22	0.25	0.38	0.11	0.24	0.45
Moldova 2004	0.10	0.19	0.08	0.03	0.04	0.23
Mozambique 2011	0.06	0.07	0.08	0.01	0.09	0.15
Namibia 2013	0.10	0.14	0.09	0.04	0.03	0.21
Niger 2012	0.15	0.15	0.19	0.09	0.14	0.25
Nigeria 2018	0.12	0.11	0.12	0.07	0.11	0.19
Pakistan 2017-18	0.28	0.19	0.20	0.04	0.09	0.37
Rwanda 2014	0.07	0.12	0.05	0.02	0.06	0.15
Senegal 2017	0.14	0.17	0.18	0.06	0.11	0.26
South africa 2016	0.04	0.06	0.04	0.02	0.01	0.09
Tanzania 2015	0.23	0.31	0.25	0.06	0.14	0.39
Togo 2013	0.10	0.12	0.10	0.06	0.05	0.17
Uganda 2016	0.22	0.28	0.23	0.07	0.12	0.39
Ukraine 2009	0.04	0.10	0.05	0.01	0.02	0.12
Zambia 2018	0.12	0.15	0.14	0.06	0.10	0.23
Zimbabwe 2015	0.18	0.18	0.14	0.06	0.06	0.31
Average	0.15	0.17	0.16	0.06	0.09	0.27

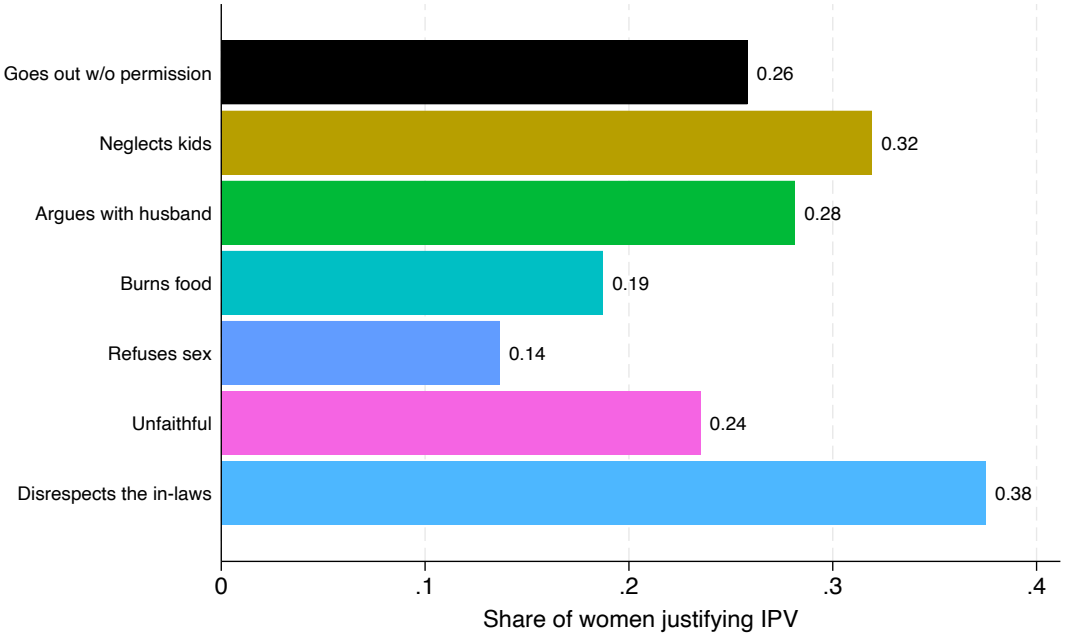
Notes: Table 1.A.2 shows the average tolerance of wife-beating at country level. The first column in the table refers to the country round used. Subsequent columns show the country's average men's tolerance towards wife-beating in various scenarios involving. Specifically if the wife: i) goes out without permission, ii) neglects the children, iii) argues with the husband, iv) burns food, v) refuses sexual intercourse. The application of sample weights ensures representativeness. *Source:* Demographic and Health Survey (DHS - last survey rounds).

Figure 1.A.3: Average tolerance of violence and prevalence of IPV



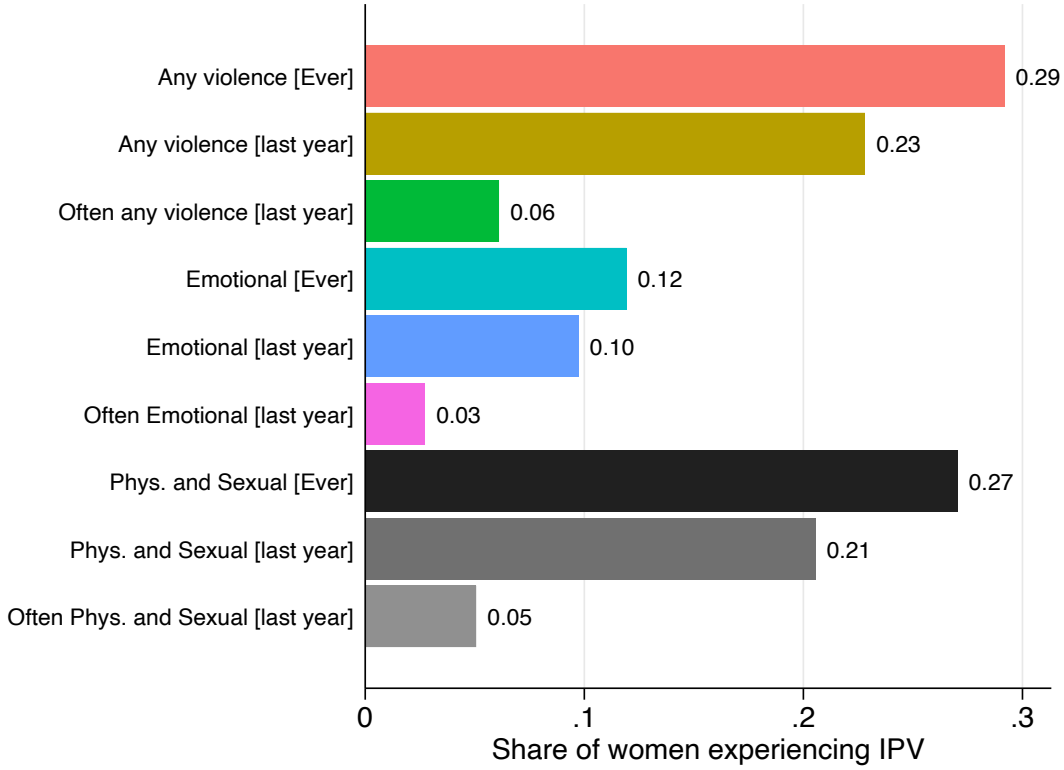
Note: The figure presents the positive correlation between the tolerance of IPV and experience of violence at country level. The y axis represents the country average women's tolerance of violence, and the x axis the country average experience of intimate partner violence during women's lifetime. The regression line (dotted line) has a slope of 0.693 and a standard error of 0.353. *Source:* Demographic and Health Survey (DHS - last survey rounds).

Figure 1.A.4: Women's tolerance of violence



Note: The figure presents the share of women who justifies violence if she (i) argues with the husband, (ii) neglects kids, (iii) goes out without permission, (iv) burns food, (v) refuses sexual intercourse, (vi) is unfaithful and (vii) disrespects the in-laws. Sample restricted to couples residing in states where the MLDA is 21 and 25. *Source:* Own calculations using the National Family Health Survey (NFHS 2005-2015-2020).

Figure 1.A.5: Prevalence of IPV in the last 12 months



Note: The figure presents the share of women who reported to have ever or in the last 12 months experienced emotional, physical, and sexual violence from their current partner, along with the frequency of the abuse. Sample restricted to couples residing in states where the MLDA is 21 and 25. *Source:* Own calculations using the National Family Health Survey (NFHS 2005-2015-2020).

1.A.0.2 Duration of Marriage and Abuse in states with MLDA at 21 and 25

This section provides some descriptive statistics of the sample used in the Event Study approach, as explained in Section 1.5.2.

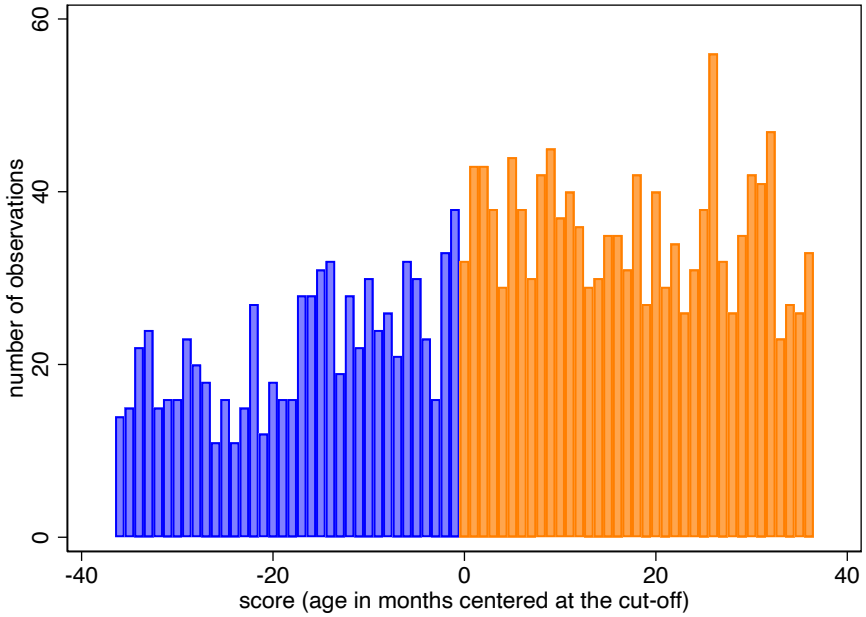
Table 1.A.3: Descriptive Statistics Full Sample, MLDA 21, MLDA 25

	Mean	SD	Min	Max
Panel A: Full Sample				
Age (men)	23.271	1.672	19.000	25.000
Age (women)	20.699	2.171	15.000	25.000
Age Marriage (men)	20.352	2.253	15.000	25.000
Age Marriage (women)	17.709	2.299	12.000	25.000
Duration Marriage	2.553	2.174	0.000	10.000
Duration Violence	0.611	1.400	0.000	9.000
Duration Violence (conditional on ever violence)	2.420	1.843	0.000	9.000
Interval to first birth (months)	20.834	12.437	0.000	108.000
Panel B: MLDA 21				
Age (men)	23.236	1.694	19.000	25.000
Age (women)	20.669	2.151	15.000	25.000
Age Marriage (men)	20.249	2.237	15.000	25.000
Age Marriage (women)	17.606	2.248	12.000	25.000
Duration Marriage	2.618	2.176	0.000	10.000
Duration Violence	0.662	1.445	0.000	9.000
Duration Violence (conditional on ever violence)	2.438	1.832	0.000	9.000
Interval to first birth (months)	21.294	12.591	0.000	108.000
Panel C: MLDA 25				
Age (men)	23.417	1.566	19.000	25.000
Age (women)	20.826	2.254	15.000	25.000
Age Marriage (men)	20.795	2.268	15.000	25.000
Age Marriage (women)	18.151	2.456	12.000	25.000
Duration Marriage	2.275	2.141	0.000	10.000
Duration Violence	0.392	1.172	0.000	9.000
Duration Violence (conditional on ever violence)	2.303	1.918	0.000	9.000
Interval to first birth (months)	18.769	11.502	0.000	102.000

Notes: Descriptive statistics (mean, standard deviation, min, and max) of the main variables of interest. Panel A includes the full sample, Panel B includes couples residing in states where the MLDA = 21, and Panel C includes couples residing in states where the MLDA = 25. *Source*: Own calculations using the National Family Health Survey (NFHS 2005-2015-2020).

Appendix 1.B Validity Assumptions

Figure 1.B.1: Assumption 1: no manipulation in the treatment status



Note: The figure presents the distribution of the running variable. Bins are of size 1 in a 36 months bandwidth around the cutoff at 0 (that corresponds to husband's age in months centred around 25 years old and 0 month). *Source:* Own calculations using the National Family Health Survey (NFHS 2005-2015-2020).

Table 1.B.1: Assumption 2: Balance of the pre-determined covariates – Full Sample

	Above MLDA	Left Bandwidth	Right Bandwidth	N
Low Caste (Men)	0.031	43	72	3,448
	(0.043)			
Low Caste (Women)	0.033	32	82	3,601
	(0.048)			
Childhood in rural areas (Men)	-0.022	41	69	2,297
	(0.068)			
Childhood in rural areas (Women)	-0.001	38	126	367
	(0.149)			
Hindu (Men)	-0.020	32	90	4,001
	(0.053)			
Hindu (Women)	-0.002	37	86	3,946
	(0.053)			
Year of Birth (Men)	0.005	38	150	6,575
	(0.044)			
Year of Birth (Women)	0.118	34	76	3,547
	(0.226)			
Age Gap	0.128	33	79	3,581
	(0.227)			
Education Gap	-0.342	37	92	4,156
	(0.416)			
Household Size	0.200	33	70	3,254
	(0.321)			
Daughters at home	0.089	42	62	3,014
	(0.075)			
Husband's unemployment	-0.020	34	124	5,463
	(0.018)			
Husband working away for work	-0.000	34	115	4,404
	(0.043)			
Husband earns cash	0.021	33	121	4,753
	(0.019)			
Abusive father (Men)	0.043	32	142	6,165
	(0.044)			
Abusive father (Women)	0.060	36	58	1,995
	(0.056)			
Wave 1	-0.000	5	27	1,090
	(0.000)			
Wave 2	0.000	11	20	1,061
	(0.000)			
Wave 3	0.000	7	29	1,266
	(0.000)			

Notes: Local non-parametric regression-discontinuity design specification in the Calonico, Cattaneo, and Titiunik, 2014 optimal bandwidth, with a triangular kernel and a linear polynomial of the score. Robust corrected standard errors clustered at the running variable level in parentheses. All specifications year of the interview and state fixed effects.* $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$. *Source:* Own estimations using the National Family Health Survey (NFHS 2005-2015-2020).

Table 1.B.2: Assumption 2: Balance of the pre-determined covariates – Lower Caste Sample

	Above MLDA	Left Bandwidth	Right Bandwidth	N
Childhood in rural areas (Men)	-0.053	36	92	1,757
	(0.066)			
Childhood in rural areas (Women)	0.123	33	83	156
	(0.191)			
Hindu (Men)	-0.012	34	83	2,279
	(0.043)			
Hindu (Women)	0.005	37	95	2,634
	(0.046)			
Year of Birth (Men)	0.009	34	156	4,021
	(0.043)			
Year of Birth (Women)	0.302	29	79	2,147
	(0.407)			
Age Gap	0.296	28	81	2,186
	(0.416)			
Education Gap	-0.507	29	134	3,495
	(0.617)			
Household Size	0.519	38	135	3,663
	(0.369)			
Daughters at home	0.140	39	64	1,891
	(0.087)			
Husband's unemployment	-0.007	38	115	3,074
	(0.026)			
Husband working away for work	-0.017	35	107	2,612
	(0.048)			
Husband earns cash	0.018	40	125	3,087
	(0.029)			
Abusive father (Men)	.024	33	118	3,109
	(0.057)			
Abusive father (Women)	0.099	34	55	1,227
	(0.082)			
Wave 1	-0.000	11	28	806
	(0.000)			
Wave 2	0.000	8	26	697
	(0.000)			
Wave 3	0.000	18	33	1,040
	(0.000)			

Notes: Local non-parametric regression-discontinuity design specification in the Calonico, Cattaneo, and Titiunik, 2014 optimal bandwidth, with a triangular kernel and a linear polynomial of the score, restricting the sample to Lower Caste individuals. Robust corrected standard errors clustered at the running variable level in parentheses. All specifications year of the interview and state fixed effects.* $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$. *Source:* Own estimations using the National Family Health Survey (NFHS 2005-2015-2020).

Table 1.B.3: Assumption 2: Balance of the pre-determined covariates – Upper Caste Sample

	Above MLDA	Left Bandwidth	Right Bandwidth	N
Childhood in rural areas (Men)	0.001	36	75	862
	(0.145)			
Childhood in rural areas (Women)	-0.548	15	71	67
	(1.079)			
Hindu (Men)	-0.077*	33	118	1,885
	(0.084)			
Hindu (Women)	-0.054	36	109	1,795
	(0.090)			
Year of Birth (Men)	-0.011	34	134	2,253
	(0.058)			
Year of Birth (Women)	-0.187	38	86	1,467
	(0.489)			
Age Gap	-0.193	38	89	1,492
	(0.470)			
Education Gap	-0.016	31	93	1,542
	(0.381)			
Household Size	-0.000	33	68	1,194
	(0.378)			
Daughters at home	0.017	34	81	1,356
	(0.118)			
Husband unemployment	-0.030	34	116	1,862
	(0.037)			
Husband working away for work	0.015	32	125	1,692
	(0.064)			
Husband earns cash	0.029	33	123	1,765
	(0.038)			
Abusive father (Men)	0.064	33	120	1,935
	(0.054)			
Abusive father (Women)	0.017	28	93	1,132
	(0.062)			
Wave 1	0.000	15	37	621
	(0.000)			
Wave 2	0.000	30	23	537
	(0.000)			
Wave 3	0.000	28	34	658
	(0.000)			

Notes: Local non-parametric regression-discontinuity design specification in the Calonico, Cattaneo, and Titiunik, 2014 optimal bandwidth, with a triangular kernel and a linear polynomial of the score, restricting the sample to Upper Caste individuals. Robust corrected standard errors clustered at the running variable level in parentheses. All specifications year of the interview and state fixed effects.* $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$. *Source:* Own estimations using the National Family Health Survey (NFHS 2005-2015-2020).

Table 1.B.4: Frandsen Test to test for no Manipulation of the running variable-Low and Upper Caste Samples

Caste	Frandsen test	p-value
Low Caste	Fail to reject	0.473
Upper Caste	Fail to reject	0.887

Notes: Frandsen test for continuity of the running variable. *Source:* Own estimations using the National Family Health Survey (NFHS 2005-2015-2020).

Appendix 1.C Robustness Checks

Table 1.C.1: Alternative definitions of alcohol consumption

	Reduced Form (ITT)	
	Alcohol consumption [as reported by men]	Alcohol consumption [as reported by women]
Above MLDA	0.102***	0.062
SE	(0.036)	(0.043)
Left BW	30	32
Right BW	95	130
N	4,224	4,617
Mean of control	0.254	0.159

Notes: Local non-parametric regression-discontinuity design specification in the Calonico, Cattaneo, and Titiunik, 2014 optimal bandwidth, with a triangular kernel and a linear polynomial of the score. *Alcohol consumption as reported by the men* is a binary variable that takes value one when the male respondent is asked whether he consumes alcohol, *Alcohol consumption as reported by the women* is a binary variable that takes value one when the female respondent is asked whether her husband consumes alcohol. Robust corrected standard errors clustered at the running variable level in parentheses. All specifications include wave and state fixed effects. * p < 0.1; ** p <0.05; *** p <0.01. *Source:* Own estimations using the National Family Health Survey (NFHS 2005-2015-2020).

Table 1.C.2: Alternative definitions of tolerance

Tolerance [Indicator]	
Above MLDA	0.015
SE	(0.087)
Left BW	37
Right BW	114
N	4945
Mean of control	0.46

Notes: Local non-parametric regression-discontinuity design specification in the Calonico, Cattaneo, and Titiunik, 2014 optimal bandwidth, with a triangular kernel and a linear polynomial of the score. The outcome variable is a binary variable that takes value one if the respondents deem as acceptable at least one situation. Robust corrected standard errors clustered at the running variable level in parentheses. All specifications include wave and state fixed effects. * p < 0.1; ** p <0.05; *** p <0.01. *Source:* Own estimations using the National Family Health Survey (NFHS 2005-2015-2020).

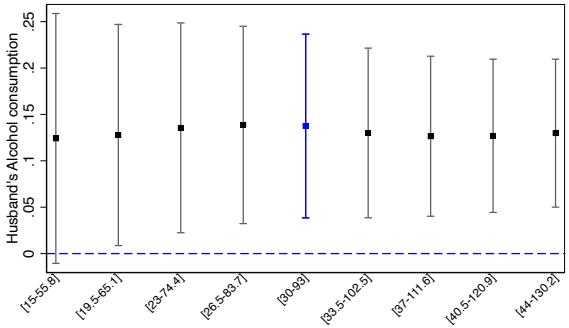
Table 1.C.3: Short-term effects – Exluding individuals born in January

	Husband Drinks	IPV in the past year			Frequent IPV in the past year			Tolerance index
		Any	Phys. & Sex.	Emotional	Any	Phys. & Sex.	Emotional	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Above MLDA	0.112*	0.055	0.013	0.056***	0.046**	0.026	0.025	0.050
SE	0.069	0.035	0.035	0.024	0.023	0.020	0.016	0.158
Left BW	35	37	35	38	36	34	35	34
Right BW	92	99	110	91	85	107	73	117
N	2,830	3,107	3,407	2,822	2,614	3,328	2,331	4,477
Mean of control	0.315	0.166	0.144	0.076	0.049	0.042	0.021	0.036

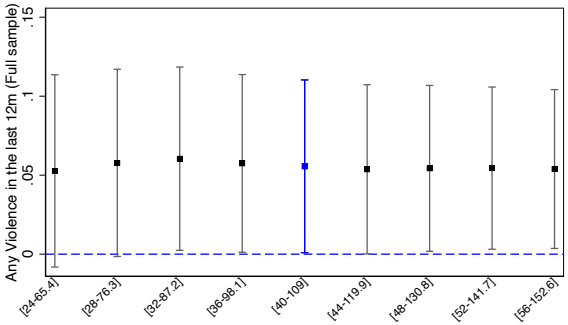
Notes: Table 3.1 reports the estimated coefficients based estimating a local non-parametric regression-discontinuity design specification in the Calonico, Cattaneo, and Titiunik, 2014 optimal bandwidth, with a triangular kernel and a linear polynomial of the score, as presented in equation 2.1, excluding from the sample individuals who declared to be born in January. The regression-discontinuity design exploits the within states variation generated by the MLDA, comparing couples whose husband's age is just below and above the minimum age at drinking. The sample consists of couples residing in states where the MLDA is 25. All specifications include wave and state fixed effects. The dependent variable of column (1) is measured as a binary variable coded as one if either the wife reports that the husband is drinking and/or if the husband self-report that he drinks alcohol. The dependent variables of columns (2), (3), and (4) are measured as a binary variable coded as one if the reported experiencing any form of IPV, any physical or sexual violence, and any emotional violence in the last 12 months. The dependent variables of columns (5), (6), and (7) are measured as a binary variable coded as one if the reported experiencing frequently any form of IPV, any physical or sexual violence, and any emotional violence in the last 12 months. The dependent variable of column (8) is a variance weighted index following Anderson, 2008 that combines women's justifiability of wife-beating in 7 scenarios: (i) if she goes out without permission; (ii) if she neglects the children; (iii) if the argues with the husband; (iv) if she burns food; (v) if she refuses sex; (vi) if she is unfaithful; (vii) if she disrespects the in-laws. Robust bias corrected standard errors clustered at the running variable level in parentheses. * p < 0.1; ** p <0.05; *** p <0.01. *Source*: Own estimations based on National Family Health Survey (NFHS 2005-2015-2020).

Figure 1.C.1: Bandwidth Sensitivity - Full Sample

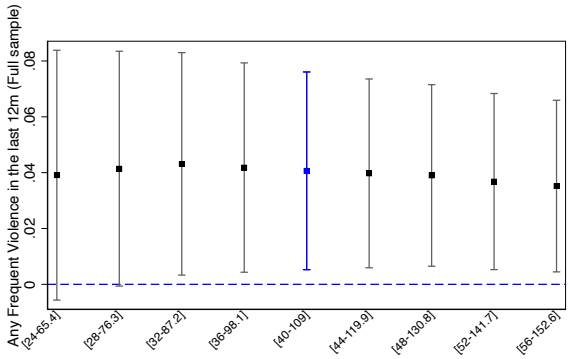
((a)) Effect of MLDA on husband's alcohol consumption, with alternative bandwidths



((b)) Effect of MLDA on prevalence of violence in the last 12 months, with alternative bandwidths



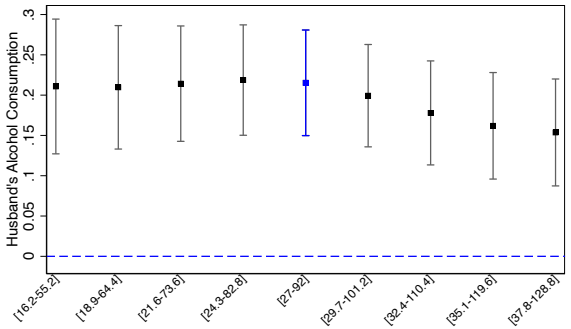
((c)) Effect of MLDA on **frequent** prevalence of violence in the last 12 months, with alternative bandwidths



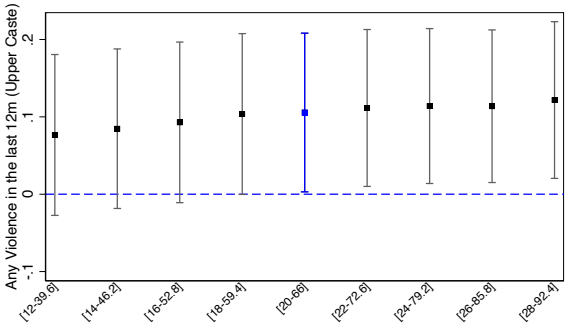
Note: Each point denotes the estimated β coefficient derived from a local nonparametric regression-discontinuity design. The x-axis bandwidth reflects the specification used. A triangular kernel with a linear polynomial of the score was utilized. The blue point estimate corresponds to the coefficient estimated using the optimal bandwidths as outlined by Calonico, Cattaneo, and Titiunik, 2014. The other coefficients were estimated by modifying these bandwidths: adding 10% (shifting towards the right of the graph) and subtracting 10% (shifting towards the left). Capped vertical bars indicate 90% confidence intervals. Robust standard errors clustered at the running variable level. *Source:* Own estimations using the National Family Health Survey (NFHS 2005-2015-2020).

Figure 1.C.2: Bandwidth Sensitivity - Upper Caste Sample

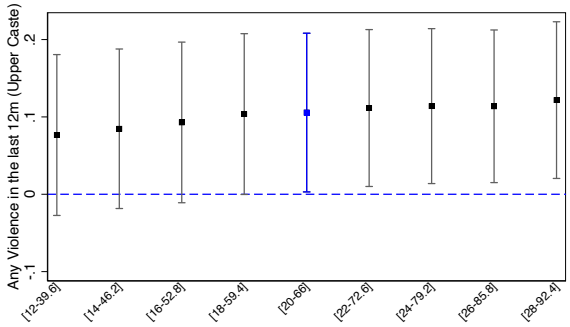
((a)) Effect of MLDA on husband's alcohol consumption, with alternative bandwidths [Upper Caste]



((b)) Effect of MLDA on prevalence of violence in the last 12 months, with alternative bandwidths [Upper Caste]



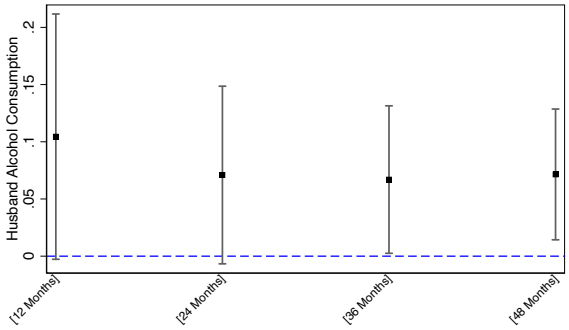
((c)) Effect of MLDA on **frequent** prevalence of violence in the last 12 months, with alternative bandwidths [Upper Caste]



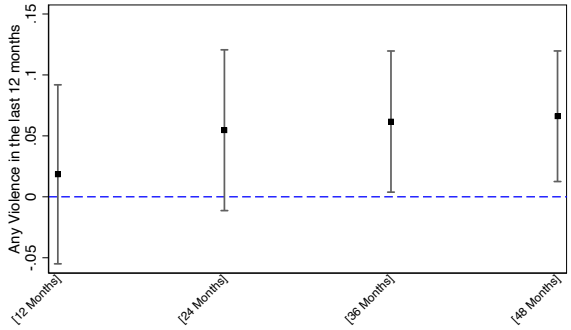
Note: Each point denotes the estimated β coefficient derived from a local nonparametric regression-discontinuity design, restricting the sample to couples belonging to the **Upper Caste**. The x-axis bandwidth reflects the specification used. A triangular kernel with a linear polynomial of the score was utilised. The blue point estimate corresponds to the coefficient estimated using the optimal bandwidths as outlined by Calonico, Cattaneo, and Titiunik, 2014. The other coefficients were estimated by modifying these bandwidths: adding 10% (shifting towards the right of the graph) and subtracting 10% (shifting towards the left). Capped vertical bars indicate 90% confidence intervals. Robust standard errors clustered at the running variable level. *Source:* Own estimations using the National Family Health Survey (NFHS 2005-2015-2020).

Figure 1.C.3: Bandwidth Sensitivity: 12-24-36-48 months

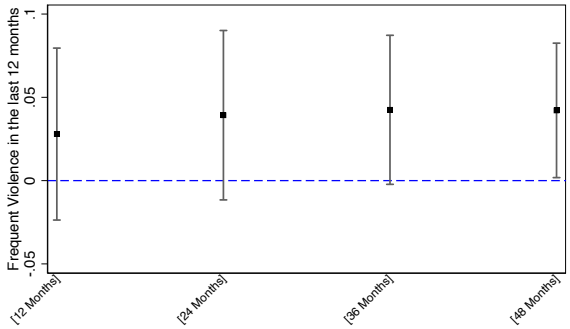
((a)) Effect of MLDA on husband's alcohol consumption, with alternative bandwidths [Full Sample]



((b)) Effect of MLDA on prevalence of violence in the last 12 months, with alternative bandwidths [Full Sample]



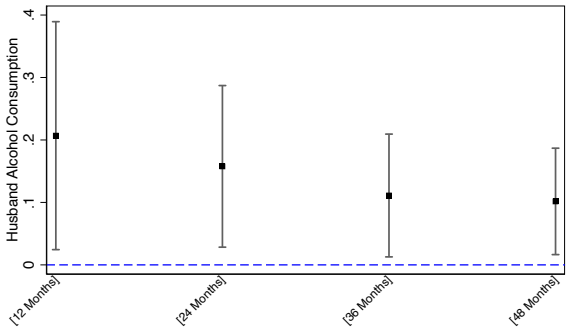
((c)) Effect of MLDA on **frequent** prevalence of violence in the last 12 months, with alternative bandwidths [Full Sample]



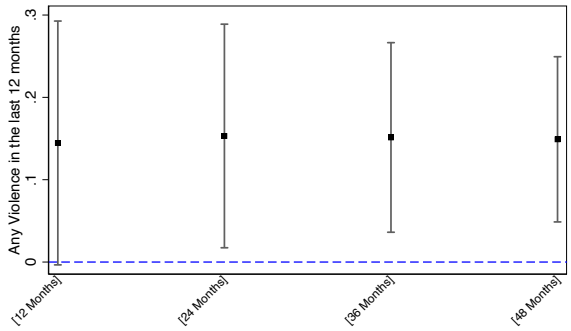
Note: Each point denotes the estimated β coefficient derived from a local nonparametric regression-discontinuity design. The x-axis bandwidth reflects the specification used. A triangular kernel with a linear polynomial of the score was utilised. The blue point estimate corresponds to the coefficient estimated using the optimal bandwidths as outlined by Calonico, Cattaneo, and Titiunik, 2014. The other coefficients were estimated by modifying these bandwidths: adding 10% (shifting towards the right of the graph) and subtracting 10% (shifting towards the left). Capped vertical bars indicate 90% confidence intervals. Robust standard errors clustered at the running variable level. *Source:* Own estimations using the National Family Health Survey (NFHS 2005-2015-2020).

Figure 1.C.4: Bandwidth Sensitivity: 12-24-36-48 months [Upper Caste]

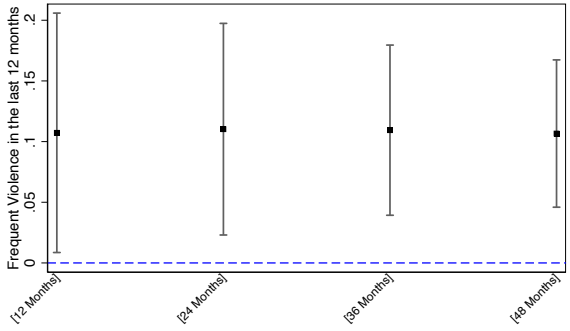
((a)) Effect of MLDA on husband's alcohol consumption, with alternative bandwidths [Upper Caste]



((b)) Effect of MLDA on prevalence of violence in the last 12 months, with alternative bandwidths [Upper Caste]



((c)) Effect of MLDA on **frequent** prevalence of violence in the last 12 months, with alternative bandwidths [Upper Caste]



Note: Each point denotes the estimated β coefficient derived from a local nonparametric regression-discontinuity design. The x-axis bandwidth reflects the specification used. A triangular kernel with a linear polynomial of the score was utilised. The blue point estimate corresponds to the coefficient estimated using the optimal bandwidths as outlined by Calonico, Cattaneo, and Titiunik, 2014. The other coefficients were estimated by modifying these bandwidths: adding 10% (shifting towards the right of the graph) and subtracting 10% (shifting towards the left). Capped vertical bars indicate 90% confidence intervals. Robust standard errors clustered at the running variable level. *Source:* Own estimations using the National Family Health Survey (NFHS 2005-2015-2020).

Table 1.C.4: Quadratic – Full sample

	Husband drinks	Any violence	Any violence [often]	Attitude
T	0.129**	0.053	0.050**	0.107
SE	0.052	0.042	0.025	0.186
P-Value	0.010	0.313	0.040	0.653
Left BW	47	35	37	44
Right BW	153	87	106	157
N	6,724	3,040	3,720	6,87
Mean of control	0.298	0.171	0.052	0.027

Notes: Local non-parametric regression-discontinuity design specification in the Calonico, Cattaneo, and Titiunik, 2014 optimal bandwidth, with a triangular kernel and a quadratic polynomial of the score. Robust corrected standard errors clustered at the running variable level in parentheses. All specifications include wave and state fixed effects. * p < 0.1; ** p <0.05; *** p <0.01. *Source:* Own estimations using the National Family Health Survey (NFHS 2005-2015-2020).

Table 1.C.5: Quadratic – Lower Caste

	Husband drinks	Any violence	Any violence [often]	Attitude
T	0.079	0.030	0.029	0.105
SE	0.070	0.052	0.031	0.255
P-Value	0.340	0.526	0.289	0.920
Left BW	39	37	41	31
Right BW	163	89	109	145
N	4,221	1,931	2,381	3,783
Mean of control	0.322	0.190	0.055	0.015

Notes: Local non-parametric regression-discontinuity design specification in the Calonico, Cattaneo, and Titiunik, 2014 optimal bandwidth, with a triangular kernel and a quadratic polynomial of the score, restricting the sample to the lower caste. Robust corrected standard errors clustered at the running variable level in parentheses. All specifications include wave and state fixed effects. * p < 0.1; ** p <0.05; *** p <0.01. *Source:* Own estimations using the National Family Health Survey (NFHS 2005-2015-2020).

Table 1.C.6: Quadratic – Upper Caste

	Husband drinks	Any violence	Any violence [often]	Attitude
T	0.232***	0.102	0.097***	-0.051
SE	0.079	0.057	0.036	0.167
P-Value	0.001	0.200	0.005	0.669
Left BW	47	33	32	42
Right BW	126	109	105	162
N	2,135	1,362	1,317	2,668
Mean of control	0.260	0.140	0.048	0.056

Notes: Local non-parametric regression-discontinuity design specification in the Calonico, Cattaneo, and Titiunik, 2014 optimal bandwidth, with a triangular kernel and a quadratic polynomial of the score, restricting the sample to the upper caste. Robust corrected standard errors clustered at the running variable level in parentheses. All specifications include wave and state fixed effects. * p < 0.1; ** p <0.05; *** p <0.01. *Source:* Own estimations using the National Family Health Survey (NFHS 2005-2015-2020).

Table 1.C.7: Exclude Delhi

	Husband drinks	Any	Phys and Sex	Emotional	Attitude Index
T	0.127***	0.086**	0.052	0.066***	0.074
SE	0.040	0.043	0.042	0.023	0.098
P-Value	0.000	0.034	0.266	0.001	0.266
Left BW	28	38	39	32	34
Right BW	88	79	88	77	118
N	3,535	2,515	2,809	2,449	4,676
Mean of control	0.245	0.172	0.145	0.078	-0.028

Notes: Local non-parametric regression-discontinuity design specification in the Calonico, Cattaneo, and Titiunik, 2014 optimal bandwidth, with a triangular kernel and a linear polynomial of the score, excluding couples residing in Delhi. Robust corrected standard errors clustered at the running variable level in parentheses. All specifications include wave and state fixed effects. * p < 0.1; ** p <0.05; *** p <0.01. *Source:* Own estimations using the National Family Health Survey (NFHS 2005-2015-2020).

Table 1.C.8: Intensity - Exclude Delhi

	Often Any	Often Phys and Sex	Often Emotional
T	0.056***	0.039*	0.032***
SE	0.026	0.023	0.015
P-Value	0.009	0.082	0.004
Left BW	34	36	33
Right BW	70	98	66
N	2,282	3,162	2,069
Mean of control	0.051	0.040	0.021

Notes: Local non-parametric regression-discontinuity design specification in the Calonico, Cattaneo, and Titiunik, 2014 optimal bandwidth, with a triangular kernel and a linear polynomial of the score, excluding couples residing in Delhi. Robust corrected standard errors clustered at the running variable level in parentheses. All specifications include wave and state fixed effects. * p < 0.1; ** p <0.05; *** p <0.01. *Source:* Own estimations using the National Family Health Survey (NFHS 2005-2015-2020).

Table 1.C.9: Exclude couples with past familial abuse – Full Sample

	Husband drinks	Any violence	Any violence [often]	Attitude Index
T	0.176***	0.092**	0.031*	0.178
SE	0.062	0.040	0.015	0.185
P-Value	0.001	0.014	0.089	0.284
Left BW	30	32	31	29
Right BW	132	79	90	104
N	2,903	1,687	1,932	2,214
Mean of control	0.209	0.110	0.027	-0.054

Notes: Local non-parametric regression-discontinuity design specification in the Calonico, Cattaneo, and Titiunik, 2014 optimal bandwidth, with a triangular kernel and a linear polynomial of the score, excluding couples with past familial abuse. Robust corrected standard errors clustered at the running variable level in parentheses. All specifications include wave and state fixed effects. * p < 0.1; ** p <0.05; *** p <0.01. *Source:* Own estimations using the National Family Health Survey (NFHS 2005-2015-2020).

Table 1.C.10: Exclude couples with past familial abuse – Lower Caste

	Husband drinks	Any violence	Any violence [often]	Attitude Index
T	0.126	0.045	0.012	0.187
SE	0.093	0.054	0.013	0.192
P-Value	0.111	0.479	0.733	0.249
Left BW	36	35	29	29
Right BW	101	74	54	83
N	1,307	953	687	1,008
Mean of control	0.217	0.106	0.021	-0.095

Notes: Local non-parametric regression-discontinuity design specification in the Calonico, Cattaneo, and Titiunik, 2014 optimal bandwidth, with a triangular kernel and a linear polynomial of the score, excluding couples with past familial abuse. Sample restricted to the upper caste. Robust corrected standard errors clustered at the running variable level in parentheses. All specifications include wave and state fixed effects. * p < 0.1; ** p <0.05; *** p <0.01. *Source:* Own estimations using the National Family Health Survey (NFHS 2005-2015-2020).

Table 1.C.11: Exclude couples with past familial abuse – Upper Caste

	Husband drinks	Any violence	Any violence [often]	Attitude Index
T	0.276***	0.151***	0.038*	0.143
SE	0.072	0.059	0.026	0.249
P-Value	0.000	0.001	0.080	0.562
Left BW	25	36	32	33
Right BW	99	73	75	123
N	804	631	640	1,055
Mean of control	0.201	0.119	0.037	0.022

Notes: Local non-parametric regression-discontinuity design specification in the Calonico, Cattaneo, and Titiunik, 2014 optimal bandwidth, with a triangular kernel and a linear polynomial of the score, excluding couples with past familial abuse. Sample restricted to the lower caste. Robust corrected standard errors clustered at the running variable level in parentheses. All specifications include wave and state fixed effects. * p < 0.1; ** p <0.05; *** p <0.01. *Source:* Own estimations using the National Family Health Survey (NFHS 2005-2015-2020).

Table 1.C.12: Include Covariates – all sample

	Husband drinks	Any violence	Any violence [often]	Attitude
T	0.129***	0.056	0.042**	0.025
SE	0.042	0.034	0.022	0.061
P-Value	0.001	0.131	0.031	0.478
Left BW	32	40	35	34
Right BW	107	109	74	129
N	4,688	3,857	2,637	5,658
Mean of control	0.298	0.171	0.052	0.304

Notes: Local non-parametric regression-discontinuity design specification in the Calonico, Cattaneo, and Titiunik, 2014 optimal bandwidth, with a triangular kernel and a linear polynomial of the score. Robust corrected standard errors clustered at the running variable level in parentheses. All specifications include wave and state fixed effects. Covariates added: religion, caste, education gap, age gap. * p < 0.1; ** p <0.05; *** p <0.01. *Source:* Own estimations using the National Family Health Survey (NFHS 2005-2015-2020).

Table 1.C.13: Include Covariates – Lower Caste

	Husband drinks	Any violence	Any violence [often]	Attitude
T	0.078	0.021	0.016	0.097
SE	0.055	0.039	0.027	0.077
P-Value	0.156	0.767	0.511	0.117
Left BW	40	39	38	33
Right BW	83	107	114	104
N	2,340	2,334	2,466	2,776
Mean of control	0.322	0.190	0.055	0.296

Notes: Local non-parametric regression-discontinuity design specification in the Calonico, Cattaneo, and Titiunik, 2014 optimal bandwidth, with a triangular kernel and a linear polynomial of the score. Robust corrected standard errors clustered at the running variable level in parentheses. All specifications include wave and state fixed effects. Sample restricted to the lower caste. Covariates added: religion, caste, education gap, age gap. * p < 0.1; ** p <0.05; *** p <0.01. *Source:* Own estimations using the National Family Health Survey (NFHS 2005-2015-2020).

Table 1.C.14: Include Convariates – Upper Caste

	Husband drinks	Any violence	Any violence [often]	Attitude
T	0.236***	0.109	0.096***	-0.051
SE	0.062	0.050	0.033	0.072
P-Value	0.000	0.115	0.001	0.472
Left BW	29	20	29	48
Right BW	87	66	64	70
N	1,425	769	784	1,243
Mean of control	0.260	0.140	0.048	0.322

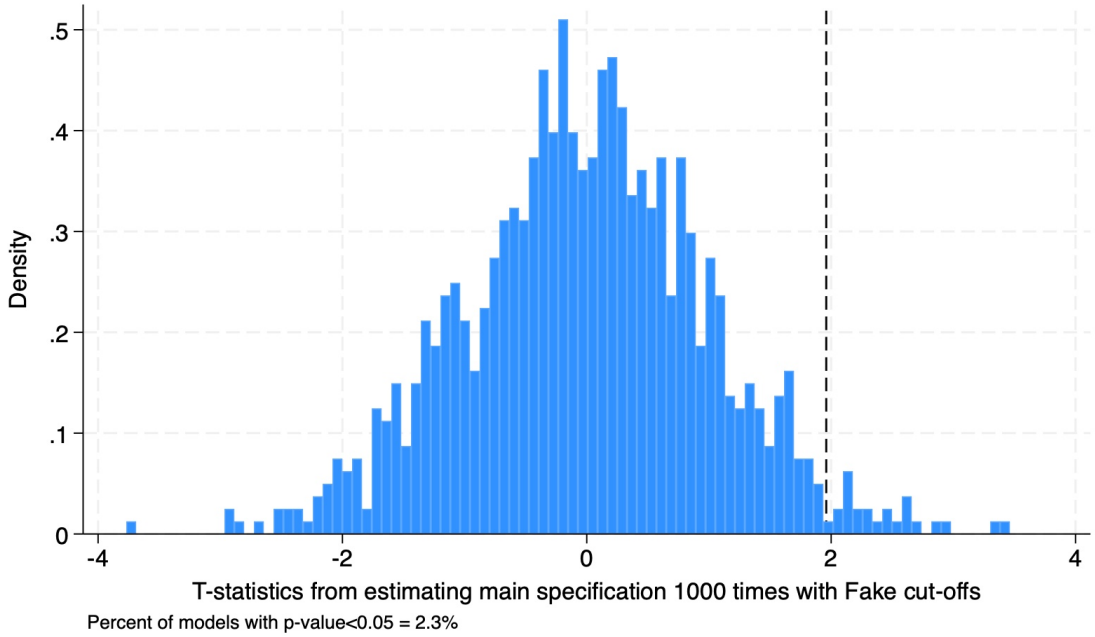
Notes: Local non-parametric regression-discontinuity design specification in the Calonico, Cattaneo, and Titiunik, 2014 optimal bandwidth, with a triangular kernel and a linear polynomial of the score. Robust corrected standard errors clustered at the running variable level in parentheses. All specifications include wave and state fixed effects. Sample restricted to the Upper Caste. Covariates added: religion, caste, education gap, age gap. * p < 0.1; ** p <0.05; *** p <0.01. *Source:* Own estimations using the National Family Health Survey (NFHS 2005-2015-2020).

Table 1.C.15: States with ban on alcohol

	Husband drinks	Any violence	Any violence [often]	Attitude
T	0.006	0.006	0.014	0.096
SE	0.071	0.059	0.028	0.102
P-Value	0.693	0.715	0.456	0.148
Left BW	29	42	38	32
Right BW	94	134	108	89
N	3,087	4,843	3,621	3,705
Mean of control	0.286	0.229	0.038	-0.064

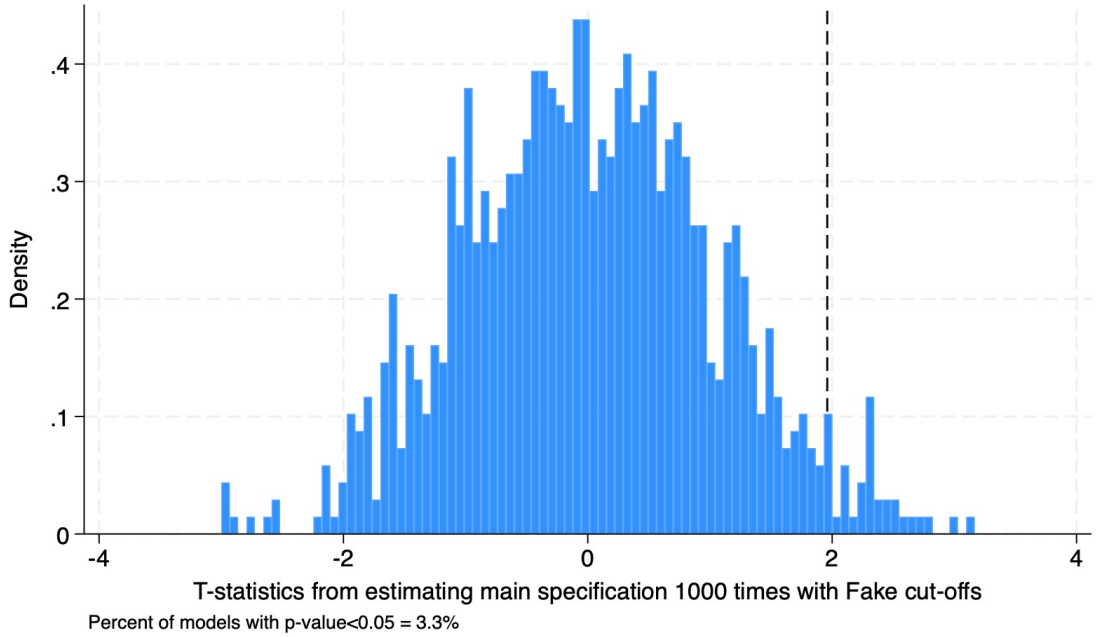
Notes: Local non-parametric regression-discontinuity design specification in the Calonico, Cattaneo, and Titiunik, 2014 optimal bandwidth, with a triangular kernel and a linear polynomial of the score. Robust corrected standard errors clustered at the running variable level in parentheses. All specifications include wave and state fixed effects. Sample restricting to couples living in states with a ban on alcohol. * p < 0.1; ** p <0.05; *** p <0.01. *Source:* Own estimations using the National Family Health Survey (NFHS 2005-2015-2020).

Figure 1.C.5: T-statistics distribution - Outcome: Husband's alcohol consumption



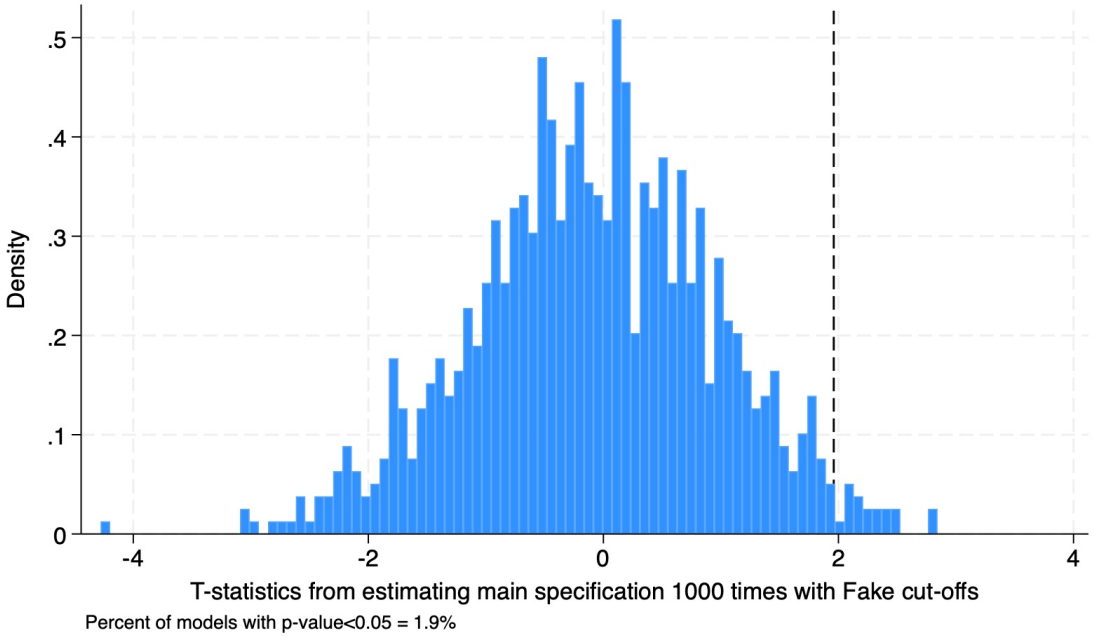
Note: The figure displays the t-statistics distribution from 1000 regressions of the specification 2.1, where I construct fake hypothetical cut-offs, obtained using a random number generator. This approach follows Young, 2019. The outcome variable is husband's alcohol consumption. *Source:* Own estimations using the National Family Health Survey (NFHS 2005-2015-2020).

Figure 1.C.6: T-statistics distribution - Outcome: Occurrence of violence in the last 12 months



Note: The figure displays the t-statistics distribution from 1000 regressions of the specification 2.1, where I construct fake hypothetical cut-offs, obtained using a random number generator. This approach follows Young, 2019. The outcome variable is the prevalence of violence in the past year. *Source:* Own estimations using the National Family Health Survey (NFHS 2005-2015-2020).

Figure 1.C.7: T-statistics distribution - Outcome: Frequent Occurrence of violence in the last 12 months



Note: The figure displays the t-statistics distribution from 1000 regressions of the specification 2.1, where I construct fake hypothetical cut-offs, obtained using a random number generator. This approach follows Young, 2019. The outcome variable is frequent prevalence of violence in the past year. *Source:* Own estimations using the National Family Health Survey (NFHS 2005-2015-2020).

Table 1.C.16: Full sample Kolesar SE

	Husband drinks	Any violence	Any violence [often]	Attitude
T	0.121***	0.054	0.042*	0.073
SE	0.045	0.047	0.026	0.096
P-Value	0.004	0.302	0.070	0.243
Left BW	33	39	36	35
Right BW	103	113	73	121
N	4,587	3,915	2,611	5,299
Mean of control	0.298	0.171	0.052	0.027

Notes: Local non-parametric regression-discontinuity design specification in the Calonico, Cattaneo, and Titiunik, 2014 optimal bandwidth, with a triangular kernel and a linear polynomial of the score. Robust corrected standard errors, as recommended by Kolesár and Rothe, 2018. All specifications include wave and state fixed effects. * p < 0.1; ** p <0.05; *** p <0.01. *Source:* Own estimations using the National Family Health Survey (NFHS 2005-2015-2020).

Table 1.C.17: LC sample Kolesar SE

	Husband drinks	Any violence	Any violence [often]	Attitude
T	0.077	0.017	0.017	0.157*
SE	0.058	0.064	0.034	0.117
P-Value	0.184	0.943	0.578	0.098
Left BW	41	38	37	36
Right BW	75	110	111	132
N	2,184	2,392	2,409	3,547
Mean of control	0.322	0.190	0.055	0.015

Notes: Local non-parametric regression-discontinuity design specification in the Calonico, Cattaneo, and Titiunik, 2014 optimal bandwidth, with a triangular kernel and a linear polynomial of the score, restricting the sample to the lower caste. Robust corrected standard errors, as recommended by Kolesár and Rothe, 2018. All specifications include wave and state fixed effects. * p < 0.1; ** p <0.05; *** p <0.01. *Source:* Own estimations using the National Family Health Survey (NFHS 2005-2015-2020).

Table 1.C.18: UC sample Kolesar SE

	Husband drinks	Any violence	Any violence [often]	Attitude
T	0.209***	0.112	0.096***	-0.098
SE	0.066	0.094	0.033	0.169
P-Value	0.000	0.354	0.001	0.732
Left BW	30	20	33	40
Right BW	91	71	69	88
N	1,504	852	872	1,494
Mean of control	0.260	0.140	0.048	0.056

Notes: Local non-parametric regression-discontinuity design specification in the Calonico, Cattaneo, and Titiunik, 2014 optimal bandwidth, with a triangular kernel and a linear polynomial of the score, restricting the sample to the upper caste. Robust corrected standard errors, as recommended by Kolesár and Rothe, 2018. All specifications include wave and state fixed effects. * p < 0.1; ** p <0.05; *** p <0.01. *Source:* Own estimations using the National Family Health Survey (NFHS 2005-2015-2020).

Table 1.C.19: Standard Errors Clustered at the district level – Full Sample

	Husband drinks	Any violence	Any violence [often]	Attitude
T	0.122***	0.090*	0.044	0.011
SE	0.045	0.050	0.027	0.101
P-Value	0.004	0.070	0.203	0.753
Left BW	39	37	30	40
Right BW	100	109	115	158
N	3,104	2,602	2,665	4,651
Mean of control	0.298	0.171	0.052	0.027

Notes: Local non-parametric regression-discontinuity design specification in the Calonico, Cattaneo, and Titiunik, 2014 optimal bandwidth, with a triangular kernel and a linear polynomial of the score. Robust corrected standard errors, clustered at the district level. All specifications include wave and state fixed effects. * p < 0.1; ** p <0.05; *** p <0.01. *Source:* Own estimations using the National Family Health Survey (NFHS 2005-2015-2020).

Table 1.C.20: Standard Errors Clustered at the district level – Lower Caste

	Husband drinks	Any violence	Any violence [often]	Attitude
T	0.088	0.046	0.043	-0.012
SE	0.060	0.071	0.038	0.138
P-Value	0.132	0.635	0.433	0.913
Left BW	40	41	30	40
Right BW	81	94	107	113
N	1,657	1,537	1,676	2,226
Mean of control	0.322	0.190	0.055	0.015

Notes: Local non-parametric regression-discontinuity design specification in the Calonico, Cattaneo, and Titiunik, 2014 optimal bandwidth, with a triangular kernel and a linear polynomial of the score, restricting the sample to the lower caste. Robust corrected standard errors, clustered at the district level. All specifications include wave and state fixed effects. * p < 0.1; ** p <0.05; *** p <0.01.
Source: Own estimations using the National Family Health Survey (NFHS 2005-2015-2020).

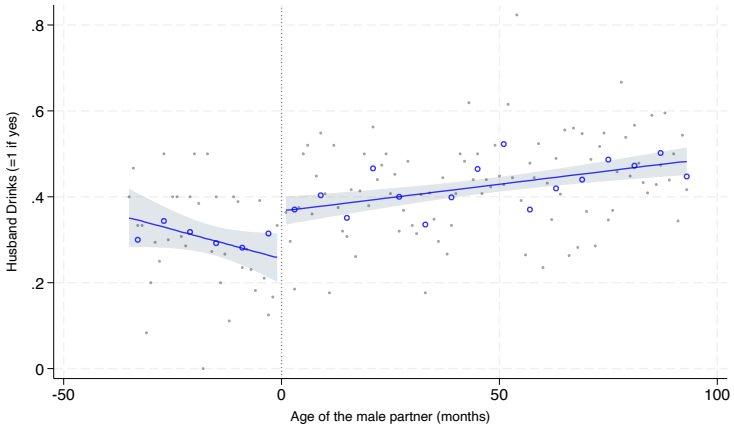
Table 1.C.21: Standard Errors Clustered at the district level – Upper Caste

	Husband drinks	Any violence	Any violence [often]	Attitude
T	0.212***	0.232***	0.096***	0.061
SE	0.071	0.065	0.035	0.192
P-Value	0.001	0.000	0.006	0.530
Left BW	30	34	33	39
Right BW	106	75	66	100
N	1,010	573	488	998
Mean of control	0.260	0.140	0.048	0.056

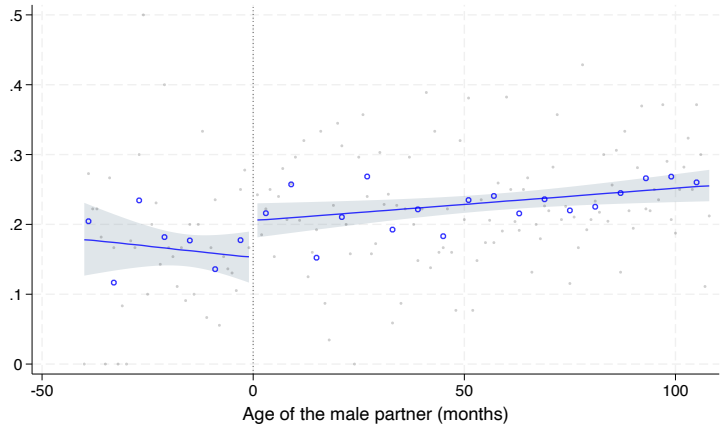
Notes: Local non-parametric regression-discontinuity design specification in the Calonico, Cattaneo, and Titiunik, 2014 optimal bandwidth, with a triangular kernel and a linear polynomial of the score, restricting the sample to the upper caste. Robust corrected standard errors, clustered at the district level. All specifications include wave and state fixed effects. * p < 0.1; ** p <0.05; *** p <0.01.
Source: Own estimations using the National Family Health Survey (NFHS 2005-2015-2020).

Figure 1.C.8: MLDA Discontinuity in the Optimal Bandwidth

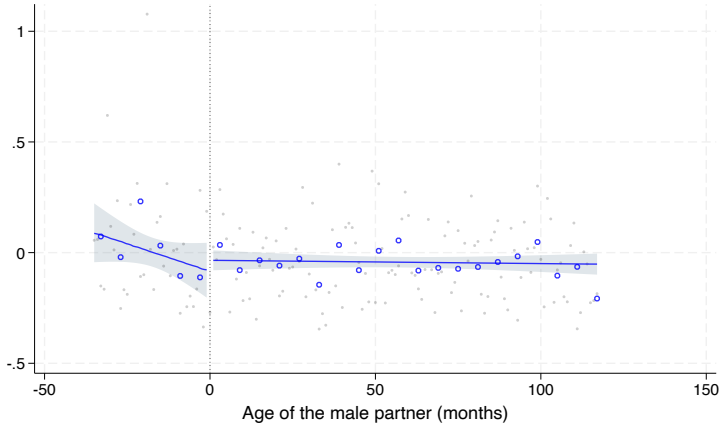
((a)) MLDA discontinuity: Husband's alcohol cosumption



((b)) MLDA discontinuity: IPV in the last 12 months



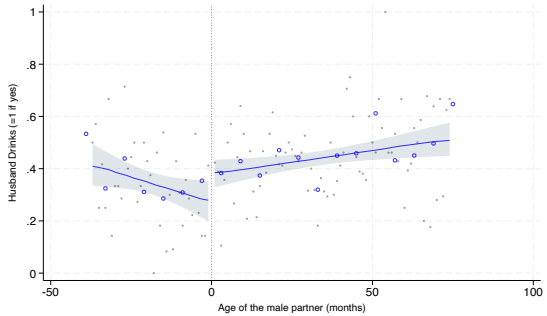
((c)) MLDA discontinuity: Women's tolerance towards wife-beating



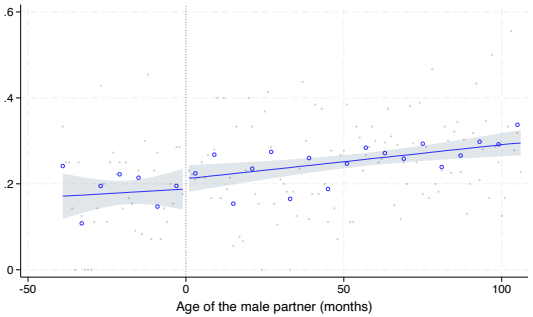
Note: The Figure 1.C.8 presents huband's alcohol consumption/wives' prevalence of IPV/ tolerance towards violence (following Anderson, 2008) against the age of the husband in months (X-axis), in the optimal bandwidth Calonico, Cattaneo, and Titiunik, 2014. The blue circles represent the average of the outcome at score bins of size 6. In Figure 1.C.8(a) the outcome variable is a dummy taking value one if the husband consumes alcohol. In Figure 1.C.8(b) the outcome variable is a dummy taking value one if the wife reports to have been victim of IPV in the last 12 months. In Figure 1.C.8(c) the outcome variable is a variance-weighted index following Anderson, 2008 that combines women's justifiability of wife-beating in 7 scenarios: (i) if she goes out without permission; (ii) if she neglects the children; (iii) if the argues with the husband; (iv) if she burns food; (v) if she refuses sex; (vi) if she is unfaithful; (vii) if she disrespects the in-laws. See corresponding Table 3.1. *Source:* Own estimation using the National Family Health Survey (NFHS 2005-2015-2020).

Figure 1.C.9: MLDA discontinuity in the optimal bandwidth, Heterogenous Effect by Caste

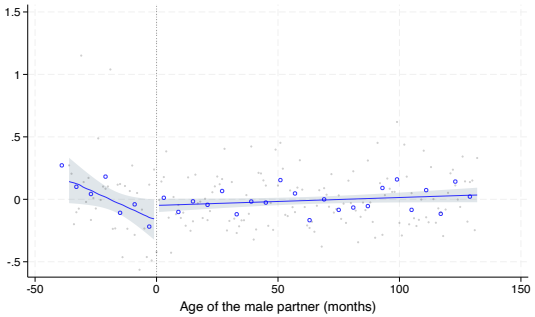
((a)) Husband's alcohol consumption - Lower Caste



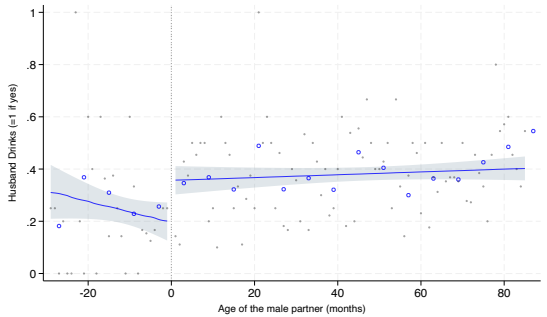
((b)) Any violence in the last 12 months - Lower Caste



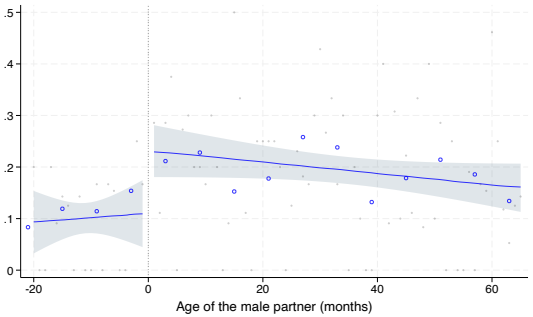
((c)) Tolerance towards wife-beating - Lower Caste



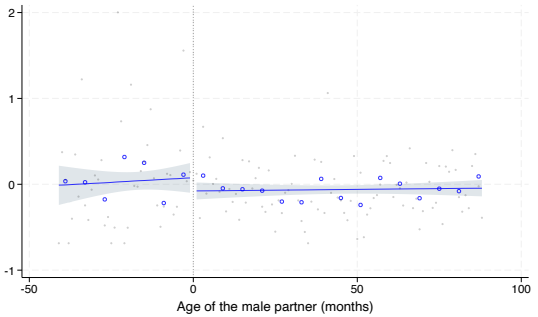
((d)) Husband's alcohol consumption - Upper Caste



((e)) Any violence in the last 12 months - Upper Caste



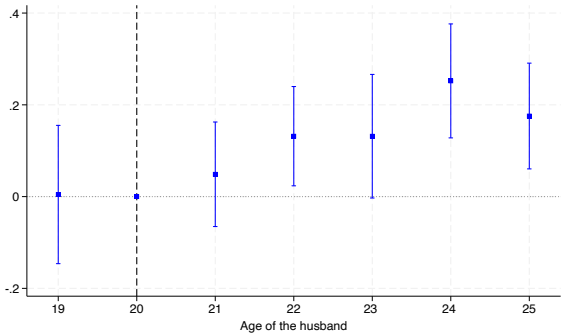
((f)) Tolerance towards wife-beating - Upper Caste



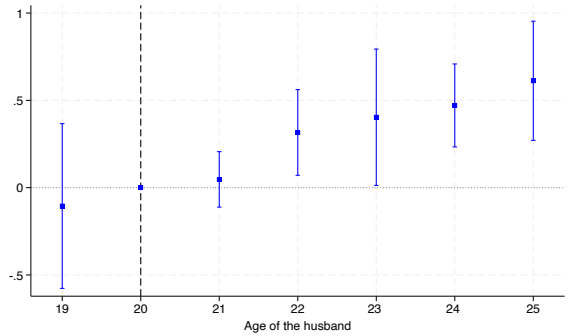
Note: Figure 1.C.9 presents the outcomes *alcohol consumption*, *prevalence of violence in the last 12m*, *women's tolerance towards wife-beating* against the age of the husband in months (X-axis), in the optimal bandwidth (Calonico, Cattaneo, and Titiunik, 2014), for the Lower (Figures: 1.C.9(a), 1.C.9(b), 1.C.9(c)) and Upper Caste Sample (Figures: 1.C.9(d), 1.C.9(e), 1.C.9(f)). The blue circles represent the average of the outcome at score bins of size 6. See corresponding Tables 1.3. *Source*: Own estimations based on National Family Health Survey (NFHS 2005-2015-2020).

Figure 1.C.10: Long-term effects – Sample restricted to couples whose husband married before 21

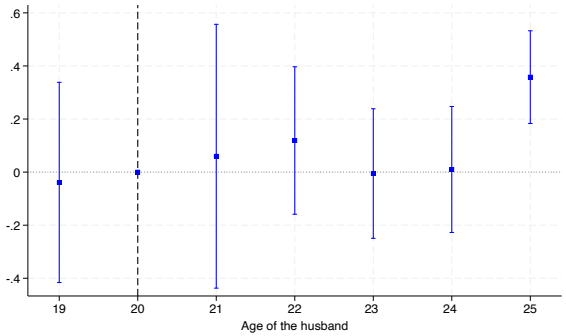
((a)) Husband's alcohol cosumption



((b)) Duration of abuse (years)



((c)) Women's attitudes towards wife-beating



Note: Figure 1.C.10 reports the coefficient of the β from equation 1.2. The y-axis reports the estimated coefficient of the interaction between the age of the partner in states where the MLDA is 21 vs MLDA at 25. The x-axis represents the age of the husband at the time of the interview relative to 21 years old, and consequently the years in which the husband was legally allowed to drink. Omitted category: individuals aged 20 at the time of the interview. The capped vertical bars show 90% confidence intervals calculated using robust standard errors clustered at the at the state and age at the interview level. Sample restricted to couples whose husband married before the age 21. *Source:* Own estimations using the National Family Health Survey (NFHS 2005-2015-2020).

Appendix 1.D Theoretical Appendix

This section shows the iterative method to derive the posterior probability under standard Bayesian updating, as discussed in Section 1.2.

Let's assume that a woman at time $t = 0$ holds a certain prior about her husband being a violent-type P_0.

- At time $t = 1$, the woman receives a violent signal θ. Thus her posterior at time $t = 1$ will take the following form:

$$P_1(\theta) = \frac{P_0 P_\theta}{P_0 P_\theta + (1-P_0)(1-P_\theta)}$$

That can be rewritten as:

$$P_1(\theta) = \frac{1}{1+(\frac{1-P_0}{P_0})(\frac{1-P_\theta}{P_\theta})}$$

- At time $t = 2$, the woman receives a second violent signal θ. Thus her posterior at time $t = 2$ will take the following form:

$$P_2(\theta^2) = \frac{P_1(\theta) P_\theta}{P_1(\theta) P_\theta + (1-P_1(\theta))(1-P_\theta)}$$

That can be rewritten as:

$$P_2(\theta^2) = \frac{1}{1+(\frac{1-P_1(\theta)}{P_1(\theta)})(\frac{1-P_\theta}{P_\theta})}$$

Knowing from the equations above that $\frac{1-P_1(\theta)}{P_1(\theta)} = (\frac{1-P_0}{P_0})(\frac{1-P_\theta}{P_\theta})$, $P_2(\theta^2)$ can be rewritten as follow:

$$P_2(\theta^2) = \frac{1}{1+(\frac{1-P_0}{P_0})(\frac{1-P_\theta}{P_\theta})^2}$$

- At time $t = 3$, the woman receives a non-violent signal $n\theta$. In the three periods from $t = 1$ to $t = 3$, she has therefore received two violent signals (θ) and one non-violent signal (nθ). Thus her posterior at time $t = 3$ will take the following form:

$$P_3(\theta^2, n\theta) = \frac{P_2(\theta^2)(1-P_\theta)}{P_2(\theta^2)(1-P_\theta)(1-P_2(\theta^2)P_\theta}$$

That can be rewritten as:

$$P_3(\theta^2, n\theta) = \frac{1}{1+(\frac{1-P_0}{P_0})(\frac{1-P_\theta}{P_\theta})^2}$$

Knowing from the equations above that $\frac{1-P_2(\theta)}{P_2(\theta)} = (\frac{1-P_0}{P_0})(\frac{1-P_\theta}{P_\theta})^2$, $P_3(\theta^2, n\theta)$ can be rewritten as follows:

$$P_3(\theta^2, n\theta) = \frac{1}{1+(\frac{1-P_0}{P_0})(\frac{1-P_\theta}{P_\theta})^2(\frac{P_\theta}{1-P_\theta})}$$

That is:

$$P_3(\theta^2, n\theta) = \frac{1}{1+(\frac{1-P_0}{P_0})(\frac{P_\theta}{1-P_\theta})^-1}$$

- At time $t = T$, after having received k violent signals and $T - k$ non-violent signals, woman's posterior will be:

$$P_T(\theta^k, n\theta^{T-k}) = \frac{1}{1+(\frac{1-P_0}{P_0})(\frac{P_\theta}{1-P_\theta})^{(T-2k)}}$$

Chapter 2

Fast Internet and Gender Norms: Evidence from Sub-Saharan Africa

2.1 Introduction

The internet has transformed many aspects of our society. The rise of the internet enabled new forms of social interaction and has transformed how individuals get, produce and exchange information (Campante et al., 2018; Larcinese, Miner, et al., 2012; Farrell, 2012). These fundamental transformations have led to a growing interest about its impact on individuals' social and economic life. Yet, little is known about the role internet plays in shaping gender equality.

This paper aims to fill this gap, by investigating whether the internet has a causal effect on gender norms. Specifically, I exploit the arrival of high-speed internet through submarine cables to African coasts between 2008-2012, to investigate whether the internet can transform gender norms, measured through the attitudes towards intimate partner violence (IPV). [1]

The net effect of internet on gender norms is an open empirical question. On the one hand, the internet may open new opportunities for women to gain social, political, and economic power. The spread of digital technology could connect marginalized women to the modern economy, generating new occupations and human capital accumulation. Furthermore, the internet could act as a coordination tool that increases women's awareness around gender equality (e.g. #MeToo movement). On the other hand, the internet could exacerbate existing gender disparities, especially if access to the internet has greater benefits for men compared to women. Moreover, the internet could create yet another platform

[1] In this study, I use *internet* and *fast internet/high-speed internet* as synonym. Moreover, *violence* and *intimate partner violence* are used interchangeably.

for abuse or violence targeting women.[2]

I address gender norms by focusing on attitudes towards the acceptability of intimate partner violence (IPV). This is a relevant gender norm given that one out of every three women worldwide has experienced intimate-partner-violence in their life-time (WHO, 2021). In Europe and the US, approximately 20 to 25% of women report being physically or sexually abused by their partners. The prevalence of intimate-partner-violence is the highest in the Sub-Saharan and South-East Asia, where 33-35% of ever-partnered women report having experienced physical and/or sexual violence by their partners at some point in their lives (WHO, 2021). Attitudes towards the acceptability of IPV are highly correlated with the prevalence of violence (García-Moreno et al., 2005), however, there is limited evidence on what drives the variation in these attitudes (Alesina, Brioschi, et al., 2016; Gulesci, Meyersson, et al., 2020).

To understand whether and how attitudes towards violence might be affected by access to the internet, I use a difference-in-differences approach. Specifically, I exploit the variation over time and space in the arrival of fast internet between 2008-2012 on African coasts via submarine cables from Europe to estimate the causal effect of internet on gender norms. I draw the identification strategy from Hjort and Poulsen, 2019. Specifically, I compare individuals' attitudes in locations that are on the terrestrial network of internet cables to those that are not. I compare these two groups during the gradual arrival of fast internet through submarine cables, that greatly increased the speed and the capacity of the national terrestrial network, that is the infrastructure through which the internet becomes available.[3]

To measure gender norms, I use the 2008 and 2013 waves of the Demographic and Health Survey (DHS) for Benin, Ghana, Kenya, Namibia, Nigeria. The DHS dataset contains geo-coded information on respondents' attitudes towards intimate partner violence (IPV), as well as many background characteristics. This enables me to perform a difference-in-differences estimation to compare outcomes of respondents before and after the arrival of fast internet in Africa. Data on the internet infrastructure come from Hjort and Poulsen, 2019.

The findings show that the arrival of fast internet causes individuals to have less egalitarian gender views. I find that individuals exposed to fast internet are

[2]The inventor of the world wide web, Berners-Lee warned that "the web is not working for women" mainly because of two reasons. First, the digital divide that keeps more than half of the world's women offline. Second, the online safety: according to a survey by Berners-Lee's Web Foundation, more than half of women have experienced violence online *The Guardian, March 2020* - https://www.theguardian.com/global/2020/mar/12/internet-not-working-women-girls-tim-berners-lee

[3]The national terrestrial networks are those infrastructures through which Internet travels prior to the last mile, as explained in Note 1. More detail in Section 2.

4 percentage points more likely to think that a man is justified in beating his wife if she neglects the children, and 3.7 percentage points more likely to find violence acceptable if a married woman goes out without her husband's permission. These are both statistically and economically significant, corresponding respectively to a 17% and 18.5% increase in acceptance of IPV relative to the mean level of the outcome. I present results that support the robustness of these findings to different specifications. I also estimate placebo difference-in-differences models that support the validity of the parallel trend assumption.

I then explore the mechanisms that could explain the findings of this paper. The arrival of high-speed internet in Sub-Saharan Africa led to more regressive views around IPV - especially among men. This result might be explained by various mechanisms at work which are discussed later. Specifically, I discuss three potential mechanisms. First, fast internet causes more regressive gender norms because it might change the balance of power within the household, by affecting labor market opportunities for men and women differently. Second, stronger effect of internet on gender norms for males might be explained by a higher access to internet for males compared to females. Third, exposure to the internet can potentially amplify already regressive gender norms, that before internet arrival individuals were reluctant to express. While I discuss all of these mechanisms, I am not able to test the third mechanism due to data limitations. Results suggests that the first mechanism is the most likely to be at play in this setting. I find suggestive evidence that the arrival of fast internet promoted employment opportunities more for men than for women. This could lead to an intra-household imbalance of power, affecting men's attitudes towards violence.

The main contribution of this work is to provide evidence of the potentially adverse effects of connectivity for women in Sub-Saharan Africa. Previous research has demonstrated that the internet has improved a number of economic outcomes (Hjort and Poulsen (2019), Riley (2020), Jack and Habyarimana (2018), Lipscomb and Schechter (2018)). This paper shows that fast internet does not necessarily improve gender equality or reduce the prevalence of gender-biased norms.

Another contribution to the literature is showing *how* gender norms can change. A large literature shows that social norms, especially gender norms, can shape behaviors and economic outcomes (Alesina, Giuliano, et al. (2013), Bertrand, Kamenica, et al. (2015), Charles et al. (2018)). However, we have less evidence on what drives *change* in gender norms. Several works studied how media can be an important vehicle for sensitizing people on education (Zavodny, 2006), and how TV or radio can affect norms and behaviors (e.g., Banerjee, Ferrara,

et al. (2019), Chong and Ferrara (2009), La Ferrara, Chong, et al. (2012) Jensen and Oster (2009)). I contribute to this literature by showing that the diffusion of internet can be another driver of change in gender norms.

The paper also relates to a growing literature on the role internet and social media play on social movements and hate crimes. Manacorda and Tesei (2020) find that mobile coverage increased protest participation in various African states. Enikolopov et al. (2020) show that higher social media penetration increased the likelihood of political protests in Russia by reducing coordination costs. Acemoglu et al. (2018) find that the protests on Tahir Square in Egypt were preceded by protest-related activity on Twitter.[4] Müller and Schwarz (2018) study the relationship between social media and hate crimes in Germany. Müller and Schwarz, 2020 find that anti-Muslim hate crimes in the US increased in locations with higher Twitter penetration. Allcott and Gentzkow, 2017 and Yanagizawa-Drott (2014) provide evidence that social media makes individuals' opinions more polarized. To the best of my knowledge, this is the first paper that investigates the role of the internet on gender norms in Africa, focusing on the long-run effects of internet penetration.

The paper is organized as follows. In section 2.2, I present the background on gender norms and internet infrastructure in Sub-Saharan Africa. In section 2.3, I explain the data used for the analysis, and in section 2.4 the empirical strategy. Section 2.5 discusses the results and section 2.6 the potential mechanisms. Section 2.7 concludes.

2.2 Background

Gender Norms

I use the acceptability of intimate-partner-violence as a proxy for gender norms. To this end, I exploit a set of questions included in the Demographic and Health Survey around the justification of violence in different scenarios. Data on the justification of IPV have been used by Jayachandran (2015), Gulesci, Meyersson, et al. (2020), Benshaul-Tolonen (2019) in different countries. It is important to point out that justification of domestic violence is distinct from experiences of violence.

[4]This paper is not too far from the vast literature which focuses on the impact of media on political and social outcomes. While traditional media has been shown to increase political participation (Gentzkow et al. (2011), Internet seem to lead to lower political turnout, most likely due to an increase in entertainment and displacing other media with greater news content (Falck et al. (2014), Campante et al. (2018), Gavazza et al. (2019)). A recent paper by Allcott, Braghieri, et al. (2020) find that Facebook deactivation for 4 weeks before the 2018 midterm elections in the US, reduces online activity, which is substituted to offline and socializing activity, increases the subjective well-being, and reduces political polarization.

Focusing on the acceptability of violence, rather than the experience of it presents some advantages. First, looking at the justification of violence reduces the risk of underreporting; second, within this analysis, focusing on attitudes enables greater geographic coverage as the attitudes module is more often collected by the DHS. The main disadvantage though is that the link between justification of violence and the actual experience of it is still not clear. However, self-perceived rights or perceptions about bodily integrity are important outcomes themselves (Benshaul-Tolonen, 2019). Indeed, existing evidence shows that cultural barriers and aspirations could play a key role in women's empowerment (Jayachandran, 2020).

Internet Infrastructure

Internet connectivity in Africa has dramatically increased in the past decade. Nowadays Internet penetration in Africa is estimated at an average rate of 24%, remaining the only continent where half of its population does not have internet access. However, this figure represents a significant improvement given that internet penetration was around 2% in 2005. Today, the Internet reaches the users in Africa through fiber cables, copper cables, wireless transmission, and satellites (the last mile). Prior to the last mile, the Internet in Africa travels through the terrestrial backbones, which were built by the national telecom in all the countries (ITU, 2013).

Between 2008-2012 submarine cables gradually arrived on African coasts, as shown in Figure 2.B.1. Submarine fiber optic cables represent the most suitable technology for carrying data over large distances in and between countries which are separated by oceans (OECD, 2014). Indeed, one single intercontinental cable is more efficient in terms of capacity and latency than combining all the world's active communications satellites together. In the 2000s, submarine cables linking Europe to Africa were built by consortia made up of private investors and governments. The submarine cables were brought to shore at landing points along the coast, typically one in each country passed by the cable. Many countries in Africa have access to submarine cable systems, either directly through local landing points or through terrestrial connections (ITU, 2018). Once introduced, there is evidence that submarine cables brought much faster speed and traffic capacity to areas which were connected to the terrestrial Internet network (Hjort and Poulsen, 2019).

Internet Use

According to the World Bank[5], the internet usage in Sub-Saharan Africa increased significantly in the period of the analysis. In 2008, 4% of the African region used the internet. In 2013 it increased to 12 %. Figure 2.B.2 shows the growth of Internet use in the analyzed countries, using Afrobarometer data. As we can see, in 2008 (prior the arrival of the Submarine cables) the internet use was almost 14% of the sample, and in 2014 (just after the arrival of the cables) the percentage of internet use almost doubled, reaching the 30 % of the internet users. Furthermore, Hjort and Poulsen (2019) documented that the arrival of submarine cables in Africa increased both the average speeds and the use of the Internet. The authors explain that this could be due to two reasons. First, technology becomes more accessible and more useful for individuals. Second, the arrival of the cables led to a drastic fall in the cost of internet provision, which the Internet Service Providers partly pass on to users via lower prices (Kende and Rose, 2015).

2.3 Data

2.3.1 Attitudes towards Intimate-Partner-Violence

I use Demographic and Health Survey (DHS) data rounds from before and just after the arrival of the submarine cables to measure gender norms[6] The Demographic and Health Surveys are nationally representative repeated cross-sections. Respondents are asked extensively about their economic and demographic background. The DHS have the advantage of collecting the GPS coordinates for the surveyed individuals' clusters. This allows me to calculate their exact distance to the terrestrial networks and hence define the connected individuals (treatment group).

To measure gender norms, I rely on some questions about tolerance towards wife-beating. Specifically, respondents are asked whether a husband is justified in beating his wife if she (i) goes out without telling him, (ii) neglects the children, (iii) argues with him, (iv) burns food, and (v) if she refuses sexual intercourse. Table 2.A.1 reports summary statistics in the last DHS waves before the arrival of the submarine cables on each country in the estimating sample. The variable

[5] https://data.worldbank.org/indicator/IT.NET.USER.ZS?end=2019&locations=ZG-BJ-CD-GH-NA&start=2008

[6] More precisely, to measure gender norms before the arrival of submarine cables, I use DHS collected in 2001 for Benin, 2006 for Namibia, and 2008 for Ghana, Kenya and Nigeria. To measure gender norms after the arrival of submarine cables, I use the DHS rounds collected in 2012 for Benin, 2013 for Namibia and Nigeria, and 2014 for Ghana and Kenya. For simplicity I will refer to 2008 as the pre-treatment period and 2013 as the post-treatment period.

labeled *Attitude Index*, is constructed as the sum of the circumstances in which the respondents think intimate-partner-violence is acceptable, following Alesina, Brioschi, et al. (2016). The average number of episodes in which spousal violence is deemed as acceptable is 0.966 (out of 5) for female respondents, and 0.55 for males. The variable labeled *Attitude Weighted Index* is a weighted index where the weights are proportional to the mean of the attitudes variables. Thus, the index puts more weight on the circumstances in which the respondents are on average more likely to find violence more justifiable.

The average of the *Attitude Weighted Index* is 0.21 for female and 0.125 for male respondents. From the upper Panel of Table 2.A.1, we notice that IPV is justified more among women than men. It is possible that men's attitudes towards violence may be affected by underreporting. As noted by Alesina, Brioschi, et al., 2016, men could hinder their true views in order to not be negatively perceived in front of the interviewer. Nevertheless, this could be true for female respondents too.

The bottom panel of Table 2.A.1 shows the summary statistics of the attitudes towards wife-beating in the five distinct scenarios. These are binary variables taking value one if the respondents think wife-beating is acceptable in one of each situations. We can notice that female respondents find IPV more justified than their male counterparts. The most common circumstance in which spousal violence is justified for both female and male respondents is when the wife neglects the children, with 28.2% of the interviewed women and 18% of men reporting that wife-beating is justified in that context. More than one fifth of the interviewed women justify violence in case the woman goes out without the permission of her husband and in case she argues with him. The share of female respondents that believe wife-beating is justifiable in these two scenarios is more than twice the share of male respondents agreeing with the statements. While violence has a high acceptance rate in the aforementioned situations, other reasons for wife-beating seem to be less acceptable. In particular, wife-beating for refusing to have sexual intercourse with their husband or burning food have relatively lower acceptability rates of 12.5% and 11.5%, respectively for female respondents, and 6.5% and 5.3% for male respondents. Overall, the descriptive patterns shown in Table 2.A.1 show that the acceptability of violence is relatively widespread at the baseline. These figures are even more striking if we consider that they are likely affected by underreporting.

Table 2.A.2 displays the overall acceptability rate of wife-beating for some reasons, the labor market outcomes and education rate by connected versus unconnected areas before the arrival of submarine cables. The average age

is 29.4 for individuals in unconnected locations, and 28.9 for those residing in the connected locations. The share of females is 66% in both connected and unconnected areas. Differences in employment between connected and unconnected areas are statistically signficant but small. The share of individuals who work in the unconnected areas is 68%, while the share of those living in the connected areas is 66%. Differences in skilled employment and education outcomes are small and insignificant. Differences in attitudes towards IPV, although being statistically significant, are rather small in magnitude.

2.3.2 Internet Data

I use data made available by Hjort and Poulsen (2019). Data on submarine network infrastructure is available on Greg Mahlknecht's Cable (see Figure 2.B.1). The Greg Cable map is freely downloadable from the Mahlknecht website. The shape file contains information on the geocoded landing points, timing of the cables' deployment, and segment lines of the submarine cables. Once installed, the submarine cables increase the capacity on internet traffic to areas connected to the terrestrial network.

Data of the terrestrial network come from AfTerFibre[7] and Africa Bandwidth Maps.[8] Data of terrestrial network in 2013 - after the submarine arrival - come from the AfterFibre map, whose GIS shape file is freely available online. Hjort and Poulsen (2019) used the map of backbone network from Africa Bandwidth Maps (available upon purchase) for 2009 and 2013, in order to identify and remove the backbone which have been built during the period of interest. I rely on the shape file of the final map which has been provided online by the authors. Following Hjort and Poulsen (2019), I calculated the shortest distance between the individuals' clusters and the terrestrial network, through NN-Join in QGis. I define an individual to be *Connected* if her (or his) location is within 500 meters from the terrestrial backbone, as shown in Figure 2.B.4. 500 meters is considered to be a reasonable proxy for high-speed internet to reach beyond the backbone cables for copper-cable last mile technologies.[9]

[7] https://afterfibre.nsrc.org/

[8] www.africabandwidthmaps.com

[9] or last mile transmission via microwaves, the distance-connectivity relationship beyond the backbone is less clear-cut. In line with Hjort and Poulsen, 2019, I choose a conservative radius based on copper-cable technologies.)

2.4 Empirical Strategy

This section provides details on the estimation strategy. I first lay out the identification strategy, then specify the estimation equation, and finally perform checks for the validity of my estimation strategy.

Identification Strategy

I use a difference-in-differences empirical strategy to estimate the causal effect of fast internet on gender norms. I compare individuals' attitudes towards intimate partner violence in areas connected to submarine internet cables via the terrestrial backbone network and those not connected.

Using the identification strategy proposed by Hjort and Poulsen (2019), I estimate the following equation:

$$Y_{i,j,c,t} = \beta_0 + \beta_1 SubmarineCables_{c,t} \times Connected_i + \beta_2 \mathbf{X_i} + \delta_j \times Connected_i + \tau_{c,t} + \epsilon_{i,j,c,t}. \tag{2.1}$$

$Y_{i,j,c,t}$ are the attitudes towards violence of respondent i, residing in cell j (0.1 x 0.1 degrees)[10], in county c, at time t. The $SubmarineCables_{c,t}$ is a dummy variable which takes value one if the terrestrial network in country c, has been connected to the submarine cable at time t. $Connected_i$ is a dummy variable which takes value one if the individual's location is connected to the terrestrial backbone or not. Note that I only keep grid cells appearing twice, i.e. before and after the submarine cables arrival. The coefficient of interest is the interaction of $SubmarineCables_{c,t}$ and $Connected_i$. This is equivalent to a treatment that takes value one if (i) the submarine cable arrives in country c at time t and (ii) if the individual's location is connected (that is, it is less than 500 meters further from the terrestrial backbone). The interaction between the cell δ_j and $Connected_i$ controls for any time invariant characteristics that might me correlated with the arrival of fast internet. τ controls for country-specific time fixed effects. $\mathbf{X_i}$ includes a set of individuals' characteristics, such as age, age squared, gender and religion. Standard errors $\epsilon_{i,j,c,t}$ are clustered at the cell level. To ensure comparability, locations that are further away from 10 km to the terrestrial backbone have been excluded in the analysis.

Validity of the parallel trends: a placebo test

In line with Hjort and Poulsen (2019), the identification strategy relies on the assumption that locations close to and slightly further away from the terrestrial

[10] 0.1 degrees correspond roughly 10 km

network would have had parallel trends concerning attitudes towards violence if it weren't for the arrival of the submarine cables. To verify the validity of the parallel trends assumption, I run a placebo difference-in-differences regression where I use information from the DHS waves about attitudes towards intimate partner violence in 2000-2003 and 2006-2008. The waves refer to the period before the arrival of submarine cables in Africa. This placebo experiment tests whether the attitudes towards IPV between 2000-2003 and 2006-2008 are associated with the submarine cables arrival. Pre-treatment rounds are only available in four countries: Ghana, Kenya, Nigeria and Namibia. Estimates in Panel A and B of Table 2.A.3 provide evidence in favour of this assumption. The outcome was not changing differently before the arrival of submarine cables, across connected and not-connected areas. Hence, it is possible to infer that the results presented in the following section are not biased by pre-existing parallel trends in attitudes towards IPV across individuals residing in locations close to or further way from the terrestrial backbones (i.e. *connected* and *not-connected* locations).[11]

2.5 Results

Main Results

Table 2.1 reports the estimation of the baseline specification, as described in Equation 1. Panel A reports the aggregated index and indicator of the attitudes towards intimate partner violence in five different scenarios: (i) if the woman goes out without the husband's permission, (ii) if she neglects the kids, (iii) if she argues with the husband, (iv) if she burns food, and (v) if she refuses to have sexual intercourse. In the first column of Panel A of Table 2.1, the dependent variable is the *Attitude Index* (constructed following Alesina, Brioschi, et al., 2016) that counts the number of situations in which the respondents justify intimate partner violence. The index captures the intensity of gender-biased norms and ranges from 0, if the respondent does not find any of the 5 situations justifiable, to 5, if the respondent finds that violence is acceptable in all the 5 situations.[12]

The impact of the arrival of submarine cables leads to an increase in the index by 0.128 (equivalent to an increase by 2.6 percentage points). This effect is statistically significant at the 10% level. In the second column of Table 2.1,

[11] Table 2.C.12 and 2.C.13 report the main estimation following Equation 1, excluding Benin to make sure that the results still hold on the sample in which I am able to run the placebo analysis. The results are in line with those presented in 2.1 and 2.2, but less precisely estimated.

[12] Given that respondents had the option of answering "don't know" and this occurred to some extent (2% of the full sample), I treat "don't know" answers equivalent to finding wife-beating not acceptable. The results are similar if I omit these observations entirely from the analysis, see Tables 2.C.14 and 2.C.15.

Table 2.1: Effect of Fast Internet on Gender Norms

PANEL A

	Attitude Index	**Attitude Weighted**
$SubmarineCables_{c,t} \times Connected_i$	0.128*	0.030*
	(0.077)	(0.017)
	[0.100]	[0.082]
Mean Outcome	0.828	0.183
Adj R-squared	0.136	0.136
Observations	47714	47714
Country×Year FE	Y	Y
Grid Cell×Connected FE	Y	Y
Controls	Y	Y

PANEL B

	Home	**Kids**	**Kids**	**Sex**	**Food**
$SubmarineCables_{c,t} \times Connected_i$	0.037*	0.041*	0.033	0.007	0.010
	(0.020)	(0.023)	(0.022)	(0.014)	(0.011)
	[0.059]	[0.080]	[0.126]	[0.613]	[0.376]
Mean Outcome	0.199	0.247	0.1837	0.0803	0.0672
Adj R-squared	0.110	0.109	0.078	0.103	0.094
Observations	47714	47714	47714	47714	47714
Country×Year FE	Y	Y	Y	Y	Y
Grid Cell×Connected FE	Y	Y	Y	Y	Y
Controls	Y	Y	Y	Y	Y

Notes: Table 2.1 reports the coefficients based on estimating equation 1. The sample includes Benin, Ghana, Kenya, Namibia, and Nigeria. Individuals are considered connected if they are closer than 0.5 km to the backbone network. The outcome *Attitude Index* is constructed as the sum of circumstances in which the respondent thinks that wife-beating is justified; it ranges from 0 to 5. The outcome *Attitude Weighted Index* is a weighted index where the weights are proportional to the mean of the attitudes variables. Panel B's outcomes are binary variables taking value one when the respondent thinks wife-beating is justified in various scenarios : if the wife goes out without permission, if she neglects the kids, if she argues with the husband, if she refuses sexual intercourse, if she burns the food. Background controls: age, age squared, religion, gender. The constant is included. Robust standard errors account for clustering at the grid level. p-value in square brackets. $^{*}\ p < 0.1$; $^{**}\ p < 0.05$; $^{***}\ p < 0.01$. *Source:* Own estimations based on DHS (2001, 2012 Benin; 2006, 2013 Namibia; 2008, 2013 Nigeria; 2008, 2014 Ghana; 2008, 2014 Kenya.)

the dependent variable is the *Attitude Weighted Index*, where the weights are proportional to the means of each single attitude variable. The estimate suggests that treated individuals are 3 percentage points more likely to find violence acceptable. This corresponds to a 16 percent effect relative to the sample mean at baseline, i.e., before the arrival of the submarine cables.

To gain a better understanding of the results, Panel B shows the estimated

effect of fast internet in African countries on the acceptability of IPV in the 5 different situations, taken separately. The arrival of fast internet is associated with an increase in the likelihood that respondents find wife-beating acceptable if women go out without the husband's permission and if they neglect their children by 3.7 percentage points (which corresponds to 18 percent relative to the mean) and 4.1 percentage points (16 percent relative to the mean), respectively. Columns (3), (4), and (5) depict the attitudes towards domestic violence in cases where the wife argues with the husband, refuses sexual intercourse, or burns food, respectively. Their estimated coefficients are positive, but they are statistically insignificant.

These findings show that attitudes towards wife-beating in Africa become more gender regressive with the availability of fast internet. The results suggest that the internet and greater connectivity per se do not necessarily improve female empowerment. Before discussing the potential channels behind this finding, I explore whether high-speed internet has a differential effect among women versus men.

Heterogeneity by gender

In this section I study whether the fast internet effect on gender norms, by gender.

Table 2.2 presents the estimation results, when I take into account for gender heterogeneity. The coefficients for the interaction term in Columns (1) and (2) show a statistically significant difference in the effect of fast internet between female and male respondents, with a stronger impact on males. Specifically, the interaction term's coefficient on the *Attitude Index* is 0.182, significant at the 10% level. For males, the treatment effect on the *Attitude Weighted Index* (Column 2) is 4 percentage points higher compared to females. The linear combination shows that increased connectivity has a positive and significant effect for men: fast-internet arrival raises the *Attitude Index* by 0.25 (5 percentage points) and the *Attitude Weighted Index* by 5.6 percentage points. This magnitude represents a 45% increase in the outcome among men at baseline.

Table 2.3 shows the heterogeneous effect of fast internet on IPV acceptability by gender in the five situations separately. The treatment interacted with gender show the different effect fast internet has on females vs males' attitudes. Overall, the linear combination suggest that the effect of more connectivty is stronger for males, in line with the results shown in table 2.2. Notably, the most pronounced divergence in attitudes between women and men concerns IPV in instances where the wife refuses sexual intercourse, with men being 4.6 percentage points more likely than women to deem violence acceptable.

Table 2.2: Effect of Fast Internet on Norms, by gender

	Attitude Index	**Attitude Weighted Index**
Male	-0.354***	-0.075***
	(0.052)	(0.011)
	[0.000]	[0.000]
$SubmarineCables_{c,t}$×$Connected_i$	0.066	0.016
	(0.084)	(0.018)
	[0.434]	[0.389]
$SubmarineCables_{c,t}$×$Connected_i$ × Male	0.182*	0.041*
	(0.108)	(0.024)
	[0.094]	[0.086]
Linear Combination	0.248**	0.0567**
	(0.1061)	(0.0234)
	[0.020]	[0.016]
Mean Outcome	0.828	0.183
Mean Outcome Female	0.966	0.212
Mean Outcome Male	0.554	0.125
Country×Year FE	Y	Y
Grid Cell×Connected FE	Y	Y
Controls	Y	Y
Adj R-squared	0.138	0.138
Observations	47714	47714

Notes: Table 2.2 reports the coefficients based on estimating the heterogeneous effect of fast internet on norms by gender, following Equation 2. The sample includes Benin, Ghana, Kenya, Namibia, and Nigeria. Individuals are considered connected if they are closer than 0.5 km to the backbone network. The outcome *Attitude Index* is constructed as the sum of circumstances in which the respondent thinks that wife-beating is justified; it ranges from 0 to 5. The outcome *Attitude Weighted Index* is a weighted index where the weights are proportional to the mean of the attitudes variables. *Source:* Own estimations based on DHS (2001, 2012 Benin; 2006, 2013 Namibia; 2008, 2013 Nigeria; 2008, 2014 Ghana; 2008, 2014 Kenya.)

Tables 2.C.1 and 2.C.2 show the results when we split the sample between female and male respondents. As we can see in table 2.C.1 the fast internet seems to have no effect on females, whereas it is possible to observe a positive and statistically significant effect of internet arrival on males. Table 2.C.2 shows that the coefficient on *Attitude Index* is 0.154, significant at the 10% level. Looking at the *Attitude Weighted Index*, we notice that the arrival of fast internet increases the males' acceptability towards wife-beating by 3.7 percentage points (that is equivalent to 30 percent relative to the sample mean).

When we unpack the attitudes variables and we observe the female sample, as shown in table 2.C.3 we see that fast internet has no effect on females' attitudes. However, when we look at table 2.C.4, we see that the effect of fast internet makes men more likely to find wife-beating acceptable if the wife goes out without the husband's permission and if she neglects their children. In particular, in the male sample, the acceptability of intimate partner violence increases by 3.9 percentage

Table 2.3: Effect of Fast Internet on Norms, by gender

	Home	**Kids**	**Argue**	**Sex**	**Food**
Male	-0.079***	-0.087***	-0.076***	-0.057***	-0.055***
	(0.014)	(0.016)	(0.013)	(0.009)	(0.008)
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
$SubmarineCables_{c,t} \times Connected_i$	0.024	0.023	0.019	-0.008	0.010
	(0.023)	(0.026)	(0.023)	(0.016)	(0.013)
	[0.310]	[0.381]	[0.415]	[0.598]	[0.468]
$SubmarineCables_{c,t} \times Connected_i \times$ Male	0.040	0.055	0.042	0.046**	-0.000
	(0.030)	(0.034)	(0.029)	(0.022)	(0.017)
	[0.188]	[0.108]	[0.143]	[0.041]	[0.980]
Linear Combination	0.0635**	0.077**	0.061**	0.037*	0.009
	(0.0257)	(0.0324)	(0.0299)	(0.0198)	(0.0140)
	[0.014]	[0.018]	[0.042]	[0.063]	[0.510]
Mean Outcome	0.199	0.247	0.183	0.103	0.094
Mean Outcome Female	0.231	0.282	0.213	0.125	0.115
Mean Outcome Male	0.138	0.554	0.177	0.06	0.052
Country×Year FE	Y	Y	Y	Y	Y
Grid Cell×Connected FE	Y	Y	Y	Y	Y
Controls	Y	Y	Y	Y	Y
Adj R-squared	0.111	0.110	0.080	0.082	0.075
Observations	47714	47714	47714	47714	47714

Notes: Table 2.3 reports the coefficients based on estimating the heterogeneous effect of fast internet on norms by gender, following Equation **??**. The sample includes Benin, Ghana, Kenya, Namibia, and Nigeria. Individuals are considered connected if they are closer than 0.5 km to the backbone network. The outcomes variables are binary variables taking value one when the respondent thinks wife-beating is justified in various scenarios : if the wife goes out without permission, if she neglects the kids, if she argues with the husband, if she refuses sexual intercourse, if she burns the food. *Source:* Own estimations based on DHS (2001, 2012 Benin; 2006, 2013 Namibia; 2008, 2013 Nigeria; 2008, 2014 Ghana; 2008, 2014 Kenya.)

points in the first case, and by 6.8 percentage points in the second one.

Robustness Checks

For the sake of conciseness, I reported only the specifications including the full set of controls as the main results. A sensitivity analysis of the main results to different specifications is reported in tables 2.C.5 and 2.C.6.

In table 2.C.7 the dependent variable is an Index that is the principal component of all the variables of attitude towards domestic violence in the different scenarios. The result is significant at the 10% level and consistent with the main ones.

Bertrand, Duflo, et al. (2004) observe that spatial correlation can bias standard errors in difference-in-differences method. Conley (1999) and Bester et al. (2011) develop a method to correct the standard errors to address spatial autocorrelation. Tables 2.C.10 and 2.C.11 present the estimates and standard errors calculated through the Conley's method. The estimated effect of fast internet on attitudes towards domestic violence remains statistically significant.[13] Moreover in tables 2.C.8 and 2.C.9, I clustered the standard errors at the administrative level, rather than the grid-cells and the estimated coefficient is significant and consistent with the main results presented in the previous section.

I also test whether the estimated effect of fast Internet on gender norms is sensitive or not to the radius around the terrestrial network used to define the connection status (lower than 500m in the main specification). In Figure 2.B.5 I display the point estimates and confidence intervals for different ranges of radii : 500m, 600m, 700m, 800m, 900m and 1000m. The point estimates go all in the same directions, but they become insignificant beyond 700 meters.

2.6 Mechanisms

The findings described in the previous section reveal that the arrival of fast internet on African coasts lead to more regressive gender norms, especially among males. These results can be explained by various mechanisms in play. In this section, I discuss the potential channels behind these findings.

2.6.1 Bargaining Power

A potential mechanism is that the arrival of internet might have changed the labour market outcomes differently for women and men. Therefore, the arrival of fast internet could have transformed the balance of power within the household and this, in turn, could have increased the acceptability of domestic violence. Existing

[13] Standard Errors to account for spatial autocorrelation are calulcated with the Stata command *reg2hdfespatial*. This command does not allow the inclusion of controls. This is the reason why the sample is slightly different than the one of main estimation.

literature on intimate partner violence typically classifies violence as *expressive* when it generates a direct utility to the perpetrator (Tauchen et al. (1991), Farmer and Tiefenthaler (1997)), or it conceptualises domestic violence as an *instrument* to extract resources from the spouse and to increase the bargaining power of the perpetrator (Tauchen et al. (1991), Eswaran and Malhotra (2011), Bloch and Rao (2002)). Therefore, in this study, if the internet had any spill-over effects on treated women and men, it may also affect their attitudes towards violence. On the one hand, it could be the case that fast internet had a positive effect on women's labour market outcomes. This financial empowerment may also invite a backlash from the extant power structures within the family leading to higher acceptability (and incidence) of domestic violence (Amaral, Bandyopadhyay, et al., 2015). On the other hand, if fast internet improves men's labour market outcomes disproportionately, this could lead to deterioration of women's bargaining power in the household. Thus, when men obtain higher incomes and their position of power within the household increases, this may alter their attitudes towards the use of violence in asserting dominance.

When I test for the effect of fast internet on employment[14], as shown in table 2.A.5, it can be seen that high-speed internet increases employment by 3.5 percentage points (in line with main findings from Hjort and Poulsen 2019).[15] In Panel B of Table 2.A.5, I include an interaction term, in order to understand whether internet affects women and men's employment differently. The interaction term shows that the effect on men is 3 percentage points higher than the effect on women, although the difference is not precisely estimated at conventional levels. Panel B of table 2.A.5 shows that the arrival of fast internet has no effect on women's employment, whereas men are 5.47 percentage points more likely to be employed. Overall, this result provides suggestive evidence that internet benefited men relatively more than women. As men gain more economic clout, they might feel entitled to assert their dominance and affect their attitudes towards intimate partner violence.

2.6.2 Internet Use

A second potential channel is that there exists a gender gap in the access to the internet. It could be the case that the effect of internet on gender norms is stronger for males because they have a greater access to internet compared to females. The DHS rounds I use, do not contain information on internet use. Therefore, to

[14]Employment is measured looking at the variable v714 in the DHS, where the respondents were asked *Are you currently working?*

[15]My results slightly differ from Hjort and Poulsen, 2019 because my analysis in conducted on a reduced number of countries

measure internet use, I rely on the rounds 4, 5, and 6 of Afrobarometer. As the DHS, the Afrobarometer contains geo-referenced information of the surveyed individuals, that allows me to calculate the exact distance to the terrestrial backbone and define the treatment and control groups. Table 2.A.5 reports the estimates of the effect of fast internet on internet use. I also take into account of the potential different effect of fast internet on its usage.

The outcome variable *Internet Use [ever]* takes value one if the respondent uses internet, and 0 if never. This measure should proxy for the extensive margin. The first column shows that individuals exposed to fast internet are 6.2 percentage points more likely to have ever used internet. This effect is statistically significant at 10% level, and corresponds to a 23% increase with respect to the average of the control group at the baseline. Column (2) reports the results when I take into account for the heterogeneous effect of fast internet on internet use by gender. The interaction term shows that there is not a statistically significant difference between men and women in the usage of internet at the extensive margin.

The variable *Internet Use [frequent]* takes value 1 if the respondent uses internet at least sometimes in the week, and 0 otherwise. This measure should proxy the intensive margin. The overall effect of the frequent usage of internet increases by 4.8 percentage points, that corresponds to approximately 38% increase with respect to the average at baseline. The effect is not statistically different for men and women. However, the coefficient suggests that the effect of fast internet on its use at the intensive margin is stronger for me. The fact that men are using internet more frequently could proxy an increase in their income and therefore more bargaining power within the household, in line with the potential channel presented above. However, another potential interpretation is that men, by using internet more, are more likely to be exposed to information that might amplify regressive attitudes towards gender roles. These data do not allow me to disentangle which of these channels might prevail.

2.6.3 Internet as information shock

Another potential channel is the internet functioning as an information shock. Growing evidence suggests that social media can increase polarization, intolerance, and hate crimes (Bursztyn, Egorov, et al., 2019; Müller and Schwarz, 2020), suggesting that the internet may alter social norms regarding acceptable behaviours. Table 2.A.1 shows that at baseline—prior to the arrival of fast internet—men exhibited more egalitarian gender views than women. Yet, with the increased availability of fast internet, men are more likely to find IPV acceptable. This result could imply that the internet and the information embedded in it

encourage individuals to express opinions they previously withheld. Such a phenomenon aligns with the concept of *pluralistic ignorance* (Katz et al. (1931)), where individuals believe their private opinion is less common than it is. The internet may act to 'lift the veil' of pluralistic ignorance, potentially intensifying pre-existing regressive gender norms. Moreover, while the internet can provide access to news and role models that inspire and empower women, it can also be perceived as a threat by men, leading them to express gender-regressive attitudes. However, these channels could be particularly relevant with the rise of social media. Given the limited prevalence of social media during the period of analysis, particularly in Sub-Saharan Africa, it is unlikely that these channels are at play.[16] However, it is worth exploring these mechanisms in future research.

2.7 Conclusions

In this paper, I analyse the impact of fast Internet on gender norms around the acceptability of intimate-partner-violence in five countries in Sub-Sahran Africa. I addressed the concerns on potential endogeneity, exploiting the variation over time and space in the arrival of high-speed connectivity through submarine cables between 2008-2012 on African coasts from Europe, using a difference-in-differences approach, in line with Hjort and Poulsen (2019). I compare individuals' attitudes around gender norms in locations in Africa that are on the terrestrial networks to those that are not. I compare the two groups before and after the arrival of submarine cables on African coasts, that greatly increased the speed and capacity of the backbones.

My findings suggest that the arrival of fast Internet in Africa led to more regressive gender norms around the acceptablity of violence. This effect is stronger for males. These findings are robust to various model specifications. The most likely mechanism at play, is that fast internet increases employment more for men than for women. This improvement in labor market opportunuties for men could have increased the intra-household imbalance of power and played a role in the higher acceptability of violence among men.

The main contribution of this paper is that internet and more connectivity per se does not improve female empowerment. Internet, if not accompanied with other forms of gender improving policies, can replicate existing pervasive norms.

[16] Facebook established its first African headquarters in 2015 (BBC News (2015)).

Appendix 2.A Tables

Table 2.A.1: Summary Statistics attitudes towards domestic violence at the baseline

Variable	(1) Women N	Mean/SE	(2) Men N	Mean/SE	T-test Difference (1)-(2)
Attitudes towards violence					
Attitude Index	13118	0.966	6669	0.555	0.412***
		(0.013)		(0.014)	
Attitude weighther Indicator	13118	0.212	6669	0.125	0.087***
		(0.003)		(0.003)	
Wife beating is justified if...					
The wife goes out without permission	13118	0.231	6669	0.139	0.093***
		(0.004)		(0.004)	
The wife neglects the children	13118	0.282	6669	0.178	0.105***
		(0.004)		(0.005)	
The wife argues with her husband	13118	0.213	6669	0.126	0.087***
		(0.004)		(0.004)	
The wife refuses sex intercourse	13118	0.125	6669	0.060	0.065***
		(0.003)		(0.003)	
The wife burns food	13118	0.115	6669	0.053	0.063***
		(0.003)		(0.003)	

Sources: Demographic and Health Survey.

Notes: The table shows the descriptive statistics of the outcome variables, before the arrival of the subamarine cables in Benin, Ghana, Kenya, Namibia, Nigeria. The variable *Attitude Index* is constructed as the sum of the circumstances in which the respondent thinks it would be acceptable for a man to beat his wife. The variable *Attitude Weighted Index* is an index with weights proportional to the mean of the attitudes variables.

Table 2.A.2: Balance Test - Connected and Unconnected at the baseline

Variable	(1) Unconnected Mean/SE	(2) Connected Mean/SE	T-test Difference (1)-(2)
Age	29.372	28.928	0.445**
	(0.079)	(0.168)	
Gender	0.664	0.660	0.003
	(0.004)	(0.008)	
Employed	0.680	0.660	0.020**
	(0.004)	(0.008)	
High Skilled	0.596	0.590	0.006
	(0.004)	(0.008)	
Primary Education	0.392	0.381	0.011
	(0.004)	(0.008)	
Higher Education	0.331	0.321	0.010
	(0.004)	(0.008)	
Attitude Weighted Index	0.186	0.168	0.018***
	(0.002)	(0.005)	
Attitude Index	0.841	0.763	0.079***
	(0.011)	(0.023)	
Norm Home	0.203	0.184	0.019**
	(0.003)	(0.007)	
Norm Kid	0.250	0.231	0.020**
	(0.003)	(0.007)	
Norm Argue	0.188	0.162	0.027***
	(0.003)	(0.006)	
Norm Sex	0.104	0.096	0.009
	(0.002)	(0.005)	
Norm Food	0.095	0.091	0.004
	(0.002)	(0.005)	

Notes: The value displayed for t-tests are the differences in the means across the groups fo many background characteristics (age, gender, employment, skill employment, education dummies) and the dependent variables (Attitude Weighted Index, Attitude Index, Attitudes towards wife beating if the wife goes out without permission (Norm Home), if she neglects kids (Norm Kid), if she argues with the husband (Norm Argue), if she refuses sex (Norm Sex), if the burns food (Norm Food). ***, **, and * indicate significance at the 1, 5, and 10 percent critical level.

Table 2.A.3: Effect of Fast Internet on Gender Norms – Placebo Test

PANEL A

	Attitude Index	**Attitude Weighted**
$SubmarineCables_{c,t} \times Connected_i$	-0.042	-0.011
	(0.121)	(0.027)
	[0.732]	[0.691]
Adj. R-squared	0.153	0.154
Observations	21912	21912
Country×Year FE	Y	Y
Grid Cell×Connected FE	Y	Y
Controls	Y	Y

PANEL B

	Home	**Kids**	**Kids**	**Sex**	**Food**
$SubmarineCables_{c,t} \times Connected_i$	-0.0190	-0.0139	-0.0056	-0.0112	0.0081
	(0.0291)	(0.0320)	(0.0292)	(0.0295)	(0.0153)
	[0.516]	[0.664]	[0.847]	[0.706]	[0.598]
Adj R-squared	0.112	0.117	0.108	0.084	0.064
Observations	21912	21912	21912	21912	21912
Country×Year FE	Y	Y	Y	Y	Y
Grid Cell×Connected FE	Y	Y	Y	Y	Y
Controls	Y	Y	Y	Y	Y

Notes: Table 2.A.3 reports the coefficients based on estimating equation 1, estimated prior to the arrival of fast internet. The sample includes Ghana, Kenya, Namibia, and Nigeria. Individuals are considered connected if they are closer than 0.5 km to the backbone network. The outcome *Attitude Index* is constructed as the sum of circumstances in which the respondent thinks that wife-beating is justified; it ranges from 0 to 5. The outcome *Attitude Weighted Index* is a weighted index where the weights are proportional to the mean of the attitudes variables. Panel B's outcomes are binary variables taking value one when the respondent thinks wife-beating is justified in various scenarios: if the wife goes out without permission, if she neglects the kids, if she argues with the husband, if she refuses sexual intercourse, if she burns the food. Background controls: age, age squared, religion, gender. The constant is included. Robust standard errors account for clustering at the grid level. p-value in square brackets. $^{*}p < 0.1$; $^{**}p < 0.05$; $^{***}p < 0.01$. *Source*: Own estimations based on Demographic and Health Survey.

Table 2.A.4: Mechanism 1: Effect of Fast Internet on Employment

	Employed	
$SubmarineCables_{c,t} \times Connected_i$	0.0350**	0.0213
	(0.0161)	(0.0194)
$SubmarineCables_{c,t} \times Connected_i \times$ Male		0.0335
		(0.0272)
Male		0.1219***
		(0.0160)
Linear Combination		0.0547**
		(0.022)
Mean Dep. Var.	0.676	0.676
Mean Dep. Var. (men)	0.760	0.760
Mean Dep. Var. (women)	0.633	0.633
Adj R-squared	0.062	0.073
Observations	47751	47751
Country×Year FE	Y	Y
Grid Cell×Connected FE	Y	Y
Controls	Y	Y

Notes: Table 2.A.5 reports the coefficients based on estimating equation 1. The sample includes Benin, Ghana, Kenya, Namibia, and Nigeria. Individuals are considered connected if they are closer than 0.5 km to the backbone network. The outcome *Employed* takes the value of one if the respondent is currently working, and 0 if not (v714). The constant is included. Robust standard errors account for clustering at the grid level. p-value in square brackets. $^{*}p < 0.1$; $^{**}p < 0.05$; $^{***}p < 0.01$. *Source:* Own estimations based on DHS (2001, 2012 Benin; 2006, 2013 Namibia; 2008, 2013 Nigeria; 2008, 2014 Ghana; 2008, 2014 Kenya.)

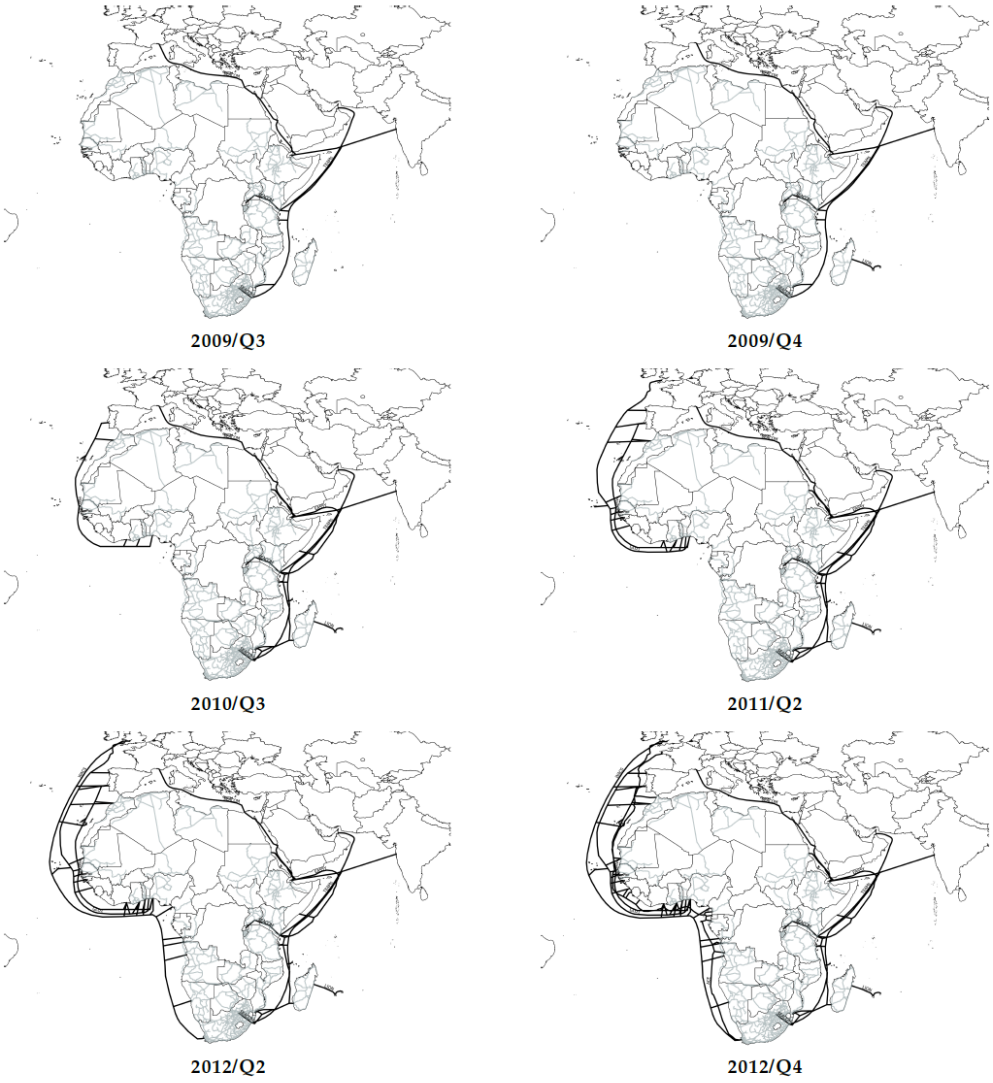
Table 2.A.5: Mechanism 2: Effect of Fast Internet on Internet Use

	Internet Use [ever]		Internet Use [frequent]	
$SubmarineCables_{c,t} \times Connected_i$	0.062*	0.072*	0.048*	0.032
	(0.038)	(0.039)	(0.027)	(0.030)
$SubmarineCables_{c,t} \times Connected_i \times$ Male		-0.020		0.031
		(0.042)		(0.028)
Male		0.074***		0.041***
		(0.016)		(0.013)
Linear Combination		0.052		0.064**
		(0.047)		(0.030)
Mean Dep. Var.	0.265	0.265	0.125	0.125
Mean Dep. Var. (men)	0.307	0.307	0.145	0.145
Mean Dep. Var. (women)	0.224	0.224	0. 104	0.104
Adjusted R-squared	0.184	0.199	0.146	0.159
Observations	12,597	12,597	12,597	12,597
Country×Year FE	Y	Y	Y	Y
Grid Cell×Connected FE	Y	Y	Y	Y

Notes: Table 2.A.5 shows the effect of fast internet on the usage. *Internet Use [ever]* takes value 1 if the individuals uses it less than a month/few times in a month/few times in a week and always, 0 if never. *Internet Use [frequent]* takes value 1 if the individual uses internet few times in the week or always, 0 if never or few times in the month. Individuals are considered connected if they are closer than 0.5 km to the backbone network. The sample includes Benin, Ghana, Kenya, Namibia, and Nigeria. The constant is included. Robust standard errors account for clustering at the grid level. $^{*}p < 0.1$; $^{**}p < 0.05$; $^{***}p < 0.01$. *Source:* Own estimations based on Rounds 4, 5, and 6 of Afrobarometer Surveys (2008, 2011, 2012, 2014)

Appendix 2.B Figures

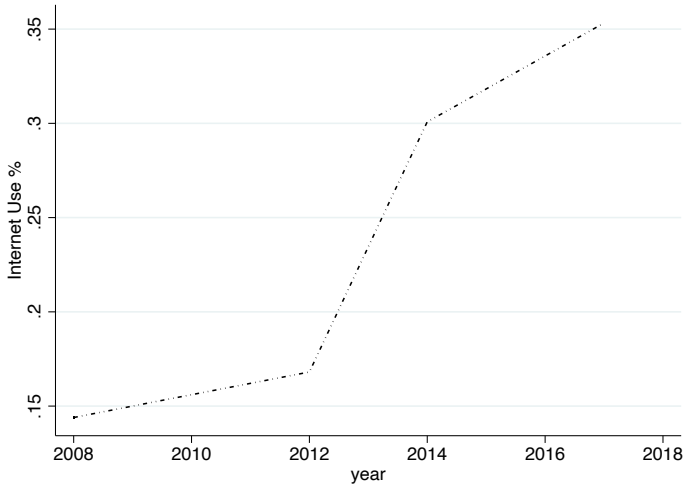
Figure 2.B.1: Submarine Cables Arrival



This figure shows the arrival of submarine Internet cables in Africa over time. The first two cables during our analysis period arrived in 2009/Q3 and the last in 2012/Q4. The submarine cables are Seacom and Teams (2009/Q3), Lion (2009/Q4), Eassy and MainOne (2010/Q3), Glo1 (2011/Q2), WACS (2012/Q2), and ACE (2012/Q4).

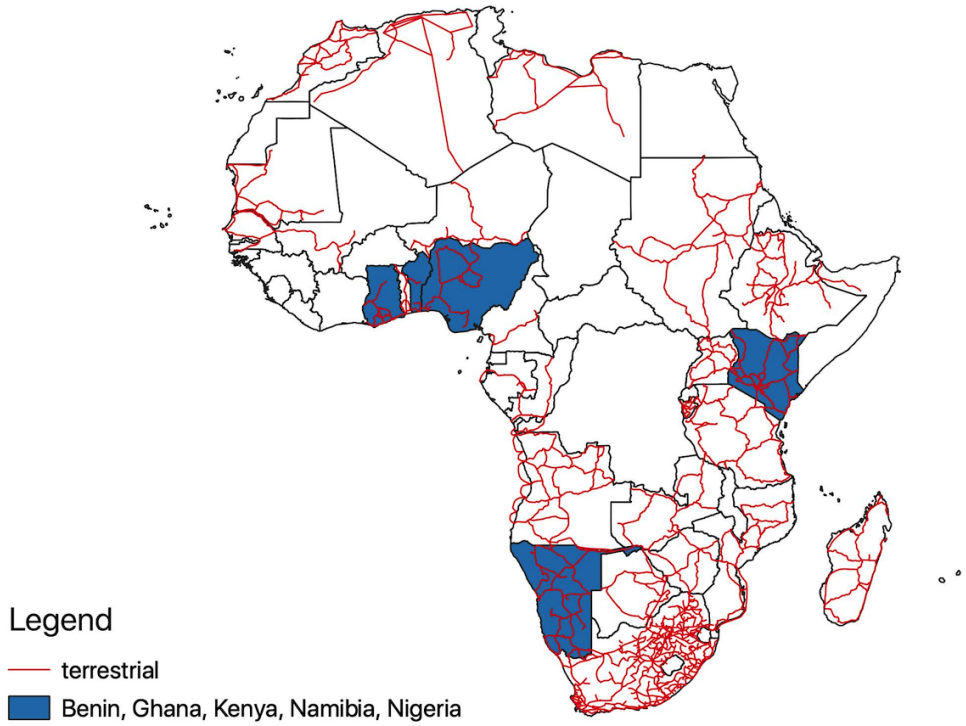
Note: This figure shows the gradual arrival of submarine cables on African coasts between 2008-2012.
Source: : Hjort and Poulsen, 2019

Figure 2.B.2: Internet Use 2008-2018



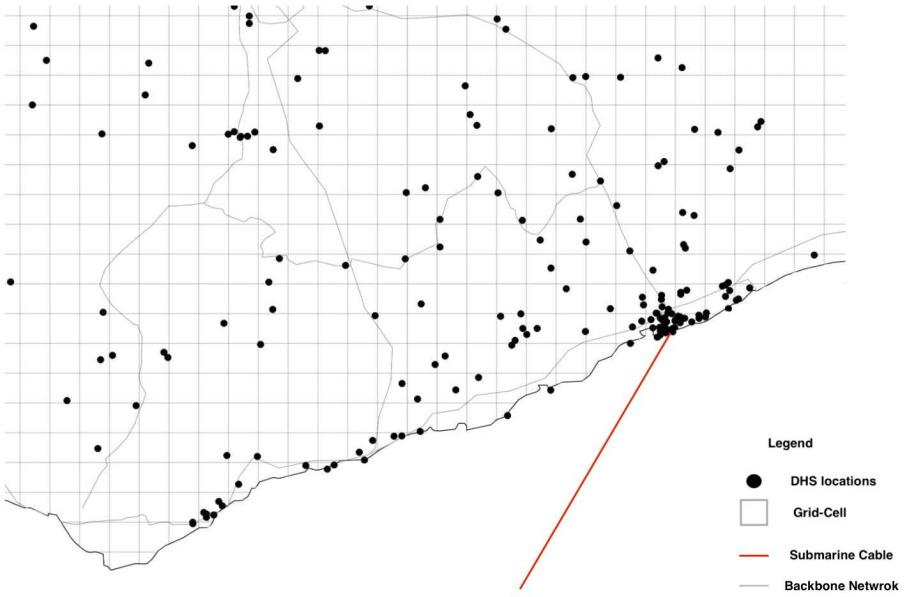
Note: The figure shows the share of individuals who reported to use the Internet at least a fewtimes a month. *Source:* Own calculations based on Afrobarometer data (Round 4, Round 5, Round 6, Round7) in Benin, Ghana, Kenya, Namibia, Nigeria.

Figure 2.B.3: Terrestrial Network and Individuals' locations



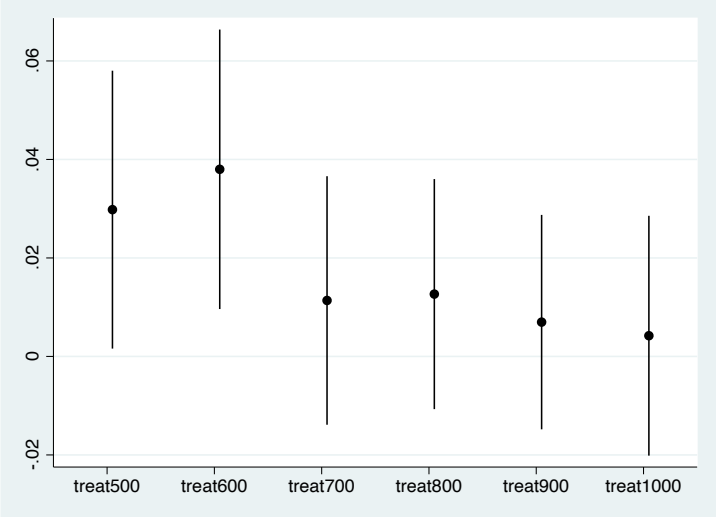
Note: The figure displays the country of the analysis in blue, and the terrestrial networks in red and the DHS clusters in green. *Note:* : The shapefile of the terrestrial network is made available by Hjort and Poulsen, 2019. Individuals locations: Demographic and Health Survey.

Figure 2.B.4: The treatment: zoom



Note: This figure shows submarine Internet cables arriving to the Accra region in Ghana, the country's terrestrial backbone network, and locations from the DHS. Grid-cells length is 0.1 decimal degrees, which is roughly 10 km. *Source:* Data on the submarine cable arrival: Greg Mahlknecht's Cable. Data for individuals' locations: DHS.

Figure 2.B.5: Sensitivity to connection radii



Note: This figure plots the coefficients using varying connection radii. The coefficients thus come from separate regressions.

Appendix 2.C Robustness Checks

Table 2.C.1: Female Sample - Attitudes towards Gender Norms

	Attitude Weighted Index	Attitude Index
$SubmarineCables_{c,t} \times Connected_i$	0.020	0.086
	(0.019)	(0.086)
	[0.292]	[0.317]
Mean Outcome	0.212	0.966
Country×Year FE	✓	✓
Grid Cell×Connected FE	✓	✓
Adj R-squared	0.178	0.177
Observations	32116	32116

Notes: Table 2.C.6 reports the coefficients based on estimating equation 1. The sample includes Benin, Ghana, Kenya, Namibia, and Nigeria. Individuals are considered connected if they are closer than 0.5 km to the backbone network. The outcome *Attitude Index* is constructed as the sum of circumstances in which the respondent thinks that wife-beating is justified; it ranges from 0 to 5. The outcome *Attitude Weighted Index* is a weighted index where the weights are proportional to the mean of the attitudes variables. Female sample. The constant is included. Robust standard errors account for clustering at the grid level. p-value in square brackets. $^{*}p < 0.1$; $^{**}p < 0.05$; $^{***}p < 0.01$.
Source: Own estimations based on Demographic and Health Survey.

Table 2.C.2: Male Sample - Attitudes towards Gender Norms

	Attitude Weighted Index	Attitude Index
$SubmarineCables_{c,t} \times Connected_i$	0.037*	0.154*
	(0.020)	(0.087)
	[0.065]	[0.075]
Mean Outcome	0.125	0.554
Country×Year FE	✓	✓
Grid Cell×Connected FE	✓	✓
Adj R-squared	0.119	0.117
Observations	15598	15598

Notes: Table 2.C.6 reports the coefficients based on estimating equation 1. The sample includes Benin, Ghana, Kenya, Namibia, and Nigeria. Individuals are considered connected if they are closer than 0.5 km to the backbone network. The outcome *Attitude Index* is constructed as the sum of circumstances in which the respondent thinks that wife-beating is justified; it ranges from 0 to 5. The outcome *Attitude Weighted Index* is a weighted index where the weights are proportional to the mean of the attitudes variables. The constant is included. Male sample. Robust standard errors account for clustering at the grid level. p-value in square brackets. $^{*}p < 0.1$; $^{**}p < 0.05$; $^{***}p < 0.01$. *Source*: Own estimations based on Demographic and Health Survey.

Table 2.C.3: Female Sample - unpacking

	Home	**Kids**	**Kids**	**Sex**	**Food**
$SubmarineCables\_ct \times Connected\_i$	0.030	0.015	0.034	-0.003	0.009
	(0.025)	(0.026)	(0.022)	(0.016)	(0.014)
	[0.216]	[0.560]	[0.126]	[0.863]	[0.552]
Mean Outcome	0.161	0.205	0.148	0.093	0.079
Adj R-squared	0.143	0.140	0.119	0.104	0.094
Observations	32116	32116	32116	32116	32116
Country× Year FE	Y	Y	Y	Y	Y
Grid Cell ×Connected	Y	Y	Y	Y	Y

Notes: Table 2.C.3 reports the coefficients based on estimating equation 1, in the sample of women. The sample includes Benin, Ghana, Kenya, Namibia, and Nigeria. Individuals are considered connected if they are closer than 0.5 km to the backbone network. The outcomes are binary variables taking value one when the respondent thinks wife-beating is justified in various scenarios: if the wife goes out without permission, if she neglects the kids, if she argues with the husband, if she refuses sexual intercourse, if she burns the food. Background controls: age, age squared, religion, gender. The constant is included. Robust standard errors account for clustering at the grid level. p-value in square brackets. $^{*}p < 0.1$; $^{**}p < 0.05$; $^{***}p < 0.01$. *Source*: Own estimations based on Demographic and Health Survey.

Table 2.C.4: Male Sample - unpacking

	Home	**Kids**	**Kids**	**Sex**	**Food**
$SubmarineCables\_ct \times Connected\_i$	0.039*	0.068**	0.021	0.020	0.006
	(0.023)	(0.030)	(0.024)	(0.015)	(0.013)
	[0.089]	[0.023]	[0.383]	[0.176]	[0.671]
Mean Outcome	0.106	0.143	0.110	0.055	0.042
Adj R-squared	0.102	0.106	0.059	0.086	0.060
Observations	15598	15598	15598	15598	15598
Country× Year FE	Y	Y	Y	Y	Y
Grid Cell ×Connected	Y	Y	Y	Y	Y

Notes: Table 2.C.3 reports the coefficients based on estimating equation 1, in the sample of men. The sample includes Benin, Ghana, Kenya, Namibia, and Nigeria. Individuals are considered connected if they are closer than 0.5 km to the backbone network. The outcomes are binary variables taking value one when the respondent thinks wife-beating is justified in various scenarios: if the wife goes out without permission, if she neglects the kids, if she argues with the husband, if she refuses sexual intercourse, if she burns the food. Background controls: age, age squared, religion, gender. The constant is included. Robust standard errors account for clustering at the grid level. p-value in square brackets. $^{*}p < 0.1$; $^{**}p < 0.05$; $^{***}p < 0.01$. *Source*: Own estimations based on Demographic and Health Survey.

Table 2.C.5: Pooled Sample - Attitudes towards Gender Norms - No controls

	Attitude Weighted Index	Attitude Index
$SubmarineCables_{c,t} \times Connected_i$	0.028*	0.119
	(0.017)	(0.076)
	[0.099]	[0.119]
Mean Outcome	0.183	0.828
Country×Year FE	✓	✓
Grid Cell×Connected FE	✓	✓
Adj R-squared	0.127	0.126
Observations	47818	47818

Notes: Table 2.C.6 reports the coefficients based on estimating equation 1. The sample includes Benin, Ghana, Kenya, Namibia, and Nigeria. Individuals are considered connected if they are closer than 0.5 km to the backbone network. The outcome *Attitude Index* is constructed as the sum of circumstances in which the respondent thinks that wife-beating is justified; it ranges from 0 to 5. The outcome *Attitude Weighted Index* is a weighted index where the weights are proportional to the mean of the attitudes variables. No controls. The constant is included. Robust standard errors account for clustering at the grid level. p-value in square brackets. $^{*}p < 0.1$; $^{**}p < 0.05$; $^{***}p < 0.01$.
Source: Own estimations based on Demographic and Health Survey.

Table 2.C.6: Pooled Sample - unpacking - No controls

	Home	**Kids**	**Kids**	**Sex**	**Food**
$SubmarineCables\_ct \times Connected\_i$	0.035*	0.038*	0.032	0.006	0.008
	(0.019)	(0.023)	(0.021)	(0.014)	(0.011)
	[0.074]	[0.099]	[0.137]	[0.642]	[0.437]
Mean Outcome	0.199	0.247	0.1837	.0803	.0672
Adj R-squared	0.103	0.101	0.074	0.075	0.069
Observations	47818	47818	47818	47818	47818
Country× Year FE	Y	Y	Y	Y	Y
Grid Cell ×Connected	Y	Y	Y	Y	Y

Notes: Table 2.C.6 reports the coefficients based on estimating equation 1. The sample includes Benin, Ghana, Kenya, Namibia, and Nigeria. Individuals are considered connected if they are closer than 0.5 km to the backbone network. The outcomes are binary variables taking value one when the respondent thinks wife-beating is justified in various scenarios: if the wife goes out without permission, if she neglects the kids, if she argues with the husband, if she refuses sexual intercourse, if she burns the food. No controls. The constant is included. Robust standard errors account for clustering at the grid level. p-value in square brackets. $^{*}p < 0.1$; $^{**}p < 0.05$; $^{***}p < 0.01$. *Source*: Own estimations based on Demographic and Health Survey.

Table 2.C.7: Principal Component Index

	PCA Index
$\text{SubmarineCables}_{c,t} \times Connected_i$	0.099
	(0.060)
	[0.10]
Controls	Y
Country × Year FE	Y
Grid Cell × Connected FE	Y
Adj R-squared	0.136
Observations	47714

Notes: Table 2.C.7 reports the coefficients based on estimating equation 1. The sample includes Benin, Ghana, Kenya, Namibia, and Nigeria. Individuals are considered connected if they are closer than 0.5 km to the backbone network. The outcome variable is a Principal Component Index constructed upon the following 5 scenarios: if the wife goes out without permission, if she neglects the kids, if she argues with the husband, if she refuses sexual intercourse, if she burns the food. No controls. The constant is included. Robust standard errors account for clustering at the grid level. p-value in square brackets. $^{*}p < 0.1$; $^{**}p < 0.05$; $^{***}p < 0.01$. *Source*: Own estimations based on Demographic and Health Survey.

Table 2.C.8: Pooled Sample - Attitudes towards Gender Norms - Alternative Standard Errors: Administrative level

	Attitude Weighted Index	Attitude Index
$SubmarineCables_{c,t} \times Connected_i$	0.030*	0.128*
	(0.016)	(0.072)
	[0.065]	[0.080]
Country×Year FE	Y	Y
Grid Cell×Connected FE	Y	Y
Adj R-squared	0.136	0.136
Observations	47714	47714

Notes: Table 2.C.8 reports the coefficients based on estimating equation 1. The sample includes Benin, Ghana, Kenya, Namibia, and Nigeria. Individuals are considered connected if they are closer than 0.5 km to the backbone network. The outcome *Attitude Index* is constructed as the sum of circumstances in which the respondent thinks that wife-beating is justified; it ranges from 0 to 5. The outcome *Attitude Weighted Index* is a weighted index where the weights are proportional to the mean of the attitudes variables. No controls. The constant is included. Robust standard errors account for clustering at the administrative level. p-value in square brackets. $^{*}p < 0.1$; $^{**}p < 0.05$; $^{***}p < 0.01$. *Source*: Own estimations based on Demographic and Health Survey.

Table 2.C.9: Unpacking - Alternative Standard Errors: Administrative level

	Home	**Kids**	**Kids**	**Sex**	**Food**
$SubmarineCables\_ct \times Connected\_i$	0.037*	0.041*	0.033*	0.007	0.010
	(0.020)	(0.021)	(0.019)	(0.013)	(0.010)
	[0.071]	[0.060]	[0.093]	[0.588]	[0.344]
Adj R-squared	0.110	0.109	0.078	0.081	0.074
Observations	47714	47714	47714	47714	47714
Country× Year FE	Yes	Yes	Yes	Yes	Yes
Grid Cell ×Connected	Yes	Yes	Yes	Yes	Yes

Notes: Table 2.C.3 reports the coefficients based on estimating equation 1, in the sample of men. The sample includes Benin, Ghana, Kenya, Namibia, and Nigeria. Individuals are considered connected if they are closer than 0.5 km to the backbone network. The outcomes are binary variables taking value one when the respondent thinks wife-beating is justified in various scenarios: if the wife goes out without permission, if she neglects the kids, if she argues with the husband, if she refuses sexual intercourse, if she burns the food. Robust standard errors account for clustering at the administrative level. p-value in square brackets. $^{*}p < 0.1$; $^{**}p < 0.05$; $^{***}p < 0.01$. *Source*: Own estimations based on Demographic and Health Survey.

Table 2.C.10: Pooled Sample - Attitudes towards Gender Norms - Alternative Standard Errors: Spatial Autocorrelation

	Attitude Weighted Index	Attitude Index
$SubmarineCables_{c,t} \times Connected_i$	0.030**	0.127**
	(0.013)	(0.061)
	[0.037]	[0.048]
Country×Year FE	Y	Y
Grid Cell×Connected FE	Y	Y
Adj R-squared	0.009	0.009
Observations	48152	48152

Notes: Table 2.C.10 reports the coefficients based on estimating equation 1. The sample includes Benin, Ghana, Kenya, Namibia, and Nigeria. Individuals are considered connected if they are closer than 0.5 km to the backbone network. The outcome *Attitude Index* is constructed as the sum of circumstances in which the respondent thinks that wife-beating is justified; it ranges from 0 to 5. The outcome *Attitude Weighted Index* is a weighted index where the weights are proportional to the mean of the attitudes variables. The constant is included.Standard errors calculated with Conley Method. p-value in square brackets. $^{*}p < 0.1$; $^{**}p < 0.05$; $^{***}p < 0.01$. *Source*: Own estimations based on Demographic and Health Survey.

Table 2.C.11: Unpacking - Alternative Standard Errors: Spatial Autocorrelation

	Home	**Kids**	**Kids**	**Sex**	**Food**
$SubmarineCables\_ct \times Connected\_i$	0.036**	0.040**	0.034**	0.007	0.009
	(0.016)	(0.019)	(0.017)	(0.010)	(0.009)
	[0.024]	[0.034]	[0.049]	[0.481]	[0.316]
Adj R-squared	0.006	0.007	0.004	0.005	0.005
Observations	48152	48152	48152	48152	48152
Country× Year FE	Yes	Yes	Yes	Yes	Yes
Grid Cell ×Connected	Yes	Yes	Yes	Yes	Yes

Notes: Table 2.C.3 reports the coefficients based on estimating equation 1, in the sample of men. The sample includes Benin, Ghana, Kenya, Namibia, and Nigeria. Individuals are considered connected if they are closer than 0.5 km to the backbone network. The outcomes are binary variables taking value one when the respondent thinks wife-beating is justified in various scenarios: if the wife goes out without permission, if she neglects the kids, if she argues with the husband, if she refuses sexual intercourse, if she burns the food. Standard Errors calculated with the Conley Method. p-value in square brackets. $^{*}p < 0.1$; $^{**}p < 0.05$; $^{***}p < 0.01$. *Source*: Own estimations based on Demographic and Health Survey.

Table 2.C.12: Effect of Fast Internet on Gender Norms – Excluding Benin

	Attitude Weighted	**Attitude Index**
$SubmarineCables\_ct \times Connected\_i$	0.025	0.108
	(0.020)	(0.089)
Observations	37,404	37,404
Adjusted R-squared	0.120	0.123
Country×Year FE	Y	Y
Grid Cell×Connected FE	Y	Y
Controls	Y	Y

Notes: Table 2.C.12 reports the coefficients based on estimating equation 1, estimated prior to the arrival of fast internet. The sample includes Ghana, Kenya, Namibia, and Nigeria. Individuals are considered connected if they are closer than 0.5 km to the backbone network. The outcome *Attitude Index* is constructed as the sum of circumstances in which the respondent thinks that wife-beating is justified; it ranges from 0 to 5. The outcome *Attitude Weighted Index* is a weighted index where the weights are proportional to the mean of the attitudes variables. Background controls: age, age squared, religion, gender. The constant is included. Robust standard errors account for clustering at the grid level. $^{*}p < 0.1$; $^{**}p < 0.05$; $^{***}p < 0.01$. *Source*: Own estimations based on Demographic and Health Survey.

Table 2.C.13: Effect of Fast Internet on Gender Norms, by gender – Excluding Benin

	Attitude Weighted	**Attitude Index**
male	-0.044***	-0.220***
	(0.011)	(0.051)
$SubmarineCables\_ct \times Connected\_i$	0.007	0.026
	(0.021)	(0.094)
$SubmarineCables\_ct \times Connected\_i \times Male$	0.051**	0.230**
	(0.024)	(0.114)
Observations	37,404	37,404
Adjusted R-squared	0.120	0.123
Country×Year FE	Y	Y
Grid Cell×Connected FE	Y	Y
Controls	Y	Y

Notes: Table 2.C.13 reports the coefficients based on estimating equation 1, estimated prior to the arrival of fast internet. The sample includes Ghana, Kenya, Namibia, and Nigeria. Individuals are considered connected if they are closer than 0.5 km to the backbone network. The outcome *Attitude Index* is constructed as the sum of circumstances in which the respondent thinks that wife-beating is justified; it ranges from 0 to 5. The outcome *Attitude Weighted Index* is a weighted index where the weights are proportional to the mean of the attitudes variables. The interaction term takes into account for differential effect by gender. Background controls: age, age squared, religion, gender. The constant is included. Robust standard errors account for clustering at the grid level. $^{*}p < 0.1$; $^{**}p < 0.05$; $^{***}p < 0.01$. *Source*: Own estimations based on Demographic and Health Survey.

Table 2.C.14: Effect of Fast Internet on Gender Norms – Excluding "I Don't Know" answers

	Attitude Weighted	**Attitude Index**
$SubmarineCables\_ct \times Connected\_i$	0.028	0.119
	(0.017)	(0.078)
Observations	45,745	45,745
Adjusted R-squared	0.141	0.140
Country×Year FE	Y	Y
Grid Cell×Connected FE	Y	Y
Controls	Y	Y

Notes: Table 2.C.14 reports the coefficients based on estimating equation 1, estimated prior to the arrival of fast internet. The sample includes Ghana, Kenya, Namibia, and Nigeria. Individuals are considered connected if they are closer than 0.5 km to the backbone network. The outcome *Attitude Index* is constructed as the sum of circumstances in which the respondent thinks that wife-beating is justified; it ranges from 0 to 5. The outcome *Attitude Weighted Index* is a weighted index where the weights are proportional to the mean of the attitudes variables. The interaction term takes into account for differential effect by gender. Background controls: age, age squared, religion, gender. "I don't know answers" treated as missing. The constant is included. Robust standard errors account for clustering at the grid level. $^{*}p < 0.1$; $^{**}p < 0.05$; $^{***}p < 0.01$. *Source*: Own estimations based on Demographic and Health Survey.

Table 2.C.15: Effect of Fast Internet on Gender Norms, by gender – Excluding "I Don't Know" answers

	Attitude Weighted	**Attitude Index**
male	-0.082***	-0.384***
	(0.011)	(0.051)
$SubmarineCables\_ct \times Connected\_i$	0.015	0.059
	(0.018)	(0.084)
$SubmarineCables\_ct \times Connected\_i \times Male$	0.039*	0.179*
	(0.023)	(0.106)
Observations	45,745	45,745
Adjusted R-squared	0.143	0.142
Country×Year FE	Y	Y
Grid Cell×Connected FE	Y	Y
Controls	Y	Y

Notes: Table 2.C.15 reports the coefficients based on estimating equation 1, estimated prior to the arrival of fast internet. The sample includes Ghana, Kenya, Namibia, and Nigeria. Individuals are considered connected if they are closer than 0.5 km to the backbone network. The outcome *Attitude Index* is constructed as the sum of circumstances in which the respondent thinks that wife-beating is justified; it ranges from 0 to 5. The outcome *Attitude Weighted Index* is a weighted index where the weights are proportional to the mean of the attitudes variables. The interaction term takes into account for differential effect by gender. Background controls: age, age squared, religion, gender. "I don't know answers" treated as missing. The constant is included. Robust standard errors account for clustering at the grid level. $^{*}p < 0.1$; $^{**}p < 0.05$; $^{***}p < 0.01$. *Source*: Own estimations based on Demographic and Health Survey.

Chapter 3

Child Marriage and Female Genital Cutting

Joint with Suzanna Khalifa.

Contribution

My contribution to this study includes participating in the idea development, managing the raw data and preparing the final data set, performing the analyses, preparing the tables and figures for the manuscript, and co-writing the manuscript.

3.1 Introduction

Harmful practices, such as child marriage and female genital cutting (FGC), are widespread. Globally, 640 million girls and women were married as children and at least 200 million have been subjected to FGC (UNICEF, 2023). A growing body of literature has studied the practices of child marriage and female genital cutting separately and has shown that they both persist despite high costs imposed on individuals and society because they both are markers to signal women's conformity to gender norms (Gulesci, Jindani, et al., 2023; Andrew and Adams, 2022; Buchmann et al., 2023; Corno, Hildebrandt, et al., 2020; Field and Ambrus, 2008; Becker, 2021; Hombrados and Salgado, 2018).[1]

In regions where child marriage and FGC are prevalent, policymakers and governments have enacted legislation aimed at their reduction (28 Too Many, 2020; UN WOMEN, 2023). Yet the effectiveness of these measures in enhancing women's welfare remains uncertain, particularly if the potential relationship between these practices is overlooked. The extent to which child marriage and

[1] In particular, they signal women's value that is typically determined by women's 'purity', chastity, respectability, fidelity and obedience (Mackie, 1996; Hicks, 2018; Daly et al., 1982; Hayes, 1975; Dickemann, 1979, 1981; Buchmann et al., 2023)

FGC intersect, especially in settings where policies aimed at their reduction are implemented, remains largely unexplored.

In this paper, we assess whether a law prohibiting and criminalizing child marriage is an effective tool to curtail child marriage in the context of Nigeria. Given the tightness of the marriage markets in this context, we extend our analysis to investigate whether the policy has unintended consequences on other harmful practices that could counteract the potential benefits of the legislation. Specifically, we explore whether policies increasing the cost of child marriage might generate an unintended increase in female genital cutting. The relation between these two harmful practices is an empirical question, as it depends on whether child marriage and female genital cutting are complement or substitute traits in the marriage market.

The context of Nigeria is particularly well suited to address this research question as it is characterised by a high prevalence of child marriage and female genital cutting. As the most populous country in the Sub-Saharan region, Nigeria has the highest number of child marriages, with 22 million child brides living in the country (UNICEF, 2018). Female genital cutting is also extremely prevalent: 20 million girls and women have undergone FGC (UNICEF, 2022b). Given the pervasive extent of the phenomena, measures have been implemented to reduce child marriage and FGC (28 Too Many, 2020; UN WOMEN, 2023). In particular, between 2003 and 2022, Nigerian states gradually ratified a Child Rights Act prohibiting and criminalizing child marriage.

To study the effectiveness of laws against child marriage, we exploit the variation in timing of the gradual adoption of Child's Rights Act laws across Nigerian states. This enables us to employ a difference-in-differences strategy within a hazard model to identify the causal effect of the policy on the hazard of being a child bride, and of being cut. To ensure more comparability, we focus our analysis on the Southern states of Nigeria, where Sharia Law plays no role.[2]

To measure the marriage and the FGC outcomes, we combine two sources of information, coming from the Demographic and Health Survey (DHS, waves 1990, 2003, 2008, 2013, 2018) and the Multiple Indicator Cluster Surveys (MICS, waves 2007, 2011, 2016, 2021). Both surveys collect information on marriage, and FGC retrospectively (e.g., age at marriage, age at FGC).

This study uncovers two main findings. First, the Child Rights Act laws decrease the annual marriage hazard by 21% among girls aged between 8 and

[2]In twelve of the Northern states of Nigeria, Sharia has been instituted as the main body of civil and criminal laws. Although the Child Rights Act has also been adopted by some Sharia States, the age of marriage is not very binding because child marriage is justified on religious and traditional grounds. For this reason, we limit our sample to women residing in states where Sharia plays no role.

17 years old, compared to young women in the same cohort and age, residing in states where the laws did not (or not yet) pass. Second, the Child Rights Act laws increase the annual FGC hazard by 45% among girls aged between 0 and 5 years old, compared to young girls in the same cohort and age group, residing in states where the laws did not (or not yet) pass. Taken together, these findings suggest that child marriage and FGC are substitute traits in the marriage market. As a result, when the cost of child marriage increases, parents may be more likely to turn to FGC as a compensating strategy to improve their daughters' marriage prospects.

The contribution of this paper is threefold. First, our paper relates to a strand of economic literature that, since Becker, 1973, has engaged in the economic analysis of the marriage market and its importance for economic development. A large body of the literature focuses on the determinants and the consequences of the timing of marriage (Field and Ambrus, 2008; Andrew and Adams, 2022; Buchmann et al., 2023; Corno, Hildebrandt, et al., 2020; Banerjee, Duflo, et al., 2013; Chiappori et al., 2017; McGavock, 2021; Greenwood et al., 2017). Moreover, FGC has been suggested as being valued in the marriage market. Chesnokova and Vaithianathan, 2010; Rai and Sengupta, 2013; Hombrados and Salgado, 2018 provide suggestive evidence of the value of FGC in the marriage market. Khalifa, 2022 provides causal evidence supporting the hypothesis that FGC can generate marriage market returns. With this paper, we study more in detail the interplay between child marriage and FGC, showing that they are two substitute traits in the marriage market.

Second, our paper contributes to the strand of the literature that focuses on policy externalities on women's well-being. Recent works show how policies might affect women in non-obvious ways (Ashraf, Field, et al., 2020; Bau, 2021; Ebenstein, 2014; La Ferrara and Milazzo, 2017; Schoellman and Tertilt, 2006; Fernandez, 2007; Fernández and Fogli, 2009; Fernández, 2011; Algan and Cahuc, 2010; Jayachandran and Pande, 2017; Lowes et al., 2017). Our findings highlight the importance of the cultural context on policy efficacy, showing the unintended consequences of policies on women's welfare.

Third, this paper addresses the origins and persistence of gender norms within the field of economics. Studies have shown how ancestral and cultural factors can shape norms and beliefs (Alesina, Giuliano, et al., 2013; Ashraf, Field, et al., 2020; Giuliano and Nunn, 2021; Becker, 2023), and how restrictive norms impose direct costs on deviations, thereby reinforcing their perpetuation (Guarnieri and Rainer, 2018). This paper furthers our understanding of the interplay between harmful norms.

The rest of the paper is organised as follows. In Section 3.2, we document the prevalence of child marriage and female genital cutting. We also describe the gradual adoption of the Child Act since 2003 across Nigerian states, and we present the institutional differences across Nigerian states. In Section 3.3, we discuss the data used for the estimation, and in Section 3.4, we present the empirical strategy. In Section 3.5, we present and discuss the main results. Lastly, we conclude in Section 3.6.

3.2 Background

Nigeria is a Federal Republic of 36 states and one Federal Capital Territory, where the capital city, Abuja, is located. A traditional divide between the Northern and the Southern regions characterises Nigeria. The Northern part of Nigeria is predominantly Muslim, and between 1999 and 2001, 12 Northern States introduced Islamic criminal law by enacting the Sharia Penal Code (Makinde and Ostien, 2011).[3] In the Southern states, conversely, the Sharia Law plays no role.

A high prevalence of harmful practices, such as child marriage and female genital cutting, characterises Nigeria. Existing social norms on gender roles underpin these harmful practices. Qualitative studies conducted in Nigeria identify that norms around women's respectability, purity, obedience, and fidelity may be potential drivers of the harmful traditional practices of child marriage and female circumcision (Veen et al., 2018). Child Marriage and FGC are, therefore, potentially competing markers to signal women's conformity to gender norms.

Harmful practices in Nigeria

Child Marriage

Child marriage, defined as a formal marriage or informal union between a child under 18 and an adult (or another child), remains prevalent despite its global decline over the past decade (UNICEF, 2018). Approximately one in five girls globally are married in childhood, with the practice particularly widespread in West and Central Africa, where 41 percent of girls marry before reaching adulthood (UNICEF, 2018).

[3]The 12 States that introduced Sharia Law are Bauchi, Borno, Gombe, Jigawa, Kaduna, Kano, Katsina, Kebbi, Niger, Sokoto, Yobe and Zamfara states. Sharia is a body of religious law that forms a part of the Islamic tradition based on scriptures of Islam, including the Koran and the *hadith*, the record of words and actions of the Islamic prophet Muhammad (Bassiouni, 2014) The Sharia adoption was a top-down political process driven by state assemblies, which started in the state of Zamfara (Alfano, 2022).

As the most populous country in the region, Nigeria is also home to the highest number of child brides at 22 million (UNICEF, 2018). Child marriage has been shown to detrimentally affect women and their children. Women who marry as adolescents attain lower levels of education, and experience earlier childbearing, reduced sexual and reproductive autonomy as well as more domestic violence (Jensen and Thornton, 2003; Field and Ambrus, 2008; Chari et al., 2017; Chiappori et al., 2017; Corno, Hildebrandt, et al., 2020; Ashraf, Field, et al., 2020). Many reasons can explain the persistence of the practice of child marriage. Economic and cultural reasons co-exist. Poor economic conditions are important drivers of the practice of child marriage because they can be considered as a form of social protection for the family of the bride (Corno, Hildebrandt, et al., 2020; Munoz-Blanco, 2023). This might be exacerbated in context where the tradition of marriage payments is widespread (Corno, Hildebrandt, et al., 2020). Cultural norms are also important in explaining the persistence of early marriage. Child marriage is often viewed as a strategy to shield girls from situations that would jeopardize their purity and future marriageability, such as sexual assault or pre-marital pregnancy. Moreover young brides are often preferred due to the beliefs that they are more fertile, more likely to lack sexual experience, and easier to control (Field and Ambrus, 2008).

Female Genital Cutting

Female Genital Cutting (FGC) is the practice of cutting or removing part of the external female genitalia for non-medical reasons. An estimated 200 million women are cut worldwide (UNICEF, 2022a) and every year, 3 million female infants and children are at risk of undergoing FGC (Sipsma et al., 2012). The WHO distinguishes three types of female circumcision. Type I is the partial or total removal of the clitoral glans (clitoridectomy) and/or the prepuce. Type II consists of the partial or total removal of the clitoral glans and the labia minora, with or without excision of the labia majora (excision). Type III, also known as infibulation, is the narrowing of the vaginal opening with the creation of a covering seal by cutting and appositioning the labia minora or labia majora with or without excision of the clitoral prepuce and glans (WHO, 2018).

In Nigeria, 20 million of girls and women are estimated to have undergone FGC. Nigeria accounts for the third highest number of women and girls who have undergone FGM worldwide (UNICEF, 2022a). In general, Type III, the most severe form, is practiced more extensively in the northern regions, while Types I and II predominate in the south (Freymeyer and Johnson, 2007). Of the six major ethnic groups only one, the Fulani, does not routinely cut women. The largest

ethnic group, the Yoruba, primarily perform Type I and Type II cutting, while the Hausa and Kanuri engage in Type III. The Ibo and Ijaw practice all types depending on local community norms (Freymeyer and Johnson, 2007).

FGC in Nigeria is typically performed during infancy, and it leads to serious health consequences both at the time of cutting (e.g., excessive bleeding and increased mortality) and in the long run (e.g., birth-related complications). Yet FGC persists as it is believed to preserve women's purity and virginity and confer better marriage prospects, by reducing the uncertainty around paternity (Corno, La Ferrara, et al., 2020; Becker, 2021; Howard and Gibson, 2019; Catania et al., 2007). According to the Nigerian DHS (wave 2003), the first mentioned benefits to FGC are first to preserve girls' virginity, and second for social acceptance. Given the value associated with FGC parents would presumably continue the practice to improve their daughters' marriage prospects (Mackie, 1996; Nour, 2008; García-Hombrados and Salgado, 2023).

Child's Rights Act Laws

In 2003, the Child's Rights Act (CRA) was enacted, with the objective of protecting the rights of children. A child is defined as a person who is less than 18 years old. The CRA addresses the rights and responsibilities, protection and welfare of children. Part III, Section 21 of the Child Right Act proclaims that *'no person under the age of 18 years is capable of contracting a valid marriage'*. Moreover it criminalizes it by stating that a person directly or indirectly involved in the practice of child marriage *'is liable on conviction to a fine of N500,000; or imprisonment for a term of five years or to both such fine and imprisonment'* (Child's Rights Act, 2003).[4] The enforcement of the CRA involved the establishment of family courts at the local and district level with the assistance of specialized units from local law enforcement to ensure compliance. Analysis of the enforcement of the Child Act laws in Nigeria has been conducted by Udoh and Edem, 2011 who investigated its implementation among Civil Servants and provide qualitative evidence suggesting that the Child Right Act was implemented as intended.

As a federal law, the Child's Rights Act was effective starting from 2003, only in the Federal Capital Territory of Abuja. The remaining states had to pass mirroring laws to protect children's rights and prohibit child marriages. Between 2003 and 2022, 31 states gradually adopted the Child Act laws. Five Northern States are yet to domesticate the law: Adamawa, Bauchi, Gombe, Kano and Zamfara. Table 3.B.1 presents a comprehensive list of the states that adopted the Child Act Laws

[4] In 2003, 500,000 Nigerian Naira equated to approximately 3,900 USD, given an exchange rate of 129 N/USD. For context, Nigeria's GDP per capita that year was roughly 787 USD. Source: World Bank Indicators

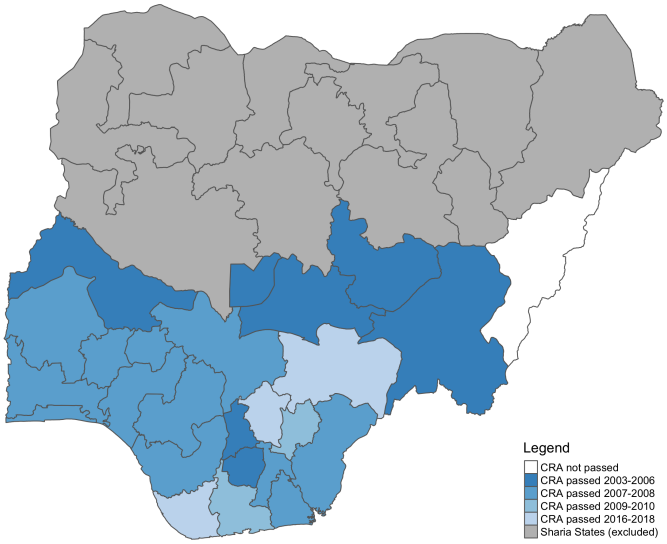
since 2003. Importantly for our study, the Child's Rights Act does legislate against harming a child which is defined as *'the use of harsh language, physical violence, exposure to the environment and any consequential physical, psychological or emotional injury or hurt'*. However, it does not specifically define Female Genital Cutting, nor violence against girls and women. [5]

Nigeria's plural and multi-religious society makes the implementation of legislation challenging (Uzoma, 2004). In many Sharia States (including those that domesticated the CRA), child marriage is justified on religious and traditional grounds. Thus, an age restriction contravenes Sharia law. Many of these states have even gone on to pass competing child protection laws that omit the CRA's age restriction altogether. Jigawa, for example, recently introduced a new bill that does not place any restriction on the age of marriage. Kaduna state, instead, permits the marriage of children of Islamic faith (Save the children, 2021).[6]. For this reason, we decide to restrict our analysis to the states (mainly Southern States), where Sharia laws play no role and the Child Act Laws are likely to be enforced and binding. The Figure 3.1 shows the gradual implementation of the CRA Laws across Nigerian states, excluding the states where Sharia plays a significant role.

[5] In 2015, Nigeria's Violence Against Persons Prohibition Act (VAPP) came into effect, representing the country's first federal attempt to prohibit female genital cutting (FGC) nationally. Prior to the VAPP, six states enacted anti-FGC legislation between 1999 and 2004. We are not able to assess the VAPP's effectiveness; the youngest cohorts observable in our data were born in 2006 and, by 2015, they were older than the age most at risk for FGC in Nigeria. Additionally, the evaluation of pre-VAPP anti-FGC laws is not feasible; the subsequent enactment of Child's Rights Act laws in these states confounds the ability to distinguish the effects of the anti-FGC laws due to the lack of cohorts affected solely by the earlier legislation.

[6] Section 24(3) of Child Protection and Welfare Law, 2018 of Kaduna State: "a child who is a Muslim, who has not attained the age of 18 years shall have the right to contract a marriage under Islamic Law and the marriage so contracted shall be valid and he shall not be liable for any offence under this section"

Figure 3.1: The gradual adoption of the Child Right Act laws in Nigeria



Note: The figure presents the gradual adoption of the Child Right Act laws in Nigeria. Note that Sharia states are in grey and they are excluded from the main analysis.

3.3 Data

Individual Level Data

Data on marriage and female genital cutting come from the Demographic and Health Surveys (DHS) and the Multiple Indicator Cluster Surveys (MICS). The survey tools used by the DHS and MICS permit direct comparisons between surveys and the survey design and implementation quality are similar over time. The DHS and the MICS are nationally representative household surveys carried out in developing countries. We use the DHS survey waves collected in 1990, 2003, 2008, 2013, and 2018 and the MICS survey waves collected in 2007, 2011, 2016/7, and 2021.

Across all the survey rounds, all women in the household between the ages of 15 and 49 are interviewed, whether they are married or unmarried. Both information on marriage and FGC is collected retrospectively. Women are asked to recall the age, month and year when they first got married and the age in which they have been circumcised. By using adult women as the source of information about cutting, we can rely on self-reported data instead of relying on mothers' responses about their daughters. This approach can significantly reduce concerns about misreporting as mothers' responses may be influenced by social desirability bias and fear of legal repercussions (De Cao and Lutz, 2018; De Cao and La Mattina, 2019).

Women residing in states where Sharia plays a role in personal status issues (e.g., marriage, divorce, inheritance) or in full are excluded from the analysis. As reported in Table 3.A.1, our final sample consists of 159,184 women and 67% of them have ever been married. As shown in Table 3.A.1 43% of women have undergone female genital cutting. Based on data from the DHS and the MICS, 3.A.1 shows the age distribution at marriage and at female genital cutting. The average age at marriage is 19.9 years old. By the age of 17, 35% of women are married, and by the age of 25, 90% are married. In Nigeria FGC is typically performed very early. The average age of FGC in the sample is approximately 3 years old. Figure 3.A.1 shows that by the age of 5 years old, 80% in Nigeria are cut.

Anti Child Marriage Policy

Data on the staggered roll-out of the Child's Rights Act Laws come from Child Act Rights Tracker. Table 3.B.1 presents a list of the the states that adopted the Child Act Laws since 2003. This source was cross validated following Chinedum, 2021.

3.4 Empirical Strategy

To examine the causal effect of the Child Act legislation on the hazard into child marriage, and on the hazard of being cut, we estimate a simple discrete approximation of a duration model, using simple OLS, adapted from Currie and Neidell, 2005; Corno, Hildebrandt, et al., 2020; Munoz-Blanco, 2023.

We estimate two distinct duration models. First, to estimate the hazard into child marriage, the duration of interest is the time between t_0, the age when a woman is at risk of being married and t_m, the time when the woman gets married (if ever). Second, to estimate the risk of being cut, the duration of interest is the time between the age the girl is at risk of being cut, t_0, and the time when she gets cut, t_c.

In our child-marriage analysis, t_0 is age 8, which is the minimum age at which a non-negligible number of women in our sample report getting married for the first time. In our FGC analysis, t_0 is age 0, that is when the girl is born.

We convert our data into person-age unbalanced panels, exploiting variables for year of birth, the age of marriage, and the age of circumcision that the DHS and MICS ask retrospectively to women. Each unit (woman) starts with t observations, where t is the age at the time of the survey. A woman who is married (or cut) at age t_m (or t_c) contributes to $t_m - t_0 + 1$ (or, $t_c - t_0 + 1$) observations to the sample:

one observation for each at-risk year until she gets married or she is cut, after which she exits the data.

When we examine child marriage, we examine data on women until the age of 17, as after that, young women are legally allowed to get married. When we examine FGC, we examine girls until the age of 5, as in Nigeria FGC is typically performed between 0-5 years old. For example, if a woman marries at age 15, she will have 8 observations (age $\in \{8, 9, 10, 11, 12, 13, 14, 15\}$). If she does not get married by the age of 17 (or if she never gets married), she will have 10 observations (age $\in \{8, 9, 10, 11, 12, 13, 14, 15, 16, 17\}$). Instead, when examining the hazard into FGC, if a woman is circumcised at age 3, she will have 4 observations (age $\in \{0, 1, 2, 3\}$). If, instead, she does not get circumcised by the age of 5 (or never), she will have 6 observations (age $\in \{0, 1, 2, 3, 4, 5\}$).[7] We merge these individual data with the year in which the Child Rights Act laws have been adopted across Nigerian states.

In order to estimate the effect of the Child's Rights Act laws on child marriage and on FGC, we exploit the gradual implementation of Child's Rights Act laws across Nigerian states, in the period between 2003 to 2018. Employing a difference-in-differences design, we compare the hazard into child marriage and FGC of girls and young women with the same age and born in the same year who have been affected by the law to those who have not, before and after the law passed.

We estimate the probability of being married (or cut) for woman i in state s born in cohort k and age t:

$$y_{i,s,k,t} = \beta_0 + \beta_1 Law_{s,t} + \alpha_s + \eta_t + \gamma_k + \epsilon_{i,s,k,t}. \tag{3.1}$$

The dependent variable $y_{i,s,k,t}$ is a binary variable coded 1 in the year the woman gets married (or cut), and 0 otherwise. The variable $Law_{s,t}$ is a dummy that takes value of 1 if the Child's Rights Act law was implemented in state s when the girl was aged t. β_1 is the main coefficient of interest and measures the effect of the law on the probability of being married by the age of 17 or being cut by the age of 5. η_t is a vector of age fixed effects, which controls for the fact that marriage and FGC have a different probability to occur at different ages. We include state fixed effects, α_s, to control for time-invariant local unobservable characteristics, such as geographic, economic and cultural factors, and year-of-birth fixed effects γ_k to account for cohort fixed effects. In alternative specifications we also included an interaction between regions and the age fixed effects, to account for age-specific changes at the region level. We cluster the standard errors at the level of the state,

[7] Figure 3.B.1 simplifies the dataset structure in more detail.

at which the treatment is assigned.[8]

The key identifying assumption behind this strategy is that girls' timing of marriage and hazard into FGC in states where the Child's Rights Act laws have been adopted would have had parallel trends if the Child's Rights Act laws had not been introduced. We provide evidence supporting the parallel trends assumption, by estimating an event study version of the equation 3.1. In particular, we estimate the following specification:

$$y_{i,s,k,t} = \beta_0 + \sum_{t}^{T} \beta^t \times Law_{s,t} + \alpha_s + \gamma_k + \epsilon_{i,s,k,t}, \tag{3.2}$$

where the dependent variable is defined as above. $Law_{s,t}$ takes value 1 if in a state s, at time t, the Child's Rights Act law was adopted, and 0 otherwise. $Law_{s,t}$ is interacted with the event dummies, that measure the girls' age relative to the year in which the law was adopted. Therefore, each estimate of β provides the change in outcomes for girls with the same age and born in the same year in treated states relative to untreated states.

A growing body of the econometric literature has shown that in settings where there are more than two time periods and units are treated at different point in times, the two-way fixed-effect (TWFE) approach can lead to biased estimators (De Chaisemartin and d'Haultfoeuille, 2020; Sun and Abraham, 2021; Goodman-Bacon, 2021; Borusyak et al., 2021; Callaway and Sant'Anna, 2021; Roth et al., 2023). The TWFE regressions make both "clean" comparisons between treated and not-yet-treated units as well as "forbidden" comparisons between units that are both already-treated (Roth et al., 2023; Goodman-Bacon, 2021). The "forbidden" comparisons potentially place negative weights on the average treatment effects for certain groups and periods. Several robust estimators have been proposed in the literature, with notable contributions including De Chaisemartin and d'Haultfoeuille, 2020; Borusyak et al., 2021; Callaway and Sant'Anna, 2021; Sun and Abraham, 2021. In our setting, we cannot rule out that the treatment can have a heterogeneous effect, as some cohorts will be more intensively exposed than others. Therefore, we implement the approach proposed by Sun and Abraham, 2021 to account for heterogeneous and dynamic treatment effect. We estimate equation 3.2 both using the TWFE and using the approach proposed by Sun and Abraham, 2021 to assess the estimates' robustness with respect to the heterogenous treatment effect. The event studies are plotted in Figures 3.C.1 and 3.C.2. The estimates are in line with those estimated with the TWFE approach.

[8] In the Robustness section, we also present our estimations taking into account of the small number of clusters.

Threats to the Identification

A potential threat to our identification strategy is that we assess the impact of the child act laws in states where the respondents reside at the time of the interview, rather than at the time of marriage. Both the DHS and the MICS elicit information on where the women reside at the time of the interview, but not retrospectively. This data limitation may introduce some bias if the respondent's recorded place of residence is different, and sufficiently far, from her location at the time of marriage. Migration can happen simply because the woman and her family might migrate after she gets married or because of virilocality, a custom that refers to the social system in which a married couple resides with or near the husband's parents. In Sub-Saharan, marriage migration is not a prevailing practice. Corno, Hildebrandt, et al., 2020 document that 77% of women do not move at the time of marriage in Sub-Saharan Africa.

To address this concern, we take advantage of a question contained in the DHS, where respondents are asked how many years they have been living in the place where the interview took place. As a robustness, we estimate the hazard in child marriage, restricting the sample to women who migrated before they got married and who have always been living in the place of residence. Table 3.C.10 reports the estimation of Equation 3.1, restricting the sample on women who migrated years before the marriage, therefore unlikely to have migrated because of the marriage (columns 1, 2) and those who never migrated (columns 3, and 4). The point estimates are robust and in line with the main results.

Another related potential concern comes from measurement error in women's recollections of the age and year of marriage. Errors in women's recollections will lead to greater imprecision in our estimates. Pullum, 2006 suggest that in the DHS the age variables are rather accurate. This limits our concern of measurement errors. Moreover, we also construct an alternative of definition of marriage, using the year at marriage, instead of the age at marriage, as we do in the main specification. Table 3.C.11 reports the estimation; the results are in line with the main estimates.[9]

3.5 Results

3.5.1 The Effect of the Child's Rights Act on Child Marriage and FGC

Table 3.1 reports the effect of the child act laws on the hazard into child marriage for young women between 8-17 years old and into FGC for girls between 0-5 years

[9]We construct the outcome variable of marital status based on respondents' age at marriage, given its lower rate of missing values compared to the year of marriage variable.

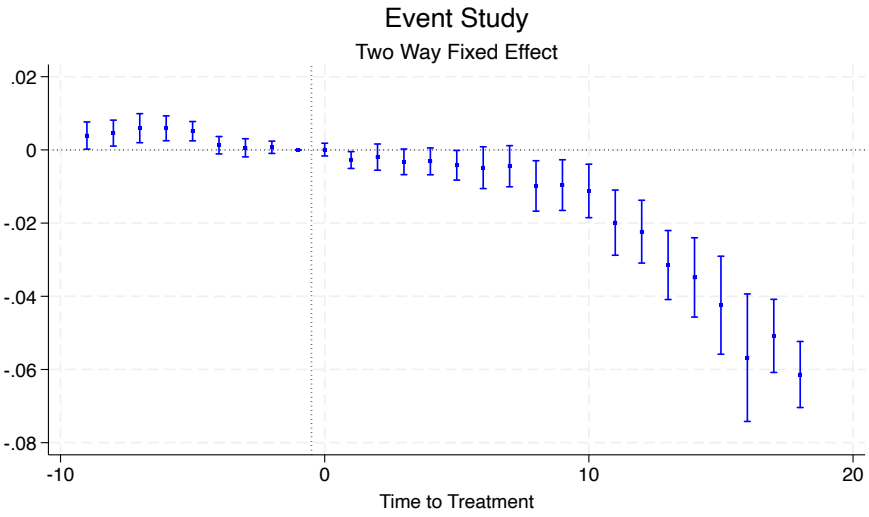
old, residing in Non-Sharia States, following equation 3.1. It shows that girls who were exposed the child act laws between 8-17 years old are 0.5 percentage points less likely to be married in the same year. The average annual marriage hazard for this age group is 0.024, that corresponds approximately to a 21 percent decrease with respect to the average. This effect is statistically significant at 1 percent level. After controlling for each region-by-age combination, the magnitude of the coefficient is very similar to that estimated in Column (1). Columns (3) and (4) of Table 3.1 report the effect of the child act laws on the hazard into female-genital-cutting for children between 0 and 5 years old, residing in non-Sharia states. The Table shows that girls who were exposed to the child act laws in the age range of highest risk of being cut, are 2.6 percentage points more likely to be cut in the same year. The average annual cut hazard for this age group is 0.058, thus the effect corresponds to about a 45% increase. This effect is statistically significant at 10 per cent level. Column (4) presents the coefficient effect, after controlling for each region-by-age group, showing that girls exposed to the laws are 2.9 percentage points more at risk of undergoing FGC. Figure 3.2 shows the β_1 coefficients corresponding to estimates in equation 3.2. The coefficients for the hazard into child marriage are very close to zero throughout the period prior the treatment. This shows there is no difference between exposed and non-exposed girls before the laws were adopted. After the gradual adoption of the laws, we see a clear decreasing trend. Figure 3.3 shows the β_1 coefficients corresponding to estimates in equation 3.2. The coefficients for the hazard into cut are imprecisely estimated but quite stable in the period prior the treatment. After the gradual adoption of the laws, we see a clear increasing trend in the FGC hazard rate. Specification 3.2 is also estimated using the approach proposed by Sun and Abraham, 2021, to account for the heterogeneous and dynamic treatment effect (see Figures 3.C.1 and 3.C.2 in the Appendix). Both event studies provide evidence in support of the parallel trend assumption. The findings shown in Tables 3.1 suggest a compensatory dynamic between the two harmful practices. As the ban on child marriage is more enforceable and the practice becomes costlier, there is an increased propensity in engaging in FGC.

Table 3.1: Effect of Child Act on the Hazard of Child Marriage and FGC – Non-Sharia States

	Married		Cut	
	(1)	(2)	(3)	(4)
Child Act	-0.005***	-0.005**	0.026*	0.029***
	(0.001)	(0.002)	(0.014)	(0.010)
Dep. var. mean	0.025	0.025	0.058	0.058
N	1,471,922	1,471,922	440,622	440,622
Adjusted R2	0.034	0.037	0.220	0.244
State FE	Y	Y	Y	Y
Birth Year FE	Y	Y	Y	Y
Age FE	Y	Y	Y	Y
Region × Age FE	N	Y	N	Y

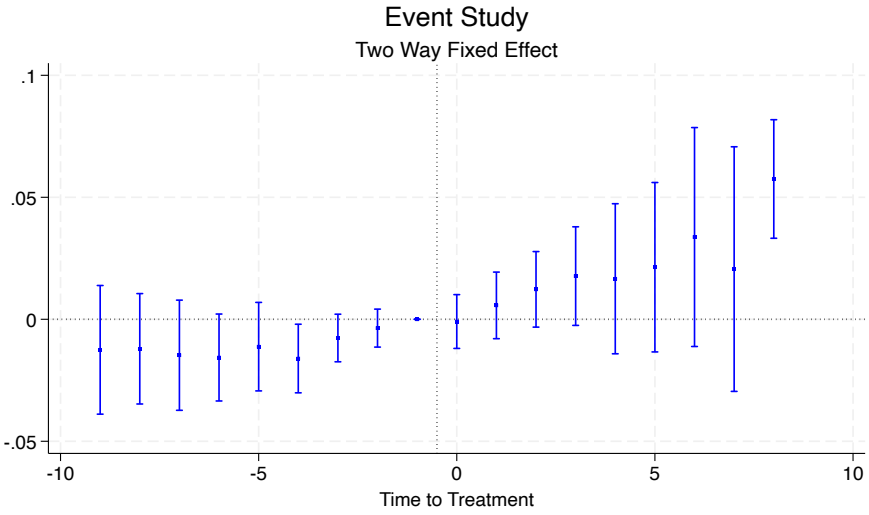
Notes: Table 3.1 reports the estimated coefficients based on estimating the equation 3.1, among young women and girls living in Non-Sharia states. The dependent variables of columns (1), (2) is a binary variable coded as one if the woman married at the age corresponding to the observation. The dependent variable of columns (3) and (4) is a binary variable coded as one if the woman underwent FGC at the age corresponding to the observation. In Columns (1) and (2) the equation 3.1 has been estimated in a sample of observations observed between 8-17 years old. In Columns (3) and (4) the equation 3.1 has been estimated in a sample of observations observed between 0-5 years old. All the specifications control for state, age, cohort FE. Robust errors clustered at the state level in parentheses. * p < 0.1; ** p <0.05; *** p <0.01.
Source: Own estimations based on the DHS (waves 1990, 2003, 2008, 2013, 2018)and MICS (waves 2007-2011-2016/7-2021).

Figure 3.2: Event Study – Marriage Hazard



Note: The figure presents the event study estimation as in equation 3.2 using the TWFE approach. *Source*: Own estimations based on the DHS (waves 1990, 2003, 2008, 2013, 2018) and MICS (waves 2007-2011-2016/7-2021).

Figure 3.3: Event Study – FGC Hazard



Note: The figure presents the event study estimation as in equation 3.2 using the TWFE approach. *Source*: Own estimations based on the DHS (waves 1990, 2003, 2008, 2013, 2018) and MICS (waves 2007-2011-2016/7-2021).

3.5.2 Robustness Checks

In this section, we carry out several sensitivity analyses and alternative specifications to address the robustness of our results.

3.5.2.1 Alternative Specifications

Tables 3.C.1 assess the sensitivity of our results by estimating the equation 3.1 with respect to the choice of alternative samples, among girls and young women residing in Non-Sharia states. Columns 1, 2, 3, and 4 of Table 3.C.1 present the effect of the child act laws on the hazard of early marriage. Specifically column 1 presents the effect of the child act laws in the hazard of being married by the age of 16. Columns 2, 3, and 4 present the child act laws effect in the hazard of early marriages, namely by the age of 18, 20 and 22 years old. The magnitude of the coefficients is very similar to the one presented in Table 3.1 and statistically significant at 1 percent level. Columns 2-4 in particular suggest that the child act had an effect in general on the timing of marriages, also when beyond the legal age. Columns 5, 6, 7, and 8 of Table 3.C.1 present the effect of the child act laws in the hazard of being cut by the 3, 4, 5, 6, and 7 years old. The point estimates range from 0.028 in Column 5 to 0.019 in Column 8, and are statistically significant at 10 percent level. Tables 3.C.2 and 3.C.3 present the results, after controlling for ethnicity and religion.

As explained in Section 3.3, the DHS and MICS collect data from women aged 15-49 years old. Due to the design of the surveys, younger participants in our main sample might not have finalised their marriage decisions yet. We address this by showing the robustness of our results on the marriage hazard when restricting the sample to a sub-group of women aged above 25 at the time of interview. Table 3.C.4 shows that our estimates on child marriage are not driven by this composition effect.[10]

3.5.2.2 Exluding States that adopted anti-FGC Laws – Southern States

Between 1999 and 2004, the Southern states of Osun, Edo, Enugu, Rivers and Baylesa enacted anti-FGC legislation. To ensure that our results are not skewed by these states, we exclude them in the estimations presented in Table 3.C.5. The magnitude of the coefficients is stable and consistent with the main estimation. However, as expected, they are slightly less precisely estimated.

3.5.2.3 Sharia States: Placebo Exercise

Table 3.C.7 reports the effect of the child act laws on the hazard into child marriage for young women between 8-17 years old and into FGC for girls between 0-5 years old, residing in states where Sharia plays a major role. Column (1) shows that the

[10]Table 3.A.1(a) shows that 90% of our sample are married by the age of 25. We use this threshold age to determine when most of the sample complete their marriage decisions.

Child Act has no statistically significant effect in the hazard of being a child bride. After controlling for each region-by-age combination, the point estimate becomes even smaller and not statistically significant. Columns (3) and (4) of Table 3.C.7 report the effect of the child act laws on the hazard into female-genital-cutting for children between 0 and 5 years old, residing in Sharia states. The Table shows no effect on the risk of being cut in that age-group. We find no statistically significant effects also when we look at different age-groups, as shown in Table 3.C.8.

3.5.2.4 The Biafran War

A potential confounder in assessing the Child Act laws' impact on child marriage could be the Biafran War, which occurred from 1967 to 1970 in the Southern East region. Empirical evidence on the role of civil conflict in the marriage market is inconclusive. Jayaraman et al., 2009 and La Mattina, 2017 found that civil conflicts correlate with delayed marriages. Conversely, other research suggests that families might resort to marriage as a protective measure for girls during conflicts (Lemmon, 2014; Brides, 2020). Akresh et al., 2023 shows that women exposed to the Biafran War have a reduced adult stature, an increased likelihood of being overweight, earlier age at first birth, and lower educational attainment. They find no effect of the Biafran war on women's age at marriage. Based on that, we believe that the Biafran War is unlikely to bias our results. We test the robustness of our results by dropping the South East region, where the was concentrated. Table 3.C.6 shows the results. The coefficients are consistent both in magnitude and in precision with the main estimates presented in Table 3.1 where the outcome is child marriage. The coefficients are consistent but less precisely estimated when the outcome is the hazard of being cut.

3.5.2.5 Inference

In our main specifications, we cluster the standard errors at the level of the treatment (i.e., at the state level). Since when we restrict the analysis to non-Sharia states we only have 25 states, the standard errors are likely to be downward biased. As a robustness check we account for the small number of clusters by wild-bootstrapping at the cluster level, as suggested by Cameron et al., 2008 and using the methodology proposed by Roodman et al., 2019. In Table 3.C.9 we replicate the estimates from the equation 3.1 and we report the corresponding p-values.

3.5.3 Additional Results

3.5.3.1 Heterogeneity by Ethnic Groups

Nigeria is a very ethnically diverse country with more than 300 ethnic groups. The Southern region of Nigeria is characterized by two main ethnicities: the Igbo in the South-east, and the Yoruba in the South-west. In the pre-colonial period, the Yoruba group was characterised by gender-neutral structures (Oyewumi, 1997). Conversely, the Igbo agrarian society has always had a strict gender-based crop division (Amadiume, 2015). These divergent perspectives on women's societal roles could lead to an heterogeneous effect of the Child's Rights Act laws on individuals belonging to these two groups. Table 3.2 shows the impact of the laws on the hazard of child marriage and FGC among individuals belonging to the Yoruba and the Igbo ethnicity. Note that women belonging to other minor ethnic groups have been excluded. The effects for the Igbo group are stronger, but there is no statistically significant differential effect among the two groups. Therefore, we conclude that the Child Act laws are similarly enforced among the two groups.

Table 3.2: Effect of Child Act on the Hazard of Child Marriage and FGC – by Ethnic Groups

	Married		Cut	
	(1)	(2)	(3)	(4)
Child Act	-0.004*	-0.004*	0.067***	0.063***
	(0.002)	(0.002)	(0.022)	(0.017)
Yoruba	-0.000	-0.000	0.008	0.008
	(0.001)	(0.001)	(0.013)	(0.012)
Child Act × Yoruba	0.001	0.001	-0.016	-0.005
	(0.002)	(0.003)	(0.028)	(0.016)
Linear Combination	-0.003	-0.003	0.051***	0.058***
	(0.002)	(0.002)	(0.015)	(0.013)
Dep. var. mean Igbo	0.016	0.016	0.124	0.124
Dep. var. mean Yoruba	0.015	0.015	0.158	0.158
N	542,690	542,690	144,901	144,901
Adjusted R2	0.023	0.023	0.353	0.355
State FE	Y	Y	Y	Y
Birth Year FE	Y	Y	Y	Y
Age FE	Y	Y	Y	Y
Region × Age FE	N	Y	N	Y

Notes: Table 3.1 reports the estimated coefficients based on estimating the equation 3.1, among young women and girls living in Non-Sharia states. The dependent variables of columns (1), (2) is a binary variable coded as one if the woman married at the age corresponding to the observation. The dependent variable of columns (3) and (4) is a binary variable coded as one if the woman underwent FGC at the age corresponding to the observation. The sample is restricted to individuals belonging either to the Igbo or the Yoruba ethnic groups. All the specifications control for state, age, cohort FE. Robust errors clustered at the state level in parentheses. * p < 0.1; ** p <0.05; *** p <0.01.
Source: Own estimations based on the DHS (waves 1990, 2003, 2008, 2013, 2018)and MICS (waves 2007-2011-2016/7-2021).

3.5.3.2 Effect of the Child Rights Act on Education

Evidence shows a negative correlation between child marriage and education (Field and Ambrus, 2008). In this section, we study the impact of Child's Rights Act laws on the completion of secondary education. The Demographic and Health Surveys (DHS) and Multiple Indicator Cluster Surveys (MICS) lack timing details for schooling; they categorize educational attainment as none, primary, secondary, and tertiary. We combine the standard ages for completing secondary education

Table 3.3: Effect of Child Act laws on Education

	Secondary Education	
	(1)	(2)
Child Act	0.028***	0.029***
	(0.004)	(0.004)
FGC		-0.004***
		(0.002)
Child Act×FGC		0.003
		(0.003)
Linear Combination		0.031***
		(0.004)
Dep. var. mean if FGC = 1	0.24	0.24
Dep. var. mean if FGC = 0	0.25	0.25
State FE	Y	Y
Birth Year FE	Y	Y
Age FE	Y	Y
Observations	1,550,921	930,968
Adjusted R-squared	0.586	0.638

Notes: Table 3.3 reports the estimated coefficients based on estimating the equation 3.1. Robust standard errors clustered at the state level in parentheses. * p < 0.1; ** p <0.05; *** p <0.01.
Source: Own estimations based on the DHS (waves 1990, 2003, 2008, 2013, 2018) and MICS (waves 2007-2011-2016/7-202).

(seventeen years) in Nigeria with individual data on educational duration and levels to estimate the effects on secondary education completion. To measure the completion of secondary education, we create a variable taking value 1 if the girl at age 17 was still in education, and 0 beforehand. We analyse the impact of the Child Act laws in the age category 8-17, that corresponds to the age category more at risk of child marriage.

In line with the hypothesis that child marriage is negatively correlated with education, Column 1 of Table 3.3 shows that the child act was effective in keeping girls in school in secondary education. Column 2 of Table 3.3 shows the results when we study the heterogeneous effect of Child Act on girls education, depending on their FGC status. [11] Table 3.3 shows the heterogeneous effect of the Child Act laws on secondary education across FGC status. The estimates show that there is not a differential impact on secondary education between cut and uncut girls.

[11] Before estimating the heterogeneous effect of the Child Act on secondary education on the age group 8-17, we have to make sure that the Child Act laws do not affect the probability of being cut. Table 3.C.12 shows that the Child Act laws had no effect on the hazard of being cut among girls aged between 8 and 17 years old.

3.6 Conclusion

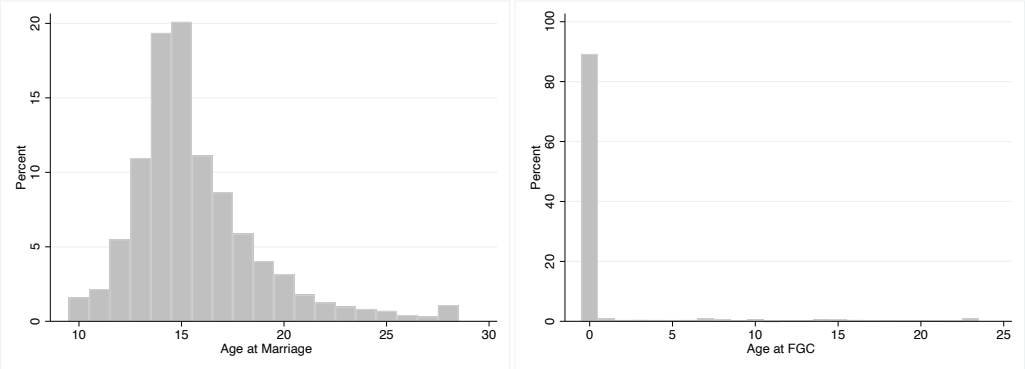
This paper studies the relationship between two harmful practices: child marriage and female genital cutting. Specifically, we study whether these two practices function as complementary or substitute traits in the marriage market. To do so, we exploit the staggered implementation of laws banning child marriage across Nigerian states, employing a difference-in-differences approach.

There are two main takeaways from this study. First, the laws were effective in reducing child marriage. Indeed, we find that the Child Right Act laws decrease the annual marriage hazard by 21 percent. Second, we find that the adoption of these policies led to unintended consequences. The Child Right Act laws increase the annual FGC hazard by 45 percent. These findings suggest that child marriage and FGC are two substitute traits in the marriage market. In contexts where both child marriage and FGC are prevalent, it is important to take into account the potential unintended consequences of policies on women's welfare. Put another way, when creating and assessing policies, it is crucial to consider every facet of a society's culture. This includes aspects that may not be obviously related to the desired outcomes.

Appendix 3.A Descriptive Statistics

Figure 3.A.1: Age at Marriage and at FGC in Nigeria

((a)) Age at Marriage ((b)) Age at FGC



Note: Panel (a) shows the age at marriage distribution in Nigeria. Panel (b) shows the age at FGC distribution. *Source:* DHS (waves 1990, 2003, 2008, 2013, 2018) and MICS (2007, 2011, 2016/7, 2021).

Table 3.A.1: Summary statistics of the regression sample

	Observations	Mean	SD
Ever Married	159,184	0.667	0.471
Age at first Marriage	105,997	19.963	5.102
FGC	94,592	0.426	0.495
Age at FGC	32,233	2.873	5.748

Note: This table shows the summary statistics of the regression sample. The sample consists of women aged 15-49 at the time of the interview. *Source:* Demographic and Health Surveys (1990-2003-2008-2013-2018) and the Multiple Indicator Cluster Surveys (2007-2011-2016-2021).

Figure 3.B.1: Panel Structure – Example

ID	Birth Year	Age	Cut	Married	Child Act Law	Treated
1	1995	0	0	0	2003	0
1	1995	1	0	0	2003	0
1	1995	2	0	0	2003	0
1	1995	3	1	0	2003	0
1	1995	4	NA	0	2003	0
1	1995	5	NA	0	2003	0
1	1995	6	NA	0	2003	0
1	1995	7	NA	0	2003	0
1	1995	8	NA	0	2003	1
1	1995	9	NA	0	2003	1
1	1995	10	NA	0	2003	1
1	1995	11	NA	0	2003	1
1	1995	12	NA	1	2003	1
1	1995	13	NA	NA	2003	1
1	1995	14	NA	NA	2003	1
1	1995	15	NA	NA	2003	1
1	1995	16	NA	NA	2003	1
1	1995	17	NA	NA	2003	1

Note: This Figure simplifies the structure of the dataset. Observations are at the level of the person age. The variable Cut is a binary variable that switches to one when the woman gets cut. The variable Married is a binary variable that takes value 1 when the woman gets married. The treatment switches to one if in that year, the Law is adopted. The green dashed box highlights the dataset to study the hazard into child marriage. The red box highlights how the dataset looks like when we study the hazard into FGC.

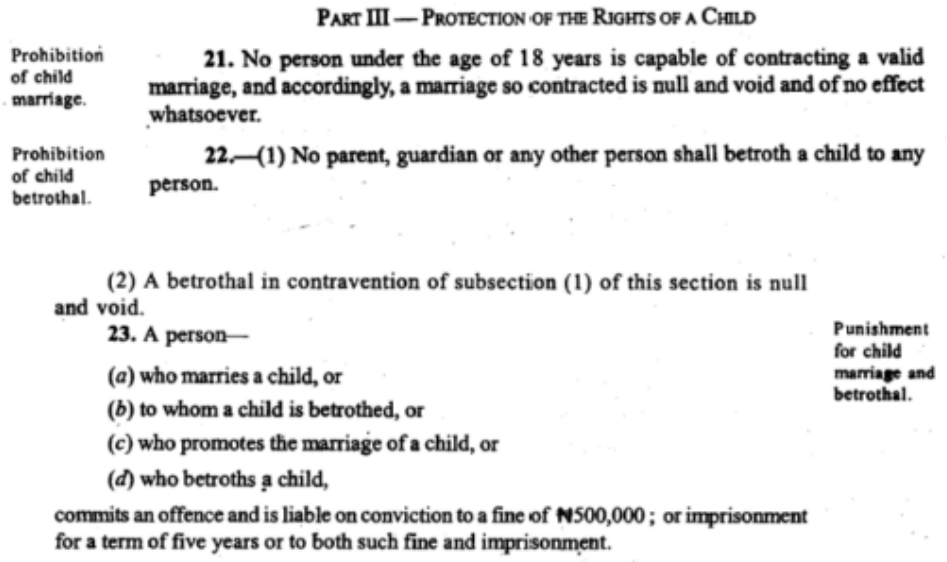
Table 3.B.1: Child Act Laws since 2003

State	Legislative Status	Executive Status
FCT	Passed	2003
Abia	Yet to be Passed	2006
Adamawa	Passed	Not assented
Awka-Ibon	Passed	2008
Anambra	Passed	2004
Bauchi	Yet to be Passed	Not assented
Bayelsa	Passed	2016
Benue	Passed	2018
Borno	Passed	2022
Cross Rivers	Passed	2008
Delta	Passed	2008
Ebonyi	Passed	2010
Edo	Passed	2007
Ekiti	Passed	2006
Enugu	Passed	2016
Gombe	Yet to be passed	Not assented
Imo	Passed	2004
Jigawa	Passed	2021
Kaduna	Passed	2018
Kano	Yet to be Passed	Not assented
Katsina	Passed	2021
Kebbi	Passed	2022
Kogi	Passed	2007
Kwara	Passed	2005
Lagos	Passed	2007
Nasarawa	Passed	2005
Niger	Passed	2010
Ogun	Passed	2006
Ondo	Passed	2007
Osun	Passed	2007
Oyo	Passed	2006
Plateau	Passed	2005
Rivers	Passed	2009
Sokoto	Passed	2022
Taraba	Passed	2005
Yobe	Passed	2021
Zamfara	Yet to be Passed	Not assented

Note: This table shows the staggered adoption of the Child Right Act by Nigerian states between 2003-2022. *Source:* Child Act Rights Tracker.

Appendix 3.B Additional Information

Figure 3.B.2: The Child Act Right, 2003



PART III — PROTECTION OF THE RIGHTS OF A CHILD

Prohibition of child marriage.

21. No person under the age of 18 years is capable of contracting a valid marriage, and accordingly, a marriage so contracted is null and void and of no effect whatsoever.

Prohibition of child betrothal.

22.—(1) No parent, guardian or any other person shall betroth a child to any person.

(2) A betrothal in contravention of subsection (1) of this section is null and void.

Punishment for child marriage and betrothal.

23. A person—

(*a*) who marries a child, or

(*b*) to whom a child is betrothed, or

(*c*) who promotes the marriage of a child, or

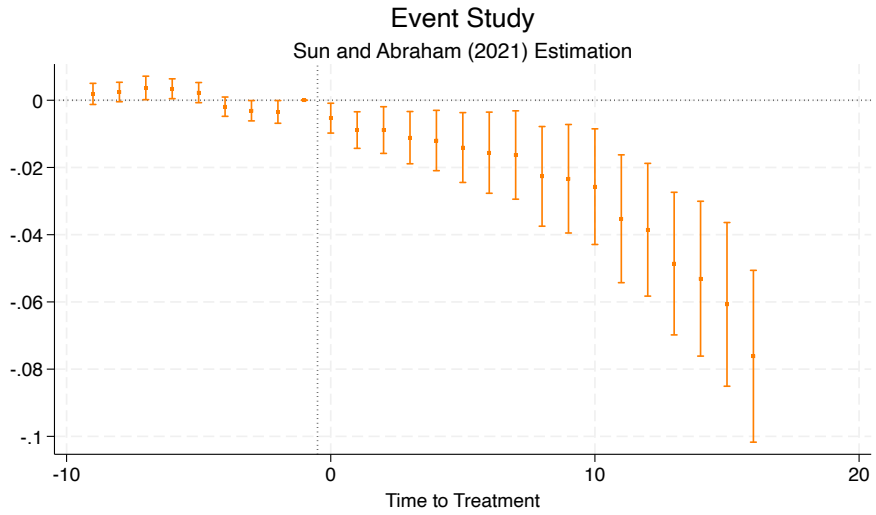
(*d*) who betroths a child,

commits an offence and is liable on conviction to a fine of ₦500,000; or imprisonment for a term of five years or to both such fine and imprisonment.

Note: Child Act Right, 2003.

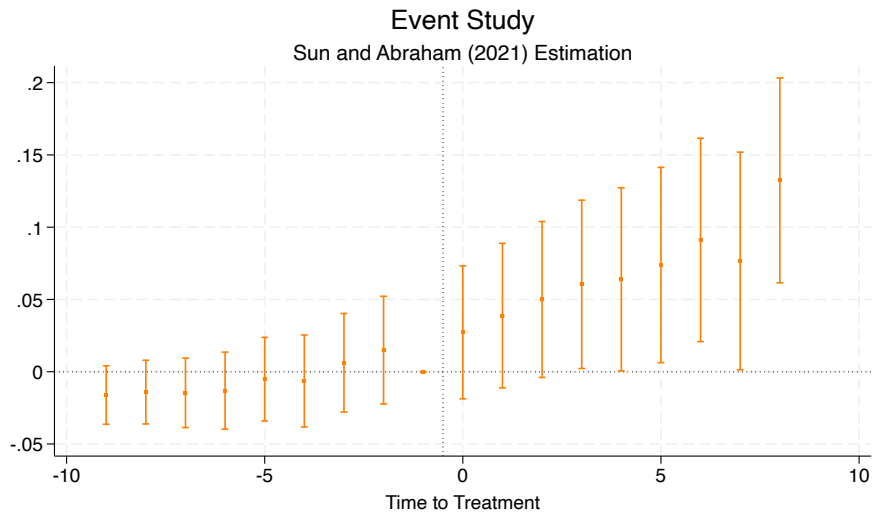
Appendix 3.C Robustness

Figure 3.C.1: Event Study – Sun and Abraham



Note: The figure presents the event study estimation as in equation 3.2 using the approach proposed by Sun and Abraham, 2021.

Figure 3.C.2: Event Study – Sun and Abraham



Note: The figure presents the event study estimation as in equation 3.2 using the approach proposed by Sun and Abraham, 2021.

Table 3.C.1: Effect of Child Act on the Hazard of Child Marriage and FGC – Different Samples]

	Married				Cut			
	by 16	by 18	by 20	by 22	by 4	by 5	by 6	by 7
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Child Act	-0.004***	-0.006***	-0.008***	-0.008***	0.029*	0.026*	0.022*	0.019*
	(0.001)	(0.001)	(0.001)	(0.002)	(0.016)	(0.014)	(0.012)	(0.011)
N	1,354,774	1,575,142	1,738,326	1,852,554	372,032	440,622	508,636	576,274
Adj. R2	0.030	0.038	0.044	0.046	0.224	0.220	0.218	0.215
State FE	Y	Y	Y	Y	Y	Y	Y	Y
Birth Year FE	Y	Y	Y	Y	Y	Y	Y	Y
Age FE	Y	Y	Y	Y	Y	Y	Y	Y

Notes: Table 3.C.1 reports the estimated coefficients based on estimating the equation 3.1, among young women and girls living in Non-Sharia states. The dependent variables of columns (1), (2), (3) and (4) is a binary variable coded as one if the woman married at the age corresponding to the observation. The dependent variable of columns (5), (6), (7) and (8) is a binary variable coded as one if the woman underwent FGC at the age corresponding to the observation. In Columns (1), (2), (3), and (4) the equation 3.1 has been estimated in a sample of observations observed between 8-16, 8-18, 8-20, and 8-22 years old. In Columns (5), (6), (7) and (8) the equation 3.1 has been estimated in a sample of observations observed between 0-4, 0-5, 0-6 and 0-7 years old. All the specifications control for state, age, cohort FE. Robust errors clustered at the state level in parentheses. * p < 0.1; ** p <0.05; *** p <0.01.
Source: Own estimations based on the DHS (waves 1990, 2003, 2008, 2013, 2018)and MICS (waves 2007-2011-2016/7-2021).

Table 3.C.2: Effect of Child Act on the Hazard of Child Marriage – Religion and Ethnicity Controls

	Married					
	(1)	(2)	(3)	(4)	(5)	(6)
Child Act	-0.002*	-0.002	-0.009***	-0.009***	-0.006***	-0.006**
	(0.001)	(0.002)	(0.002)	(0.003)	(0.002)	(0.002)
State FE	Y	Y	Y	Y	Y	Y
Birth Year FE	Y	Y	Y	Y	Y	Y
Age FE	Y	Y	Y	Y	Y	Y
Region × Age FE	N	Y	N	Y	N	Y
Ethnicity Controls	Y	Y	N	N	Y	Y
Religion Controls	N	N	Y	Y	Y	Y
Observations	1,166,065	1,166,065	938,454	938,454	754,150	754,150
Adjusted R2	0.036	0.040	0.039	0.043	0.041	0.046

Notes: Table 3.C.2 reports the estimated coefficients based on estimating the equation 3.1, among young women and girls living in Non-Sharia states. The dependent variable is a binary variable coded as one if the woman married at the age corresponding to the observation. The estimates correspond to the hazard of being married by age 17. The specification in col (1) controls for ethnicity, col (2) controls for ethnicity and age × region FE. In columns (3) and (4), we control for religions, with and without age × region FE. Columns (5) and (6) controls for both ethnicity and religions, with and without age × region FE. All the specifications control for state, age, cohort FE. Robust errors clustered at the state level in parentheses. * p < 0.1; ** p <0.05; *** p <0.01.
Source: Own estimations based on the DHS (waves 1990, 2003, 2008, 2013, 2018)and MICS (waves 2007-2011-2016/7-2021).

Table 3.C.3: Effect of Child Act on the Hazard of FGC – Religion and Ethnicity Controls

	Cut					
	(1)	(2)	(3)	(4)	(5)	(6)
Child Act	0.029*	0.035***	0.019	0.029*	0.020	0.033*
	(0.017)	(0.012)	(0.021)	(0.016)	(0.024)	(0.017)
State FE	Y	Y	Y	Y	Y	Y
Birth Year FE	Y	Y	Y	Y	Y	Y
Age FE	Y	Y	Y	Y	Y	Y
Region × Age FE	N	Y	N	Y	N	Y
Ethnicity Controls	Y	Y	N	N	Y	Y
Religion Controls	N	N	Y	Y	Y	Y
Observations	324,537	324,537	243,093	243,093	182,922	182,922
Adjusted R2	0.262	0.289	0.302	0.332	0.338	0.371

Notes: Table 3.C.3 reports the estimated coefficients based on estimating the equation 3.1, among young women and girls living in Non-Sharia states. The dependent variable is a binary variable coded as one if the woman married at the age corresponding to the observation. The estimates correspond to the hazard of being cut by age 5. The specification in col (1) controls for ethnicity, col (2) controls for ethnicity and age × region FE. In columns (3) and (4), we control for religion, with and without age × region FE. Columns (5) and (6) controls for both ethnicity and religions, with and without age × region FE. All the specifications control for state, age, cohort FE. Robust errors clustered at the state level in parentheses. * p < 0.1; ** p <0.05; *** p <0.01.
Source: Own estimations based on the DHS (waves 1990, 2003, 2008, 2013, 2018)and MICS (waves 2007-2011-2016/7-2021).

Table 3.C.4: Effect of Child Act laws on the Hazard of Child Marriage (women above 25)

VARIABLES	Married	
	(1)	(2)
Child Act	-0.005*	-0.007**
	(0.003)	(0.003)
State FE	Y	Y
Birth Year FE	Y	Y
Age FE	Y	Y
Region × Age FE	N	Y
Observations	849,099	849,099
Adjusted R-squared	0.036	0.040

Notes: Table 3.C.4 reports the estimated coefficients based on estimating the equation 3.1, including only women above 25 years old at the time of the interview. Robust standard errors clustered at the state level in parentheses. * p < 0.1; ** p <0.05; *** p <0.01.
Source: Own estimations based on the DHS (waves 1990-2003-2008-2013-2018) and MICS (waves 2007-2011-2016/7-202).

Table 3.C.5: Effect of Child Act on the Hazard of Child Marriage and FGC in Non-Sharia States Exluding states with Anti-FGC policy

	Married		Cut	
	(1)	(2)	(3)	(4)
Child Act	-0.005***	-0.004*	0.023	0.025**
	(0.001)	(0.002)	(0.016)	(0.012)
Dep. var. mean				
N	1,076,316	1,076,316	315,177	315,177
Adj. R2	0.033	0.037	0.211	0.237
State FE	Y	Y	Y	Y
Birth Year FE	Y	Y	Y	Y
Age FE	Y	Y	Y	Y
Region × Age FE	N	Y	N	Y

Notes: Table 3.C.5 reports the estimated coefficients based on estimating the equation 3.1, among young women and girls living in Non-Sharia states, excluding the Southern States that adopted the anti-FGC Laws between 1999-2002 (Osun, Edo, Enugu, Rivers, Bayelsa, Ogun). The dependent variables of columns (1), (2) is a binary variable coded as one if the woman married at the age corresponding to the observation. The dependent variable of columns (3) and (4) is a binary variable coded as one if the woman underwent FGC at the age corresponding to the observation. In Columns (1) and (2) the equation 3.1 has been estimated in a sample of observations observed between 8-17 years old. In Columns (3) and (4) the equation 3.1 has been estimated in a sample of observations observed between 0-5 years old. All the specifications control for state, age, cohort FE. Robust errors clustered at the state level in parentheses. * p < 0.1; ** p <0.05; *** p <0.01.
Source: Own estimations based on the DHS (waves 1990, 2003, 2008, 2013, 2018)and MICS (waves 2007-2011-2016/7-2021).

Table 3.C.6: Effect of Child Act on the Hazard of Child Marriage and FGC - Excluding South East (Biafran War)

	Married		Cut	
	(1)	(2)	(3)	(4)
Child Act	-0.006***	-0.005**	0.017	0.019*
	(0.001)	(0.002)	(0.013)	(0.010)
Dep. var. mean	0.027	0.027	0.05	0.05
N	1,106,789	1,106,789	330,567	330,567
Adj. R2	0.035	0.038	0.202	0.229
State FE	Y	Y	Y	Y
Birth Year FE	Y	Y	Y	Y
Age FE	Y	Y	Y	Y
Region × Age FE	N	Y	N	Y

Notes: Table 3.C.6 reports the estimated coefficients based on estimating the equation 3.1, among young women and girls living in non-Sharia states and Excluding the South-East region, where the Biafran War was most concentrated. The dependent variables of columns (1), (2) is a binary variable coded as one if the woman married at the age corresponding to the observation. The dependent variable of columns (3) and (4) is a binary variable coded as one if the woman underwent FGC at the age corresponding to the observation. In Columns (1) and (2) the equation 3.1 has been estimated in a sample of observations observed between 8-17 years old. In Columns (3) and (4) the equation 3.1 has been estimated in a sample of observations observed between 0-5 years old. All the specifications control for state, age, cohort FE. Robust errors clustered at the state level in parentheses. * p < 0.1; ** p <0.05; *** p <0.01.
Source: Own estimations based on the DHS (waves 1990, 2003, 2008, 2013, 2018) and MICS (waves 2007-2011-2016/7-2021).

Table 3.C.7: Effect of Child Act on the Hazard of Child Marriage and FGC – Sharia States

	Married		Cut	
	(1)	(2)	(3)	(4)
Child Act	-0.019	-0.007	0.012	-0.021
	(0.013)	(0.016)	(0.015)	(0.013)
Dep. var. mean	0.032	0.032	0.006	0.006
N 799,018	799,018	185,536	185,536	
Adj. R2	0.102	0.103	0.199	0.227
State FE	Y	Y	Y	Y
Birth Year FE	Y	Y	Y	Y
Age FE	Y	Y	Y	Y
Region × Age FE	Y	N	Y	N

Notes: Table 3.C.7 reports the estimated coefficients based on estimating the equation 3.1, among young women and girls living in Sharia states. The dependent variables of columns (1), (2) is a binary variable coded as one if the woman married at the age corresponding to the observation. The dependent variable of columns (3) and (4) is a binary variable coded as one if the woman underwent FGC at the age corresponding to the observation. In Columns (1) and (2) the equation 3.1 has been estimated in a sample of observations observed between 8-17 years old. In Columns (3) and (4) the equation 3.1 has been estimated in a sample of observations observed between 0-5 years old. All the specifications control for state, age, cohort FE. Robust errors clustered at the state level in parentheses. * p < 0.1; ** p <0.05; *** p <0.01.
Source: Own estimations based on the DHS (waves 1990, 2003, 2008, 2013, 2018)and MICS (waves 2007-2011-2016/7-2021).

Table 3.C.8: Effect of Child Act on the Hazard of Child Marriage and FGC – Sharia States [different samples]

	Married				Cut			
	by 16	by 18	by 20	by 22	by 4	by 5	by 6	by 7
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Child Act	-0.020	-0.020	-0.020	-0.018	0.013	0.012	0.012	0.010
	(0.013)	(0.013)	(0.013)	(0.012)	(0.016)	(0.015)	(0.013)	(0.013)
N	762,493	826,744	863,059	883,825	155,798	185,536	215,242	244,911
Adj. R2	0.103	0.100	0.097	0.095	0.204	0.199	0.194	0.190
State FE	Y	Y	Y	Y	Y	Y	Y	Y
Birth Year FE	Y	Y	Y	Y	Y	Y	Y	Y
Age FE	Y	Y	Y	Y	Y	Y	Y	Y

Notes: Table 3.C.8 reports the estimated coefficients based on estimating the equation 3.1, among young women and girls living in Sharia states. The dependent variables of columns (1), (2), (3) and (4) is a binary variable coded as one if the woman married at the age corresponding to the observation. The dependent variable of columns (5), (6), (7) and (8) is a binary variable coded as one if the woman underwent FGC at the age corresponding to the observation. In Columns (1), (2), (3), and (4) the equation 3.1 has been estimated in a sample of observations observed between 8-16, 8-18, 8-20, and 8-22 years old. In Columns (5), (6), (7) and (8) the equation 3.1 has been estimated in a sample of observations observed between 0-4, 0-5, 0-6 and 0-7 years old. All the specifications control for state, age, cohort FE. Robust errors clustered at the state level in parentheses. * p < 0.1; ** p <0.05; *** p <0.01.
Source: Own estimations based on the DHS (waves 1990, 2003, 2008, 2013, 2018)and MICS (waves 2007-2011-2016/7-2021).

Table 3.C.9: Wild-Bootstrap of the Standard Errors

Outcome	Married	Cut
Wild Bootstap P Value	0.002	0.099

Notes: Table 3.C.9 shows the Wild Boostrap p-values for the difference-in-difference regression, as shown in equation 3.1. The P-Values are computed using the stata command *boottest*. Column (1) reports the hazard of being a childbride for girls between 8-17 years old. Column (2) reports the hazard of being cut for girls between 0-5 years old. The specifications include state, age and year of birth fixed effects.

Table 3.C.10: Effect of Child Act on the Hazard of Child Marriage and FGC – Migration

	Married			
	(1)	(2)	(3)	(4)
Child Act	-0.006**	-0.006*	-0.010***	-0.010**
	(0.002)	(0.003)	(0.003)	(0.004)
Dep. var. mean	0.021	0.021	0.025	0.025
N	383,631	383,631	244,033	244,033
Adjusted R2	0.035	0.040	0.039	0.044
State FE	Y	Y	Y	Y
Birth Year FE	Y	Y	Y	Y
Age FE	Y	Y	Y	Y
Region × Age FE	N	Y	N	Y

Notes: Table 3.C.10 reports the estimated coefficients based on estimating the equation 3.1, among young women and girls living in Non-Sharia states. The dependent variables. In Columns (1) and (2) the equation 3.1 has been estimated in a sample of observations observed between 8-17 years old, among women who migrated in the years before they got married. In Columns (3) and (4) the equation 3.1 has been estimated in a sample of observations observed between 8-17years old on the sample of women who declared to have always been living in the same place where they have been interviewed. All the specifications control for state, age, cohort FE. Robust errors clustered at the state level in parentheses. * p < 0.1; ** p <0.05; *** p <0.01.
Source: Own estimations based on the DHS (waves 1990-2003-2008-2013-2018). Only the DHS contains information on migration.

Table 3.C.11: Different Definition of Marital Status

VARIABLES	Married	
	(1)	(2)
Child Act	-0.004***	-0.004**
	(0.001)	(0.001)
State FE	Y	Y
Birth Year FE	Y	Y
Age FE	Y	Y
Region × Age FE	N	Y
Observations	1,489,743	1,489,743
Adjusted R-squared	0.031	0.034

Notes: Table 3.C.11 reports the estimated coefficients based on estimating the equation 3.1. The dependent variable is a binary variable coded as one if the woman married at the age corresponding to the observation, constructed using the recalled year of marriage, instead if the age at marriage. Robust bias corrected standard errors clustered at the state level in parentheses. * p < 0.1; ** p <0.05; *** p <0.01.
Source: Own estimations based on the DHS (waves 1990-2003-2008-2013-2018) and MICS (waves 2007-2011-2016/7-202).

Table 3.C.12: Effect of Child Act laws on FGC - Age Group 8-17

	(1)	(2)
VARIABLES	cut	cut
treated	0.001	0.002
	(0.001)	(0.001)
State FE	Y	Y
Birth Year FE	Y	Y
Age FE	Y	Y
Region × Age FE	Y	Y
Controls	Y	Y
Observations	646,924	646,924
Adjusted R-squared	0.009	0.009

Notes: Table 3.1 reports the estimated coefficients based on estimating the equation 3.1. The dependent variableis a binary variable coded as one if the woman underwent FGC at the age corresponding to the observation. The sample is restricted to girls aged between 8-17 years old. Robust bias corrected standard errors clustered at the state level in parentheses. * p < 0.1; ** p <0.05; *** p <0.01.
Source: Own estimations based on the DHS (waves 1990, 2003, 2008, 2013, 2018)and MICS (waves 2007-2011-2016/7-202).

Conclusion

This thesis presented three chapters exploring how gender norms and harmful behaviours form, change and interact. In this concluding chapter, I summarise their findings and highlight the policy implications they suggest.

The first chapter estimates the causal relationship between intimate partner violence (IPV) and tolerance of it in a setting where divorce is very costly. The chapter shows theoretically that tolerance of violence can serve as a coping mechanism for victims and survivors, particularly under prolonged exposure to abuse. It tests this hypothesis in the context of India, where IPV and tolerant attitudes towards it are particularly prevalent. There are two main takeaways from this study. First, a rise in the prevalence of intimate partner violence does not lead to a shift in victims' attitudes towards violence in the short term. Second, it shows that the length of exposure to abuse is a crucial factor in changing victims' acceptability of violence. Indeed, evidence indicates that long-term exposure to violence shifts women's attitudes towards it. This finding suggests that over time, after receiving repeated information about their partners being abusive, victims might begin to internalise the abuse. As a result, they might opt to increase their tolerance towards violence as a strategy to decrease the disutility they receive from the abuse. Designing attitude-changing interventions targeting recently formed couples could effectively prevent the normalising cycle. In line with the conceptual framework proposed in the paper, this type of policy should increase the cost associated with changing attitudes. Conversely, once victims change their attitudes, these interventions might not necessarily be welfare-enhancing. In these situations, enhancing alternative options outside the marriage may be more beneficial.

The second chapter studies the causal effect of internet penetration on gender norms around attitudes towards intimate partner violence (IPV). To this end, I employ a difference-in-differences strategy that exploits the arrival of fast internet on African coasts via submarine cables from Europe. Results show that fast internet leads to more regressive gender norms: exposed individuals are more likely to find domestic violence justifiable. This effect is particularly strong for

men. The most likely mechanism to be at play in this setting is that the internet benefits more men than women in the labour market, namely in the likelihood of being employed. This might suggest that when men's position in the household increases, this may alter their attitudes towards the use of violence in asserting dominance. These results suggest that the internet, despite its significance for economic advancement, does not foster women's empowerment. Thus, the internet, if not accompanied by other gender-improving policies, can replicate pervasive norms.

The third chapter assesses whether a law that prohibits and criminalises child marriage in Nigeria, is an effective tool to reduce this practice. We also study whether the policy has spill over effects on other harmful practices, such as female genital cutting (FGC). To do so, we use survey data and exploit a staggered adoption of laws banning child marriage in Nigeria between 2003 and 2022. This study uncovers two main findings. First, the laws decrease the annual marriage hazard among girls between 8 and 17, who are the most at risk of early marriages. Second, the laws increase the annual FGC hazard by 45% among girls between ages 0 and 5 years old, which is the age category that is most at risk of female genital cutting in Nigeria. Taken together, these findings suggest that child marriage and FGC are substitute traits in the marriage market. As a result, when the cost of child marriage increases, parents may be more likely to resort to FGC as a compensating strategy to increase the value of their daughters' marriage prospects. This by no means implies that legislation against harmful practices is not needed, but that when creating policies, it is essential to take into account every aspect of a society's culture.

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