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ABSTRACT

Natural Disasters and Acceptance of Intimate Partner Violence: The Global Evidence*

This paper examines the dynamic impact of natural disasters on the individual acceptance of a physical form of intimate partner violence (IPV). Based on a global sample of individual survey data and historical geo-referenced records of natural disasters at a subnational level, we show that natural disasters have long-lasting effects on IPV acceptance, increasing it in the short- (0-4 years) and medium- (10-14 years) run. Furthermore, heterogeneity analyses reveal that lower educated people are affected more relative to higher educated people, men are affected more than women, as are older cohorts relative to younger cohorts, while there are no differences between the effects of disasters on IPV attitudes of people with high and low income. Drawing on theories of IPV, we also uncover that likely mechanisms that may link disasters to the increased acceptance of IPV are psychological distress and economic insecurity fears.

JEL Classification: J12, I31, P37, Q54

Keywords: natural disasters, intimate partner violence, domestic abuse

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1. Introduction

Based on existing estimates, over 1.8 billion people worldwide live in areas at severe risk of natural disasters (Institute for Economics and Peace 2023). This situation is likely to become worse in the face of climate change and its impacts on the frequency and intensity of disasters (Acevedo and Novta 2017; IPCC 2018). Natural disasters have wide-ranging consequences for individuals and societies, causing economic damage (Boustan et al. 2020; Felbermayr and Gröschl 2014; Joseph 2022; Otrachshenko and Nunes 2022), poverty (Carter et al. 2007; Sakai et al. 2017), inequality (Bui et al. 2014; Cappelli et al. 2021; Otrachshenko and Popova 2022), mortality (Deschenes and Moretti 2009; Otrachshenko et al. 2017; 2018), food insecurity (De Haen and Hemrich 2007; Sassi and Cardaci 2013; Nelson et al. 2016; Escalante and Maisonnave 2022), poor institutions (Leeson and Sobel 2008; Yamamura 2014; Nguyen 2017; Wenzel 2021; Khurana et al. 2022, Rahman et al. 2022), political discontent (Cerqua et al. 2023; Mackay et al. 2023a), and conflict (Eastin 2016; Schleussner 2016), among others. However, the impact of natural disasters is not limited to short-term changes in outcomes. Existing evidence highlights the role played by such disasters in the evolution of social norms that guide interactions (Gelfand et al. 2011; Giuliano and Nunn 2021; Gelfand et al. 2024). An emerging body of work draws links between exposure to natural disasters and specific cultural traits such as religiosity (Bentzen 2019; Bentzen and Force 2023) and trust (Fleming et al. 2014; Toya and Skidmore 2014; Rahman et al. 2020; De Juan and Hänze 2021; Mackay et al. 2023b). This evidence suggests that natural disasters may influence social norms across societies in long-lasting ways. However, the evidence on the impacts of natural disasters on various norms of behavior remains relatively limited.

This paper contributes to the literature by looking at whether and how exposure to natural disasters shapes the norms of behavior within a family by focusing on a specific norm: the acceptance of physical violence. The use of physical violence within a family, particularly intimate partner violence (IPV), is widespread globally, with 1 in 3 women of reproductive age estimated to have experienced physical and/or sexual violence by their intimate partner in their lifetime (World Health Organization 2021). Experiences of domestic violence have devastating impacts on the health and well-being of survivors (Campbell 2002; Devries et al. 2013; Beleche 2019) and their children (Aizer 2011; Currie et al. 2022; Bhuller et al. 2023; Hillis et al. 2016; Bharati et al. 2024) and lead to significant economic costs due to associated medical, legal, police and counseling costs, property damage, and lost earnings (UN Women 2016). Based on existing work, IPV is driven by the presence of norms that justify such violence (Heise and Kotsadam 2015). Yet the evidence on the causes of violence against women and the associated norms remains scant (for reviews, see Kiani et al. 2021; Hsu and Henke 2022), and, as a result, policies that address such violence are often piecemeal and reactive.

We put forward and test the hypothesis that natural disasters, through inducing emotional distress and economic insecurity, and imposing constraints on women's independence and autonomy, contribute to an environment where IPV becomes more acceptable. Our empirical analysis is based on a global sample of individuals drawn from the World Values Surveys (WVS) and historical geo-referenced records of natural disasters spanning several decades taken from the Geocoded Disasters Dataset (GDIS) – an extension to the Emergency Events Database (EM-DAT) that allows us to make use of subnational data on major natural disasters (Rosvold and Buhaug 2021a, 2021b). We match the individuals' attitudes on the justifiability of beating one's wife with information on their exposure to natural disasters throughout their lifespan at the level of subnational geographic regions and document important dynamics with respect to time elapsed since exposure to a natural disaster. Acceptance of intimate partner violence goes up in the short- (0-4) and medium- (10-14) run following exposure to a disaster and goes down only 20 years after exposure to a disaster. In addition to analyzing the acceptance of IPV, we study the acceptance of physical violence against children, documenting largely comparable patterns.[1] These findings are robust to a large set of sensitivity checks. In addition, heterogeneity analyses reveal that lower educated people are affected more relative to higher educated people, men are affected more than women, as are older cohorts relative to younger cohorts, while there are no differences between the effects of disasters on IPV attitudes of people with high and low income. Moreover, drawing on theories of IPV, discussed in the next section, we engage, within the limits of our dataset, with a range of mechanisms that may link disasters to acceptance of IPV.

Our study adds to the emerging body of work on the impacts of exogenous shocks on IPV and the associated norms. The earlier work has shown that IPV goes up in response to political unrest and conflicts (La Mattina 2017; Bargain et al. 2019; Ekhator-Mobayode et al. 2022; Torrisi 2023; La Mattina and Shemyakina 2024), labor market shocks and structural changes in the economy (Anderberg et al. 2016; Schneider et al. 2016; Kotsadam et al. 2017; Bhalotra et al. 2021a, 2021b; Erten and Keskin 2021, 2024) and health emergencies, such as the Covid-19 pandemic (Arenas-Arroyo et al. 2021; Berniell and Facchini 2021; Bhalotra et al. 2021c; Hsu and Henke 2021a, 2021b; Gibbons et al. 2021; Roman et al. 2023; Rocha et al. 2024).[2] Closely related to our work are the studies on the link between weather shocks and IPV, which offer mixed findings.[3] In the context of Sub-Saharan African countries, some studies

[1] Based on the estimates by Hills et al. (2016), half of children aged 2-17 globally experience past year emotional, physical, or sexual violence.

[2] The literature on causes of violence against women has provided evidence on the role of other factors such as family structures (Jacoby and Mansuri 2010; Khalil and Mookerjee 2019; Tur-Prats 2019; 2021), women's empowerment (Aizer 2010; Heath 2014; Angelucci and Heath 2020; Baranov et al. 2021; Mavisakalyan and Rammohan 2021; Kotsadam and Villanger 2022; Zhang and Breunig 2023), education (Erten and Keskin 2018, 2022; Gulesci et al 2020; Akyol and Kırdar 2022), features of institutions and policies (Aizer and Dal Bo 2009; Amaral 2017; Chin and Cunningham 2019; Amuedo-Dorantes and Deza 2022; Amaral et al. 2023; Bochenkova et al. 2023), and cultural traits (Leyaro et al. 2017; Yilmaz 2018; González and Rodríguez-Planas 2020; Alesina et al. 2021; Davis et al. 2022; Guarnieri and Tur-Prats 2023).

[3] For a review of the interdisciplinary literature on the link between extreme weather events and violence against women, see van Daalen et al. (2022).

show a positive link between extreme rainfall (droughts or floods) and IPV (Abiona and Foureaux Koppensteiner 2018; Epstein et al. 2020), while little or no association is found in others (Cools et al. 2020; Cooper et al. 2021). A study by Díaz and Saldarriaga (2023) on Peru finds that the probability of experiencing IPV goes up in response to exposure to a dry but not a wet shock. They attribute their findings to two mechanisms: increased economic insecurity and stress that deteriorates men's mental health and reduced female empowerment that affects their ability to negotiate within the relationship. Another study based in Peru by Barros and Xu (2020) documents a positive link between exposure to earthquakes and the incidence of IPV and shows that it is driven by an increase in male intra-household bargaining power and a rise in alcohol consumption. Additionally, in the context of the 2015 Nepal earthquake, Khanna and Fujii (2020) show that exposure to the earthquake led to an increase in the incidence of IPV due to an increase in stress felt by the affected individuals. The relationship between extreme weather events and IPV is not limited to developing country contexts. Henke and Hsu (2020) and Heilmann et al. (2021) establish a relationship between hot temperatures and IPV in the US. Finally, extreme weather events, through causing shocks in income, also affect other forms of violence against women, including religiously motivated murders of elderly women (witch killing) in Tanzania (Miguel 2005), dowry deaths in India (Sekhri and Storeygard 2014), child marriages in Sub-Saharan African countries and India (Corno et al. 2020) and female genital cutting in Sub-Saharan Africa (McGavock and Novak 2023).[4]

We add to this literature in several important ways. Firstly, our study is based on a global survey of individuals and examines their acceptance of IPV in relation to a full set of different natural disasters they may have been exposed to. In doing so, it is in the position to throw light on the mixed findings in the literature that stem from specific mostly developing-

[4] There are also studies on the link between extreme weather and interpersonal violence more broadly; see, for example, Hsiang et al. (2013), Ranson (2014), Otrachshenko et al. (2021), and Li et al. (2023).

country contexts or disaster types. Secondly, it goes beyond the focus on contemporaneous or short-term impacts of disasters in the existing studies on the link between disasters and violence against women, by studying and documenting important long-term dynamics in the relationship. Thirdly, it adds to the analyses of the mechanisms underlying the relationship between disaster exposure and IPV by Díaz and Saldarriaga (2023) and Barros and Xu (2020) but extends it further to shed light on likely mechanisms from the global long-term perspective. Fourthly, unlike most of the studies in the literature where the focus is on women's reports or attitudes (largely due to data constraints), we additionally study the responses of men's attitudes to natural disasters. This is an important addition to knowledge given the dominant role of men in the perpetration of IPV.

More broadly, we add to the evidence base on the vulnerability of women to climate change and its manifestations through extreme weather events (see Hailemariam et al. 2023 for a review). In this line of work, our results suggest that climate change is likely to cause long-lasting changes in the social norms justifying IPV in addition to affecting a range of other outcomes relevant to women's well-being, including their health (Bahru et al 2019; Stone et al. 2022), employment and economic security (Flatø et al. 2017; Hickson and Marshan 2022; Otrachshenko et al. 2024b), and intra-household position (Eastin 2018; Barros and Xu 2020).

By providing evidence on the long-lasting impact of natural disasters on norms of acceptance of IPV, our analysis is also related to the literature on the historical origins of various cultural norms (see Nunn 2012, 2014, 2020; Voigt 2024 for reviews), including those related to gender (see Giuliano 2018, 2020 for reviews). This literature has shown that contemporary gender norms have been shaped by various historical circumstances and shocks, such as ethnic deportations (Miho et al. 2024), ancestral ecological resource scarcity (Hazarika et al. 2019), ancestral adoption of the plow (Alesina et al. 2013), the duration of experience of agriculture (Hansen et al. 2015), ancestral irrigation (Fredriksson and Gupta 2023), gender composition of colonial settlers (Grosjean and Khattar 2019), and the slave trade (Lowes and Nunn 2024).

We organize the paper as follows. The next section describes the conceptual background that may explain the relationship between natural disasters and IPV acceptance and puts forward our hypotheses. We then describe our econometric approach, robustness checks, and data, and discuss the findings. The final section concludes.

2. Conceptual background and hypotheses

Theories of IPV (see Angelucci and Heath 2020 and Hsu and Henke 2022 for discussions) offer several predictions on how exposure to natural disasters may affect IPV and the associated norms.

Based on theories of *expressive violence*, IPV may provide utility to the perpetrator and is used to relieve frustration (e.g. Dobash and Dobash 1979; Tauchen et al. 1991; Anderberg and Rainer 2013). Consistent with theories of expressive violence, Card and Dahl (2011) show that professional football losses lead to increases in IPV, reflecting the role of emotional cues in the precipitation of violence. Cardazzi et al. (2024) arrive at a similar result in a case study of basketball game losses. Ivandic et al. (2024) study the role of alcohol and emotions in explaining domestic abuse following football games and show that the relationship is driven by alcohol consumption. In addition, Lindo et al. (2018) find that football game days, through intensifying partying, lead to an increase in reports of rape victimization among college students.

Natural disasters, through their negative impact on the exposed individuals' mental health (Obradovich et al. 2018; Crandon et al. 2022) and economic well-being (Gignoux and Menéndez 2016; Johar et al. 2022; Mackay et al. 2023a), may induce marital conflict and frustration that results in an expressive IPV.[5] Such frustration may affect violent behavior directly or mediated through alcohol consumption (Markowitz 2000; Jewkes 2002; Angelucci 2008; Averett and Wang 2016; Otrachshenko et al. 2021; Nguyen 2024), for example, due to its inhibiting effect on self-control (Schilbach 2019). From the survivors' perspective, the tolerance for violence may go up as their outside options are likely to deteriorate under the conditions of stress and resource scarcity after a disaster. For example, Tsaneva et al. (2019) show that women's intrahousehold bargaining power is lower in violent areas where it may be harder to leave a bad relationship.

IPV may also be an instrument to control women's resources, according to the theories of *instrumental violence* (e.g. Tauchen et al. 1991; Bloch and Rao 2002; Eswaran and Malhotra 2011). In line with these theories, Hsu (2017) suggests that male partners use IPV to control the allocation of household resources by showing that IPV increases shortly after the receipt of welfare payments. A similar conclusion results from the study by Bobonis et al. (2013) who find evidence of the use of verbal abuse to gain control over the public transfers to women. Heath (2014) shows that women with low bargaining power face an increased risk of IPV when joining the labor force and attribute this finding to the males' desire to counteract their partners' increased bargaining power due to employment.

Violence may also be used by males to reassert their dominance in response to a status threat. Such *male backlash* can be seen as the "emotional counterpart" of the theory of instrumental violence (Hsu and Henke 2022, p. 6). In line with this theory, Bueno and Henderson (2017) find that women who earn more than their husbands are at a higher risk of experiencing sexual IPV. Similarly, Gage (2005) and Zhang and Breunig (2023) find that female breadwinning is associated with a higher risk of physical violence and emotional abuse

[5] Literature in psychology also suggests links between uncomfortable temperatures and aggressive behaviors (e.g. Anderson 1989; Anderson et al. 2000).

by a male partner. Dhanaraj and Mahambare (2022) show that women in employment are exposed to higher levels of IPV due to male backlash but also find IPV more justifiable due to "female guilt", which in turn further raises the IPV exposure.

The theories of instrumental violence and male backlash, while different in underlying motivations, are likely to generate similar predictions regarding employment arrangements and relative bargaining power within the household (Jewkes 2002; Hsu and Henke 2022). In the context of natural disasters, a female's low expected earnings make them less inclined to leave their partner, even if they may be the violent type. Whereas males under such circumstances, as Anderberg et al. (2016) suggest, have lower incentives to conceal their nature if they are the violent type. Hence, as they show, female unemployment increases IPV. Welfare provisioning in response to natural disasters may also prompt instrumental violence as a way of controlling household resources (Bobonis 2013; Hsu 2017). Moreover, to the extent that the situations of shock contribute to the revival of traditional norms (Goli et al. 2022; Mavisakalyan and Minasyan 2023; Otrachshenko et al. 2024a), natural disasters may result in an environment conducive to the acceptance and use of violence to reassert male dominance.

Based on the *exposure reduction* theories, IPV may also increase as a response to an increase in the time a couple spends together (Dugan et al. 1999; 2003). Chin (2012) finds a negative association between women's employment and the incidence of IPV in India and shows that it is mainly driven by the exposure reduction effect. More recently, increases in the time couples spend together due to Covid-19 have been linked to increases in the incidence of IPV. For example, consistent with exposure reduction theory, Hsu and Henke (2021a) find that staying at home due to Covid-19 led to an increase in domestic violence in the US (see also Hsu and Henke 2021b). Similarly, a multi-country study by Berniell and Facchini (2021) documents an increase in the Google search intensity index of domestic violence-related topics as more people stayed home, captured through Google Mobility Data. Natural disasters, through their impacts on the labor market status of men and women, may also affect the time that couples spend together. If natural disasters lead to a decrease in hours worked by at least one partner, the time a couple spends together is likely to go up, increasing the possibility of justifying and having an IPV incident due to increased exposure.

In practice, there are complementarities between the different theories of violence (Angelucci and Heath 2020), but all point towards a positive association between natural disaster exposure and acceptance of IPV. It should be noted that most of the discussion (and empirical evidence thereof) at the first instance is relevant to the shorter-term impacts of natural disasters. For example, an emotional response to a natural disaster likely finds its manifestation in expressive violence and the associated norms in the aftermath of a disaster. However, it's possible that such an incidence of emotional response to a natural disaster, once normalized, persists over time. This argument is in line with studies that document the long-term persistence of cultural features triggered by exposure to shocks (e.g. Nunn and Wantchekon 2011; Grosjean and Khattar 2019; Nikolova et al 2022; Miho et al 2024). Hence, evolving norms may imply the sustained impact of natural disasters on the acceptance of IPV over a period till a new steady state is achieved.

Based on this discussion, our main hypothesis is as follows:

H1: Natural disasters increase IPV acceptance over time.

Identification of what theory is likely to be at play is reliant on very detailed data that is rarely available in secondary-data-based applications. However, the theories in combination point towards several mechanisms potentially underlying the relationship between natural disasters and IPV acceptance, presented through the following hypotheses:

H2a: Natural disasters increase IPV acceptance through increasing psychological stress, alcohol consumption, and the likelihood of marital conflicts.

H2b: Natural disasters increase IPV acceptance through (the fear of) the household's income and employment losses.

H2c: Natural disasters increase IPV acceptance through changes in gender-related attitudes toward more traditional roles.

3. Methodology

We estimate the following econometric model:

$$IPV\_acceptance_{irct} = \sum_{j \in \{0,\ldots,m\}} \beta_j Disaster_{rc,t-j} + \boldsymbol{\gamma} \boldsymbol{X}_{irct} + \boldsymbol{\theta}_r + \boldsymbol{\delta}_c + \alpha_t + \varepsilon_{irct} \quad (1)$$

where the dependent variable is the IPV acceptance, *IPV_acceptance,* by an individual *i* living in the region *r* of the country *c* at the survey year *t*. As described in the next section, the dependent variable ranges from 1 (never justifiable) to 10 (always justifiable).

Disaster is a set of explanatory variables accounting for the occurrence of natural disasters in the region *r* of the country *c*. These variables take three values: 0 if no natural disasters of any type occurred *j* periods before the survey time, 1 if at least one natural disaster of any type occurred *j* periods before the survey time, and 2 if a respondent was not yet born in the j^{th} period before the survey time.[6] We account for $j \in \{0, \ldots, m\}$ in 5-year time frames: 0-4 years, 5-9 years, 10-14 years, 15-19 years, 20-24 years, and 25 and more years before the survey took place. In our case, as described in the next section, disaster data range from 1960 to 2018, while the individual-level survey comparable across countries was conducted in 2017 and 2018. For each respondent in our survey, we thus create variables of experiencing a disaster in certain periods in the past and analyze how those disasters affect *current* IPV attitudes.

[6] Respondents in our sample are between 17 and 100 years old (see Table 1 for descriptive statistics).

$\mathbf{X}$ is a vector of the individual socio-demographic characteristics, including age and its square, and a dummy for biological sex. As discussed by Dell et al. (2014), including extra socioeconomic controls in the regressions analyzing the effects of extreme weather events may create an overcontrolling problem since many socioeconomic variables, including income, education, and employment status, are themselves affected by extreme weather events. Angrist and Pischke (2009) refer to such controls as "bad controls". We thus limit the set of controls to exogenous individual characteristics only.

$\boldsymbol{\theta}$ is a vector of the latitude and longitude of the respondent's residence location, potentially accounting for the unobservable cultural or geographic characteristics of specific places. $\boldsymbol{\delta}$ are country fixed effects, while α is a dummy for the survey year that equals 1 for 2018 and 0 for 2017. β_j and $\boldsymbol{\gamma}$ are the model parameters, and ε is a stochastic disturbance term. For simplicity of interpreting the coefficient estimates, we estimate Eq. (1) by ordinary least squares (OLS).[7] Standard errors are robust to heteroskedasticity and clustered at the region's level.

In addition, we analyze the heterogeneity of our results by respondent's socioeconomic characteristics, including age, gender, income status, employment, and education, and by the continent of respondent's residence.

As detailed in the results section, we also provide a battery of robustness checks for our results. Specifically, we test whether the results are not driven by the immigration of individuals with pro-IPV attitudes, the emigration of individuals with anti-IPV attitudes, and unobserved factors. In addition, we test the robustness of our results to a different definition of the dependent variable, to different model specifications, and run a falsification test by randomly assigning the respondents to placebo natural disaster locations.

[7] The results of ordered probit estimation are similar and are in Table A1 in the appendix.

4. Data

4.1. IPV attitudes

Data on IPV acceptance, as well as respondents' socioeconomic characteristics, come from the World Values Survey, wave 7 (WVS 2017-2022). It is an individual-level survey of people's attitudes and values with a unified questionnaire across countries. WVS has several key features that make it an appropriate dataset for this study. Firstly, unlike many sources of data on IPV, such as the Demographic Health Surveys, the questions on IPV attitude are asked to both women and men rather than being restricted to women. While men are the key perpetrators of IPV in many situations, most of the literature on IPV is based on the reports and attitudes of women due to data availability, thereby providing limited inferences. Secondly, through its unique coverage of IPV views in both developing and developed countries, WVS additionally affords the opportunity to provide a truly global analysis of the link between natural disasters and IPV attitudes whereas most existing evidence comes from developing country contexts. We limit the WVS data to only those countries that were surveyed in 2017 and 2018. There are two reasons for this. The first is the need to disentangle the effects of natural disasters and the effects of Covid-19 on IPV attitudes since numerous studies document that the pandemic fostered IPV (see Arenas-Arroyo et al. 2021; Berniell and Facchini 2021; Bhaltora et al. 2021c; Boserup et al. 2020; Chandan et al. 2020; Mahase 2020; Moore et al. 2022; Rocha et al. 2024; Roman et al. 2023; and Sharma and Borah 2022, among others). The second reason, as described in the next section, is the availability of geocoded data on natural disasters.

We use the two survey questions on the acceptance of IPV. In both questions, a respondent is asked, "Please tell me for each of the following actions whether you think it can always be justified, never be justified, or something in between," with possible answers ranging from 1 (never justifiable) to 10 (always justifiable). The first action asked in this question is related to the attitudes toward intimate partner violence ("For a man to beat his wife"), while the second is related to the approval of domestic abuse of children ("Parents beating children").

4.2. Natural disasters

We use the Geocoded Disasters (GDIS) dataset available from Rosvold and Buhaug (2021a and 2021b). It includes geocoded information and the regional locations of droughts, earthquakes, extreme temperatures, floods, landslides, dry and wet mass movements, storms, and volcanic activity that occurred globally in the period from January 1, 1960, to December 31, 2018.[8] Events are defined as disasters and are included in the database if they have a certain magnitude. Specifically, there is either a certain number of deaths (ten or more people killed), a certain number of affected people (100 or more affected), a declared state of emergency, or international assistance required because of those disasters (Rosvold and Buhaug 2021b).

We merge the GDIS database with the WVS, wave 7 (WVS 2017-2022), at the level of subnational regions. Specifically, we link the variable "geolocation" in the GDIS database, which stands for the name of the disaster location at the most disaggregated administrative level (Rosvold and Buhaug 2021b), to a specific subnational region in the WVS (variable "N_REGION_ISO").[9] For this, for each disaster in the GDIS database, we first compare whether the name in "geolocation" in the GDIS corresponds to the name "N_REGION_ISO" in the WVS, accounting for potential differences in spelling, and assign the corresponding code from "N_REGION_ISO" to disasters in the GDIS database. If the match is not possible to find, we also compare whether the match can be found using variables "adm1", "adm2", "adm3", and "location" in the GDIS database. Finally, for the remaining unmatched disasters, we consult publicly available Internet sources and manually check to which administrative region

[8] This is a geocoded extension from the Emergency Events Database (EM-DAT, www.emdat.be) administered by the Catholic University of Leuven's Centre for Research on the Epidemiology of Disasters (CRED).

[9] When "N_REGION_ISO" is not available in the WVS, we use "N_REGION_WVS" instead.

"geolocation" and "location" can be attributed and then compare whether this region is included in the WVS. Finally, GDIS and WVS are matched based on the codes from "N_REGION_ISO".[10]

When merging the two datasets, we account for several situations. First, the same disaster may occur in several WVS regions simultaneously. In this case, this disaster is accounted for in several WVS regions. Second, several disasters may occur in the same WVS region either in the same or different time frames. If these disasters occurred in the same time frame, we denote it as equal to one in the corresponding time frame in our model, as described below. If the disasters occurred in different time frames, we account for them in each time frame in the region. In the robustness checks, we also account for the frequency of disasters that have occurred. As explained above, we limit the sample only to those countries of WVS wave 7 that were surveyed in 2017 and 2018. A combined dataset includes over 21,000 cases of different disaster types matched to over 49,000 respondents residing in 32 countries worldwide.[11]

As described above, for each respondent, we create a set of variables corresponding to the time when each disaster happened in the respondent's region of residence. Specifically, we include a set of variables *Disaster* for *any* disaster 0 to 4 years ago, 5 to 9 years ago, 10 to 14 years ago, 15 to 19 years ago, 20 to 24 years ago, and over 25 years ago. To create those variables, we use the GDIS data on the year when each disaster happened in each region. To

[10] Our approach of merging the two datasets at the level of subnational regions allows for more precise matching of disaster and respondents' locations, compared to using geo-coordinates for this purpose. First, we have an exact match between the subnational region(s) of disaster occurrence and the respondent's residence across all countries used in the analysis. Second, we use regions at the same administrative level in both datasets. Finally, we avoid possible measurement errors caused by inconsistencies in the geo-coordinates in both datasets, including missing values, latitudes with values out of the range [-90, 90] degrees, and cases when latitudes and longitudes are misplaced, etc.

[11] Those countries are Andorra, Argentina, Australia, Bangladesh, Bolivia, Brazil, Chile, China, Colombia, Ecuador, Germany, Greece, Hong Kong SAR, Indonesia, Iraq, Kazakhstan, Jordan, South Korea, Lebanon, Malaysia, Mexico, Nigeria, Pakistan, Peru, Puerto Rico, Romania, Russia, Serbia, Thailand, Turkey, Egypt, and the United States.

prevent the sample dropout, we also control for cases when respondents were not yet born in the studied time frame.

In all model specifications, we also include the respondents' age and its square, a dummy for biological sex, and the latitude and longitude of the respondent's residence location. These data also come from the WVS.

4.3. Mechanisms

Several variables are used as proxies to test the mechanisms behind the disaster-IPV attitudes relationship within the limits of our data, following the hypotheses formulated above.

1. *Hypothesis 2a* posits that natural disasters increase IPV acceptance through increasing psychological stress, alcohol consumption, and the likelihood of marital conflicts. To proxy for physical and mental health, we draw on the survey question "*All in all, how would you describe your state of health these days?*" with possible responses on a Likert scale from 1 (very poor) to 5 (very good). The second variable used to engage with hypothesis 2a is the perceived frequency of alcohol consumption in the respondent's neighborhood as a proxy for the respondent's own alcohol consumption. It is measured based on a survey question "*How frequently do the following things occur in your neighborhood? Alcohol consumption in the streets.*" with responses ranging from 1 (not at all frequently) to 4 (very frequently). The last variable we use is the trust in own family based on a survey question "*I'd like to ask you how much you trust people from various groups. Could you tell me for each whether you trust people from this group completely, somewhat, not very much or not at all? Your family.*" with responses from 1 (do not trust at all) to 4 (trust completely). We employ this variable to proxy for the likelihood of family conflict.

2. *Hypothesis 2b* predicts that natural disasters increase IPV acceptance through (the fear of) the household's income and employment losses. We use a set of variables related to control over household resources and a fear of losing such control: fear of losing a job, fear of not

being able to give children a good education, respondent's and spousal employment/self-employment, and self-assessed household income. These mechanisms are based on the following survey questions: "*To what degree are you worried about the following situations? 1) Losing my job or not finding a job; 2) Not being able to give my children a good education*." with the answers ranging from 1 (not at all) to 4 (very much); "*We would like to know in what group your household is. Please, specify the appropriate number, counting all wages, salaries, pensions and other incomes that come in*.", where 1 is the lowest income group and 10 is the highest income group; a dummy variable for respondent's employment that equals 1 is a respondent is employed full time, part-time, or self-employed and 0 otherwise, and a similarly specified dummy variable for the respondent's spouse.

3. *Hypothesis 2c* states that natural disasters increase IPV acceptance through changes in gender-related attitudes toward more traditional roles. We use the following survey questions: "*How would you feel about the following statements? 1) If a woman earns more money than her husband, it's almost certain to cause problems. 2) When a mother works for pay, the children suffer, and 3) When jobs are scarce, men should have more right to a job than women*." with possible answers from 1 (disagree strongly) to 5 (strongly agree).

Descriptive statistics on the variables used in the analysis are presented in Table 1.

5. Results

5.1. Main results

We start by presenting descriptive evidence on the relationship between exposure to natural disasters and IPV attitudes. Figure 1 shows a strong positive unconditional correlation between a dummy of experiencing a disaster of any type and IPV acceptance. The correlation is statistically significant at a 5% level, and its confidence interval becomes tighter as the mean exposure to a disaster grows.

Table 2 and the corresponding Figures 2a and 2b present the main results. As shown, experiencing a natural disaster of any type in the past 5 years increases the respondent's justification of beating one's wife by 29.2 percentage points (p.p.).[12] This effect is long-lasting and is still observed with a notable impact even up to 15 years after the disaster, though it becomes slightly smaller in magnitude over time (17.9 p.p.). Only in the period of 20 to 24 years after a disaster, the effect on the acceptance of IPV is reversed, and those who experienced a disaster in the long run report lower acceptance of IPV. Interestingly, when we disentangle these results by gender, we find that the effect is larger for men compared to women (columns 2 and 3 in Table 2 and Figure 2b). Thus, we find empirical support for our hypothesis H1.

Next, we analyze the heterogeneity of our results by the continent of the respondents' residence and socioeconomic characteristics. Table 3a shows the results for individuals living on different continents and, thus, being exposed to different cultures and to a different frequency of natural disasters. As shown, in the first 5 years post-disaster, we observe no effects of disasters on IPV acceptance in Asia, South America, and Australia, although, in Asia, the effect seems to be delayed since we observe an increase in IPV acceptance in Asia 10-14 years after the disaster. In Africa, the initial effects of disasters are larger in magnitude than in the baseline specification; in North America and Europe, these effects are similar in magnitude to the baseline specification. Interestingly, in Australia and North America, an increase in IPV attitudes following a disaster is shorter in life than in baseline specification: the effect reverses 5 to 9 years and 10 to 15 years after experiencing a disaster, respectively.

Finally, we analyze the consequences of disasters for individuals with different socioeconomic characteristics, defined by age, education, and income. Table 3b presents the results. Compared to the baseline specification in Table 2, we find no effects for young individuals (17 to 20 years old) and a stronger effect for older individuals (age groups 41 to 60

[12] Full OLS regression results for Table 2 are presented in Table A2 in the appendix.

years old and 61 years and older). In addition, the effects are larger in magnitude for the lower-educated individuals compared to the higher-educated. The effects are similar in magnitude to the baseline specification for middle-aged individuals (21-40 years old) and for high- and low-income individuals. For those groups, the confidence intervals overlap with those in the baseline specification, suggesting no statistically significant differences with the baseline specification.

5.2. Robustness checks related to migration issues

We conduct several robustness checks to ensure that migration issues do not affect our results. Table 4 presents the results of these robustness checks.

First, we test that the results are not driven by the immigration of individuals who are more likely to justify IPV. For instance, international migrants may bring their own values, cultural norms, habits, and experiences from the countries of their origin (e.g., Angelini et al. 2015; Galli and Russo 2019; Norris and Inglehart 2012; Pavlik et al. 2019). If those attitudes and cultural traits are related to IPV acceptance positively, our results may overestimate the effects of natural disasters. To test whether this is the case, we exclude international migrants from the analysis sample and check if the results are similar to the baseline results. As shown in column 2 of Table 4, the results remain robust compared to the baseline model in Table 2. This alleviates the concern regarding the potential effects of the immigration of individuals with higher acceptance of IPV.

Second, in response to natural disasters, individuals may also either prefer to or be forced to migrate out of the disaster locations (see Berlemann and Steinhardt 2017; Boustan et al. 2012; Fan et al. 2018; Gröger and Zylberberg 2016; Mahajan and Yang 2020; McIntosh 2008; Sheldon and Zhan 2022). If those who migrate out of disaster locations are also less likely to justify IPV, this may affect our results. Given that there is no information on internal migration in our sample, we can only test the issue of out-migration indirectly and do this in several ways: (1) divide the analysis sample into countries with high- and low- population displacement rates due to natural disasters; (2) compare the results for high- and low-income individuals, and (3) proxy for internal migration by attachment to the place of residence and test whether excluding those who are not attached to their locality or region affects our findings.

We first divide the analysis sample into countries with high- and low- population displacement rates due to natural disasters.[13] It might be the case that in countries with high displacement rates, our results are more likely to capture the attitudes of those who stayed in the disaster locations and not the attitudes of the general population. That is, if stayers are selected based on some specific unobservable individual characteristics that are also related to abuse attitudes, e.g., personality traits or cultural preferences, our results might be biased. Comparing columns 3 and 4 in Table 4, we see that this is not the case since the differences in coefficients' estimates in 0 to 4 years after a disaster are not statistically significant, given that the confidence intervals overlap. The results also do not differ from the baseline specification in Table 2. Some difference is observed only related to the longevity of the disaster effect. In countries with low displacement rates due to disasters, the IPV-enforcing effects of natural disasters are no longer observed after 4 years post-disaster. In addition, individuals in countries with low displacement rates also become anti-IPV quicker than in countries with high displacement rates. However, such differences in the estimates are likely related to the strength of disasters in those countries and not to migration issues as such.

We then also compare the results for high- and low-income individuals (see columns 5 and 6 in Table 4). A priori it is unclear whether high- or low-income individuals are more likely to migrate from the disaster locations. On the one hand, "environmental migrants" are more

[13] To calculate the per capita displacement rates due to natural disasters, we use data on the total number of displaced people due to natural disasters in each country included in our sample and divide it by the total population of this country. For this, we use data on displacement due to natural disasters from the Global Report on Internal Displacement (2019) and on the total population from the World Bank.

likely to have a higher income and be less financially constrained since disasters increase the liquidity constraints and fixed costs of migration (Drabo and Mbaye 2015; Gröger and Zylberberg 2016; Sheldon and Zhan 2022). If they are also less likely to justify IPV, this may lead to overestimating the effect of natural disasters on IPV attitudes. However, several theoretical arguments may limit the potential effect of the emigration of high-income individuals with anti-IPV attitudes on our estimates. First, environmental factors may not necessarily be the primary ones in migration decisions. Low-income individuals who seek better economic opportunities are also likely to move out of the disaster location and more likely to stay in host (non-disaster) destinations (Eyer et al. 2018; Fan et al. 2018; Goldbach 2017; Landry et al. 2007). Also, disaster-driven migration is often a temporary one and many environmental migrants return in the short run (Groen and Polivka 2010; Landry et al. 2007; Paxson and Rouse 2008). Moreover, post-disaster reconstruction and public interventions may attract highly educated, high-income individuals to disaster locations (Boustan et al. 2012; Groen and Polivka 2010). Low-income individuals may even be discouraged from returning to post-disaster locations (Groen and Polivka 2010; Paxson and Rouse 2008). In this case, our model will provide a lower-bound estimate of the effect of natural disasters on IPV acceptance.

In columns 5 and 6 of Table 4, we show that natural disasters affect high- and low-income individuals similarly, alleviating the potential concerns of the sample composition effects on our results. The results also do not statistically differ from the baseline specification in Table 2. While the emigration of high-income individuals who do not justify IPV might be a possible alternative explanation for our findings, the existing evidence on post-disaster migration and our robustness checks do not support such an explanation.

It might also be the case that more socially disadvantaged populations are more likely to stay in more disaster-prone locations since they cannot afford to live in places with fewer shocks. If those population groups are also more likely to justify IPV, our results may overestimate the effects of natural disasters. To alleviate this concern, we check whether the results differ between high- and low-income individuals in regions with high and low frequency of natural disasters. The results are presented in Table A3 in the appendix. The confidence intervals of the estimate "Disaster [0 to 5) years ago" overlap, suggesting no statistical differences in the effects of experiencing a disaster in the past 5 years on the IPV acceptance of high- and low-income individuals in regions with a high disaster frequency (see columns 6 and 7 in Table A3). We also find that 10 years after a disaster, high-income individuals in high-frequency areas are statistically more likely to justify IPV than low-income individuals in those areas, while 20 years after a disaster, low-income individuals are statistically less likely to justify IPV compared to high-income individuals in those areas. These findings suggest that potentially different location choices of high- and low-income individuals are unlikely to affect our estimates of the effects of natural disasters on IPV acceptance. The results also do not differ between high-income individuals in areas with different frequencies of disasters (columns 6 and 8 in Table A3) and between low-income individuals in those areas (columns 7 and 9 in Table A3).

Finally, we exclude individuals who are not attached to their locality or region of residence as they are more likely to migrate (Landry et al. 2007) and test whether this changes the results compared to the baseline specification. These results are presented in columns 7 and 8 of Table 4. In both cases, the confidence intervals overlap with those in the baseline specification, suggesting that potential out-migration from the disaster locations likely does not affect our estimates of the effects of natural disasters on IPV acceptance. Interestingly, when we simulate our results by assigning a different share of those who do not feel close to their locality or region, we find that the effect of natural disasters on IPV acceptance becomes statistically insignificant only when 70% of respondents do not feel close to their locality (see

Figure 3). In other words, if migrants have potentially different values, the share of migrants in a locality/region should be rather high to make our results statistically insignificant.

In summary, a battery of robustness checks suggests that potential changes in the sample composition due to the immigration or emigration of individuals with specific characteristics and potentially different IPV attitudes are likely not the major explanation behind our results.

5.3. Robustness checks related to the model specification

We next test whether our results are influenced by the model specification. These robustness checks are presented in Table 5. We first redefine the dependent variable into a dummy, which equals one if a respondent justifies the IPV and zero if a respondent thinks that the IPV is never justifiable. Compared to the baseline model in Table 2, the pattern of results remains similar: in the first 15 years post-disaster, the effects of natural disasters on IPV acceptance are positive and become negative after 15 years (see column 2 in Table 5). These results confirm that memories of natural disasters are long-living and affect individual attitudes even a long time after the disaster experience.

When we then redefine disasters into a dummy that equals one if respondents experienced a disaster at any time in their life and zero otherwise (see column 4 in Table 5), the effect of the disaster becomes quantitatively smaller compared to the baseline model. This suggests that failing to account for the long-lasting effects of natural disasters may lead to underestimating the effects of natural disasters on individual attitudes and further justifies the analysis of the dynamic impact of disasters.

In addition, following the methodology proposed by Oster (2019), in the model with a dummy variable for natural disasters presented in column 4 in Table 5, we check whether unobservable factors affect our results. The findings suggest that the influence of unobservable factors should be at least 27.9 times higher to make the effect of natural disasters on IPV acceptance statistically insignificant. That is, unobserved factors are unlikely to affect our results.

In column 3 of Table 5, we also present the results with an alternative dependent variable: the acceptance of beating children. Compared to the IPV justification, the pattern of results remains similar, although the initial effect of natural disasters on the acceptance of beating children is quantitatively smaller than the one on the IPV.

In addition, we test whether the structure of our model design affects our results. For this, we present the findings redefining the baseline model specification by including fewer periods post-disaster (see columns 5-8 in Table 5 for 5, 10, 15, or 20 years post-disaster, respectively). As shown, the results in baseline specification remain robust to such modifications.

We then include the frequency of disasters as an additional control in our model to account for potential anticipation effects. That is, we may expect that in areas with more frequent disasters, the individuals may anticipate and get used to those disasters, implying that their effect on the IPV justification could be smaller in magnitude. As shown in column 9 in Table 5, the estimated effect of 0-5 years after a disaster is slightly larger in magnitude compared to the baseline, but the confidence intervals intersect, suggesting that the results remain robust to this model modification and controlling for the frequency of disasters does not alter the findings of the baseline model. In Figure 4, we also present simulations with a hypothetically increased frequency of disasters. As shown, with an increase in frequency, the effect of disasters remains stable, since confidence intervals intersect with the baseline specification in Table 2. However, we may still expect that more frequent disasters may spur adaptation, as suggested by the finding that the frequency of disasters by itself reduces the IPV justification (column 9 in Table 5).

In addition, we check whether the results are driven by specific countries. To this end, we leave one country out of the sample at a time and estimate the baseline specification in Eq. (1). The results presented in Figure 5 suggest that our findings are not sensitive to sample composition.

Finally, we run a falsification test by randomly assigning the respondents to placebo natural disaster locations and checking whether placebo natural disasters affect IPV justification. Since given our data structure, we are not able to formally test for pre-trends in our model, this falsification test also assures that actually treated and control groups differ only by a disaster experience.[14] If placebo natural disasters also affect IPV acceptance, this may imply that the treatment effect of disasters that we find in our baseline model might be due to some other differences between the treatment and control group and not due to the actual disaster experience. That is, the pre-trend assumption may be violated in this case. Figure 6 shows that the impact of experiencing a placebo natural disaster (defined as a dummy variable) is centered around zero and is statistically significant only in 6% of 1,000 simulations, suggesting that baseline results are not a data artifact.[15]

5.4. Mechanisms

Table 6 presents the results of testing specific mechanisms behind the relationship between natural disasters and IPV acceptance. This table has three panels of results, testing the predictions of Hypotheses 2a, 2b, and 2c.

As shown in panel (1) of Table 6, in the short run, natural disasters lead to subjective health and family trust deterioration. This supports the theories of expressive violence,

[14] This test is commonly used in the literature, see, e.g. Borjas (2017) who estimates the impact of Cuban immigration on the wages of locals, Nikolova et al. (2022) who examine the allocation of forced labor camps on the current level of trust, and Otrachshenko et al. (2022) who study the willingness to pay for environmental good.

[15] Corresponding simulations for the effects of placebo natural disasters [0-5) years ago are presented in Figure A1 in the appendix and yield similar results.

implying that natural disasters may lead to psychological distress, increasing the likelihood of intrahousehold conflicts. Regarding alcohol consumption, we find no effect of natural disasters in the short run, while in the medium- and long run (5 to 9 and more than 25 years after a disaster), alcohol consumption decreases. We thus find support for hypothesis 2a in the case of subjective health and family trust but not in the case of alcohol consumption.

Panel (2) of Table 6 shows the results of testing hypothesis 2b. In line with the hypothesis, natural disasters increase the fear of losing employment. This effect is long-lasting: the fears are alleviated only in the medium run (10 to 14 years after a disaster), suggesting that natural disasters increase feelings of economic insecurity that may, in turn, facilitate IPV acceptance. Interestingly, in the short- and medium-run, we find no effects of disasters on the actual employment of respondents and their spouses and self-assessed household income. However, positive changes in the household's economic situation occur only 15 or more years post-disaster.

In panel (3) of Table 6, we show the results of testing hypothesis 2c. We find no support for this hypothesis in the short run. However, in the medium run (5 to 9 years after a disaster) and long run (25 or more years post-disaster), natural disasters may still spur traditional gender norms and, thus, lead to IPV. This is in line with the literature, suggesting that social and cultural norms are slowly changing.

In sum, we find that natural disasters are likely to trigger psychological distress and economic insecurity fears that in turn lead to an increase in IPV acceptance.

6. Conclusion

This paper documents the long-lasting effects of natural disasters on the acceptance of intimate partner violence. Compared to individuals in localities with no natural disasters, those who currently live in the disaster localities are more likely to accept IPV up to 15 years after a disaster. These findings can be potentially explained by subjective health and family trust deterioration and by fears of household economic insecurity in response to disasters.

These findings have several important implications. First, the effects of natural disasters on IPV attitudes that we document are likely to reflect increases in the actual IPV incidence. Indeed, as Heise and Kotsadam (2015) show, the presence of norms that justify IPV is a significant predictor of IPV occurrence among individuals. Thus, offering psychological, legal, and medical support to inhabitants in post-disaster locations is as important as post-disaster reconstruction and economic damage mitigation. Second, beyond economic damages, our study suggests that natural disasters may durably shape individual attitudes. Thus, given that the frequency and severity of natural disasters are likely to increase globally due to climate change, targeted IPV prevention measures should be designed by educating and empowering vulnerable population groups.

Our study opens several avenues for future research. First, while we contribute to understanding the societal implications of natural disasters on a global scale by focusing on one specific dimension of social and cultural norms, IPV attitudes, the consequences of climate change for individual attitudes and preferences are likely to be even broader and affect various spheres of life. Thus, a multi-disciplinary approach is needed for examining the consequences of disasters and designing prevention, adaptation, and mitigation measures. Second, our focus in this paper is on the endorsement of physical violence against women (and children), whereas natural disasters are likely to affect other forms of violence against these as well as other groups in society, including emotional and sexual violence, femicide, controlling behaviors, etc. Understanding the impact of natural disasters on a wider spectrum of violence and the associated norms is an important direction for future research. Third, we have offered insights into some of the likely mechanisms underlying the relationship between natural disasters and the endorsement of physical IPV. However, our investigation is reliant on the use of proxies within the limits of our dataset and is constrained in its ability to offer formal and comprehensive tests of different theories of violence and their predictions. Detailed datasets to capture and identify the specific pathways of the effect of natural disasters on violence against women are likely to open up opportunities for further research in this area.

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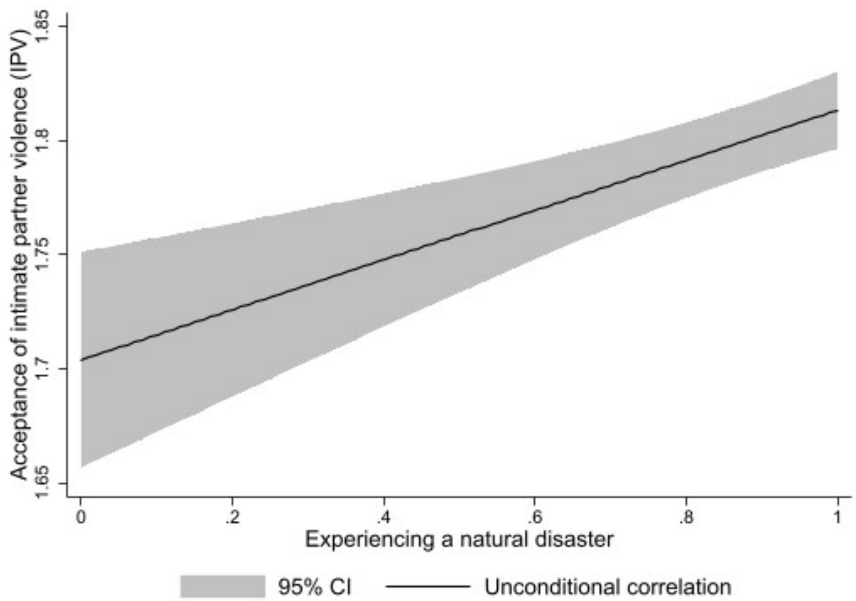
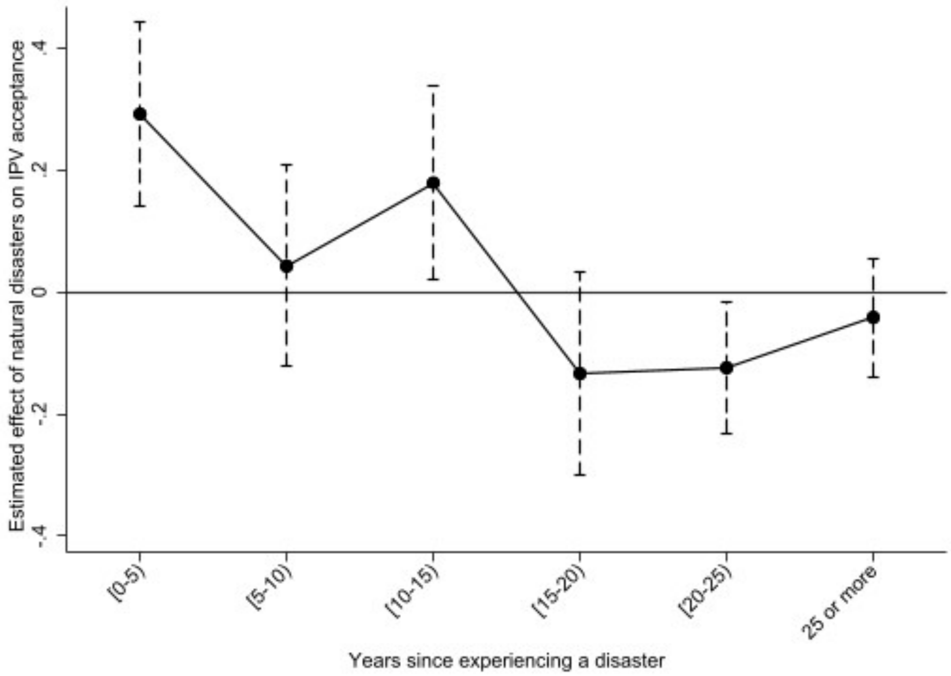
FIGURES

Figure 1. Exposure to natural disasters and IPV acceptance



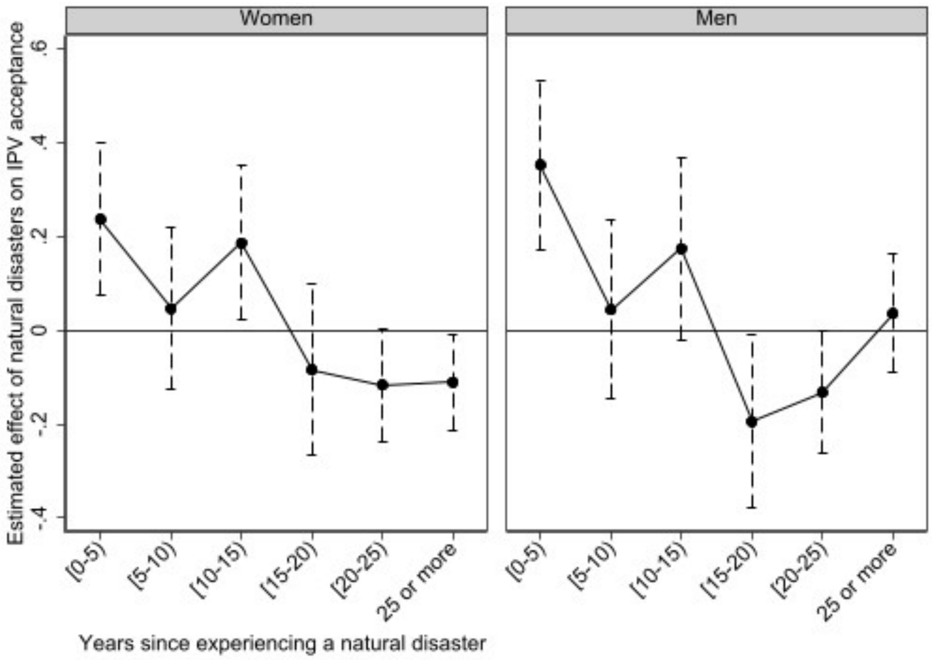
Source: Authors' construction. Notes. The figure presents an unconditional correlation between IPV acceptance (justifying beating one's wife) and exposure to a disaster with a 95% confidence interval. Exposure to a natural disaster is based on a dummy variable that equals 1 if respondents experienced any type of natural disaster in their life and 0 otherwise.

Figure 2a. Natural disasters and IPV acceptance



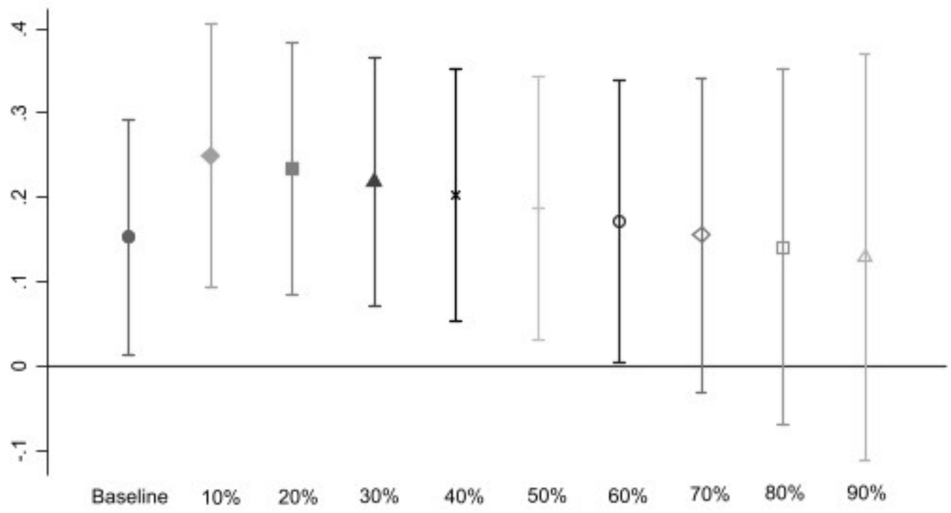
Source: Authors' construction. Notes: The figure shows the estimated effects of natural disasters on IPV acceptance based on Table 2. Dashed lines correspond to the 95% confidence interval. The results are for experiencing any type of natural disaster (extreme temperature, drought, earthquake, flood, landslide, (dry) mass movement, storm, and volcanic eruption). Each regression includes controls for age and its square, biological sex, latitude, longitude, a dummy for 2018, a dummy for not being born in the studied period of disaster, and country fixed effects.

Figure 2b. Natural disasters and IPV acceptance by gender



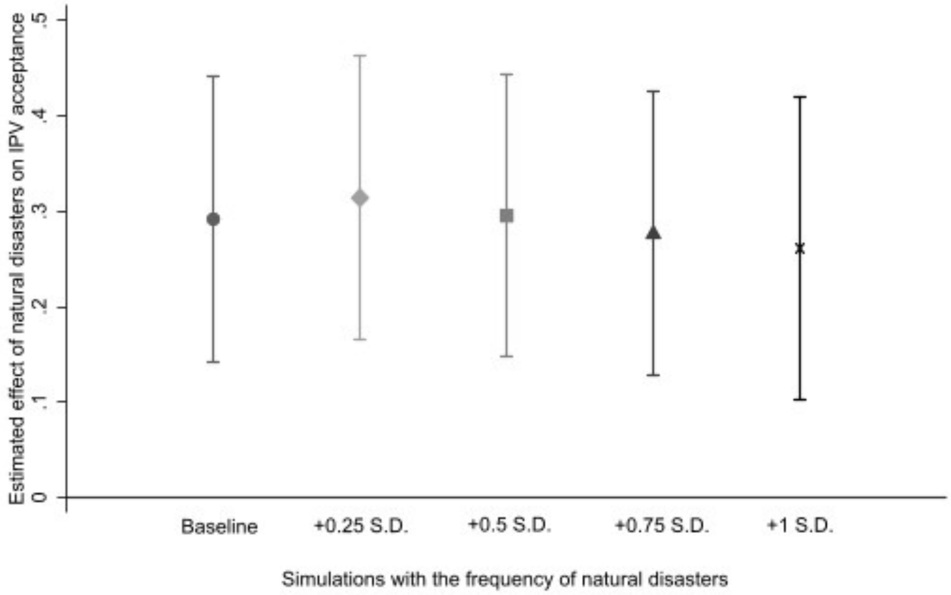
Source: Authors' construction. Notes: The figure shows the estimated effects of natural disasters on IPV acceptance by gender based on Table 2. Dashed lines correspond to the 95% confidence interval. The results are for experiencing any type of natural disaster (extreme temperature, drought, earthquake, flood, landslide, (dry) mass movement, storm, and volcanic eruption). Each regression includes controls for age and its square, latitude, longitude, a dummy for 2018, a dummy for not being born in the studied period of disaster, and country fixed effects.

Figure 3. Estimates with a changing share of respondents who do not feel local



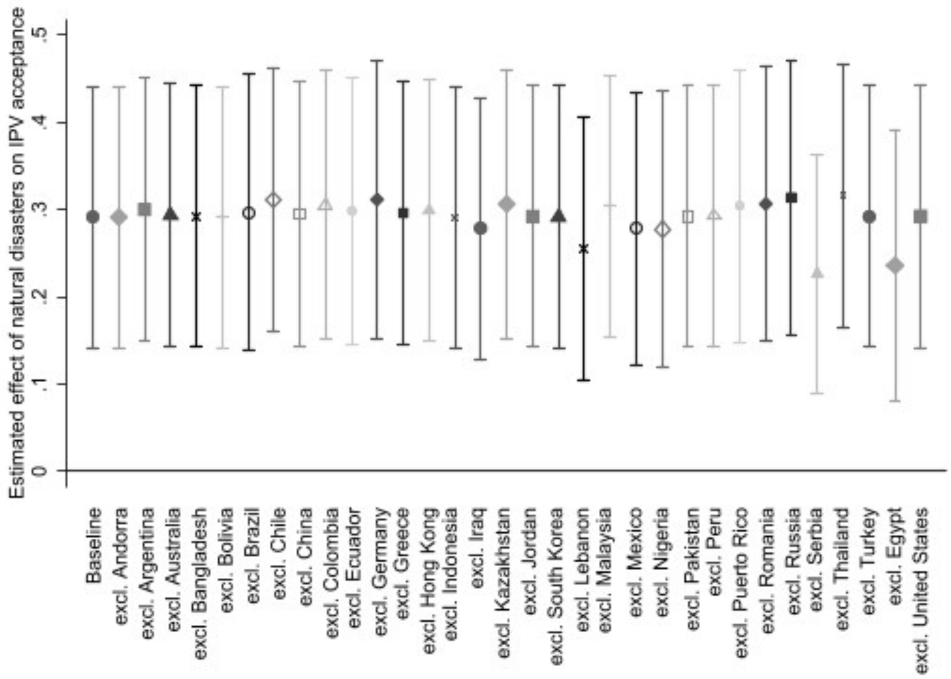
Source: Authors' construction. Notes: The figure shows the estimated effects of natural disasters on IPV acceptance and their 95% confidence intervals. These estimates are based on simulations with a different share of respondents who do not feel close to the locality where they live. The baseline corresponds to the effect of natural disasters measured as a dummy (column 4 in Table 5). The results are for experiencing any type of natural disaster (extreme temperature, drought, earthquake, flood, landslide, (dry) mass movement, storm, and volcanic eruption). Each regression includes controls for age and its square, biological sex, latitude, longitude, a dummy for 2018, a dummy for not being born in the studied period of disaster, and country fixed effects.

Figure 4. Frequency of natural disasters and IPV acceptance



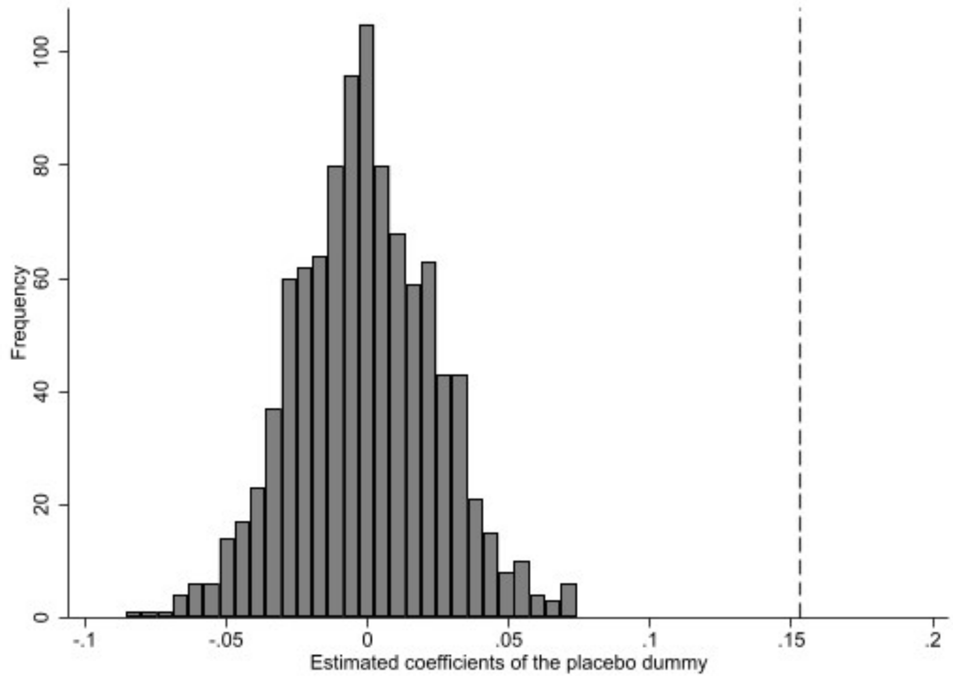
Source: Authors' construction. Notes: The figure shows the estimated effects of natural disasters [0-5) years ago on IPV acceptance based on simulations with a different frequency of natural disasters (with a 95% confidence interval). The baseline estimate is from Table 2, column 1. The results are for experiencing any type of natural disaster (extreme temperature, drought, earthquake, flood, landslide, (dry) mass movement, storm, and volcanic eruption). Each regression includes controls for age and its square, biological sex, latitude, longitude, a dummy for 2018, a dummy for not being born in the studied period of disaster, and country fixed effects. S.D. stands for standard deviation and denotes the standard deviation in the frequency of any natural disasters in a region of respondent's residence.

Figure 5. Results with leaving one country out of the sample at a time



Source: Authors' construction. Notes: The figure shows the estimated effects of experiencing any natural disaster [0, 5) years ago on IPV acceptance with their 95% confidence intervals, based on the estimation leaving one country out of the sample at a time. The baseline model is from Table 2, column 1. The results are for experiencing any type of natural disaster (extreme temperature, drought, earthquake, flood, landslide, (dry) mass movement, storm, and volcanic eruption). Each regression includes controls for age and its square, biological sex, latitude, longitude, a dummy for 2018, a dummy for not being born in the studied period of disaster, and country fixed effects.

Figure 6. Distribution of the estimated effect of placebo natural disasters on IPV acceptance



Source: Authors' construction. Notes: The figure shows the estimated effects of placebo natural disasters on IPV acceptance based on 1,000 simulations, assigning respondents to locations where no actual disaster happened. The dashed line corresponds to the effect of natural disasters measured as a dummy (column 4 in Table 5). The results are for experiencing any type of natural disaster (extreme temperature, drought, earthquake, flood, landslide, (dry) mass movement, storm, and volcanic eruption). Each regression includes controls for age and its square, biological sex, latitude, longitude, a dummy for 2018, a dummy for not being born in the studied period of disaster, and country fixed effects.

TABLES

Table 1: Descriptive statistics

Variable	Description	Obs	Mean	Std. Dev.	Min	Max
Dependent variables						
Wife beating justified	Please tell me whether you think the following action can always be justified, never be justified, or something in between: For a man to beat his wife. 1= never justifiable, 10=always justifiable	49,794	1.801	1.808	1	10
Child beating justified	Please tell me whether you think the following action can always be justified, never be justified, or something in between: Parents beating children. 1= never justifiable, 10=always justifiable	49,643	2.753	2.465	1	10
Explanatory variables						
Natural disasters of any type						
Disaster [0 to 5) years ago	=1 if a disaster of any type happened in the respondent's region of residence 0 to 4 years before the survey, and 0 otherwise	49,794	0.717	0.451	0	1
Disaster [5 to 10) years ago	=1 if a disaster of any type happened in the respondent's region of residence 5 to 9 years before the survey, and 0 otherwise	49,794	0.742	0.437	0	1
Disaster [10 to 15) years ago	=1 if a disaster of any type happened in the respondent's region of residence 10 to 14 years before the survey, and 0 otherwise	49,794	0.729	0.444	0	1
Disaster [15 to 20) years ago	=1 if a disaster of any type happened in the respondent's region of residence 15 to 19 years before the survey, and 0 otherwise	49,794	0.752	0.432	0	1
Disaster [20 to 25) years ago	=1 if a disaster of any type happened in the respondent's region of residence 20 to 24 years before the survey, and 0 otherwise	49,794	0.717	0.451	0	1
Disaster 25 or more years ago	=1 if a disaster of any type happened in the respondent's region of residence 25 or more years before the survey, and 0 otherwise	49,794	0.550	0.497	0	1
Disaster (dummy)	=1 if a disaster of any type happened in the respondent's region of residence any time in the respondent's life	49,794	0.887	0.317	0	1
Socio-demographic characteristics						
Age	Respondent's age in years	49,794	42.824	16.086	17	100
Female	=1 if a respondent is a woman, and 0 if a respondent is a man	49,794	0.523	0.499	0	1
Mechanisms						
Subjective health	All in all, how would you describe your state of health these days? 1=very poor, 5=very good	49,717	3.820	0.850	1	5

Alcohol in the neighborhood	How frequently do the following things occur in your neighborhood? Alcohol consumption in the streets. 1=not at all frequently, 4=very frequently	46,173	2.148	1.018	1	4
Trust in family	Could you tell me for each whether you trust people from this group completely, somewhat, not very much or not at all? Your family. 1=do not trust at all, 4=trust completely	49,717	3.713	0.583	1	4
Worry about losing a job	To what degree are you worried about the following situations? Losing my job or not finding a job. 1=not at all, 4=very much	47,914	2.850	1.090	1	4
Worry of not being able to afford children's education	To what degree are you worried about the following situations? Not being able to give my children a good education. 1=not at all, 4=very much	46,716	2.970	1.094	1	4
Employed or self-employed (respondent)	=1 is a respondent is employed full-time, part-time, or self-employed, and 0 otherwise	49,169	0.594	0.491	0	1
Employed or self-employed (spouse)	=1 is a respondent's spouse is employed full time, part-time, or self-employed, and 0 otherwise	31,187	0.661	0.473	0	1
Self-assessed income	We would like to know in what group your household is. Please, specify the appropriate number, counting all wages, salaries, pensions and other incomes that come in. 1=the lowest income group, 10=the highest income group	48,634	4.768	2.030	1	10
Problem if a woman earns more than her husband	How would you feel about the following statement? If a woman earns more money than her husband, it's almost certain to cause problems. 1=disagree strongly, 5=strongly agree.	49,136	2.945	1.165	1	5
Children suffer if a mother works	How would you feel about the following statement? When a mother works for pay, the children suffer. 1=disagree strongly, 5=strongly agree.	49,094	2.504	0.907	1	4
Men have more right to a job when jobs are scarce	How would you feel about the following statement? When jobs are scarce, men should have more right to a job than women. 1=disagree strongly, 5=strongly agree.	49,500	3.012	1.307	1	5

Source: Authors' construction based on the WVS and GDIS matched sample.

Table 2: Natural disasters and IPV acceptance

	Wife beating justified (1=Never justifiable, 10=Always justifiable)		
	Whole sample	Women	Men
Disaster [0 to 5) years ago	0.292***	0.237***	0.353***
	(0.076)	(0.082)	(0.092)
Disaster [5 to 10) years ago	0.043	0.046	0.044
	(0.084)	(0.088)	(0.097)
Disaster [10 to 15) years ago	0.179**	0.185**	0.173*
	(0.081)	(0.084)	(0.099)
Disaster [15 to 20) years ago	-0.133	-0.083	-0.194**
	(0.085)	(0.093)	(0.094)
Disaster [20 to 25) years ago	-0.124**	-0.116*	-0.132**
	(0.055)	(0.061)	(0.067)
Disaster 25 or more years ago	-0.042	-0.111**	0.036
	(0.049)	(0.051)	(0.064)
Observations	49,794	26,032	23,762
R-squared	0.074	0.068	0.080

Notes: The table shows the results for any type of natural disaster (extreme temperature, drought, earthquake, flood, landslide, (dry) mass movement, storm, and volcanic eruption). OLS results are reported. *** p<0.01, ** p<0.05, * p<0.1. Robust standard errors clustered at the region level are in parentheses. Each regression includes controls for age and its square, biological sex, latitude, longitude, a dummy for 2018, a dummy for not being born in the studied period of disaster, and country fixed effects.

Table 3a: Heterogeneity by continent

	Baseline from Table 2	Asia	Africa	North America	South America	Europe	Australia
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Disaster [0 to 5) years ago	0.292***	0.230	0.602***	0.285***	0.139	0.321*	0.040
	(0.076)	(0.170)	(0.202)	(0.088)	(0.099)	(0.164)	(0.047)
Disaster [5 to 10) years ago	0.043	0.104	0.017	0.126**	0.068	-0.212	-0.615***
	(0.084)	(0.135)	(0.190)	(0.051)	(0.141)	(0.191)	(0.122)
Disaster [10 to 15) years ago	0.179**	0.335***	0.190	-0.924***	-0.029	0.166	0.977*
	(0.081)	(0.128)	(0.183)	(0.164)	(0.150)	(0.163)	(0.440)
Disaster [15 to 20) years ago	-0.133	0.139	-0.401**	0.377	0.115	-0.123	0.283*
	(0.085)	(0.174)	(0.180)	(0.235)	(0.130)	(0.195)	(0.141)
Disaster [20 to 25) years ago	-0.124**	-0.069	-0.148	0.360**	-0.123	-0.241*	-1.209**
	(0.055)	(0.098)	(0.160)	(0.175)	(0.080)	(0.131)	(0.473)
Disaster 25 or more years ago	-0.042	-0.102	-0.416*	-0.055	-0.074	0.040	0.273
	(0.049)	(0.078)	(0.246)	(0.131)	(0.077)	(0.127)	(0.154)
Observations	49,794	20,229	2,426	2,570	12,725	7,681	1,763
R-squared	0.074	0.062	0.089	0.024	0.032	0.150	0.012

Notes: The table shows the results for any type of natural disaster (extreme temperature, drought, earthquake, flood, landslide, (dry) mass movement, storm, and volcanic eruption). OLS results are reported. *** p<0.01, ** p<0.05, * p<0.1. Robust standard errors clustered at the region level are in parentheses. Each regression includes controls for age and its square, biological sex, latitude, longitude, a dummy for 2018, a dummy for not being born in the studied period of disaster, and country fixed effects.

Table 3b: Heterogeneity by socioeconomic characteristics

	Baseline from Table 2	17-20 y.o.	21-40 y.o.	41-60 y.o.	More than 61 y.o.	Low education	High education	Low income	High income
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Disaster [0 to 5) years ago	0.292***	0.169	0.287***	0.338***	0.314***	0.334***	0.207**	0.244***	0.261***
	(0.076)	(0.143)	(0.089)	(0.093)	(0.083)	(0.079)	(0.102)	(0.073)	(0.092)
Disaster [5 to 10) years ago	0.043	0.001	0.014	0.017	0.212**	0.025	0.040	0.117	-0.105
	(0.084)	(0.202)	(0.098)	(0.104)	(0.105)	(0.091)	(0.103)	(0.086)	(0.109)
Disaster [10 to 15) years ago	0.179**	0.098	0.266***	0.140	0.125	0.144	0.256**	0.196**	0.136
	(0.081)	(0.186)	(0.094)	(0.101)	(0.105)	(0.090)	(0.103)	(0.078)	(0.114)
Disaster [15 to 20) years ago	-0.133	-0.104	-0.152	-0.025	-0.165	-0.098	-0.194*	-0.155*	-0.023
	(0.085)	(0.157)	(0.102)	(0.107)	(0.113)	(0.090)	(0.107)	(0.086)	(0.120)
Disaster [20 to 25) years ago	-0.124**	-	-0.135*	-0.222***	-0.188**	-0.072	-0.230***	-0.074	-0.223***
	(0.055)		(0.072)	(0.082)	(0.087)	(0.060)	(0.083)	(0.061)	(0.073)
Disaster 25 or more years ago	-0.042	-	-0.082	-0.021	-0.088	-0.067	0.028	-0.109**	0.047
	(0.049)		(0.058)	(0.089)	(0.076)	(0.053)	(0.058)	(0.051)	(0.063)
Observations	49,794	3,044	21,512	17,299	7,939	35,375	14,086	31,669	16,965
R-squared	0.074	0.079	0.074	0.079	0.078	0.072	0.097	0.082	0.065

Notes: The table shows the results for any type of natural disaster (extreme temperature, drought, earthquake, flood, landslide, (dry) mass movement, storm, and volcanic eruption). OLS results are reported. *** p<0.01, ** p<0.05, * p<0.1. Robust standard errors clustered at the region level are in parentheses. Each regression includes controls for age and its square, biological sex, latitude, longitude, a dummy for 2018, a dummy for not being born in the studied period of disaster, and country fixed effects.

Table 4: Robustness checks related to migration issues

	Baseline from Table 2	Excluding international migrants	Countries with a high displacement rate due to disasters	Countries with a low displacement rate due to disasters	High-income individuals	Low-income individuals	Excluding those who do not feel close to their village/town/city	Excluding those who do not feel close to their county / region / district
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Disaster [0 to 5) years ago	0.292***	0.287***	0.301***	0.284***	0.261***	0.244***	0.310***	0.346***
	(0.076)	(0.075)	(0.107)	(0.105)	(0.092)	(0.073)	(0.078)	(0.080)
Disaster [5 to 10) years ago	0.043	0.050	0.065	0.020	-0.105	0.117	0.029	0.052
	(0.084)	(0.085)	(0.120)	(0.114)	(0.109)	(0.086)	(0.090)	(0.090)
Disaster [10 to 15) years ago	0.179**	0.180**	0.236**	0.119	0.136	0.196**	0.221***	0.197**
	(0.081)	(0.082)	(0.114)	(0.118)	(0.114)	(0.078)	(0.085)	(0.082)
Disaster [15 to 20) years ago	-0.133	-0.132	-0.098	-0.163	-0.023	-0.155*	-0.169*	-0.208**
	(0.085)	(0.086)	(0.136)	(0.109)	(0.120)	(0.086)	(0.089)	(0.087)
Disaster [20 to 25) years ago	-0.124**	-0.123**	-0.084	-0.177**	-0.223***	-0.074	-0.153***	-0.164***
	(0.055)	(0.056)	(0.071)	(0.083)	(0.073)	(0.061)	(0.056)	(0.056)
Disaster 25 or more years ago	-0.042	-0.046	-0.088	-0.023	0.047	-0.109**	-0.041	0.010
	(0.049)	(0.049)	(0.064)	(0.071)	(0.063)	(0.051)	(0.049)	(0.053)
Observations	49,794	47,094	28,133	21,661	16,965	31,669	43,252	38,628
R-squared	0.074	0.074	0.077	0.067	0.065	0.082	0.076	0.077

Notes: The table shows the results for any type of natural disaster (extreme temperature, drought, earthquake, flood, landslide, (dry) mass movement, storm, and volcanic eruption). OLS results are reported. *** p<0.01, ** p<0.05, * p<0.1. Robust standard errors clustered at the region level are in parentheses. Each regression includes controls for age and its square, biological sex, latitude, longitude, a dummy for 2018, a dummy for not being born in the studied period of disaster, and country fixed effects.

Table 5: Additional robustness checks

	Baseline from Table 2	Wife beating justified (0=Not justifiable, 1=Justifiable)	Child beating justified (1=Never justifiable, 10=Always justifiable)	With a dummy for disasters	Collapsing the model at 5 years	Collapsing the model at 10 years	Collapsing the model at 15 years	Collapsing the model at 20 years	With disasters' frequency
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Disaster [0 to 5) years ago	0.292***	0.062***	0.192**		0.269***	0.260***	0.274***	0.281***	0.335***
	(0.076)	(0.020)	(0.088)		(0.074)	(0.074)	(0.075)	(0.075)	(0.078)
Disaster [5 to 10) years ago	0.043	0.037*	-0.021			0.061	0.062	0.054	0.090
	(0.084)	(0.021)	(0.094)			(0.078)	(0.082)	(0.084)	(0.088)
Disaster [10 to 15) years ago	0.179**	0.057***	0.171*				0.126	0.158*	0.245***
	(0.081)	(0.020)	(0.088)				(0.077)	(0.081)	(0.088)
Disaster [15 to 20) years ago	-0.133	-0.055***	0.003					-0.144*	-0.077
	(0.085)	(0.021)	(0.094)					(0.085)	(0.089)
Disaster [20 to 25) years ago	-0.124**	-0.042***	-0.289***						-0.094*
	(0.055)	(0.015)	(0.060)						(0.056)
Disaster 25 or more years ago	-0.042	-0.018	-0.005						-0.012
	(0.049)	(0.012)	(0.054)						(0.050)
Disaster (dummy)				0.153**					
				(0.071)					
Disaster 5 or more years ago					-0.033				
					(0.077)				
Disaster 10 or more years ago						-0.056			
						(0.073)			
Disaster 15 or more years ago							-0.202**		
							(0.078)		
Disaster 20 or more years ago								-0.101*	
								(0.053)	
Disasters' frequency									-0.081**
									(0.035)
Observations	49,794	49,794	49,803	49,794	49,794	49,794	49,794	49,794	49,794
R-squared	0.074	0.109	0.157	0.071	0.073	0.073	0.074	0.074	0.075

Notes: The table shows the results for any type of natural disaster (extreme temperature, drought, earthquake, flood, landslide, (dry) mass movement, storm, and volcanic eruption). OLS results are reported. *** p<0.01, ** p<0.05, * p<0.1. Robust standard errors clustered at the region level are in parentheses. Each regression includes controls for age and its square, biological sex, latitude, longitude, a dummy for 2018, and country fixed effects.

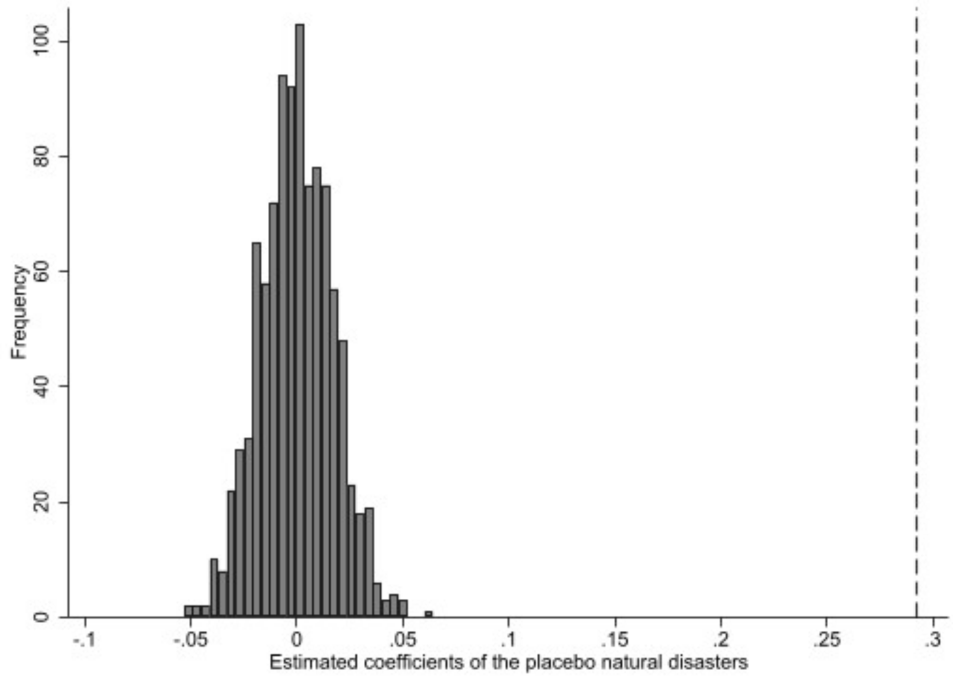
Table 6: Mechanisms

	Hypothesis 2a			*Hypothesis 2b*					*Hypothesis 2c*		
	Subjective health	Alcohol in the neighborhood	Trust in family	Worry about losing a job	Worry of not being able to afford children's education	Employed or self-employed (respondent)	Employed or self-employed (spouse)	Self-assessed income	A problem if a woman earns more than her husband	Children suffer if a mother works	Men have more right to jobs when jobs are scarce
Disaster [0 to 5) years ago	-0.050**	0.024	-0.029*	0.060*	0.065	-0.012	-0.012	-0.054	-0.035	-0.054	0.032
	(0.024)	(0.043)	(0.016)	(0.036)	(0.041)	(0.012)	(0.012)	(0.069)	(0.036)	(0.037)	(0.038)
Disaster [5 to 10) years ago	-0.016	-0.088*	0.032	0.094**	0.054	-0.006	-0.012	-0.055	0.076*	0.057*	0.007
	(0.027)	(0.053)	(0.020)	(0.040)	(0.045)	(0.014)	(0.016)	(0.090)	(0.039)	(0.034)	(0.042)
Disaster [10 to 15) years ago	0.041	-0.029	-0.010	-0.066*	-0.065	-0.006	-0.016	-0.113	-0.070*	0.028	0.017
	(0.031)	(0.048)	(0.020)	(0.039)	(0.042)	(0.014)	(0.016)	(0.098)	(0.039)	(0.038)	(0.046)
Disaster [15 to 20) years ago	0.017	0.096**	-0.021	-0.040	-0.065	0.010	0.029*	0.253***	0.029	-0.010	-0.046
	(0.029)	(0.047)	(0.019)	(0.038)	(0.042)	(0.015)	(0.015)	(0.087)	(0.034)	(0.033)	(0.044)
Disaster [20 to 25) years ago	-0.003	0.009	0.013	0.048*	0.050*	0.018	0.001	-0.075	-0.015	0.016	-0.055
	(0.017)	(0.033)	(0.013)	(0.026)	(0.029)	(0.011)	(0.011)	(0.063)	(0.025)	(0.022)	(0.035)
Disaster 25 or more years ago	0.033**	-0.047*	0.009	-0.037	0.036	0.019**	0.005	0.032	0.032	0.001	0.052**
	(0.016)	(0.026)	(0.010)	(0.024)	(0.025)	(0.009)	(0.011)	(0.047)	(0.023)	(0.019)	(0.024)
Observations	49,717	46,173	49,717	47,914	46,716	49,169	31,187	48,634	49,136	49,094	49,500
R-squared	0.100	0.171	0.075	0.195	0.244	0.251	0.280	0.065	0.149	0.177	0.338

Notes: The table shows the results for any type of natural disaster (extreme temperature, drought, earthquake, flood, landslide, (dry) mass movement, storm, and volcanic eruption). OLS results are reported. *** p<0.01, ** p<0.05, * p<0.1. Robust standard errors clustered at the region level are in parentheses. Each regression includes controls for age and its square, biological sex, latitude, longitude, a dummy for 2018, a dummy for not being born in the studied period of disaster, and country fixed effects. See Table 1 for variable definitions.

APPENDIX

Figure A1. Distribution of the estimated effect of placebo natural disasters [0-5) years ago on IPV acceptance



Source: Authors' construction. Notes: The figure shows the estimated effects of placebo natural disasters [0-5) years ago on IPV acceptance based on 1,000 simulations, assigning respondents to locations where no actual disaster happened. The dashed line corresponds to the baseline effect of natural disasters (column 1 in Table 2). The results are for experiencing any type of natural disaster (extreme temperature, drought, earthquake, flood, landslide, (dry) mass movement, storm, and volcanic eruption). Each regression includes controls for age and its square, biological sex, latitude, longitude, a dummy for 2018, a dummy for not being born in the studied period of disaster, and country fixed effects.

Table A1: Natural disasters and IPV acceptance, ordered probit results (coefficients)

	Wife beating justified (1=Never justifiable, 10=Always justifiable)
Disaster [0 to 5) years ago	0.205***
	(0.055)
Disaster [5 to 10) years ago	0.063
	(0.053)
Disaster [10 to 15) years ago	0.143**
	(0.055)
Disaster [15 to 20) years ago	-0.101*
	(0.056)
Disaster [20 to 25) years ago	-0.114***
	(0.042)
Disaster 25 or more years ago	-0.052
	(0.036)
Observations	49,794
Pseudo R-squared	0.050

Notes: The table shows the results for any type of natural disaster (extreme temperature, drought, earthquake, flood, landslide, (dry) mass movement, storm, and volcanic eruption). OLS results are reported. *** p<0.01, ** p<0.05, * p<0.1. Robust standard errors clustered at the region level are in parentheses. Each regression includes controls for age and its square, biological sex, latitude, longitude, a dummy for 2018, a dummy for not being born in the studied period of disaster, and country fixed effects.

Table A2: Natural disasters and IPV acceptance, OLS, full regression results

	Wife beating justified (1=Never justifiable, 10=Always justifiable)		
	Whole sample	Women	Men
Disaster [0 to 5) years ago	0.292***	0.237***	0.353***
	(0.076)	(0.082)	(0.092)
Disaster [5 to 10) years ago	0.043	0.046	0.044
	(0.084)	(0.088)	(0.097)
Disaster [10 to 15) years ago	0.179**	0.185**	0.173*
	(0.081)	(0.084)	(0.099)
Disaster [15 to 20) years ago	-0.133	-0.083	-0.194**
	(0.085)	(0.093)	(0.094)
Disaster [20 to 25) years ago	-0.124**	-0.116*	-0.132**
	(0.055)	(0.061)	(0.067)
Disaster 25 or more years ago	-0.042	-0.111**	0.036
	(0.049)	(0.051)	(0.064)
Not born in the studied period of disaster	-0.052	-0.012	-0.092
	(0.058)	(0.076)	(0.082)
Age	-0.001	0.002	-0.003
	(0.004)	(0.005)	(0.006)
Age-squared	-0.000	-0.000	-0.000
	(0.000)	(0.000)	(0.000)
Biological sex	-0.172***	-	-
	(0.025)		
Latitude	-0.007	-0.006	-0.009
	(0.005)	(0.005)	(0.006)
Longitude	0.001	0.001	0.001
	(0.001)	(0.001)	(0.001)
Dummy for 2018	0.000	-0.011	0.011
	(0.111)	(0.123)	(0.141)
Constant	1.692***	1.469***	1.750***
	(0.221)	(0.238)	(0.274)
Country fixed effects	yes	yes	yes
Observations	49,794	26,032	23,762
R-squared	0.074	0.068	0.080

Notes: The table shows the results for any type of natural disaster (extreme temperature, drought, earthquake, flood, landslide, (dry) mass movement, storm, and volcanic eruption). OLS results are reported. *** p<0.01, ** p<0.05, * p<0.1. Robust standard errors clustered at the region level are in parentheses.

Table A3. Natural disasters and IPV acceptance of high- and low-income individuals in regions with high and low frequency of disasters

	Baseline from Table 2	High-income individuals	Low-income individuals	High frequency of disasters	Low frequency of disasters	High frequency of disasters & high income	High frequency of disasters & low income	Low frequency of disasters & high income	Low frequency of disasters & low income
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Disaster [0 to 5) years ago	0.292***	0.261***	0.244***	0.432***	0.368***	0.663*	0.352***	0.308***	0.319***
	(0.076)	(0.092)	(0.073)	(0.142)	(0.088)	(0.379)	(0.100)	(0.105)	(0.086)
Disaster [5 to 10) years ago	0.043	-0.105	0.117	0.191	0.061	0.687***	0.040	-0.136	0.148
	(0.084)	(0.109)	(0.086)	(0.183)	(0.095)	(0.121)	(0.237)	(0.124)	(0.097)
Disaster [10 to 15) years ago	0.179**	0.136	0.196**	-	0.199**	-	-	0.186	0.211***
	(0.081)	(0.114)	(0.078)		(0.083)			(0.120)	(0.080)
Disaster [15 to 20) years ago	-0.133	-0.023	-0.155*	-0.820	-0.146	0.623	-1.346*	-0.030	-0.159*
	(0.085)	(0.120)	(0.086)	(0.896)	(0.090)	(0.416)	(0.803)	(0.130)	(0.090)
Disaster [20 to 25) years ago	-0.124**	-0.223***	-0.074	0.063	-0.155**	0.087	0.051	-0.329***	-0.068
	(0.055)	(0.073)	(0.061)	(0.083)	(0.074)	(0.122)	(0.090)	(0.099)	(0.081)
Disaster 25 or more years ago	-0.042	0.047	-0.109**	-0.095*	-0.053	-0.017	-0.148**	0.083	-0.134**
	(0.049)	(0.063)	(0.051)	(0.057)	(0.068)	(0.080)	(0.064)	(0.095)	(0.068)
Observations	49,794	16,965	31,669	25,289	24,505	8,744	16,040	8,221	15,629
R-squared	0.074	0.065	0.082	0.047	0.094	0.047	0.058	0.087	0.097

Notes: The table shows the results for any type of natural disaster (extreme temperature, drought, earthquake, flood, landslide, (dry) mass movement, storm, and volcanic eruption). OLS results are reported. *** p<0.01, ** p<0.05, * p<0.1. Robust standard errors clustered at the region level are in parentheses. Each regression includes controls for age and its square, biological sex, latitude, longitude, a dummy for 2018, a dummy for not being born in the studied period of disaster, and country fixed effects. The frequency of disasters is calculated based on the number of disasters that occurred in a region over the period 1960-2018. The region is defined as having a high frequency of disasters if the number of disasters there is above the mean frequency. "Disaster [10 to 15) years ago" is omitted in columns 4, 6, and 7 because of the low number of observations with high frequency of disasters in that period.