

In the Aftermath of Earth, Wind, and Fire: Natural Disasters and Respect for Women’s Rights

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Abstract Though much research has been devoted to a range of socioeconomic and political consequences of natural disasters, little is known about the possible gendered effects of disasters beyond the well-documented immediate effects on women’s physical well-being. This paper explores the extent to which natural disasters affect women’s economic and political rights in disaster-hit countries. We postulate that natural disasters are likely to contribute to the rise of systematic gendered discrimination by impairing state capacity for rights protection as well as instigating economic and political instability conducive to women’s rights violations. To substantiate the theoretical claims, we combine data on women’s economic and political rights with data on nine different natural disaster events—droughts, earthquakes, epidemics, extreme temperatures, floods, slides, volcanic eruptions, windstorms, and wildfires. Results from the data analysis for the years 1990–2011 suggest that natural disasters have a detrimental effect on the level of respect for both women’s economic and political rights. One major policy implication of our findings is that disasters could be detrimental to women’s status beyond the immediate effects on their personal livelihoods, and thus, policymakers, relief organizations, and donors should develop strategies to prevent gendered discrimination in the economy and political sphere in the affected countries.

Keywords Women’s rights · Gendered discrimination · Natural disasters · Human rights

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Introduction

Natural disasters are pervasive events that severely affect civilian livelihoods.¹ There were on average 388 natural disasters per year between 2003 and 2013. These events were responsible for an average of over 100,000 deaths each year, and the estimated economic losses for the period amount to an average of over \$156 billion annually (Guha-Sapir et al. 2013). As climate change is predicted to result in more frequent and intense natural disasters (IPCC 2014), these destructive events are likely to remain a major concern for policymakers and citizens in the foreseeable future. Given the frequency and scale of natural disasters, a great deal of academic and policy research has been devoted to their possible effects on disaster-hit countries.

Though disasters stemming from environmental processes have a wide range of negative impacts on the affected societies, one strand of the literature suggests that these effects are not gender-neutral and women are disproportionately affected by disaster events along with other marginalized groups (Bradshaw 2015). The suggested gendered vulnerabilities are connected to larger patterns of discriminatory cultural practices and women's limited access to education, economic resources, and political decision-making mechanisms. Existing gender-focused studies specifically concentrate on how nature-induced disasters might lead to an increase in women's mortality rates, food insecurity, physical abuse, increased workload, and loss of economic opportunity in the aftermath of disasters (e.g., Neumayer and Plumper 2007; David and Enarson 2012; Enarson 1998, 2012; Enarson and Morrow 1998; Enarson and Meyreles 2004; Fisher 2010; Fordham 1998; Reid 2013; Rivers 1982; Ross 2012; Seager 2006; Sultana 2010; True 2012).

One potential shortcoming of the gender-specific literature is its narrow focus on the immediate effects of natural shocks on women's physical well-being (Enarson and Meyreles 2004; Enarson 2012; Oxfam 2010). The key contribution of this study is to broaden the current understanding of the gendered consequences of natural disasters by examining the extent to which these cataclysmic events affect the level of respect for women's economic and political rights. We illustrate that the possible adverse effects of disasters could go beyond the short-term cost to women's physical well-being and security.

We conceptualize women's rights as the extent to which women are able to exercise and enjoy the objectives of economic and political rights that are codified in a large body of international human rights law. This conceptualization includes the government's ability to enforce rules and norms in the society as well as other government-citizen interactions. Specifically, with a focus on government-citizen interactions and the government's ability and willingness to enforce basic rights and freedoms in society, we explore to what extent natural disasters significantly affect the treatment of women in the economy and political sphere, controlling for other covariates of

¹ Throughout the manuscript, we define natural disasters as nature-induced cataclysmic events that often result in major human suffering and large-scale economic or infrastructure damage. Hence, natural hazards turn into natural disasters when they destroy human lives and livelihoods. We use the term "natural" to be consistent with the literature. When we use the term "natural," we do not intend to disregard or downgrade the significant levels of human agency and responsibility, which influence how these events are experienced. We recognize that vulnerability to natural disasters is directly related to social, economic, and political factors (Blaikie et al. 1994). We specifically focus on the following major disaster events: droughts, earthquakes, epidemics, extreme temperatures, floods, slides, volcanic eruptions, windstorms, and wildfires.

women's rights violations such as poverty, political oppression, civil wars, and demographic factors.

Our study also speaks to the broader cross-national literature on the consequences of natural disasters. Studies show that natural disasters are likely to trigger political instability and violent conflicts (Drury and Olson 1998; Olson and Drury 1997; Le Billon and Waizenegger 2007; Brancati 2007; Nel and Righarts 2008), increase terror incidents (Berrebi and Ostwald 2011), increase state corruption (Yamamura 2014), and induce more state repression (Wood and Wright 2015). Others have expanded this line of research examining the extent to which disasters affect the macroeconomic performance of disaster-hit countries (Noy 2009; Neumayer et al. 2014), democratization (Ahlerup 2013; Fair et al. 2014), and public perception of the state (Carlin et al. 2014; Chamlee-Wright and Storr 2010; Cole et al. 2012; Gasper and Reeves 2011).

Research has also focused on possible effects of government actions before and during disasters, including links between government actions and mortality and vulnerability to disasters (Escaleras et al. 2007; Keefer et al. 2011; Lin 2015). Because of its broad-based approach with almost no reference to disadvantaged groups, this literature overlooks the possible impact of disasters on marginalized groups. Our study is complementary to both this literature and the gender-focused natural disaster work, providing a thorough cross-national assessment of how disasters might instigate more discrimination against one of the globally disadvantaged groups, women. Our study therefore acts as a bridge connecting two strands of the literature on the consequences of disasters.

The rest of the paper is organized as follows. In the following section, we present our theoretical framework explaining how natural disasters might contribute to the rise of systematic gendered economic and political discrimination. Next, we discuss the data and model specifications and report the findings from the data analysis. We conclude with a discussion of the research and policy-making implications of the findings.

Political Economy of Natural Disasters and Women's Rights

Natural disasters are unexpected shocks to states and their inhabitants that have a wide range of negative impacts such as death, infrastructure damage, livelihood insecurity, depletion of public resources, economic disruption, and political uncertainty (e.g., Benson and Clay 2004; Blaikie et al. 1994; Brancati 2007; Kahn 2005; Nel and Righarts 2008; Pelling 2003). In this section, we build our theoretical framework linking three major adverse effects of disaster events—economic stagnation, weakened state capacity, and political instability—with the level of respect for women's rights in disaster-struck countries. We specifically assert that adverse macroeconomic conditions coupled with weakened state capacity in the aftermath of disasters decrease the level of respect for women's economic rights. We also maintain that heightened political instability and repression in the wake of disasters create conditions conducive to higher levels of women's political rights violations.

Disasters and Women's Economic Rights

Natural disasters might adversely affect the regular functioning of affected economies, especially in the short term, by disrupting economic production and interrupting trade

and investment (Cavallo et al. 2013; Fomby et al. 2009; Hochrainer 2009; Loayza et al. 2009; Noy 2009). The adverse economic conditions in turn create conditions conducive to more gendered economic discrimination in disaster-hit countries. Women in many societies are regarded as providing supplemental income for their families rather than being independent economic actors. Men, on the other hand, are typically perceived as the main economic contributor to their families. The “male breadwinner bias” suggests that women are often passed over for, or encouraged to give up jobs to make way for men seeking employment (Beneria 2003; Elson and Çağatay 2000). These expectations mean that adverse economic conditions in the aftermath of disasters might increase the extent of women’s economic rights violations (Enarson and Fordham 2001; David and Enarson 2012; Peek and Fothergill 2008).

Women might be particularly susceptible to systematic discrimination in hiring, promotion, and pay practices during the economic downturn associated with the postdisaster period. For example, research on the impacts of Hurricane Mitch in 1998 found that large numbers of women in disaster-hit Nicaraguan communities who had male spouses were forced to return to the home rather than remaining in formal employment (Bradshaw 2004). Similarly, after Hurricanes Katrina and Rita in the USA, women frequently faced arbitrary firing and other discriminatory practices in the affected regions. As such, women’s jobs accounted for 103,000 out of the 180,000 lost in the aftermath of the storms. Women’s earnings declined by 8.2% in the 3 years following Hurricane Katrina, with the employment and income of women of color particularly hard hit following these storms (David and Enarson 2012; Enarson 2012).

Women are frequently overrepresented as part-time or informal sector workers, as well as in low-wage manual jobs (Enarson 1991, 2012, 2014). Disasters which result in infrastructure damage, migration, and/or loss of some forms of property result in women’s inability to continue employment in such informal or part-time labor as cottage industries and home-based work. Research on floods and tsunamis in India and Pakistan suggest that public and private employers were less likely to provide postdisaster compensation for workers in these categories, thus interfering with women’s right to continue in a position of gainful employment (Juran 2012). After severe 2010 floods in Pakistan, for example, women reported losing their livelihoods in agriculture, cottage industry or home-based work. More women than men said they had limited access to information about economic recovery opportunities and support from the state (UN Women 2010). Thus, it is likely that women’s right to gainful employment is negatively impacted after disasters in part due to gendered patterns of employment in some economic sectors, as well as a lack of state support for unemployed or informally employed women.

The negative economic effects of disasters not only increase the extent of gendered economic discrimination but also reduce the state’s ability to enforce women’s economic rights. The adverse conditions following disasters damage state capacity by reducing the state’s ability to collect taxes and generate other revenue to provide public goods and services. Additionally, natural disasters create pressure for states to dedicate resources to issues regarded as top priority, such as immediate disaster recovery and relief efforts (Burkle 2006). Disasters are frequently treated as simply an urgent crisis that requires infrastructure or economic development and recovery efforts (Bradshaw 2015). While this is no doubt true, this depoliticized approach to

disasters serves to both narrowly focus state resources on immediate relief efforts, as well as exclude human rights concerns from making it onto the policy-making agenda. This perception largely overlooks gendered human rights concerns beyond possibly hard to ignore issues like gender-based violence or other physical abuses, and fails to assess or address opportunities for women's equal participation in the economy and political arena.

Natural disasters, therefore, result in reduced state resources and devotion of the remaining scarce public resources to the immediate disaster recovery and relief efforts. Under these conditions, governments will be left with limited resources and lack political will to effectively enforce women's economic rights. For example, in the aftermath of Hurricane Katrina, President Bush relaxed the minimum wage laws in affected areas in the USA, which was criticized as allowing companies to violate pay standards that had been codified into law. The relaxed minimum wage laws were particularly detrimental to women who account for a significant portion of the lower paid labor force (Edsall 2005). This was regarded by the administration as a justifiable move in the context of a "national emergency" (Ross 2012).

States play a key role in human rights protection, including the recognition and enforcement of women's economic rights. They are expected to avoid rights violations and implement existing laws to prevent discrimination by private actors that often occur in the form of exploitative working conditions, arbitrary firings and layoffs, and unfair payment and promotion practices (Donnelly 2013). States are more likely to be effective in enforcing women's economic rights if they have sufficient administrative and bureaucratic capacity to establish various regulatory and enforcement bodies to reduce gendered discrimination. States are specifically in need of trained personnel and officials to carry out inspections and prosecute any systematic gendered discrimination in the economy. Yet, encountering a disaster and assigning it a higher national priority in the political agenda, and the accompanying heavy economic burden, would serve to lessen government enforcement of women's economic rights.

This proposition does not imply that government resources are spent substantially on enforcing women's rights in countries without disasters. Yet, encountering an unexpected natural shock and assigning it a higher priority would simply help governments justify the lack of government enforcement of women's rights. At the same time, there have been several studies documenting the tendency for both men and women to revert to "traditional" gender roles in the aftermath of disasters (Bradshaw 2015; Enarson and Meyreles 2004). This could result in states feeling less pressure to strongly enforce women's rights as disasters exacerbate existing inequalities that are a complex combination of cultural, social, economic, and political factors.

Our argument does not imply that only women face economic hardship and discrimination after disasters. Rather, we assert that women will be particularly susceptible to the negative impacts of disasters due to their existing marginalized status. We expect that the reduced state capacity to enforce women's rights along with the adverse economic conditions contribute to the rise of women's economic rights violations in disaster-struck countries. Based on the above discussion, we postulate that:

Hypothesis 1: Natural disasters adversely affect the level of respect for women's economic rights in the affected countries.

Disasters and Women's Political Rights

Natural disasters might also be detrimental to women's political rights. Earlier studies suggest that states might face significant political turmoil and social unrest succeeding natural disasters (Brancati 2007; Drury and Olson 1998; Nel and Righarts 2008; Olson and Drury 1997; Wood and Wright 2015). Challenges to state authority during and after disasters emerge through a few different mechanisms. First, disasters often allow the public to critically evaluate government performance in the handling of emergency operations, and even serve as a check on government legitimacy (Olson and Gawronski 2010; Pelling and Dill 2010; Poggione et al. 2012). It is also a time that can function as a focal point for perceived grievances against the state (Le Billon and Waizenegger 2007).

Further, studies suggest that disasters create conditions that trigger political protest and violence (Drury and Olson 1998; Brancati 2007; Nel and Righarts 2008) and increase domestic terror incidents (Berrebi and Ostwald 2011). For example, there were fears about social unrest to the point of government overthrow in Pakistan shortly after the 2010 flooding that resulted in thousands of deaths and millions displaced (Shah 2010; Witte 2010). Additionally, recent political unrest in Haiti has been linked at least partially to citizen frustration with a lack of government-led recovery 5 years after an earthquake which is estimated to have killed between 90,000 and 316,000 people and displaced more than 1.5 million (Jones 2015).

Existing research suggests that disaster-hit states often respond to these growing pressures by opting for repressive tactics (e.g., arbitrary detention, torture, and extrajudicial killings) against citizens in disaster-hit countries (Wood and Wright 2015). Governments might use repressive tactics because they often perceive repression as a vital tool to avoid the erosion of their authority and restore the status quo (e.g., Gartner and Regan 1996; Regan and Henderson 2002).

As the political order dissolves and state repression rises, women are more likely to experience gendered political discrimination in disaster-hit countries. First, more political instability and repression will hinder women's ability to take part in political activities such as joining political parties and forming women's rights organizations that advocate more presence of women in the political sphere. Earlier gender-focused research suggests that political instability and violence pose a major threat to women's sociopolitical status because of the persistence of both structurally unequal access to economic and political resources, and gender-based discrimination prevalent in hierarchical social settings (Enloe 2000, 2010; Sjoberg 2010; Tickner 2001; True 2012). Further, reduced state capacity along with growing political turmoil in the aftermath of disasters not only reduces the state's ability to protect women's political rights but also makes it easy for governments to justify their failure to enforce women's political rights along with other basic human rights.

We do not suggest that only women suffer during political turmoil in the wake of disasters. Rather, we claim that more political repression and instability creates a more coercive, potentially violent domestic environment in which the most disadvantaged segments of society might suffer significant costs. Women are among this category of disadvantaged in most countries. Their political rights are often under-enforced, and we maintain that this situation will worsen in periods of instability following disasters. Based on the above discussion, our second hypothesis is:

Hypothesis 2: Natural disasters adversely affect the level of respect for women's political rights in the affected countries.

Research Design

To assess the empirical relevance of the hypotheses proposed above, we put together a time-series, cross-section dataset. The cross-section component of the dataset is country, including 148 countries for which the data are available. The time component is year, encompassing the period 1990–2011, inclusive. Summary statistics for the variables discussed in detail below appear in Table 1.

Outcome Variables

To test the hypotheses on the adverse women's rights effects of natural disasters, we use data from the Cingranelli-Richards (CIRI) dataset (Cingranelli and Richards 2012). The CIRI dataset provides a comprehensive cross-national assessment of women's economic and political status. It is particularly well-suited for this study's research question: whether disasters significantly affect the level of respect for women's economic and political rights. The variables used in the analysis are *women's economic rights* and *women's political rights*. They specifically account for the extent to which governments

Table 1 Summary statistics (based on the full models in Tables 3 and 4)

Variable name	Mean	Std. dev.	Min	Max
Women's political rights	1.910	0.563	0	3
Women's economic rights	1.301	0.685	0	3
Disaster deaths (per 1000 people)	0.019	0.441	0	23.195
GDP per capita (logged)	7.815	1.612	3.913	11.124
Democracy	3.146	6.662	-10	10
CEDAW ratification (years)	12.707	8.560	0	32
Female education	44.913	10.742	6.013	69.687
Civil wars	0.167	0.373	0	1
Buddhism	0.049	0.216	0	1
Catholicism	0.273	0.445	0	1
Hinduism	0.015	0.123	0	1
Islam	0.246	0.431	0	1
Orthodoxy	0.065	0.247	0	1
Protestantism	0.039	0.195	0	1
Former S. Union/E. Europe	0.151	0.358	0	1
Latin America	0.161	0.368	0	1
Sub-Saharan Africa	0.291	0.454	0	1
Asia	0.135	0.341	0	1
N. Africa/Middle East	0.112	0.315	0	1
Western countries	0.150	0.357	0	1

recognize women's internationally recognized rights and strictly enforce them. The variables are ordinal measures ranging from 0 to 3. A score of 0 denotes that a country lacks legal mechanisms protecting gender-specific rights and women living that country face systematic gendered discrimination in a given year. A score of 3, on the other hand, indicates that a country has codified almost all of women's international recognized rights into its law and strictly enforces them and does not allow gendered discrimination in the economic and political spheres.

The economic rights included in the coding of the *women's economic rights* variable are "Equal pay for equal work; nondiscrimination by employers; equality in hiring and promotion practices; job security (maternity leave, unemployment benefits, no arbitrary firing or layoffs, etc.); free choice of profession or employment without the need to obtain a husband or male relative's consent; the right to gainful employment without the need to obtain a husband or male relative's consent; the right to be free from sexual harassment in the workplace; the right to work at night; the right to work in occupations classified as dangerous; the right to work in the military and the police force" (Cingranelli and Richards 2012, p. 77). The *women's political rights* variable assesses the degree to which women enjoy the following political rights: "The right to vote; the right to run for political office; the right to hold elected and appointed government positions; the right to join political parties; the right to petition government officials" (Cingranelli and Richards 2012, p. 71).

Explanatory Variables

The raw data on disasters are gathered from the Emergency Events Database (EM-DAT) (Guha-Sapir et al. 2014). The data were collected by the Centre for Research on the Epidemiology of Disasters (CRED). The EM-DAT is considered the most complete and the best available cross-national disaster data over a long period of time and is thus a widely used data source for scholarly research and policy work on disasters (e.g., Kahn 2005; Neumayer and Plumper 2007; Nel and Righarts 2008; Wood and Wright 2015). The data are derived from a number of sources including various United Nations agencies, NGOs, media outlets, research institutes, and insurance companies. For an event to be included in the dataset as a disaster, at least one of the following conditions needs to be met: (1) at least ten or more reported fatalities; (2) at least 100 or more people reported homeless, injured, or requiring immediate assistance and survival needs; (3) government declaration of a state of emergency; and/or (4) an appeal for international assistance.

The data analysis includes the following disaster categories stemming from natural hazards as identified by the EM-DAT: droughts, earthquakes, epidemics, extreme temperatures, floods, slides, volcanic eruptions, windstorms, and wildfires. The total number of each disaster event and disaster-related deaths in our sample appears in Table 2. Our dataset comprises 4364 different disaster episodes, which led to the deaths of over 1.7 million people during the time period of the analysis. The disaster statistics clearly indicate that natural disasters are frequent events with potentially lethal consequences for human life and livelihood.

The theoretical framework established in the preceding section suggests that disasters pose a major threat to women's rights to the extent that they exact significant socioeconomic and political costs on disaster-hit countries. To test this argument, we use the *disaster deaths* variable. It is the total number of people killed from natural

Table 2 Disaster statistics in sample (1990–2011)

	Number of events	Total disaster deaths
Droughts	313	24,272
Earthquakes	345	804,194
Epidemics	665	161,828
Ext. temperatures	292	148,569
Floods	1405	157,591
Slides	276	20,289
Volcano eruptions	87	1500
Windstorms	791	380,512
Wildfires	190	1667
Total	4364	1,700,422

disasters divided by total population size (in thousands). As suggested by earlier research (Neumayer and Plumper 2007; Berrebi and Ostwald 2011; Wood and Wright 2015), the disaster death measure is a good proxy for socioeconomic and political effects of disasters since the higher the number of people affected (e.g., injured or homeless people) in a social setting, the higher the disaster-related fatalities in most disaster cases. We use a population-adjusted measure since the magnitude of natural disasters in a very populous country might be different from a country with a relatively small population size. The EM-DAT also offers information about the number of people injured, rendered homeless, and otherwise affected. But information on disaster deaths is less arbitrary and less susceptible to reporting problems due to more publicity and attention from the media and international organizations on disaster casualties (Quarantelli 2001; Neumayer and Plumper 2007).

We include a battery of control variables to account for the major socioeconomic and political covariates of women's rights. We include the natural log of *GDP per capita* to control for the expectation that developed countries tend to have less gendered discrimination. Economic wealth might provide more social and economic opportunities for women to gain more economic empowerment and greater economic freedom to help ameliorate systematic gendered discrimination (Richards and Gelleny 2007; Drury and Peksen 2014; Detraz and Peksen 2016). The data for economic development are from the World Development Indicators database (World Bank 2014).

The model also includes a political regime variable, *democracy*, to consider a possible impact of the political environment on women's rights. Human rights scholarship tends to agree that widespread repression is less likely in democratic polities (Mitchell and McCormick 1988; Poe et al. 1999). Democratically elected leaders are less inclined to commit human rights abuses, including violations of women's rights, because they are constrained by the possibility of losing power through popular elections and a functioning checks and balances system (Peksen 2011; Murdie and Peksen 2015). The democracy measure ranges from +10 (most democratic) to -10 (most autocratic) and comes from the Polity IV dataset (Marshall et al. 2012).

We include *CEDAW years* that counts the number of years since ratification of the Convention on the Elimination of All Forms of Discrimination against Women (CEDAW). There is likely to be a positive association between the convention

ratification and government respect for women's rights (Cole 2012). To assess the role of female education, we add *female tertiary education*, which is the percentage of tertiary students who are women. Higher levels of female educational achievements might contribute to socioeconomic and political empowerment. Highly educated women are more likely to assume key roles in economic and political life that might enable them to push for high levels of respect for their economic and political rights (Murdie and Peksen 2015). The education data are from the UNESCO cross-national database on education (2013).

We control for the extent of internal armed conflicts in a given country to account for the possible adverse effects of civil conflicts on women's rights. Studies suggest that militarization of societies as a result of ongoing military conflicts instigates more gendered discrimination and undermines women's economic and political well-being (Cohn 2013; Peksen 2011). Further, hierarchical social structures and traditional biases make women particularly susceptible to any major economic damage and political instability caused by armed conflicts (Enloe 2000; Meintjes et al. 2001). *Civil conflicts* is a binary variable coded 1 if there is an ongoing armed conflict with at least 25 battle-related deaths in a given year and 0 otherwise. We gathered the conflict data from the Armed Conflict Dataset (Gleditsch et al. 2002).

We include the *time trend* variable in the model, which measures the calendar, to assess whether there is a linear trend of more or less respect for women's rights over time. Finally, we add the binary region variables to control for the possible region-specific unobserved factors affecting women's rights. The variables are *Asia-Pacific*, *Middle East-North Africa*, *Latin America-Caribbean*, *Sub-Saharan Africa*, *former Soviet Union-Eastern Europe*, and *Western countries* (reference category). Cultural differences across countries might be particularly important in assessing women's economic and political status (Poe et al. 1997; Walker and Poe 2002). To control for the impact of religious practices on the extent of gendered discrimination, we control for the following dichotomous religion variables in the model: *Buddhism*, *Catholicism*, *Hinduism*, *Islam*, *Orthodoxy* (i.e., *Orthodox Christianity*), *Protestantism*, and *Other* (reference category). The variables are coded 1 if the religion under consideration is the dominant religion (i.e., practiced and/or affiliated by more than half of the population) and 0 otherwise.

Methodological Specifications and Estimation Technique

Dependence across the categories of an outcome variable (i.e., autocorrelation) is a common statistical problem in any data arrayed as time-series cross-section (Beck and Katz 1995). Temporal dependence is also an important theoretical issue since past levels of respect for women's rights might be a strong indicator of the current treatment of women. Following Drury and Peksen (2014), we include 1-year ($t - 1$) lagged binary variables for each category of the women's rights variables to control for the autocorrelated categories of the outcome variables. Drury and Peksen (2014) note that a 1-year lagged dependent variable, which is an alternative approach to correct for autocorrelation, is less appropriate because the women's rights variables are nonlinear and hence does not include sufficient trend information for lagging. All the time variant independent variables in the models are lagged 1 year to make sure that our explanatory variables temporally precede the women's rights measures. This allows us to mitigate

any simultaneity bias and hence lessens concerns about the direction of inference. All models are predicted using ordered logit estimator because the women's rights variables are ordinal variables. We employed two diagnostic tests—correlation coefficients and variance inflation factors—to check the issue of collinearity and found no issue with multicollinearity in any of the estimations.

Data Analysis and Discussion

Table 3 reports the models analyzing the possible effect of natural disasters on the level of government respect for women's economic rights. We first run two partial models to check whether our results are robust to the inclusion or exclusion of the key socioeconomic and political covariates of women's rights discussed in the "Research Design" section. The first partial model excludes all the control variables accounting for major socioeconomic, political, and religious factors connected with women's rights. The second partial model drops only the religion dummies. The third model is a full model and includes all the control variables.

Table 3 Disasters and women's economic rights

	DV: women's economic rights		
	Model 1	Model 2	Model 3
Disaster deaths	-0.971** (0.363)	-0.896** (0.354)	-0.960** (0.357)
GDP per capita		0.300** (0.057)	0.243** (0.063)
Democracy		0.018+ (0.010)	0.015 (0.010)
CEDAW ratification		0.021** (0.008)	0.020* (0.009)
Female education		0.001 (0.006)	-0.0002 (0.006)
Civil wars		-0.239+ (0.137)	-0.232 (0.144)
Buddhism			-0.073 (0.256)
Catholicism			-0.136 (0.167)
Hinduism			-0.569+ (0.321)
Islam			-0.525** (0.178)
Orthodoxy			-0.406 (0.252)
Protestantism			0.280 (0.246)
Time trend	-0.001 (0.008)	-0.028** (0.011)	-0.014 (0.012)
Temporal correction 1	3.241** (0.197)	3.143** (0.205)	3.411** (0.210)
Temporal correction 2	6.368** (0.239)	6.117** (0.247)	6.405** (0.247)
Temporal correction 3	9.000** (0.352)	8.755** (0.362)	8.934** (0.366)
Region dummies	Yes	Yes	Yes
Observations	2949	2896	2849
Chi ²	1341.25	1307.11	1382.83
Log-pseudo likelihood	-1721.95	-1655.62	-1589.79

Robust standard errors appear in parentheses. All time variant explanatory variables are lagged 1 year ($t-1$)
 ** significant at 0.01, * significant at 0.05, + significant at 0.1

The results in the first model suggest that the severity of disasters measure has a negative and statistically significant effect on the level of government respect for women's economic rights. That is, the higher the damage natural hazards inflict on countries, the lower the extent of respect for women's economic rights. The findings in the second model indicate that the inclusion of the economic wealth, democracy, female education, CEDAW ratification, and civil war variables has no major effect on the main finding that natural disasters significantly undermine women's economic status. We find very similar results in the full model, which reveal that disasters are likely to have an adverse effect on the likelihood of respect for women's economic rights even when we account for all the major socioeconomic and political covariates of women's economic status.

Overall, the results in Table 3 lend strong support for our first hypothesis on the negative impact of natural disasters on women's economic rights. As our theoretical framework suggests, adverse macroeconomic conditions coupled with weakened state capacity in the wake of disasters are likely to undermine the level of respect for women's economic rights.

In Fig. 1, we assess the substantive effect of natural disasters on the predicted probability of respect for women's economic rights. We report the change in the predicted probability of respect for women's economic rights as the disaster deaths variable shifts from its low to high values. For statistical convenience, we only report the marginal effects for the third category (3) of the outcome measure, suggesting whether women's economic rights are strictly enforced. We restrict the disaster variable in the figure to 3 to exclude outlier cases with extremely high disaster casualties. In our sample, about 98% of disaster events have 3 or lower death counts per 1000 people.

According to the figure, when the disaster variable is altered from 0 to 0.6 (minor disaster deaths), the predicted probability of major respect for women's economic rights decreases by 37% (from 0.003 to 0.0019). The shift from 0 to 1.8 (moderate disaster

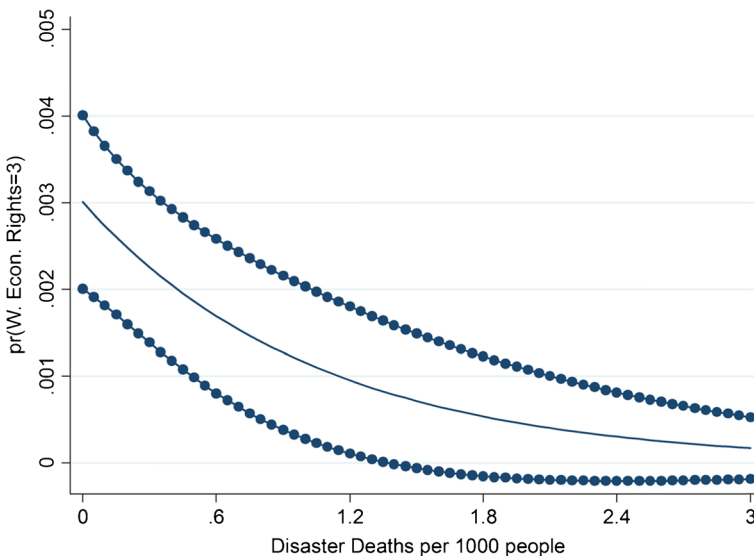


Fig. 1 Marginal effect of disasters on the predicted probability of women's economic rights

deaths), on the other hand, reduces the predicted probability of major respect for women's economic rights by 67% (from 0.003 to 0.001). When the disaster variable moves from 0 to 3 (major disaster deaths), we observe that the predicted probability of major respect for women's economic rights declines by 93% (from 0.003 to 0.0002). The size of the decline in the probability of respect for women's economic rights is an indication that the hypothesized effect of disaster events is substantively significant in affecting women's economic status.

In Table 4, we report the models estimating the possible effect of disasters on the level of respect for women's political rights. Similar to Table 3, we first predict two partial models and then a full model including all the control variables along with the disaster variable. The results across the models in Table 4 suggest that the higher the number of disasters deaths, the lower the level of respect for women's political rights. Since the main finding is consistent across the models, the inclusion or exclusion of the major socioeconomic, political, and cultural covariates of women's rights appears to have no major effect on the hypothesized negative impact of disaster events on women's political status.

Table 4 Disasters and women's political rights

	DV: women's political rights		
	Model 4	Model 5	Model 6
Disaster deaths	-0.072* (0.030)	-0.070* (0.034)	-0.084** (0.033)
GDP per capita		0.013 (0.073)	-0.036 (0.080)
Democracy		0.051** (0.014)	0.041** (0.015)
CEDAW ratification		0.019* (0.009)	0.018+ (0.010)
Female education		-0.009 (0.008)	-0.010 (0.009)
Civil wars		0.090 (0.177)	0.067 (0.187)
Buddhism			-0.296 (0.319)
Catholicism			0.166 (0.259)
Hinduism			0.033 (0.705)
Orthodoxy			-0.847** (0.204)
Islam			-0.940** (0.343)
Protestantism			1.050** (0.286)
Time trend	0.076** (0.011)	0.061** (0.013)	0.082** (0.015)
Temporal correction 1	2.182** (0.381)	2.065** (0.410)	2.740** (0.459)
Temporal correction 2	6.091** (0.439)	6.013** (0.460)	6.698** (0.520)
Temporal correction 3	10.479** (0.498)	10.445** (0.516)	10.785** (0.571)
Region dummies	Yes	Yes	Yes
Observations	2963	2910	2862
Chi ²	1143.77	1099.61	1244.41
Log-pseudo likelihood	-1067.91	-1016.28	-963.93

Robust standard errors appear in parentheses. All time variant explanatory variables are lagged 1 year ($t-1$)
 ** significant at 0.01, * significant at 0.05, + significant at 0.1

Taken as a whole, the results in Table 4 support the hypothesis that there is a negative association between natural disasters and the level of respect for women's political rights. This is because growing political turmoil and repression in the aftermath of disasters create conditions conducive to more women's political rights violations.

Figure 2 reports the marginal effect of disasters on women's political rights.

According to the figure, when the disaster deaths variable changes from 0 to 0.6 (relatively minor disaster deaths), the predicted probability of respect for women's political rights goes down by about 4% (from 0.0119 to 0.0115). When we shift the variable from 0 to 1.8 (moderate disaster deaths), we observe a significant decline, 16% (from 0.0119 to 0.010), in the predicted probability of major respect for women's political rights. When the disaster variable moves from 0 to 3 (major/severe disaster deaths), we find that the predicted probability of major respect for women's political rights declines by 24% (from 0.0119 to 0.009). These results indicate that disaster events can be particularly detrimental to women's political status especially when they inflict significant damage on disaster-hit countries.

Among the control variables in Tables 3 and 4, countries that have democratic regimes and ratified the CEDAW convention are likely to have higher levels of respect for women's economic and political rights. The binary Islam variable, on the other hand, is negatively associated with women's economic and political rights. The Christian Orthodox variable has a significant negative effect and Protestantism has a positive significant effect on women's political rights in Table 4. The GDP per capita variable shows a significant positive effect, while the Hinduism variable has a negative effect on women's economic rights in Table 3.

Robustness Checks and Sensitivity Analysis

The data analysis reported above uses a global sample to test the hypotheses. Table 5 reports additional models to examine whether our main findings are robust to the use of

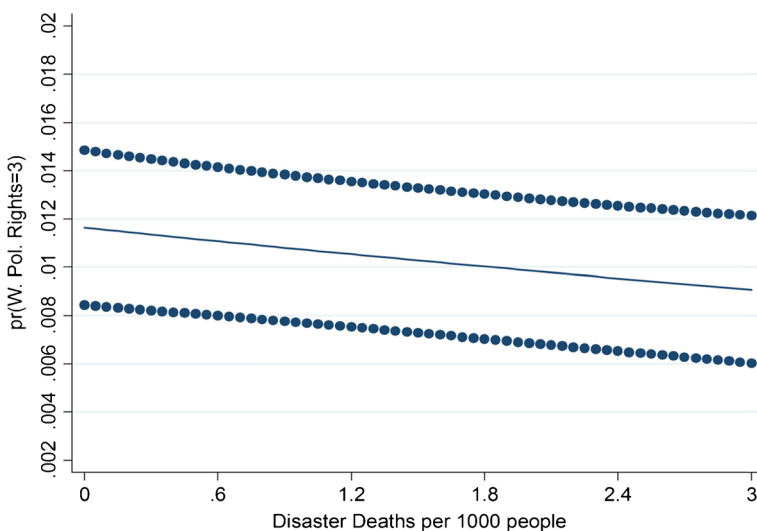


Fig. 2 Marginal effect of disasters on the predicted probability of women's political rights

Table 5 Robustness checks

	DV: women's political rights		DV: women's economic rights	
	Developing countries	Nondemocracies	Developing countries	Nondemocracies
Disaster deaths	-0.105** (0.032)	-0.152** (0.037)	-0.920** (0.363)	-1.357** (0.465)
GDP per capita	-0.091 (0.080)	-0.241** (0.097)	0.274** (0.064)	0.193* (0.081)
Democracy	0.038** (0.015)	0.044* (0.019)	0.017 (0.011)	0.012 (0.014)
CEDAW ratification	0.007 (0.012)	0.004 (0.014)	0.023* (0.011)	0.013 (0.014)
Female education	-0.012 (0.009)	-0.007 (0.010)	-0.003 (0.007)	0.001 (0.008)
Civil wars	0.138 (0.194)	0.063 (0.224)	-0.386** (0.156)	-0.429* (0.190)
Buddhism	-0.467 (0.372)	-0.668 (0.429)	0.684* (0.284)	0.712* (0.365)
Catholicism	0.398 (0.306)	1.191** (0.410)	-0.035 (0.207)	0.057 (0.372)
Hinduism	-0.400 (0.694)	-1.368 (0.848)	-0.135 (0.339)	-0.134 (0.295)
Islam	-0.979** (0.216)	-1.007** (0.246)	-0.277 (0.188)	-0.028 (0.214)
Orthodoxy	-1.153** (0.411)	-1.987** (0.540)	-0.368 (0.308)	-0.407 (0.424)
Protestantism	-1.342** (0.253)	-1.562** (0.305)	-0.078 (0.663)	-0.157 (0.742)
Time trend	0.109** (0.017)	0.120** (0.020)	-0.036** (0.014)	-0.039* (0.018)
Temporal correction 1	2.735** (0.458)	2.817** (0.464)	3.323** (0.207)	3.442** (0.237)
Temporal correction 2	6.546** (0.520)	6.448** (0.542)	6.232** (0.247)	6.495** (0.295)
Temporal correction 3	10.211** (0.595)	9.498** (0.685)	8.787** (0.594)	9.882** (0.965)
Region dummies	Yes	Yes	Yes	Yes
Observations	2390	1524	2377	1512
Chi ²	853.75	577.19	913.86	607.11
Log-pseudo likelihood	-847.09	-595.94	-1315.1	-772.29

Robust standard errors appear in parentheses. All time variant explanatory variables are lagged 1 year ($t-1$)
 ** significant at 0.01, * significant at 0.05, + significant at 0.1

alternative country samples. We first restrict the models to developing countries to assess whether the inclusion of major developed countries biases the main results. For statistical convenience, we consider Australia, Canada, Japan, the USA, New Zealand, and Western European countries as major developed countries during the time period of our analysis.

The inclusion of wealthier countries in the sample may bias the results because they tend to suffer fewer deaths and less infrastructure damage from disasters (Albala-Bertrand 1993; Kahn 2005) and have relatively higher levels of respect for women's rights (Richards and Gelleny 2007; Drury and Peksen 2014). Richer countries have the fiscal capacity to be more effective at preventing and mitigating the costs of natural shocks through effective regulation, medical care, and emergency treatment. Further, they are well-equipped to deal with disaster threats due to investments in necessary technical equipment and other technological innovations (e.g., sophisticated early warning technologies for windstorms). In the models (first and third models) estimated with the developing countries sample in Table 5, we continue to find support for the assertion that disasters are likely to worsen the level of respect for women's economic and political rights in natural disaster-hit countries.

We also run partial models that exclude liberal democracies. Following a common practice in the political science literature, we consider countries with the democracy score of 7 or higher as consolidated, liberal democratic polities on our 21-point democracy variable (−10 to 10) discussed above. We offer this robustness check to consider the possibility that our results may be driven partly by the inclusion of consolidated democratic regimes in the sample since they tend to be more effective at mitigating the effects of disaster events (Albala-Bertrand 1993; Alexander 2000; Kahn 2005) and have higher levels of respect for women's rights (Richards and Gelleny 2007; Drury and Peksen 2014).

Democratic polities might be better at mitigating the consequences of disaster shocks because democratic leaders with high public accountability are more likely to allocate public resources such as food relief, health services, and other emergency treatments to those in need. Further, democratic regimes tend to be more committed to the rule of law and thus will establish strict rules in the processes of preparation, immediate response, and quick recovery from natural shocks. It includes rules such as strictly enforcing building codes to strengthen buildings against earthquake risks and minimizing habitation in disaster risk areas such as landslide zones and flood plains. In the partial models predicted using the less democratic countries sample (second and fourth models) in Table 5, our main findings on the adverse effect of natural disasters remain unaltered, further confirming the robustness of the main results reported in Tables 3 and 4.

Finally, while we do not report it here to save space, we also ran additional models to test the lingering effects of disasters on the level of respect for women's rights. Specifically, we lagged our main explanatory variable up to 4 years to assess whether the hypothesized impact of disasters lasts following the initial year of disasters. The results suggest that disasters might continue to have some adverse effects on women's rights up to 2 years after their occurrence. We, however, find no significant effect 3 or 4 years after the onset of disasters.

Conclusions

This article explored the extent to which natural disasters affect the level of respect for women's economic and political rights in affected countries. We advanced the hypotheses that disasters might pose a major challenge to women's economic and political status through their adverse effects on state capacity and economic and political conditions in the affected countries. The data analysis lends significant support for the theoretical claims that natural disasters are detrimental to women's economic and political rights.

Existing gender-focused scholarship has mostly focused on the extent to which disaster events exacerbate women's physical well-being and security. Our study builds on this work by pushing beyond a focus on the immediate impacts on women's well-being to explore how disasters might affect the overall treatment of women in the economy and political sphere across countries. Our analysis is also complimentary to the broader cross-national literature on natural disasters. While this literature has been instrumental in highlighting a wide range of socioeconomic and political effects of disaster events, there has been very limited reference to the marginalized groups, such as women, who might disproportionately feel the impacts of disasters. Adopting a

gender-focused approach, we provide systematic evidence that disasters are likely to worsen the economic and political status of one globally disadvantaged group, women.

Our results have significant policy implications. Issues like women's rights are often considered to be low on the list of state priorities postdisaster, because the tasks of providing material relief and restoring political order and stability might take precedence (Bradshaw 2015). In other words, disasters are frequently considered to be urgent events which impact everyone equally. Our findings suggest that this is simply not the case. An approach to disaster recovery which fails to consider gendered human rights impacts will also likely fail to create opportunities for women's equal participation politically and economically. The postdisaster period could provide an opportunity to alter pre-existing inequalities; however, this will not happen if the politics of these inequalities are not understood and gendered human rights violations are not part of the response and recovery. We therefore suggest that disaster management and relief policies need to specifically include components that ensure women's legally recognized rights are protected. Failure to do so can mean that marginalized groups, including women, face multiple hardships: first the natural disaster, then gendered discrimination in its aftermath (Phillips 2012).

The international community has utilized international law to enshrine human rights norms. It is essential that states are aware of the dangers of women's rights violations in the period after disasters, and work toward removing these. Less respect for women's rights in the wake of natural disasters might not only contribute to gendered discrimination but also undermine long-term economic growth and development in disaster-struck countries given the established positive association between gender equality and economic prosperity.

While it is beyond the scope of our analysis, future research should build on our analysis that focuses on the national level outcomes by investigating the effect of disasters at local area events. Disasters are likely to have some major effects on the overall respect for human rights and freedoms, but it is likely that the impact of disasters will be felt most at the subnational level, especially in the areas where disasters occur. Country-specific studies focused on local areas would be particularly useful to explore major local level consequences of disaster events.

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