

## ORIGINAL ARTICLE

# Does government response to natural disasters explain violence? The case of the Sendero Luminoso and conflict in Peru

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## Abstract

**Objective:** We consider how the Peruvian government's responses to natural disaster events shaped political violence patterns from 1989 to 2020.

**Methods:** We gather data on government disaster response and compare the effect of positive disaster responses, such as reconstruction and regulation of domestic/international aid, and negative disaster responses, such as neglect or placing restrictions on movement near the affected areas, on violent conflict. To address the endogeneity between armed conflict and disaster responses, we estimate a structural equation model where we allow armed conflicts and disaster responses to be fully endogenous.

**Results:** Using a structural equation model at the province-year level, we show that negative disaster responses increase the risks for political violence, while positive disaster responses do not affect the risks for armed conflict. Armed conflict in turn makes negative policy responses to disasters more likely but has no effect on positive disaster responses.

**Conclusions:** The results suggest that poor government response to natural disasters can foster grievances and aid rebel recruitment, increasing the risks for armed conflicts.

Disaster response refers to the actions and policies taken after a community has been overwhelmed by the effects of a natural hazard. Disasters represent the failure of the community and local government to cope with extreme events, often due to poor planning or weak capacity (Comfort 2005; Paul 2011). As disasters are fundamentally social and political phenomena, analyzing society and politics is essential to understanding disasters (Reinhardt and Ross 2019; Tierney 2014). Natural disasters and political violence both represent types of security failures by the states, but the link between disasters and political violence

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is not always clear. Some studies find that disaster events increase the risk of violence (Brancati 2007; Nel and Righarts 2008), while others find only a weak or inconsistent relationship (Bergholt and Lujala 2012; Omelicheva 2011). We argue that government responses to natural disasters play a key role in explaining political outcomes, particularly political violence.

Government policy responses shape disaster consequences. In the face of disasters, governments can choose to evacuate vulnerable populations, reconstruct damaged homes and infrastructure, or ignore or repress the affected area. In certain cases, attitudes toward the government and officials (Darr, Cate, and Moak 2019; Lazarev et al. 2014), electoral outcomes (Gasper and Reeves 2011), and public support for the government or for anti-state movements (Vadlamannati 2011) can all be shaped by government response. To prevent grievances and poor state control from providing opportunities for mobilization, states may turn to repression (Wood and Wright 2016), further fueling grievances and triggering conflict (Gawronski and Olson 2013).

In this article, we address patterns in government response and explain how they shape political violence in the case of Peru. Peru's civil war (1980–2000) resulted in nearly 70,000 deaths and displaced at least 430,000 people (Segura 2012). Previous case studies conclude that Sendero Luminoso benefited from weak government and inept response to the 1982–1983 El Niño events and recruited more members (Katz and Levin 2016; Kingdon and Gray 2022; Puente 2017). Do disasters explain the pattern of violent events in Peru more generally? We look beyond the initial rise of Sendero Luminoso and code the quality of government response to natural disasters between 1989 and 2020. We test whether government responses to natural disaster events shape political violence in Peru by responding effectively to crises or aggravating grievances through failed response and neglect. Using data on the location of state-based conflict (Uppsala Conflict Data Program; Sundberg and Melander 2013), we demonstrate that negative government response to disaster is a strong predictor of armed conflict, while positive disaster policy responses have no effect on political violence.

Our study contributes to the growing body of research assessing the links between natural disasters and violence across the world through our new data set, methods, and the empirical findings. A primary contribution comes from the use of our new Disasters, Migration, and Violence data set (Mitchell and Pizzi 2024). The data allow us to assess the government's role in mitigating or aggravating the strength of the relationship between disasters and violence. In addition, where case studies primarily focused on major disaster events or El Niño seasons, we can analyze disasters of varying sizes and impact. The added variation in disaster characteristics and inclusion of government responses contribute to a clearer understanding of the agency government actors have shaping patterns of violence and disaster effects in a way that has not been quantitatively assessed previously. Second, we contribute by taking the endogenous effects of disasters on violence and violence on disasters into account when we estimate quantitative models. We use a three-stage least squares structural equation model, which allows disaster response and violence to be fully endogenous so that we can estimate the direct effect of disaster response on violence separately from the effect of violence on disaster responses. The results show that while positive disaster policy response does not influence the occurrence of political violence, negative responses increase the likelihood of armed conflict. Our research thus highlights the role of government in providing protection from harm in the form of armed conflict and natural hazards and contributes to empirical evidence that poor government response to disasters has a detrimental effect on all forms of public security.

## PERUVIAN POLITICS AND THE RISE OF SENDERO LUMINOSO

We conduct a single country study of Peru to explore the role of government response in shaping the relationship between natural disasters and violent conflict using quantitative analysis of disaster responses and violent events between 1989 and 2020. We select Peru for this analysis because of the variation on key variables and the high number of observations of both violence and disasters. Peru is highly exposed and vulnerable to natural hazards, ranking 20th globally for disasters, and this vulnerability is only being

exacerbated by climate change (Bruni 2015). In addition, disaster response by the government varies over time and by the type of disaster (Mitchell and Pizzi 2024). Finally, while Peru has a high number of deaths from conflict events overall, there is variation in patterns of violence by the government and rebel groups across time and space. Our study fits with the recent growth in single country studies using quantitative data to test hypotheses (Pepinsky 2019). Our data draw on a single country but use a universal coding scheme that will be applied to other countries in the future. We thus attempt to balance internal validity with detailed knowledge of political dynamics in Peru and external validity with measures and concepts that can (and will) be applied to all countries in the world. We expect to find similar trends across countries once data are available.

The rise of Sendero Luminoso has been partly blamed on the weakness of government response to El Niño flooding, but Sendero has its roots in government neglect and regional politics before the 1982–83 weather patterns changed. Sendero Luminoso began as a Maoist student organization based in the rural highlands of the Ayacucho department (Weinstein 2006). During the 1970s and 1980s, the Peruvian government ignored the needs of the rural, largely indigenous population in Ayacucho, allowing Sendero to get a foothold in the region. High levels of economic and land inequality meant that there was a large portion of the population who were poor and had few opportunities for improving their lot (Harvey 1992; Palmer 1986). The lack of land ownership and economic security left the population—especially the rural poor and indigenous populations—particularly vulnerable to natural disasters and economic disruption. The central government largely neglected the area rather than invest in public services, better governance, or transportation links. In this context, Sendero's brand of communism and promises of a return to the glory of the Incan Empire appealed to rural and disenfranchised residents of Ayacucho (DeWitt 1992; Harvey 1992; Mealy and Austad 2012). The central government ignored the growth of Sendero Luminoso and underestimated both its appeal and capacity until the group had membership in more than half the country and had already established itself as an alternate form of government in regions of Ayacucho (Harvey 1992; Weinstein 2006).

Neglect also left the government ill prepared to respond in times of crises. The 1982–1983 El Niño drought reduced overall agricultural output by 15 percent (McClintock 1984). The impacts were worst among the rural, highland populations, who largely blamed the government. Since the government lacked capacity to both fight the rebels in the area and respond to the divergent El Niño conditions of floods and droughts around the country, the government did nothing to address farmers' grievances (Caviedes 1985). The same neglect took place during the 1972–1973 El Niño, but by the 1980s, Sendero was positioned to take advantage of the poor response to recruit aggrieved individuals and gain support among those suffering from government neglect. Sendero violence against the state escalated in 1982, primarily focusing on areas of drought (Puente 2017). The military responded with repression of the indigenous population in disaster zones, and as is often the case (Lichbach 1998; Moore 2000), the repression alienated the populace and further increased Sendero support and membership. The violence and environmental degradation also led to displacement and mass migration to the cities, and Sendero began to recruit among newly created urban slums (Kingdon and Gray 2022). The disasters associated with the 1982–1983 El Niño thus contributed to the ease with which Sendero recruited individuals to the cause and help explain political violence. Though the group's numbers dwindled in the late 1990s, splinter groups currently operate throughout Peru, carrying out attacks against civilian and government targets.

Many of the same problems in disaster response persisted during the 1997–1998 El Niño as well. Responses remained politically driven, following the logic of bolstering public support for Fujimori's 2000 reelection campaign (Olson et al. 2001). Fujimori did not convoke the national defense system to respond but instead set up ad hoc working groups according to a political logic. The results were high levels of destruction, poor responses, and wasted resources, but the government focused its information campaign on its relief efforts rather than reporting on damage. While the same weaknesses persisted in disaster response, the question remains: Did poor disaster response also contribute to violence after Sendero's strength peaked?

## CONFLICT EXPLANATIONS: WEAK STATES AND GRIEVANCES

Disaster events provide an opportunity for the state to demonstrate its capacity to respond and take care of citizens, but poor disaster response increases grievances by highlighting the inability or unwillingness of the state to protect lives and livelihoods. The literature on civil war and conflict demonstrates that grievances against the government and poor state capacity are associated with anti-state sentiment and easier rebel recruitment (Gurr and Moore 1997; Humphreys and Weinstein 2008). Disasters can provide an opportunity for existing armed groups to recruit (Ide 2023) and to escalate violence (Ide et al. 2020). At the same time, conflict also exacerbates the risks of disaster by creating new hazards, increasing the population at risk and highly vulnerable, and by destroying coping capacity among the public and government (Peters 2021). Thus, the same conditions of weak states, aggrieved populations, and poor coping capacity explain the risks of both conflict and disasters (Peters and Kelman 2020). Quality government responses demonstrate the capability of the state and the competence in mobilizing the necessary resources as well as leadership in anticipating and responding to disasters (Olson and Gawronski 2010). After a natural disaster, the public evaluation of government performance draws more heavily on the quality and type of response than the hazard itself (Poggione et al. 2012). Poor performance fosters grievances, and where there are alternative actors challenging the government such as Sendero Luminoso or other rebel groups, public support may shift. When we look at the policies governments implement, we thus expect that poorly handled disasters provide an impetus for conflict and violence.

Peru suffers regular flooding during the summer months, cold snaps during the winter, droughts in coastal and highland regions, and is in a known earthquake zone. While Peru has improved its government response over time, each instance of poor response to natural disasters can lead to support for rebel groups, anti-government sentiment, and violence. Utilizing the typology of governmental disaster response in Mitchell and Pizzi (2021) provides a framework to demonstrate the links between disaster response, grievances, and violence in Peru. Government responses are categorized into reconstruction, regulation, relocation, restrictions, and neglect; each may have a conditioning effect on conflict events. Reconstruction refers to the government's distribution of aid supplies to rebuild after a disaster. Regulation refers to the internal coordination of government actors. Restriction prevents affected people from going home or accessing the area in which the disaster took place. Relocation moves disaster victims from their communities. Finally, neglect by the government means that there was no response to the disaster. Each of these may influence whether grievances turn deadly. Several examples illustrate the links between poor disaster response and violence in Peru.

First, disasters provide rebel groups opportunities to recruit by demonstrating more competence in reconstructive efforts or compassion than the government. Disasters can demonstrate the limited reach of the state and gaps for rebel recruitment. Disasters also exacerbate vulnerabilities that make potential recruits more likely to join rebellions (Jayamaha et al. 2018). In an example from Peru, after flooding of Lake Titicaca in February 1986, a local government official was killed and the warehouse containing aid for the flood victims was ransacked. News reports indicated that flooding had been ongoing since early January, but the aid was stuck in a government warehouse, suggesting inability or unwillingness on the part of the government to quickly allocate goods to affected campesinos. Sendero Luminoso rebels then distributed the stolen flood aid to townspeople in the town of Chupa, enhancing local support.

Second, poor response to natural disasters often comes from weak state capacity rather than from deliberate neglect, and cases where governments respond poorly demonstrate the weakness of the state and the inability to provide basic security to citizens. For example, after reforms, central officials tasked municipal governments with disaster response, but flooding in La Esperanza in 2010 revealed they had failed to provide sufficient training for those committees. Plans for training and infrastructural works to build containment walls and set up effective early warning systems are not always implemented, leaving local and regional governments responsible but unprepared. The lack of a functional regulation of disaster response apparatus demonstrates weakness on the part of authorities. This weakness both motivates anti-state actors and means the state cannot prevent violence from occurring. Where poor response is due to

state weakness, rebel groups also have an opportunity for conflict as rebels can capitalize on institutional deficiencies (Taydas, Peksen, and James 2010).

Third, disaster displacement exacerbates inequalities and can destabilize social and political systems. The 1982–1983 El Niño weather phenomenon brought flooding and drought to areas where grievances against the government were already heightened and accelerated the recruitment efforts of the rebel group Sendero Luminoso (Kingdon and Gray 2022).<sup>1</sup> Flooding and natural disasters can also exacerbate grievances over land inequalities and dissatisfaction with economic opportunities. When governments do not provide adequate reconstructive aid, existing inequalities are on display. The 1986 flooding of Lake Titicaca left 200,000 people homeless. The mayor of Puno city complained that displaced peasants were “invading” the city but did not provide alternative housing. Campesinos, who were largely indigenous, were also left without adequate food, medicine, or shelters in some areas. Flood displacement exacerbated pressure on existing land holders and the government to carry through with land reforms, but land inequalities remained. The national government was able to deliver some aid and supplies for emergency housing, but it did little to alleviate the land pressures that forced peasants to relocate during the floods. In this instance, the lack of strong reconstructive efforts or outright neglect highlighted grievances in cities both among those displaced and the long-term residents. As political and economic inequalities due to ethnic identity can create the conditions for civil conflict (Buhaug, Cederman, and Gleditsch 2014), inadequate governmental response during this flooding event may have catalyzed further conflict. More generally, disasters and climate volatility can act as threat multipliers and intensify or lengthen civil wars (Ghimire, Ferreira, and Dorfman 2015; Von Uexkull et al. 2016).

Some disasters increase costs of basic goods and foodstuffs for the general populace while perpetuating economic grievances for farmers, potentially stoking violent reactions, complicating everyday governance. Landslides and avalanches often disrupt transportation links between regions, which can increase the costs of food and other critical items. For example, in 2017, floods caused an immediate 5 percent jump in the price of lemons, potatoes, and cooking oil and disrupted 40 percent of the national dairy production. These economic grievances can be further exacerbated by government policies interacting with disaster events. For example, the government policy of austerity measures already enacted by President Fujimori exacerbated disaster-induced hardships. After receiving little support during the August 1990 drought, large numbers of farmers moved into cities in search of work, while city dwellers went into the countryside in search of food. High food prices due to combined policy and disaster increased displacement and poverty and provided an opportunity for Sendero Luminoso to recruit additional guerilla fighters from newly relocated campesinos in the cities and the neglected poor.

Good government response would address these key problems. Indeed, in some cases, effective government responses to disasters and increased state presence suppress rebel recruitment (Walch 2018). Building state capacity before an event allows local officials to respond quickly and effectively and not leave the population languishing without help, and effective policy response can minimize the disruption from displacement and damage to those who depend on agriculture. Without quality response and given existing grievances of the population, however, we expect to see a rise in violence following disasters.

## RESEARCH DESIGN

To assess the link between disasters and violence in Peru, we draw on our newly constructed Disasters, Migration, and Violence (DMV) data set, which incorporates government response to individual disasters across the country and over time (Mitchell and Pizzi 2024). We compile a list of Peruvian disasters from the EM-DAT database, focusing on four types of disasters: geophysical (earthquake, rock fall, landslides, volcanic), meteorological (storms, cyclones), hydrological (flooding, landslide, avalanche, wave), and

<sup>1</sup> El Niño describes the periodic warming of the Pacific Ocean as part of the larger El Niño-Southern Oscillation (ENSO). In Peru, El Niño years typically see dramatic flood events, severe droughts, and disruption of fishing and farming.

climatological (droughts, wildfire).<sup>2</sup> During our period of analysis (1989–2020), 108 disasters fit these categories: hydrological (56.5 percent), geophysical (14.9 percent), meteorological (24.2 percent), and climatological (4.5 percent). Floods ( $N = 46$ ) are most common, followed by earthquakes ( $N = 22$ ) and landslides ( $N = 17$ ).

To code information about government response, we consult United Nations Office for the Coordination of Humanitarian Affairs (OCHA) reports, news sources (e.g., Nexis-Uni), scholarly studies, and other databases (e.g., Google) in a 3-year window following each hazard event. We located information on disaster response for 92 cases (80.7 percent). Disaster responses are coded at the disaster level and then matched to the geographic area where the disaster occurred using all three administrative levels: department ( $N = 26$ ), province ( $N = 196$ ), and district ( $N = 1873$ ). We focus analyses on the province-year level ( $N = 6277$ ), although results are similar using district-year data ( $N = 59,941$ ; Supporting Information Appendix).

We draw upon Mitchell and Pizzi's (2021) categorization of disaster policy responses which includes reconstruction, regulation, relocation, restrictions, and neglect. *Reconstruction* aggregates the level of relief goods and overall resources provided by the government (none, low, medium, or high), with 44.4 percent of disasters followed by medium to high relief goods provision and 17.5 percent of disasters experiencing medium or high levels of government resource allocations. *Regulation* focuses on government coordination of disaster response internally (27.8 percent of disasters medium to high) and with outside nongovernmental organizations or international organizations (26.8 percent), including government-led meetings with aid organizations (21.3 percent). *Relocation* refers to situations where the government evacuates people from disaster-affected areas either temporarily (34.2 percent of disasters) or permanently (3.7 percent). *Restrictions* occur when the government does not allow people to move near disaster-affected areas or return home after the events (5 percent). Restrictions and relocation are most likely after floods and landslides but are usually temporary (Mitchell and Pizzi 2024). We code *Neglect* when there is an obvious failure by the government to respond to the disaster at any administrative level (18.5 percent). Negative government responses such as restrictions and neglect should increase citizen grievances toward the government and improve rebel group recruitment in affected areas. On the other hand, we expect positive policy responses such as reconstruction, regulation, and relocation<sup>3</sup> to reduce grievances and hamper rebel recruitment. We calculate the mean response in each province year for each disaster response measure, which captures the government's typical response to disasters in each area.<sup>4</sup>

Violent events data in Peru come from the Uppsala Conflict Data Program's Georeferenced Event Dataset, which covers organized violence between 1989 and 2021 (Sundberg and Melander 2013). An armed conflict occurs in a given location year if an organized group uses force against another organized actor (or civilians) and causes at least 25 deaths in that year (5.67 percent of province-years have armed conflicts). We include state-based, non-state, and one-sided violence, although our models produce similar results if we restrict analysis to state-based violence only.<sup>5</sup>

There is clearly a relationship between disaster frequency and armed conflict. Among the seven departments in Peru with the highest rates of civil conflict, five are in the 95th percentile for disasters as well (Ancash, Ayacucho, Huanuco, Junin, and Lima). There may be an endogenous relationship between armed conflict and disaster responses, as disaster responses can affect the probability of the onset of armed conflict, but existing armed conflict in the area can also affect the government's willingness and capacity to provide disaster aid to the stricken area. Ignoring such endogeneity in the model results in biased coefficients. To address the endogeneity issue, we utilize a three-stage least squares (3SLS) structural equation model (SEM) where we allow armed conflict and disaster responses to be fully endogenous. Specifically,

<sup>2</sup> The EM-DAT International Disasters Dataset can be downloaded at <https://www.emdat.be/>.

<sup>3</sup> However, we acknowledge that relocation could be viewed negatively by citizens depending on government financial support for housing and shelters.

<sup>4</sup> In the Supporting Information Appendix, we also present results using other aggregated measures for disaster response (sum, maximum, modal, median). In our view, the mean response best captures how the government typically responds to a given area by averaging across both positive and negative responses (assuming two or more disasters occurred in a given province year).

<sup>5</sup> See Table A16 in the Supporting Information Appendix.

this approach creates two equations where armed conflict is a function of disaster responses and other controls in one model, and disaster responses are a function of armed conflict and a disaster dummy that is exogenous to disaster responses in the other model. By concurrently estimating two interrelated equations in a system of models, SEM allows the direct effect of disaster responses on armed conflict to be estimated separately from the impact of armed conflict on disaster responses, resulting in unbiased coefficients for both equations. We utilize 3SLS instead of two-stage least squares (2SLS) for estimating this model because 3SLS is more efficient than 2SLS (Belsley 1988).<sup>6</sup>

We include several control variables to account for variance in armed conflict in Peru across space and time. First, we include measures for population size and 2007 GDP levels (in Peruvian currency) that are available at the regional (administrative 1) level and copied to all provinces.<sup>7</sup> We include these measures as they are related to the state's capacity, which can affect both state disaster responses and the risk of armed conflicts (Hege and Sambanis 2006). Second, we capture the level of support for the national government in each province using election results from the most recent presidential election (1990, 1995, 2000, 2001, 2006, 2011, 2016, or 2021). We include the winner's vote share at the province level for each presidential election to capture political ties between each province and the center, as areas that support the president may be likely to receive more disaster aid and less likely to support rebel movements. By the same token, we also include the sum of blank or null votes in each area and the overall absentee rate for each presidential election vote, with the idea that voter absenteeism as a measure of political discontent will be associated with grievances and armed conflict more generally (Dyrstad and Hillesund 2020), and also with the likelihood of receiving adequate disaster aid from the government.<sup>8</sup> Additionally, we include a dummy variable for state disaster declarations to account for the seriousness of disaster situations. This is because the severity of the impacts can affect both the government's responses to disasters and the opportunistic structures (such as weakened local governance or disrupted security) that rebel groups can utilize. Finally, we include a measure of lagged armed conflict to capture the history of violence in each province, as armed conflicts in the previous year can affect the likelihood of the onset of armed conflict in subsequent years and can also reduce the government's willingness or capacity to access the area and provide disaster aid.

## EMPIRICAL RESULTS

Table 1 presents the results from the structural equation model. Consistent with our argument, we see that negative government policy responses to disasters, such as neglecting an area after a hazard event, or restricting the movement of people after disasters, significantly increase the risks for armed conflicts in those areas. Restrictions has the largest conflict inducing effect among all disaster response variables. On the other hand, we expected positive responses, such as the provision of relief goods and reconstruction aid, the government's regulation of disaster responses, or the relocation of people from disaster-affected areas, to reduce citizen grievances and make it more difficult for Sendero Luminoso to recruit supporters and funds from people in those areas. Yet, we find that none of these positive disaster response policies has a significant effect on armed conflict risks.

An examination of our data indicates that positive and negative responses often occur together, so the government may do things that local populations expect (e.g., provide relief aid) but fail to provide long-term reconstruction funds for rebuilding or successfully regulate disaster responses or relocate people. While we use the mean response at province year for our main analysis, we show in the Supporting

<sup>6</sup>In results not shown, we also tried an instrumental variables approach using disaster occurrence as an instrument for response. Diagnostic tests suggest that our instrument is not valid for the analysis.

<sup>7</sup>In other words, the value of a variable at administrative level 1 (e.g., population size in Ancash in 2000) is coded for each administrative 2 unit within that region in that year (e.g., the 20 provinces within Ancash). The data for these regional variables are taken from <https://www.inei.gob.pe/estadisticas/indice-tematico/sociales/>.

<sup>8</sup>These data are taken from <http://blog.pucp.edu.pe/blog/fernandotuesta/datapolitica/elecciones-presidenciales/>.

**TABLE 1** Structural equation model (SEM) models for the effect of disaster policy responses on armed conflict in Peru, province level, 1989–2020.

DV: Armed Conflict	Model 1	Model 2	Model 3	Model 4	Model 5
	Reconstruction	Regulation	Relocation	Restrictions	Neglect
Positive response					
Reconstruction	0.0122 (0.00750)				
Regulation		0.0203 (0.0123)			
Relocation			0.0864 (0.0471)		
Negative response					
Restriction				0.366*** (0.0997)	
Neglect					0.176* (0.0722)
Lagged armed conflict	0.253*** (0.00881)	0.252*** (0.00881)	0.253*** (0.00883)	0.250*** (0.00884)	0.251*** (0.00885)
Population	6.28e-09 (5.57e-09)	7.45e-09 (5.59e-09)	6.17e-09 (5.67e-09)	5.47e-09 (5.68e-09)	5.57e-09 (5.60e-09)
GDP	-3.64e-10 (3.18e-10)	-4.19e-10 (3.19e-10)	-3.65e-10 (3.21e-10)	-3.26e-10 (3.25e-10)	-3.44e-10 (3.15e-10)
Pres. Winner vote share	-0.0551 (0.0319)	-0.0605 (0.0319)	-0.0565 (0.0326)	-0.0545 (0.0317)	-0.0652 (0.0343)
Null/Blank vote share	0.0204 (0.0705)	0.0381 (0.0705)	0.0230 (0.0725)	0.0178 (0.0700)	0.0395 (0.0733)
Vote abstention (%)	0.297*** (0.0700)	0.290*** (0.0673)	0.293*** (0.0671)	0.291*** (0.0675)	0.288*** (0.0673)
Declaration	-0.0137 (0.0208)	-0.00332 (0.0164)	-0.0101 (0.0167)	-0.00489 (0.0105)	-0.0103 (0.0128)
Constant	-0.0192 (0.0213)	-0.0176 (0.0201)	-0.0176 (0.0196)	-0.0172 (0.0200)	-0.0129 (0.0224)
DV: Policy response	Reconstruction	Regulation	Relocation	Restrictions	Neglect
Disaster dummy	2.275*** (0.0317)	1.103*** (0.0220)	0.298*** (0.00772)	0.0616*** (0.00407)	0.147*** (0.00602)
Armed conflict	-0.0364 (0.125)	0.102 (0.0872)	-0.0154 (0.0306)	0.0329* (0.0161)	0.0478* (0.0238)
Constant	0.00137 (0.0198)	-0.00383 (0.0138)	0.000579 (0.00483)	-0.00123 (0.00255)	-0.00179 (0.00377)
Observations	5453	5453	5453	5453	5453

Note: Standard errors are given in parentheses, DV = dependent variable.

\* $p < 0.05$ ; \*\* $p < 0.01$ ; \*\*\* $p < 0.001$ .

Information Appendix that aggregation using the sum (Supporting Information Appendix Tables A2, A7, A12), maximum (Supporting Information Appendix Tables A3, A8, A13), modal (Supporting Information Appendix Tables A4, A9, A14), or median (Supporting Information Appendix Tables A5, A10, and A15) responses produces similar results, especially for negative policy responses increasing armed conflict risks.<sup>9</sup> We also show that our results are robust at other administrative levels (district [Supporting Information Appendix Tables A6–A10], region [Supporting Information Appendix Tables A11–A15], and to the influence of El Niño cycle [Supporting Information Appendix Table A17]).

As we noted earlier, disasters and armed conflicts are endogenously related. Government disaster responses can affect the probability of the onset of armed conflict, while an existing armed conflict in the area can influence the government's willingness and capacity to provide disaster aid to the affected region. As we expect, the SEM model demonstrates that armed conflicts significantly increase the chances that the government will engage in negative forms of disaster responses. In contrast, armed conflicts do not significantly impact the likelihood of the government engaging in positive disaster responses, such as providing reconstruction funds, regulating disaster relief efforts, or temporarily or permanently relocating people from disaster-affected areas. This implies a reciprocal relationship between negative forms of government disaster responses and armed conflicts.

Furthermore, while armed conflicts do not influence the government's positive responses, these positive responses do not suppress the onset of armed conflicts. This suggests that the government may have a hard time convincing people in disaster-affected areas that it is willing to provide adequate public goods to help them become more resilient to future disasters. In other words, once a weak state has implemented economic, political, and social policies poorly, and a rebel group has emerged to protest that government, it is difficult to use positive disaster responses to address the underlying grievances that produced armed clashes.

## CONCLUSION

Our project builds on the previous literature linking disasters and violence by demonstrating the paramount importance of government policy responses. To assess the effect of disaster response on violent events, we code the type of government policy response to disasters in Peru between 1989 and 2020. We model the endogenous relationship between disaster responses and violence events. The findings demonstrate that disaster response has a direct effect on the likelihood of conflict: negative government response is a strong predictor of violent conflict, while positive government response has no effect. These findings underscore the importance of effective response to extreme weather and preventing a rise in violence. Disasters create security risks and test state capacity. In places where rebel groups operate and there are already grievances against the government, it is difficult for the government to limit violence after a disaster, especially if it engages in neglect or negative policies. Poor disaster responses reflect state weakness and vulnerability.

While we do not include epidemics or pandemics in our data set, there are clear implications for these other types of safety threats. The Peruvian government's response to the COVID-19 pandemic was inept, and the suffering reflected persistent vulnerabilities (Lavell et al. 2023). The same districts that suffer the worst damage from floods, droughts, and earthquakes also suffered the most from the disease, weak preventive and treatment measures, and poorly executed lockdowns. Despite some improvement in response over time, Peru continues to suffer from natural disasters that challenge its capacity to respond. Indeed, another El Niño weather cycle began in 2023, providing an opportunity to improve response and demonstrate capacity.

Future research will broaden our findings internationally and cross-nationally. First, we are in the process of expanding the data set to include other countries and will soon be able to compare the patterns

<sup>9</sup> Some measures (e.g., maximum) show all types of disaster policy responses to be positively related to armed conflict. As discussed previously, we think the mean best captures the typical policy response and represents a balance between positive and negative policy responses in the same area.

of response by the state and the links to conflict. Our data set on Peru begins only after Sendero Luminoso had an established foothold in Ayacucho and other rural districts. We hope to test whether negative disaster responses link to violence in contexts where there is not an established rebel group or history of violence. Our hope is to find that where there is no preexisting anti-state movement, positive responses by the government reduce the likelihood of conflict. Second, future research should explore the role of inter-state conflict and rivalry on disaster response. In this study, we have only focused on intrastate conflict, but Peru also has historically contested territorial claims on the borders with Bolivia and Ecuador. We will explore whether these historical rivalries also shape disaster response and the likelihood of inter- and intra-state violent events. Our hope is that the ongoing data collection will allow researchers to understand the effects of disaster policy on conflict, protests, environmental migration, and other political processes and for practitioners to select disaster response strategies that limit public grievances and reduce the likelihood of violence.

As natural disasters increase in frequency and severity, governments around the world need to prepare to respond quickly and competently to each event. Disasters and conflict both represent security risks to the state and occur in similar conditions of weakened state capacity. Disasters and conflict are more than just correlates in contexts of weak state capacity, however. The way the government responds—even to similar disasters and in the same country—shapes the possibility of violence. Our research indicates that negative government response can increase the likelihood of conflict, thus compounding the suffering of civilians.

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## SUPPORTING INFORMATION

Additional supporting information can be found online in the Supporting Information section at the end of this article.

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