Reducing Post-Disaster Conflict Risk through Migrant Remittances

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Abstract

How do migration and remittance patterns influence the relationship between disasters and intrastate conflicts? Existing literature focuses on how disaster migration increases social tension and can lead to violent conflict, but it rarely examines the role of labor migration and diaspora networks in building disaster resilience. Countries whose citizens can rely on migrant remittances are less likely to experience conflict because disaster victims and affected populations can rely on remittance support from parts of their social networks that did not experience the disaster. We expect that higher inflows of remittances mitigate adverse effects of hazards (e.g., displacement), reduce post-disaster grievances, and lower the likelihood of intrastate conflicts. We test our theory by examining global patterns using a cross-sectional time series dataset of disasters and international remittances (1970-2023) and find that political violence risks after disasters are lower in countries that receive more remittances. We also leverage within country variation with analyses of domestic and international remittances and political violence across districts in Peru (2004-2022). Our cross-national and Peru empirical results show the important role of migrant networks on resilience in the face of disasters.

Introduction

The social and political contexts in which hazards (e.g., earthquakes, floods) occur are critical to understanding their effects. Disasters – like politics in general – are local. The effects are intensely felt locally and overwhelm local capacity to cope. But recovery does not need to rely only on local resources, networks, and communities. Communities with greater resilience are better able to prepare, withstand, and recover from natural hazards and other crises (Clarke and Chenoweth 2006; Clark-Ginsberg et al. 2020; Cutter, Ash, and Emrich 2014; Patel et al. 2017; Tiernan et al. 2019). Research on resilience and vulnerability emphasizes the importance of understanding the community context and relevant social networks (e.g., Cutter, Ash, and Emrich 2014; Tierney 2014). Where disaster-affected populations can draw on networks that are beyond the reach of a particular hazard, they are more likely to be resilient.

In this study, we focus on how established remittance patterns improve resilience and reduce one negative consequence of disasters: conflict. When disasters strike, victims can rely on financial support from networks of friends and family, making them more resilient and less reliant on government and local funds to rebuild their lives. Economic support from the diaspora and migrants outside of the disaster-affected community helps to offset the effect of hardships caused by extreme weather and natural hazards and thus diminishes the effect of disasters on the grievances that lead to conflict. Our argument is that the ability to draw on a geographically dispersed network for financial support when disasters occur improves resilience, reduces grievances, and therefore reduces the likelihood of intrastate conflict. Using a multivariate time series modeling approach, we examine the effect of remittance inflows on the likelihood that disaster-affected areas will experience intrastate conflict. We test our argument across countries and across districts within Peru. The cross-country analysis assesses broad trends, while the analysis of Peru incorporates within-country variance in remittances and allows for more fine-grained analysis of the links among regions experiencing disasters, remittances, and conflict. At both the cross-national and within-country level of analysis, we find that political violence risks after disasters are lower in countries and communities that receive higher amounts of remittances, while in cross-national analyses, remittances can increase conflict risks in contexts without disasters.

Our empirical findings help to explain some of the disparate findings linking disasters, remittances, and civil conflict. For example, remittances have been shown to increase support for rebel groups (e.g., Collier and Hoeffler 2004; Bakonyi and Stuvøy 2005), while in other studies, they are seen as vehicles for replacing the lack of social welfare spending by the state, reducing citizens' dissatisfaction with government policies (e.g., Batu 2019; Eldemerdash and Landis 2023). The relationship between disasters and conflict also demonstrates a wide range of empirical patterns (positive (e.g., Brancati 2006; Ide 2023), negative (e.g., Kreutz 2012; Walch 2014), and null (e.g., Bergholt and Lujala 2012; Omelicheva 2011). We show that there is an interaction effect between disasters and remittances, whereby disasters are less likely to produce intrastate conflict if the affected area receives more remittances. Nevertheless, in contexts with few disasters, high levels of remittances can increase political violence risks. Our findings help to reconcile some of these disparate empirical patterns by showing how remittances and disasters interact in influencing citizen grievances and the likelihood they engage in conflict.

Disasters and Conflict

Researchers have reached divergent conclusions about the effects of disasters and extreme weather on conflict. Disasters such as earthquakes, tornados, and floods disrupt daily life, threaten the security of the populace, and change demands for government support while also potentially

impairing state capacity. Studies have found that large disaster events increase the likelihood of violence and civil war (e.g., Brancati 2006; Ide 2023, 223; Ide et al. 2020). The impact of such disasters on conflict can be understood through three key concepts: motive, incentive, and opportunity (Nel and Righarts 2008). Motive is driven by heightened grievances arising from increased poverty, inequality, displacement, and marginalization. The incentive to engage in conflict grows in environments where competition for scarce resources intensifies. Where state capacity is overwhelmed and disrupted due to disasters, there may also be more opportunity for rebellion. A key challenge of disasters is the mismatch between the state's limited resources and the growing demands caused by the disaster, creating an opportunity for conflict (Xu et al. 2016).

In contrast, disasters may have a peacekeeping effect in places already experiencing conflict. They can prompt rebel groups to cooperate with the government in disaster relief efforts, potentially reducing conflict (Walch 2014). In some cases, disasters create situations that facilitate conflict resolution, as governments facing emergency situations must respond to demands for effective relief, which may require concessions to separatist groups (Kreutz 2012). Still other studies find only a weak relationship between disasters and conflict (Bergholt and Lujala 2012; Omelicheva 2011). One of the challenges of assessing the relationship between disasters and conflict is the range of possible causal paths and intervening variables such as poverty (Slettebak 2013), forced migration (Naudé 2009), and types of government responses (Mitchell et al. 2024; Mitchell and Pizzi 2024). Adaptation efforts can also reduce the effects of natural hazards and thus reduce grievances after crisis events (Barnett and Webber 2009; Omelicheva 2011).

Studies that focus on extreme weather and climate change reach similarly inconsistent results but sometimes have more nuanced explanations for who participates in violence and under what conditions. Some find that extreme temperature and precipitation increase the risk of civil war (e.g., Burke et al. 2009; Hendrix and Glaser 2007; Devitt and Tol 2012), while others find no relationship (e.g., Buhaug 2010; Koubi et al. 2012) or a non-linear relationship (e.g., Hendrix and Salehyan 2012). In a study of the effects of extreme weather on conflict from 10,000 BCE, Hsiang et al (2013) find that rainfall and temperature deviations increase the risk of conflict across the globe. Research in parts of Africa has shown that because climate variability including high heat (Burke et al. 2009) or extreme rain (Fjelde and Von Uexkull 2012) harms agricultural yield, the likelihood of communal conflict and civil war increases. The driver of conflict in these cases is the economic side effects of erratic weather. Still, these findings are not always consistent. O'Loughlin et al (2014) find that high temperatures are associated with more conflict, but the authors do not find a reliable relationship between deviations in precipitation across 42 countries in sub-Saharan Africa. Instead, they find that climate anomalies are less influential than other key political and economic events and geographic factors. In part, the 'political vulnerability' of climate change and extreme weather affected groups matters (Raleigh 2010). While the catalyst may be weather related, the likelihood of conflict largely depends on the underlying levels of political and economic marginalization. The risk of increased violence is thus not evenly distributed across society. In the face of droughts, groups that are politically marginalized and depend on agriculture (and thus more economically vulnerable to extreme weather and natural hazards) increase their likelihood of political violence while most groups see little change in the risk of conflict (Von Uexkull et al. 2016).

Linking Migration to Disasters and Conflict

The role of migration in the link between disasters and conflict is similarly ambiguous. Environmental, political, social, and economic factors shape the opportunities and constraints of potential migrants as much as any disaster event. In many cases, migration is a form of adaptation as

populations move to reduce their risk and vulnerability to hazards and extreme weather (Black et al. 2013). As the climate changes and weather events gets more extreme, people can stay in place and do nothing, they can stay and try to adapt, or they can leave affected areas (Reuveny 2007). Disaster migration occurs when affected populations evacuate for their safety, but most of this migration is temporary (Morrissey and House 2009), confined to the same country, and there may also be immobile populations that do not have the means to move (Black et al. 2013). When populations are forced to leave their homes because of natural disasters or environmental change, they can experience greater cooperation and solidarity, at least among members of their own community (Drury and Olson 1998; Slettebak 2013). Disaster migration can also lead to increased competition over resources, increasing the risks of violent conflict (Brancati 2007; Nel and Righarts 2008). Other studies find no significant effects of disaster migration on conflict (Bergholt and Lujala 2012; Omelicheva 2011). One challenge with this line of research is that typical models ignore contingent factors such as government policies, income, and institutional capacity (Brzoska and Fröhlich 2016).

Economic and labor migration can also help shape disaster migration and resilience to hazards. Labor migration is often seasonal or circular, with migrants returning to their home communities periodically. These migrants typically leave home temporarily and retain ties to their source communities, often sending remittances to relatives who remain at home (Massey et al. 1993; Mendola 2012). People displaced by disasters often rely on the same labor migration networks for support (Raleigh, Jordan, and Salehyan 2008). Remittances can be a major source of income for households and governments and can be a particularly important part of resilience when there are severe economic or climate shocks (Kibreab 2017). Natural disasters are location specific and connections outside the affected area can help with resilience by providing resources after disasters occur. We build on this literature by evaluating one way that existing migration patterns can influence the outcomes of disasters – through the money sent home.

The Effects of Remittances on Conflict

Research on the relationship between remittances and conflict also reveals a range of divergent perspectives (Abutudu and Emuedo 2011; Eldemerdash and Landis 2023; Regan and Frank 2014). Conventional wisdom suggests that remittances and diasporas can serve as a source of funding for rebel groups, thereby fueling conflict (Bakonyi and Stuvøy 2005; Collier 2004), especially in places already experiencing violence (Collier and Hoeffler 2004). Some diasporas communities develop from conflict-driven emigration and harbor historical resentments toward the regime in their homeland. As a result, political entrepreneurs seeking to fund a rebellion may revive these dormant grievances to secure finance (Collier 2000). With greater financial resources than those in their homeland, emigrants can more easily finance military operations and engage in proxy warfare (Abutudu and Emuedo 2011). Two famous examples come from Kosovo and Sri Lanka. The rise in strength of the Kosovo Liberation Army (KLA) in 1998, regarded as a terrorist organization by the Serbian government, is attributed to the extensive fundraising efforts of the Albanian diaspora in the West (Ballentine and Sherman 2003). Similarly, the Liberation Tigers of Tamil Eelam (LTTE), as a terrorist insurgency, played a key role in the prolonged and devastating conflict in northern Sri Lanka, fueled by financial support from the Tamil diaspora (Baser and Swain 2008; Chalk 2008). In the immediate aftermath of rapid-onset natural disasters, remittance inflows can exacerbate social unrest in autocratic countries by providing financial resources that enable dissident groups to mobilize protests and other forms of anti-state action (Eldemerdash and Landis 2023). However, many disaster-affected areas are also in high-elevation or remote areas, where it is more difficult for people to receive outside remittances (Le De, Gaillard, and Friesen 2013), and for the government to respond effectively to the hazard events.

Other research finds that migrant remittances can reduce conflict risks. One reason for the divergent findings is the different types and measures of remittances. Informal remittances are those transferred across borders without the aid of recognized institutions like Western Union or other banks, while formal remittances pass through state-regulated financial institutions (Regan and Frank 2014). Informal remittances are more difficult to measure but are estimated to be between 35% and 75% of recorded (formal) remittance flows.[1] Studies linking remittances to the escalation of violent conflicts primarily concentrate on informal remittances as means of rebel or terrorist financing (Elu and Price 2012; Regan and Frank 2014). In contrast, formal remittances, regulated (and measured) by the state, can reduce social welfare demands on the state and, by doing so, diminish the motivation for rebellion (Batu 2019; Eldemerdash and Landis 2023). Remittances are viewed as a shock-absorbing mechanism for migrant families, particularly during unexpected events such as natural disasters (e.g., hurricanes, floods, drought, earthquakes) or macroeconomic shocks (Ajide and Alimi 2019). These formal remittances, often driven by altruism, have been found to be compensatory and counter-cyclical (Ajide and Alimi 2019); remittance flow levels tend to increase after economic and political crises (Acharya 2021; Bettin, Presbitero, and Spatafora 2017; Frankel 2011). Similarly, studies have shown that remittance flows increase in the aftermath of disasters (Bragg et al. 2018; Le De, Gaillard, and Friesen 2013). For example, after a massive earthquake in Nepal in 2015, foreign aid for recovery flowed in, but so did increased remittances from Nepalese living abroad in places like South Korea and Qatar, helping reconstruction and recovery (Manandhar 2016).

It is widely recognized that economic hardship, which fosters grievances among citizens, is a key driver of conflict (Fjelde and Von Uexkull 2012; Nel and Righarts 2008). These hardships could be generated by economic crises or natural hazards. Especially where government aid is limited or inadequate, disaster victims need to rely on other sources for support. Existing migration patterns can improve community resilience and recovery. Economic crises lead to demand for social services, but less state capacity to meet those demands, and migrant remittances help mitigate the effects of economic instability, reducing pressure on governments from political opposition. These remittances function as a stability mechanism, and as substitutes for less developed financial systems (Bettin and Zazzaro 2018), reducing the likelihood of civil war during periods of significant economic stress or crises (Regan and Frank 2014). Remittances can also help disaster-affected individuals rebuild homes with better materials (e.g., concrete), making them more resilient to future disasters (Mohapatra, Joseph, and Ratha 2012).

We focus on disasters as a source of shocks that can have adverse effects on state capacity and the economy. To meet the needs of those suffering after a disaster, friends and family abroad can provide support with remittances. These can come from individuals living in other regions of the same country (domestic) or in other countries (international). As during economic crises, demand for social services and support rises after disasters. The needs are often extraordinary but temporary, including funds for urgent healthcare, food, and reconstruction of damaged homes. While states typically try to meet these demands, there are limitations to state capacity as disasters also inhibit the regular functioning of government, at least locally. Our basic argument is that migrant remittances can enhance resilience and reduce grievances in the wake of a disaster. International migrants can send money directly to support disaster-affected friends and family, thus reducing demands on the state and dampening the shock. Based on this argument, our primary testable proposition is that *places with higher levels of remittances will be less likely to see*

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[1] See https://www.centralbanking.com/central-banks/economics/data/7949526/understanding-informal-remittances.

intrastate conflict after disasters. While households many receive remittances on a regular basis, the shock of a disaster is likely to lead to more need for support from diaspora populations. The support of migrant populations and established remittance networks help to boost the security of friends and relatives in their place of origin. There may also be a boost in remittances by migrants, even if they must make some sacrifices, as these networks sometimes serving as roles akin to insurers in wealthy countries (Agarwal and Horowitz 2002; Amuedo-Dorantes and Pozo 2006; SeyedSoroosh Azizi 2017; Seyedsoroosh Azizi 2019; Gubert 2002; Yang and Choi 2007). The networks of support thus reduce the need for help from the state and reduces the potential dissatisfaction at having their needs unmet by weak states and poor disaster responses.

Research Design

We test whether remittances from both domestic and international sources shape the chance of civil conflict. We do this first by examining international remittances at the country level. Next, we examine the locations of disasters and conflict within the country of Peru and examine the effects of within-country remittances (both from domestic and foreign sources). Taken together, we can see the broad trends but also the nuanced and local effects of disasters and remittances. This section explains the cross-national analysis, followed by the explanation of the within Peru design, data, and analysis.

Our global cross-sectional time series dataset includes information about natural hazards, remittances, and intrastate conflict from existing datasets. Intrastate conflict data comes from Banks' CNTS Data Archive and the Uppsala/PRIO Armed Conflict Database. First, we use the weighted conflict index from the Banks CNTS dataset, which weights eight forms of political violence using different severity levels: Assassinations (25), Strikes (20), Guerrilla Warfare (100), Government Crises (20), Purges (20), Riots (25), Revolutions (150), and Anti-Government Demonstrations (10). This score has an average of 3174 with a range of 0 to 1707875. We also test two alternative measures of conflict: summed conflict events and a UCDP conflict measure. The first alternative conflict measure counts the total number of all eight forms of political violence for each country year, with an average of 5.2, and a range of 0 to 3718. The second alternative conflict measure is taken from the UCDP/PRIO Armed Conflict Database and is a dummy variable that equals 1 if a state has one or more armed conflicts (intrastate or internationalized intrastate conflicts with 25 or more battle deaths) each year (3.96%) and 0 otherwise (96.04%). Because the first two measures approximate interval measures, we use a GLS model, whereas we estimate the UCDP model as a logit model. For each model, we include a one-year lag of conflict to capture dynamic processes.

Data on disasters is taken from the EM-DAT International Disasters Dataset. We count the total number of disasters events that occur each year in each country, excluding biological disasters (e.g., epidemics). Country years with missing data are recoded as zero disaster events. States experience an average of 2.94 disasters per year, which is reduced to an average of 1.38 when we recode missing to zero, with a range of 0 to 43.

The World Bank Group provides information on personal remittances received by each country per year, with data covering years from 1970 to 2023. Personal remittances data include personal cash between resident and non-resident individuals, as well as compensation of employees who work in an economy where they are not a resident. We utilize the personal remittances received (current US dollars) variable and divide by 1,000,000,000 to set the baseline in billions of US dollars. If data is missing before the first year of data availability (e.g., Poland's data begins in 1994 but is missing between 1970-1993), but it contains values for every year thereafter (1994-2023), then we

treat the missing data as missing in our analyses. Some countries have time series gaps in remittance data, however, which gives us a way to estimate the baseline level in years the data is missing. For countries that have a span of data (e.g., Chile, 1983-1990), a missing data period (e.g., Chile 1991-1999), and then another span of data (e.g., Chile 2000-2023), we code the missing data using the remittance value in the last known period (e.g., 1990 for Chile in the years 1991-1999).[2] The average remittance inflow is 1.71 billion US dollars with a range from 0 to 119.5 billion (India-2023).

We interact the disaster count variable with the remittance value, with an expectation that the estimated parameter's sign should be negative if remittances help disaster-affected populations and reduce grievances against a state that may respond poorly. We test our hypotheses with remittances in the same year and run additional models with the level of remittances lagged one year in the expectation that the prior year's remittances will improve resilience and dampen the effect of subsequent disasters on conflict.

We include several control variables that are common in the civil war literature. We generate a baseline dataset using the peacesciencer R package (Miller 2022) with the following variables: 1) a logged measure of GDP in 2011 US dollars (mean=24.3, range is 15.5-30.7), 2) a logged measure of population size (mean=15.5, range is 9.7-21), 3) the V-Dem polyarchy (electoral democracy) score (mean=0.45, range is 0.013-0.924), and 4) religious fractionalization (mean=0.39, range is 0.002-0.813). All means are reported for years between 1970-2023, the range of our remittance data. Our expectation is that political violence should be more likely in states with bigger populations and greater religious fractionalization and less likely in wealthier, more democratic countries (Anyanwu 2014; Fearon and Laitin 2003).

For our main theoretical variables, we expect the interaction variable between disasters and remittances to have a negative estimated parameter. The sign on the constituent variable parameters depends on one's perspective in the literature. Disasters may have positive effects on conflict, although they provide opportunities for cooperation and disaster diplomacy. Remittances could boost resilience and reduce citizen grievances but also provide potential support for rebel groups. We include lagged conflict in each estimated model to capture the idea in the literature that remittances could be more conflict inducing in already conflict-prone environments.

Cross-National Findings

In Table 1, we present the findings from our cross-national analysis. The interaction of the count of disasters and remittance inflows is negative and significant at the 99% confidence level both without (Model 1) and with (Model 2) a lag in remittances. This is consistent with our theory, showing that countries that experience a higher count of disasters but also receive more remittances face lower risks for political violence than countries without remittances (signs are negative and significant in both models). In the absence of remittances, disasters do not systematically alter the risks for conflict. However, in the absence of disasters, remittances and lagged remittances are positively and significantly associated with conflict. The control variables show some variation but generally fit the literature's expectation of lower conflict risks for smaller population and more democratic states. Lagged conflict is positively related to future conflict in Models 1 and 2.

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[2] We also tried setting these values to missing or to zero and our results were not altered.

Table 1. Remittance inflows (billions), disasters, and intrastate conflict

	Model 1: Weighted Conflict Index	Model 2: Weighted Conflict Index
Disaster Count	17.173	17.866
	(18.840)	(19.538)
Remittance Inflows	133.092***	
	(20.832)	
Disasters × Remittances	-6.646***	
	(1.774)	
Remittance Inflows$_{t-1}$		154.778***
		(22.831)
Disasters × Remittances$_{t-1}$		-7.562***
		(1.970)
Population Size	162.771**	160.241**
	(66.599)	(70.568)
GDP	-31.987	-37.433
	(52.268)	(55.300)
Lagged Conflict	0.646***	0.653***
	(0.020)	(0.021)
V-Dem Polyarchy	-603.474***	-609.644***
	(200.469)	(211.210)
Religious Frac.	-281.137	-283.494
	(230.322)	(246.080)
Constant	-1126.191	-959.804
	(794.413)	(845.506)
Model Fit	$\chi^2(8) =$	$\chi^2(8) =$
	1290.87***	1237.70***
Model	GLS	GLS
Random Effects	Yes	Yes
Observations	4507	4359

Note: Standard errors in parentheses. *p<.10; **p<.05; ***p<.01

Figure 1 shows the marginal effects of disasters on Weighted Conflict across different levels of remittance inflows.[3] We see that for countries with very low remittance flows, the effect of disasters on conflict is indistinguishable from zero. In countries with higher remittances, the effect of disasters on conflict turns negative. However, the distribution of remittance inflows (rug marks) suggests that many countries do not receive a high enough level of remittances to offset conflict risks from natural hazards. But the overall pattern of results is consistent with our theory about how remittances can help those affected by disasters be more resilient in their aftermath, which helps to lower overall grievances towards governments that provide inadequate post-disaster relief.

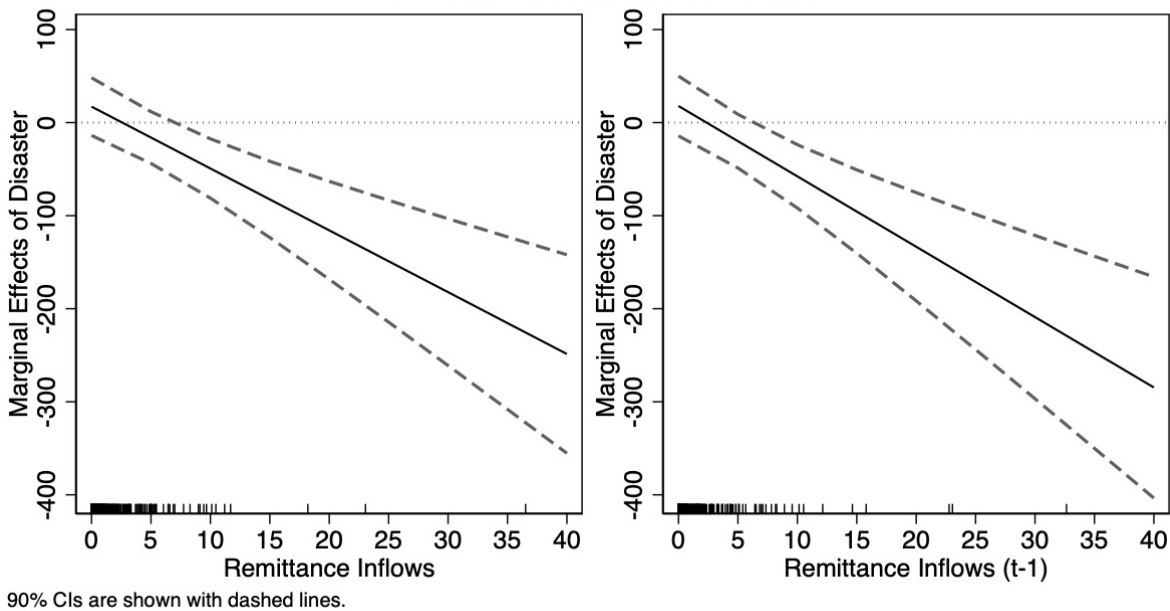Figure 1. Marginal Effects of Disaster on Weighted Conflict, Conditional on Remittance Inflows

90% CIs are shown with dashed lines.

Figure 1. Marginal effects of disaster on weighted conflict, conditional on remittance inflows (in billions). Lines are marginal values, and shaded areas are 90% confidence intervals. Rug marks along the x-axis indicate the distributions of the two remittance variables. Calculations are derived from models in Table 1.

Models with alternate outcome variables of the summed conflict events and UCDP measures are presented in Appendix Table A1. Using summed conflict events (Models 1 and 2) gives the same results as the weighted measure – we estimate negative interactions terms that are statistically significant at the 99% confident level. Using the UCDP measures (Models 3 and 4), the interaction parameter is still negative but its significance is slightly lower at the 95% and 90% level, without and with a year lag in remittance inflows, respectively. Our results are robust across a variety of conflict measures.

Within-Country Findings: Peru

The cross-national patterns show that remittance networks dampen the likelihood of conflict but ignore the nuances of within country remittance variation. In this section, we examine

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[3] This graph is created using the grinter Stata package developed by Fred Boehmke. See https://myweb.uiowa.edu/fboehmke/methods.html.

the effects of both international and domestic remittances across regions in Peru. Most disaster events only affect parts of a country and most migration is within country. By shifting to a single country context, we can study phenomenon that do not necessarily affect the country as a whole and are unlikely to be evenly distributed across space and time within any given country context, i.e., disasters, migration, conflict, and remittances. Single country studies are particularly helpful for nuanced assessments of this type of event as they control for unobserved national-level variation that might otherwise influence the outcomes (Pepinsky 2019). Here we focus on a typical case (Seawright and Gerring 2008) in order to confirm the cross-national relationship also exists at the subnational level and when taking into account domestic remittances.[4]

Peru provides variation on our key variables, has a large number of disaster events (*N*=183, 1900-2020), and is important to understand as it has the highest number of hazard-related casualties and people affected on a per capita basis in South America (Parodi, Kahhat, and Vázquez-Rowe 2021). Peru has also experienced a civil war (1980-2000) involving multiple rebel groups and has experienced some ongoing violence after those conflicts ended (McClintock 2006). Case studies show that the larger rebel group, the Sendero Luminoso, benefited from poor government response to the El Niño of 1982-83 and used the opportunity to recruit new members (Katz and Levin 2016; Kingdon and Gray 2022; Puente 2017).

The unit of analysis is the administrative 3 district level (N = 1873) for each year in Peru from 2004-2022 (N=20,786). The dependent variable captures the total number of armed conflict events in each district-year using the Uppsala Conflict Data Program's Georeferenced Event Dataset (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). We include state-based, non-state, and one-sided violence.

We incorporate additional data on both domestic and international remittances within Peru. Domestic and international remittances are common among family members and by associations of migrants that have moved away but maintain close ties with and commitments to improve life in the community of origin (Long 2008). The need to move to find work means that many families have members living in multiple regions of the country, at least temporarily. These family members then provide a network for sending money and resources when they are needed. Urbanization has increased in Peru since the 1950s, growing from 65% rural to 75% urban by 2005 (Takenaka and Pren 2010). While most labor mobility in Peru is from rural to urban areas, intra-rural migration and movement to smaller towns and urban centers has expanded in recent years. Regardless of destination, temporary labor mobility benefits the welfare of the origin households, particularly among the poorest migrant households (Fabry and Maertens 2025). International migration has grown since the 1980s, with as many as 10% of Peruvians permanently living abroad (Takenaka and Pren 2010). Migrants come from every region, class, and ethnic group, but the return of financial benefits are not evenly shared. Less than half of migrants living abroad send remittances at all, and the vast majority of those remittances (more than 95%) went to urban households (Paerregaard 2015).

We compile information on remittances received in each district of Peru from 2004 to 2022 using the ENAHO individual-level survey data.[5] This is a national household survey that asks several questions about remittances, including whether they have been received, what source they come

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from (e.g., family, friends, abroad), and how they are used (e.g., housing, savings, household expenses). The data capture the unequal distribution of remittances and strength of established networks of support that migrants can tap during times of crisis. Each ENAHO survey contains approximately 80,000 respondents and includes the administrative location. We aggregate this information to the district-year by recording the proportion of survey respondents that report receiving remittances from domestic or international sources; the average is 0.07, with a range from 0 to 0.78.

To capture the frequency of natural hazard events in each district-year in Peru, we draw on previous coding of disaster events and locations within Peru (Mitchell and Pizzi 2024). The dataset includes four types of disasters coded by the EM-DAT International Disasters Dataset (https://www.emdat.be/): geophysical, meteorological, hydrological, and climatological. We create a dummy variable for each district that experiences one or more of these disaster types (43%) for each year in our sample (2004-2022). Floods are the most common disaster types, followed by earthquakes and landslides.

Figure 2 shows the average disaster count (left), the average proportion of individuals in a district receiving remittances (center), and the average number of armed conflict events (right) across the lowest level of administration (districts) in Peru. These data are aggregated across all years. The figure shows that there are clear patterns for each variable but the relationship across variables is less obvious. Disasters take place throughout the country with most in the highland areas of Southern Peru and in the southern coastal regions. Remittances are more concentrated in the coastal areas, where there are large population centers such as the capital city, Lima. In contrast, conflict is largely concentrated in the interior highland areas where the Shining Path was the most active, including the Ayacucho department.

Figure 2. Average Disaster Count, Prop. Receiving Remittance, and Armed Conflict across District-level Regions in Peru
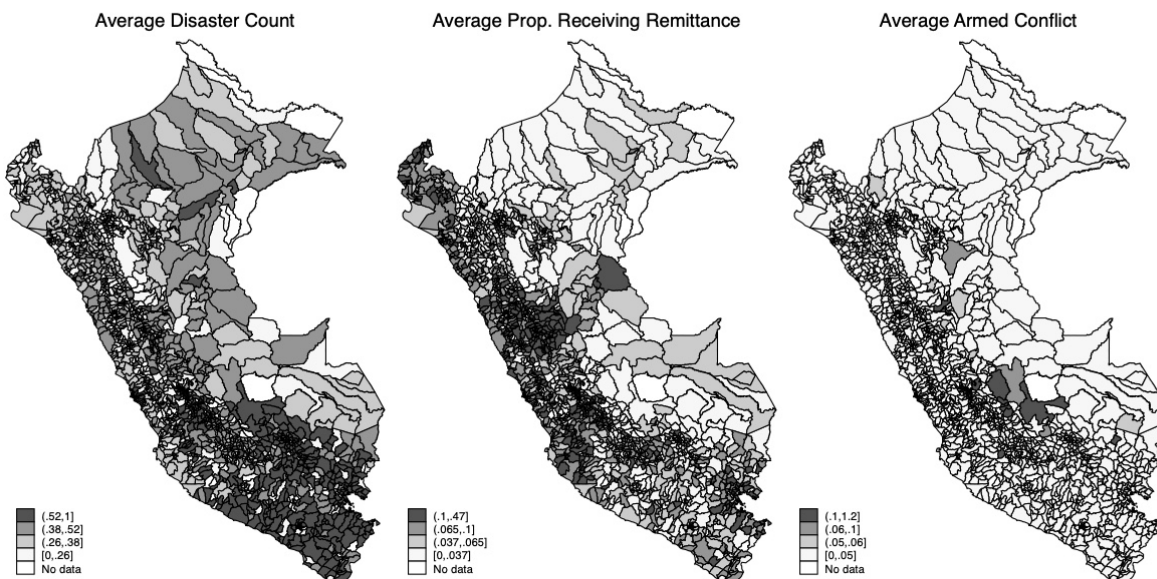

Figure 2. Average disaster count, proportion of population receiving remittances, and armed conflict across district-level regions in Peru.

The results of our multivariate analysis are presented in Table 2. Model 1 captures armed conflict and remittances received in the same year (*t*), while Model 2 considers remittances received two years ago (*t-2*).[6] As in the cross-national models, we interact disasters and remittances and expect the interaction term to have a negative value. This design reflects our theoretical expectation that areas hit by disasters in Peru will experience fewer armed conflicts if more individuals in the area receive remittances from within or outside the country. Three control variables mirror those in the cross-national analysis: population size, GDP, and lagged conflict. In addition, we include controls that capture regional politics with a measure of the winner's vote share in the last presidential election. This captures political ties between districts and the center. We also include a control for negative government response to the disaster event (neglect) because previous work finds that poor disaster response and conflict events reinforce each other in Peru (Mitchell et al. 2024). These last two variables capture the levels of and reasons for discontent with the government, which may then relate to conflict.

Table 2. Remittance proportion, disasters, and intrastate conflict at the district-level in Peru

	Model 1: Armed Conflict & Remittances at time *t*	Model 2: Armed Conflict & Remittances at time *t-2*
Disaster dummy$_t$	1.438**	1.479**
	(0.590)	(0.622)
Prop. Receiving Remittances$_t$	-0.077	
	(4.353)	
Disasters$_t$ ✕ Remittances$_t$	-11.907*	
	(6.406)	
Prop. Receiving Remittances $_{t-2}$		-0.316
		(5.109)
Disasters ✕ Remittances$_{t-2}$		-13.703**
		(6.867)
Population Size$_t$	1.181	1.179
	(0.765)	(0.802)
GDP$_t$	-1.563***	-1.514**
	(0.583)	(0.624)
Lagged Conflict$_{t-1}$	2.085***	2.438***
	(0.747)	(0.855)
Winner Vote Share$_t$	-1.493	-1.110
	(1.296)	(1.433)
Negative Policy Response$_t$	0.569	0.806

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[6] We tried different lag lengths and found lag two to be the best dynamic specification for this dataset.

	(0.576)	(0.582)
Constant	-0.023	-0.465
	(5.383)	(5.314)
Model Fit	$\chi^2(8) =$ 40.13***	$\chi^2(8) =$ 42.56***
Model	Logit	Logit
Random Effects	Yes	Yes
Observations	18558	16460

Note: Standard errors in parentheses. *p<.10; **p<.05; ***p<.01

The results are consistent with our cross-national findings: in districts of Peru where a higher proportion of individuals report receiving more remittances (domestic and international), the effect of disasters on armed conflicts is reduced. In Model 1, the interaction term is significant at the 90% confidence level, but in Model 2, with lagged remittances, the interaction is significant at the 95% confidence level. This is consistent with the logic of our theory, whereby individuals receiving more remittances are better equipped to handle the negative consequences of disaster events, reducing grievances against the Peruvian government. District years with lower GDP are also associated with more conflict while conflict in the previous year is associated with a higher chance of conflict. Interestingly, our measures of underlying political discontent – winner vote share – and of disaster-related discontent – neglect – are both insignificant.

Figure 3 shows the marginal effects of disasters on armed conflict controlling for remittances. As the proportion of households receiving remittances in a district increases, the chances for armed conflict go down, with effects being statistically significant up through about 5% remittance levels. We do not see further reductions in conflict risks at higher remittance levels, which is partly a reflection of the rareness of the dependent variable (occurring in less than 1% of districts). But the overall pattern of results is consistent with what we observed in the cross-national time series data.

Figure 3. Marginal Effects of Disaster on Armed Conflict Probability,
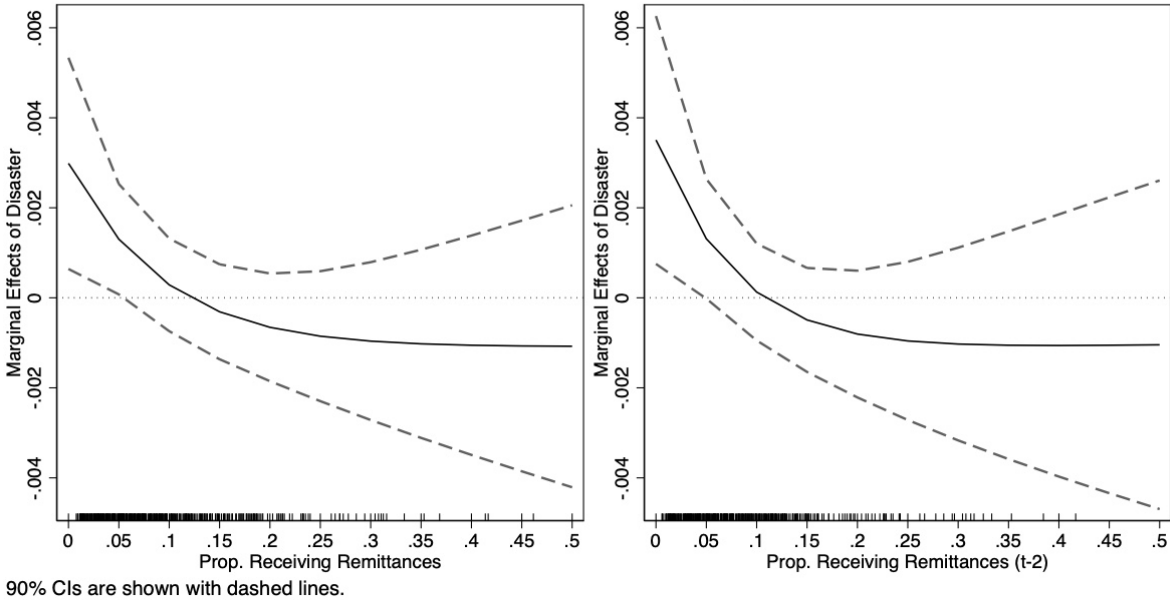Conditional on Remittance Proportion

90% CIs are shown with dashed lines.

Figure 3. Marginal effects of disaster on armed conflict probability, conditional on the proportion of households receiving remittances at the district-level in Peru. Lines are marginal values, and shaded areas are 90% confidence intervals. Rug marks along the x-axis indicate the distributions of the remittance variables. Calculations come from models in Table 2.

Conclusion

Our project addresses the way that migration and diaspora networks can influence the effect of disasters on conflict. The findings show the importance of remittances for social stability and security; stronger remittances networks are associated with a decline in the risk of political violence. Disasters are less likely to be followed by conflict and violence when a strong record of remittances provides external interpersonal financial support. The pattern of interaction between remittances and disaster events is consistent at the cross-national level and across districts within Peru. In our cross-national analysis, where remittances are higher without the motivation of supporting disaster victims, however, we do see higher risk of conflict.

The research we present here contributes to efforts to understand the conditions and processes that can reduce the harm and speed recovery from disasters and understand when and why countries are at risk for violent conflict. With this paper, we focus specifically on how labor and diaspora networks can improve resilience and social cohesion of disaster affected populations and limit social conflicts. The findings point to the relevance of policies supporting, discouraging, or neglecting circular migration, remittances, and diaspora connections. Ongoing changes in migration policy, including additional restrictions and regulations, may reduce labor migration as well as migrant incomes and thus remittances. These policies are worrying in light of our findings: these results suggest that policies that support and enhance resilience in the face of crises – including through broader connections to existing migrants and additional targeted support for disaster

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displaced population – are important in the face of increasingly severe weather- and climate-related disasters.

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Appendix

Table A1. Remittance inflows (billions), disasters, and intrastate conflict

	Model 1: Summed Conflict Events	Model 2: Summed Conflict Events	Model 3: UCDP Conflict	Model 4: UCDP Conflict
Disaster Count	-0.012	-0.012	0.013	-0.008
	(0.042)	(0.043)	(0.048)	(0.049)
Remittance Inflows	0.348***		0.100**	
	(0.043)		(0.042)	
Disasters×Remittances	-0.019***		-0.006**	
	(0.003)		(0.003)	
Remittance Inflows$_{t-1}$		0.403***		0.094**
		(0.047)		(0.045)
Disasters×Remittances$_{t-1}$		-0.021***		-0.006*
		(0.004)		(0.003)
Population Size	1.223**	0.976*	0.049	0.215
	(0.536)	(0.565)	(0.644)	(0.674)
GDP	0.028	0.047	-0.365	-0.358
	(0.270)	(0.282)	(0.314)	(0.326)
Lagged Conflict	0.503***	0.504***	-0.442*	-0.561**
	(0.015)	(0.015)	(0.259)	(0.274)
V-Dem Polyarchy	-3.040***	-2.735***	1.052	0.995
	(0.585)	(0.612)	(0.806)	(0.825)
Religious Frac.	-4.029***	-4.091**	-3.615*	-3.639
	(1.532)	(1.599)	(2.196)	(2.299)
Constant	-16.371***	-13.033**		
	(5.859)	(6.167)		
Model Fit	$F_{(8, 4345)} =$ 163.60***	$F_{(8, 4197)} =$ 159.40***	$\chi 2$ (8) = 13.32	$\chi 2$ (8) = 13.48*
Model	GLS	GLS	Logit	Logit
Fixed Effects	Yes	Yes	Yes	Yes
Observations	4507	4359	2249	2142

Note: Models 3 and 4 are conditional fixed-effects logit. Constant terms are not reported as country fixed effects are conditioned out. Standard errors in parentheses. *p<.10; **p<.05; ***p<.01.
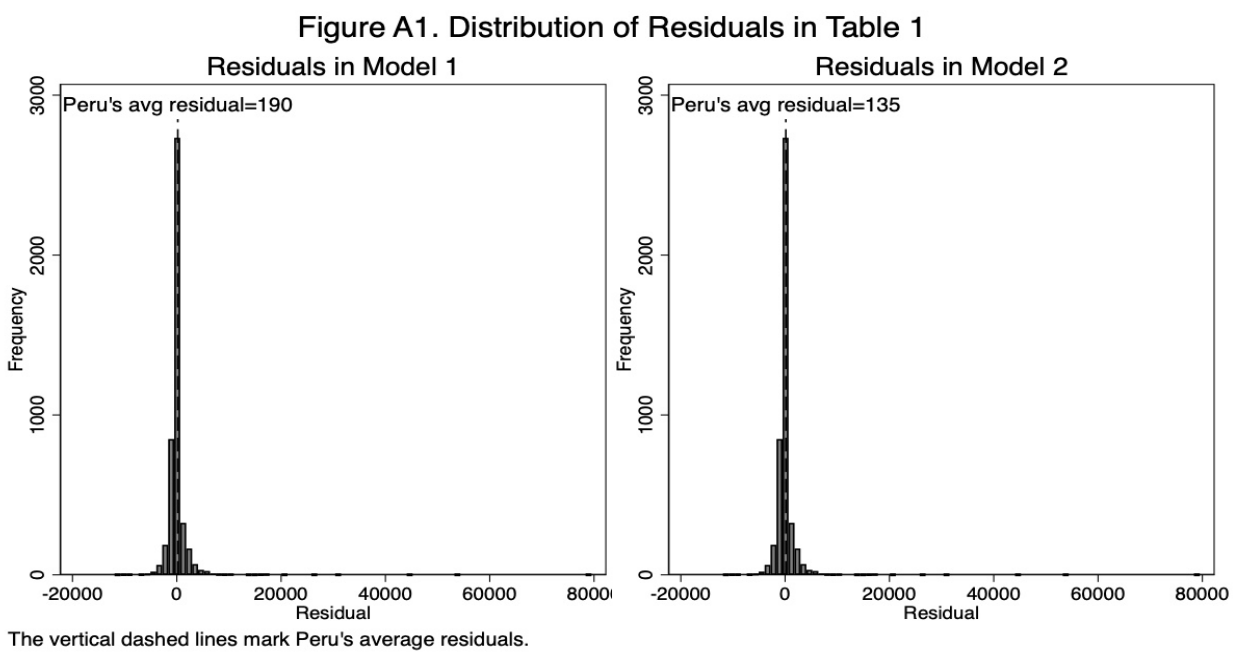
Figure A1. Distribution of Residuals in Table 1

Figure A1. Distribution of residuals in Model 1, Table 1. The vertical dashed lines mark Peru's average residuals (Model 1: 190; Model 2: 135), both of which are near-zero.