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Samia Costa

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Abstract

Natural disasters have been a major cause of human suffering. Countries with higher income, lower inequality, lower corruption, and more democratic regimes have been found to experience less casualties from disasters. Government repression, however, could also play a role in disaster preparedness. In particular, I examine whether governments that are deemed to be human rights violators, which may not expect to receive assistance, experience lower casualties due perhaps to greater investment in disaster preparedness. I find an inverse U-shaped relationship between repression and casualties, with countries at either end of the distribution experiencing lower fatalities.

JEL-Code: D700, H500, O000, F350.

Keywords: natural disasters, government repression, disaster preparedness, human rights.

Samia Costa
Department of Economics
University of St. Gallen
Rosenbergstrasse 51
9000 St. Gallen
Switzerland
samia.costa@unisg.ch

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1. Introduction

Natural disasters, such as earthquakes and windstorms, are exogenous events. The impact of a natural disaster, however, is not solely a function of its magnitude. Anbarci et al. (2005), Kahn (2005), Keefer et al. (2011), and Kellenberg and Mobarak (2008), for instance, show that higher income countries suffer lower casualties even though they are not affected by a smaller number of disasters than lower income countries. Kahn (2005) also finds that democracies and countries with lower inequalities suffer lower deaths. Anbarci et al. (2005) similarly find that lower inequality reduces the impact of natural disasters, while Escaleras et al. (2007) and Keefer et al. (2011) conclude that corruption raises the mortality from disasters. Toya and Skidmore (2007) find that more developed countries (higher income and educational attainment, greater openness and financial development, and lower government expenditures) suffer less deaths.

Although much work has been done examining the impact that these different factors have on disaster mortality due to the incentives they generate for disaster preparedness, the literature has not explored at length the effect of government repression. Cohen and Werker (2008) develop a model in which they introduce humanitarian aid, finding that it generates a "bailout effect," meaning that if governments know they will receive assistance in the event of a disaster, they will invest less in disaster prevention. In the case of "pariah" states, there could be two possibilities. On the one hand, such countries could invest more in disaster prevention because of an expectation that they will not receive assistance following a natural disaster.[1] On the other hand, they could simply report lower deaths. Another possibility is that repressive governments in these countries may invest more in prevention, as well as in disaster response, as a means to maintain power, especially when their hold is tenuous. In all

[1] Costa (2010) finds that human rights violators are less likely to receive disaster assistance from the US.

cases, the finding would be of a negative relationship between the extent of repression and natural disaster deaths.

In fact, Cohen and Werker (2008) note that in South Africa, the mortality rate from natural disasters rose by 10 percent after the end of Apartheid, while the overall mortality in Africa fell by more than 90 percent over the same period.

To my knowledge, the no empirical studies have been done on the effect of the degree of government repression and disaster mortality. Keefer et al. (2011) examine which political and economic factors affect government incentives to provide disaster prevention measures. They find, among other things, that fatalities are higher in autocracies in which ruling parties are less institutionalized. Raschky and Schwindt (2009) explore the impact of aid anticipation on disaster casualties. The authors show in a model that the mere anticipation of foreign aid can lead to higher rates of mortality from natural disasters. Examining the effect of aid, measured as total real ODA commitments per capita, on disaster mortality, they find that the expectation of receiving aid does in fact raise the death toll from wind storms, although the results are mixed in the case of floods and earthquakes.

In this paper, I empirically test whether countries whose governments are deemed to be repressive (and which hence may not expect to receive assistant) experience less disasters and lower mortality rates from natural disasters. I find that overall, countries with worse human rights records are no less likely to experience a natural disaster, but that they suffer higher casualties than countries with better human rights records. However, the relationship between repression and fatalities is an inverted U-shaped, so that countries at either end of the human rights distribution have lower casualties.

The paper is divided as follows. Section 2 provides a description of the data, while Section 3 outlines the empirical specification. Section 4 presents the results, while the last section concludes.

2. Data

This section discusses the data used in the analysis. In particular, I describe the different sources used for constructing the dependent variable, the three human rights indicators, and the various control variables. Summary statistics on all variables are provided in Table 1. The sample covers the period between 1987 and 2008.

Table 1: Summary Statistics

Variable	N	Mean	Std. Dev.	Min	Max
Disaster Variables					
# Killed	2459	293.7	3546	0	139434
# Affected	2459	1.235e+06	1.180e+07	0	2.530e+08
# Disasters	2459	0.264	1.042	0	20
# Earthquakes	2459	1.272	2.549	0	35
# Floods	2459	0.170	0.707	0	11
# Landslides	2459	0.838	2.463	0	29
# Wind Storms	2459	0.140	0.531	0	6
# Extreme Temperature	2459	293.7	3546	0	139434
Human Rights Variables					
PTS	2459	2.529	1.096	1	5
Physical Integrity	2459	3.218	2.291	0	8
Purges	2459	0.0207	0.187	0	5
Controls Variables					
Log ODA	2459	3.977	2.886	0	10.09
Democracy	2459	0.577	0.494	0	1
Log GDP per Capita	2459	8.554	1.341	5.067	11.36
Log Population	2459	16.32	1.508	12.41	21.00
Population Density	2459	140.0	514.4	1.433	6650
Log Land area	2459	12.43	1.751	6.507	16.61
Latitude	2459	0.294	0.194	0	0.722
Corruption	2459	2.925	1.333	0	6
% Urban	2459	55.68	22.62	8.500	100

Notes: Disaster variables are taken from EM-DAT. Among the human rights indicators, PTS is the Political Terror Scale, taken from Gibney et al. (2011); Physical Integrity is from Cingranelli and Richards (2010); and Purges is from Banks (2008). Among the control variables, Log ODA is the log of Official Development Assistance (non-humanitarian relief), taken from the OECD; Lag Disaster Response is the share of natural disasters that received assistance the previous year, obtained from OCHA, Democracy takes a value of 1 if the country is democratic (from Cheibub et al., 2009), log population, population density, log land area, and percent urban are taken from the World Development Indicators, log GDP per capita is from the Penn World Tables, Corruption is the ICRG index, and latitude is from La Porta et al. (1999).

2.1. Natural Disaster Fatalities

Information on the number of deaths from natural disasters is taken from the Emergency Disasters Data Base (EM-DAT), which is maintained by the Centre for Research on the Epidemiology of Disasters (CRED) at the Université Catholique de Louvain.[2] The number of casualties is defined as "persons confirmed as dead and persons missing and presumed dead." Recorded disasters include natural, technological (such as transport accidents), and complex disasters (famines). For the purposes of this paper, I restrict the sample to earthquakes, floods, landslides, windstorms, and extreme temperature events (heat or cold waves).

Disasters are recorded in the database if at least one of the following criteria is met: (1) 10 or more people reported killed; (2) 10 or more people reported affected; (3) a state of emergency is declared; (4) international assistance is requested.

2.2. Government Repression

I obtain a measure of repression from the Political Terror Scale (PTS).[3] The PTS is a measure of political violence and terror experienced by a country in a given year. It is concerned strictly with state terror; in other words, actual "violations of physical or personal integrity rights carried out by a state (or its agents)" (Wood and Gibney, 2010). The data used to construct this index are taken from yearly country reports by Amnesty International and from the State Department's Country Reports on Human Rights Practices.

The index varies between 1 and 5, with higher values denoting poorer human rights. More specifically, level 5 denotes countries in which "terror has expanded to the whole population. The leaders of these societies place no limits on the means or thoroughness with which they pursue personal or ideological goals." Level 4 countries are those where "civil

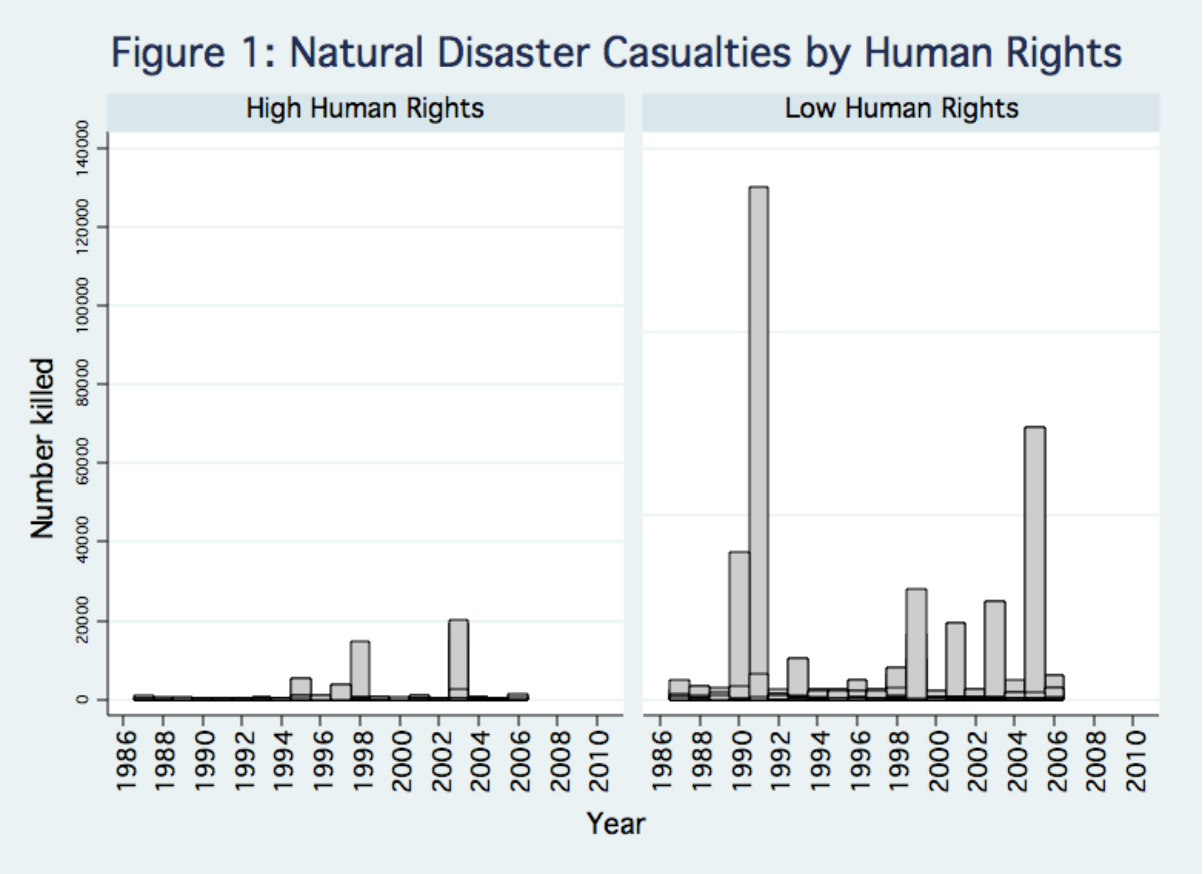
2 http://www.em-dat.net/
3 See http://www.politicalterrorscale.org/about.php for more information.

and political rights violations have expanded to large numbers of the population. Murders, disappearances, and torture are a common part of life. In spite of its generality, on this level terror affects those who interest themselves in politics or ideas." In Level 3 countries "there is extensive political imprisonment, or a recent history of such imprisonment. Execution or other political murders and brutality may be common. Unlimited detention, with or without a trial, for political views is accepted," while in Level 2 countries "there is a limited amount of imprisonment for nonviolent political activity. However, few persons are affected, torture and beatings are exceptional. Political murder is rare." Finally, Level 1 includes "countries under a secure rule of law, people are not imprisoned for their views, and torture is rare or exceptional. Political murders are extremely rare." I use the average of the two scores as the human rights indicator, but in Appendix Table 1, I experiment with each indicator separately.

Figure 1 shows the number of casualties over time for repressive governments, which are defined, as in Besley and Persson (2009) as those with a Political Terror Scale score of 3 and above, and countries with no or very low repression. It suggests that countries deemed to have repressive governments have higher death toll from disasters.

An alternative to the PTS dataset is the Cingraneli and Richard's (2010) CIRI Database. In particular, I use the Physical Integrity index, which is an additive indicator constructed from the Torture, Extrajudicial Killing, Political Imprisonment, and Disappearance indices. It takes values between 0 (denoting no respect for the four rights) to 8 (full government respect). To be consistent with the Political Terror Scale, I rescale the index so that higher values denote worse human rights.

Each component index varies from 0 to 2, with 0 denoting that the relevant violation took place frequently, 1 indicating that it occurred occasionally, and 2 that it never took place in a given year. Torture "refers to the purposeful inflicting of extreme pain, whether mental or physical, by government officials or by private individuals at the instigation of government



Note: Human rights are measured using the Political Terror Scale. Countries defined as having high human rights are those with PTS scores below 3.

officials." Extrajudicial killings are defined as "killings by government officials without due process of law. They include murders by private groups *if* instigated by government."

Political Imprisonment denotes "the incarceration of people by government officials because of: their speech; their non-violent opposition to government policies or leaders; their religious beliefs; their non-violent religious practices including proselytizing; or their membership in a group, including an ethnic or racial group," while Disappearances "are cases in which people have disappeared, political motivation appears likely, and the victims have not been found."[4]

Cingraneli and Richard (1999) argue that this measure is an improvement over the PTS because it allows one to examine which physical integrity right is violated, as well as which right is violated first. However, as Reed and Gibney (2010) point out, this index is

[4] See http://ciri.binghamton.edu/documentation/ciri_coding_guide.pdf for coding guidelines.

problematic. For instance, it is not clear that the different categories that make up physical integrity (disappearances, killing, torture, and imprisonment) are equivalent, as assumed. Secondly, it presumes a degree of accuracy that is hard to be obtained—for example, a score of 1 in the torture category means that there were between 1 and 49 instances of torture in a given country, something that is very hard to measure with certainty. There is also no justification provided for these thresholds, or any evidence that population size is taken into account. Because both measures are problematic, I present results using each index.

In addition, I also experiment with measuring human rights using the number of purges events, which is taken from Banks' Cross-National Time-Series Data Archive. This variable measures "any systematic elimination by jailing or execution of political opposition within the ranks of the regime or the opposition" (Banks 2008). As Besley and Persson (2009) note, the Banks measure is more conservative than the Political Terror Scale.

2.3. Additional Controls

To account for other possible factors that may affect the number of casualties from natural disasters, I further include the number of disasters, the log of GDP per capita, the percent of the population living in urban areas, population density, the log of population, the log of development aid, a democracy indicator, corruption, the log of land area, and the absolute value of latitude, as well as a time trend.

I generate a count of the number of natural disasters that took place in a given country and year using data from EM-DAT. Countries that experienced more natural disasters are expected to suffer greater casualties.

The log of per capita income is taken from the Penn World Tables, and is PPP converted using the Laspeyres index, at 2005 constant prices. Kahn (2005), Strömberg (2007), Cohen and Werker (2008), and Keefer et al. (2011) find that richer countries have

lower mortality rates from natural disasters. Kellenberg and Mobarak (2008) find that the relationship between income and disaster risk is non-linear, increasing initially before falling in the case of floods, landslides, and windstorms.

I also include the log of land area, the log of population, population density, and the percentage of the population living in urban areas, all from the World Development Indicators. Cohen and Werker (2008) argue that because smaller countries are less able to smooth disaster relief, they invest more in disaster preparedness and hence experience lower mortality from disasters. Also, countries with larger populations and those that are more densely populated have more people who are potentially at risk from a natural disaster. As for urbanization, Kellenberg and Mobarak (2008) find that in the case of earthquakes, low income but highly urbanized countries experience more casualties, whereas the same countries have lower deaths following landslides and windstorms.

Data on development aid is total official development assistance (ODA), excluding humanitarian assistance, and is taken from the OECD. This can be viewed as one way to account for the "Samaritan's dilemma" (Buchanan, 1975; Coate, 1995), which refers to the moral hazard problem generated from the fact that because a country received development assistance, it may underinvest in disaster mitigation in the expectation of a bailout, thus resulting in a greater number of casualties and people affected by the disaster. As mentioned in the introduction, Raschky and Schwindt (2009) find that having received foreign aid is associated with higher deaths from windstorms, though the effect is ambiguous in the case of floods and earthquakes.

Kahn (2005) and Keefer et al. (2011) find that democracies have lower death tolls. Cohen and Werker (2008) argue that this is because in democracies governments place a greater weight on social welfare and so will invest more in disaster preparedness. To measure

democracy, I use the Cheibub et al. (2009) dichotomous indicator.[5] Under their classification, the dummy variable takes a value of 1 if the country's regime is democratic, which is defined as regimes fulfilling all of the following rules: 1. The chief executive is selected directly by popular election or indirectly by a body that was itself chosen by popular election, 2. the legislature is also popularly elected, 3. more than one party competes in elections, 4. the incumbent is replaced under the same electoral rules under which he was elected.

Kahn (2005) further posits that better institutional quality decreases the number of deaths. To account for institutional quality, I include the corruption perception index from the International Country Risk Guide (ICRG). The ICRG corruption index provides an appraisal of corruption within the political system. It is based on the opinion of experts, and aims to provide potential investors with an assessment of political risk. In other words, the index measures the risk associated with corruption, not the actual level of corruption.[6]

The index varies from 0 to 6, with higher values denoting lower levels of corruption. The data are a simple average of monthly indices, which makes it continuous between 0 and 6. For ease of interpretation, I reverse the index. The advantage of using the ICRG index is that it is available for a longer time period. It is also highly correlated to other measures of corruption perception (see Treisman, 2000, for more details). Using the same corruption indicator, Escaleras et al. (2007) show that higher corruption is associated with greater casualties from earthquakes.[7]

[5] I also experimented using the Polity2 indicator, taken from the Polity IV database, and the conclusions were unchanged. Results are available upon request.

[6] Political Risk Services, which publishes the ICRG index, states that "the greatest risk in such corruption is that at some time it will become so overweening, or some major scandal will be suddenly revealed, as to provoke a popular backlash, resulting in a fall or overthrow of the government, a major reorganizing or restructuring of the country's political institutions, or, at worst, a breakdown in law and order, rendering the country ungovernable." See http://www.prsgroup.com/ICRG_Methodology.aspx

[7] I also experimented using ethnic fractionalization and average risk of expropriation as measures of institutional quality, but the conclusions were unchanged. Cohen and Werker (2008) argue that countries with higher ethnic fragmentation have higher mortality rates, since governments will invest less in disaster prevention in areas that are hostile. When measuring institutional quality using ethnic fragmentation, he finds that it is insignificant in explaining earthquake deaths, but that in zero-inflated negative binomial estimates, countries that are more highly fragmented actually have lower deaths.

Finally, following Kahn (2005), I include the absolute value of latitude, taken from La Porta et al. (1999), and continental dummies (Africa, Asia, America, Europe, with Oceania as the omitted category) to control for geographic factors. Both latitude and the location dummies capture risk factors to particular natural disasters that do not change over time.

3. Empirical Specification

My empirical specification seeks to answer two questions. First, I examine whether countries whose governments are deemed to be repressive experience more natural disasters. Second, I explore whether the number of fatalities from natural disasters is smaller in these countries.

3.1. Incidence of Natural Disasters

The first step is to analyze whether human rights violators are more likely to experience a natural disaster. This is important because it could be that countries with repressive governments experience more or less deaths simply because they have a higher or lower incidence of disasters. To explore this possibility, I estimate the following equation:

$$Prob\left(disaster_{idt}\right) = f\left(HR_{it}, LogIncome_{it}, LogPop_{it}, Geography_{i}, Trend_{t}\right) \qquad (1)$$

where $disaster_{idt}$ takes a value of 1 if disaster *d* occurred in country *i* at time *t*, HR_{it} is the relevant human rights indicator; $LogIncome_{it}$ and $LogPop_{it}$ are the log of per capita income and the log of population, respectively; $Geography_{i}$ are the geographic indicators (log of land area, latitude, and continent dummies); and $Trend_{t}$ denotes a time trend. I estimate both a probit and a fixed effects logit.

3.2. Government Repression and Fatalities

I use a balanced panel at the country-year level to estimate the effect of government repression on casualties from earthquakes, floods, landslides, windstorms, and extreme temperature events. I include only countries that experienced at least one natural disaster during the period of interest.

Because the total number of deaths from natural disasters is a non-negative count, and due to overdispersion in the data, I estimate a zero-inflated negative binomial (ZINB) model. The ZINB model allows for the fact that an observation of zero deaths may be simply due to the fact that the country did not experience a natural disaster in a given year. In other words, it introduces a splitting mechanism, whereby a zero-count model is estimated via logit, with the dependent variable taking a value of 1 if there were no natural disaster deaths in a given country and year. Following Kahn (2005), I include the number of natural disasters, as well as interactions between the number of disasters and income and population as explanatory variables.

The log likelihood function is given by:

$$L = \sum_{i \in S} \ln\left[F\left(z_i\gamma\right) + \left\{1 - F\left(z_i\gamma\right)\right\} p_i^m\right] + \sum_{i \in S}\begin{bmatrix}\ln\left\{1 - F\left(z_i\gamma\right)\right\} + \ln\Gamma\left(m + y_i\right) \\ -\Gamma\left(y_i + 1\right) - \ln\Gamma\left(m\right) + m\ln p_i + y_i \ln\left(1 - p_i\right)\end{bmatrix} \quad (2)$$

$$m = 1/\alpha$$

$$p_i = 1\sqrt{1 + \alpha\exp\left(x_i\beta\right)}$$

where F is the logit link function, Γ is the gamma distribution, and S is the set of country-year observations where there were no natural disaster casualties.

For the non-zero count model, the control variables are the human rights indicator, the number of disasters, income, population, percent urban, population density, land area, latitude, the democracy indicator, the institutional measure, region dummies, and a time trend.

4. Results

In this section I discuss the results of the empirical analysis. Table 1 presents the results examining the relationship between government repression and the likelihood of a natural disaster, while in Table 2, I estimate ZINB models for all disasters exploring whether human rights violators experience more casualties. In Table 4, I investigate potential non-linearities in the impact of the perceived human rights situation in a country, while in Table 5 and 6, I test the robustness of the results to including a measure of inequality, and the share of disasters that received assistance in the previous year, respectively. Table 7 examines the roles of government stability and income. Tables 8-12 provides the results for earthquakes, floods, landslides, wind storms, and extreme temperature events separately, while Table 13 explores the effect of human rights on the total number of people affected by the natural disaster.

4.1. Do Countries with Repressive Governments Experience More Natural Disasters?

Table 2 examines whether countries with worse human rights records are more likely to experience a natural disaster. In all cases, regardless of the human rights measure, I find that human rights are insignificant in explaining the probability of a natural disaster taking place in a given country. This provides some assurance that any finding that human rights plays a role in explaining the level of casualties is not driven by a relationship between human rights and the incidence of disasters.

The results however suggest that larger countries, measured either as by population or land area, are more likely to experience a natural disaster, while the coefficient on the trend variable indicates that the incidence of natural disasters has been increasing.

Table 2: Explaining the Incidence of Natural Disasters

	(1)	(2)	(3)	(4)	(5)	(6)
	Political Terror Scale		*Physical Integrity*		*Purges*	
	Probit	*FE Logit*	*Probit*	*FE Logit*	*Probit*	*FE Logit*
Human Rights	-0.016	-0.090	-0.005	0.012	-0.068	-0.045
	(0.021)	(0.102)	(0.010)	(0.047)	(0.065)	(0.332)
Log GDP per capita	-0.033	-0.836**	-0.031	-0.624	-0.028	-0.690*
	(0.023)	(0.375)	(0.022)	(0.437)	(0.021)	(0.399)
Log Population	0.210***	-0.077	0.211***	0.007	0.210***	-1.088
	(0.019)	(0.932)	(0.019)	(0.995)	(0.019)	(0.983)
Log Area	-0.006	18.039***	-0.005	18.053***	-0.010	19.512***
	(0.016)	(2.787)	(0.016)	(2.868)	(0.016)	(2.055)
Latitude	-0.090		-0.116		-0.030	
	(0.189)		(0.188)		(0.187)	
Trend	0.019***	0.130***	0.018***	0.123***	0.016***	-0.822***
	(0.003)	(0.025)	(0.003)	(0.027)	(0.004)	(0.022)
Observations	2,572	2,702	2,486	2,615	2,450	2,580
Pseudo R-Squared	0.2685	0.2211	0.2677	0.2263	0.2641	0.2189
Log Likelihood	-1277.2330	-923.0832	-1228.7876	-884.2172	-1227.1988	-882.8984

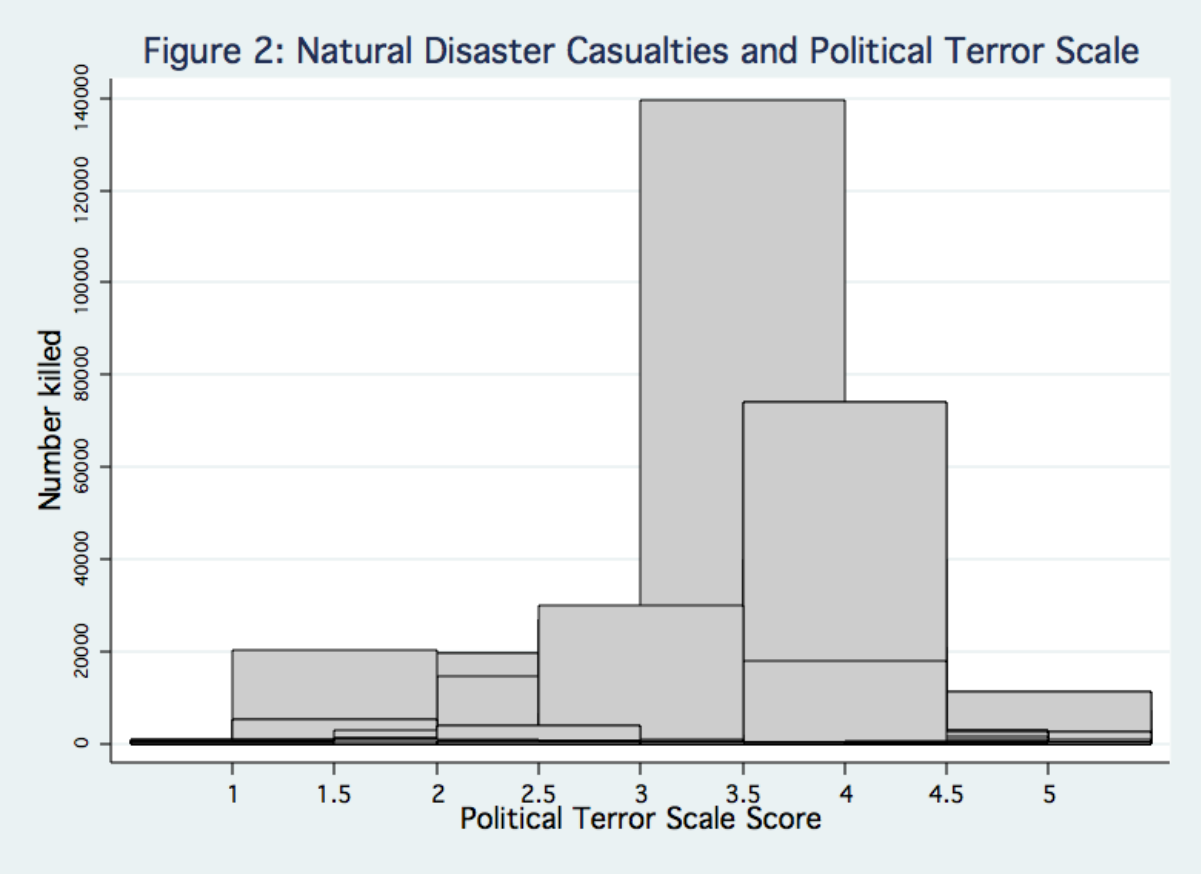
Notes: Dependent variable equals 1 if the country experienced a natural disaster in a given year. Robust standard errors clustered by country in parenthesis. *** denotes significance at the 1% level; ** at the 5% level; and * at the 10% level. All regressions include continent and year fixed effects.

4.2. Government Repression and Natural Disaster Casualties

Examining fatality counts using a ZINB model on all natural disasters (earthquakes, floods, landslides, windstorms, and extreme temperature) in Table 3, I find that when repression is measured using the political terror scale, the worse the human rights record the higher the number of fatalities. The same is true when using the physical integrity index as the measure of violations. When I use purges, however, the results suggest that countries that experience more purge events actually have lower mortality rates. Furthermore, and as expected, larger populations are associated with more casualties.

In Appendix Table 1, I disaggregate the Political Terror index into the Amnesty International and the State Department scores, with lower values indicating better human rights. In Appendix Table 2, the Physical Integrity Index is split into its components, namely, Torture, Extrajudicial Killings, Political Prisoners, and Disappearances, with higher values denoting better human rights records.

Columns 1 and 3 of Appendix Table 1 suggest that the impact of government repression on disaster casualties is the same regardless of whether I use the Amnesty International or the State Department-based scores. In particular, the relationship observed in Figure 2, where casualties are lower at each end of the human rights distribution, still holds. The log of population is still positively correlated with fatalities, as is corruption in the case of the Amnesty International sample. The results also suggest a negative trend in casualties.



Note: Higher Political Terror Scale scores denote worse human rights. Data are from Wood and Gibney (2010).

Table 3: Government Repression and the Number of Casualties

	(1)	(2)	(3)	(4)	(5)	(6)
	Political Terror Scale		*Physical Integrity*		*Purges*	
Government Repression	0.519***	0.448**	0.229***	0.215***	-0.259***	-0.402***
	(0.140)	(0.175)	(0.065)	(0.076)	(0.086)	(0.096)
Number disasters	0.066	0.044	0.032	0.024	0.036	0.017
	(0.045)	(0.041)	(0.038)	(0.035)	(0.040)	(0.034)
Log GDP per capita	-0.143	-0.200	-0.073	-0.036	-0.276	-0.187
	(0.240)	(0.283)	(0.240)	(0.285)	(0.257)	(0.311)
% Urban	0.008	0.010	0.007	0.009	0.010	0.010
	(0.012)	(0.016)	(0.013)	(0.016)	(0.012)	(0.016)
Population Density	0.001	0.000	0.001	0.001	0.001	0.001
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Log Population	0.535***	0.624***	0.668***	0.677***	0.684***	0.709***
	(0.150)	(0.175)	(0.125)	(0.156)	(0.165)	(0.184)
Log ODA	0.027	0.006	0.097	0.086	0.028	0.026
	(0.091)	(0.082)	(0.088)	(0.085)	(0.097)	(0.084)
Trend	-0.046**	-0.048*	-0.031	-0.039	-0.012	-0.024
	(0.022)	(0.029)	(0.022)	(0.028)	(0.023)	(0.029)
Democracy	0.095	0.218	0.135	0.284	-0.224	-0.094
	(0.346)	(0.391)	(0.302)	(0.359)	(0.353)	(0.392)
Corruption		0.265		0.202		0.348**
		(0.180)		(0.166)		(0.149)
Log Area	-0.123	-0.164	-0.152	-0.193	-0.062	-0.100
	(0.144)	(0.185)	(0.126)	(0.169)	(0.170)	(0.200)
Latitude	-1.406	-0.463	-0.553	-0.219	-2.142	-1.005
	(1.792)	(2.047)	(1.698)	(1.896)	(2.046)	(2.196)
ZINB						
# Disasters	-23.649***	-20.454***	-24.212***	-21.789***	-23.994***	-20.697***
	(1.862)	(2.584)	(2.150)	(2.644)	(1.875)	(2.747)
Log Pop*#Disasters	-0.061	-0.170	-0.011	-0.087	-0.058	-0.239*
	(0.090)	(0.126)	(0.112)	(0.137)	(0.085)	(0.135)
Log GDP/capita*#Disasters	0.277**	0.217	0.268**	0.236	0.271*	0.239
	(0.135)	(0.151)	(0.128)	(0.153)	(0.146)	(0.168)
Constant	87.780**	90.037	55.590	70.071	18.383	41.129
	(44.235)	(58.129)	(44.122)	(55.484)	(47.000)	(57.744)
Alpha	21.809***	20.909***	21.581***	20.674***	21.946***	21.861***
	(0.018)	(0.022)	(0.651)	(0.195)	(0.501)	(0.883)
Log Alpha	1.458***	1.446***	1.447***	1.442***	1.391***	1.368***
	(0.016)	(0.016)	(0.016)	(0.016)	(0.017)	(0.018)
Observations	3,520	2,702	3,278	2,615	3,489	2,580
Zero observations	2244	1590	2035	1515	2200	1465
Log Likelihood	-8162.2950	-7189.8354	-7952.7068	-7116.6364	-8131.8869	-7120.3001

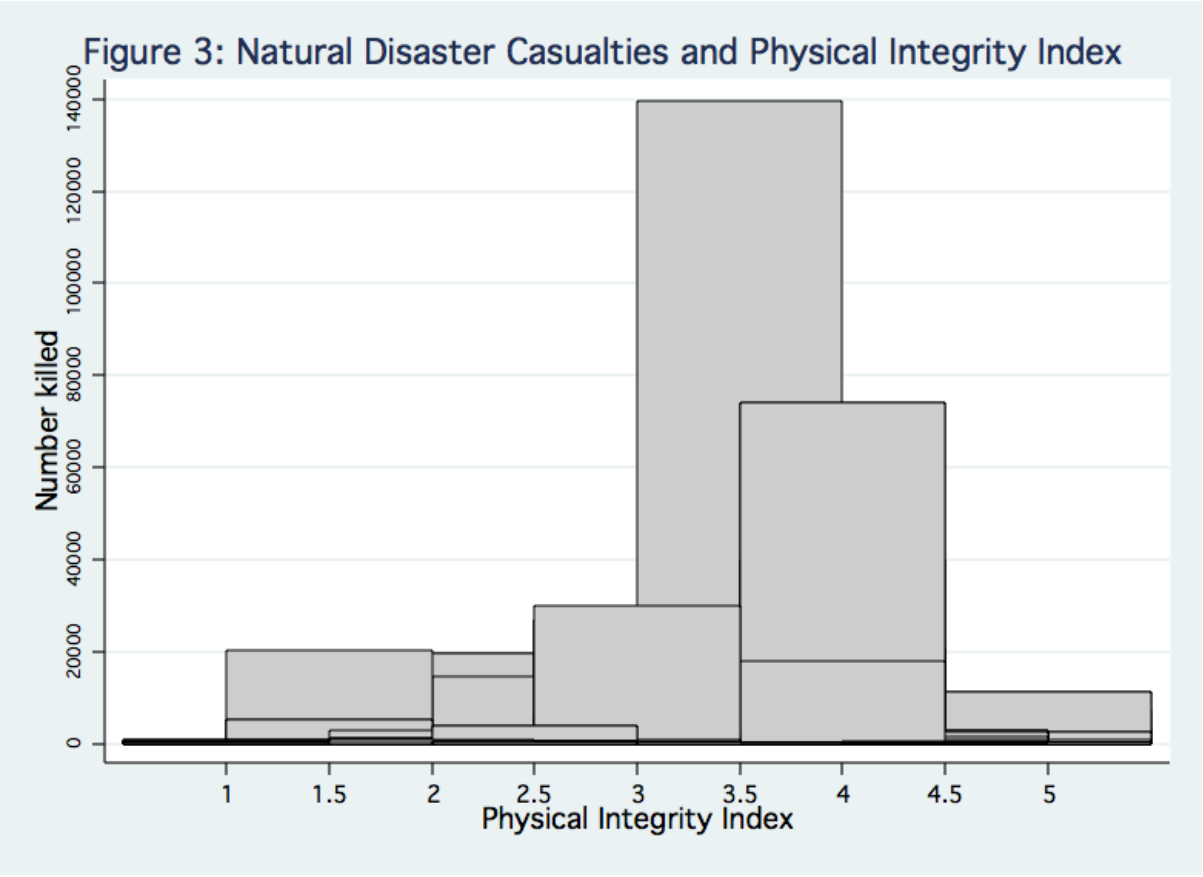
Notes: Dependent variable is the number killed. Robust standard errors clustered by country in parenthesis. *** denotes significance at the 1% level; ** at the 5% level; and * at the 10% level. All regressions include continent fixed effects.

In the case of the Physical Integrity index components, I find in the odd-numbered columns that countries with lower levels of torture and extrajudicial killings suffer lower

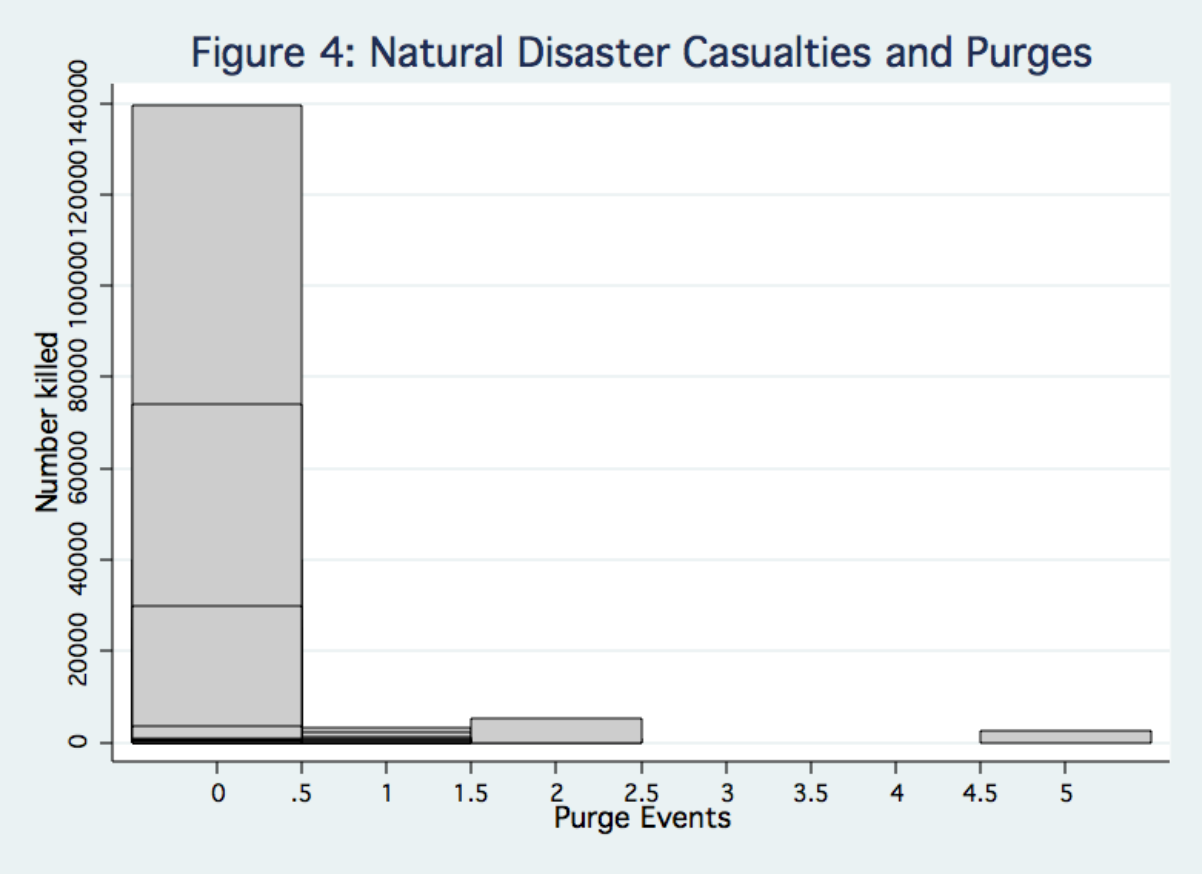
casualties, while when considering disappearances, it is those countries at either end of the distribution. Political prisoners, however, seem to have no impact on casualties. I still find that the log of population is positively correlated with casualties and that there is a negative trend associated with fatalities.

4.3. Examining Potential Non-Linearities

As suggested in Figures 2-4, as well as Cohen and Werker (2008), it is possible that the relationship between government repression and casualties is non-linear. In other words, countries with the best and the worst human rights records may experience less natural disaster deaths than those in the mid-range of the human rights score distribution, due perhaps to greater investment in disaster preparedness.



Note: Higher Physical Integrity index scores denote worse human rights. Data are from Cingranelli and Richards (2010).



Note: Purge events data are taken from Banks (2008).

To test for this possibility, I include in Table 4 a quadratic term to account for the possibility that the effect of human rights violations on disaster casualties is non-linear. When measuring repression using the Political Terror Scale or the CIRI Physical Integrity Index, I find, as suggested in Figures 2 and 3, that the number of casualties rises the worse the degree of repression only up to a point, only to fall for the worst human rights violators. In particular, the results suggest that the turning point occurs at a score between 3.5 and 3.7 in the Political Terror Scale, and between 5.8 and 6.2 in the Physical Integrity Index. As before, I find that larger populations are associated with higher casualties.

I find similar results when disaggregating the PTS score in Appendix Table 1 and the physical integrity indicator in Appendix Table 2. In particular, columns 2 and 4 of Appendix Table 1 suggest that the relationship between casualties and human rights still exhibit the

Table 4: Non-Linearity in Effect of Government Repression on Disaster Casualties

	(1)	(2)	(3)	(4)	(5)	(6)
	Political Terror Scale		*Physical Integrity*		*Purges*	
Government Repression	2.723***	3.276***	0.657***	0.763***	-1.122***	-1.436***
	(0.646)	(0.612)	(0.179)	(0.186)	(0.403)	(0.553)
Government Repression Sq.	-0.365***	-0.468***	-0.053**	-0.066***	0.224***	0.264**
	(0.105)	(0.097)	(0.021)	(0.022)	(0.082)	(0.111)
Number disasters	0.094**	0.081*	0.045	0.041	0.039	0.020
	(0.045)	(0.044)	(0.039)	(0.038)	(0.039)	(0.035)
Log GDP per capita	-0.039	0.054	-0.085	-0.007	-0.283	-0.204
	(0.228)	(0.263)	(0.243)	(0.279)	(0.258)	(0.312)
% Urban	0.002	0.003	0.007	0.007	0.010	0.009
	(0.012)	(0.015)	(0.012)	(0.015)	(0.012)	(0.016)
Population Density	0.001	0.002	0.001	0.001	0.001	0.000
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Log Population	0.349**	0.342*	0.626***	0.569***	0.683***	0.709***
	(0.151)	(0.181)	(0.120)	(0.153)	(0.162)	(0.179)
Log ODA	-0.034	-0.034	0.067	0.068	0.027	0.026
	(0.082)	(0.077)	(0.089)	(0.088)	(0.097)	(0.084)
Trend	-0.059**	-0.063**	-0.036	-0.039	-0.014	-0.026
	(0.023)	(0.030)	(0.022)	(0.028)	(0.023)	(0.029)
Democracy	0.085	0.193	0.115	0.238	-0.237	-0.116
	(0.310)	(0.334)	(0.303)	(0.353)	(0.352)	(0.392)
Corruption		0.193		0.117		0.331**
		(0.172)		(0.150)		(0.150)
Log Area	-0.059	-0.026	-0.173	-0.182	-0.066	-0.097
	(0.134)	(0.169)	(0.119)	(0.161)	(0.167)	(0.198)
Latitude	-0.177	0.495	0.001	0.297	-2.056	-0.897
	(1.652)	(1.688)	(1.607)	(1.742)	(2.032)	(2.232)
ZINB						
# Disasters	-23.732***	-21.626***	-25.133***	-21.794***	-23.509***	-20.388***
	(1.926)	(2.671)	(2.451)	(2.601)	(1.822)	(2.736)
Log Pop*#Disaster	-0.073	-0.180	-0.020	-0.098	-0.059	-0.237*
	(0.090)	(0.126)	(0.110)	(0.136)	(0.085)	(0.135)
Log GDP/capita*#Disaster	0.270**	0.217	0.254**	0.227	0.273*	0.242
	(0.128)	(0.149)	(0.126)	(0.150)	(0.146)	(0.170)
Constant	111.801**	117.893**	65.615	70.561	22.584	44.478
	(46.265)	(59.276)	(45.252)	(56.079)	(47.058)	(58.334)
Alpha	22.144***	22.246***	22.786***	20.947***	21.460***	21.491***
	(0.576)	(0.586)	(0.971)	(0.024)	(0.321)	(0.833)
Log Alpha	1.432***	1.409***	1.436***	1.429***	1.389***	1.366***
	(0.016)	(0.017)	(0.016)	(0.017)	(0.017)	(0.018)
Turning Point	3.726***	3.502***	6.227***	5.795***	2.501***	2.723***
	(0.263)	(0.171)	(1.030)	(0.767)	(0.179)	(0.252)
Observations	3,520	2,702	3,278	2,615	3,489	2,580
Zero obs	2244	1590	2035	1515	2200	1465
Log Likelihood	-8138.7984	-7158.9893	-7944.0626	-7106.3653	-8130.2371	-7118.4520

Notes: Dependent variable is the number killed. Robust standard errors clustered by country in parenthesis. *** denotes significance at the 1% level; ** at the 5% level; and * at the 10% level. All regressions include continent fixed effects.

inverted U-shape regardless of whether it is measured using the Amnesty International or the State Department score. In the case of the components of the Physical Integrity index, the even numbered columns indicate that the effect of tortures, killings, and political prisoners is insignificant when the squared term is included, but that countries at either end of the disappearances distribution have lower casualties.

In the case of purges, I reach the opposite conclusion. In particular, the number of casualties initially falls as the number of purge events rise, only to rise again, with a turning point estimated around 2.5-2.7 purge events. As before, however, larger populations are associated with more fatalities.

4.4. Robustness Checks

To check for the robustness of the results, in Table 5 I further include inequality as a control variable, while in Table 6, I examine the role of previous disaster aid. In Table 7, I examine how the effect of the level of human rights differs depending on government stability and income.

4.4.1. Accounting for Inequality

Kahn (2005) and Anbarci et al. (2005) find that countries with greater inequality have higher mortality rates. To investigate whether the results are robust to including a measure of inequality, I experiment with including the GINI coefficient, taken from the World Income Inequality Database.[8]

The results in Table 5 show that the conclusions are unchanged for the Political Terror Scale and the CIRI Physical Integrity index. In particular, worse human rights records in both cases are correlated with higher casualties from natural disasters, with the number of

[8] http://www.wider.unu.edu/research/Database/en_GB/database/

Table 5: Accounting for Inequality

	(1)	(2)	(3)	(4)	(5)	(6)
	Political Terror Scale		*Physical Integrity*		*Purges*	
Government Repression	0.827***	3.701***	0.255**	0.781**	-0.461	-1.936
	(0.232)	(0.983)	(0.121)	(0.322)	(0.564)	(1.551)
Gov Repression Squared		-0.489***		-0.066*		0.896
		(0.157)		(0.035)		(0.650)
Number Disasters	0.013	0.051	0.004	0.018	0.007	0.005
	(0.031)	(0.046)	(0.028)	(0.033)	(0.035)	(0.034)
Log GDP per capita	0.348	0.306	0.236	0.175	0.087	0.064
	(0.411)	(0.435)	(0.409)	(0.418)	(0.450)	(0.457)
GINI	-0.016	-0.090	0.020	0.021	-0.012	-0.008
	(0.101)	(0.125)	(0.100)	(0.109)	(0.109)	(0.109)
Log ODA	-0.028	-0.036	-0.016	-0.023	-0.019	-0.021
	(0.025)	(0.024)	(0.026)	(0.026)	(0.028)	(0.029)
% Urban	-0.017	-0.018	-0.011	-0.010	-0.008	-0.008
	(0.017)	(0.017)	(0.017)	(0.018)	(0.018)	(0.018)
Population Density	0.000	0.000	0.001	0.002	0.000	-0.000
	(0.002)	(0.004)	(0.002)	(0.002)	(0.002)	(0.002)
Log Population	0.851**	0.740*	0.861***	0.767***	0.990***	1.018***
	(0.352)	(0.440)	(0.291)	(0.285)	(0.341)	(0.358)
Log Area	-0.294	0.044	-0.239	-0.228	0.071*	0.069*
	(0.315)	(0.033)	(0.263)	(0.260)	(0.037)	(0.037)
Trend	0.075**	-0.373	0.084**	0.084**	-0.269	-0.290
	(0.032)	(0.421)	(0.034)	(0.034)	(0.307)	(0.324)
Democracy	0.308	0.370	0.080	0.042	-0.631	-0.667
	(0.514)	(0.486)	(0.582)	(0.554)	(0.522)	(0.538)
Corruption	0.051	-0.066	0.064	-0.038	0.126	0.109
	(0.194)	(0.182)	(0.193)	(0.189)	(0.201)	(0.205)
Latitude	-4.106*	-2.308	-4.708**	-3.581	-6.350***	-6.302***
	(2.208)	(2.541)	(2.358)	(2.533)	(2.277)	(2.344)
ZINB						
# Disasters	-22.801***	2.217***	-19.858***	-19.098***	-14.472***	-14.454***
	(5.488)	(0.709)	(3.834)	(3.871)	(3.904)	(3.892)
Log Pop*#Disasters	-0.250	0.834	-0.248	-0.259	-0.283	-0.279
	(0.206)	(0.785)	(0.207)	(0.207)	(0.209)	(0.209)
Log GDP/capita*#Disaster	0.373	1.277	0.247	0.232	0.242	0.241
	(0.308)	(1.088)	(0.285)	(0.281)	(0.296)	(0.294)
Constant	-158.861**	1.471	-176.581**	-175.464**	-148.184**	-144.418**
	(62.689)	(1.412)	(69.000)	(68.782)	(73.010)	(73.164)
Alpha	22.650***	-22.391***	20.830	20.385***	16.036***	15.965***
	(4.054)	(4.967)	(0.467)	(0.433)	(0.146)	(0.147)
Log Alpha	1.330***	-0.262	1.358***	1.346***	1.381***	1.379***
	(0.026)	(0.208)	(0.026)	(0.026)	(0.026)	(0.026)
Observations	1,013	0.327	1,021	1,021	1,031	1,031
Zero obs	486	(0.303)	490	490	498	498
Log Likelihood	-3365.8477	-97.876	-3402.5181	-3397.7274	-3424.1554	-3423.7084

Notes: Dependent variable is the number killed. Robust standard errors clustered by country in parenthesis. *** denotes significance at the 1% level; ** at the 5% level; and * at the 10% level. All regressions include continent fixed effects.

casualties being lower at the highest and lowest levels of human rights. The number of purges, however, is now insignificant in explaining the number of casualties.

Furthermore, the results suggest once more that larger populations are correlated with more casualties, while countries that are closer to the Equator have more fatalities.

4.4.2. Including Share of Disasters that Received Assistance

One possible explanation as to why countries with more repressive governments may suffer lower casualties from a natural disaster is that these countries do not expect to receive disaster assistance, and hence invest more on disaster preparedness. In addition, previous disaster assistance may create a moral hazard problem, so that countries invest less in preparedness in anticipation of a bailout. To evaluate these arguments, I test whether including a variable measuring the share of natural disasters in a given country that received assistance the previous year has an effect on the relationship between human rights and casualties.

Data on disaster assistance is taken from OCHA, which is the United Nations Office for the Coordination of Humanitarian Affairs. In particular, data are obtained from its ReliefWeb Financial Tracking Service (FTS), which is a database providing all reported international humanitarian aid.[9] These include aid from non-governmental organizations, bilateral aid, in-kind aid, and private donations. Note that because reporting is strictly voluntary, the data are far from comprehensive.

From this dataset I generate a variable that is equal to the share of natural disasters that received assistance the previous year. I then experiment with including this variable as an additional regressor or interacting it with the relevant human rights indicator.

[9] http://ocha.unog.ch/fts2/

Results, shown in Table 6, suggest that there is no difference in the impact of human rights violations on casualties between countries that received disaster relief the previous year and those that did not. In particular, I still find that countries at either end of the human rights distribution (measured using the PTS and Physical Integrity Index) suffer lower casualties, while those with highest and lowest number of purge events have more deaths. This suggests that the expectation of not receiving disaster assistance may not explain the observed relationship between government repression and casualties.

4.4.3. The Role of Income and Government Stability

Another possible non-linearity may arise from the interaction between human rights and government stability and income. Human rights violators with greater government stability may underinvest in disaster prevention because of a lower threat of unrest that could lead to a change in power.

In the case of income, Kellenberg and Mobarak (2008) find that casualties from floods, landslides, and windstorms rise with income up to a point, then decrease afterwards. This is because for countries at the low end of the income distribution, the marginal benefit of increasing income is greater than the marginal cost from increased natural disaster risk. The higher disaster risk, in turn, arises from consumers in these countries being more averse towards diverting resources towards disaster mitigation. After a certain level of income, citizens may value disaster mitigation more, so disaster risk falls. Furthermore, as countries get wealthier, changes in location choice and urbanization may also increase the disaster risk.

Government stability is taken from ICRG, and measures "both of the government's ability to carry out its declared program(s), and its ability to stay in office."[10] The index takes values between 0 and 12, and as with the corruption indicator, higher values denote greater risk of government instability.

[10] See http://www.prsgroup.com/ICRG_Methodology.aspx.

Table 6: Accounting for Previous Disaster Assistance

	(1)	(2)	(3)	(4)	(5)	(6)
	Political Terror Scale		*Physical Integrity*		*Purges*	
Government Repression	2.626***	0.369**	0.590***	0.139*	-3.303***	-2.181***
	(0.679)	(0.186)	(0.207)	(0.078)	(0.760)	(0.581)
Gov Repression Squared	-0.385***		-0.050**		1.069**	
	(0.109)		(0.024)		(0.543)	
Repression*Lag Response		-0.285		0.118		1.135**
		(0.353)		(0.125)		(0.481)
Lag Response	0.431	1.408	0.673**	0.196	0.456	0.367
	(0.314)	(1.144)	(0.305)	(0.613)	(0.323)	(0.309)
Number Disasters	0.086*	0.069	0.044	0.025	0.049	0.047
	(0.045)	(0.047)	(0.038)	(0.032)	(0.039)	(0.038)
Log GDP per Capita	-0.070	-0.194	0.030	0.003	-0.235	-0.242
	(0.272)	(0.267)	(0.265)	(0.272)	(0.303)	(0.299)
% Urban	0.015	0.020	0.016	0.016	0.019	0.018
	(0.013)	(0.013)	(0.013)	(0.013)	(0.014)	(0.015)
Population Density	-0.001	-0.002***	-0.001	-0.001***	-0.002**	-0.002**
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Log Population	0.699***	0.847***	0.876***	0.951***	0.936***	0.919***
	(0.148)	(0.134)	(0.115)	(0.107)	(0.132)	(0.135)
Log ODA	-0.037	-0.022	0.080	0.092	-0.008	-0.003
	(0.086)	(0.089)	(0.088)	(0.084)	(0.096)	(0.095)
Trend	-0.121***	-0.110**	-0.065	-0.069*	-0.074*	-0.045
	(0.041)	(0.043)	(0.040)	(0.040)	(0.042)	(0.040)
Corruption	0.253	0.272	0.086	0.117	0.277*	0.296**
	(0.170)	(0.172)	(0.141)	(0.154)	(0.148)	(0.146)
Democracy	0.025	-0.007	0.150	0.157	-0.242	-0.128
	(0.302)	(0.325)	(0.286)	(0.288)	(0.332)	(0.332)
Log Area	-0.322**	-0.374***	-0.419***	-0.407***	-0.365**	-0.349**
	(0.136)	(0.134)	(0.127)	(0.128)	(0.149)	(0.153)
Latitude	0.739	-0.607	0.188	-0.375	-0.962	-0.924
	(1.510)	(1.808)	(1.585)	(1.695)	(1.949)	(1.924)
ZINB						
# Disasters	-22.030***	-21.873***	-21.786***	-21.885***	-25.359***	-23.945***
	(2.419)	(2.525)	(2.453)	(2.463)	(3.257)	(3.142)
Log Pop*#Disasters	0.965***	0.957***	0.945***	0.948***	0.193	0.140
	(0.115)	(0.118)	(0.126)	(0.127)	(0.177)	(0.169)
Log GDP/capita*#Disasters	0.190**	0.190*	0.210**	0.215**	0.071	0.061
	(0.094)	(0.098)	(0.105)	(0.108)	(0.154)	(0.148)
Constant	233.411***	212.436**	122.184	129.119	141.738*	84.241
	(81.991)	(85.463)	(80.601)	(80.505)	(84.731)	(81.057)
Alpha	4.994***	4.958***	4.840***	4.842***	21.481***	21.031***
	(0.449)	(0.454)	(0.488)	(0.493)	(0.760)	(0.299)
Log Alpha	1.417***	1.440***	1.411***	1.418***	1.378***	1.361***
	(0.023)	(0.024)	(0.026)	(0.027)	(0.018)	(0.019)
Observations	2,023	2,023	1,960	1,960	1,774	1,892
Zero obs	1152	1152	1099	1099	950	1019
Log Likelihood	-5565.6988	-5581.3830	-5506.2317	-5510.0011	-5186.2460	-5503.6301

Notes: Dependent variable is the number killed. Robust standard errors clustered by country in parenthesis. *** denotes significance at the 1% level; ** at the 5% level; and * at the 10% level. All regressions include continent fixed effects.

The results are presented in Table 7. They suggest that although higher risk from government instability is associated with more casualties, the impact of human rights is no different between more and less stable countries.

In the case of income, however, I find that for low income countries, worse human rights records reduces the number of casualties, while for high income countries, the number of deaths rises as the level of government repression, as measured by the Political Terror Scale and the Physical Integrity index, increases. This means that the degree of repression reverses the relationship between income and casualties found by Kellenbeg and Mobarak (2008). When measuring human rights using purge events, however, I find instead that low-income countries with more purges have higher casualties than high-income countries with the same level of repression.

4.5. Government Repression and Casualties by Disaster Type

In Tables 8-12, I examine the effect of government repression on disaster-specific casualties. In Table 8, I examine the case of earthquakes; Table 9 explores the impact of human rights violations on casualties from floods; Table 10 presents the estimates for the case of landslides; while Tables 11 and 12 examine the cases of windstorms and extreme temperature events.

The results suggest that countries with worse human rights records, as measured by the Political Terror Scale or the Physical Integrity Index, experience greater casualties from Earthquakes, while the impact of purges is now smaller for both ends of the distribution. The number of earthquakes affecting a country in a given year and the size of population are both positively related to the number of fatalities, while the trend variable suggests that earthquake casualties have been falling.

Table 7: Interactions with Government Stability and Income

	(1)	(2)	(3)	(4)	(5)	(6)
	Political Terror Scale		*Physical Integrity*		*Purges*	
Government Repression	1.168***	-1.643*	0.304	-0.782**	0.152	3.457**
	(0.448)	(0.996)	(0.204)	(0.347)	(0.325)	(1.375)
Repression*Gov Stability	-0.086		-0.008		-0.140	
	(0.062)		(0.026)		(0.096)	
Repression*Income		0.247**		0.121***		-0.554***
		(0.119)		(0.043)		(0.204)
Government Stability	0.409**		0.221*		0.082	
	(0.187)		(0.124)		(0.078)	
Number Disasters	0.057	0.065	0.032	0.040	0.025	0.020
	(0.046)	(0.044)	(0.038)	(0.037)	(0.037)	(0.034)
Log GDP per Capita	-0.194	-0.869*	0.067	-0.439	-0.197	-0.190
	(0.282)	(0.472)	(0.268)	(0.330)	(0.313)	(0.312)
% Urban	0.007	0.009	0.003	0.007	0.008	0.010
	(0.016)	(0.015)	(0.015)	(0.015)	(0.016)	(0.016)
Population Density	0.001	0.001	0.002*	0.002	0.001	0.000
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Log Population	0.542***	0.556***	0.610***	0.631***	0.661***	0.703***
	(0.172)	(0.177)	(0.152)	(0.149)	(0.183)	(0.181)
Log ODA	-0.028	-0.052	0.112	0.063	0.019	0.024
	(0.085)	(0.090)	(0.079)	(0.082)	(0.084)	(0.084)
Trend	-0.076**	-0.055*	-0.075**	-0.032	-0.044	-0.026
	(0.034)	(0.029)	(0.033)	(0.026)	(0.032)	(0.029)
Democracy	0.176	0.036	0.255	0.134	-0.176	-0.111
	(0.396)	(0.386)	(0.358)	(0.346)	(0.390)	(0.392)
Corruption	0.247	0.257	0.167	0.108	0.348**	0.340**
	(0.166)	(0.182)	(0.156)	(0.163)	(0.147)	(0.149)
Log Area	-0.062	-0.151	-0.115	-0.194	-0.051	-0.097
	(0.186)	(0.181)	(0.160)	(0.163)	(0.197)	(0.198)
Latitude	-0.809	-0.504	-0.270	-0.358	-1.209	-0.962
	(2.078)	(1.879)	(1.853)	(1.708)	(2.229)	(2.215)
ZINB						
# Disasters	-20.900***	-20.963***	-22.456***	-22.171***	-20.401***	-20.305***
	(2.680)	(2.671)	(2.718)	(2.638)	(2.659)	(2.718)
Log Pop*#Disasters	-0.162	-0.182	-0.079	-0.094	-0.235*	-0.240*
	(0.129)	(0.128)	(0.138)	(0.138)	(0.135)	(0.135)
Log GDP/capita*#Disasters	0.223	0.220	0.265*	0.231	0.241	0.239
	(0.156)	(0.150)	(0.160)	(0.151)	(0.169)	(0.168)
Constant	144.198**	111.621*	141.218**	60.889	80.116	44.705
	(67.406)	(58.113)	(65.770)	(52.548)	(64.483)	(58.016)
Alpha	21.173***	21.579***	20.939***	21.217***	21.492***	21.492***
	(0.343)	(0.662)	(0.223)	(0.181)	(0.014)	(0.680)
Log Alpha	1.431***	1.438***	1.427***	1.431***	1.363***	1.366***
	(0.016)	(0.016)	(0.016)	(0.017)	(0.018)	(0.018)
Observations	2,702	2,702	2,615	2,615	2,580	2,580
Zero obs	1590	1590	1515	1515	1465	1465
Log Likelihood	-7176.1529	-7182.6225	-7102.9476	-7106.9231	-7116.5791	-7118.8582

Notes: Dependent variable is the number killed. Robust standard errors clustered by country in parenthesis. *** denotes significance at the 1% level; ** at the 5% level; and * at the 10% level. All regressions include continent fixed effects.

Table 8: Government Repression and Earthquake Casualties

	(1)	(2)	(3)	(4)	(5)	(6)
	Political Terror Scale		*Physical Integrity*		*Purges*	
Gov Repression	0.728***	1.652*	0.625***	0.606**	-1.035	9.852***
	(0.191)	(0.995)	(0.137)	(0.304)	(1.071)	(2.959)
Gov Repression Sq		-0.145		0.002		-10.432***
		(0.149)		(0.039)		(2.148)
Number Earthquakes	4.327***	4.306***	4.233***	4.232***	4.494***	4.509***
	(0.627)	(0.621)	(0.644)	(0.654)	(0.616)	(0.601)
Log GDP per capita	0.086	0.143	0.474	0.470	-0.132	-0.128
	(0.337)	(0.325)	(0.412)	(0.386)	(0.366)	(0.367)
% Urban	0.002	0.000	-0.005	-0.005	0.010	0.010
	(0.016)	(0.016)	(0.017)	(0.016)	(0.017)	(0.017)
Population Density	-0.002	-0.002	-0.001	-0.001	-0.002**	-0.002**
	(0.001)	(0.002)	(0.001)	(0.001)	(0.001)	(0.001)
Log Population	0.697**	0.631**	0.367	0.365	0.806***	0.802***
	(0.273)	(0.260)	(0.281)	(0.302)	(0.244)	(0.244)
Log ODA	0.232*	0.233*	0.275**	0.275**	0.230*	0.242*
	(0.127)	(0.123)	(0.124)	(0.127)	(0.125)	(0.125)
Trend	-0.057**	-0.055**	-0.070***	-0.071***	-0.078***	-0.077***
	(0.025)	(0.024)	(0.023)	(0.023)	(0.028)	(0.028)
Democracy	-0.162	-0.186	-0.030	-0.029	-0.297	-0.296
	(0.388)	(0.393)	(0.380)	(0.385)	(0.420)	(0.415)
Corruption	-0.223	-0.267	-0.240	-0.236	-0.044	-0.046
	(0.157)	(0.167)	(0.159)	(0.167)	(0.162)	(0.162)
Log Area	-0.204	-0.152	-0.219	-0.220	-0.099	-0.090
	(0.210)	(0.210)	(0.216)	(0.215)	(0.214)	(0.213)
Latitude	2.242	2.483	4.076**	4.093**	1.697	1.717
	(1.852)	(1.871)	(1.889)	(1.931)	(1.831)	(1.825)
ZINB						
# Disasters	-16.254**	-16.386**	-16.185***	-16.012***	-17.200	-16.851
	(8.039)	(6.479)	(2.445)	(2.466)	(21.993)	(32.678)
Constant	96.709*	92.880**	125.572***	126.385***	139.846**	136.695**
	(49.512)	(47.308)	(46.363)	(44.558)	(56.909)	(56.436)
Alpha	13.455***	13.804***	14.613***	14.453***	13.451***	12.669***
	(0.566)	(0.569)	(0.703)	(0.747)	(0.562)	(0.534)
Log Alpha	2.540***	2.532***	2.503***	2.503***	2.544***	2.530***
	(0.041)	(0.042)	(0.041)	(0.042)	(0.042)	(0.041)
Observations	2,702	2,702	2,615	2,615	2,580	2,580
Zero obs	2500	2500	2417	2417	2378	2378
Log Likelihood	-1366.2634	-1365.6471	-1328.6310	-1328.6293	-1365.3771	-1362.5614

Notes: Dependent variable is the number killed. Robust standard errors clustered by country in parenthesis. *** denotes significance at the 1% level; ** at the 5% level; and * at the 10% level. All regressions include continent fixed effects.

In the case of floods, I find a positive effect of human rights violations (PTS) on casualties, and a bell-shaped relationship between the Physical Integrity index and deaths. As is the case with Earthquakes, a higher number of floods and larger population are associated with more deaths from floods, while both trend and GDP per capita have a negative relationship to casualties.

The degree of government repression does not appear to have an impact on casualties from Landslides, except when measured using the PTS, which seems to have a positive and linear effect. The number of slides and population show a positive association with casualties, while the trend variable and the log of land area, along with latitude, are all correlated with lower fatalities.

As for Wind Storms, I find a bell-shaped relationship between the PTS and deaths, while a greater number of purge events are found to be associated with lower deaths. The results also suggest that, as expected, countries that experience more windstorms in a given year, as well as those with higher population density, suffer higher casualties, while those with a smaller percentage of the population in urban areas have lower fatalities. As with the other types of disasters, I also find a negative trend in windstorms deaths.

Finally, in the case of Heat and Cold Waves, the results suggest that there is no impact of human rights violations, as measured by the Physical Integrity index, on casualties, whereas according to the PTS, greater human rights violations increase the number of deaths, with the number however lower at either end of the PTS distribution. As for purges, I find that more purge events are correlated with lower casualties. I also find that fatalities are higher in countries that experience more extreme temperature events, those with larger population, higher GDP per capita, more foreign aid, and those that are democratic, while they are lower in countries with larger areas. Heat and cold wave deaths are also found to have a negative trend.

Table 9: Government Repression and Casualties from Floods

	(1)	(2)	(3)	(4)	(5)	(6)
	Political Terror Scale		*Physical Integrity*		*Purges*	
Gov Repression	0.305**	0.810	0.014	0.521***	0.201	-0.083
	(0.143)	(0.511)	(0.056)	(0.182)	(0.181)	(0.666)
Gov Repression Sq		-0.081		-0.058***		0.079
		(0.085)		(0.019)		(0.137)
Number Floods	0.530***	0.526***	0.499***	0.479***	0.478***	0.478***
	(0.126)	(0.125)	(0.125)	(0.117)	(0.126)	(0.125)
Log GDP per capita	-0.688***	-0.665***	-0.714***	-0.725***	-0.728***	-0.733***
	(0.231)	(0.237)	(0.254)	(0.250)	(0.254)	(0.253)
% Urban	0.025*	0.023*	0.027*	0.023*	0.025*	0.025*
	(0.014)	(0.014)	(0.015)	(0.014)	(0.015)	(0.015)
Population Density	0.002	0.002	0.002	0.002	0.002	0.001
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Log Population	0.355***	0.337**	0.478***	0.453***	0.504***	0.514***
	(0.136)	(0.138)	(0.141)	(0.139)	(0.132)	(0.135)
Log ODA	-0.064	-0.073	-0.038	-0.059	-0.051	-0.051
	(0.058)	(0.058)	(0.061)	(0.059)	(0.065)	(0.066)
Trend	-0.123***	-0.124***	-0.123***	-0.118***	-0.096***	-0.096***
	(0.018)	(0.018)	(0.018)	(0.017)	(0.018)	(0.018)
Corruption	-0.137	-0.138	-0.318	-0.242	-0.283	-0.297
	(0.251)	(0.249)	(0.285)	(0.288)	(0.295)	(0.296)
Democracy	-0.028	-0.042	0.051	-0.021	0.027	0.022
	(0.124)	(0.126)	(0.130)	(0.127)	(0.128)	(0.129)
Log Area	-0.064	-0.052	-0.102	-0.050	-0.075	-0.079
	(0.143)	(0.147)	(0.146)	(0.149)	(0.143)	(0.143)
Latitude	-1.878	-1.596	-2.027	-1.734	-2.278	-2.243
	(1.470)	(1.453)	(1.598)	(1.482)	(1.597)	(1.619)
ZINB						
# Disasters	-15.153***	-15.926***	-16.626***	-16.654***	-16.207***	-16.217***
	(0.515)	(0.522)	(0.547)	(0.598)	(0.508)	(0.507)
Constant	246.341***	247.173***	245.478***	234.576***	191.938***	191.125***
	(34.957)	(34.937)	(35.657)	(34.732)	(35.635)	(35.443)
Alpha	15.587***	16.366***	17.064***	17.102***	16.594***	16.602***
	(0.329)	(0.338)	(0.358)	(0.412)	(0.319)	(0.317)
Log Alpha	1.477***	1.475***	1.475***	1.456***	1.417***	1.417***
	(0.022)	(0.022)	(0.022)	(0.021)	(0.024)	(0.024)
Observations	2,702	2,702	2,615	2,615	2,580	2,580
Zero obs	1942	1942	1867	1867	1822	1822
Log Likelihood	-4674.7364	-4673.6980	-4597.9823	-4588.7612	-4619.3130	-4619.1747

Notes: Dependent variable is the number killed. Robust standard errors clustered by country in parenthesis. *** denotes significance at the 1% level; ** at the 5% level; and * at the 10% level. All regressions include continent fixed effects.

Table 10: Government Repression and Casualties from Landslides

	(1)	(2)	(3)	(4)	(5)	(6)
	Political Terror Scale		*Physical Integrity*		*Purges*	
Gov Repression	0.248***	0.466	0.002	0.038	-0.063	-0.017
	(0.089)	(0.513)	(0.060)	(0.227)	(0.157)	(0.384)
Gov Repression Sq		-0.034		-0.004		-0.024
		(0.079)		(0.023)		(0.137)
Number Slides	5.018***	5.021***	5.043***	5.041***	5.034***	5.028***
	(0.580)	(0.590)	(0.604)	(0.606)	(0.582)	(0.585)
Log GDP per capita	0.201	0.220	0.166	0.173	0.177	0.177
	(0.228)	(0.230)	(0.237)	(0.235)	(0.235)	(0.235)
% Urban	0.013	0.013	0.016*	0.016*	0.014	0.014
	(0.009)	(0.009)	(0.009)	(0.009)	(0.008)	(0.008)
Population Density	-0.004**	-0.004**	-0.004**	-0.004**	-0.004**	-0.004**
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Log Population	0.548**	0.543**	0.530***	0.531***	0.529***	0.527***
	(0.219)	(0.219)	(0.205)	(0.205)	(0.204)	(0.205)
Log ODA	0.085	0.083	0.130**	0.128**	0.137**	0.137**
	(0.060)	(0.060)	(0.062)	(0.063)	(0.060)	(0.060)
Trend	-0.105***	-0.105***	-0.109***	-0.109***	-0.091***	-0.091***
	(0.020)	(0.020)	(0.020)	(0.020)	(0.020)	(0.020)
Corruption	-0.092	-0.073	-0.069	-0.065	-0.035	-0.034
	(0.258)	(0.266)	(0.254)	(0.259)	(0.255)	(0.256)
Democracy	-0.041	-0.050	0.026	0.025	0.004	0.004
	(0.110)	(0.112)	(0.115)	(0.117)	(0.105)	(0.106)
Log Area	-0.477**	-0.470**	-0.433**	-0.431**	-0.399**	-0.398**
	(0.212)	(0.214)	(0.198)	(0.200)	(0.197)	(0.198)
Latitude	-2.103**	-2.172**	-2.192**	-2.229**	-2.222**	-2.223**
	(0.860)	(0.872)	(0.878)	(0.885)	(0.877)	(0.876)
ZINB						
# Disasters	-12.805***	-12.821***	-12.805*	-12.804*	-12.809***	-12.809***
	(2.661)	(2.248)	(6.816)	(6.582)	(4.663)	(4.872)
Constant	199.417***	199.300***	208.077***	208.368***	172.117***	172.693***
	(39.992)	(39.992)	(39.343)	(39.255)	(40.460)	(40.440)
Alpha	8.122***	9.037***	8.539***	8.561***	8.339***	8.521***
	(0.354)	(0.365)	(0.377)	(0.372)	(0.360)	(0.362)
Log Alpha	2.026***	2.027***	2.036***	2.036***	1.998***	1.997***
	(0.047)	(0.049)	(0.051)	(0.051)	(0.049)	(0.050)
Observations	2,702	2,702	2,615	2,615	2,580	2,580
Zero obs	2515	2515	2429	2429	2394	2394
Log Likelihood	-1318.4561	-1318.4249	-1314.0965	-1314.0838	-1306.0195	-1306.0202

Notes: Dependent variable is the number killed. Robust standard errors clustered by country in parenthesis. *** denotes significance at the 1% level; ** at the 5% level; and * at the 10% level. All regressions include continent fixed effects.

Table 11: Government Repression and Casualties from Wind Storms

	(1)	(2)	(3)	(4)	(5)	(6)
	Political Terror Scale		*Physical Integrity*		*Purges*	
Gov Repression	-0.078	1.234*	-0.167	0.032	-1.167***	-1.300
	(0.230)	(0.645)	(0.107)	(0.266)	(0.306)	(1.182)
Gov Repression Sq		-0.222**		-0.022		0.039
		(0.098)		(0.026)		(0.251)
Number Storms	0.552***	0.528**	0.542***	0.536**	0.555**	0.557**
	(0.210)	(0.207)	(0.205)	(0.210)	(0.228)	(0.243)
Log GDP per capita	-0.345	-0.383	-0.582*	-0.536*	-0.359	-0.361
	(0.280)	(0.280)	(0.306)	(0.304)	(0.290)	(0.290)
% Urban	-0.042***	-0.039***	-0.035**	-0.036**	-0.045***	-0.045***
	(0.015)	(0.015)	(0.016)	(0.016)	(0.016)	(0.016)
Population Density	0.004***	0.004***	0.003**	0.003**	0.004***	0.004***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Log Population	-0.225	-0.244	-0.029	-0.066	-0.185	-0.183
	(0.246)	(0.239)	(0.275)	(0.263)	(0.245)	(0.240)
Log ODA	-0.046	-0.059	-0.056	-0.051	-0.048	-0.048
	(0.113)	(0.110)	(0.111)	(0.112)	(0.116)	(0.116)
Trend	-0.146***	-0.146***	-0.150***	-0.144***	-0.129***	-0.129***
	(0.030)	(0.031)	(0.031)	(0.033)	(0.029)	(0.030)
Corruption	0.445	0.474	0.422	0.426	0.432	0.429
	(0.338)	(0.311)	(0.347)	(0.345)	(0.333)	(0.333)
Democracy	0.089	0.047	0.170	0.138	0.044	0.043
	(0.209)	(0.201)	(0.187)	(0.195)	(0.166)	(0.165)
Log Area	-0.045	0.000	-0.110	-0.073	-0.070	-0.072
	(0.209)	(0.194)	(0.223)	(0.211)	(0.198)	(0.196)
Latitude	2.792	3.061*	3.178*	2.875	2.781	2.816
	(1.835)	(1.776)	(1.911)	(1.942)	(1.737)	(1.801)
ZINB						
# Disasters	-1.433***	-1.404***	-1.319***	-1.310***	-1.453**	-1.458**
	(0.528)	(0.511)	(0.456)	(0.456)	(0.595)	(0.621)
Constant	300.309***	299.551***	308.315***	295.361***	265.674***	266.110***
	(60.256)	(61.394)	(62.351)	(66.230)	(59.158)	(59.984)
Alpha	3.349***	3.338***	3.198***	3.194***	3.269***	3.270***
	(0.268)	(0.260)	(0.227)	(0.226)	(0.275)	(0.281)
Log Alpha	1.812***	1.789***	1.773***	1.767***	1.769***	1.771***
	(0.189)	(0.191)	(0.186)	(0.189)	(0.208)	(0.218)
Observations	2,702	2,702	2,615	2,615	2,580	2,580
Zero obs	2231	2231	2145	2145	2106	2106
Log Likelihood	-0.078	1.234*	-0.167	0.032	-1.167***	-1.300

Notes: Dependent variable is the number killed. Robust standard errors clustered by country in parenthesis. *** denotes significance at the 1% level; ** at the 5% level; and * at the 10% level. All regressions include continent fixed effects.

Table 12: Government Repression and Casualties from Heat and Cold Waves

	(1)	(2)	(3)	(4)	(5)	(6)
	Political Terror Scale		*Physical Integrity*		*Purges*	
Gov Repression	0.510**	2.587***	0.011	0.145	-33.493***	-18.467***
	(0.257)	(0.784)	(0.112)	(0.319)	(2.703)	(4.986)
Gov Repression Sq		-0.383***		-0.020		-15.191
		(0.116)		(0.034)		(0.000)
Number Temperature	7.600***	7.340***	7.650***	7.519***	8.263***	8.537***
	(0.686)	(0.638)	(0.687)	(0.651)	(0.633)	(1.285)
Log GDP per capita	1.496***	1.526***	1.454***	1.320***	1.399***	-0.176
	(0.332)	(0.324)	(0.330)	(0.311)	(0.266)	(0.641)
% Urban	-0.013	-0.015	-0.010	-0.008	-0.009	-0.025*
	(0.012)	(0.012)	(0.012)	(0.012)	(0.010)	(0.013)
Population Density	-0.001	-0.001	-0.001	-0.001	-0.001	-0.000
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Log Population	0.895***	0.911***	0.927***	1.026***	1.023***	-0.018
	(0.246)	(0.234)	(0.240)	(0.247)	(0.206)	(0.404)
Log ODA	0.182*	0.162*	0.243***	0.227***	0.238***	-0.174
	(0.096)	(0.097)	(0.088)	(0.083)	(0.074)	(0.187)
Trend	-0.062***	-0.074***	-0.056***	-0.031	-0.035*	-0.001
	(0.021)	(0.022)	(0.022)	(0.025)	(0.021)	(0.030)
Corruption	0.201	0.170	0.010	-0.054	0.017	-0.172
	(0.339)	(0.301)	(0.372)	(0.332)	(0.322)	(0.401)
Democracy	0.299**	0.295**	0.397***	0.353***	0.375***	-0.295
	(0.135)	(0.133)	(0.132)	(0.122)	(0.120)	(0.249)
Log Area	-0.546**	-0.563**	-0.484**	-0.553**	-0.499**	-0.042
	(0.253)	(0.244)	(0.237)	(0.235)	(0.205)	(0.287)
Latitude	-0.649	0.973	-1.911	-2.313	-2.578	-0.129
	(2.151)	(1.942)	(2.045)	(2.035)	(1.919)	(2.642)
ZINB						
# Disasters	-11.939***	-11.933***	-11.922***	-11.857***	-0.424	-11.909***
	(0.493)	(0.474)	(0.469)	(0.554)	(0.400)	(0.379)
Constant	95.502**	117.646***	84.129*	33.394	41.019	2.905
	(42.660)	(44.553)	(43.593)	(49.697)	(41.532)	(57.735)
Alpha	7.374***	6.979***	6.437***	2.408***	-13.195***	5.569***
	(0.449)	(0.404)	(0.428)	(0.527)	(1.411)	(0.214)
Log Alpha	2.181***	2.146***	2.192***	2.205***	2.178***	2.268***
	(0.031)	(0.028)	(0.029)	(0.029)	(0.027)	(0.112)
Observations	2,702	2,702	2,615	2,615	2,580	2,580
Zero obs	2519	2519	2430	2430	2395	2395
Log Likelihood	-1347.3081	-1343.9424	-1370.1331	-1372.0196	-1366.5791	-1381.4643

Notes: Dependent variable is the number killed. Robust standard errors clustered by country in parenthesis. *** denotes significance at the 1% level; ** at the 5% level; and * at the 10% level. All regressions include continent fixed effects.

4.6. Government Repression and the Total Number Affected

In Table 13, I examine whether the level of government repression also has an impact on the total number of people affected by a natural disaster. The total number of affected is defined in EM-DAT as "people that have been injured, affected and left homeless after a disaster," with injured being "people suffering from physical injuries, trauma or an illness requiring medical treatment as a direct result of a disaster." Affected are "people requiring immediate assistance during a period of emergency, i.e. requiring basic survival needs such as food, water, shelter, sanitation and immediate medical assistance. Appearance of a significant number of cases of an infectious disease introduced in a region or a population that is usually free from that disease," and homeless are "people needing immediate assistance in the form of shelter."[11]

The results suggest the level of human rights violations has no impact on the number of people affected, as the coefficients on all three human rights indicators are insignificant. I also find that countries that experience a greater number of disasters, those with larger populations, and lower incomes have higher numbers of people being impacted by a natural disaster.

5. Conclusion

This paper examined whether countries deemed to have repressive regimes have lower mortality rates from natural disasters. Because these countries may be considered "pariah" states, they may invest more in disaster preparedness in the expectation of receiving no disaster aid. On the other hand, these countries may also underreport the number of casualties. They could also invest more in preparedness and provide better response to disasters to avoid losing their grip on power.

[11] See http://www.emdat.be/glossary/

Table 13: Government Repression and the Number Affected by a Natural Disaster

	(1)	(2)	(3)	(4)	(5)	(6)
	Political Terror Scale		*Physical Integrity*		*Purges*	
Gov Repression	-0.083	0.184	-0.077	-0.007	0.464	0.734
	(0.117)	(0.488)	(0.054)	(0.159)	(0.328)	(0.603)
Gov Repression Sq		-0.042		-0.008		-0.097
		(0.076)		(0.017)		(0.125)
Number Disasters	0.120***	0.120***	0.116***	0.116***	0.102***	0.101***
	(0.030)	(0.030)	(0.030)	(0.030)	(0.029)	(0.029)
Log GDP per capita	-0.688***	-0.675***	-0.701***	-0.691***	-0.704***	-0.696***
	(0.207)	(0.213)	(0.221)	(0.223)	(0.221)	(0.222)
% Urban	-0.007	-0.008	-0.007	-0.007	-0.009	-0.009
	(0.011)	(0.011)	(0.012)	(0.012)	(0.012)	(0.012)
Population density	0.001	0.001	0.001	0.001	0.001	0.002
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Log Population	0.421**	0.398**	0.440**	0.431**	0.430**	0.428**
	(0.166)	(0.166)	(0.173)	(0.172)	(0.171)	(0.171)
Log ODA	0.076	0.072	0.088	0.087	0.104*	0.105*
	(0.056)	(0.057)	(0.061)	(0.062)	(0.058)	(0.058)
Trend	-0.067***	-0.069***	-0.060***	-0.061***	-0.007	-0.008
	(0.020)	(0.020)	(0.021)	(0.021)	(0.021)	(0.020)
Corruption	-0.124	-0.106	-0.161	-0.149	-0.061	-0.055
	(0.317)	(0.318)	(0.320)	(0.319)	(0.301)	(0.302)
Democracy	0.127	0.122	0.091	0.081	0.026	0.027
	(0.111)	(0.110)	(0.105)	(0.104)	(0.098)	(0.098)
Log Area	0.009	0.025	0.029	0.034	0.058	0.062
	(0.156)	(0.156)	(0.162)	(0.162)	(0.161)	(0.162)
Latitude	1.057	1.068	0.950	0.950	1.116	1.124
	(1.511)	(1.518)	(1.497)	(1.506)	(1.428)	(1.426)
ZINB						
# Disasters	-13.331***	-13.332***	-13.359***	-13.355***	-22.328***	-22.320***
	(1.956)	(1.961)	(2.135)	(2.136)	(2.637)	(2.633)
Log Pop*#Disasters	0.282***	0.282***	0.283***	0.283***	0.180	0.182
	(0.090)	(0.090)	(0.097)	(0.097)	(0.131)	(0.131)
Log GDP/capita*#Disasters	0.626***	0.626***	0.629***	0.628***	0.493***	0.489***
	(0.106)	(0.106)	(0.108)	(0.108)	(0.122)	(0.121)
Constant	142.765***	146.859***	128.689***	129.854***	22.599	22.966
	(40.927)	(40.962)	(43.034)	(42.804)	(41.368)	(41.220)
Alpha	4.042***	4.044***	4.006***	4.005***	15.131	15.129
	(0.205)	(0.205)	(0.205)	(0.205)	(0.000)	(0.000)
Log Alpha	1.451***	1.452***	1.444***	1.443***	1.466***	1.465***
	(0.029)	(0.029)	(0.030)	(0.030)	(0.015)	(0.015)
Observations	2,702	2,702	2,615	2,615	2,580	2,580
Zero obs	1553	1553	1487	1487	1429	1429
Log Likelihood	-15012.204	-15011.904	-14736.101	-14735.902	-14870.311	-14870.056

Notes: Dependent variable is the number killed. Robust standard errors clustered by country in parenthesis. *** denotes significance at the 1% level; ** at the 5% level; and * at the 10% level. All regressions include continent fixed effects.

The results, however, suggest instead that the worse the human rights record the higher the number of deaths. However, I also find that the relationship between human rights and casualties is inverse U-shaped, so that those countries at the high and low end of the distribution suffer less casualties.

These findings do not appear to be due to the expectation of receiving less aid or because of government instability. However, I do find that in low-income countries, the higher the level of human rights violations the lower the casualties, whereas the relationship is the opposite in high-income countries.

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Appendix Table 1: Natural Disaster Casualties and Amnesty and State Department Scores

	(1)	(2)	(3)	(4)
	Amnesty International		*State Department*	
Gov Repression	0.254	2.442***	0.393**	2.490***
	(0.162)	(0.572)	(0.173)	(0.688)
Gov Repression Sq		-0.348***		-0.361***
		(0.093)		(0.104)
Number disasters	0.034	0.052	0.058	0.085
	(0.039)	(0.038)	(0.050)	(0.055)
Log GDP per capita	-0.122	0.074	-0.194	0.002
	(0.308)	(0.292)	(0.288)	(0.255)
% Urban	0.009	0.001	0.011	0.004
	(0.016)	(0.015)	(0.016)	(0.015)
Population Density	0.000	0.001	0.000	0.001
	(0.001)	(0.001)	(0.001)	(0.001)
Log Population	0.749***	0.537***	0.632***	0.471***
	(0.202)	(0.207)	(0.167)	(0.175)
Log ODA	-0.024	-0.032	-0.017	-0.078
	(0.078)	(0.075)	(0.087)	(0.082)
Trend	-0.064**	-0.067**	-0.058*	-0.073**
	(0.032)	(0.032)	(0.031)	(0.033)
Democracy	-0.061	-0.056	0.142	0.155
	(0.402)	(0.335)	(0.387)	(0.351)
Corruption	0.442**	0.436**	0.279	0.230
	(0.179)	(0.177)	(0.173)	(0.172)
Log Area	-0.208	-0.084	-0.166	-0.072
	(0.195)	(0.198)	(0.186)	(0.170)
Latitude	-0.451	0.668	-0.652	-0.118
	(2.072)	(1.630)	(2.237)	(2.001)
ZINB				
# Disasters	-20.539***	-19.376***	-22.073***	-21.871***
	(2.663)	(2.612)	(3.132)	(2.647)
Log Pop*#Disaster	-0.207	-0.202	-0.168	-0.176
	(0.136)	(0.137)	(0.127)	(0.126)
Log GDP/capita*#Disaster	0.202	0.190	0.234	0.253
	(0.146)	(0.143)	(0.159)	(0.161)
Constant	119.438*	124.236**	110.930*	137.652**
	(64.587)	(63.001)	(62.953)	(65.298)
Alpha	21.768***	20.626***	22.326***	22.079***
	(0.615)	(0.348)	(1.829)	(0.763)
Log Alpha	1.446***	1.421***	1.458***	1.433***
	(0.017)	(0.017)	(0.016)	(0.017)
Observations	2,391	2,391	2,672	2,672
Zero obs	1356	1356	1582	1582
Log Likelihood	-6785.7688	-6765.6230	-7024.8803	-7003.8468

Notes: Dependent variable is the number killed. Robust standard errors clustered by country in parenthesis. *** denotes significance at the 1% level; ** at the 5% level; and * at the 10% level. All regressions include continent fixed effects.

Appendix Table 2: Components of Physical Integrity Index and Natural Disaster Casualties

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Torture		*Killings*		*Political Prisoners*		*Disappearances*	
Repression	-0.872***	-0.868	-0.709***	-0.616	0.072	0.261	0.242	2.268***
	(0.225)	(0.536)	(0.181)	(0.700)	(0.211)	(0.617)	(0.196)	(0.553)
Repression Sq		-0.003		-0.044		-0.095		-0.908***
		(0.267)		(0.311)		(0.324)		(0.257)
Number disasters	0.034	0.034	0.026	0.027	0.032	0.032	0.037	0.034
	(0.035)	(0.035)	(0.034)	(0.034)	(0.040)	(0.040)	(0.041)	(0.034)
Log GDP/capita	-0.019	-0.019	0.011	0.006	-0.175	-0.173	-0.213	-0.138
	(0.275)	(0.281)	(0.279)	(0.279)	(0.315)	(0.318)	(0.315)	(0.277)
% Urban	0.006	0.006	0.003	0.003	0.014	0.015	0.014	0.011
	(0.014)	(0.014)	(0.014)	(0.014)	(0.016)	(0.015)	(0.016)	(0.015)
Pop. Density	0.000	0.000	0.000	0.000	-0.000	-0.000	-0.000	0.000
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Log Population	0.638***	0.638***	0.766***	0.769***	0.843***	0.853***	0.849***	0.775***
	(0.157)	(0.152)	(0.148)	(0.151)	(0.168)	(0.172)	(0.170)	(0.151)
Log ODA	0.096	0.096	0.095	0.093	0.078	0.080	0.065	0.082
	(0.090)	(0.091)	(0.086)	(0.086)	(0.099)	(0.101)	(0.097)	(0.082)
Trend	-0.046*	-0.046*	-0.045*	-0.046*	-0.058**	-0.057*	-0.061**	-0.047*
	(0.025)	(0.025)	(0.026)	(0.026)	(0.030)	(0.029)	(0.030)	(0.027)
Democracy	0.183	0.183	0.181	0.173	-0.036	-0.046	-0.103	0.014
	(0.340)	(0.341)	(0.339)	(0.342)	(0.384)	(0.376)	(0.395)	(0.365)
Corruption	0.198	0.198	0.163	0.162	0.349**	0.340**	0.347**	0.294**
	(0.159)	(0.158)	(0.160)	(0.156)	(0.154)	(0.148)	(0.154)	(0.148)
Log Area	-0.274*	-0.274*	-0.277*	-0.281*	-0.259	-0.266	-0.259	-0.151
	(0.163)	(0.159)	(0.161)	(0.170)	(0.182)	(0.188)	(0.188)	(0.166)
Latitude	0.737	0.736	0.431	0.436	-0.163	-0.210	-0.349	-1.307
	(1.767)	(1.757)	(1.632)	(1.649)	(2.114)	(2.091)	(2.109)	(1.993)
ZINB								
# Disasters	-20.943***	-22.710***	-23.455***	-23.449***	-23.109***	-23.462***	-23.111***	-23.498***
	(2.607)	(2.876)	(2.991)	(2.560)	(2.731)	(3.021)	(2.714)	(2.539)
Log Population	-0.115	-0.115	-0.084	-0.084	-0.096	-0.095	-0.098	-0.091
*#Disaster	(0.136)	(0.136)	(0.138)	(0.137)	(0.139)	(0.139)	(0.138)	(0.138)
Log GDP/capita	0.209	0.209	0.230	0.228	0.224	0.223	0.218	0.220
*#Disaster	(0.146)	(0.146)	(0.151)	(0.151)	(0.154)	(0.154)	(0.152)	(0.152)
Constant	87.915*	87.971*	84.796*	84.909*	108.245*	106.874*	113.525*	85.448
	(49.831)	(50.908)	(51.165)	(51.279)	(59.089)	(58.804)	(60.707)	(53.471)
Alpha	20.539***	22.306***	22.357***	22.364***	22.243***	22.595***	22.327***	22.585***
	(0.159)	(1.384)	(1.422)	(0.639)	(0.847)	(1.429)	(0.027)	(0.021)
Log Alpha	1.422***	1.422***	1.422***	1.422***	1.455***	1.454***	1.452***	1.437***
	(0.017)	(0.017)	(0.017)	(0.017)	(0.016)	(0.016)	(0.016)	(0.016)
Observations	2,622	2,622	2,620	2,620	2,622	2,622	2,621	2,621
Zero obs	1519	1519	1517	1517	1520	1520	1520	1520
Log Likelihood	-7124.34	-7124.34	-7122.71	-7122.66	-7141.18	-7141.02	-7133.95	-7121.35

Notes: Dependent variable is the number killed. Robust standard errors clustered by country in parenthesis. *** denotes significance at the 1% level; ** at the 5% level; and * at the 10% level. All regressions include continent fixed effects.