Climate Change, Natural disaster-induced displacement, and organized violence

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**Abstract**

This paper addresses the effect of the natural disaster-induced displacement on organized violence and the role of economic development and political stability on this relationship. The displacement as a potential mechanism through which natural disasters may result in different types of organized violence has frequently been argued. By adopting a world sample from 2010 – 2018, the empirical result only indicates that there is a correlation between the number of displacement and intrastate conflict. Also, the effect of displacement is more obvious in less economic development and political instability countries. Thus, only focusing on the natural disaster may ignore other key variables and cause some misguided policy-makings.

Keywords: climate change, natural disaster-induced displacement, organized violence

**Introduction**

Natural disasters such as earthquakes, floods, and droughts have been argued to have profound security and political implications. Many speculate that natural disasters might increase different types of organized violence (Ide, et al, 2020: 102062; Homer-Dixon, 1994:5; Raleigh and Kniveton, 2012: 51). Also, recent climate change makes natural disasters increase in both frequency and intensity (IPCC, 2018). This makes the relationship between natural disasters and conflict attract more attention. Migration has widely been discussed as a mechanism connecting the natural disaster and organized violence. Some argued that more displacement is likely to increase organized violence (especially for intrastate conflict) because the sudden coming of displaced people might exacerbate the previous socio-economic tension and the resource scarcity, or deepen the potential ethnic (or group) distrust in receiving areas (Homer-Dixon, 1994: 40; Reuveny, 2007: 659; Raleigh et al, 2008: 34-36; Gleditsch et al, 2007: 4-7). However, some hold more moderate views. They emphasize the role of other local contexts such as economic development and political stability. For instance, organized violence caused by displacement is heightened during times of economic slowdown or political instability (Slettebak, 2012: 163; Ghimire et al, 2015: 614; Buhaug and Rod, 2006: 316; Salehyan and Gleditsch, 2006; Theisen et al, 2013). This paper will examine that, to what extent does natural disasters-related displacement affect organized violence, and the influence of economic development and political stability on this relationship.

I will gather data on natural disaster-induced displacement and organized violence (including intrastate conflicts) in a world sample from 2010 to 2018. Also, other variables such as economic development and political stability are added to test the explanatory power of displacement.

In the following sections, the nexus of climate change, natural disaster-induced displacement, and organized violence will be introduced. After exhibiting my research design and result analysis, a concluding remark will follow.

**Climate change, natural disaster-related displacement, and the organized violence nexus**

There are growing concerns about the potential threat of “climate refugees”. As argued by Hartmann (1995: 18-19), climatic refugees are the displaced people who can no longer survive in their homelands because of climate shocks. Based on a conservative estimate conducted by Norman Myers, around 200 million will be displaced by climate-related phenomena by 2050 (Myers, 1995). This indicates a huge effect of climate change on displacement. Natural disasters as an extreme form of climate change have played an important role in resulting in increased displacement. They would have both direct and indirect impacts on displacement. The physical damage to property and dwelling caused by rapid-onset natural disasters will lead to a proximate displacement. People losing their homes have no choice but to migrate to other areas (Ghimire et al, 2015: 614; Nel and Righarts, 2008: 162). Besides, natural disasters can increase displacement indirectly through eroding socioeconomic stability and increasing the competition over scarce resources in affected areas (such as long-term droughts) (Raleigh, 2011: 82; Black et al, 2011: 3).

Furthermore, some have argued that natural disaster-induced displacement may promote both organize violence and intrastate conflicts (Reuveny, 2007: 658-660; Homer-Dixon, 1999; Van Ireland et al, 1996). There exist various mechanisms connecting displacement and organized violence (Reuveny, 2007: 659; Gleditsch et al, 2007; Homer-Dixon, 1999). A mass influx of displaced people may burden resource reserves in receiving areas. More contests over the limited resource are intensified because of the population explosion. Also, the potential ethnic tension and distrust may be exacerbated due to the coming of the displaced people. Additionally, the socioeconomic inequality as a by-product of the intergroup tension may contribute to organized violence. Thus, natural disaster-induced displacement has the potential to increase organized violence. However, some argue that the effect of natural disaster-induced displacement on organized violence needs to consider the specific local context. Displacement exacerbates and catalyses instances of organized violence in conjunction with other variables. The effects of displacement are still debated (Burrows and Kinney, 2016: 443).

Socio-economic development and political stability are two important contextual variables. As argued by Cohen and Werker (2008), natural disasters tend to afflict countries with vulnerable socio-economic systems. Less developed countries tend to experience more organized violence than their developed counterparts in the face of an influx of displacement. Besides, political stability including the capacity of government and regime type are key contextual variables in affecting organized violence (Hendrix and Glaser, 2007: 695; Collier et al, 2009: 3-5). An unstable political regime will be eroded further by natural disasters. It will provide more “opportunities” for potential rebels to initiate organized violence. Also, its weak government often lacks enough efficiency and capacity to provide resources to aid displaced people influenced by natural disasters. This will further intensify the dissatisfaction of people and encourage the occurrence of rebels. Thus, the possibility that those contextual variables such as economic development and political stability may outweigh displacement in affecting the occurrence of organized violence should be under more serious consideration.

**Research Design**

This paper adopts a world sample from 2010 to 2018, as some data are limited up to 2018. The level of analysis is state-year. We have 705 complete state-years when excluding the unit with omitted variables.

## **Dependent variables: Events on organized violence and intrastate conflicts**

The effects of natural disaster-induced displacement are tested on three dependent variables – total events of organized violence, intrastate conflict events, and intrastate conflict onset. The number of events of organized violence is the count of the number of corresponding events in a given year. These events record comes from UCDP Georeferenced Event Dataset (GED) (Sundberg and Melander, 2013). The organized violence event is defined as “an incident where armed force was used by an organized actor against another organized actor (or civilians) resulting in at least 1 direct death” (Stina, 2020: 4). This represents organized violence in each state-year. As one of the most important types of organized violence, the data about intrastate conflicts are from UCDP/PRIO Armed Conflict Dataset (Gleditsch et al, 2002). It covers conflicts that include at least 25 conflict-related deaths. For robustness, we also test intrastate conflict onset as a dummy variable that takes a value of 1 of the state-year including at least 1 intrastate conflict, and 0 otherwise. In Figure 1, the distribution that organized violence has concentrated on natural disaster-prone regions such as South Asia and Africa can be observed. As seen in Figure 2, despite some fluctuation, the overall trend of organized violence events and intrastate conflicts has been upward during 2010-2018. This corresponds to the trend of IPCC natural disasters (IPCC, 2018).

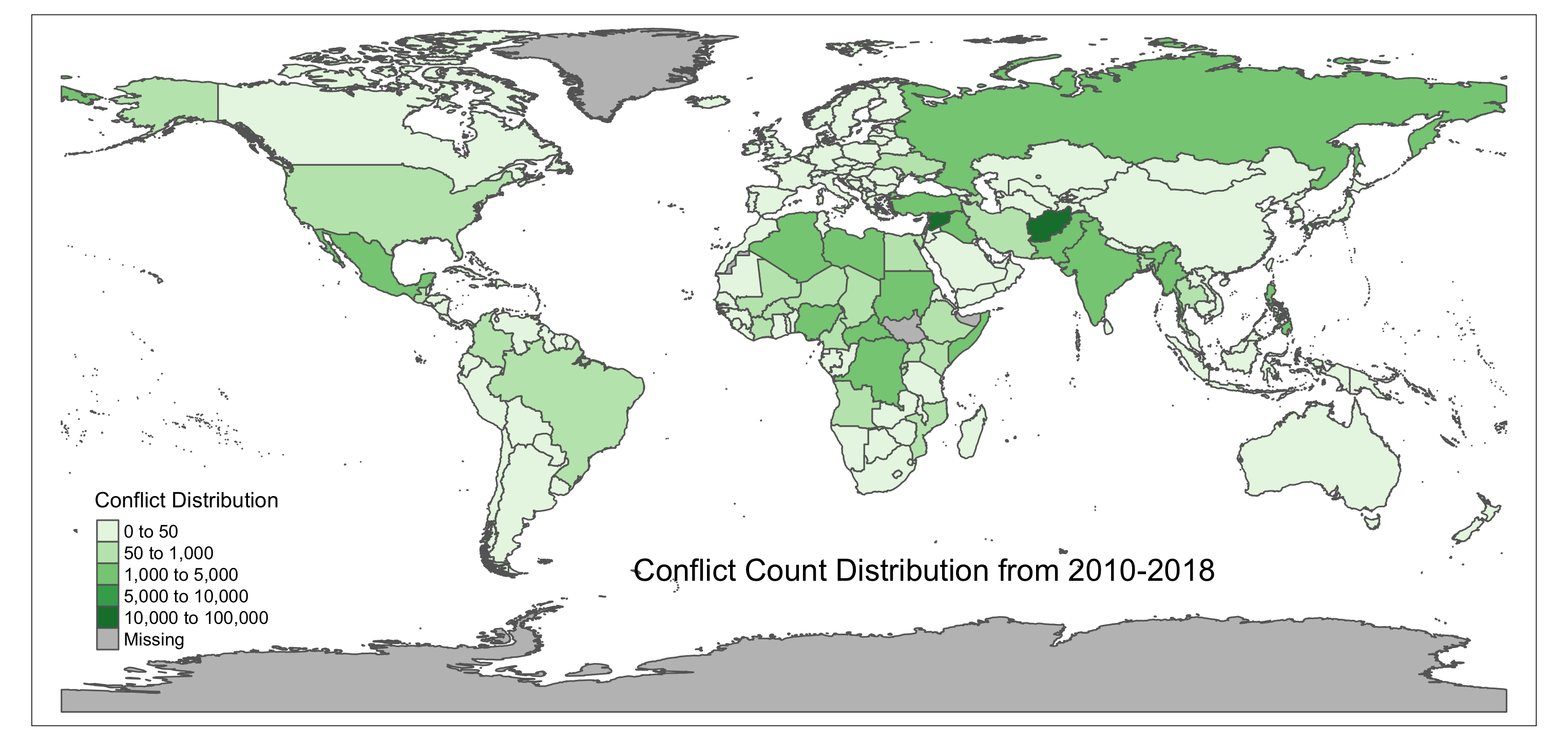


Figure 1. The distribution of the count of organized violence from 2010 to 2018.

../../Conflict%20distribution%20yearly.pdf

Figure 2. The trend of the count of all events of the organized violence from 2010 to 2018

**Key explanatory variables: Internally displacement associated with disasters**

Displacement data comes from the Internal displacement monitoring centre (IDMC). It is represented by the number of new cases or incidents of displacement recorded over a given state-year. Also, this displacement is only caused by weather and geophysical-related disasters (Guiding Principles on internal displacement, 1998).

**Control**

GDP per capita as one of the most common and strongest indicators used in civil conflict research on the state level is adopted to capture the socio-economic development (Raleigh and Kniveton, 2012: 57). For government capacity, a dataset called the functioning of government from Freedom House has been adopted (Freedom House, 2019). It contains an index from 0 (worst) to 12 (best) to evaluate the extent of corruption, accountability, and openness. Based on this, the extent to which a national legislative representative determines the policies of the government could be measured. Additionally, Polity2 was used to proxy the regime type. As claimed by Herge et al (2001), there exists an inverted-U-shaped relationship between regime type and stability. Organized violence has been least likely to occur in both highly authoritarian and full democracies regime. Thus, the Polity2 scale and its squared terms are both included. Besides, we control both uneven economic development and population[[1]](#footnote-1). The former has been frequently as a proxy of “grievance” in civil conflict research (Collier and Hoeffler, 2004). The latter one, population (nature log) has been a popular variable in conflict researches (Slettebak, 2012: 167). Organized violence is more likely to occur in densely populated areas.

**Methods of analysis**

Due to the highly skewed distribution of total events of organized violence and intrastate conflicts, the negative binomial regression suitable for over-dispersed data will be utilized. Displacement and GDP per capita in the nature-log term will be used to tackle the skewed dispersion. Additionally, for a robustness check, we utilize a range of specifications including excluding countries in the highest (or lowest) quartiles of GDP per capita and testing the countries belonging to different regime types.

**Results**

The first three models in Table 1 are baseline models covering all control variables. Despite some disjunctions, results are generally in line with our previous expectations. Findings of government function and regime type are comported with our previous political stability hypotheses. An inverted-U relationship between regime type and organized violence or intrastate conflicts has been confirmed through the significant and negative coefficient of “polity2 square” in all three models. Additionally, the population (natural log) is consistent with the previous literature with a positive and significant coefficient. Two exceptions are the insignificance coefficient of economic inequality in models 2, 3, and insignificant coefficients of GDP per capita in all three models. For the former, the same insignificance has been confirmed in other researches before (Collier and Hoeffler, 2004; Fearon and Latin, 2003). It may be a result of the function of multi-collinearity between economic development and political stability. When excluding polity2 and government functioning variables from the model, the GDP per capita variable returns significant and negative coefficients and conforms to our socio-economic hypothesis.

Model 4-6 explores the effects of displacement on events of organized violence and intrastate conflicts. In model 4, the coefficient estimate of displacement is highly statistically significant with a positive sign. The same results are also in model 5,6 (intrastate ones). Those results return a straight view of a positive correlation between natural disaster-induced displacement and organized violence (or intrastate conflicts) when excluding other variables.

In Model 7-9, all control variables tested in baseline models have been included. Results of the effects of displacement on organized violence are different from previous Models (4-6). After including all control variables, model 7 presents a different picture that displacement loses its significance. The effects of displacement have been neutralized. This has gone against the previous finding in Model 4. For Model 8 (intrastate conflict onset), the original significance of displacement has also been obscured. For model 9 (intrastate conflict count), the coefficient of displacement has still kept statistical significance with a positive sign. The magnitude of the coefficient has, however, reduced from a 0.1% significance limit to a 5% significance limit. Thus, the extent of political stability and economic development obscures the effects of displacement on both organized violence and intrastate conflicts.

In order to further evaluate the effects of political stability and economic development, some specifications have been introduced. We test models excluding countries in both the highest and lowest GDP per capita quartiles and models belonging to three different categories of regime type[[2]](#footnote-2). For the model excluding countries in the lowest GDP per capita quartile, the coefficient of displacement loses its significance. In contrast, when excluding countries in the highest GDP per capita quartile, the magnitude of the coefficient estimate has been around the 5% significance limit. This indicates that natural disaster-induced displacement tends to affect intrastate conflicts in less developed countries. For the specification about regime type, due to the unequal number of observations in each group limited by missing variables, results do not reach our expectation that more intrastate conflicts will occur in the unstable democratic regime. However, the important role of regime type still can be observed in our previous table.

**Conclusion**

In this paper, a general correlation between natural disaster-induced displacement and the number of intrastate conflicts (as one type of organized violence) has been observed. Also, the effect of displacement on intrastate conflicts is more obvious in less economic development and relative political instability countries. Here, the effects of specific local context (especially for the regime type) needs to be explored further with more complete data. In conclusion, this paper shows the influence of natural disaster-induced displacement on organized violence and emphasizes the importance of local contexts (economic development and political stability). Thus, the government should focus more on its own economic development and political stability in order to prevent organized violence. Do not only blame climate-related natural disasters when suffering organized violence.

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | | | | | | | | | | |
|  | Dependent variable: | | | | | | | | | |
|  |  | | | | | | | | | |
|  | Event  (Count) | Intrastate  (Dummy) | Intrastate  (Count) | Event  (Count) | Intrastate  (Dummy) | Intrastate  Count) | Event  (Count) | Intrastate  (Dummy) | Intrastate  (Count) |
|  | negative | logistic | negative | negative | logistic | negative | negative | logisticl | negative |
|  | binomial |  | binomial | binomial |  | binomial | binomial |  | binomial |
|  | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
|  | | | | | | | | | | |
| Economic inequality | 0.219\*\*\* | -0.131 | -0.087 |  |  |  | 0.264\*\*\* | -0.089 | -0.007 |
|  | (0.083) | (0.092) | (0.082) |  |  |  | (0.097) | (0.107) | (0.095) |
|  |  |  |  |  |  |  |  |  |  |
| GDP per capita (2010 US dollar)) | 0.058 | 0.035 | -0.072 |  |  |  | -0.189 | 0.033 | 0.006 |
|  | (0.103) | (0.108) | (0.093) |  |  |  | (0.123) | (0.128) | (0.110) |
|  |  |  |  |  |  |  |  |  |  |
| Polity2 | 0.024 | 0.157\*\*\* | 0.129\*\*\* |  |  |  | 0.168\*\*\* | 0.155\*\*\* | 0.102\*\*\* |
|  | (0.026) | (0.031) | (0.026) |  |  |  | (0.034) | (0.039) | (0.032) |
|  |  |  |  |  |  |  |  |  |  |
| Polity2\_square | -0.025\*\*\* | -0.034\*\*\* | -0.026\*\*\* |  |  |  | -0.034\*\*\* | -0.029\*\*\* | -0.021\*\*\* |
|  | (0.004) | (0.005) | (0.004) |  |  |  | (0.006) | (0.007) | (0.006) |
|  |  |  |  |  |  |  |  |  |  |
| Government functioning | -0.491\*\*\* | -0.345\*\*\* | -0.353\*\*\* |  |  |  | -0.564\*\*\* | -0.351\*\*\* | -0.358\*\*\* |
|  | (0.055) | (0.064) | (0.056) |  |  |  | (0.066) | (0.080) | (0.070) |
|  |  |  |  |  |  |  |  |  |  |
| Population (log) | 1.555\*\*\* | 0.987\*\*\* | 1.004\*\*\* |  |  |  | 1.626\*\*\* | 1.002\*\*\* | 0.909\*\*\* |
|  | (0.068) | (0.086) | (0.072) |  |  |  | (0.101) | (0.122) | (0.102) |
|  |  |  |  |  |  |  |  |  |  |
| Number (log) |  |  |  | 0.282\*\*\* | 0.212\*\*\* | 0.193\*\*\* | 0.055 | -0.001 | 0.116\*\* |
|  |  |  |  | (0.042) | (0.032) | (0.033) | (0.048) | (0.053) | (0.048) |
|  |  |  |  |  |  |  |  |  |  |
| Constant | -22.478\*\*\* | -15.589\*\*\* | -15.301\*\*\* | 2.034\*\*\* | -3.586\*\* | -2.978\*\*\* | -22.480\*\*\* | -16.248\*\*\* | -16.112\*\*\* |
|  | (1.650) | (1.788) | (1.502) | (0.396) | (0.334) | (0.327) | (1.928) | (2.189) | (1.827) |
|  |  |  |  |  |  |  |  |  |  |
|  | | | | | | | | | | |
| Observations | 1,308 | 1,308 | 1,308 | 950 | 950 | 950 | 715 | 715 | 715 |
| Log Likelihood | -2,531.569 | -338.401 | -579.710 | -2,779.916 | -410.372 | -638.723 | -1,881.852 | -242.663 | -426.318 |
| theta | 0.129\*\*\* (0.008) |  | 0.479\*\*\* (0.072) | 0.068\*\*\* (0.004) |  | 0.224\*\*\* (0.033) | 0.166\*\*\* (0.012) |  | 0.483\*\*\* (0.079) |
| Akaike Inf. Crit. | 5,077.138 | 690.802 | 1,173.420 | 5,563.833 | 824.744 | 1,281.445 | 3,779.703 | 501.326 | 868.635 |
|  | | | | | | | | | | |
| Note: | p<0.1; ***p<0.05;*** p<0.01 | | | | | | | | | |

Table 1. Models

**Replication data:**

<https://drive.google.com/file/d/14eilcp-6Q8rY9JqNe_zeLN9M_R3uddab/view?usp=drivesdk>

**Appendix**

|  |  |  |  |
| --- | --- | --- | --- |
|  | | | |
|  | Dependent variable: | | |
|  |  | | |
|  | Event  (Count) | Intrastate  (Dummy) | Intrastate  (Number) |
|  | negative | normal | negative |
|  | binomial |  | binomial |
|  | (1) | (2) | (3) |
|  | | | |
| Number (log) | 0.076 | -0.005 | 0.053 |
|  | (0.055) | (0.006) | (0.040) |
|  |  |  |  |
| Economic inequality | 0.276\*\* | -0.047\*\*\* | -0.489\*\*\* |
|  | (0.116) | (0.012) | (0.089) |
|  |  |  |  |
| GDP per capita (2010 US dollar)) | -0.263 | -0.053\*\* | -0.944\*\*\* |
|  | (0.220) | (0.026) | (0.159) |
|  |  |  |  |
| Polity2 | 0.220\*\*\* | 0.015\*\*\* | 0.141\*\*\* |
|  | (0.045) | (0.005) | (0.033) |
|  |  |  |  |
| Polity2\_square | -0.027\*\*\* | -0.005\*\*\* | -0.045\*\*\* |
|  | (0.007) | (0.001) | (0.006) |
|  |  |  |  |
| Government functioning | -0.611\*\*\* | -0.019\* | -0.127 |
|  | (0.099) | (0.010) | (0.079) |
|  |  |  |  |
| Population (log) | 1.556\*\*\* | 0.078\*\*\* | 0.734\*\*\* |
|  | (0.117) | (0.012) | (0.090) |
|  |  |  |  |
| Constant | -21.257\*\*\* | 0.008 | -1.504 |
|  | (2.724) | (0.280) | (2.153) |
|  |  |  |  |
|  | | | |
| Observations | 446 | 446 | 446 |
| Log Likelihood | -954.891 | -113.853 | -188.148 |
| theta | 0.192\*\*\* (0.019) |  | 422.991 (10,009.590) |
| Akaike Inf. Crit. | 1,925.782 | 243.706 | 392.296 |
|  | | | |
| Note: | p<0.1; ***p<0.05;*** p<0.01 | | |
|  |  | | |

Table 2. Models without the countries in the lowest GDP per capita quartile

|  |  |  |  |
| --- | --- | --- | --- |
|  | | | |
|  | Dependent variable: | | |
|  |  | | |
|  | Event  (Count) | Intrastate  (Dummy) | Intrastate  (Count) |
|  | negative | normal | negative |
|  | binomial |  | binomial |
|  | (1) | (2) | (3) |
|  | | | |
| Number (log) | 0.044 | 0.004 | 0.121\*\* |
|  | (0.049) | (0.007) | (0.047) |
|  |  |  |  |
| Economic inequality | 0.130 | -0.027\*\* | -0.058 |
|  | (0.105) | (0.013) | (0.098) |
|  |  |  |  |
| GDP per capita (2010 US dollar)) | -0.217\* | 0.024 | 0.049 |
|  | (0.125) | (0.017) | (0.110) |
|  |  |  |  |
| Polity2 | 0.161\*\*\* | 0.017\*\*\* | 0.089\*\*\* |
|  | (0.035) | (0.005) | (0.031) |
|  |  |  |  |
| Polity2\_square | -0.031\*\*\* | -0.003\*\*\* | -0.019\*\*\* |
|  | (0.006) | (0.001) | (0.006) |
|  |  |  |  |
| Government functioning | -0.581\*\*\* | -0.030\*\*\* | -0.322\*\*\* |
|  | (0.068) | (0.009) | (0.071) |
|  |  |  |  |
| Population (log) | 1.607\*\*\* | 0.100\*\*\* | 0.875\*\*\* |
|  | (0.101) | (0.012) | (0.100) |
|  |  |  |  |
| Constant | -20.860\*\*\* | -1.304\*\*\* | -15.651\*\*\* |
|  | (1.945) | (0.239) | (1.812) |
|  |  |  |  |
|  | | | |
| Observations | 621 | 621 | 621 |
| Log Likelihood | -1,844.155 | -252.774 | -422.488 |
| theta | 0.167\*\*\* (0.012) |  | 0.497\*\*\* (0.081) |
| Akaike Inf. Crit. | 3,704.310 | 521.548 | 860.975 |
|  | | | |
| Note: | p<0.1; ***p<0.05;*** p<0.01 | | |

Table 3. Model without the countries in the highest GDP per capita quartile

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | | | | | | |
|  | Dependent variable: | | | | | |
|  |  | | | | | |
|  | Intrastate  (Dummy)  (-5,5] | Intrastate  (Count)  (-5,5] | Intrastate  (Dummy)  [-10,-5] | Intrastate  (Count)  [-10,-5] | Intrastate  (Dummy)  (5,10] | Intrastate  (Count)  (5,10] |
|  | normal | negative | normal | negative | normal | negative |
|  |  | binomial |  | binomial |  | binomial |
|  | (1) | (2) | (3) | (4) | (5) | (6) |
|  | | | | | | |
| Number (log) | 0.004 | 0.100\* | -0.040\*\* | -0.664\*\* | 0.018\*\*\* | 0.264\*\*\* |
|  | (0.012) | (0.057) | (0.019) | (0.267) | (0.007) | (0.066) |
|  |  |  |  |  |  |  |
| Economic inequality | -0.008 | 0.041 | 0.091\*\* | 1.564 | -0.021\* | -0.127 |
|  | (0.025) | (0.119) | (0.043) | (1.015) | (0.012) | (0.136) |
|  |  |  |  |  |  |  |
| GDP per capita (2010 US dollar)) | 0.098\*\*\* | 0.321\*\* | 0.019 | 0.612 | -0.042\*\* | -0.513\*\*\* |
|  | (0.028) | (0.127) | (0.058) | (1.486) | (0.019) | (0.179) |
|  |  |  |  |  |  |  |
| Polity2 | -0.021\*\* | -0.102\*\* | -0.164 | -139.658 | 0.301\*\* | 7.309\*\*\* |
|  | (0.010) | (0.044) | (0.525) | (2,143,615.000) | (0.146) | (1.994) |
|  |  |  |  |  |  |  |
| Polity2\_square | 0.002 | -0.046\*\* | -0.014 | -10.789 | -0.019\*\* | -0.467\*\*\* |
|  | (0.003) | (0.019) | (0.034) | (164,893.500) | (0.009) | (0.131) |
|  |  |  |  |  |  |  |
| Government functioning | -0.045\*\*\* | -0.253\*\*\* | -0.086 | -1.038 | -0.018\*\* | -0.386\*\*\* |
|  | (0.015) | (0.090) | (0.056) | (1.156) | (0.009) | (0.095) |
|  |  |  |  |  |  |  |
| Population (log) | 0.153\*\*\* | 0.979\*\*\* | 0.040 | 0.740 | 0.063\*\*\* | 0.684\*\*\* |
|  | (0.023) | (0.157) | (0.037) | (0.670) | (0.012) | (0.124) |
|  |  |  |  |  |  |  |
| Constant | -2.825\*\*\* | -19.997\*\*\* | -1.203 | -471.974 | -1.641\*\*\* | -37.168\*\*\* |
|  | (0.511) | (3.001) | (2.260) | (6,925,526.000) | (0.584) | (7.771) |
|  |  |  |  |  |  |  |
|  | | | | | | |
| Observations | 252 | 252 | 52 | 52 | 411 | 411 |
| Log Likelihood | -118.530 | -222.344 | -5.215 | -14.657 | -61.598 | -142.376 |
| theta |  | 0.964\*\*\* (0.259) |  | 250.945 (722.737) |  | 4.322 (3.143) |
| Akaike Inf. Crit. | 253.060 | 460.687 | 26.430 | 45.314 | 139.196 | 300.753 |
|  | | | | | | |
| Note: | p<0.1; ***p<0.05;*** p<0.01 | | | | | |

Table 2. Model with the countries in each polity group

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1. Data from QOD (2020) [↑](#footnote-ref-1)
2. stable democracy (5,10), unstable type (-5,5), authoritarian [-10,-5]). See the specific table in Appendix. [↑](#footnote-ref-2)