**Supplementary material: Appendix for ‘Protection through Presence: UN Peacekeeping and the Costs of Targeting Civilians’[[1]](#footnote-1)**

**TABLE A1: List of missions included in the analysis**

|  |  |  |
| --- | --- | --- |
| **Country** | **UN Mission** | **Period included**\* |
| Burundi | ONUB | Jun 2004 – Dec 2006 |
| Central African Republic | MINURCAT | Sep 2007 – Dec 2010 |
| Chad | MINURCAT | Sep 2007 – Dec 2010 |
| Democratic Republic of the Congo | MONUC | Feb 2000 – Jun 2010 |
| Democratic Republic of the Congo | MONUSCO | Jul 2010 – Dec 2011 |
| Ivory Coast | UNOCI | Apr 2004 – Dec 2011 |
| Liberia | UNMIL | Sep 2003 – Dec 2011 |
| Sierra Leone | UNAMSIL | Jan 2000 – Dec 2005 |
| South Sudan | UNMISS | Jul 2011 – Dec 2011 |
| Sudan | UNMIS | Mar 2005 – Jul 2011 |
| Sudan | UNAMID | Jul 2007 – Dec 2011 |
| Sudan | UNISFA | Jun 2011 – Dec 2011 |

\*Missions are included from the month in which they were established by the Security Council or received a mandate to protect civilians. We follow the missions until December 2011, or until they end.

**TABLE A2a: Summary statistics with and without peacekeeping deployment**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | PK presence= 0  (N= 206,979) | | | | PK presence= 1  (N= 10,223) | | | |
|  | *Mean* | *Std. dev* | *Min* | *Max* | *Mean* | *Std. dev* | *Min* | *Max* |
| Populationlog | 10.25 | 1.33 | 5.64 | 14.46 | 11.64 | 1.15 | 8.14 | 14.52 |
| Mountainous Terrain | .08 | .19 | 0 | 1 | .14 | .26 | 0 | 1 |
| Distance to Citylog | 6.16 | .61 | 4.08 | 8.66 | 5.48 | .48 | 4.50 | 6.99 |
| Battle Deathst-1 | .05 | 3.30 | 0 | 731 | .29 | 4.28 | 0 | 204 |
| Spatial Lag OSVt-1 | .02 | .15 | 0 | 1 | .07 | .25 | 0 | 1 |
| #Troops in Neigh. Cellst-1 | 1.10 | 4.26 | 0 | 80 | 13.32 | 17.32 | 0 | 89.7 |
| Decay Function OSV | .01 | .09 | 0 | 1 | .09 | .23 | 0 | 1 |

Table A2a shows descriptive statistics for our main explanatory variables of interest. The sample is split based on whether peacekeepers are present in the cell that month or not. The descriptive statistics suggest that locations with peacekeepers look quite similar to those that see peacekeeping deployment, particularly in terms of population, the degree of mountainous terrain, distance to the city and even battle activity. Overall, cells with peacekeeping deployment have somewhat higher population levels, more rugged terrain and is a bit closer to a urban center than cells without peacekeeping. They also tend to have higher levels of battle deaths from civil war violence and seeing more violence against civilians in their immediate vicinity or having a history of one-sided violence in the recent past. Also, not surprisingly, these descriptive statistics suggest that peacekeepers cluster in space. These patterns suggest that, if anything, peacekeepers actually go to the more violence-affected locations at a higher risk of violence.

**TABLE A2b: Onset of Peacekeeping Deployment, Logit Models**

|  |  |  |
| --- | --- | --- |
|  | Model 1 | Model 2 |
|  | PK Onset | PK Onset |
| OSV Gov 3 months | -0.006 | -0.007 |
|  | (0.016) | (0.013) |
| OSV Reb 3 months | 0.003 | 0.003 |
|  | (0.001)\* | (0.001)\* |
| Pre-deployment OSV 6-months |  | 0.008 |
|  |  | (0.002)\*\* |
| Pre-deployment Battle Deaths 6 months |  | 0.002 |
|  |  | (0.001)\*\* |
| Populationlog | 0.272 | 0.098 |
|  | (0.106)\* | (0.100) |
| Mountainous Terrain | 1.701 | 0.668 |
|  | (0.339)\*\* | (0.329)\* |
| Distance to Citylog | -1.159 | -1.440 |
|  | (0.202)\*\* | (0.191)\*\* |
| Battle Deathst-1 | -0.005 | -0.005 |
|  | (0.007) | (0.007) |
| Spatial Lag OSVt-1 | -0.053 | -0.349 |
|  | (0.322) | (0.329) |
| #Troops in Neigh. Cellst-1 | 0.013 | 0.050 |
|  | (0.007)+ | (0.006)\*\* |
| Decay Function PK onset | 2.554 | 2.308 |
|  | (0.424)\*\* | (0.417)\*\* |
| Country FE | *Yes* | *No* |
|  |  |  |
| Constant | -2.440 | 0.450 |
|  | (2.158) | (2.022) |
| *N* | 200,153 | 200,153 |
| + *p*<0.1; \* *p*<0.05; \*\* *p*<0.01 | | |
| Robust standard errors in parentheses clustered on cell. | | |

In Table 2 in the manuscript we focused on whether the onset of peacekeeping deployment is shaped by previous levels of violence against civilians, as well civil war battle deaths. Here we present some alternative specifications to these models. First, we re-estimate our main model *Peacekeeping Onset* with country-fixed effects to account for unobserved heterogeneity at the country level. As shown in Model 1, the coefficient for civilian targeting by rebel groups (*OSV Reb 3-months*) remains positive and statistically significant. Hence, peacekeeping deployment appears to be shaped by previous levels of violence against civilians by rebel actors. As seen in Model 2, adding variables that summarize the intensity of one-sided violence and battle deaths in the cell in the 6-month period prior to peacekeeping deployment to the country confirms this pattern. Whereas the coefficients for pre-deployment one-sided violence and battle-deaths are positive and significant suggesting that peacekeepers deploy to areas that previously have seen violence, our key findings remain the same. We consistently find that local peacekeeping deployment responds to civilian targeting by rebel actors, but not to one-sided violence by governments, nor to civil war battle dynamics.

**Table A3: Peacekeeping presence, logit models**

|  |  |  |
| --- | --- | --- |
|  | Model 1 | Model 2 |
|  | PK presence | PK presence |
| OSV 3 months | 0.003 |  |
|  | (0.001)\* |  |
| OSV Gov 3 months |  | -0.002 |
|  |  | (0.005) |
| OSV Reb 3 months |  | 0.003 |
|  |  | (0.001)\* |
| Pre-deployment OSV 6 months | 0.010 | 0.010 |
|  | (0.003)\*\* | (0.003)\*\* |
| Pre-deployment Battle Deaths 6 months | 0.002 | 0.002 |
|  | (0.001)\*\* | (0.001)\*\* |
| Populationlog | 0.185 | 0.185 |
|  | (0.068)\*\* | (0.068)\*\* |
| Mountainous Terrain | 0.298 | 0.298 |
|  | (0.243) | (0.243) |
| Distance to Citylog | -0.949 | -0.949 |
|  | (0.135)\*\* | (0.135)\*\* |
| Battle Deathst-1 | 0.001 | 0.001 |
|  | (0.002) | (0.002) |
| Spatial Lag OSVt-1 | 0.044 | 0.047 |
|  | (0.304) | (0.304) |
| #Troops in Neigh. Cellst-1 | 0.027 | 0.027 |
|  | (0.007)\*\* | (0.007)\*\* |
| PK presencet-1 | 10.190 | 10.191 |
|  | (0.136)\*\* | (0.136)\*\* |
| Constant | -3.150 | -3.152 |
|  | (1.397)\* | (1.397)\* |
| *N* | 209,857 | 209,857 |
| + *p*<0.1; \* *p*<0.05; \*\* *p*<0.01 | | |
| Robust standard errors in parentheses clustered on cell. | | |

In alternative specifications of our models with peacekeeping deployment, we use *Peacekeeping Presence* as the dependent variable. The results are in line with those obtained for peacekeeping onset. Model 1 shows a positive and significant effect of one-sided violence on peacekeeping presence. In Model 2, we distinguish between government and rebel violence, and as before we find a positive and significant effect concerning violence by rebel actors, whereas the coefficient for one-sided violence by government actors is not precisely estimated.

**Table A4: Alternative measure, long-term trends in violence**

|  |  |  |
| --- | --- | --- |
|  | Model 1 | Model 2 |
|  | OSV reb | OSV gov |
| #Troops in Cellt-1 | -0.022 | -0.009 |
|  | (0.010)\* | (0.027) |
| Populationlog | -0.036 | 0.135 |
|  | (0.075) | (0.162) |
| Mountainous Terrain | 1.427 | 0.568 |
|  | (0.279)\*\* | (0.536) |
| Distance to Citylog | -0.627 | -0.864 |
|  | (0.188)\*\* | (0.251)\*\* |
| Battle Deathst-1 | -0.001 | 0.008 |
|  | (0.003) | (0.004)\* |
| Spatial Lag OSVt-1 | 1.628 | 0.877 |
|  | (0.218)\*\* | (0.380)\* |
| #Troops in Neigh. Cellst-1 | -0.013 | -0.009 |
|  | (0.006)\* | (0.011) |
| Decay Function OSV Gov | 0.137 | 3.671 |
|  | (0.262) | (0.540)\*\* |
| Decay Function OSV Reb | 4.264 | 1.177 |
|  | (0.262)\*\* | (0.561)\* |
| OSV Reb Change\_pr | 0.701 |  |
|  | (0.458) |  |
| OSV Gov Change\_pr |  | 2.605 |
|  |  | (1.372)+ |
| Constant | -3.525 | -4.422 |
|  | (1.628)\* | (2.940) |
| *N* | 198,162 | 198,162 |
| + *p*<0.1; \* *p*<0.05; \*\* *p*<0.01 | | |
| Robust standard errors in parentheses clustered on cell. | | |

It is possible that peacekeepers are deployed to secure stability in areas where the rate of violence is already trending towards peace. In the manuscript we include control variables capturing longer-term time trends in our dependent variable, comparing the average level of violence in the previous 4-month period, to the preceding 4-month period (constructed as moving averages). In Appendix Table A4, Model 1 and 2 we report alternative specifications with *OSV Reb Change\_pr* and *OSV Gov Change\_pr*, which instead compare changes in the proportion of months with occurrence of one-sided violence. Our findings remain the same, showing a negative and significant effect of the number of troops on the risk of one-sided violence by rebel groups, whereas we find no corresponding effect for violence by government actors.

**Table A5: Threshold effects**

|  |  |
| --- | --- |
|  | Model 1 |
|  | OSV Reb |
| Troops in Cell >400t-1 | -0.599 |
|  | (0.236)\* |
| PK presencet-1 | 0.413 |
|  | (0.194)\* |
| Populationlog | -0.047 |
|  | (0.071) |
| Mountainous Terrain | 1.263 |
|  | (0.272)\*\* |
| Distance to Citylog | -0.632 |
|  | (0.174)\*\* |
| Battle Deathst-1 | -0.002 |
|  | (0.003) |
| Spatial Lag OSVt-1 | 1.553 |
|  | (0.210)\*\* |
| #Troops in Neigh. Cellst-1 | -0.012 |
|  | (0.007)+ |
| Decay Function OSV Gov | 0.168 |
|  | (0.265) |
| Decay Function OSV Reb | 4.350 |
|  | (0.235)\*\* |
| Constant | -3.373 |
|  | (1.491)\* |
| *N* | 214,617 |
| + *p*<0.1; \* *p*<0.05; \*\* *p*<0.01 | |
| Robust standard errors in parentheses clustered on cell. | |

Whereas our results generally indicate that a larger presence of local peacekeeping forces is associated with a lower risk of civilian targeting by rebel actors, it does not speak directly to the question of the number of troops required for effective civilian protection. When iteratively recoding the troop deployment variable with various cutoff points, we identify a threshold at 400 troops, where local deployment renders a statistically significant effect on the risk of one-sided violence (see Model 1). A dummy variable marking troop deployment of 300 or more troops is negative, but not significant. In Table A5, the control for troop presence in the cell is positive and significant. Possibly, selection into the most violence prone locations confound the impact of peacekeepers at low levels of troop presence, and bias against finding significant effects at lower thresholds.

**Table A6: Displacement effects**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Model 1 | Model 2 | Model 3 | Model 4 |
|  | OSV *Reb* | OSV *Reb* in cell given no PK | OSV in neigh.  Cells | OSV in neigh.  Cells |
| #Troops in Cellt-1 | -0.039 |  | -0.036 |  |
|  | (0.010)\*\* |  | (0.012)\*\* |  |
| #Troops in Cellt-2 |  |  |  | -0.039 |
|  |  |  |  | (0.012)\*\* |
| Populationlog | -0.096 | -0.025 | 0.160 | 0.158 |
|  | (0.072) | (0.078) | (0.038)\*\* | (0.039)\*\* |
| Mountainous Terrain | 1.257 | 1.314 | 1.424 | 1.424 |
|  | (0.272)\*\* | (0.276)\*\* | (0.132)\*\* | (0.133)\*\* |
| Distance to Citylog | -0.682 | -0.624 | -0.219 | -0.205 |
|  | (0.182)\*\* | (0.206)\*\* | (0.084)\*\* | (0.086)\* |
| Battle Deathst-1 | -0.001 | 0.000 | -0.001 | -0.001 |
|  | (0.003) | (0.004) | (0.003) | (0.003) |
| Spatial Lag OSVt-1 | 1.477 | 1.643 | 2.786 | 2.799 |
|  | (0.210)\*\* | (0.247)\*\* | (0.077)\*\* | (0.077)\*\* |
| #Troops in Neigh. Cellst-1 |  | -0.013 | 0.022 | 0.023 |
|  |  | (0.011) | (0.003)\*\* | (0.003)\*\* |
| Decay Function OSV Gov | 0.092 | 0.048 | 0.788 | 0.708 |
|  | (0.258) | (0.467) | (0.208)\*\* | (0.208)\*\* |
| Decay Function OSV Reb | 4.372 | 4.442 | 2.307 | 2.365 |
|  | (0.235)\*\* | (0.265)\*\* | (0.152)\*\* | (0.152)\*\* |
| Inverse Distance Troopst-1 | 0.284 |  |  |  |
|  | (0.193) |  |  |  |
| Constant | -2.550 | -3.737 | -4.766 | -4.854 |
|  | (1.549)+ | (1.789)\* | (0.831)\*\* | (0.848)\*\* |
| *N* | 205,923 | 206,896 | 217,202 | 212,032 |
| + *p*<0.1; \* *p*<0.05; \*\* *p*<0.01 | | | | | |
| Robust standard errors in parentheses clustered on cell. | | | | | |

In Table A6, we report on alternative specifications for the control for peacekeepers in close-by locations. First, the impact of peacekeepers in proximate locations may be manifest across longer distances, particularly if peacekeepers cluster in space. Our alternative spatial lag – *Inverse Distance Troops* – takes the inverted distance in kilometers to the most proximate peacekeeping deployment in the country in a given month.[[2]](#footnote-2) The coefficient for troop presence in the cell remains negative and statistically significant, whereas the coefficient for the spatial lag (*Inverse Distance Troops*) is not statistically significant. We thus find no evidence of a displacement effect.

Next, in Model 2 we estimate the effect of the number of peacekeeping troops in the neighboring cells *(#Troops in Neighbort-1*) on the risk of one-sided violence, given that there are no peacekeepers present at the location. Our results show no indication of a displacement effect, as we find no significant effect of troops in the vicinity on the risk of violence.

In Model 3 and 4, respectively, we estimate the effect of peacekeeping troops at a location (t-1 and t-2) on the risk of one-sided violence in the neighboring cells. The variables *#Troops in Cellt-1*and *#Troops in Cellt-2*display negative and significant effects of peacekeeping troops at a location on the risk for violence against civilians in the vicinity. Hence, if anything these results suggest that peacekeepers reduce violence in proximate locations through patrolling and monitoring. Whereas the coefficient for the number of troops in neighboring cells is positive and significant in these models, the geographical reference point for the peacekeeping and OSV variable is not necessarily the same.

**Table A7: Cell-fixed effects, country-fixed effects and time trend**

|  |  |  |  |
| --- | --- | --- | --- |
|  | Model 1 | Model 2 | Model 3 |
|  | OSV reb | OSV reb | OSV reb |
| #Troops in Cellt-1 | -0.036 | -0.019 | -0.023 |
|  | (0.018)\* | (0.007)\* | (0.012)\* |
| Populationlog | 0.809 | -0.168 | -0.099 |
|  | (0.807) | (0.084)\* | (0.070) |
| Mountainous Terrain |  | 1.311 | 1.290 |
|  |  | (0.282)\*\* | (0.274)\*\* |
| Distance to Citylog |  | -0.987 | -0.664 |
|  |  | (0.204)\*\* | (0.178)\*\* |
| Battle Deathst-1 | -0.001 | -0.001 | -0.001 |
|  | (0.005) | (0.003) | (0.003) |
| Spatial Lag OSVt-1 | 1.055 | 1.466 | 1.548 |
|  | (0.148)\*\* | (0.204)\*\* | (0.206)\*\* |
| #Troops in Neigh. Cellst-1 | -0.020 | -0.006 | -0.008 |
|  | (0.007)\*\* | (0.005) | (0.006) |
| Decay Function OSV Gov | 0.753 | 0.359 | 0.427 |
|  | (0.274)\*\* | (0.258) | (0.255)+ |
| Decay Function OSV Reb | 1.775 | 4.114 | 4.338 |
|  | (0.175)\*\* | (0.222)\*\* | (0.226)\*\* |
| Cell FE | *Yes* | *No* | *No* |
|  |  |  |  |
| Country FE | *No* | *Yes* | *No* |
| Time POC mandate |  |  | -0.005 |
|  |  |  | (0.002)\*\* |
| Constant |  | -0.936 | -2.180 |
|  |  | (1.861) | (1.547) |
| *N* | 12,340 | 199,941 | 217,202 |
| + *p*<0.1; \* *p*<0.05; \*\* *p*<0.01 | | | |
| Robust standard errors in parentheses clustered on cell. | | | |

In Table A7, we report additional robustness accounting for geographic and temporal effects. First, we re-estimate Model 2 from Table 3 using a conditional logit model, which includes cell-fixed effects. The inclusion of cell-fixed effects allows us to control for time-invariant, unobserved heterogeneity across our units of observation, for example related to ethnic geography or the degree of state penetration and administrative reach into the cell. If these factors influence the risk of civilian victimization, while also being correlated with the deployment of peacekeepers, this would bias our results. As shown in Model 1, the coefficient for *#Troops in Cell* remains negative and statistically significant at the 95% confidence level. The fixed-effects model examines the determinants of within-panel variability in civilian targeting, conditional on the panel ever experiencing such violence. The negative and significant estimate thus brings confidence that our results is not simply caused by cross-cell variation, but that the deployment of peacekeepers leads to a reduction in the probability of civilian targeting in their area of operation.

In Model 2, we report a model where we instead use country-fixed effects, thereby accounting for unobserved heterogeneity at the country level.[[3]](#footnote-3) Again, our main coefficient of interest, *#Troops in Cell*, is negative and statistically significant at the 95% level.

Finally, in Model 3 we ensure that our results are robust to accounting for time trends in our data. We are particularly concerned with how the UN has interpreted and implemented the protection mandate in peacekeeping operations over time. Our result for the violence reducing effect of peacekeepers is robust to including a measure of the time since the UN civilian protection mandate was first introduced in 1999.

**Table A8: Additional control variables**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Model 1 | Model 2 | Model 3 | Model 4 |
|  | OSV reb | OSV reb | OSV reb | OSV reb |
| #Troops in Cellt-1 | -0.023 | -0.024 | -0.019 | -0.024 |
|  | (0.010)\* | (0.010)\* | (0.007)\*\* | (0.009)\*\* |
| Populationlog | -0.103 | -0.210 | -0.147 | -0.074 |
|  | (0.075) | (0.090)\* | (0.076)+ | (0.071) |
| Mountainous Terrain | 1.321 | 1.274 | 1.210 | 1.195 |
|  | (0.282)\*\* | (0.267)\*\* | (0.269)\*\* | (0.295)\*\* |
| Distance to Citylog | -0.777 | -0.982 | -0.901 | -0.841 |
|  | (0.186)\*\* | (0.218)\*\* | (0.205)\*\* | (0.182)\*\* |
| Battle Deathst-1 | -0.001 | -0.001 | -0.001 | -0.001 |
|  | (0.003) | (0.003) | (0.003) | (0.003) |
| Spatial Lag OSVt-1 | 1.533 | 1.415 | 1.494 | 1.522 |
|  | (0.210)\*\* | (0.202)\*\* | (0.207)\*\* | (0.208)\*\* |
| #Troops in Neigh. Cellst-1 | -0.008 | -0.007 | -0.006 | -0.006 |
|  | (0.006) | (0.006) | (0.006) | (0.006) |
| Decay Function OSV Gov | 0.250 | 0.435 | 0.304 | 0.471 |
|  | (0.262) | (0.263)+ | (0.255) | (0.250)+ |
| Decay Function OSV Reb | 4.315 | 4.101 | 4.222 | 4.246 |
|  | (0.233)\*\* | (0.232)\*\* | (0.233)\*\* | (0.228)\*\* |
| Total Size of PKOt-1 | -0.024 |  |  |  |
|  | (0.044) |  |  |  |
| P5 Troops in PKOt-1 | -0.436 |  |  |  |
|  | (0.138)\*\* |  |  |  |
| Duration of PKO Mission | 0.002 |  |  |  |
|  | (0.002) |  |  |  |
| GCPpc |  | -0.735 |  |  |
|  |  | (0.142)\*\* |  |  |
| Excluded Group |  | -0.225 |  |  |
|  |  | (0.157) |  |  |
| Diamonds |  |  | -0.315 |  |
|  |  |  | (0.481) |  |
| Oil |  |  | 0.705 |  |
|  |  |  | (0.171)\*\* |  |
| Rebel Strength |  |  |  | 0.539 |
|  |  |  |  | (0.167)\*\* |
| Government Strength |  |  |  | 0.275 |
|  |  |  |  | (0.142)+ |
| Constant | -1.731 | 4.982 | -1.092 | -3.771 |
|  | (1.639) | (2.386)\* | (1.699) | (1.722)\* |
| *N* | 213,519 | 217,161 | 217,202 | 210,518 |
| + *p*<0.1; \* *p*<0.05; \*\* *p*<0.01 | | | | |
| Robust standard errors in parentheses clustered on cell. | | | | |

In Table A8 we report robustness to a number of additional controls to our main model in Table 3. In Model 1 we include three additional control variables that account for potentially important mission-specific characteristics: *Total* *Size of PKO*[[4]](#footnote-4)*;* *P5 Troops in PKO*[[5]](#footnote-5)*;* and the *Duration of PKO* mission. With these additional controls *#Troops in Cell* remains negative and significant at the 95% level.[[6]](#footnote-6)

Next, we control for *GCPpc* (the cell-equivalent to GDP per capita) to account for development in the cell.[[7]](#footnote-7) We also control for the presence of population groups at particular risk of civilian targeting by creating a dummy variable *Excluded Group* denoting whether an ethno-political group that is excluded from political power or discriminated against lives in the cell. The presence of politically marginalized population groups increases the risk of one-sided violence (Fjelde and Hultman 2014). This factor could also be systematically related to peacekeeping deployment, for example if peacekeepers are sent to protect populations at risk. The data is constructed by combining data on the political status of ethno-political groups in the Ethnic Power Relations dataset with spatial data on their sub-national settlement patterns from the GeoEPR dataset.[[8]](#footnote-8) As shown in Model 2, the results are robust to the introduction of these additional controls (and including these variables separately does not change the results).

Moreover, we also add controls for the presence of natural resources in the form of oil and diamonds. The risk of civilian targeting may be higher in areas in proximity to valuable natural resources (Humphreys 2005), and such strategically important areas could also see a higher risk of peacekeeping deployment. The dummy variable for *Diamonds* in is constructed through spatial overlay operations with geographical data on on diamond extraction (Gilmore et al. 2005). For *Oil*, we have aggregated the local data (Lujala, Rød, and Thieme 2007) to the country level, as OSV never occurs in cells with petroleum extraction. As shown in Model 3, the coefficient for *#Troops in Cell* remains negative and statistically significant.

In addition, we control for the strength of the warring actors. Military capacity could affect the likelihood of warring actors targeting civilians (Wood 2010), while also influencing the ability of peacekeepers to be active at a location and deter violence. Data on the strength of the rebel side is taken from the Non-State Actor Dataset (Cunningham, Gleditsch and Salehyan 2009). The variable *Rebel Strength* denotes the relationship of the rebel side to the government and ranges from 0 (much weaker) to 4 (much stronger). In our sample this variable ranges from 0 (much weaker) to 2 (at parity), as very few groups are ‘stronger’ or ‘much stronger’ relative to the government. The group-level variable is aggregated to the conflict level by taking the maximum value. We also control for the absolute level of strength of the government. These data on the strength of the government come from the National Material Capabilities data set v.4.0 by the Correlates of War project (Singer, Bremer, and Stuckey 1972). To construct the variable *Government Strength* we use information on the size of the state army (measured in thousands) and take the natural logarithm of the variable to reduce variable skewness. As shown in Model 4, the number of peacekeeping troops remains negative and significant at the 99% level after taking into account the strength of the warring actors.

**Table A9: Case control logit design and rare events logit**

|  |  |  |
| --- | --- | --- |
|  | Model 1 | Model 2 |
|  | Case control logit | Rare events logit |
|  | OSV reb | OSV reb |
| #Troops in Cellt-1 | -0.025 | -0.023 |
|  | (0.010)\* | (0.011)\* |
| Populationlog | -0.059 | -0.053 |
|  | (0.067) | (0.070) |
| Mountainous Terrain | 1.262 | 1.378 |
|  | (0.249)\*\* | (0.269)\*\* |
| Distance to Citylog | -0.658 | -0.688 |
|  | (0.169)\*\* | (0.176)\*\* |
| Battle Deathst-1 | -0.002 | 0.001 |
|  | (0.003) | (0.003) |
| Spatial Lag OSVt-1 | 1.423 | 1.521 |
|  | (0.195)\*\* | (0.208)\*\* |
| #Troops in Neigh. Cellst-1 | -0.010 | -0.011 |
|  | (0.005)+ | (0.006)+ |
| Decay Function OSV Gov | 0.282 | 0.233 |
|  | (0.249) | (0.259) |
| Decay Function OSV Reb | 3.859 | 4.330 |
|  | (0.214)\*\* | (0.230)\*\* |
| Constant | -2.446 | -2.943 |
|  | (1.463)+ | (1.533)+ |
| *N* | 114,778 | 217,202 |
| + *p*<0.1; \* *p*<0.05; \*\* *p*<0.01 | | |
| Robust standard errors in parentheses clustered on cell. | | |

Our analysis of one-sided violence events using high-level spatial resolution data is associated with problems relating both to spatial dependence and rare events, which may lead to an underestimation of standard errors. Model 1 reports the results when implementing a case-control logit design where we compare violence-affected cells with a random sample of non-violent locations (see Buhaug et al. 2011). We rerun our preferred model after dropping 50% of the observations from panels that never see one-sided violence. This approach may help address the problem of spatial correlation across nearby cells, as well as reduce rare events problems. In Model 2 we rerun the model using a rare events logit estimator (King and Zeng 2001). In both models, the variable troops in cell remains negative and statistically significant.

**Table A10: Dropping imprecise events**

|  |  |
| --- | --- |
|  | Model 1 |
|  | OSV reb restricted |
| #Troops in Cellt-1 | -0.026 |
|  | (0.012)\* |
| Populationlog | -0.059 |
|  | (0.071) |
| Mountainous Terrain | 1.517 |
|  | (0.273)\*\* |
| Distance to Citylog | -0.749 |
|  | (0.162)\*\* |
| Battle Deathst-1 | -0.001 |
|  | (0.003) |
| Spatial Lag OSVt-1 | 1.608 |
|  | (0.216)\*\* |
| #Troops in Neigh. Cellst-1 | -0.010 |
|  | (0.006) |
| Decay Function OSV Gov | -0.005 |
|  | (0.255) |
| Decay Function OSV Reb | 4.337 |
|  | (0.231)\*\* |
| Constant | -2.676 |
|  | (1.418)+ |
| *N* | 217,202 |
| + *p*<0.1; \* *p*<0.05; \*\* *p*<0.01 | |
| Robust standard errors in parentheses clustered on cell. | |

When relying on spatially disaggregated data, there is a potential risk of assigning events to the wrong grid-cell due to imprecise information. As a robustness test, we use the UCDP GED precision scores to drop all events of one-sided violence where we are less certain that the event took place in the grid cell to which it has been assigned in our dataset. When using this more restricted version of our dependent variable, we still find a negative and statistically significant effect of *# Troops in cell*.

**Table A11: Thresholds in our dependent variable**

|  |  |  |
| --- | --- | --- |
|  | Model 1 | Model 2 |
|  | OSV reb>0 | OSV reb>9 |
| #Troops in Cellt-1 | 0.008 | -0.043 |
|  | (0.007) | (0.021)\* |
| Populationlog | -0.136 | 0.021 |
|  | (0.055)\* | (0.082) |
| Mountainous Terrain | 1.055 | 1.563 |
|  | (0.207)\*\* | (0.290)\*\* |
| Distance to Citylog | -0.560 | -0.692 |
|  | (0.153)\*\* | (0.197)\*\* |
| Battle Deathst-1 | 0.001 | -0.001 |
|  | (0.002) | (0.004) |
| Spatial Lag OSVt-1 | 1.575 | 1.404 |
|  | (0.149)\*\* | (0.226)\*\* |
| #Troops in Neigh. Cellst-1 | 0.001 | -0.015 |
|  | (0.003) | (0.009)+ |
| Decay Function OSV Gov | 0.690 | -0.272 |
|  | (0.253)\*\* | (0.302) |
| Decay Function OSV Reb | 4.445 | 4.416 |
|  | (0.200)\*\* | (0.283)\*\* |
| Constant | -2.138 | -4.109 |
|  | (1.316) | (1.693)\* |
| *N* | 217,202 | 217,202 |
| + *p*<0.1; \* *p*<0.05; \*\* *p*<0.01 |  |  |
| Robust standard errors in parentheses clustered on cell. | | |

Our dependent variable is a dummy variable for whether five civilians or more were killed. While we think this threshold is reasonable (partly as we think it is unrealistic for peacekeepers to eliminate all violence, partly as we want to put our theory to a hard test and see if peacekeepers can reduce violence at very low levels), it is an arbitrary threshold. We therefore show the results using two other thresholds. First, in Model 1 we employ the lowest possible threshold, examining whether peacekeepers are able to reduce the risk of any violence (1 person or more killed). Here, we do not find a negative effect of peacekeeping troops as we do in our main models. In Model 2, we use a higher threshold (10 or more killed). Here, we do find a negative and significant effect. Hence, peacekeepers cannot reduce violence completely and we may still see smaller instances of violence in the presence of peacekeepers. But these results also demonstrate that the negative effect that we find is not completely dependent on the choice of threshold.

**Table A12: Security Council P5**

|  |  |  |
| --- | --- | --- |
|  | Model 1 | Model 2 |
|  | OSV reb | OSV reb |
| #Troops in Cellt-1 | -0.022 | -0.022 |
|  | (0.011)\* | (0.011)\* |
| Permanent-5t-1 | -0.634 | -0.509 |
|  | (0.657) | (0.209)\* |
| Permanent-5\*#Troops in Cellt-1 | 0.006 |  |
|  | (0.030) |  |
| Populationlog | -0.059 | -0.059 |
|  | (0.072) | (0.072) |
| Mountainous Terrain | 1.321 | 1.321 |
|  | (0.273)\*\* | (0.273)\*\* |
| Distance to Citylog | -0.703 | -0.703 |
|  | (0.177)\*\* | (0.177)\*\* |
| Battle Deathst-1 | -0.001 | -0.001 |
|  | (0.003) | (0.003) |
| Spatial Lag OSVt-1 | 1.544 | 1.544 |
|  | (0.209)\*\* | (0.209)\*\* |
| #Troops in Neigh. Cellst-1 | -0.011 | -0.011 |
|  | (0.006)+ | (0.006)+ |
| Decay Function OSV Gov | 0.283 | 0.283 |
|  | (0.263) | (0.263) |
| Decay Function OSV Reb | 4.374 | 4.374 |
|  | (0.232)\*\* | (0.232)\*\* |
| Constant | -2.824 | -2.824 |
|  | (1.546)+ | (1.546)+ |
| *N* | 214,617 | 214,617 |
| + *p*<0.1; \* *p*<0.05; \*\* *p*<0.01 | | |
| Robust standard errors in parentheses clustered on cell. | | |

In our analyses, we do not make any distinction between different troop contributing countries at the local level. However, the impact of troops on the ground may vary depending on where they are from. In particular, it is possible that troops from the permanent members of the Security Council (P5 countries) may have a stronger impact on reducing violence due to the signaling value of P5 countries choosing to contribute with troops (as they rarely do) as well as their potentially superior training and equipment. We have coded a dummy variable whether any of the P5 countries deployed any troops to each location. We then interact this variable with *#Troops in Cell*. The results, displayed in Model 1, show no evidence of an interaction effect between P5 countries and troop strength, but *#Troops in Cell* is negative and significant also in the absence of troops from P5 countries at the local level. In Model 2 we include the P5 measure (without the interaction term), and the results show that both troops strength and P5 troops significantly reduces the risk of one-sided violence by rebel groups. These findings indicate the need for more in-depth analysis of the impact of various troop-contributing countries at the local level, in particular in terms of their signaling value and their capacity.

**Bibliography**

Buhaug, Halvard, Kristian Skrede Gleditsch, Helge Holtermann, Gudrun Østby and Andreas Forø Tollefsen. 2011. “It’s the Local Economy, Stupid! Geographic Wealth Dispersion and Conflict Outbreak Location.” *Journal of Conflict Resolution* 55 (5): 814–840.

Cunningham, David, Kristian Gleditsch, and Idean Salehyan. 2009. “It Takes Two: A Dyadic Analysis of Civil War Duration and Outcome.” *Journal of Conflict Resolution* 53 (4): 570–597.

Gilmore, Elisabeth, Päivi Lujala, Nils Petter Gleditsch, and Jan Ketil Rød. 2005. “Conflict diamonds: A new dataset.” *Conflict Management and Peace Science* 22 (3): 257–292.

King, Gary, and Langche Zeng. 2001. ‘‘Logistic Regression in Rare Events Data.’’ *Political Analysis* 9 (2): 137–63.

Lujala, Päivi, Jan Ketil Rød, and Nadja Thieme. 2007. “Fighting over oil: Introducing a new dataset.” *Conflict Management and Peace Science* 24 (3): 239–256.

Singer, J. David, Stuart Bremer, and John Stuckey. 1972. ”Capability Distribution, Uncertainty, and Major Power War, 1820-1965.” In Bruce Russett, ed. *Peace, War, and Numbers*, Beverly Hills: Sage, 19–48.

1. Note: The appendix reports the results for a number of additional robustness checks and extensions to the main results reported in the manuscript. The robustness checks primarily relate to the relationship between peacekeeping and violence against civilians by rebel actors. [↑](#footnote-ref-1)
2. The variable is introduced at t-1 to account for the temporal process of displacement. [↑](#footnote-ref-2)
3. In the country fixed effects model, South Sudan and Chad are dropped from the analysis, as these countries do not see any variation in our dependent variable during the time period under study. [↑](#footnote-ref-3)
4. The variable is measured as the total number of troops divided by population (denoted in 1,000,000), using data from Kathman (2013) and the UN national aggregate database (UN 2014). Using a simple count of the number of troops does not significantly alter our main findings. [↑](#footnote-ref-4)
5. *P5 Troops in PKO* is a dummy capturing the presence of peacekeeping troops in the country from at least one of the five permanent members (P5) of the UN Security Council. [↑](#footnote-ref-5)
6. Since we include control variables at a higher level of spatial aggregation, we have ensured that these results do not change when estimating robust standard errors clustered on the country, rather than the cell. [↑](#footnote-ref-6)
7. Data on local economic activity for GCP per capita is based on Nordhaus (2006) and is measured in five-year intervals and imputed for in-between years. These variables are taken from the PRIO-GRID (Tollefsen, Strand, and Buhaug 2012). For more details on data sources and operationalization, see Tollefsen (2012). [↑](#footnote-ref-7)
8. Cederman, Wimmer and Min 2010; Wucherpfennig et al. 2011. [↑](#footnote-ref-8)