

UN Troop Deployment and Preventing Violence Against Civilians in Darfur

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Does the presence of UN peacekeeping force lower civilian fatalities at the local level? If it does, is it because of their coercive military capacity or for other reasons such as their roles in monitoring and reporting violent atrocities? To explore these questions, I study the deployment of peacekeeping units in Darfur and its impact on violence against civilians. Using original geocoded data of UN deployments before and after the intervention, I examine what aspects of such deployments impact one-sided civilian killings by government and rebel groups. Results indicate that deploying UN peacekeepers in an area restrains belligerent from targeting civilians. However, results also show that the military capacity of peacekeepers is not a significant factor in lowering civilian killings. While their ability to defend themselves is extremely important for peacekeepers, these findings caution against the militarization trend in UN peacekeeping and seek to re-shift focus on other substantive aspects of peacekeeping.

Recent research on peacekeeping interventions show that deploying larger and more diverse peacekeeping forces in a post-conflict country saves civilian lives from armed violence (Bove and Ruggeri 2016; Hultman, Kathman, and Shannon 2013). But our understanding of the role of military peacekeepers at the local level remains unclear. For instance, some scholars worry that deploying forces can be potentially self-defeating when it comes to protecting local civilians in peacekeeping missions as it only exacerbates their vulnerability (Hunt 2017:115; Karlsrud 2015). Understanding in what ways locally deployed military peacekeeping units impact civilian lives can have a number of implications not only for scholars and practitioners, but also for policymakers in the UN and troop contributing countries.

In this paper, I explore the puzzle of how peacekeeping troop deployments impact violence against civilians in nearby areas by examining the case of UN peacekeeping in Darfur, one of the largest and toughest missions in the history of peacekeeping. The nature and size of the peacekeeping operation in Darfur changed significantly in 2008, when the UN took control of the fledgling African Union mission (Appiah-Mensah 2006). The transitional period provides an excellent opportunity to compare civilian killings in a region, before and after the UN deployment. Such micro-level comparison makes it possible to obtain a clean identification of the effects of peacekeeping deployments and further explore theoretical expectations about underlying mechanisms.

I argue that deploying peacekeepers can lower civilian killings at the local level and the findings in this paper provide support for this argument. They show that the presence of UN peacekeepers in various regions of Darfur, as well as their deployment sizes, were influential factors in lowering civilian fatalities. I also seek to understand the mechanism that is driving these results. The two ways that peacekeepers may restrain local perpetrators are—by using military or coercive force to directly deter the potential perpetrators, and by conducting other peacekeeping activities, such as monitoring and reporting civilian atrocities, which can raise reputational and other political costs for the actors. But if military or coercive force were an influential factor, then we expect to find relatively lower civilian deaths around

areas that have higher quality troops in terms of their military professionalism. However, findings in this study do not support this expectation, thus indicating that the effectiveness of peacekeepers in checking violent perpetrators stems from their other peacekeeping roles like monitoring, verification and reporting.

Political groups in post-conflict countries are strategic actors for whom endorsement from credible international players matter for their long-term political survival. Due to this, the presence of peacekeepers and their ability to monitor and report can have substantive impact on their behavior. This study contributes by evaluating the effectiveness of military peacekeepers in protecting civilians at the local level. As these results suggest, the role of military peacekeepers in a peacekeeping mission is complex.¹ But more important, by highlighting these findings, this study seeks to re-shift the focus of debate from militarization and the use of force to other more substantive aspects of peacekeeping.

Identification problem in peacekeeping research is often amplified by layers of confounding factors at various levels and also by the overall complexity of peacekeeping operations. In this study, I use three measures to improve the strategy of causal identification. First, I use original longitudinal data of peacekeeping deployments in Darfur from 2005. This deployment data is novel as it provides dynamic and geocoded information of all peacekeeping units in Darfur. Moreover, the region is nearly as large as France, with widely scattered concentric settlements. From research point of view, such dispersal across desert condition is ideal for identifying the effects of treatment or the deployments, since it limits the spillover effect to control group or the non-deployment areas.

Second, the unit of analysis in the study is grid-cell years. Darfur region is divided into fixed 55km x 55km grid-cells for each year of study. Using grid-cells standardizes comparisons and takes into account proximity and spread of units, minimizing some of the biases inherent in using political boundaries such as municipalities. For instance, sizes of political boundaries tend to be uneven, change over time, and are often endogenous to deployment decisions in

¹In the words of former UN Secretary General Dag Hammarskjöld, “Peacekeeping is not a job for soldiers, but only soldiers can do it.”

the first place. Using fixed grid-cells as the unit of analysis minimizes these problems (Branch 2016: 864).

Third, unlike past studies that examine the effect of peacekeeping only by looking at the post-deployment time period, I include three years before and after the UN deployment and use difference-in-difference estimator. Specifically, I compare the differences in outcomes² in the pre-deployment period (2005-2007) with outcomes in the post-deployment period (2008-2010). In essence, this strategy is useful in isolating and comparing the effect of UN deployment in an area, with the counterfactual scenario of what would have occurred in that area in absence of the deployment. To check the robustness of this strategy, I extend the deployment data set from 2005 to 2015 and use a fixed effects model. In sum, this study examines new theoretical expectations about the impact of peacekeeping on local violence with a strong empirical approach.

Can Presence of Peacekeepers Curb Local Violence?

A handful of studies show the positive consequence of deploying peacekeeping missions in post-conflict countries. Examining at the cross-national level, they show that deploying peacekeepers tends to lower the likelihood of conflict recurrence in post-conflict countries (Gilligan and Sergenti 2008; Hartzell and Hoddie 2003; Quinn, Mason, and Gurses 2007; Pearson, Lounsbury, Walker, and Mann 2006). Even in countries with *active* conflicts, peacekeeping deployments are found to lower battle-related deaths (Hultman, Kathman, and Shannon 2014). These studies provide valuable insights into our understanding of peacekeeping. Yet, two areas remain unclear and require more systematic investigation. First, it is difficult to conclude from these country-level studies whether deploying military units at a local level has any substantive effect on lowering civilian violence in the area. The dynamics of conflict at a local level can be quite different from that at the central or country level (Autesserre 2010; Kalyvas 2006). Moreover, efforts to forge peace at the central level, such as diplomatic effort and other resources mobilized by the international community, can

²Between deployment (treatment) and non-deployment (control) grid-cells

confound the local level mechanism.³

Another unclear area is the underlying mechanism of how deploying military peacekeepers might impact civilian protection at the local level. While the country-level studies show that deploying UN missions can lower violence against civilians, it is not clear whether it is the coercive military power of the peacekeepers or their symbolic and monitoring role that is more effective in restraining belligerents from perpetrating those atrocities. Hultman et al. (2013), for instance, examine cross-national cases to compare the effectiveness of armed peacekeeping deployments with unarmed observer missions in protecting civilians. They show that deployment of armed troops is more effective than unarmed observers in lowering incidents of one-sided violence against civilians. However, the authors pool country-year data and use negative binomial model, without taking into account *when* these two types of peacekeepers get deployed.⁴ But, when examining only *post-conflict* cases, Fortna (2004: 283) finds that the deployment of unarmed observers is relatively more effective in keeping the peace than deploying military units.

Recent micro-level studies have made important contributions to our understanding of the impact of peacekeepers in local contexts. For instance, Ruggeri, Dorussen and Gizelis (2017) analyze disaggregated local-level data of four African countries to study the effect of peacekeepers on *conflict durations*. With grid-cells as the unit of analysis, they use survival analysis to show that deployment of peacekeepers shortens conflict duration in the deployed grid-cell and that increasing their number also has a more positive effect in *shortening* the conflict. These findings, to some extent, are similar to those of Beardsley and Gleditsch (2015), who find that deploying peacekeepers can restrict belligerent movement in the deployed area, thus preventing the expansion of conflict-zones. But shortening or containing a conflict does not necessarily imply a lower number of conflict-related fatalities, as seen in some brief and localized, yet very intense episodes of violence like the Rwandan

³Past studies discuss the role of major power in peacekeeping missions and the biases prevalent in UN Security Council Resolutions (Mullenbach 2005).

⁴For instance, while many unarmed observers get deployed in war-prone areas to monitor the situation and provide an early warning, most armed peacekeeping units get deployed during the post-conflict phase.

genocide. Quite the contrary, a study conducted on Bosnian conflict does not find any clear evidence of peacekeeping deployments lowering local-level violent fatalities (Costalli 2014). The study uses yearly data of municipalities of Bosnia-Herzegovina *after* the deployment of UN Protection Force (1992-95), but finds that the presence of UN forces *did not* significantly reduce the number of violent killings. It should be noted that Bosnian conflict at the time was an active war,⁵ since the Dayton Peace Accord was signed only in December 1995. But even then, the result contrasts with a finding discussed earlier, that deploying peacekeepers in an active conflict tends to lower civilian killings (Hultman et al. 2014). This non-finding may be indicative of the fact that the civilian protection mandate in UN peacekeeping became more mainstream only after 2005 (Bellamy and Williams 2011: 827), and mainly as a result of lessons learned from failures like Rwanda and Bosnia-Herzegovina. Still, it begs the question of how peacekeeping deployments in contemporary missions affect violence against civilians at the local level.

Peacekeeping Deployments and Civilian Fatalities

Belligerent groups in armed conflicts draw resources from the population and often compete with each other for territorial control and population support (Balcells 2010; Kalyvas 2006). Even after they agree to stop fighting, hostility and competition continue to remain, and may even exacerbate during political events like elections or drafting of a new constitution (Joshi, Melander, and Quinn 2017). This competition and uncertainty often lead to opportunistic and preemptive attacks on opponent group members and alleged supporters. They may also target civilians to coerce them from joining opponent groups (Wood, Kathman, and Gent 2012: 652).

Deploying peacekeeping units in such contexts can lower the likelihood of violence in three ways. First, the presence of a third party can lower mutual uncertainty and mistrust among the belligerents. This comes from the belief that opponents are less likely to perpetrate unilateral violence under a third party's observance (Walter 1997). Physically,

⁵Rather than post-accord deployment, which is the focus of this study

peacekeepers provide forums for belligerents to coordinate and exchange information (Ruggeri, Gizelis, and Durussen 2013). Compared to regional or bilateral interventions, the UN's reputation as neutral arbiters provides additional impetus for cooperation (Fortna 2008: 84, 86). Therefore, while greater mistrust about the opponent's intentions leads to increased uncertainty and chances of preemptive strikes, the presence of peacekeepers can have the opposite effect of diffusing the tension.

Second, peacekeepers can raise physical costs for groups that perpetrate civilian atrocities. Most peacekeeping missions today are mandated to protect civilians (Bellamy 2009). Due to this, having a unit of peacekeepers stationed near a settlement area or vulnerable places like internally displaced person (IDP) sites raises the risk of costly encounter for potential perpetrators that seek to target civilians. For instance, in May 2008, when a heavy fighting started between the Sudanese Armed Forces and the Sudanese People's Liberation Army in Abyei region, local civilians who rushed to the nearby camp of Zambian peacekeepers were offered sanctuary and later relocated to a safer place (UN Secretary General's report S/2008/485:6). Belligerents did not deliberately target the UN camp, which saved numerous civilian lives. This is *deterrence by default* since the mere positioning of peacekeepers raises the cost for belligerents seeking to target civilians in the area, even when peacekeepers do not intend to fight armed elements in protecting civilians. Larger the size of troops deployed, greater is the potential cost for belligerents.

Finally, peacekeepers' ability to monitor and report can draw international condemnation against perpetrators of civilian violence. Former belligerent parties in a post-conflict country are rational actors with specific political goals, for whom international support is crucial. Especially when belligerents are signatories of peace agreements, the presence of UN peacekeepers and their roles in monitoring and identifying violent perpetrators can immensely raise reputational costs for the parties (Fortna 2004; Gilligan and Sergenti 2008; Mullenbach 2005).

Not only presence, but their size should also play an influential role. A larger size

of peacekeeping deployments in an area boosts their monitoring capacity and reach. Larger unit size facilitates more frequent monitoring patrols as it ensures that there are sufficient number of troops available to do such tasks, as well as to guard the camps or provide reinforcement if required. UNAMID peacekeepers in Darfur frequently conducted investigative and other types of patrols. Between August 15 and October 1, 2009, for instance, UNAMID military personnel conducted 3,033 confidence-building patrols, 2,729 escort patrols, 1,031 night patrols, and 37 investigation patrols (S/2009/592). These numbers are substantively higher compared to the preceding African Union mission, which conducted far smaller number of escort patrols primarily around IDP sites, due to troop shortages (Ekengard 2008). In sum, larger size of peacekeeping units should deter potential perpetrators from harming civilians by raising these costs. These discussions lead to following hypotheses.

H1: Compared to no deployment, deploying peacekeeping units in a region is more likely to lower the number of civilian killings in their vicinity.

H2: Larger the size of a deployed peacekeeping unit, the number of civilian killings in its vicinity is likely to be lower.

Exploring the Mechanism: Military Power vs Other Means of Peacekeeping

If peacekeepers are effective in lowering civilian violence, as suggested by the above hypotheses, an important but difficult question for policymakers is to pinpoint what attributes make peacekeepers more effective. For instance, their military capacity to physically deter potential perpetrators may be more effective than their other peacekeeping roles. Past studies have argued that larger number of deployed peacekeepers is synonymous with greater coercive capacity in deterring local spoilers (Beardsley 2011; Hultman et al. 2013: 879; Ruggeri et al. 2017). But the effectiveness of a large number of peacekeeping forces might be due to their increased ability to perform peacekeeping tasks such as monitoring and reporting, thus suggesting that these roles have greater importance in peacekeeping missions.

In fact, larger deployment sizes may not even signal physical deterrence against potential armed actors. There are numerous instances when peacekeepers have chosen not to engage with armed groups, despite their sizes. As the Force Commander of UNAMID Rodolphe Adada stated, even if the peacekeepers are in full strength “peacekeepers are not here to stand between rival armies and militias engaged in full-scale combat” (Adada 2008). There are many examples of such reluctance among peacekeepers to avoid costly confrontation, although this sharply contrasts the idea of *robust* peacekeeping that was started with the aim to raise costs to “spoilers” of peace (Nasu 2011: 368).⁶ Moreover, since monitoring and other peacekeeping roles are not as risky as forcefully deterring armed actors, peacekeepers should be more inclined to take these roles, irrespective of their numbers. A large number of peacekeepers, therefore, can undoubtedly facilitate an increased level of monitoring and reporting activities and raise the reputational cost for groups that perpetrate violence against civilians. Reputational cost matters highly for actors in post-conflict countries since it has direct influence on their political ambitions and availability of resources (Krain 2012; Savun and Tirone 2012). Field reports from the peacekeepers can play important role in raising political costs for potential perpetrators and holding them accountable. Research indicates that 62% of the targeted sanctions by the UN against armed groups and individuals are used in conjunction with peacekeeping (Biersteker, Eckert, Tourinho and Hudakova 2018).

As discussed earlier, another explanation why peacekeeping interventions might work in lowering violence against civilians is because presence of third party deescalates tension by lowering mistrust. In post-conflict contexts, opposition parties are more prone to take the violent path fearing that their rivals will not similarly commit to peace, thus leaving them worse off if they choose the peaceful route. This is more likely the case in places like Darfur, where many armed groups are not signatories of peace agreements, as they are likely to launch preemptive strikes in the context of uncertainty. Presence of third parties

⁶Critics argue that a large number of troops but with a low level of commitment can only exacerbate violent killings. For instance, Krain (2005) indicates that when UN created safe haven sites in Bosnia-Herzegovina, but without a strong commitment to protect civilians, it only led to the mass killing of the Bosniacs.

in those circumstances can deflate tensions through coordination and information-sharing. As one study indicates, the higher the level of uncertainty or the strength of opposition force, the more likely are the rebels and government forces to cooperate and coordinate with peacekeeping forces (Ruggeri *et al.* 2013).

Therefore, more than their military capacity to deter, it is possible that peacekeepers are effective in restraining potential perpetrators because of their non-militaristic peacekeeping roles. The following section builds an argument for coercive capacity of the peacekeepers in order to empirically test the resulting hypothesis. A null result for this test will weaken the case for coercive capacity⁷ and vice-versa.

Can Peacekeepers' Military Capacity Restrain Potential Perpetrators?

Deterring local spoilers of peace requires peacekeepers to take risks. Unlike traditional missions where peacekeepers stood as a physical buffer between belligerents, modern-day peacekeeping in post-conflict contexts are expected to carry out a riskier goal of protecting civilians by using coercive force (Ruggeri *et al.* 2017: 169). This goal is directly dependent on their willingness to fight against violent perpetrators and their drive toward successful accomplishment of the mission. One way to isolate and assess this attribute among deployed peacekeepers is by looking at the degree of their military professionalism.

Military professionalism can be defined in many ways, but according to Toronto (2017), the two essential elements of military professionalism are expertise and a sense of calling, both of which are directly related to their level of commitment to goals. Expertise refers to the existence of a military-specific body of knowledge and its application, whereas the sense of calling is leaders' commitment to goals that is beyond their personal gain (Toronto 2017: 855-856). While the concept is abstract, past studies have operationalized the level of military professionalism by looking at the amount of resources that countries invest in their military forces in the form of military expenditure per capita (Daniel, Heuel, and Margo

⁷That quality of troops in terms of their military effectiveness or coercive capacity does not deter armed actors from killing civilians.

2009; Toronto 2017). Countries that spend more on their troops, on average, have more professional military.

Moreover, the UN sets a standard for all participating troop-contributing countries in terms of logistics —what weapons and equipment each troop-contributing country must have, and reimburses them (Coleman 2014). This means that all participating units will have a certain level of capacity to operate militarily. Yet, all TCCs have incentive to take less risk, if possible. We should therefore expect, at least theoretically, that their professionalism defined as the willingness to act or do their duty when called, should set them apart. In other words, we should expect military peacekeeping units from countries that invest more resources in their armed forces to more aggressively pursue their mandates and deter belligerents from targeting civilians, compared to troops from countries that invest relatively less. This should, on average, lead to lower level of violent civilian killings in areas, where there are peacekeeping units from countries that spend more on their military.

H3: Higher the military expenditure of deployed units, the number of civilian killings in their vicinity is likely to be lower.

The Darfur Crisis

I test the above hypotheses using an original data set of UN peacekeeping deployments in the Darfur region of Sudan. Violence in the region peaked in 2003 when fighting intensified between the Sudanese government and various Darfuri rebel groups. After the death of nearly 100,000 people, the key actors of the conflict⁸ agreed to sign the humanitarian ceasefire agreement in April 2004. As a part of the agreement, peacekeepers from the regional intergovernmental organization, the African Union, deployed to Darfur. The African Union Mission in Sudan (AMIS) was mandated to monitor, verify, investigate and report transgressions of the agreement (African Union 2007; De Waal 2007: 1041). However, the initial deployment of around 3000 African Union peacekeepers proved inadequate for stabi-

⁸The Government of Sudan, Sudan Liberation Movement/Army (SLM/A) and Justice and Equality Movement (JEM)

lizing the deteriorating situation in Darfur. In July 2005, AMIS II was launched to boost its presence but even at its peak, in mid-2006, the mission only had around 6000 military personnel including staffs and unarmed military observers. The main AMIS peacekeeping units in the region were the three Nigerian battalions, three Rwandan battalions, a South African battalion, a South African Reserve company, a Senegalese battalion, and a Gambian Reserve company (Appiah-Mensah 2006). For a region as large as France, the size of this force structure was inadequate. But worse, the mission faced the problem of limited resources. Despite the increase in overall size, there was no increase in funding or logistical support. As result, the African Union peacekeepers were unpaid for months, their mobility was severely constrained, and their operational capability largely restrained.

Deployment of the UNAMID

On July 2007, the UN Security Council unanimously adopted Resolution 1769, which authorized UN intervention in Darfur. This was the result of several peace attempts such as the Tripoli Agreement,⁹ numerous bilateral communiques, and the most important, the Darfur Peace Agreement signed in May 2006. UNAMID became the first hybrid mission in the history of peacekeeping and it was mandated to support the implementation of the Darfur Peace Agreement, as well as to protect civilians and promote security and the rule of law.

Launching of the UNAMID mission in 2008 fundamentally changed the role and capacity of peacekeeping operations in Darfur, both in terms of the number and quality. The change from AMIS to UNAMID resulted in substantively enhanced logistical capability and funding for peace operations. The African Union troops that continued to remain in UNAMID started getting the UN daily allowance and were equipped as per the UN self-sustainment capability checklist (UN 2007: 4). Countries like Nigeria and Rwanda provided additional battalions and rotated their troops with fresh units. The authorized plan included deployment of 26,000 peacekeepers, out of which 19,555 would be military peacekeepers from various countries. By November 2008, 9,941 military personnel had deployed, which included

⁹Signed by Chad, Sudan and Libyan government in February 2006

the deployment of the first Egyptian battalion and a rotation of 10 African battalions with fresh troops (UN 2008).¹⁰ By October 2009, the strength of military personnel in UNAMID reached 14,638, which was 75% of the total authorized strength (UN 2009). Additional resources included second Egyptian Battalion, Ethiopian battalion, Chinese engineering company, Thai Battalion and equipment like armored personnel carriers. With an increase in resources, UNAMID was able to boost its security activities. By mid-2010, 17,308 military peacekeepers were deployed in the UNAMID, which was 88% of the authorized strength.

Empirical Design

The initial years before and after the deployment provide an excellent window of opportunity for understanding the effect of UNAMID deployment on local-level violence. From 2005 to 2010, the macro-level political context in Darfur had not changed significantly. The Darfur Peace Agreement (DPA) that was held in Abuja in July 2006, was in fact planned in early 2005.¹¹ After the Abuja DPA, the next round of DPA was not until 2011.¹² The one major event at the time was the deployment of UNAMID in 2008. From a research point of view, the time period from 2005 to 2010, therefore, is ideal for evaluating the impact of UN deployment using difference-in-difference estimation technique.

To understand the effect of peacekeeping deployment on civilian violence, I use grid-cell year as the unit of analysis. I first divided the Darfur region into grid-cells using prio-grid data set (Tollefsen, Strand, and Buhaug 2012). Each grid-cell is a quadratic square polygon on two-dimensional terrestrial plane which, as mentioned earlier, is approximately 55km X 55km. I then collected yearly data for each grid-cell starting from 2005 to the end of 2010. The resultant data set has 1284 grid-cell year observations and covers three years before and after the start of UNAMID deployment in 2008.

¹⁰A battalion has 4 to 6 companies, and has a total of 600 to 800 military personnel.

¹¹The two main signatories were SLA (Minni Minawi) and the Government of Sudan. The major rebel forces in Darfur, namely the SLA/M (Abdul Wahid) and JEM did not sign the agreement.

¹²In Doha, where JEM became one of the signatories of the Agreement

Dependent Variables

The dependent variables for this study are the number of civilians killed by government and rebel forces in each grid-cell year. The data on fatalities come from the Armed Conflict and Location and Event Data set (ACLED), which codes date, location and other characteristics of conflict events, such as the information about actors, type of events, and the number of fatalities in those events (Raleigh, Linke, Hegre and Karlsen 2010).¹³ Since the unit of analysis is grid-cell year, I aggregate the number of civilians killed by government or government-affiliated militias and various rebel groups in each grid-cell year using ACLED.¹⁴ In total there are three dependant variables, (1) total number of civilians killed by both sides, (2) those killed only by government forces or government-affiliated militias, and (3) those killed by various rebel groups.

According to the ACLED data, the total number of violent fatalities in Darfur, due to one-sided violence by either government or rebel forces, were 784 in 2005, 482 in 2006, 919 in 2007, 336 in 2008, 42 in 2009, and 122 in 2010. This suggests that, on average, there was a decline in the overall level of violent fatalities as the years progressed. Panels in Figure 1 depict the gridded map of Darfur, three years before and after the deployment of UNAMID peacekeepers. The darker shade of the cells corresponds to the number of civilian fatalities from violence. Solid dark diamonds in the right panel of the figure represent the location of peacekeeping units.

[Figure 1 about here.]

Main Explanatory Variables

The main explanatory variable in this study is the deployment of UNAMID peacekeepers. To measure UNAMID deployment, I use count of *operational units* in a grid-cell, rather

¹³I also provide in the online supplementary file findings using UCDP GED data set, and the main results hold. I chose to use ACLED primarily because it provides a more comprehensive list of actors compared to UCDP GED, which is helpful in disaggregating rebel and government perpetrators.

¹⁴Fatalities due to clashes or the number of peacekeepers that were killed by belligerents are not included in these dependent variables.

than the number of military personnel as done by some past studies (Hultman et al. 2013, 2014; Ruggeri et al. 2017). This is because the number of personnel in an area does not necessarily reflect their operational capability. For instance, base headquarters often have more manpower due to the presence of non-operational force enablers, such as logistic, medical or signal unit personnel, who do not have much direct impact on protecting civilians. Instead, patrolling an area is often the function of deployable infantry or mechanized units. Therefore, for the purpose of this study, count of operational units is more useful.

The data on deployed operational units are generated from the Secretary General's quarterly reports available in UN digital archives. In Darfur, like in most peacekeeping missions, the basic operational military units are companies, which have about 150 to 200 personnel, depending on the military structure of the troop contributing countries. From 2008 to 2010, the size of operational units deployed in Darfur grid-cells ranged from 1 to 9 companies.¹⁵ The data set has 50 grid-cell years with one company strength, 17 grid-cell years with 2 companies, 6 with 3 companies, 2 with 4 companies, 2 with 5 companies, 1 with 6 and 1 with 9 companies. In contrast, 563 grid-cell years do not have any UNAMID deployments in those three years.¹⁶

To measure the presence of peacekeeping (H1), I use a deployment dummy, which is coded as 1 for grid-cells with any number of peacekeeping units and 0 otherwise. The two other explanatory variables expected to influence violent fatalities are deployment size (H2) and the professionalism of the peacekeepers (H3) proxied by military expenditure. For deployment size, I use the count of peacekeeping companies deployed in a grid-cell for each year since 2008.

A novel aspect about this deployment data is that it is dynamic and the deployment sizes vary on an annual basis. The size of deployed unit in a grid-cell is coded at the beginning

¹⁵Table 1.1 in the online supplementary file shows the yearly frequency distribution of peacekeeping units (companies) in the region, from 2008 to 2015.

¹⁶Once deployed, the peacekeeping units are stable until 2010. This is helpful in estimating the effect of the treatment in these deployed grid-cells. There is a change in only one of the grid-cells in 2010, which I exclude from the list of treated cells. But including this grid-cell does not have any significant impact on the main result.

of each year while violent fatalities are aggregated for the year. Because deployment size precedes violent fatalities in each grid-cell, there is no need to lag the deployment variable in order to understand its effect on civilian fatalities for that year.

Finally, explanatory variable for H3 requires information on military professionalism of deployed units. Following Toronto (2017), I use military expenditure per capita for each troop contributing country to measure military professionalism of its units deployed in Darfur, from the Stockholm International Peace Research Institute (SIPRI).¹⁷ In the UNAMID deployment data set, the top four troop contributing countries with the highest military expenditure per capita are South Africa, Thailand, Egypt, and Senegal.

Control Variables

I include a number of other factors as control measures that could also impact civilian fatalities. First, the size of peacekeeping deployment tends to correlate with the size of settlement areas or population centers, since those places tend to be logistically more feasible to sustain. Control variable grid-cell population is a static measure of population from 1991 census (Tollefsen *et al.* 2012). While the precise population figure is likely to have changed since the census, this variable is still useful since it captures the spread of population across grid-cells.

Second, the level of change in population due to conflict-induced migration could be another confounding factor that contributes to violent civilian fatalities, since large settlements of displaced people tend to become vulnerable to atrocities. Darfurians in IDP sites often became the targets of violence from both government and rebel forces. According to 2010 estimates, around 64% of the Darfuri population were affected by the conflict and 59% of the affected population were living in IDP sites in various parts of Darfur (Darfur Relief and Documentation Centre 2010: 19). Since the IDP site population is not captured by

¹⁷Available in <https://www.sipri.org/databases/milex> (Accessed January 5, 2019). Toronto (2017) uses military expenditure per soldier from Correlates of War data set. But the COW data set extends only till 2012, and the correlation for each year between the two is around 85% for UNAMID troop contributing countries. Using military expenditure per soldier from the COW data set does not produce a substantively different result.

grid-cell population counted more than two decades ago, I control for grid-cells that have more than 50,000 IDPs using a dummy variable.¹⁸

Third, majority of UNAMID deployments in 2008 were boosts to the African Union deployment that were already in place. It is therefore important to account for this fact in order to understand the effect of UNAMID deployments. I use a dummy variable to indicate gridcells where African Union peacekeepers were deployed prior to 2008.¹⁹

Finally, distances from border and capital are important to consider in Darfur. This is because neighboring countries, Chad and Libya in particular, played a key role in the conflict (Flint and De Waal 2008: 150). I include a control for the distance to the closest border and capital from each grid-cell centroid, measured as a log of kilometers from the PRIO GRID data set (Tollefsen et al. 2012).

Identification Strategy

I use difference-in-difference estimator to estimate the effect of deployment on fatalities. The estimator takes into account the unobserved time-invariant heterogeneity while allowing to control for time-variant covariates.²⁰ I take the three year periods before and after the deployment ($t=0,1$) in order to measure the trend in the treatment group or grid-cells with deployment (T), and control group (C) that did not have deployment after 2008.²¹ To find the effect of treatment, we would ideally compare the observed effect in deployment cells with the counterfactual *potential outcome* in the deployment grid-cells, had there been no deployment.

¹⁸Kalma Camp, Otash camp and Al Salam camp are all in a grid cell in Nyala, Ed Daein camp, and Gereida, and Zamzam camp in a grid-cell near El Fasher. Data on IDP population is acquired from the Office of the United Nations High Commissioner for Human Rights.

¹⁹AMIS presence in Darfur started trickling in since 2004. As of mid-2005, there were only 1647 protection force, mainly to provide security for 454 military observers as reported in the African Union Peace and Security Council report no. PSC/PR/2(XXVIII). It is not until the beginnin of 2006, after the launch of AMIS II, that their strength is significant in various grid-cells. AMIS presence is therefore coded since 2006.

²⁰See Wooldridge (2010: 147-148) for discussion on how difference-in-difference technique for pooled cross-sections over two time periods that straddle across a policy change resemble a natural experiment, while also allowing for the option to add other covariates in the equation (Wooldridge 2010: 151).

²¹For further details on the equation see Angrist and Pischke (2008: 229)

$$\rho = (E[Y_{ist}|s = T, t = 1] - E[Y_{ist}|s = T, t = 0]) - (E[Y_{ist}|s = C, t = 1] - E[Y_{ist}|s = C, t = 0]) \quad (1)$$

Since, the *potential outcome* cannot be observed, I utilize the parallel trend assumption, which states that in the absence of treatment, a trend over time in treatment cells would be parallel to that of the trend in control cells. With that assumption in mind, the difference in trend between the two groups is ρ in equation (1), which is the effect of the deployment.

The specification for the above intuition can be represented in the regression form as equation (2), which includes control variables X_{it} . $Post_c$ in the equation is the dummy vector that is coded as 0 for pre-deployment and 1 for post-deployment years. The vector $deployment_i$ represents grid-cells that are treated or grid-cells where UNAMID deployed peacekeeping units after 2008. β_3 in the equation is the effect of deployment and is the parameter of interest. γ_i and λ_t are fixed effects for grid-cells and years respectively. X_{it} represents the cells- and time-varying covariates that are used as controls. The right-hand side vector Y_{ic} is the count of violent fatalities in grid i , when c is pre- or post- deployment.²²

$$Y_{ic} = \beta_0 + \beta_1(Post_c) + \beta_2(deployment_i) + \beta_3(deployment_i X Post_c) + \gamma_i + \lambda_t + \beta X_{it} + \epsilon_{ji} \quad (2)$$

The interaction term $(deployment_i X Post_c)$ in the above equation is equivalent to a dummy vector that has the value of 1 for deployment grid-cells after 2008 and 0 otherwise. This dummy variable could be replaced with ordinal or continuous measures such as the deployment size or TCC military expenditure per capita in order to estimate their effect on

²²The three dependent variables are: combined total fatalities by government and rebel groups; fatalities by government forces and militias; and fatalities by rebel groups

fatalities.

Results

Using specification (2), I analyze the effect of peacekeeping units on three different types of violent fatalities in Darfur: (a) total one-sided violent fatalities by either government- or rebel-affiliated forces, (b) one-sided killings by Sudanese Armed Forces, police or the Janjaweed militias and (c) one sided violent fatalities by various rebel groups. Tables 1.1, 1.2 and 1.3 show results of the full models, although for the purpose of clarity, only coefficients for the main variables of interest are included.²³ Substantive effect of results from Table 1.1 is depicted in Figure 2.

As shown in the figure, deploying peacekeepers in a grid-cell significantly reduces civilian fatalities (H1). According to the first model in Table 1.1, the presence of peacekeeping units in a grid-cell reduces, on average, nearly 22 civilian deaths. The second and third columns in the table show that the presence of peacekeepers has slightly higher effect in lowering government-affiliated killings (coefficient -11.59) than civilian killings by rebel groups (coefficient -10.16).

[Table 1 about here.]

[Figure 2 about here.]

Results in Table 1.2 shows that the size of a deployed unit also has a similar restraining effect on belligerent violence against civilians (H2). Model 1 in the table shows that increasing the size of a deployed unit by 1 company lowers civilian killings by 6.13. In other words, compared to no deployment, deploying 2 companies in grid-cell saves, on average, approximately 12 civilian lives, when controlled for a number of other factors. Disaggregating the fatalities by actors, models 2 and 3 in Table 1.2 show that increasing the size of

²³See online supplementary file for results with full models, and also for additional results with UCDP GED data set instead of ACLED, which also yields similar results.

deployed units tends to lower both government and rebel perpetrated fatalities. Here, too, the coefficient is slightly higher for government killings.

However, the quality of deployed peacekeepers is not statistically significant in restraining belligerent violence against civilians. As shown in Table 1.3, the coefficients for military expenditure per capita are insignificant for all three models. This indicates that the effect of UN deployment on local-level violence may not be due to their professional quality, but perhaps due to their role in monitoring and reporting atrocities of the belligerents. The larger effect of peacekeeping deployments on government killings compared to the rebels is also not unexpected. Governments are usually more organized institutions than rebel groups. Although they both need external support and legitimacy, especially in times of civil wars, governments have more to lose from the reputational damage because of UN reports. In addition, even if we assume that both equally care about their reputations, government forces usually have more cohesion and control compared to the rebels. Consequently, in presence of the UN peacekeepers, they are able to exercise restraint better compared to the rebel groups, as rightly reflected by the results in this study.

Robustness Check With Fixed Effect Models

I check the robustness of the above findings using fixed-effects models on an extended panel data set that includes years from 2005 until 2015. Using grid-cells as fixed across time, estimates from the models reveal whether changes in grid-cell deployments have any impact on civilian killings. The three dependent variables in the models remain the same as before but since fixed effect models reject time-constant variables, I use only two of the three key explanatory variables: deployment size and military expenditure per capita of the deployed units.²⁴ Similarly, the models include three time-varying control variables that are discussed below.

²⁴The third explanatory variable, the presence of peacekeepers, is not appropriate since this variable has a time-constant value of 1 for the number of years of deployment in grid-cells and a constant value of 0 for the rest. I, therefore, use only two other explanatory variables that time-varying and the Hausman test shows that fixed-effects model is appropriate for both.

First, it is important to control for the population since it has direct bearing on civilian killings. But the grid-cell population used in Table 1 does not work for fixed effect models since the variable is constant across years. Therefore, I use yearly mean of night lights to estimate population settlements. Night lights is not a perfect measure of population but past works have shown that it can be used as a proxy for population density (Besley and Reynal-Querol 2014; Sutton 1997). The values of the annual calibrated mean of night lights for the grid-cell years range from 0 to 1 (Tollefsen *et al.* 2012). For Darfur, the two highest values since 2005 have been in grid-cell that includes El Fasher the capital (mean night lights 0.079), and grid-cell that includes Nyala, the next most populous town (mean night lights 0.078).

Second, locations of large IDP sites also confound the rate of civilian victimization as discussed above. However, since using a constant dummy for large IDP sites does not work for fixed effect models, I include IDP population of the sites that provide shelter to 20,000 or more IDPs. Data for population sizes in these sites are available only for three time periods: from 2005 to 2007, from 2008 to 2011, and from 2012 to 2015.²⁵ Third, similar to the earlier analysis, a dummy variable to indicate the deployment of African Union peacekeepers prior to 2008 is included as a control variable.

[Table 2 about here.]

Table 2 shows the result of fixed effect models, where positive coefficient indicates that a unit increase of a variable tends to increase government- or rebel-perpetrated civilian killings, while, negative coefficient suggests that such an increase tends to lower those killings. Models 1 and 2 estimate how peacekeeping unit sizes in a grid-cell and military expenditures affect overall civilian fatalities, perpetrated by both government and rebel groups. The remaining four models disaggregate the effect of unit size and military expenditure on civilian

²⁵The data on IDP population (in ten thousand) comes from United Nations Office for the Coordination of Humanitarian Affairs in Darfur.

fatalities by government forces (models 3 and 4) and rebel groups (models 5 and 6).

Overall, results in Table 2 confirm the earlier findings that deployment size of peacekeeping units matters but not their military capacity to coerce. Looking at coefficients for variable *Peacekeeping unit size*, model 1 indicates that adding one company of peacekeepers can save nearly 6 civilian lives in a grid-cell. Comparing models 3 and 5, we find that the size of peacekeeping units has a larger effect on government-affiliated forces than on rebels. While both models have negative coefficients, the coefficient for variable *Peacekeeping unit size* in model 3 is nearly three times larger than in model 5. This suggests that deployment sizes have much greater restraining effect on government forces than on rebels. However, similar to results in Table 1, coefficients for *military expenditure* in models 2, 4 and 6 are not statistically significant at $p < 0.1$. This suggests that an increase in military expenditure per capita of troop contributing countries does not have a significant relationship with civilian killings. In sum, findings here suggests that other non-coercive aspects of peacekeeping such as monitoring, reporting, and the associated reputational cost may be more important determinants of why peacekeeping appears to be working in saving civilian lives.

Among other variables, variable *AMIS* warrants some discussion since it is significant in most of the models in Table 2.²⁶ Compared to year 2005, rebel perpetrated civilian killings decreased in grid-cells after the AMIS deployment in 2006 and 2007 but not government perpetrated violence. AMIS is reported to have taken some measures to protect civilians but were often criticized for doing little to check government atrocities (Badescu and Bergholm 2009: 298). In fact, rebel groups in Darfur have alleged African Union to be taking side with the government (Sudan Tribune 2006), which does not contrast with the findings in this study.

Anecdotal evidences from Darfur tend to support the line of argument in this study that reputational and political costs because of peacekeeping monitoring and reporting may

²⁶Full models for Table 1.1, 1.2 and 1.3 are included in the supplementary material. Although models 1 in Table 1 includes variable AMIS, results in Table 1 will not be discussed since model specification for the table is mainly to measure the impact of UN peacekeeping units before and after their deployment.

have checked belligerents from targeting civilians. After the deployment of UNAMID, reports from the UN highlighted intimate accounts of atrocities against civilians perpetrated by belligerents. For instance, Secretary General's report released in December 2008 (S/2008/781:6) states that,

On 10 and 11 October two internally displaced persons were killed and at least eight others were injured, including an 8-year-old girl, when SAF [Sudanese Armed Forces] soldiers entered Nertiti IDP site, in Zalingei, Western Darfur, and opened fire in the vicinity of internally displaced persons.

Reports like these exerted significant pressure on the Sudanese government. We can infer this from their subsequent actions. For instance, despite their earlier commitment to freedom of movement for the UN peacekeepers, Sudanese military and the Government of Sudan often imposed “no-go” areas for UN peacekeepers, especially after any violent incidents. Examples of such actions can be found in numerous reports, one of which is described below (S/2009/592:4).²⁷

In September 2009, officials of the Government of the Sudan denied UNAMID access to the area around Korma (Northern Darfur) for 11 days, including a UNAMID investigation patrol on 19 September to Dirma village (15 km from Korma) and a UNAMID patrol to Korma on 25 September. This significantly impeded the capacity of the Mission to verify in a timely fashion the reports of fighting in the area, civilian casualties and humanitarian needs.

Credible reports from peacekeeping units on ground exerted accountability pressure on the Sudanese Government. While the smaller and opportunistic rebel groups may not face a similar level of pressure, larger rebel groups, such as the prominent factions of Justice and Equality Movement and Sudanese Liberation Army, that have clearer political objectives,

²⁷See also Sudan Tribune (2012) or Sudan Tribune (2011).

are more likely to be affected by the UN presence.²⁸ These prominent rebel groups are often more strategic about their actions and are thus likely to be responsive to the UN presence and their monitoring activities, rather than its coercive capacity.

Conclusion

Building peace in a post-conflict country is complex. Protection of civilians is often the first step toward establishing an accountable government necessary for building sustainable peace. In this paper, I examine how deploying a peacekeeping unit can protect civilian lives at the local level, by analyzing a novel peacekeeping deployment data from Darfur. I find that deploying peacekeeping units restrains both government and rebel violence against civilians. Both presence and size of the deployed peacekeeping units are found to have a positive effect of lowering civilian killings in the area. Yet, testing the hypothesis about the mechanism reveals that increased military professionalism of the units, measured by their countries' military expenditure, does not have substantive effect on lowering civilian killings.

There is no doubt that peacekeeping units deployed in a mission should possess certain level of military capacity to defend themselves and to coerce or deter spoilers of peace. Perhaps we can infer this from the positive effect of presence and size of peacekeepers on lowering civilian fatalities. But this study also cautions against the growing trend of militarization in peacekeeping (for example, Friis 2010). It suggests that enhancing the quality of peacekeepers, in terms of their military capacity to coerce and deter, may not have much added value. Either peacekeeping mandates prevent them from taking certain military offensive actions, which seems quite unlikely given the increasing militarization in modern missions, or, that peacekeepers may be less inclined to take such risks in the context of a peacekeeping mission. This is a matter for future research. But what this study suggests is that their other non-coercive roles, such as monitoring, reporting and providing a forum to communicate, provide a better explanation for whatever positive effect they have on checking

²⁸Abrahms (2018: 74-81) discusses how rebel leaders of more successful groups are generally careful and strategic about causing harm to civilians.

potential perpetrators from killing civilians. As with all single-case studies, a limitation of this research is the question of generalizability. But Darfur being one of the most difficult missions with entrenched conflict, the positive effect of deployment in saving civilian lives there suggests optimism elsewhere. Future research can test this study's findings in cross-national context, and can also explore several interactive relationships between micro- and macro-level factors in lowering violence and sustaining peace.

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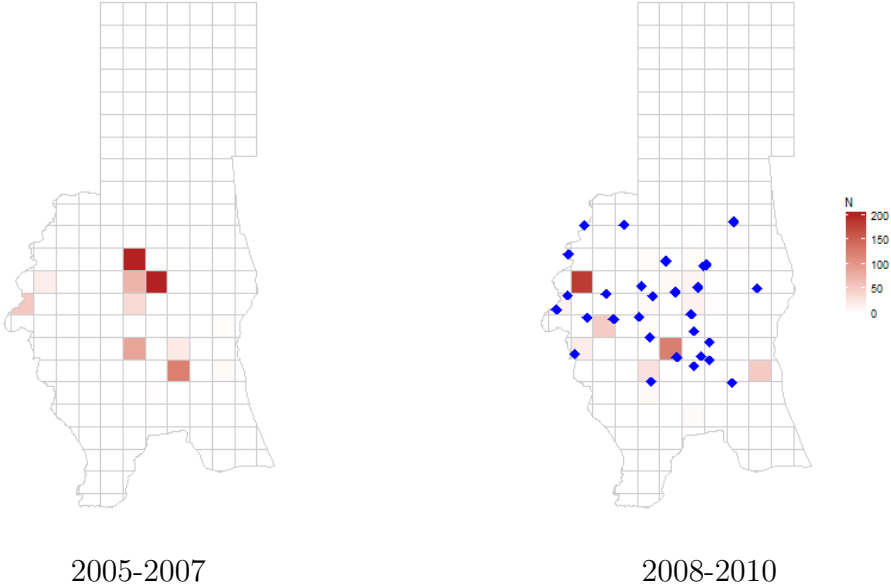
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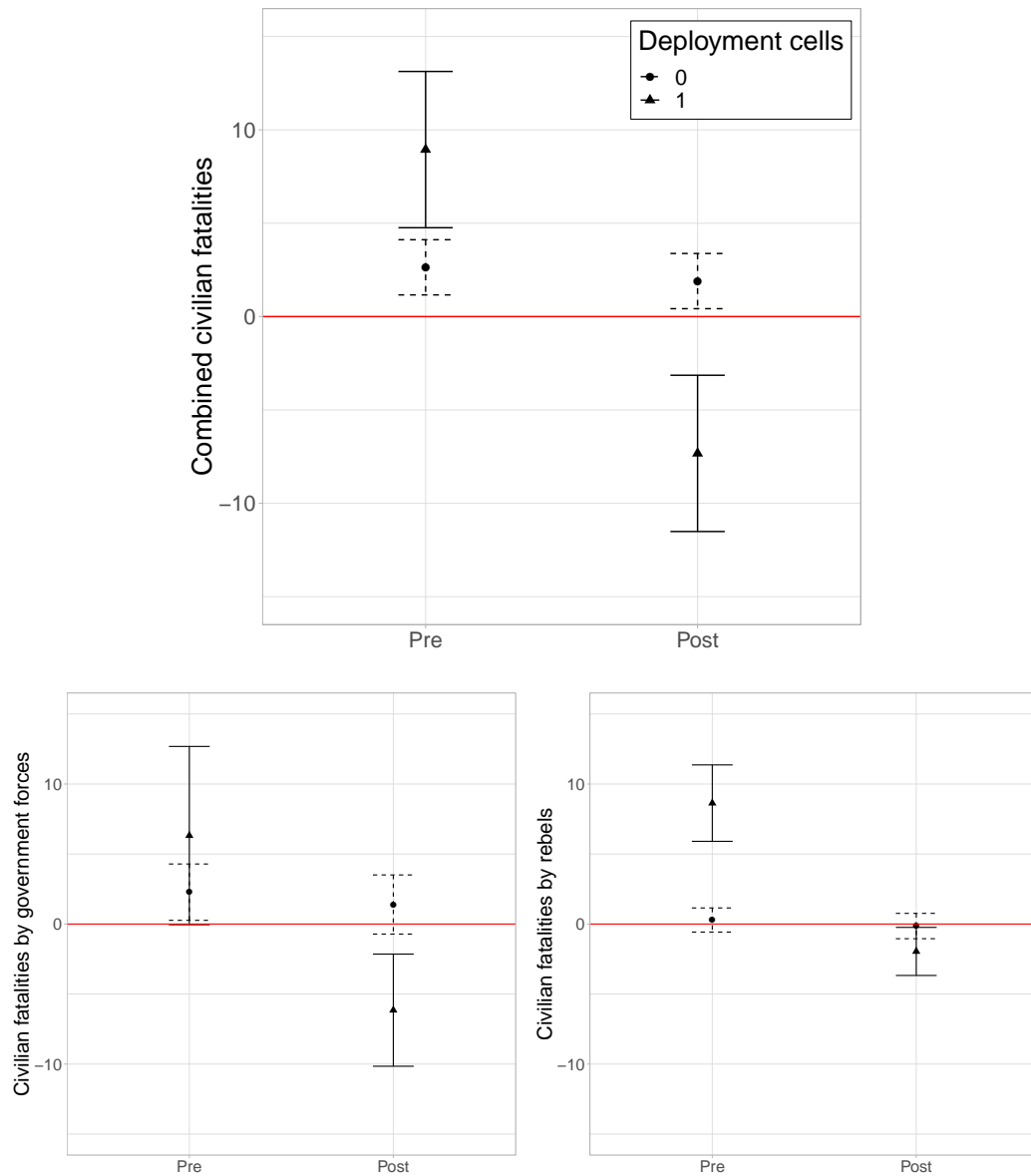
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Figure 1. Civilians killed in Darfur during pre- and post-deployment years



Note: Figure above shows the map of Darfur from 2005-2010. The shaded grid-cells in the maps represent the number of civilians killed in violent incidents. The darker diamonds in the right panel represent the location of UNAMID peacekeeping units.

Figure 2. Effects of Peacekeeping units on civilians fatalities



Note: Figures above show the effect of UNAMID deployment on violent fatalities, depicted as predicted probabilities from models 1, 2 and 3 in Table 1.1. They show the difference in mean civilian fatalities by government and rebel groups in pre- and post 2008, three years before and after the deployment of UNAMID.

Table 1. Deployment of UN peacekeeping units and its effect on civilian fatalities

Table 1.1. Effect of UN peacekeeper presence on fatalities
2005-2010, with controls

	Both (1)	By Gov (2)	By Rebels (3)
Treatment cells:post	-21.75*** (4.19)	-11.59*** (3.65)	-10.16*** (1.56)
R ²	0.23	0.19	0.11
Num. obs.	1284	1284	1284

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Table 1.2. Effect of unit deployment size on fatalities
2005-2010, with controls

	Both (1)	By Gov (2)	By Rebels (3)
Deployment size	-6.13*** (1.29)	-3.68*** (1.12)	-2.44*** (0.48)
R ²	0.23	0.20	0.10
Num. obs.	1284	1284	1284

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Table 1.3. Effect of military expenditure per capita of TCC
on fatalities, with controls

	Both (1)	By Gov (2)	By Rebels (3)
Military expenditure per capita	-0.001 (0.09)	0.05 (0.08)	-0.05 (0.03)
R ²	0.21	0.19	0.08
Num. obs.	1284	1284	1284

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Note: Tables above include other control variables, namely, IDP sites (dummy), African Union deployments before 2008, grid-populations, distance of the grid-cell centroid from border and from capital. Tables with full models are available in Supplementary File.

Table 2. Effect of peacekeeping troops using fixed effects models

	Fatalities by both		Fatalities by government		Fatalities by rebels	
	(1)	(2)	(3)	(4)	(5)	(6)
Peacekeeping unit size	-7.28*** (0.73)		-5.36*** (0.63)		-1.92*** (0.26)	
Military expenditure		0.00 (0.06)		0.03 (0.05)		-0.03 (0.02)
IDP	4.47*** (0.56)	3.13*** (0.56)	3.01*** (0.49)	2.01*** (0.48)	1.46*** (0.20)	1.12*** (0.20)
African Union (Prior to '08)	-5.63** (2.53)	5.71** (2.47)	-1.22 (2.20)	7.58*** (2.13)	-4.41*** (0.91)	-1.86** (0.88)
Night lights	5.61 (24.75)	-38.95 (25.14)	5.73 (21.53)	-28.79 (21.72)	-0.12 (8.91)	-10.16 (8.95)
Wald χ^2	139.38***	36.99***	102.52***	29.83***	92.21***	39.26***
Num. obs.	2354	2354	2354	2354	2354	2354

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Note: Table above shows the effects of peacekeeping unit sizes or the military expenditure of troop contributing countries on civilian killings in Darfur. The unit of analysis for the result is grid-cell years for the period covering from 2005 to 2015. The control variables are IDP population in ten thousands, AMIS presence prior to 2008, and night lights.