Under fire:
Geotemporal patterns in attacks on UNAMSIL

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Abstract

Peacekeepers operate in a highly fragile environment and are repeatedly attacked. While there is increasing evidence on why peacekeepers are attacked, little is known about when and where these attacks occur. This is unfortunate for two reasons. On the one hand, peacekeepers could be better protected and thus better fulfil their mission. On the other hand, decision-makers could be better informed, which would result in more adaptive and hence more promising deployments. In this term paper, I look at the geospatial patterns of attacks on the UN peacekeeping mission in Sierra Leone (UNAMSIL). Using event history analyses and spatial regressions, I analyse newly published data on peacekeepers at risk. The results show that attacks follow spatial rather than temporal patterns, emphasising the importance of geographically diverse peacekeeper bases to ensure the mandate's success.

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Introduction

When and where are peacekeepers attacked? While the literature is slowly exploring motives for why rebels, paramilitary, or civilians attack peacekeeping operations (PKOs) in the first place, there is virtually no evidence on the timing and location of such attacks. It remains unclear whether specific time windows or spatial patterns in attacks emerge throughout a mission. Salverda (2013) showed that the relative size of the rebel group could be the reason for violence against peacekeepers, while Fjelde et al. (2016) identify the battle-related losses of the rebels as the primary motive. However, how the timing and the location of the attack enter into the calculus of opposing troops remains unexplained. This is unfortunate, especially since peacekeeping troops are constantly exposed to both mild and harsh forms of violence and could better protect themselves and the local population through improved information.

From an academic perspective, this paper reviews and adds to the still incomplete theory on timings and locations of attacks on peacekeepers. It reviews previous findings by revealing how the rationales behind why peacekeepers are attacked can also explain how peacekeepers are attacked. And it complements existing theory by attempting to describe patterns of attack on PKOs based on related literature. From a policy perspective, the answers hold important lessons for future missions. As Walter et al. (2020) describe in their review article, the scholarly literature can only provide very rough advice regarding deployment timing. However, what level of danger and, more importantly, at what moment and where troops are exposed to risk once they are in the field are unclear. Insights into this can not only ensure increased safety of deployed troops but also better inform decision-makers. Finally, several newly published datasets allow for more detailed insights, particularly concerning the level of analysis. Following the literature's shift to ever more fine-grained levels, this paper focuses on the closest possible unit of analysis to capture local conditions as accurately as possible.

Before presenting possible reasons behind the timing of the attacks, it is worthwhile first to introduce the motives for an attack by rebel forces. Salverda (2013) follows a capacity logic in her contribution: the larger the rebel force is compared to the PKOs, the more likely an attack is. Fjelde et al. (2016) argue with a related capacity logic. They theorize that after large losses on the rebel side, the probability of an attack on peacekeepers increases. Due to reduced capacity, rebels attack PKOs, entailing a strong signal, with which they desire to improve their bargaining position. Looking at milder forms of violence, Duursma (2019) explains how intelligence collected by the peacekeepers can be another reason for an attack. However, none of these contributions provides information on the timing (and location) of such violent acts. Salverda (2013) operationalizes time and the independent variable too crudely to draw conclusions about the exact timing of attacks. Fjelde et al. (2016) operate at a more fine-grained level and find across all models that the time since the past attack is highly significant. Duursma (2019) discusses the exact timing of obstructions only in passing. As a robustness check, he conducts a survival analysis and concludes that "obstruction and/or intimidation of peacekeepers is quite an effective early warning mechanism of impending violence against civilians (p. 244)".

Clearly, then, the timing of violent attacks or obstructions might be a central determinant that deserves more attention. To explain precisely when and where these attacks occur, I draw on related literature. My main argument is that missions are particularly at risk in their first year of deployment. A combination of underdeveloped infrastructure, lack of local contacts, high rebel capacity, and high levels of conflict, make PKOs especially vulnerable in their first year of deployment. Subsequently, I utilize previous findings on terrorist attacks in civil wars to explain violent patterns against PKOS. I hypothesize that attacks often follow each other in short time intervals. Last, adopting mechanisms from the conflict spillover literature, I show that the higher the attacks in surrounding regions, the more likely it will occur in the area surrounded.

Against this background, this research paper differs from and improves upon the existing literature in three respects. Theoretically, I expand the theory on the motives behind attacks on PKOs with a particular focus on the rationale behind the timing of such attacks. Methodologically, event history analysis and spatial regressions can accurately identify when and where attacks occur. Last, I follow the trend in the literature in recent years to better account for local dynamics by including both more fine-grained temporal and spatial units.

Literature review

The timing of attacks on peacekeepers has barely been examined so far. One reason for this is that little is known about the motives that drive opposing troops to attack peacekeepers in the first place. The most important contributions in this field follow a capacity logic and consider the size and the battle-related losses, respectively, of rebel groups as the main reason for attacks on PKOs (Salverda 2013, Fjelde et al. 2016). While this argument generalises well and finds sufficient empirical evidence, not enough emphasis is placed on the timing of an attack. This is surprising because Fjelde et al. (2016), the most recent contribution in this regard, find evidence across all model specifications that the timing of previous attacks plays an important role in predicting future attacks. Results from the literature on terrorist attacks in civil wars corroborate this finding (Polo & González 2020). They show that the timing of attacks is often planned or at least not completely arbitrary. And neither is the location of these attacks. The emerging literature on conflict diffusion shows how conflict parties' attacks are both temporally and spatially interdependent (Schutte & Weidmann 2011, Zhukov 2012, Cremaschi et al. 2020).

To better understand when PKOs are attacked, one must first understand how PKOs are attacked. Salverda (2013) was the first to do so. According to her rationale, PKOs act as protectors of the weaker party, incentivising rebel groups to fight them in the local power struggle for territory. She finds that comparatively larger rebel groups are primarily responsible for attacks on peacekeeping troops. However, her data on a dyad-year basis (rebel group-peacekeeping operation) disregards both essential temporal and spatial components, which have proven decisive in related works of this field (e.g. Buhaug & Gates 2002, Koubi et al. 2014). These include, among others, the topography or socio-economic indicators of the relevant area. Furthermore, she acknowledges that with the crude operationalization of her outcome variable, she is likely to miss substantial variation in the use of violence by rebel groups against peacekeepers.

Likewise, the contribution by Fjelde et al. (2016) follows a capacity logic. They operationalise the rebels' capacity based on their battle-related losses and hypothesise that groups suffering from significant losses seek unconventional methods in the struggle for territorial control. Attacking PKOs entails strong signalling to the conflict parties and thus constitutes a strategy to improve their position at the negotiation table. However, they take too little account of local dynamics. While they apply a more fine-grained temporal unit (monthly basis), they use the country as a whole as the spatial unit of their analysis.

Yet, it has become evident in recent years that local dynamics can differ significantly from national events when it comes to peacekeeping (Ruggeri et al. 2017). Duursma (2019) is most successful in including these sub-national dynamics in his analysis by focusing on a narrow geographical and temporal space, namely Darfur, between January 2008 and April 2009. His interest lies in a milder form of violence: obstructions and intimidations on PKOs. Theorising that more severe (i.e. fatal) attacks are too damaging for the rebels' reputation, he argues, they use obstruction and intimidation to prevent peacekeepers from reducing their sphere of influence. However, the question remains as to how generalisable these findings from Darfur are.

The capacity logic in terms of attack probability can be applied not only to the rebels, but also to the peacekeepers' mission size and composition. While it is generally believed that the larger mission size has a pacifying impact on the course of the conflict, its composition is equally important (e.g. Hultman et al. 2014, Ruggeri et al. 2013). Bove & Ruggeri (2016) show that the diversity of a mission (measured by the troops' ethnic composition) impacts the effectiveness of a mission just as much as its size. They argue that peacekeepers from different countries cover different capabilities and at the same time prevent misconduct due to the mutual monitoring of contingents, resulting in better performance. Indeed, the sheer size of a mission is not necessarily a good indicator of a mission's effectiveness. Di Salvatore (2019) shows that as the size of UN military personnel increases, so does the homicide rate in their vicinity. Thus, the literature shows mixed findings as to whether and how mission size influences the likelihood of an attack, let alone its timing.

In this regard, the extensive literature on terrorist attacks during civil wars offers further insights. It may seem debatable to compare mechanisms behind attacks on PKOs with mechanisms behind terrorist attacks. Yet, they share important common features. Peacekeepers may be seen as representative of the government, one of the primary targets of terrorist attacks, in that they are sent at its request and often in its defence. Thus, despite their impartiality, peacekeepers represent the very party the adversaries oppose. Besides, peacekeepers not only protect the weaker conflict party but also the population. While doing so, they gather critical information about the enemy, thereby further exacerbating the danger of an attack (see Duursma 2019). Therefore, despite a partly different logic, it is worthwhile to cautiously apply existing findings from the literature on terrorist attacks in civil wars to the rationale behind attacks on PKOs.

Scholars agree that terrorist attacks on targets during civil wars seldom occur randomly but instead can stem from various motives (Polo & González 2020). What is much less clear, however, is when they exactly carry out these attacks. Barros et al. (2006), examining the specific case of the Basque ETA, finds that attacks follow seasonal patterns and decrease under strong political repression. Aksoy (2014) shows how in Western European democracies, terrorist attacks are more likely shortly before elections. And Polo & González (2020) show that the timing of a terrorist attack depends on the battle-related losses and the mobilisation capacity of the rebels, respectively. That is, the more losses rebels suffer in the conflict and the more they have to mobilise potential recruits from the population, the more frequently they carry out attacks. However, this frequency is conditional on the efficacy of those terrorist acts. If rebels realise their actions will not gather any support among the population, they will not resort to attacks even if their capacity is reduced.

This shows that both the rebels' and the peacekeepers' capacities are crucial for the timing of an attack. Fjelde et al. (2016) and Polo & González (2020) show how decimated rebel groups attack PKOs significantly more often than stronger groups. However, these studies have so far only implicitly included capacity on the part of peacekeepers. Several studies show that larger missions have a better record (see Di Salvatore & Ruggeri (2017) for overview). But to what extent size plays a role concerning (the timing of) an attack remains unclear. Bove & Ruggeri (2016) find that comparatively smaller rebel groups are more likely to cooperate with PKOs. On the other hand, Polo & González (2020) find that smaller groups in civil wars are more likely to resort to terrorist attacks, in which PKOs can be considered targets, due to a lack of alternatives.

In addition, the timing hinges on other factors such as upcoming elections (Aksoy 2014), the effectiveness of terrorism per se (Polo & González 2020) or more general conflict dynamics.

The evidence is not only inconclusive about temporal patterns of attacks on peacekeeping missions but also with regard to their geographical patterns. The exploratory contribution by Townsen & Reeder (2014) on diffusion patterns of peacekeeping missions is an exception in this respect. They are interested in the poorly studied second-stage deployment of peacekeepers. In other words, the decision as to where exactly they are stationed in the country once deployed. To prevent conflict, they argue, peacekeepers station themselves in areas that are easily accessible and densely populated, conditional on available resources. Peacekeepers also concentrate on areas where either rebels are fighting the government or the civilian population is threatened. However, as the study only focuses on the Democratic Republic of the Congo, its external validity is limited. Besides, the analysis remains static in time. Taking a calendar year as their temporal unit of analysis disregards the movements of the peacekeepers within this year, but above all, also the sequence of attacks.

Zhukov (2012) offers another rationale behind the geographical distribution pattern of violence and thus implicitly of the deployment of peacekeepers by theorising the strategic importance of transportation networks. He argues that common operationalisations such as Euclidean distance or conventional contiguity measures overlook the fact that the spatial distance between two places alone hardly considers the realities on the ground. From a strategic perspective, two neighbouring regions cannot be regarded as equal if one area has a well-developed road network while the other has hardly any paved roads. He concludes that roads, among other infrastructure, are a central part of the insurgents' calculus regarding the diffusion of violence. Thus, it is plausible that peacekeepers are likely to follow this logic (Townsen & Reeder 2014).

Theory

Thus, in both temporal and spatial terms, there is little evidence to suggest patterns behind attacks on peacekeepers. Therefore, this paper contributes to the existing literature in three ways. First, it tests and complements the previous findings related to capacity logic. It tests them by referring to a more local level while at the same time paying more attention to temporal dynamics. And it complements previous findings by trying to answer the question of when exactly peacekeeping missions are attacked. Second, it disaggregates the temporal patterns of attacks. After all, besides knowing when the probability of an attack is highest, it is also pertinent to know whether these attacks follow a pattern over time.

Third, it sheds more light on spatial interdependence and offers explanations for why attacks on peacekeepers happen in certain places and to what extent they are dependent on the location of previous attacks.

A dangerous start

Peacekeepers are naturally sent to places where conditions are highly fragile. As a result, the launch of a mission is both difficult and crucial. In its Capstone Doctrine on Peacekeeping Missions (2010), the UN sets out clear guidelines and timelines to facilitate the so-called start-up phase of a mission. It recognises, however, that the ideal target of 90 days for deploying initial elements is merely notional as the logistics behind a mission are highly complex (p. 63). Apart from the preliminary clarifications on the contributing countries and the budget, the missions face significant challenges once they are deployed. There is often a lack of infrastructure because it has either been destroyed by a conflict or never existed. Such infrastructure includes essential housing for the troops, but also bridges or drivable roads, which first have to be constructed until they eventually become entire peacekeeping economies (Jennings & Bøås 2015, Rolandsen 2015). Another difficulty listed by the UN Doctrine in the initial phase of a mission is its composition. People from a wide variety of professional, ethnic and religious backgrounds come together and must act and function as a unit right from the start to guarantee peace on the ground. A challenge that also brings negative sides (Bell et al. 2018, Horne & Barney 2019). In addition, the troops lack tacit knowledge about local conditions. Rogers (2007) illustrates the importance of such knowledge by comparing UN peacekeepers with Chinese peacekeepers who, unlike the blue helmets, are not recruited on a one-off basis but are deployed repeatedly as a more or less fixed unit. The effectiveness of the latter, he argues, is that they are able to acquire critical specific knowledge about logistics, operational intelligence, or local atmospherics due to these repeated deployments (p. 89).

At the same time, peacekeepers are embedded in an environment that is either extremely fragile where conflict can break out at any time or where war has already erupted. In either case, the opposing forces are well-organised since they are already involved in a conflict or are preparing for it. It also means that they have a stable mobilisation base. Be it because of the necessary recruitment during an ongoing war or in preparation for it. In other words, to follow the logic of the previous sections, it is to be expected that the opposing troops have a very high capacity. This predicament is further exacerbated if the rebel groups are outnumbered. As the existing literature points out, an attack is particularly likely in such a scenario (Salverda 2013, Fjelde et al. 2016).

Moreover, peacekeepers cannot necessarily count on the support of the local population right from the start. The idea of the locals welcoming the peacekeepers with open arms is outdated (Autesserre 2021). They must first familiarise themselves with the local conditions and customs to gain the local population's trust and eventually their all-important support.

Consequently, the initial phase is not only difficult for a new mission but also particularly dangerous. The peacekeepers are only gradually establishing the organisation, infrastructure and coordination to fulfil their mission. On the other hand, the conflict parties are well-positioned and thus in a much better bargaining position in the power struggle. This asymmetry, coupled with the fact that PKOs initially lack local support, means that peacekeepers face the greatest dangers of an attack right at the beginning of their missions. Consequently, the first hypothesis reads:

H1: During the start-up phase, peacekeeping missions are more likely to be attacked.

Trapped in a spiral of violence

On 06 April 1998, rebels attacked soldiers of the Economic Community of West African States Monitoring Group (ECOMOG) on the Njaima Sewafe Bridge in Sierra Leone's eastern Kono District. Two Nigerian soldiers were killed. Six days later, an identical incident took place, this time 30km west of the bridge in another village. Four ECOMOG soldiers died in these attacks. Two days later, attacks retook place with casualties on the side of the peacekeepers. And again, two days later, rebels attacked several villages in Kono District until the situation finally calmed down on 20 April.

What explains this quick succession of attacks on peacekeepers? Pruitt et al. (2004) offer two possible explanations. Both are based on the assumption that two parties pursue unequal goals and that conflict arises as a result. According to their aggressor-defender model, a conflict escalates as the aggressor takes ever more severe measures to achieve their goal. The defender takes a passive role and limits themselves to ward off the aggressor's actions. Since PKOs, depending on their mandate, are only allowed to defend themselves in the worst cases, this model corresponds to their reality. However, the aggressor-defender model does not sufficiently explain acts of violence that occur in quick succession since conflict often brings conflict with it, i.e. rarely arises unilaterally.

As its name implies, the conflict spiral model looks at how two parties incite each other to conflict. An action taken by one party leads to more vigorous action by the other party, which in turn leads to even more assertive action, ultimately leading to the outbreak of conflict. Pruitt et al. (2004) distinguish between retaliatory and defensive conflict spirals. Arms races are typical examples of a defensive conflict spiral. In action brought about by fear, there is a counter-reaction by the opponent, who perceives this action as a threat and thus also arms themselves for protection. More relevant to the reality of peacekeepers is the concept of retaliatory conflict spiral. This vicious cycle leads to worse and worse actions and is characterised by resentment and anger, bringing us back to what happened in the Kono District. While the rebels had not lost any of their people in the early days, they too suffered casualties in this spiral of conflict. Six months later, in battles for supremacy in Tombodu Town, ECOMOG killed over 80 RUF and AFRC rebels.

Thus, attacks rarely come alone. While insurgents commit isolated attacks, it is more common that violence escalates in a spiral of conflict. As the example in Kono District shows, the peacekeepers started to fight back after the first attacks, resulting in further attacks by the insurgents. Consequently, the second hypothesis is:

H2: Attacks on peacekeepers occur at short intervals, incited by previous attacks from insurgents.

Spatial patterns of attacks

But what can be said about spatial patterns of attacks? As a growing literature on conflict diffusion within a national border shows, attacks are not only temporally but also spatially interdependent. Accessibility, one reason for this, has already been discussed (Zhukov 2012). But weather can also re-localise conflict, as Carter & Veale (2015) find. And Bohnet et al. (2018) show how internally displaced persons can shift conflict locations. Consequently, I assume that these dynamics also influence attacks on PKOs.

Inevitably, the question of endogeneity arises. It is intuitive to assume that PKOs are only attacked where they are in the first place. That is, in areas where they are stationed. Often, however, the exact opposite is the case. Usually, they are safest in their bases because of the strong security measures. And they are exposed to the greatest risk when patrolling in smaller units, i.e., comparatively unprotected. Figure 1 underlines this point. The blue dots represent the peacekeeper bases; the orange dots represent where rebels have attacked the PKOs. At the country's very eastern and western ends, respectively, one can see that both bases and attacks are present in certain areas. In the south, on the other hand, there have been occasional deployments but no attacks. And in the north, starting from Sierra Leone's capital to the eastern border of the country, a sort of belt runs through where no peacekeepers were stationed, but many attacks occurred. While endogeneity cannot be completely ruled out, in reality, the link does not seem to be as clear as expected.

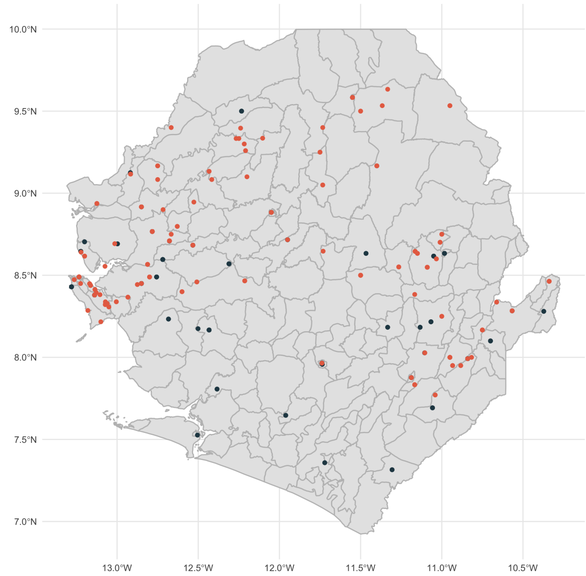

Figure 1: Attacks on peacekeepers (orange) and their deployments (blue) in Sierra Leone.

Anecdotal evidence offers further insights. Let us again take the series of attacks in Sierra Leone's Kono District. In the period under discussion, all attacks were carried out within a radius of 50km. What can explain these attacks, which are closely linked not only in time but also in space? As Townsen showed, peacekeepers are deployed to areas with a good road network, and thus easier to maintain logistics. And what is true for peacekeepers' logistics is also true for rebels. Rebels have an easy time attacking peacekeepers along these routes while at the same time being able to withdraw quickly. For this reason, the attacks do not necessarily have to take place directly where peacekeepers are stationed but in areas that are easily accessible.

Another reason for the local concentration of attacks can be raw material deposits. In the case of Sierra Leone, the focus is mainly on diamonds. First found in the eastern districts of Kono and Kenema, diamonds have played an essential role in Sierra Leone's economy since the 1930s, which only intensified during the conflict (Silberfein 2004). Not surprisingly, the Kono District, where the attacks took place, was one of the areas where most peacekeepers lost their lives. As a central means of financing, control over the mines was an important strategic goal. Accordingly, these areas were contested, leading to geographically clustered attacks.

Yet another reason can be the urbanisation of an area. Smaller and larger cities are important targets, acting not only as economic engines but also as large pools to mobilise people whose control often also has a symbolic appeal. This applies not only to the capital but also to smaller provincial cities in peripheral regions of a country. Therefore, the third hypothesis is:

H3: Attacks on PKOs are geographically clustered.

Tapping into these geospatial patterns allows us to formulate a subsequent hypothesis in this context. As the literature shows, attack locations are both temporally and spatially interdependent. In hypothesis 2, I consider the temporal pattern in isolation and argue that the attacks follow each other in short time intervals. In Hypothesis 3, I consider only the spatial component and hypothesise that attack locations cluster based on their accessibility. Hypothesis 4 combines these two previous assertions:

H4: Attacks in surrounding regions are associated with an increased risk of an attack in the central area surrounded by these regions.

UNAMSIL as case study

I will focus on the United Nations Mission in Sierra Leone (UNAMSIL). Retrospectively described as a success story, it was not clear for a long time whether the mission would be able to fulfil its mandate given the numerous violent clashes with insurgents. Figure 2 shows the dangers which the PKOs were facing. On the left are the number of attacks on peacekeepers at the height of the civil war between 1998 and the official end of the war in 2002. On the right are the best estimates of deaths from both the PKOs (in black) and the rebel groups (in red). The operation "No Living Thing", which claimed the lives of several hundred peacekeepers at the beginning of 1999, is visible. From mid-1999 onwards, calm returned. Although there were still isolated attacks, no more lives were lost in bilateral clashes, neither on the peacekeepers nor on the part of the rebels.

The section is designed as follows. A brief overview will familiarise the reader with the situation in Sierra Leone. After that, the central assumptions underlying the models are discussed and the data presented. Finally, I outline the independent and dependent variables used in the different models.

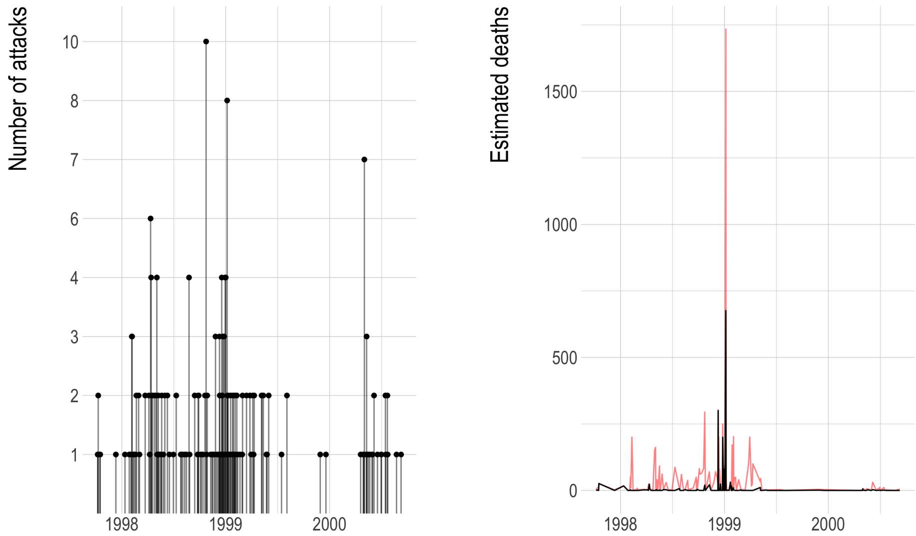

Figure 2: Left: Number of attacks on peacekeepers in Sierra Leone between 1998-2002. Right: Estimated number of deaths on the side of the peacekeepers (black) and the rebels (red) in the same period.

The civil war in Sierra Leone

Since gaining independence in 1961, Sierra Leone had been embroiled in political power struggles and internal conflict. In 1991, the Revolutionary United Front (RUF) emerged and, supported by Charles Taylor in Libera, grew and took control of more and more areas. In 1997, together with the military, it overthrew President Ahmad Tejan Kabbah. ECOMOG, the monitoring group with military functions of the Economic Community of West African States, had been in the country for a few years already at that time but was limited in its capacity, thus incapable of defending the elected government. In the spring of 1998, Kabbah could return to office thanks to an ECOMOG intervention, which Nigeria had strengthened in the meantime. Shortly afterwards, the United Nations Observer Mission in Sierra Leone (UNOMSIL) was established. Jointly with ECOMOG, UNOMSIL's mission was to monitor the disarmament of combatants and train local security forces.

January 1999 marked one of the darkest chapters of the civil war. During the operation "No Living Thing", several thousand rebels invaded the capital Freetown, killing thousands of civilians, including children, and hundreds of ECOMOG soldiers. Kabbah, compelled to end this atrocity, was willing to make political concessions to the rebels. On 7 July 1999, the Lomé Peace Agreement was passed, offering some political power to the insurgents. However, the agreement and the resulting ceasefire were short-lived. In months, the rebels were again fighting the government.

On 22 October 1999, the UN Security Council responded to calls for more security personnel by establishing the United Nations Mission in Sierra Leone (UNAMSIL) – a much larger mission with far-reaching competencies and an initial capacity of 6000 troops. With the establishment of UNAMSIL, both UNOMSIL and the troops of the Nigeria-led ECOMOG withdrew. As early as February 2000, the mission's capacity was increased by another 5,000 troops and its competencies were further expanded. Nevertheless, one of the major setbacks of UNAMSIL could still not be prevented when the RUF kidnapped about 500 peacekeepers in May 2000.

This event represented a turning point for the mission. By March 2001, the maximum capacity was increased to 17,000 troops with a clear mandate to respond to rebel attacks. An additional thousand British troops were deployed in May 2000, which were crucial in ensuring that the Abuja Agreement, adopted in November of the same year, was respected and the ceasefire implemented.

Despite the difficult start and moments when the mission almost failed, UNAMSIL is widely considered a success. It brought peace to the country after the significant increase in capacity and the support of British troops, which has lasted since the official end of the civil war in 2002. However, UNAMSIL is also considered a success story because its wide-ranging powers and recognition enabled it to disarm rebels effectively, train security personnel and monitor elections. Against this background, it is interesting to examine where and when the mission had to withstand attacks to successfully fulfil its mission.

Data and Methodology

The data to explore the violence against peacekeepers comes from the UCDP Peacemakers at Risk dataset (Lindberg Bromley 2018). It contains information on (lethal) attacks on peacekeepers in Sub-Saharan Africa between 1989 and 2009 with an unprecedented level of detail. The time and location of the attack are listed, but also various indicators of casualties on both sides involved, the reliability of the information and administrative data.

I use event history analysis (EHA) to explain temporal patterns. Unlike conventional regression models, these so-called time-to-event analyses allow drawing conclusions about the exact time of one or recurrent events. Originating in the biomedical field, EHA is now also a widely used in the political sciences to examine the effect of economic crises on domestic political regime change (Gasiorowski 1995) or the length of a peace treaty (Box-Steffensmeier et al. 2003), among many others. Essentially, EHA traces the exact course of an observation up to time t. The survival function, the probability that an observation will survive beyond time t, and the hazard function, the immediate risk that the relevant event occurs, are central to this. While the former is monotonically decreasing (the higher t, the more likely it is that an individual will not experience the event), the latter is monotonically increasing (with increasing time t, the risk of the event also increases).

One of EHA's central assumptions is non-informative censoring, which is understood as the absence of an event for an observation during the study period. This absence can have many origins: During a clinical trial, patients may drop out of the treatment regimen or data from an observation may be lost. If the censored observations do not show any systematic differences from the non-censored observations, this is called non-informative censoring. Thus, the absence of the event has nothing to do with the neglect of an indicator or other origins that could introduce bias into the analysis. While in the case of Sierra Leone, the censored observations do not show informative differences, I will return to this issue in the discussion of the results.

Furthermore, in multivariate EHA, the assumption of proportional hazards is key. This assumption describes the fact that the observations have a proportional hazard rate to each other over the entire period. Say we have two hypothetical regions in a country. The proportional hazard assumption states that if region A has a hazard rate that is twice as high as region B at a certain point in time, region A is assumed to have a hazard rate that is twice as high over the entire period. Often, however, as with Sierra Leone, this is not the case. At certain times, specific regions may have a higher or lower hazard rate than other regions due to battle dynamics or other reasons. The proportional hazard assumption is violated in this case.

But hazard rates can also change over time. For example, one can assume that in regions that have already suffered many attacks, the probability of another attack increases more over time than in the other areas that have experienced only a few attacks. Consequently, the proportional hazard assumption would be violated and would introduce significant bias into the analysis. Political science methodologists have become increasingly aware of this fact, and there are standardised ways to check the proportional hazard assumption and, if violated, to adequately control for it. In this respect, I follow the approach outlined by Jin and Boehmke (2017).

Finally, I must say a word about time-varying covariates and recurrent events. Unlike in conventional survival analysis, where the relevant event (i.e. death) can only occur once, recurrent events are the norm in conflict studies. A region may be particularly contested and therefore experience the event again and again. This circumstance and a potential violation of the proportional hazard assumptions are taken into account in the models. Also, in this regard, there have been methodological innovations designed to take account of this circumstance to achieve accurate results. I apply extensions of the widely used Cox models to investigate recurrent events correctly. The exact model specifications are explained in the Results section.

Dependent variable and units of analysis

I define the attacks on peacekeepers as the primary dependent variable, with each attack coded as a single event and defined as follows: "Violence by material means against an intervening third party actor resulting in either a fatal attack or a non-fatal serious outcome such as injuries or kidnappings (Codebook, p.6, Lindberg Bromley 2018)".

The time frame extends from the first recorded attacks in 1998 to the official end of the war in 2002. In terms of time, the data is structured on a monthly level. The spatial unit for the EHA is the PRIO-GRID, a grid spanning the entire globe, where one unit corresponds to an area of roughly 50km x 50km at the equator. This fine-grained level has several advantages. First, it is apolitical, i.e. independent of administrative boundaries or other political institutions, making it an exogenous unit to better study conflicts (Tollefsen 2012). Second, such a small spatial unit allows for much more precise spatial analysis, which is particularly interesting in the present case. Third, there are now various socio-economic, topological or demographic indicators that have a grid identifier, which makes it much easier to control for possible confounders and thus prevent bias in the analysis. Finally, this apolitical unit can be scaled arbitrarily, particularly useful for identifying the Modifiable areal unit problem (MAUP). This problem describes the fact that one can obtain different results depending on the aggregation of spatial indicators. Considering that there are only very rough spatial analyses on attacks on PKOs so far, this issue is particularly important.

Independent variables

I operationalise the independent variable according to the hypothesis. To investigate whether the start-up phase is perilous for PKOs, the independent variable takes the form of a binary indicator that shows whether the attack took place in the first year of the mission or not. For the second hypothesis (attacks occur at short intervals), the independent variable is an integer describing how much time has passed since the previous attack. The number of attacks serves as the independent variable for the third hypothesis. For the last hypothesis, I operationalise the independent variable as the number of attacks in surrounding grids, using both the rook and queen contiguity measures. This makes a sizable difference for square spatial units as I use. I will explain this distinction in more detail in the corresponding section.

Controls

As control variables, I include topographic and socio-economic indicators as well as information on mission size. A key topographic variable is the distance to the capital (spherical distance in kilometres). While it would be desirable to have more precise information than the mere distance to the capital, the spherical distance serves as an approximation for the accessibility of an area. As Zhukov (2012) has shown, this has a decisive influence on conflict dynamics. Further, I control for the distance to the nearest neighbouring country. This is to adjust because fighting in neighbouring countries can spill over to the relevant country, as happened during the conflict in Sierra Leone. Both indicators come from Weidmann et al. (2010). As discussed earlier, natural resources, especially diamonds, also play an important role in Sierra Leone. Accordingly, it is critical to control for this fact so as not to bias the results. The data on diamond deposits come from Gilmore et al. (2005) and Lujala et al. (2005).

As a socio-economic control variable, I use the calibrated night light to represent economic activity in a grid. It is now well accepted that nighttime light emission works as a good enough proxy for urbanisation and economic development (Mellander et al. 2015). Especially in areas that are difficult to access and where data is generally scarce, nighttime lights serve as a valid alternative to control for economic activity in the respective grid. This is necessary because both peacekeepers' bases and rebel attacks could be a function of how urbanised (and thus strategically important) an area is. I take the calibrated data, which is more suitable for time series analysis, from *Urban Observing Sensors* (2014). Finally, I control for the size of the respective mission, which is recorded on a monthly basis. These data come from Cil et al. (2020) and allow me to see how both previous attacks and the relevant attack interact with mission size.

Results

Figure 3 shows the overall Kaplan-Meier survival curve together with the standard confidence intervals (95%). Within the first year, the probability of survival drops to slightly above 50% — first, at least visual, evidence for the first hypothesis. After a little more than two and a half years, the survival probability is slightly above 10%. In other words, the peacekeepers in Sierra Leone suffered almost all attacks in the first two years of their deployment and could carry out their mission without any major incidents during the rest of their mandate. However, the Kaplan-Meier estimate does not account for any covariates, thus not allowing more accurate inferences about the hypothesised patterns. Table 1 shows the results of the multivariate models.

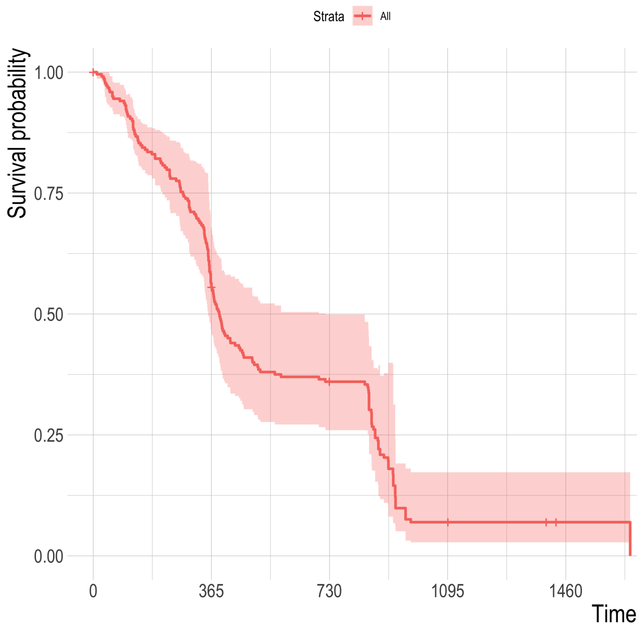

Figure 3: Overall Kaplan-Meier survival curve estimates with 95% confidence intervals between 1998 and 2002.

Model 1 shows the results of a conventional logistic regression in which the dependent variable indicates whether an attack on peacekeepers took place or not. Controlling for topographic and socio-economic factors, the start-up phase was not significantly more dangerous than the following years for the peacekeeping operations, despite a sharply declining survival curve. Thus, the first null hypothesis cannot be rejected.

The subsequent event history analyses (models 2-5) are based on 228 observations and 187 events, i.e. attacks on PKOs. The significance threshold is set at 5%. Model 2 shows the results of a multivariate Cox model in its simplest form. The coefficients for the number of troops and the travel distance to the capital are highly significant, and as they increase, the risk of an event decreases. More precisely, each additional peacekeeper is associated with a risk reduction of 0.2% and each extra kilometre of distance to the capital with a decrease of 0.5%. However, the model in this specification is only of limited value. It does not take into account clusters of similar values or strata of observations at risk.

Precisely these parameters are taken into account in model 3. Following the methodology of Prentice et al. (1981), this model specification includes both similar, i.e. clustered, values and strata. For the latter, this means that all observations in the first stratum are at risk of attack, but only those that suffered an attack are considered for the next stratum. This approach allows a more accurate representation of observations at risk that suffered multiple events, as with some grids in Sierra Leone. Model 3 shows a different picture. Only the coefficient of the distance to the capital is still significant, this time with a positive sign. However, these slightly puzzling results could be related to a central assumption of these models.

As already mentioned, the proportional hazard assumption underlying the Cox models presented here states that the multiplicative effect on the individual hazard rates of the observations remains proportional. Yet, especially in the political sciences, the violation of this assumption is more often the rule than the exception (Box-Steffensmeier & Zorn 2001). Some covariates in models 2 and 3 also violate this assumption, potentially leading to biased and thus less meaningful results. However, the violation of this assumption does not preclude the use of Cox models, and there is now extensive (political science) literature on how models can be estimated efficiently under these circumstances. I follow Jin & Boehmke (2017) in estimating these more robust Cox models. The results are shown in model 4.

The coefficients of both the number of troops and the distance to the capital are no longer significant. On the other hand, the indicator on diamonds is now significant. In grids where diamond deposits are located, the hazard is 2.9 times higher than in other areas. Also, the risk of an attack is higher in more urban areas. Finally, the clustering coefficient, i.e. the indicator of similar values, is significant. This coefficient will be discussed in more detail in the section on spatial patterns.

Thus, there is no evidence for the second hypothesis: The positive coefficient shows that the more time passed since the last attack, the higher the risk of an attack. According to expectations, however, it should have been negative. The hypothesised temporal patterns are therefore not empirically supported. The peacekeepers had not been exposed to a higher risk of attack during the start-up phase in Sierra Leone. And the visual trends regarding attack sequences are not confirmed in the models. While this seems to be the case in certain areas, overall, the attacks do not follow each other in short intervals.

Table 1: Results from logistic regression (Model 1) and Cox models (Models 2-4)

	Deaths PKOs (binary)		**Time**	
	Model 1	**Model 2**	**Model 3**	**Model 4**
Year: 2000	0.246			
	(0.581)			
Year: 1999	0.347			
	(0.651)			
Year: 1998	0.205			
	(0.655)			
n Troops	0.0001	-0.002^{***}	0.0004	0.100
	(0.0002)	(0.0003)	(0.0004)	(0.028)
Distance (border)	-0.0002	-0.005	0.009	-0.003
	(0.001)	(0.002)	(0.004)	(0.003)
Distance (capital)	0.001	-0.003^{*}	0.003^{*}	-0.002
	(0.0005)	(0.001)	(0.001)	(0.002)
Diamonds	-0.266	0.539	-0.069	1.061^{*}
	(0.151)	(0.348)	(0.348)	(0.383)
Nightlights	-0.011	0.045	-0.020	2.483^{***}
	(0.008)	(0.018)	(0.021)	(0.194)
Time since last attack	-0.00003	-0.0001	-0.0001	0.003^{**}
	(0.0003)	(0.001)	(0.001)	(0.001)
Cluster				0.001^{**}
				(0.0001)
n Troops x Time				-0.014
				(0.004)
Nightlights x Time				-0.405^{***}
				(0.032)
Constant	0.343			
	(0.700)			
N	187	228	228	228
R-squared		0.197	0.050	0.954
Max. R-squared		0.999	0.995	0.999
Log Likelihood	-111.540	-826.712	-605.621	-500.508
Wald Test		69.950^{***} (df = 6)	35.140^{***} (df = 6)	95.520^{***} (df = 9)
LR Test		50.141^{***} (df = 6)	11.800 (df = 6)	702.549^{***} (df = 9)
Score (Logrank) Test		42.988^{***} (df = 6)	12.108 (df = 6)	562.888^{***} (df = 9)
AIC	243.080			

$^{***}p < .001$; $^{**}p < .01$; $^{*}p < .05$

To test the third hypothesis, I use Moran's I as the global measure and Local G as the local measure to test the data for spatial autocorrelation. For this purpose, I use the next smallest political unit after the districts, the chiefdoms, allowing for even more precise results. Included are all but one chiefdom, which as an island, has no direct neighbours, resulting in a total of 166 administrative units. Figure 4 shows the total number of attacks per chiefdom on the left and the grids coloured according to their local G-value on the right. One can already discern some patterns. In the east of the country, there is a comparatively high concentration of attacks around the capital Freetown. In the southeast of the country, the exact opposite is the case. Here, there were no attacks on peacekeepers in most chiefdoms. In the northeast of the country, the distribution is more mixed. The isolated yellow chiefdom lies in Kono District, the diamond-rich area that has been the scene of as many as 30 attacks on PKOs. There have also been numerous attacks on the eastern border with Liberia, while there have only been isolated episodes in the north.

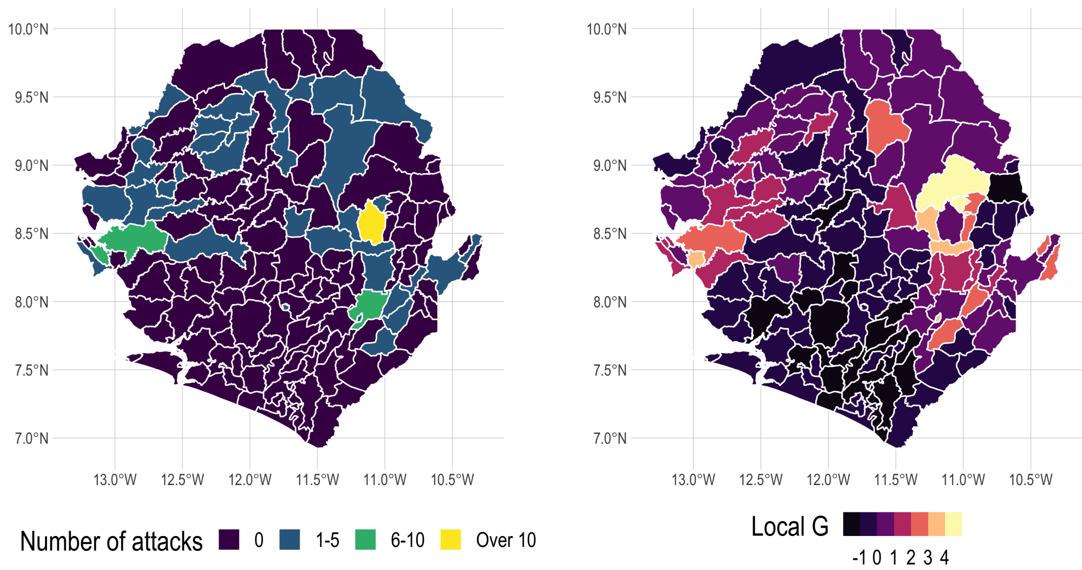

Figure 4: Left: Number of attacks on peacekeepers per chiefdom in 1998.
Right: Local G measure per chiefdom for the same year.

I determine the global spatial autocorrelation via Moran's I, calculating the correlation with two different contiguity measures due to its sensitivity depending on the weight matrix. Taken from chess logic, the rook measure considers those units that share borders as neighbours, while the queen measure also considers the units on the diagonal as neighbours.

In the maximum case, this results in four neighbours with the rook measure and eight neighbours with the queen measure, affecting the weighting of the individual units considerably.

With a p-value of less than 5%, the spatial autocorrelation with both methods is significant and indicates that the attacks on PKOs are not randomly distributed. Thus, there is evidence for the third hypothesis that attacks are concentrated in certain areas. As in the Kono District, a high occurrence of raw materials can be a reason for this but also urbanisation, making a city a strategically important point. We also saw that the distance to the capital is crucial, visually confirmed by this data.

With the Local G measure, I determine where precisely the values cluster. This is also known as a hot spot, cold spot analysis. Like the global Moran's I, this measure assumes that the values are randomly distributed and then calculates the extent to which the values for the chiefdoms deviate from the expected value. Hot spots – high values of attacks surrounded by areas with high attacks – are coloured red in the right plot in Figure 4. Cold spots – low values of attacks surrounded by regions with low values – are dark purple. We recognise the patterns described at the beginning of this section. There were few attacks in the south and north of the country, while on the border with Liberia in the east or around Freetown, the peacekeepers suffered many attacks. Thus, we can reject the third null hypothesis and find confirmation that attacks on PKOs are spatially concentrated.

As mentioned above, conflict dynamics are dependent on their environment, which raises the question of how this was the case in Sierra Leone. To investigate this, I limit the analysis to 1998, which was by far the year with the highest number of attacks (n = 137). Where appropriate, given the evidence on spatial clustering, I use autoregressive models that account for spatial autocorrelation and thus provide an unbiased estimate. Table 2 shows the results.

Controlling for the same variables as in the EHA, Model 1 shows that attacks in the surrounding chiefdoms (defined by the queen measure) are associated with the number of attacks. More precisely, for every thirteen attacks in the surrounding area, there is one attack in the central chiefdom. Since this model is based on an ordinary least squares regression (the addition of a spatial lag is insignificant in this specification), the coefficient's value can be interpreted straightforwardly. All other variables remain insignificant. In the second model, this time autoregressive and thus accounting for spatial autocorrelation, I use a binary indicator as the dependent variable. This indicator shows whether a lethal attack on peacekeepers has taken place. This is relevant insofar as the operationalisation is deliberately kept broad so that different types of violence can be considered. It turns out that although the values cluster geographically, the number of attacks in the surrounding chiefdoms is not associated with an increased likelihood of a fatal attack. All other control variables also remain insignificant. Thus, I can only partially reject the fourth null hypothesis. While it has been shown that the number of attacks is geographically concentrated and is also a significant predictor when measured by the number of attacks, it is not measured by the attacks' lethality. This is an important difference, which I will take up again in the discussion of the findings.

Table 2: Results from spatial models

	OLS	**Spatial regression**
Spatial lag	0.078^{**}	0.007
	(0.028)	(0.004)
Distance to border	-0.004	-0.001
	(0.005)	(0.001)
Distance to capital	-0.001	-0.00003
	(0.003)	(0.001)
Diamonds	0.470	0.050
	(0.640)	(0.103)
Excluded ethnic groups	0.185	-0.033
	(0.581)	(0.093)
Nightlights (avg)	1.373	-0.044
	(1.978)	(0.317)
Constant	0.777	0.101
	(0.837)	(0.135)
N	160	160
R-squared	0.085	
Adj. R-squared	0.049	
Log Likelihood		-40.410
Residual Std. Error	1.926 (df = 153)	
F Statistic	2.361^{*} (df = 6; 153)	
Wald Test		6.744^{**} (df = 1)
LR Test		5.464^{*} (df = 1)
AIC		98.819

$^{***}p < .001$; $^{**}p < .01$; $^{*}p < .05$

Discussion

What are the implications of these results from Sierra Leone? Conceptually, two questions need to be discussed more in-depth. First, the endogenous nature of the attacks on peacekeepers. Do more attacks lead to more peacekeepers or more peacekeepers to more attacks? The second is the distinction between different types of violence. Do different patterns emerge in mild use of force compared to lethal attacks by rebels? Methodologically, it is worth discussing the accurate identification of geospatial patterns in more detail.

Concerns about endogeneity are a longstanding feature of the peacekeeping literature. In most cases, this concerns the endogenous nature of deployments. Typically, it is assumed that deployment is not arbitrary but that peacekeepers mostly have to deal with "hard cases", resulting in underestimating their effectiveness (Carnegie & Mikulaschek 2020). A similar problem arises with the research question at hand. What is the interplay between attacks on PKOs and their locations? In this research design, I assume that peacekeepers represent the reactive party. In other words, the activities of the rebels are determinant. They attack peacekeepers because they have been weakened on the battlefield, have a generally limited capacity or find an opportune moment. In response, peacekeepers defend themselves. However, as the spiral of violence theory shows, the two parties to the conflict are in an interplay, i.e. both react to each other. Consequently, the PKOs also play an active role, to which the insurgents in turn respond. Therefore, it is likely that the mere presence and the actions of peacekeepers can lead to attacks. Possible examples are grievances arising from increased demand for sex trafficking due to peacekeepers (Bell et al. 2018). Or the general sizeable cultural distance between peacekeepers and the local population, which is related to poorer protection of the population and higher battlefield casualties (Bove & Ruggeri 2016). Although the analyses of this paper are built at a fine-grained level in both temporal and spatial terms, future contributions in this context should further explore the endogeneity problem inherent in attacks on PKOs.

Furthermore, one could examine the timing behind different types of violence more closely. Slightly more than 40% of all attacks on peacekeepers in Sierra Leone between 1998 and 2002 were fatal. In addition, they were concentrated in certain areas. As previous contributions indicate, it must be assumed that the rationale behind and thus the timing and locality of these attacks differ. Since there have only been very limited findings on geospatial patterns regarding attacks on PKOs, I deliberately chose to operationalise attacks broadly in this paper. However, it would have been equally interesting to trace such patterns for milder forms, as Duursma (2019) has done for Darfur. This would be another avenue for further contributions to understand attacks on PKOs better.

Methodologically, an even more refined temporal specification could have partially alleviated the endogeneity problem mentioned. While methodological advances now allow more complex temporal relationships to be modelled with event history analyses, the covariates lacked the necessary temporal detail to address this issue. Including time covariates or splitting them into different strata helped identify the sequence of events as accurately as possible. However, analysis on a weekly or even daily level would have provided for more insightful results.

As already mentioned, spatial clustering needs to be further addressed as it affects both censoring, the core assumption behind event history analyses, and the spatial regressions. The latter have shown that model specifications matter a great deal. With the same variables used as in the EHA, adding a spatial parameter did not improve the model. In this respect, I am confident that the EHAs are not spatially biased. What is less clear, however, also because it is not testable, is the assumption of non-informative censoring. Assuming that adjusting for the covariates under whose inclusion this assumption is warranted, I cannot conclusively rule out the possibility that the grids or chiefdoms in the peripheral regions where no attacks took place differ systematically from the rest. In this context, qualitative insights would help to get to the core of this matter.

Last, the question arises as to how generalisable these findings from Sierra Leone are. Apart from the mission in Somalia, UNAMSIL was the most dangerous for peacekeepers, according to the data used. It is true that PKOs in many other deployments fall victim to attacks or are exposed to harassment by insurgents, but to a much lesser extent. Also, due to the relatively good accessibility of all parts of the country, the attacks were geographically dispersed. However, as Townsen (2014) and Duursma (2019) have shown, attacks in bigger countries are primarily concentrated along major road networks or strategic points. While this was not so much the case in Sierra Leone, the size and topography of a country play a crucial role in this context, potentially limiting the results' generalisability.

Conclusion

This term paper examined when and where peacekeepers are attacked. While previous findings showed why peacekeepers are attacked, they left unanswered how rebels attack PKOs. Based on existing theoretical mechanisms and findings from related literature, this paper aimed to fill this gap. I focused on the UN Peacekeeping Mission in Sierra Leone – a mission marked by numerous attacks throughout the deployment. Using new data on peacekeepers at risk, fine-grained topographic and socio-demographic covariates, and different methods, I was able to show which temporal and spatial patterns were prevalent in attacks on peacekeepers.

The analyses showed that the attacks followed spatial rather than temporal patterns. The first hypothesis held that PKOs are particularly vulnerable in the first year due to a combination of underdeveloped infrastructure, lack of local contacts, high rebel capacity, and high levels of conflict. However, no evidence could be found to support this claim. The second hypothesis, stating that attacks would follow each other in short time intervals, could not be supported empirically either. A cascade of attacks seems to be rather an exception and was therefore not statistically significant.

However, I found empirical evidence for the spatial hypotheses. Measures for global as well as local autocorrelation were significant, indicating a spatial concentration of attacks. This may have various origins, including resource-rich areas, urbanisation or accessibility of the area. In a subsequent step, I then examined how the attacks were spatially related. The hypothesis was that attacks in surrounding regions are associated with the number of attacks in the area surrounded by these regions. Here the findings were mixed. While there is a statistically significant association between the number of attacks, this is not the case when distinguishing between fatal and non-fatal attacks.

Many avenues for research are still unexplored. The concern of endogeneity of peacekeeping deployments is also central in this paper and could be further explored. One approach would be a more precise spatial and temporal analysis to see how events follow each other exactly. Or extending the approach pursued to find more generalisable results. These are urgently needed, as they ultimately contribute to the protection of the peacekeepers themselves and the better fulfilment of their core business, the maintenance of peace.

References

Aksoy, D. (2014), 'Elections and the Timing of Terrorist Attacks', *The Journal of Politics* **76**(4), 899–913.

Autesserre, S. (2021), *The frontlines of peace: an insider's guide to changing the world*, Oxford University Press, New York, N.Y.

Barros, C. P., Passos, J. & Gil-Alana, L. A. (2006), 'The timing of ETA terrorist attacks', *Journal of Policy Modeling* **28**(3), 335–346.

Bell, S. R., Flynn, M. E. & Martinez Machain, C. (2018), 'U.N. Peacekeeping Forces and the Demand for Sex Trafficking', *International Studies Quarterly* **62**(3), 643–655.

Bohnet, H., Cottier, F. & Hug, S. (2018), 'Conflict-induced IDPs and the Spread of Conflict', *Journal of Conflict Resolution* **62**(4), 691–716.

Bove, V. & Ruggeri, A. (2016), 'Kinds of Blue: Diversity in UN Peacekeeping Missions and Civilian Protection', *British Journal of Political Science* **46**(3), 681–700.

Box-Steffensmeier, J. M., Reiter, D. & Zorn, C. (2003), 'Nonproportional Hazards and Event History Analysis in International Relations', *Journal of Conflict Resolution* **47**(1), 33–53.

Box-Steffensmeier, J. M. & Zorn, C. J. W. (2001), 'Duration Models and Proportional Hazards in Political Science', *American Journal of Political Science* **45**(4), 972.

Buhaug, H. & Gates, S. (2002), 'The Geography of Civil War', *Journal of Peace Research* **39**(4), 417–433.

Carnegie, A. & Mikulaschek, C. (2020), 'The Promise of Peacekeeping: Protecting Civilians in Civil Wars', *International Organization* **74**(4), 810–832.

Carter, T. A. & Veale, D. J. (2015), 'The timing of conflict violence: Hydraulic behavior in the Ugandan civil war', *Conflict Management and Peace Science* **32**(4), 370–394.

Cil, D., Fjelde, H., Hultman, L. & Nilsson, D. (2020), 'Mapping blue helmets: Introducing the Geocoded Peacekeeping Operations (Geo-PKO) dataset', *Journal of Peace Research* **57**(2), 360–370.

Cremaschi, S., Kirdemir, B., Masullo, J., Pah, A. R., Payette, N. & Yarlagadda, R. (2020), Do Non-State Armed Groups Influence Each Other in Attack Timing and Frequency? Generating, Analyzing, and Comparing Empirical Data and Simulation, *in* E. Deutschmann, J. Lorenz, L. G. Nardin, D. Natalini & A. F. X. Wilhelm, eds, 'Computational Conflict Research', Springer International Publishing, Cham, pp. 167–182.

Di Salvatore, J. (2019), 'Peacekeepers against Criminal Violence—Unintended Effects of Peacekeeping Operations?', *American Journal of Political Science* **63**(4), 840–858.

Di Salvatore, J. & Ruggeri, A. (2017), Effectiveness of Peacekeeping Operations, *in* 'Oxford Research Encyclopedia of Politics', Oxford University Press.

Duursma, A. (2019), 'Obstruction and intimidation of peacekeepers: How armed actors undermine civilian protection efforts', *Journal of Peace Research* **56**(2), 234–248.

Fjelde, H., Hultman, L. & Lindberg Bromley, S. (2016), 'Offsetting Losses: Bargaining Power and Rebel Attacks on Peacekeepers', *International Studies Quarterly* **60**(4), 611–623.

Gasiorowski, M. J. (1995), 'Economic Crisis and Political Regime Change: An Event History Analysis', *American Political Science Review* **89**(4), 882–897.

Gilmore, E., Gleditsch, N. P., Lujala, P. & Ketil Rod, J. (2005), 'Conflict Diamonds: A New Dataset', *Conflict Management and Peace Science* **22**(3), 257–272.

Horne, C. & Barney, M. (2019), 'The Impact of UN Peacekeeping Operations on Human Trafficking', *International Migration* **57**(5), 3–20.

Hultman, L., Kathman, J. & Shannon, M. (2014), 'Beyond Keeping Peace: United Nations Effectiveness in the Midst of Fighting', *American Political Science Review* **108**(4), 737–753.

Jennings, K. M. & Bøås, M. (2015), 'Transactions and Interactions: Everyday Life in the Peacekeeping Economy', *Journal of Intervention and Statebuilding* **9**(3), 281–295.

Jin, S. & Boehmke, F. J. (2017), 'Proper Specification of Nonproportional Hazards Corrections in Duration Models', *Political Analysis* **25**(1), 138–144.

Koubi, V., Spilker, G., Böhmelt, T. & Bernauer, T. (2014), 'Do natural resources matter for interstate and intrastate armed conflict?', *Journal of Peace Research* **51**(2), 227–243.

Lindberg Bromley, S. (2018), 'Introducing the UCDP Peacemakers at Risk dataset, sub-Saharan Africa, 1989–2009', *Journal of Peace Research* **55**(1), 122–131.

Lujala, P., Gleditsch, N. P. & Gilmore, E. (2005), 'A Diamond Curse?: Civil War and a Lootable Resource', *Journal of Conflict Resolution* **49**(4), 538–562.

Mellander, C., Lobo, J., Stolarick, K. & Matheson, Z. (2015), 'Night-Time Light Data: A Good Proxy Measure for Economic Activity?', *PLOS ONE* **10**(10), e0139779.

of Peacekeeping Operations, D. (2010), 'United Nations Peacekeeping Operations- Principles and Guidelines'.

Polo, S. M. T. & González, B. (2020), 'The Power to Resist: Mobilization and the Logic of Terrorist Attacks in Civil War', *Comparative Political Studies* **53**(13), 2029–2060.

Prentice, R. L., Williams, B. J. & Peterson, A. V. (1981), 'On the regression analysis of multivariate failure time data', *Biometrika* **68**(2), 373–379.

Pruitt, D. G., Kim, S. H. & Rubin, J. Z. (2004), *Social conflict: escalation, stalemate, and settlement*, McGraw-Hill series in social psychology, 3rd ed edn, McGraw-Hill, Boston.

Rogers, P. D. (2007), 'China and United Nations Peacekeeping Operations in Africa', *Naval War College Review* **60**(2), 73–93. Publisher: U.S. Naval War College Press.

Rolandsen, O. H. (2015), 'Small and Far Between: Peacekeeping Economies in South Sudan', *Journal of Intervention and Statebuilding* **9**(3), 353–371.

Ruggeri, A., Dorussen, H. & Gizelis, T.-I. (2017), 'Winning the Peace Locally: UN Peacekeeping and Local Conflict', *International Organization* **71**(1), 163–185.

Ruggeri, A., Gizelis, T.-I. & Dorussen, H. (2013), 'Managing Mistrust: An Analysis of Cooperation with UN Peacekeeping in Africa', *Journal of Conflict Resolution* **57**(3), 387–409.

Salverda, N. (2013), 'Blue helmets as targets: A quantitative analysis of rebel violence against peacekeepers, 1989–2003', *Journal of Peace Research* **50**(6), 707–720.

Schutte, S. & Weidmann, N. B. (2011), 'Diffusion patterns of violence in civil wars', *Political Geography* **30**(3), 143–152.

Silberfein, M. (2004), 'The Geopolitics of conflict and diamonds in Sierra Leone', *Geopolitics* **9**(1), 213–241.

Townsen, A. A. & Reeder, B. W. (2014), 'Where Do Peacekeepers Go When They Go?', *Journal of International Peacekeeping* **18**(1-2), 69–91.

Urban Observing Sensors (2014), *in* Q. Weng, ed., 'Global Urban Monitoring and Assessment through Earth Observation', 0 edn, CRC Press, pp. 72–105.

Walter, B. F., Howard, L. M. & Fortna, V. P. (2020), 'The Extraordinary Relationship between Peacekeeping and Peace', *British Journal of Political Science* pp. 1–18.

Weidmann, N. B., Kuse, D. & Gleditsch, K. S. (2010), 'The Geography of the International System: The CShapes Dataset', *International Interactions* **36**(1), 86–106.

Zhukov, Y. M. (2012), 'Roads and the diffusion of insurgent violence', *Political Geography* **31**(3), 144–156.