

The Dynamics of UN Peacekeeping Operations

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Summary of Thesis

A burgeoning literature examines UN peacekeeping operations, including the rationales of UN peacekeeping contributions, UN peacekeeping as a foreign policy, and the effectiveness of UN peacekeeping operations. This thesis builds on the existing literature and seeks a further understanding on the dynamics of UN peacekeeping operations. In three chapters, speaking to each of the topics above, it pursues relevant new topics by bridging new variables from different research fields with peacekeeping studies. Chapter One uses the variable, trade potential, from the economic integration literature, and argues that trade potential rather than actual trade should help explain countries' decision to commit troops to UN peace operations. It uses a gravity model to estimate expected trade and then calculates and measures trade potential. Chapter Two employs a network inferential model to examine whether UN peacekeeping participation can actually enhance a country's status, given that the literature argues that status motivates many countries to participate in peacekeeping operations. Chapter Three examines how peacekeeping and humanitarian aid affect the risks of local conflict. The existing literature has found that peacekeeping reduces violence, while humanitarian aid could exacerbate the violence. It uses subnational datasets regarding peacekeeping, aid, and conflict to test the integrated effect of peacekeeping and humanitarian aid. The thesis therefore presents new theoretical and empirical findings on the dynamics of UN peacekeeping operations. Three chapters aim to bridge peacekeeping studies with different research fields including economic integration, foreign policy analysis, network analysis, and aid.

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Introduction - The Dynamics of UN Peacekeeping Operations

Introduction

Peacekeeping is an important conflict resolution tool to reduce violence and promote peace used by the international community. Peacekeeping can be conducted by regional organizations, such as the African Union (AU), the European Union (EU), and the Economic Community of West African States (ECOWAS), but the United Nations (UN) has been the main international organization engaged in peacekeeping. The peacekeeping activity is a joint product model (Khanna et al. 1996) of providing public goods, most ambitiously world peace and regional stability, and possibly preserving private benefits such as financial reimbursements. Compared with other peacekeeping activities, UN peacekeeping operations are cost-efficient, making it the preferred option for many countries (Rost and Greig 2011). Also, UN peacekeeping can be quite controversial, because its effectiveness has been questioned by different strands of literature. UN peacekeeping operations therefore are a research field attracting both academics and policy makers from conflict studies, foreign policy analysis, development studies, and area studies.

The research agenda of UN peacekeeping can be broadly separated into three areas: (a) why contribute to UN peacekeeping operations, (b) regarding peacekeeping as a foreign policy tool, how do countries achieve their stated goals via peacekeeping, (c) seen as a conflict resolution tool, what is the effectiveness of the UN peacekeeping operations? My thesis aims to address these questions. Chapter One, “Trade Potential and UN Peacekeeping Participation” addresses the question of why contribute to the UN peacekeeping operations. It argues that expectations about trade with the conflict region, or trade potential, rather than actual trade, should help explain countries' decision to commit troops to UN peacekeeping operations. It uses a gravity model to deduct trade potential defined as estimated or counterfactual trade

volume from the actual trade volume. Chapter Two, “UN Peacekeeping Contribution and Status Enhancement”, examines whether a country can actually enhance its status via contributing to the peacekeeping operations. The existing literature argues that status is a motivation of UN peacekeeping contribution but without systematic evidence on the motivation’s result. In other words, it examines that peacekeeping as a foreign policy tool, whether a country can achieve its stated goal of status and how the country achieves it via peacekeeping. It uses a network inferential model to test the theory. Chapter Three, “Peacekeeping, Aid and Violence: The Integrated Effect of Humanitarian Aid and UN Peacekeeping” carries on the literature about peacekeeping effectiveness. The existing literature has found that peacekeeping reduces violence, while humanitarian aid could exacerbate violence. It uses subnational datasets regarding peacekeeping, aid and conflict to test the integrated effect of peacekeeping and humanitarian aid.

Overall, the thesis speaks to three broad peacekeeping literature by pursuing relevant new topics and bringing variables from different fields. Chapter One communicates with the field of economic integration, peacekeeping studies and foreign policy decision making. It answers the question of why contribute to UN peacekeeping. The status chapter bridges the field of international status, peacekeeping studies, and inferential network analysis. It addresses the puzzle of whether the participation of UN peacekeeping can achieve its stated foreign policy goal, i.e., status enhancement. Chapter Three speaks to the peacekeeping community and the aid community. It solves the question of UN peacekeeping’s effectiveness when it interacts with another conflict management tool. Now I proceed to the literature review to explain how my three chapters fill in the gaps in the peacekeeping literature.

Literature Review

Why contribute to UN peacekeeping operations?

Peacekeeping is an important conflict resolution tool to reduce violence and promote peace used by the international community. Earlier scholars claim that the peacekeeping contribution can be regarded as an impure public good (Bobrow and Boyer 1997; Shimizu and Sandler 2002) or a “joint product model” (Khanna et al. 1999). Peacekeeping operations include both public benefits, i.e., world peace, which is accessible to any country, and private benefits, such as financial reimbursements. In a broad way, decisions on sending UN troops can be influenced by public benefits and private benefits.

For the public benefits at the international level, the threat of international peace or regional stability is an important factor of countries’ UN peacekeeping contribution. Using conflict intensity as a proxy measurement of risks, Bove and Elia (2011) present that the greater the security threats are, the higher UN peacekeeping contribution will be. Regional stability measured by spatial proximity (Bove and Elia 2011; Perkins and Neumayer 2008) is also found to raise the likelihood of peacekeeping participation.

For the private benefits, it can be classified into three categories: political or military benefits, economic benefits, and normative benefits. From the perspective of political benefits, regional stability can be mentioned here again, because it is a typical example both as a public good and a private good. Stemming refugee flows is related to regional stability but is more national-specific. Uzonyi (2015) argues that in the post-Cold War area, refugee flows can predict countries’ likelihood of the troop contribution and the size of contribution. In his later book (Uzonyi, 2020), he further studies on the refugee flow’s influence on the dynamics

of UN peacekeeping troop contribution and finds that a state can withdraw more quickly from a peacekeeping mission when it keeps receiving higher volumes of refugee inflows, despite the peacekeepers' presence. Peacekeeping deployment could also be influenced by coup-proofing. Kathman and Melin (2017) find that some member states worry about their security interest, and when there are coup attempts, the states are more likely to contribute to UN peacekeeping operations. Relatedly, Lundgren (2018) further shows that if countries largely rely on financial reimbursement from the UN, UN peacekeeping participation can reduce coup attempts, but the coup-constraining effect can be weaker when there are fewer alternative troop suppliers. Besides, participation in UN peacekeeping can get more military exposure and help train the military for countries which are lack of resources (Kathman and Melin 2017; Bobrow and Boyer 1997). It can also change the civil-military relationship. By analysing Latin American countries, Sotomayor (2010) finds that depending on existing political institutions and the troops' performance during the peace operation, some countries can diverge their civil-military relationship, while some can integrate it. Furthermore, relational proximity could also influence countries' peacekeeping contribution. Perkins and Neumayer (2008) show that former colonial ties play a role in peacekeeping contribution. Ward and Dorussen (2016) find that to maintain political or foreign policy affinity, countries that are more central in a network of policy preferences are more likely to contribute UN peacekeeping troops.

From the perspective of economic interests, a large amount of literature (e.g., Victor 2010; Gaibullov et al. 2009; Gaibullov et al. 2015) argues that countries aim to gain financial reimbursement from the UN by peacekeeping participation. However, Coleman and Nyblade (2018) argue that the economic benefit is overemphasized and show that only a limited subset of developing states, but not top UN troop contributors conduct peacekeeping for profit. Still,

countries can get some economic benefits even though not directly from the UN. Boutton and D’Orazio (2019) argue that despite the stagnant UN reimbursement rates and the rising costs of participation, developing countries still participate in UN peacekeeping, because they can get foreign aid from “pivotal states”, i.e., major powers, which is strategically allocated to persuade developing states to contribute. Furthermore, many studies (e.g., Rost and Greig 2011; Stojek and Tir 2015) show that trade plays an important role in peacekeeping contribution. It could be in the form of Foreign Direct Investment (Gaibulloev et al. 2009) or trade opportunity measured by the trade volume before the civil war (Stojek and Tir 2015). However, Stojek and Tir focuses on the trade interest of the permanent 5 - countries in the UN Security Council- China, France, Russia, UK and USA - rather than all countries. They follow Perkins and Neumayer’s research, which does not show any association between trade between individual countries and peacekeeping participation.

From the perspective of normative benefits, it has been argued that many countries, especially middle powers participate in UN peacekeeping for getting status or winning a reputation for “good citizenship” (Neack 1995; Cooper 1997). Also, many developing country studies that focus on one country’s peacekeeping policy examine what kind of prestige that a country wants to pursue (e.g., Beswick 2010; Krishnasamy 2001; Bellamy and Williams 2013). Furthermore, norm diffusion is another argument. Lebovic (2004) argues that democratic governments are particularly willing to contribute for supporting liberal norm diffusion via UN peacekeeping. However, this argument is questioned by Duursma and Gledhill (2019). They find that democratic governments can be reluctant to contribute, especially when elections are on hold. Non-democratic governments are more likely to make sizeable contributions because they can partly disregard public opinion. Cunliffe (2013) makes a different argument by using a critical approach that UN peacekeeping are acts that

the “wealthy and powerful” states of the Global North use to “suppress and contain conflict across the unruly periphery of the international order” by using military personnel and equipment from the Global South in order to export “imperial multilateralism”.

The private interest above is regarding a direct gain of interest. An alternative interest is to reduce the costs of free riding that result from countries benefitting from the public gains of peacekeeping, such as maintaining peace and stability, without contributing to missions. Gaibulloev et al. (2015) examine a sample of peacekeeping operations from 1990 to 2012 and find that UN peacekeeping missions display no personnel free riding problem, but non-UN peacekeeping missions have. However, Passmore et al. (2018) find that free riding problem exist in UN peacekeeping and explains the shortfall of troop contributions. Levin (2021) finds that peacekeeper fatalities have a negative impact on peacekeeping contribution, where wealthy countries compared with poor countries are more sensitive and make a large reduction in contributions, but there is less evidence that democracies (compared with non-democratic countries) are more sensitive to peacekeeper fatalities. It is consistent with Raes et al. (2018) finding that among OECD countries, there is no “body bag syndrome”, i.e., a casualty aversion that decreases public support of peacekeeping contribution.

An alternative approach studying peacekeeping contribution is from the perspective of the UN institution rather than from the country perspective. This approach is mostly concerned with peacekeeping as a public good, because when the UN Security Council focuses on the public good aspect, it usually authorizes mandates or sends troops into “hard cases”, including cases with more casualty and civilian violence (e.g., Gilligan and Stedman 2003; Gilligan et al. 2008; Fortna 2008; Hultman 2013). Some scholars disaggregate the characteristics of “hard cases”. Bakaki and Hinkkainen (2016) find that in the post conflict

periods, the use of child soldiers (as hard cases) mobilizes UN peacekeeping operations. Hultman and Johansson (2017) find that reports of sexual violence on average increase the likelihood of a peacekeeping operation, though there are contradictory findings on the UN's reactions to types of sexual violence based on the perpetrators. Mehrl and Dworschak (2021) find that women's participation in rebel groups increases the UN peacekeeping deployment, because female combatants represent that "a conflict is so severe that it even forces society's most pacific members to take up arms".

To sum up, Chapter One, "Trade Potential and UN Peacekeeping Participation", follows the strand of literature by arguing that trade potential is another private interest factor in explaining UN peacekeeping participation. Especially, trade, among different private benefits, presents a mixed result. Rost and Greig (2011) examine the non-UN peacekeeping operations and find that trade interest can explain the peacekeeping contributions while Perkins and Neumayer (2008) find that there is no association between trade ties and peacekeeping contributions if examining both UN peacekeeping and non-UN peacekeeping operations. Following examining peacekeeping contributions, Stojek and Tir (2015) utilize UN Security Council's five permanent members' (P5 countries) trade volumes with UN peacekeeping host countries to test trade's influence on peacekeeping participation and find a positive relationship. By probing this mixed-result puzzle, Chapter One argues that individual country's trade interest still matters, and it is possible that the actual trade volume itself may not be a good indicator of a country's trade interest. After all, trade has been regarded as a valid motivation in third party military intervention (e.g., Kathman 2011; Bove et al. 2014). It uses a new concept of trade potential in conflict studies and tries to combine the trade potential concept from economic integration literature with peacekeeping studies. Lastly, it uses a two-step research design. In the first step, it uses gravity model in a sub-sample

method to calculate the predicted trade and then get the trade potential. In the second step, it runs the main model to obtain empirical results.

Peacekeeping as a Tool of Foreign Policy

Countries' peacekeeping contribution decision is the first step of foreign policy. The strand of literature is summarized in the previous section. However, when a country participates in peacekeeping, does the country achieve its stated foreign policy goal and how does the country use peacekeeping as the tool to achieve it? There are not many quantitative papers answering the questions, but some country study papers answer or partially answer the questions. The strand of literature usually uses qualitative method and mixes the question of why a country participates in peacekeeping with what is the impact of the country's peacekeeping participation on stated goals, but still prioritizes the motivation question rather than the question of peacekeeping's influence.

Among all quantitative peacekeeping motivation literature, to the best of my knowledge, only Lundgren (2018) explicitly examines peacekeeping's effect on coup attempts, which is one of the foreign policy goals of African peacekeeping sender countries. He finds that if countries largely rely on financial reimbursement from the UN, UN peacekeeping participation can reduce coup attempts, but the coup-constraining effect can be weaker when there are fewer alternative troop suppliers. All other quantitative peacekeeping research of foreign policy motivation does not test peacekeeping's reverse effect on the stated goals. Country study papers tend to mix the question of why a country participates in peacekeeping with its participation's influence on stated goals, and mostly prioritize the why question rather than the influence question. For example, Fung (2015) conducts a case study of why China participates in UN peacekeeping in Darfur, and argues that identity explains most in this case

and reputation also adds to the explanation, but not material benefits. In her evidence part, she shows that China's peacekeeping participation in Darfur reduces criticism from the US, eases the US official's boycott on 2008 Beijing Olympic Games and receives social praise from peer countries, which shows that the peacekeeping achieves the foreign policy goal of maintaining China's reputation and identity as a Permanent 5 country and responsible power.

Sotomayor's book (2014) is an outlier. He focuses on peacekeeping's influence on the civil-military relationship. His introduction part firstly clarifies that domestic reform could be a motivation for countries' peacekeeping contribution and argues that a democratizing state can regard peacekeeping as a way of restructuring its military's traditional roles. However, his book mainly focuses on peacekeeping's influence on civil-military relationship in Argentina, Brazil and Uruguay. He finds that with the exception of Argentina, the peacekeeping experience of Argentina, Brazil and Uruguay does not promote military institutional reform, does not enhance their professionalism, and does not increase the integration and interaction between defence department and civilian leaders in the foreign policy department. What also distinguishes Sotomayor's research is that he specifically mentions the interaction mechanism among peacekeeping troops, officers, and NGOs within the mission in shaping the civil-military relationship. It answers the how question, though the mechanism is not triggered all the time in his case studies.

However, the examination of whether peacekeeping achieves claimed foreign policy goals remains limited. This is especially apparent in the relationship between peacekeeping and status. Several country studies claims that a country's peacekeeping participation is motivated by achieving status, but there is no systematic evidence on whether peacekeeping actually helps to achieve status. Furthermore, interestingly, among all private-benefit contribution

rationales, prestige, reputation, or status is a consistent motivation among different categories of countries in using peacekeeping as a foreign policy tool (unlike financial reimbursement, coup-proofing, etc.). For example, in the category of middle powers, Canada uses peacekeeping as a tool to earn a good citizen reputation (Neack 1995; Thakur 1980) and Norway uses peacekeeping operation as a tool to gain status, which is a part of “forces-for-status” strategy (Graeger 2014). In the category of emerging or rising powers, China wants to become a “legitimate great power” or a “developing power” (Suzuki 2008). Nigeria, as a developing country, regards itself as a “responsible regional hegemon” in peacekeeping contribution and it also applies to situations in Nepal and Ghana (Bellamy and Williams 2013). More country study literature clarifies this including Australia, New Zealand, Fiji, (McDougall 2017), Argentina (Norden 1995), South Africa (Cilliers and Malan 1996), Rwanda (Beswick 2010), Brazil (Kinkel 2013), Pakistan, Bangladesh, India, and Mongolia (Avezov 2014).

Another strand of literature discusses the relationship between UN peacekeeping and status by focusing on the mechanism of social comparison and social mobility (Larson and Shevchenko 2019). Larson and Shevchenko (2019) claim that “social mobility occurs when the lower status groups try to imitate the higher status groups ... social creativity occurs when the lower status groups try to find new value dimensions in which it is superior”. In order to adhere to democratic values and conform to the international peace norm, in the early 1990s, Argentina transformed the image of a historically problematic military into a professional internationalist image via peacekeeping participation (Norden 1995), which shows social comparison. Canada focuses on its own comparative advantage and finds it “niche” diplomacy, i.e., peacekeeping operations to achieve its “good citizen” label (Cooper 1997), which shows social creativity. However, the two mechanisms are more about answering why

countries choose peacekeeping as a tool to achieve status from a socio-psychological perspective, rather than explains whether peacekeeping really help the country achieve status and let alone, how countries achieve status by using peacekeeping as a foreign policy tool.

Lastly, there is another strand of literature explains why UN peacekeeping becomes an unattractive foreign policy tool for some countries, while becomes some other countries' choice. During the Cold War, UN peacekeeping are dominated by Western middle powers, such as Australia, Canada, Norway, Sweden, etc. (Meiske and Ruggeri 2017). The superpowers in the Cold War disengaged from peacekeeping to keep their tensions and interests out of the "impartial" peacekeeping operations, while middle powers participated in to gain special recognition and enhance their international standings (Cooper 1997; Maloney 2001). The motivation of status enhancement for these countries kept until the early 1990s, when Canada, Finland, Norway, and Austria were still top contributors. Meanwhile, in the 1990s, second-generation peacekeeping missions were undertaken in Cambodia (1991-93), the former Yugoslavia (1992-95), Somalia (1992-95), Rwanda (1993) and elsewhere. Compared with first-generation peacekeeping, second-generation missions are authorized to use force for reasons other than self-defence and the goals of second-generation peacekeeping are various and difficult to define. Much controversy arose for the use of troops in missions (Britannica 2022). Also, the UN was seen slow and ineffective; especially its failures in Rwanda, the former Yugoslavia, and Somalia gave many middle power countries which were top contributors bad tastes and therefore they gradually moved away from UN peacekeeping (Nilsson and Zetterlund 2016). The journal *International Peacekeeping* has a special issue (Issue 5, Volume 23, 2016) on whether European countries will return to UN peacekeeping. In this issue, it firstly elaborates why countries including France, the UK, Germany, Italy, the Netherlands, Ireland, Denmark, Sweden, and Norway, moved away from UN peacekeeping

and chose alternative peacekeeping tools, such as the NATO and the EU. It also makes predictions on each countries' future UN peacekeeping policy. In short, Koops and Tercovich (2016) show that in the later 1990s, the middle powers began to reduce troop contribution and use the policy of "token troop contribution". Countries, like France have been thinking that the ability of the UN is limited and not an appropriate tool for complex and multidimensional peace operations (Tardy 2016). Especially, these countries have different organizational menu of choices. They could even carry out state peacekeeping (Rost and Greig 2011). Their leave gives an opportunity for developing countries in participating in UN peacekeeping operations. In the later 1990s, Pakistan, India, and Bangladesh gradually became the top contributors (Meiske and Ruggeri 2017). Countries, like emerging powers including China, Brazil, and South Africa (Tardy 2012) began to contribute. Many other developing countries (such as Rwanda, Nepal, Indonesia, Niger, and Uruguay) may also become the top 20 UN peacekeeping contributors (Coleman and Nyblade 2018).

Chapter Two, "UN Peacekeeping Contribution and Status Enhancement" follows the aforementioned strands of literature by arguing that a country can learn, perform, and socialize to enhance its status via peacekeeping. It proposes a network theory (i.e., invitation continuation, cooperation continuation, and signalling theory), measures status enhancement via gaining a Defense Cooperation Agreement tie, and then uses a temporal exponential random graph model to test it empirically. It finds that compared with non-participants, it is more likely for UN peacekeeping sender countries to achieve status enhancement. It disentangles countries' interaction activities within peacekeeping missions, and how the interaction helps status enhancement.

Peacekeeping Effectiveness

Peacekeeping is not only a foreign policy tool, but more about a conflict resolution tool. If we focus on the peacekeeping as a tool of conflict resolution, it is important to assess its effectiveness. There are several general patterns in the literature regarding peacekeeping effectiveness in the post-Cold War era: from being pessimistic to being optimistic; from negative peace to positive peace; from national level to local level (or even individual level); from a top-to-bottom approach to a bottom-up approach; from examining peacekeeping's effectiveness alone to examining the integrated effect led by other conflict management tools. These patterns are not mutually exclusive.

Fortna and Howard (2008) and Walter et al. (2020) have a detailed literature review on countries and scholars' attitude on UN peacekeeping during and after the Cold War. They show that there were twists and turns on peacekeeping effectiveness. During the Cold War, the UN peacekeeping was considered instrumental in resolving disputes (Fortna and Howard 2008). However, the optimism was changed due to the Somalia, Rwanda, etc. cases. Several books show the pessimism (e.g., Jett 1999; Fleitz 2002). The literature in the 1990s was mostly descriptive and contained narrative studies (Fortna and Howard 2008). Meanwhile, there was a positive turn in practice and theory. Diehl in 1988 published what may be one of the first studies on peacekeeping effectiveness that moves beyond the descriptive approach of the first wave of peacekeeping studies (Fortna and Howard 2008; Di Salvatore and Ruggeri 2017).

With the rise of quantitative methods in peacekeeping effectiveness research, it mostly shows a consensus and optimism. The measurement initially starts with a negative peace concept, i.e., reducing violence. The traditional measurement of negative peace could be the onset or

duration of the conflict (e.g., Doyle and Sambanis 2000; Fortna 2008) and the death toll, including battle-related deaths (e.g., Hultman et al. 2014) or one-sided violence (e.g., Hultman et al. 2013; Kathman and Wood 2016). Most quantitative papers' theoretical mechanism is that the presence of UN peacekeeping can increase the military costs of using violence (e.g., Hultman et al. 2013). Howard (2019) identifies *persuasion* and *inducement* as peacekeeping mechanisms that go beyond *coercion*, or the military dimension. It also moves from the national level to the local or sub-national level (e.g., Costalli 2014; Ruggeri et al. 2017; Fjelde et al. 2019; Phayal 2019; Phayal and Prins 2019). Overall, if the measurement of the peacekeeping effectiveness is concerning negative peace, except some articles (Costalli 2014), most studies show that UN peacekeeping operations do keep peace (e.g., Fortna 2008; Gilligan and Sergenti 2008; Hultman et al. 2013, 2014; Carnegie and Mikulaschek 2020). Some research uses different measurements of negative peace. Smidt (2020) finds that UN peacekeeping mitigates communal violence in Côte d'Ivoire. Sometimes, negative peace indicators can be combined with positive peace indicators, because in the process of promoting democracy, electoral violence can be a new form of violence. Fjelde and Smidt (2021) find that peacekeeping missions in Africa reduce the risks of electoral violence by promoting electoral security, but the reducing effect is stronger for non-state actors compared with government-affiliated actors. Smidt (2021) finds that by routinely organizing election education events, UN peacekeepers can mitigate violence at the individual and subnational levels. Some research differentiates UN troops' effects from UN police's effects and focuses on UN police's unique influence on some alternative negative peace indicators. Di Salvatore (2019) finds that UN police rather than UN troops mitigate the criminal violence. Bara (2020) finds that though UN troops can reduce civilian targeting by former combatants, the troop does not reduce violence perpetrated by other armed actors. UN police instead mitigate post-war violence generally because of their broader effect on public security. Johansson and

Hultman (2019) find that UN peacekeeping is generally difficult to lessen sexual violence. Peacekeepers' influence on reducing sexual violence is weak and only UN police within protection missions reduces the risk of sexual violence by rebels.

If peacekeeping effectiveness is measured by positive peace indicators, the results are mixed. Socio-economically, Caruso et al. (2016) find that the increased size of peacekeeping troops can help agricultural production in South Sudan. Bove et al. (2021) show that peacekeepers' military presence improves local security including both observed and perceived security. It leads to better local economies and households' subjective well-being, while Mvukiyehe and Samii (2020) find no effect from peacekeeping deployment on local security measured by physical victimization, fear of victimization, or migration patterns but only modest effect on socio-economic vitality. Some studies examine peacekeeping's influence on cooperative events. Dorussen and Gizelis (2013) show that activities that strengthen state capacity are usually supported by both governments and rebels, while activities related to improvements in human rights do not get cooperative behaviours from either side. Nomikos (2022) finds that in Mali, peacekeepers increase individuals' willingness to cooperate with members of other groups. Politically, Steinert and Grimm (2014) show that UN peacebuilding can be conducive to democratization. Joshi (2013) finds that UN peacekeeping helps initiate a democratic political process and therefore, increase the durability of peace. Blair (2020) shows that UN peacekeeping can have a big positive effect on the rule of laws.

There are also some studies regarding the unintended effect of peacekeeping effectiveness. Gizelis and Xun (2019) explain the positive relationship between peacekeeping presence and maternal health success based on UN peacekeeping's direct effect of providing medical and training facilities, and an indirect security effect of improving access to maternal health.

Bakaki and Böhmelt (2021) present a side effect that UN peace missions are associated with better environmental quality measured by water sanitation.

Another strand of literature regarding peacekeeping effectiveness focuses on the impact of the organization of peacekeeping. Some focuses on female representation. Karim (2017) finds that there exist an “access gap” that prevents female peacekeepers from fully contributing to the mission’s operations, which cannot let the mission’s effectiveness reach its full potentials. Karim and Beardsley (2016) show that higher proportions of both female peacekeepers and personnel from countries with better records of gender equality is associated with lower levels of sexual violation conducted by the UN military troops. Some criticizes that the top-to-bottom approach inhibits peacekeeping effectiveness. Pouligny (2006) highlights the contrast between the official version of peacekeeping and local sentiment. Autesserre (2010, 2014, 2021) pinpoints problems in Congo and recommends adopting a bottom-up approach to achieve a better peacekeeping effectiveness. Similarly, Campbell (2018) argues that if international peacebuilding organizations aim to achieve a better effectiveness, they need to be accountable to local institutions or people rather than international actors. The diversity of the composition of peacekeepers is another factor. Bove and Ruggeri (2015) argue that a peacekeeping’s diversity, i.e., how many countries contribute peacekeepers, helps protecting civilians. However, Goldring and Hendricks (2018) argue that the diversity factor is overstated and that peacekeepers from culturally proximate countries are more effective at protecting civilians. Lastly, Blair et al. (2021) focuses on the mandate implementation, which can be considered as peacekeeping effectiveness at the official level. They find that mandate fragmentation is negatively associated with mandate implementation, especially for peacebuilding tasks, while ongoing violence is also negatively correlated with implementation of peacebuilding tasks, but not with security tasks.

There is also an emerging interest in the integrated effect of different conflict management methods and actors. The UN itself has begun to consider the integration of its resources and to mandate multidimensional peacekeeping missions in support of a comprehensive peace. Howard (2019) highlights the use of economic instruments by peacekeepers, such as aid and trust funds, as *inducements* for peace. Other scholars research the integrated effect of peacekeeping operations and mediation (Greig and Diehl 2005; Beardsley et al. 2019; Clayton and Dorussen 2021).

Chapter Three “Peacekeeping, Aid and Violence: The Integrated Effect of Humanitarian Aid and UN Peacekeeping” follows the literature about the integrated effect of peacekeeping with other conflict management tools. It also follows the literature of aid’s effectiveness (Zürcher 2017; Findlay 2018). More specifically, from the perspective of aid community, it answers under what condition foreign aid workd effectively, because no different types of aid is immune to predation and looting, and can have a violence-inducing effect (Zürcher 2017).

Summary of the Three Chapters

Having discussed the existing literature and showed how my chapters fit into the literature in a bigger category, I now summarize the three chapters of this thesis and the gaps in the literature.

Chapter One examines the relationship between trade potential and individual countries’ UN peacekeeping participation. Perkin and Neumayer (2008) use trade as a control variable without finding statistical significance and therefore, Stojeck and Tir (2015) change their

research object to examine the relationship between trade and the UN's participation from the perspective of an institution. It seems reasonable to expect the individual countries (not only the UN institution) contribute peacekeeping out of private as well as public interests, but so far little evidence shows that trade matters. I argue that the expectations about trade with the conflict region, or trade potential, rather than actual trade, should help explain countries' decision to commit troops to UN peacekeeping. I use trade potential via gravity models in the way of deducting the estimated or counterfactual trade volume from the actual trade volume. I find empirical support that there exists a positive relationship between trade potential and individual countries' UN peacekeeping participation.

Chapter Two argues that participating UN peacekeeping operations can enhance status. It is commonly argued that countries contribute UN peacekeeping to gain status, but there is no systematic evidence that participating UN peacekeeping can really have such an effect. I argue that countries can learn, perform, socialize in UN peacekeeping, and therefore gain status. The previous literature uses degree of centrality score to measure status because it can capture the concept of status, shared belief of international standings, and the property of status, "positional, perceptual, and social". However, the degree of centrality score cannot be used as a dependent variable because it violated the identical and independent assumption. Therefore, I focus on the status enhancement (the formation of a network) rather than the status (measured as degree of centrality score). I use Defense Cooperation Agreement (DCA) to measure status and use gaining of a DCA to show status enhancement. UN peacekeeping is firstly regarding countries' military action wielded in a peaceful way and status could be focused on military aspects. In other word, I examine how the interaction within UN peacekeeping can help status enhancement. A dyadic theory is not enough because the interaction within UN peacekeeping could between senders and peacekeeping host countries

and between two senders. Based on learning, performance, and socialization theory, I propose a network theory, including invitation continuation, cooperation continuation, and signalling theory and use a Temporal Exponential Random Graph Model to test the theory.

Chapter Three investigates the integrated effect of UN peacekeeping operations and humanitarian aid in a subnational level. In a subnational level, peacekeepers are not alone often shown with humanitarian agencies. Both are aimed at reducing violence and share the goal of “protection of civilian”, but in the subnational literature, peacekeeping reduces the violence while humanitarian aid induces violence. I argue that by means of sharing information and the provision of security bubbles, peacekeepers can reverse the impact of aid on conflict. Empirically, I use the PRIO-Grid system and the coincidence of subnational location of humanitarian agencies and peacekeeping troops to test whether peacekeeping and aid are indeed complementary in reducing violence against civilians.

Taken together, three chapters fit into the broad literature of UN peacekeeping including the rationales of the UN peacekeeping contribution, UN peacekeeping as a foreign policy, and the effectiveness of the UN peacekeeping operations.

Chapter I - Trade Potential and UN Peacekeeping Participation

Introduction

Peacekeeping is an important conflict resolution tool. In the light of its importance, there is a question to be raised: what determines peacekeeping troop contributions? Scholars give different answers to this question. Trade is one of the important explanatory variables of this question for it is a crucial self-interest motivation. However, the existing literature finds mixed results about the trade's influence on peacekeeping troop contribution (Perkins and Neumayer 2008; Stojek and Tir 2015; Rost and Greig 2011; Gaibulloev et al. 2015). Different papers examine the relationship in different ways. Rost and Greig (2011) examine the non-UN peacekeeping operations and find that trade interest can explain the peacekeeping contributions while Perkins and Neumayer find that there is no association between trade ties and peacekeeping contributions if examining both UN peacekeeping and non-UN peacekeeping operations. Following examining peacekeeping contributions, Stojek and Tir utilize UN Security Council's five permanent members' (P5 countries) trade volumes with UN peacekeeping host countries to test trade's influence on peacekeeping participation. They argue that country's contribution is secondary to the mission authorization and therefore, the UN peacekeeping participation is influenced by the key states' trade interests, i.e., P5 countries' interest rather than all countries' trade interest. However, it is possible that individual country's trade interest still matters. It could be the reason that the actual trade volume itself may not be a good indicator of a country's trade interest, given that Stojek and Tir regard the realized trade volume as the forward-looking trade opportunity.

I argue that trade potential is a better indicator to show a country's trade interest in peacekeeping host countries when trade ties are disrupted by wars. Trade potential estimates the extra trade volume, which is the trade volume additional to the realized or actual trade

volume. Not only P5 countries but many countries are potentially concerned about the disrupted trade influences the domestic economy and prefer to protect their established trade linkages and investments in mission countries. The objective of peacekeeping is to restore peace which may allow for future trade; in other words, trade potential of peace rather than realized trade under conflict should motivate peacekeeping contributions. Furthermore, this paper links the concept of trade potentials from the field of the economic integration with peacekeeping studies. It bridges the economic literature via using the concept of trade potential in conflict studies and helps conflict literature adding a new variable to explain the motivation of peacekeeping contribution.

In the next section, I review the literature on what determines peacekeeping contributions, in the process of which I pinpoint the position of economic motivations in peacekeeping contributions literature. Then, I narrow it down to the relationship between trade ties and peacekeeping contributions. I show how scholars use different ways to examine the trade's influence on peacekeeping participation. I argue that trade potential is a better indicator of peacekeeping contributors' private interest and present my theoretical mechanism linking trade potentials and peacekeeping contributions. Next, I present my research design and discuss my empirical result. I introduce how to use the gravity model to measure trade potentials and use logistic regression to run the main model. Finally, I conclude that trade potentials influence UN peacekeeping participation.

Peacekeeping Motivations and Peacekeeping Contribution

Earlier scholars claim that the peacekeeping contribution can be regarded as an impure public good (Bobrow and Boyer 1997) or a 'joint product model' (Khanna et al. 1999). Peacekeeping operations include both public benefits, i.e., world peace, which is accessible to any country, and private benefits, such as financial reimbursements. In other words, in the

process of providing public goods, the providers gain various benefits. Otherwise, if the provider does not receive any private benefit, peacekeeping contribution will be underprovided or even not be provided (Boutton and D’Orazio 2020). Therefore, several studies have focused on the private benefits and distinguish different kinds of private benefits, which can be generally classified into three categories: political benefits, economic benefits and normative benefits.

From the perspective of political benefits, countries send peacekeeping for regional security concerns (Bove and Elia 2011; Perkins and Neumayer 2008), coup-proofing (Kathman and Melin 2016; Lundgren 2018), maintaining political or foreign policy affinity (Ward and Dorussen 2016), stabilizing former colonial ties (Perkins and Neumayer 2008) and stemming refugee flows (Uzonyi 2015). Normatively speaking, some countries send peacekeeping troops for winning a “good citizen” reputation (Neack 1995). Then, there are economic motivations including financial reimbursements (Bobrow and Boyer 1997; Gaibullov et al. 2015), getting foreign aid from “pivotal states”, i.e., developed countries (Boutton and D’Orazio 2020) and trade interests (Perkins and Neumayer 2008; Stojek and Tir 2015; Rost and Greig 2011; Gaibullov et al. 2015).

Even though trade interest, as one type of economic benefits, is intuitive in explaining the motivation of peacekeeping troop contributions, the literature presents mixed results. In previous research, Rost and Greig (2011) found a statistically significant relationship in state-conducted peacekeeping operations while Perkins and Neumayer (2008) who examine both UN peacekeeping and non-UN peacekeeping operations find no association. Following upon Perkins and Neumayer, Stojek and Tir (2015) examine the scope of UN peacekeeping operations, and respond to Perkins’ no association result. Given that Perkins and Neumayer’s paper finds no association, Stojek and Tir only test P5 countries’ trade volumes and peacekeeping contributions, and regards peacekeeping contribution from the perspective of

the UN institution rather than individual countries. Gaibulloev et al. (2015) mention trade as an explanatory factor in peacekeeping personnel contributions.¹ Their paper uses per capita GDP to measure contributing countries' well-being for the richer a country is, the more loss (including trade loss) will be incurred. Also, the author uses a monadic measurement, trade openness (trade/GDP), to examine its influence on peacekeeping contributions. As their paper argues, trade openness does not positively affect the supply of peacekeepers for industrial countries may not do business in the conflict areas such as Africa.

Careful reading reveals that there is a subtle but significant distinction between Perkins and Neumayer's and Stojek and Tir's theoretical arguments. Perkins and Neumayer use bilateral trade volumes in a dyadic method to examine whether it is related to an individual country's peacekeeping contribution. In contrast, Stojek and Tir (2015) think that no association between trade volumes and peacekeeping contributions because Perkins and Neumayer (2008) examine all countries' willingness. Stojek and Tir switch to examine major UN decision makers' contribution willingness because they argue that country's contribution is secondary to the mission authorization. Therefore, the UN peacekeeping participation is influenced by the key states' trade interest (P5 countries) rather than all countries' trade interest. Peacekeeping participation in their paper means the UN authorization, which is from the perspective of the UN institution. In short, voluntary sending troops by a country is different from the UN's authorization and then participation.

However, the changed strategy shows that scholars still believe that trade ties should hold explanatory power in peacekeeping contributions. After all, the trade is an important part in private economic benefits and countries will protect it. Setting aside the literature of peacekeeping operations, trade has been regarded as a valid motivation in third party military intervention. Kathman (2011) argues that the potential conflict spillover risk increases the

¹ They regard trade interest as a part of a country's private benefits and as a proxy for trade interests.

likelihood of the intervention of neighbouring countries with strong trade interests in order to contain the violence. Bove et al. (2014) investigate what the relationship of bilateral trade flows between the United States and the rest of the world and US military presence. Bove et al. (2016) find that countries at war with higher bilateral trade in oil and gas are more likely to attract the external intervention.

However, here in peacekeeping studies, given that the influence of the trade is mixed, I question whether actual trade itself is able to capture a country's private trade interests properly. I thus propose an alternative method, trade potential to model trade benefits.

Reconsider the Mechanism: Trade Potentials and Peacekeeping Contribution

Stojek and Tir (2015) explicitly and carefully lay out a causal path from trade to participation in peacekeeping missions. Their causal path can be summarized in this way: both interstate wars and intrastate wars influence international trade (Bayer and Rupert 2004; Anderton and Carter 2001). The interrupted international trade can have a powerful effect on domestic politics as it diminishes economic growth and job creation (Rogowski 1987; Stojek and Tir 2015). Then, the affected growth and employment can influence the incumbent office holding (Lewis-Beck and Stegmaier 2000; MacKuen 1983). In order to lower the affected risk, countries will contribute troops in peacekeeping operations for post-civil war stability of mission host countries, considered as the vehicle of future trade and economic growth, can be regarded as in a contributors' interest (Kassebaum and Hamilton 1994).

Specifically, Stojek and Tir (2015) argue that "P5 countries and their trade-oriented domestic constituencies are more motivated by future profit-making opportunities than by undoing past losses" in order to seek faster profits from their investment. Their empirical result shows that the past trade loss, which is measured by the difference between trade volumes prior to the civil war onset and trade volumes prior to the ceasefire, actually dissuades the UN

peacekeeping participation. Following on Srojek and Tir's path, I argue that trade potential influences the UN peacekeeping participation. Trade potential means the expected trade volume that a country could achieve, if there were no wars. It is a perceived or predicted concept.

Before arguing trade potential's influence, two limitations on Stojek and Tir's trade argument should be noted. Stojek and Tir (2015) argue that P5 countries, as they are economically powerful, can already establish high trade volume ties with peacekeeping host countries, which shows both the trade promise (for the past trade can be regarded as a promise for the future trade) and material evidence (for the high-volume trade is already showed with the actual trade). First, it is questionable to use the realized/current trade prior to the civil war to represent the trade opportunity. The war may have lasted already a long time and that trade volume could be outdated as trade opportunity. Second, many non-P5 countries may currently not have as high as P5 countries' trade volumes but they also have trade interest in peacekeeping host countries. They may expect that they could have more extensive trade links in the future after the war has ended. Non-P5 countries can also have trade opportunity or promise in the future and are inclined to contribute troops, but this trade future expectation is not necessarily captured by the current/realized trade volume. I argue that counterfactual trade volume can be represented by trade potentials.

Trade potential means that the extra trade volume a country could have achieved if there were no wars (perceived/predicted trade). Compared with the Stojek and Tir's method that using the trade volume before the wars shows the trade opportunity/promise, trade potential can be dynamically estimated each year after the war breaks out. In other words, trade potential is regarding a counter-factual concept.

Furthermore, the elasticity of demand and supply (Reuveny 2003; Li and Sacko 2002) and asset specificity (Williamson 1966; Li 2008) or factor mobility (Hirschman 1980) is relevant to estimate trade potential. Countries and lobby groups or traders have their trade expectation even though there is a war. Firms are profit-maximizing. They estimate the conflict-associated risks and internalize the related transaction costs, which reduce trades even before conflicts' occurrence (Li and Sacko 2002). However, the reduced trade links does not mean that there is no demand or supply from the peacekeeping senders. Therefore, trade is elastic, and countries are endeavouring to protect the shrunk trade interest, to remedy it and if possible to expand it. In other words, traders will have *ex ante* expectations, which are trade potentials. Countries then send peacekeeping troops. Also, regarding factor mobility and asset specificity, traders, i.e., peacekeeping senders do not want to spend money to find an alternative market for they have already invested in peacekeeping host countries with specific assets. Especially, Foreign Direct Investment (FDI), as an important private benefits in the peacekeeping contribution (Gaibulloev et al. 2015), can be incorporated in the trade interest. The FDI are considered by investors in a long-time term for factories and infrastructures do not easily translate into liquid asset (Li 2008). As long as the infrastructure is still workable, it represents trade potential for it is much easier to re-invest in an extant country. Therefore, I argue that this future trade expectation means the perceived future trade opportunities, which can be represented by the predicted trade volume and further represented by the trade potentials, i.e.:

Trade potential = Predicted trade volume – Actual/Existing trade volume

Arguably, trade potential presents a powerful motivation to send peacekeepers. Sending peacekeeping troops may not necessarily guarantee that the trade ties can be quickly remedied with the pre-war increasing trade speed. However, the deterrence effect of peacekeeping troops (Doyle and Sambanis 2000; Fortna 2004) may reduce the possible

damage caused by the civil war. Therefore, countries will contribute troops to attain peace and to maintain it post-conflict.

Then why do countries choose UN peacekeeping rather than other forms of third-party intervention? Stojek and Tir already argue that UN peacekeeping is a more cost-economical, legitimate, and effective tool than a unilateral action. Firstly, the cost of UN peacekeeping operations is shared by UN members. Even though Rost and Greig (2011) argue that countries can contribute to a state-conducted peacekeeping, they also admit that peacekeeping is costly. Given that the financial burden is shared by other UN members, the expenditure of peacekeeping operations is much cheaper than the cost of state-conducted peacekeeping operations (Stojek and Tir 2015). Not only costly in manpower and resources, UN peacekeeping is a better choice for countries in terms of reputation and audience costs (Stojek and Tir 2015). Participating in UN peacekeeping operations reduces the risk of unpopular results while statesmen at least echo the interest group's demand. Also, participation in UN peacekeeping can be a legitimate and noble symbol (Hurd 2002), reducing the voices of opposition.

In short, based on Stojek and Tir's causal mechanism, I suggest distinguishing realized/current trade, and trade potential. Whereas trade have been examined as predictors of peacekeeping operations and found to affect P5 behaviour but not that of smaller contributor countries. I focus on trade potential. Besides, trade potentials can be measured in a time-dynamic-variation way, which can help to examine the continuation of a mission's troop contribution.

An argument is summarized in hypothesis 1:

Hypothesis 1: The higher trade potential between peacekeeping contributing countries and mission host countries, the higher probability that UN peacekeeping troops will be sent by contributing countries.

Research Design

This paper focuses on trade potentials' influence on countries' UN peacekeeping contributions, which is the main model. I first introduce the gravity model to calculate predicted trade volume. Then, trade potentials are calculated via deducting actual trade volumes from predicted trade volumes. Finally, I insert trade potential into a model of UN peacekeeping contributions, and run the main model is by using the calculated trade potentials in step one. Before the two steps, the current literature regarding trade potentials and the gravity model are presented initially.

Trade Potentials and the Gravity Model

The gravity model is a widely used method to forecast international trade volumes in economics. Derived from and similar to Newton's physical principle of mutual attraction of two masses, the gravity model in economics gains an empirical success in predicting countries' trade flows. Many articles associate the gravity model with the liberal peace theory.

As Kabir et al. (2017) comprehensively summarize, the gravity model can be broadly classified into three topics: generalized gravity model (Anderson 1979; Anderson and Van Wincoop 2003; Deardorff 1998), gravity model used in intra-industry trade (Bergstrand 1990), and gravity mode used in homogeneous and heterogeneous product (Feenstra 1998). The focus here is on the generalized gravity model rather than the other two topics. Gravity model articles associated with conflict studies (Martin et al. 2008; Long 2008; Keshk et al. 2004; Hegre 2009; Håvard et al. 2010) usually discuss liberal peace theory, i.e., the

relationship between trade and the probability of the war. The main reason scholars (Keshk et al. 2004; Hegre 2009; Håvard et al. 2010) introduce gravity model components to conflict studies is that they question whether trade flow can model well in the liberal peace theory. The gravity model suggests different social interactions may influence both trade and conflict. Gravity model is not usually used to calculate trade potentials and barely used in the peacekeeping research community.

Therefore, I use the gravity model to calculate trade potentials and focus on the basic components of gravity model including population, GDP and distance. In modelling international trades via the gravity model, the demand factor of international trades is proportioned with the GDP, and the supply factor is proportioned with the population. “Higher income suggests higher demand, while higher population suggests greater self-sufficiency” (Wang and Winters 1992). The distance factor represents the trade costs. In other words, “the model believes that bilateral trade is positively related to incomes of the two trading countries and negatively related to their geographical distance and the size of their respective domestic markets” (Li and Sacko 2002). Further clarification of the gravity model in this article will be in the following section.

First, I introduce the concept of trade potential. This terminology is often seen in economics and international political economy. Trade potential is an operationalization to research the integration of economy. When a country is going to join the international trade system, the existing in-the-system countries will have the economic expectations of new countries and then will forecast future trade volumes. For instance, it is widely studied on Eastern Europe’s economic integration into the European Union (EU) economy (Wang and Winters 1992; Hamilton and Winters 1992; Martínez-Zarzoso and Nowak-Lehmann 2003; Nilsson 2000). However, to the best of my knowledge, the concept of trade potential has so far not been used in conflict studies. The trade potential concept here is used to measure the economic

expectation of peacekeeping senders on host countries. To some extent, peacekeeping host countries are expected to re-integrate into the non-conflict international trade system. In other words, conflicts influence host countries' trades with other countries. Peacekeeping senders may have an expectation to normalize host countries' economic relationships, which motivates peacekeeping contribution.

Step One: Estimate Predicted Trade Volume

To estimate the predicted trade volume, the gravity model will only include some basic components. \hat{T} is the predicted trade volume, P the population, G the GDP, and D means the distance between country i and country j in kilometres.

$$\widehat{\ln T_{ij}} = \beta_i \ln P_i + \beta_j \ln P_j + \beta_i \ln G_i + \beta_j \ln G_j - \beta_{ij} \ln D_{ij} + \epsilon_{ij}$$

Imports and exports (Barbieri et al. 2009; 2016) are added up to a number representing total trade volume. I use the dyadic version of the Correlates of War Project (COW) Trade dataset. To try to expand the time frame, the relative longer time frame datasets of GDP (Gleditsch 2002) and population (Banks and Wilson 2019) are used. I identify the distance between two countries via capital distance as in Gleditsch and Ward's dataset (Gleditsch and Ward 2001).

Several strategies are used in step one. Firstly, I use the sub-sample, which includes all non-conflict dyads and excludes the in-conflict dyads to estimate the gravity model coefficients. Secondly, in the gravity model estimation, the time frame is restricted to the post-World War II era. Furthermore, step one is a data-driven process and therefore, Theil's U is used to decide which gravity model specification will be used.

In the first step, all countries can be divided into countries that are in conflicts and countries that are not in conflicts. We do not want in-conflict countries included in the gravity model estimation because we want to estimate counter-factual trade volumes for these in-conflict

countries. In other words, the conflict dyads are not kept in the country pool in the process of calculating the gravity model coefficients. The country pool which is used in the first step is a sub-sample of all countries. Otherwise, it influences the coefficients. For example, all countries' trade with South Sudan from 2013 to present will be excluded in gravity model estimation in the first step because South Sudan experienced a civil war in 2013. I use the UCDP dyadic version dataset (Harbom et al. 2008; Peterson 2014) to identify which countries are suffering inter-state or intra-state wars. Then I label belligerents with time ID and delete these countries in the dyadic trade dataset.²

The scope of countries is restricted previously and now the restriction of the time scope is explained here. From the perspective of the history, many countries disappeared and became independent, which creates problems of the country inconsistency. To specify and compare the result more easily, I use the time frame of the post-World-War II period in the first step estimation.³

Step one is a data-driven process in which different models, including country1-fixed effect, country2-fixed effect⁴ and year-fixed effect are used to calculate the trade potential. Subsequently, I use Theil's U value (Bechtel and Leuffen 2010; Theil 1966) to assess the model quality. The understanding of Theil's U is that if a country's trade can be estimated directly by the trade of its last year (the naïve estimation), there is no point in using the gravity model to predict the trade volume. The equation of Theil's U is presented. If the predicted trade by the gravity model is better than the naïve estimation, the value should be smaller than one. If different data-driven processes of the gravity model are better than naïve

² This method is consistent with Luca De Benedictis and Claudio's trade potential literature. They call this method as "out-of-sample". I change the wording here to refrain from the confusion with the "out-of-sample" method in forecasting

³ The second step is from 1990 to 2012 due to the data limitation for some control variables.

⁴ country1 and country2 mean country fixed effect. The original dataset keeps the data in a one-dyad-once way.

estimation (i.e., one year before trade), the smaller value of Theil's U is, the better model quality is. i.e.:

$$U = \sqrt{\frac{\sum_{t=1}^T (\text{Actual Trade Volume} - \widehat{\text{Predicted Trade Volume}})^2}{\sum_{t=1}^T (\text{Actual Trade Volume} - \widehat{\text{Naive Trade Volume}})^2}}$$

Given that Theil's U makes a comparison with the naïve estimation, the gravity model equation should always add another term, that is, the lagged dependent variable. Theil's U uses naïve estimation as a benchmark. If examined from another perspective, only if the gravity model equation includes the lagged trade volume variable (i.e., naïve estimated result), can the Theil's U assure that the gravity model terms (population, GDP and distance) play their role. In order to use Theil's U to assess the prediction quality, the predicted trade volume calculated by the gravity model which includes the lagged actual trade variable is compared with the naïve estimated trade volume.

Step Two: Main Model

Independent Variable: Trade Potential

Following up step one, to calculate the trade potential, I deduct the predicted trade volume from the actual trade volume.⁵ Several points should be noted here.

First, every country receives a trade potential value for every year. It is in contrast with Stojek and Tir's method (Stojek and Tir 2015). Their method of calculating trade loss is using trade volumes prior to the civil war onset minus trade volumes prior to the ceasefire. They use the trade before the civil war directly represents the trade opportunity. Both trade volumes prior to the civil war onset and trade volumes prior to the ceasefire are static. Therefore, their trade and trade loss variables are static. However, trade potential variable is

⁵ For a similar approach, see De Benedict and Vicarelli.

calculated annually because each year has a predicted trade volume value and an actual trade volume value. Therefore, trade potential is dynamic.

Secondly, trade potential may have a negative value (De Benedictis and Vicarelli 2005). Since potential trade is measured by deducting actual trade from predicted trade volumes it is possible to have negative trade potential. A positive value of the trade potentials means that there is a real trade potential in the future, while a negative value means that there is no trade potential for the actual trade already ‘has reached its potential level’ (De Benedictis and Vicarelli 2005). From the methodological perspective of ordinary least square estimation (OLS), this is reasonable. A negative value means that there are data points under the predicted linear line. Even though negative values can occur, they are not informative and, therefore, I have decided to code all negative values as zero because it is suggested by the theory that ‘trade has reached its potential level’.

Thirdly, trade potentials include some extreme values. Usually for trade and GDP variables, log-transformation is used. In line with previous studies, I log transform trade potential as the variable includes some extreme values and its distribution is skewed.

Dependent Variable

The dependent variable is the UN peacekeeping participation, i.e., participating in or not. It is a dummy variable rather than a continuous variable for the theory does not necessarily indicate that the higher the trade potential, the larger the number of troops that a country will contribute. However, the result of the dependent variable as a continuous variable (i.e., troop numbers) is also provided as a comparison purpose in the robustness check section. Data for the dependent variable is compiled from two datasets: Kathman’s dataset (Kathman 2013) and IPI dataset (Perry and Smith 2013; IPI 2019). The original datasets are the number of peacekeeping troops, including military troops, the UN peacekeeping police, and observers.

The UN peacekeeping participation is coded as one when at least one person including military troops, the UN peacekeeping police, and observers, is sent to a UN peacekeeping mission. Otherwise, it is coded as zero.

Also, token troop contribution can be regarded as an issue in peacekeeping contribution (Coleman 2013). Therefore, another way to code dependent variable is that I set a cutoff point at 20. In other words, if a sender contributes less than 20 personnel in a host country mission, it will not be counted as participation and will be coded as 0. This result is also showed in the robustness check section.

Control Variables

Many other variables can influence the UN peacekeeping participation. To illustrate it clearly, control variables are elucidated via different perspectives including the characteristics of conflicts, missions, host countries, peacekeeping senders and the dyadic relationship between host countries and peacekeeping senders.

Regarding the characteristics of conflicts themselves, conflict intensity can be counted. A country is likely to contribute the UN peacekeeping troop in intense conflicts. Conflict intensity is measured with the UCDP dataset of the battle related death (Pettersson et al. 2019).⁶ In conflict studies, conflict intensity can be a categorical variable and classified into two categories (less than 1000 people and more than 1000 people), while here conflict intensity is a continuous variable measured with the number of death people.

As for the characteristics of missions, the mission type can influence peacekeeping participation. Peacekeeping senders may decide to send troops based on the mission types including observer mission and traditional mission (Hegre et al. 2019). Many developed

⁶ This variable is re-managed and recoded by the author. I delete some intra-state dyads for some conflicts are not in the control or mandate of UN peacekeeping missions. For example, FLEC-R and FLEC-FAC are rebels who fight in the enclaves of Angola, Cabinda, which is not related with UN missions. Therefore, the death toll is not counted within the conflict intensity

countries contribute token troops in peacekeeping missions (Coleman 2013). Token troop strategy means a limited number of troop contributions and is widely used in the UN peacekeeping missions to gain prestige. The easier way to contribute token troops is via the observer missions. Even though the dependent variable is not the number of troops, the code of peacekeeping participation is based on the number of troops and may be influenced by mission types. The latest measurement of peacekeeping mission types is updated by Hegre et al. Therefore, the model controls this variable by classifying missions into two types as Hegre et al (2019).

From the perspective of peacekeeping contributors, the model includes the variables of financial reimbursement, democratic status and other on-going missions. Firstly, even though financial reimbursement is criticized by Coleman and Nyblade, financial reimbursement argument is still widely used in the current peacekeeping contribution literature that countries' UN peacekeeping participation is for financial profit-making. However, there is no direct measurement in the current literature but in the way of military expenditures per soldier (Ward and Dorussen 2016). Therefore, military expenditures per soldier here is a proxy measurement of financial reimbursement from the UN and is calculated via the ratio of military expenditures to the number of military personnel relying on the COW dataset of National Material Capabilities (Singer et al. 1972). Secondly, democratic countries are more likely to contribute peacekeeping troops (Perkins and Neumayer 2008; Lebovic 2004). Therefore, polity democratic score, polity 2 is used to control for the regime types. Furthermore, on-going other missions are included in the model. The variable may constrain peacekeeping contributors' military ability to contribute in other peacekeeping missions and the data is used from Ward and Dorussen's replication material (Ward and Dorussen 2016).

From the perspective of dyadic relationship, the model incorporates distance between host countries and peacekeeping contributors, security alliance, colonial ties (Martin et al. 2008),

refugee flows and direct contiguity relationship. Firstly, the longer the distance between two countries, the less likely a country send troops. Distance data is used from the minimum capital distance dataset (Gleditsch and Ward 2001). Secondly, security alliance influences the contribution of peacekeeping missions (Lebovic 2004). Security alliance is proxy measured by defense pact with a dummy variable.⁷ The data is from the COW dataset of security alliance (Gibler and Sarkees 2004). Thirdly, former colonial ties can influence peacekeeping participation (Perkins and Neumayer 2008). They are coded as dummy variables from the dataset (Mayer and Zignago 2011). Furthermore, the dyadic refugee flows can influence the peacekeeping contribution because contributors concern about their regional stability (Perkins and Neumayer 2008; Bove and Elia 2011) and contribute to the host countries to avoid the conflict spill-over effect (Uzonyi 2015). Refugee data is from the UNHCR (2019) database.⁸ Also, in order to test whether a country worries a spill-over conflict, the border dummy variable is included for the neighbour country bordered with host countries are likely to contribute to the UN peacekeeping missions. The COW dataset of the direct contiguity (Douglas et al. 2002) is used to code common borders and changed from different types of contiguity into a dummy variable.

Empirical Analysis

Gravity Model Coefficient Calculation

As previously mentioned, the sub-sample method and the Theil's U value are used to improve and assess the quality of the model prediction. Therefore, only the best performing model's regression table is presented here.⁹ The model is the gravity model with dyad fixed

⁷ Given that the original dataset is used for survival analysis, therefore, many dyads without any security alliance do not appear in the dataset. These dyads are filled with 0 in this paper's dataset.

⁸ Some dyads are not included in the dataset will be imputed with 0 as no refugees.

⁹ There are different estimate techniques. As I mentioned in the article, step 1 is only for data-driven process and therefore, I use the basic version of gravity model with OLS estimator. However, to ensure the robustness of the result, I include the gravity model with "colonial ties, common language and common border" variables with

effect and has the lowest value of the Theil's U (**0.871**). The Theil's U values of other models are presented in the appendix.

In Table 1.1, all gravity model factors are statistically significant at 1% confidence level. The model has a high R square value for it includes the lagged dependent variable, which is consistent with Hegre et al.'s result (2010).

Table 1.1 Gravity model with dyad fixed effect

	Model 1
Trade _{t-1} (LDV)	0.69*** (0.00)
GDP _{country1}	0.27*** (0.00)
GDP _{country2}	0.26*** (0.00)
Population _{country1}	-0.09*** (0.00)
Population _{country2}	-0.03*** (0.00)
Distance	-0.34*** (0.01)
R ²	0.96
Adj. R ²	0.96
Num. obs.	376268

*** $p < .001$, ** $p < .01$, * $p < .05$

Step Two: Main Model and Discussion

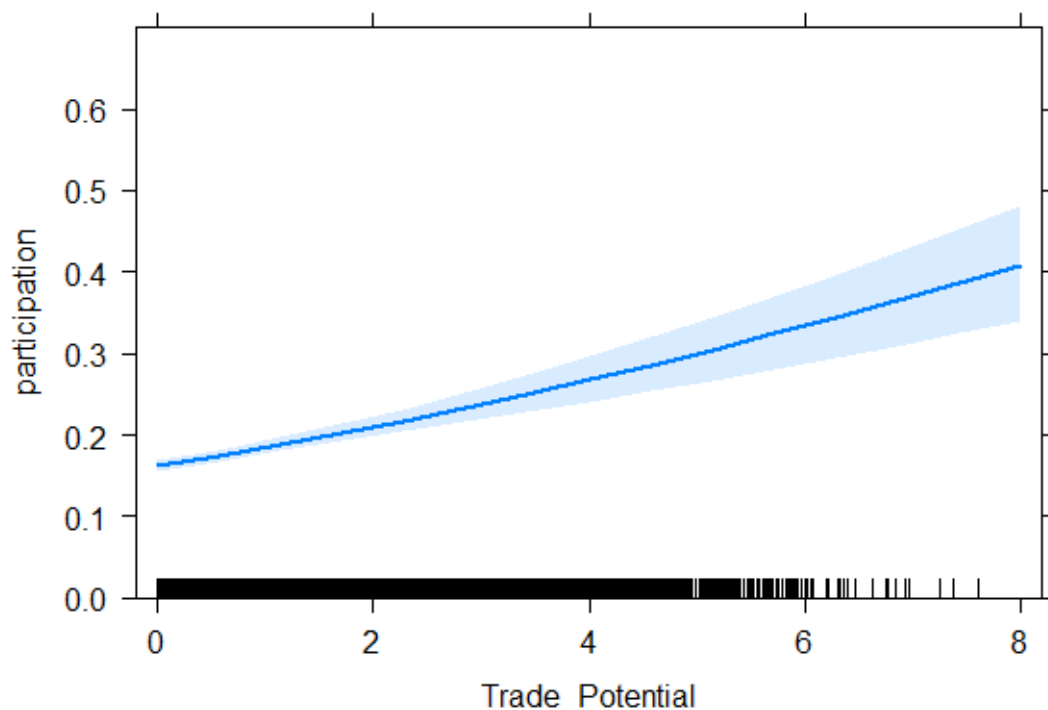
My dependent variable, the UN peacekeeping participation, is binary for again my theory does not necessarily indicate that the higher the trade potential, the larger the number of troops that a country will contribute. I use logit models for step two of the analysis. The standard error is clustered in a dyadic fashion. Table 1.2 shows the result of the main model, which is the main model.

OLS estimator (Anderson and Van Wincoop 2003). I also use Poisson Pseudo-Maximum Likelihood Estimator (PPML) method (Silva and Tenreyro 2006). Both step 1 and step 2 results are showed in the appendix

As previously mentioned, the main independent variable is censored if there are negative values. Trade potential is also taken the natural log form for there are some positive outliers. The skewness of the distribution can then be justified. These methods are employed in the following table. Model 1 is statistically significant at 1% level and in a positive direction, which shows that there exists a positive relationship between trade potential and the UN peacekeeping participation. Therefore, the hypothesis one holds. However, given that these results are from logit models, their coefficients cannot be interpreted directly. To obtain a substantive understanding of the effect of trade potential on the UN peacekeeping (PKO) participation, I thus present the predicted probability of a country contributing over its trade potential in Figure 1.1.

Figure 1. 1: Effect of trade potential on UN peacekeeping participation

Effect of trade potential on UN PKO participation



The figure above shows the influence of trade potential's influence on UN peacekeeping operation participation. When there is no trade potential and other control variables are held

at their mean values, the probability is around 20%. The probability can achieve up to around 40% when the trade potential value is at its max. In other words, when all the other control variables are held to the mean value, the larger trade potential is, the more likely a country participates in the UN peacekeeping operations.

Regarding control variables, some are consistent with the existing literature while others are not. The capital distance, colonial ties and democratic country status are in the expected direction (Ward and Dorussen 2016). The capital distance shows a negative relationship with a country's peacekeeping participation, while colonial ties between senders and host countries show a positive relationship and democratic countries are also more likely to participate in the peacekeeping operations. Even though the financial reimbursement is a popular and important argument in explaining the UN peacekeeping contribution, Model 1 is in line with Coleman and Nyblade's (2018) findings that the financial reimbursement is not a valid explanation. The number of concurrent missions variable is in a different expected direction but consistent with the literature's finding (Ward and Dorussen 2016), which shows that countries have a general willingness in contributing the UN peacekeeping troops. Furthermore, PKO mandate tells the same story with the number of concurrent missions. It shows that countries are likely to contribute to traditional missions compared with observer missions. However, after using trade potential variable, some other variables are inconsistent with the literature or lose their significance. Conflict intensity loses the significance, which is inconsistent with the literature (Bove and Elia 2011) and does not show that conflict intensity makes a country more likely to participate in a UN peacekeeping operation. The variable of border country shows a negative relationship, which does not show that a neighbour country worries about the spill-over conflict. The refugee flow variable shows an opposite direction compared with the literature (Uzonyi 2015).

Table 1. 2: Trade potential's influence on peacekeeping participation

	Model 1
Trade potential	0.16*** (0.02)
Capital distance	-0.00*** (0.00)
Security alliance	-0.29* (0.12)
Colonial ties	0.69* (0.23)
Democratic country (Polity2)	0.06*** (0.00)
Refugee flows	-0.00* (0.00)
Conflict Intensity	-0.00 (0.00)
PKO mandate	0.93*** (0.05)
Border (dummy)	-0.85*** (0.17)
Number of co-current missions	0.56*** (0.02)
Financial reimbursement	-0.00 (0.00)
Constant	-2.02*** (0.05)
AIC	13036.38
BIC	13127.68
Log Likelihood	-6506.19
Deviance	13012.38
Num. obs.	14892

*** $p < .001$, ** $p < .01$, * $p < .05$, standard errors are clustered in a dyadic fashion

Robustness Checks

Cut-off Binary and Continuous Dependent Variable

Some argues that token troop contribution can be regarded as an issue in peacekeeping contribution. Therefore, in Model 2, the dependent variable is recoded for I set up a cutoff point at 20, which means if a country contributes less than 20 personnel, it doesn't count as participation. Model 3 uses the continuous variable (i.e., troop number) as the dependent variable. In both models, the influence of the trade potential is statistically significant at 1% level (Table 1.3).

Comparison between Predicted Trade and Actual Trade

Some may argue that trade potential could have a reversed causality for peacekeeping contribution. The presence of the peacekeeping may secure the stability and then increase the trade volume. Therefore, in this part, I take a step back and dissect trade potential into two parts: predicted trade volume and actual trade volume. The actual trade volume may have a reserve causal relationship with the UN peacekeeping participation, but the predicted trade volume does not. The data of the predicted trade volume is generated by the gravity model. Also, to be consistent with the empirical result, the negative values of predicted trade volumes are coded as zero. Also, this is an opportunity to compare the influence of the actual trade and the predicted trade. According to the regression table, Model 4 presents the result that predicted trade volume still holds (Table 1.4).

Table 1. 3: Trade potential's influence on peacekeeping participation and contribution

	Model 2 binary DV (recoded)	Model3 Continuous DV
Trade potential	0.10*** (0.03)	0.06*** (0.01)
Capital distance	-0.00*** (0.00)	-0.00*** (0.00)
Security alliance	0.28 (0.17)	0.04 (0.05)
Colonial ties	1.67*** (0.26)	1.01*** (0.21)
Democratic country (Polity2)	0.04*** (0.01)	0.01*** (0.00)
Refugee flows	-0.00 (0.00)	-0.00*** (0.00)
Conflict Intensity	0.00*** (0.00)	0.00** (0.00)
PKO mandate	0.98*** (0.07)	0.41*** (0.03)
Border (dummy)	-1.21*** (0.27)	-0.39*** (0.01)
Number of co-current missions	0.50*** (0.02)	0.39 (0.01)
Financial reimbursement	-0.00** (0.00)	-0.00** (0.00)
Constant	-3.30*** (0.08)	0.29*** (0.02)
AIC	6719.04	
BIC	6810.34	
Log Likelihood	-3347.52	
Deviance	6695.04	
Num. obs.	14892	14892
R ²		0.16
Adj. R ²		0.16

*** $p < .001$, ** $p < .01$, * $p < .05$, standard errors are clustered in a dyadic fashion

Table 1. 4: Robustness check

	Model 4 binary DV	Model 5 binary DV (recoded)	Model 6 continuous DV
Actual trade (log)	0.01*** (0.04)	0.08 (0.05)	0.02 (0.02)
Predicted trade (log)	0.25*** (0.04)	0.21*** (0.05)	0.09*** (0.02)
Capital distance	-0.00*** (0.00)	-0.00*** (0.00)	-0.00*** (0.00)
Security alliance	-0.57*** (0.13)	0.00 (0.17)	-0.11 (0.06)
Colonial ties	0.11 (0.22)	1.02*** (0.26)	0.73*** (0.21)
Democratic country (Polity2)	0.05*** (0.00)	0.04*** (0.01)	0.01*** (0.00)
Refugee flows	-0.00* (0.00)	-0.00 (0.00)	-0.00*** (0.00)
Conflict Intensity	-0.00 (0.00)	0.00*** (0.00)	0.00*** (0.00)
PKO mandate	1.17*** (0.05)	1.29*** (0.07)	0.50*** (0.03)
Border (dummy)	-1.27*** (0.18)	-1.77*** (0.27)	-0.54*** (0.06)
Number of co-current missions	0.51*** (0.02)	0.46*** (0.02)	-0.36*** (0.01)
Financial reimbursement	-0.00** (0.00)	-0.00*** (0.00)	-0.00*** (0.00)
Constant	-2.48*** (0.06)	-3.95*** (0.09)	-0.12*** (0.02)
AIC	12757.17	6517.88	
BIC	12856.08	6616.79	
Log Likelihood	-6365.59	-3245.94	
Deviance	12731.17	6491.88	
Num. obs.	14892	14892	14892
R ²			0.17
Adj. R ²			0.17

*** $p < .001$, ** $p < .01$, * $p < .05$, standard errors are clustered in a dyadic fashion

Conclusion

In this paper, I identify the puzzle of mixed result in trade's influence on peacekeeping contribution. Then, I argue that trade potential rather than trade should be a better indicator of peacekeeping contributors' interest in host countries. I argue that the lobby groups can argue elasticity of demand and supply, asset specificity or factor mobility to pressure the government to send peacekeepers. By using a gravity model to calculate the predicted trade volume and then get the value of trade potential, I run a logit regression on peacekeeping participation. The result shows that trade potential is a good indicator. For a robustness check, I use both predicted trade volume and actual trade volume to show that the result still holds.

I contribute the peacekeeping studies in several ways. Firstly, I probe the puzzle of mixed result of trade's influence on peacekeeping contribution. I provide the empirical evidence that trade potentials influence on peacekeeping contribution. Secondly, I introduce a new concept of trade potential in conflict studies and try to combine trade potential concept from economic integration literature with peacekeeping studies. Trade potential can be an important indicator in many other conflict studies. Thirdly, I use a two-step research design. In the first step, I use gravity model in a sub-sample method to calculate the predicted trade and then get the trade potential. In the second step, I run the main model to get the result.

Some scholars (Ward et al. 2013) question the empirical workhouse of the gravity model and use a latent space model to modify it. The future research can carry on this issue. However, the results presented here are supportive of the hypothesized linkage between trade potential and UN peacekeeping contributions.

Appendix - Trade Potential and UN Peacekeeping Participation

- A.1.1 Alternative Model Specification with OLS Estimator
- A.1.2 Theil's U Table
- A.1.3 Gravity Model with Three Extra Variables
- A.1.4 PPML Estimator
- A.1.5 Main Model without control
- A.1.6 Regression with only predicted trade or actual trade

A.1.1 Alternative Model Specification with OLS Estimator

	Model 1	Model 2	Model 3	Model 4	Model 5
	Pool	Random	FE with ccode1	FE with ccode2	FE with year
Trade _{t-1} (LDV)	0.87*** (0.00)	0.86*** (0.00)	0.86*** (0.00)	0.85*** (0.00)	0.88*** (0.00)
GDP _{country1}	0.11*** (0.00)	0.12*** (0.00)	0.14*** (0.00)	0.13*** (0.00)	0.11*** (0.00)
GDP _{country2}	0.12*** (0.00)	0.12*** (0.00)	0.13*** (0.00)	0.12*** (0.00)	0.12*** (0.00)
Population _{country1}	-0.04*** (0.00)	-0.04*** (0.00)	-0.03*** (0.00)	-0.04*** (0.00)	-0.03*** (0.00)
Population _{country2}	-0.03*** (0.00)	-0.03*** (0.00)	-0.03*** (0.00)	0.02*** (0.00)	-0.03*** (0.00)
Distance	-0.11*** (0.00)	-0.12*** (0.00)	-0.13*** (0.00)	-0.14*** (0.00)	-0.11*** (0.00)
R ²	0.93	0.92	0.96	0.96	0.96
Adj. R ²	0.93	0.92	0.96	0.96	0.96
Num. obs.	376268	376268	376268	376268	376268

Table A1.1: Alternative model specification with OLS estimator *** $p < .001$, ** $p < .01$, * $p < .05$

A.1.2 Theil's U Table

Table A1.2: Theil's U value table (sub-sample OLS)

Models (All with LDV)	Theil's U	Choose?	observations
FE with importer2 (ccode2) dummy	0.9440105		376268
FE with importer1 (ccode1) dummy	0.9498293		376268
FE with year dummy	0.9486414		376268
Pooled	0.9564451		376268
RE	0.9568447		376268
FE with dyad	0.8712868	smallest	376268

A.1.3 Gravity Model with Three Extra Variables

	Model 1
Trade _{t-1} (LDV)	0.87*** (0.00)
GDP _{country1}	0.11*** (0.00)
GDP _{country2}	0.12*** (0.00)
Population _{country1}	-0.04*** (0.00)
Population _{country2}	-0.03*** (0.00)
Distance	-0.10*** (0.01)
Colony	0.15*** (0.01)
Common Language	0.08*** (0.00)
Border (dummy)	0.10*** (0.01)
R ²	0.96
Adj. R ²	0.96
Num. obs.	376268

Table A1.3.1 Step One: Gravity model with three extra variables and year fixed effect *** $p < .001$, ** $p < .01$, * $p < .05$

	Model 1 binary DV	Model 2 binary DV (recoded)	Model 3 Continuous DV
Trade potential	0.12*** (0.02)	0.03 (0.03)	0.03* (0.01)
Capital distance	-0.00*** (0.00)	-0.00*** (0.00)	-0.00*** (0.00)
Security alliance	-0.29* (0.12)	0.28 (0.17)	0.04 (0.05)
Colonial ties	0.73*** (0.22)	1.72*** (0.25)	1.03*** (0.21)
Democratic country (Polity2)	0.06*** (0.01)	0.05*** (0.01)	0.01*** (0.00)
Refugee flows	-0.00* (0.00)	-0.00 (0.00)	-0.00*** (0.00)
Conflict Intensity	0.00 (0.00)	0.00*** (0.00)	0.00** (0.00)
PKO mandate	0.93*** (0.05)	0.97*** (0.07)	0.41*** (0.03)
Border (dummy)	-0.84*** (0.17)	-1.21*** (0.27)	-0.39*** (0.01)
Number of co-current missions	0.56*** (0.02)	0.50*** (0.02)	0.39 (0.01)
Financial reimbursement	-0.00 (0.00)	-0.00** (0.00)	-0.00** (0.00)
Constant	-1.99*** (0.05)	-3.24*** (0.08)	0.32*** (0.02)
AIC	13067.63	6729.67	
BIC	13158.93	6820.97	
Log Likelihood	-6521.82	-3352.83	
Deviance	13043.63	6705.67	
Num. obs.	14892	14892	14892
R ²			0.16
Adj. R ²			0.16

Table A1.3.2 Step Two Result the gravity model with three extra variables *** $p < .001$, ** $p < .01$, * $p < .05$, standard errors are clustered in a dyadic fashion

A.1.4 PPML Estimator

	Model 1
Trade _{t-1} (LDV)	0.94*** (0.00)
GDP _{country1}	0.05*** (0.00)
GDP _{country2}	0.05*** (0.00)
Population _{country1}	0.00 (0.00)
Population _{country2}	0.00 (0.00)
Distance	-0.04*** (0.00)
Num. obs.	389648

*Table A1.4.1 Step One: Gravity model with PPML estimator ***p < .001, **p < .01, *p < .05*

	Model 1 binary DV	Model 2 binary DV (recoded)	Model 3 Continuous DV
Trade potential	0.15*** (0.02)	0.12*** (0.02)	0.05* (0.01)
Capital distance	-0.00*** (0.00)	-0.00*** (0.00)	-0.00*** (0.00)
Security alliance	-0.34** (0.12)	0.29 (0.15)	0.03 (0.05)
Colonial ties	0.70** (0.22)	1.78*** (0.24)	1.11*** (0.20)
Democratic country (Polity2)	0.05*** (0.01)	0.03*** (0.01)	0.01*** (0.00)
Refugee flows	-0.00* (0.00)	-0.00 (0.00)	-0.00*** (0.00)
Conflict Intensity	-0.00 (0.00)	0.00*** (0.00)	0.00** (0.00)
PKO mandate	1.04*** (0.05)	1.13*** (0.07)	0.48*** (0.03)
Border (dummy)	-0.83*** (0.16)	-1.31*** (0.24)	-0.37*** (0.05)
Number of co-current missions	0.55*** (0.02)	0.49*** (0.02)	0.38*** (0.01)
Financial reimbursement	-0.00* (0.00)	-0.00** (0.00)	-0.00** (0.00)
Constant	-2.02*** (0.05)	-3.30*** (0.08)	0.30*** (0.02)
AIC	14505.05	7419.73	
BIC	14597.47	7512.15	
Log Likelihood	-7240.53	-3697.87	
Deviance	14481.05	7395.73	
Num. obs.	16338	16338	16338
R ²			0.17
Adj. R ²			0.17

Table A1.4.2 Step Two Result: the gravity model with PPML's step one result *** $p < .001$, ** $p < .01$, * $p < .05$, standard errors are clustered in a dyadic fashion

A.1.5 Main Model without control

	Model 1 binary DV	Model 2 binary DV (recoded)	Model 3 Continuous DV
Trade potential	0.25*** (0.02)	0.19*** (0.02)	0.03* (0.00)
Constant	-1.58*** (0.02)	-2.77*** (0.02)	0.12*** (0.02)
AIC	19502.00	9710.57	
BIC	19517.82	9726.39	
Log Likelihood	-9749.00	-4853.29	
Deviance	19498.00	9706.57	
Num. obs.	20113	20113	20113
R ²			0.01
Adj. R ²			0.01

*Table A1.5 Step Two Result: Models without control variables ***p < .001, **p < .01, *p < .05 , standard errors are clustered in a dyadic fashion*

A.1.6 Regression with only predicted trade or actual trade

	Model 1	Model 2
Actual trade (log)		0.22*** (0.01)
Predicted trade (log)	0.26*** (0.01)	
Capital distance	-0.00*** (0.00)	-0.00*** (0.00)
Security alliance	-0.57*** (0.13)	-0.56*** (0.13)
Colonial ties	0.11 (0.22)	0.16 (0.22)
Democratic country (Polity2)	0.05*** (0.00)	0.05*** (0.00)
Refugee flows	-0.00* (0.00)	-0.00* (0.00)
Conflict Intensity	-0.00 (0.00)	-0.00 (0.00)
Border (dummy)	-1.27*** (0.18)	-1.23*** (0.18)
Number of co-current missions	0.51*** (0.02)	-0.51*** (0.02)
Financial reimbursement	-0.00** (0.00)	-0.00*** (0.00)
Constant	-2.48*** (0.06)	-2.40** (0.06)
AIC	12757.17	12794.67
BIC	12846.52	12885.97
Log Likelihood	-6365.59	-6385.33
Deviance	12731.17	12770.67
Num. obs.	14892	14892

Table A1.6 Step Two Result: Regression with only predicted trade or actual trade *** $p < .001$, ** $p < .01$, * $p < .05$, standard errors are clustered in a dyadic fashion

Chapter II- UN Peacekeeping Contribution and Status Enhancement

Introduction

Status is an important concept in international relations. It represents a collective belief of the international standing in a community (Renshon 2016). Apart from material incentives, countries are also motivated by status (Wohlforth 2009). To pursue it, countries use different status-seeking strategies. There are two types of status-seeking events: public and dramatic type, such as militarized conflicts (Renshon 2017 2016), and quieter type, including foreign aid (Bezerra et al. 2015), mediations (Baxter et al. 2018), and peacekeeping operations (Carvalho and Neumann 2014). Dramatic events can simultaneously calibrate the perception of status that a country possess or should possess on many aspects (economic, political, and military aspects) (Peffley and Hurwitz 1992), while quieter events can change the perception on an everyday basis and be specialized in specific fields (Carvalho and Neumann 2014). Two types of status-seeking strategies differ from the speed, degree, and aspect of peers' new acceptance of a country's international standing. Nevertheless, different tools share the same aim of changing peer groups' perception on international standings. Countries choose status-seeking tools based on their need, capability, specialization as well as the features of tools.

Among various tools, I focus on one quieter tool, UN peacekeeping. There are several reasons. First, militarized interstate conflict has not been a main tool used by many countries in the past three decades. It had been often used from the 19th century to the Cold War.¹⁰ Also, interstate wars have been declining and civil wars have become dominant since the 1950s (Gleditsch et al. 2013). Second, compared with other quieter tools, UN peacekeeping is an often used status-seeking tool in different types of countries. Most research regarding war

¹⁰ Most literature (Wallace 1971; Doran et al. 1979; East 1972; Gochman 1980; Fossum 1967; Ray 1974) focuses on the time frame from the 1800s to the 1970s. Only a recent paper (Renshon 2016) has a longer time frame from 1816 to 2005, but again inter-state war is no longer a common status-seeking tool in the post-Cold War era.

and status usually analyze major powers, except that Renshon begins to emphasize the local community. Not every country has an opportunity and a specialized capacity to conduct mediation, or has the economic capability to invest in foreign aid for status. However, UN peacekeeping is cost-effective and almost every country which participates in UN peacekeeping claims that it aims for status. It includes middle powers, such as Canada (Neack 1995), and Norway (Græger 2014); rising powers, like China (Suzuki 2008; 2014) and India (Avezov 2014); developing countries, like Nigeria and Nepal (Bellamy and Williams 2013); even small island countries, like Fiji (McDougall 2017). Yet, countries' motivation for status is not equal to their achievements in status. Then, **do peacekeeping operations really enhance status? How countries achieve status via UN peacekeeping? Does status-via-peacekeeping argument hold generally?**

I argue that countries can use **learning, performance and socialization** strategies to gain status via the UN peacekeeping platform. Specifically, I argue that countries focus on gaining status on military aspects rather than on some other aspects when using peacekeeping as a tool, because peacekeeping is foremost regarding countries' peaceful usage of military. UN peacekeeping participation can be considered as countries' strategic actions in a multilateral platform to achieve military status. Through the participation, the progress of troops' military learning, performance, and their professional military socialization happen in an interactive environment, and are observed by the international community, which can be considered as signals to show their military credibility in a rationalist approach (Gartzke et al. 2017; O'Neil 2001). Consequently, I set up three applied hypotheses (**invitation continuation, cooperation closing, and signalling hypothesis**) in a network way to discuss the impact of interactions among countries on their status enhancement. The three hypotheses argue that the interaction in the peacekeeping network influences the formation of the status network. I use the status network to represent the shared belief of international standings, because ties in

network can show many countries' concentrated choices, which reflects countries' beliefs (Maoz 2010). Therefore, if a country gets a tie, it gets recognition and achieves status enhancement.

I use Defense Cooperation Agreement (DCA) network dataset (Kinne 2018) to measure military status from 1990 to 2010. Status needs to be translated into an influence-related currency to be measured (Maoz 2010). Here, I am interested in peacekeeping as a status-seeking tool in the post-Cold War era, and DCA is a relative accurate way of capturing countries' military recognition in the international community during the time frame. DCA shows a symmetric military trust, has a wider geographic inclusion and is flexible in recognition within the international community (Kinne 2018; 2020). Also, previous measurements are not applicable. Security alliance used by Maoz (2010) does not vary in the post-Cold War era (Kinne 2018; 2020). Diplomatic or embassy exchange shares the same issue of reaching the ceiling effect, suffers the issue of easy break (Maoz 2010) and does not necessarily capture the military status in the post-Cold War age (Maoz 2010). Empirically, I use the temporal exponential random graph model (TERGM) to test my applied network hypotheses.¹¹

This paper contributes to several strands of literature. First, it examines the effectiveness of peacekeeping as a foreign policy tool. Second, it enriches status literature by specifying how strategic actions implemented in UN peacekeeping. Third, it uses inferential network analysis method that goes beyond traditional descriptive network analysis in measuring status as a degree of centrality score. With the status literature, it bridges the rationalist approach (strategic action) and the psychological and constructivist approach (the centrality score reflects a shared belief concept). It also examines the peacekeeping's effect on status enhancement systematically rather than only bases on one country's evidence.

¹¹ The TERGM model begins to be used in the conflict research (Turner et al. 2019).

The State of Knowledge of Status

The concept of status and status as a motivation

Status is defined more clearly in the recent literature: a shared or collective belief of a country's international standing (Fung 2019a; Renshon 2019). Status is "positional, perceptual, and social" (Renshon 2019).¹² In the prior literature, it could be mixed-used with prestige (Maoz 2010), reputation, and honour (O'Neil 2001). The recent literature (Fung 2019a; Renshon 2016) begins to modify this. It emphasizes that one country's status is recognized by any other two actors (not including the country itself, to stress the characteristic of "social" and "belief") and is comparable (to stress "positional").¹³ Here, reputation deserves a particular distinction. It is defined as a tool using its past military credibility to predict the future situation in security studies (Crescenzi and Donahue 2017; Erickson 2015). It usually refers to one country's belief rather than a shared belief of another country and is restricted within two actors.

The logic of countries' status-seeking motivation is based on the theory of individuals'. Henri Taifel's Social Identity Theory (SIT) is one of the basic theoretical foundations of empirical research of status (Renshon 2019). Individuals have their social identity. They attach to a social membership, where they share the knowledge, value and emotional significance (Tajfel 1978). Compared with other groups, they want their attached group distinguished with a better and different positive value and with a higher status (Turner 1975). The distinction and categorization process leads to competition and status-seeking behaviour (Mercer 1995). International relations scholars extend the logic into countries' status-seeking behaviour (Larson et al. 2014; Wohlforth 2009; Mercer 1995). Furthermore, if a country achieves higher status, it can get both intangible good (e.g., esteem), and also tangible good (Larson et al.

¹² In other words, it is many countries' (social) shared belief (perceptual and social) on one country's international standing or rank (positional).

¹³ Honour and prestige may not inherently comparable (Renshon 2016; Larson and Shevchenko 2019).

2014). It may let other countries adjust their policies to accommodate the country's interest (Larson et al. 2014).

Status as a motivation is researched both in a psychological and constructivism approach and in a strategic and rationalism approach (Renshon 2016). Larson and Shevchenko (2019) base their examination of the countries' status-seeking strategies on the SIT literature, through a socio-psychological perspective. They argue that countries can imitate higher status countries' behaviour based on higher status ones' norm (social mobility), invest efforts to defeat the higher status group (social competition) and find special niches with a higher value to gain status (social creativity). O'Neil (2001) examines the states' strategic usage of prestige, such as states' decision making on supporting other countries based on prestige. Renshon (2016) bridges two approaches in a subtle way. He argues that after compared with its material capability, if a state is unsatisfied with the current status, the state is likely to initiate a war, which shows the psychological explanation. While he uses a rational-instrumental approach to measure status or rankings by centrality scores of diplomatic exchanges (Götz 2021). The centrality score approach echoes the shared belief concept of status with a constructivism propriety. Yet, this strand of literature focuses on explaining why and how status motivates some status-seeking behaviours rather than explains whether a specific status-seeking tool actually helps states achieve status.

Peacekeeping (PK) as a status-seeking tool

The peacekeeping (PK) literature also accepts the above insights to apply. A sizeable country study literature treats UN PK as a foreign policy tool and argues that status is an important motivation in explaining why a country participates in UN PK (Neack 1995; Meiske and Ruggeri 2017). Some countries set up a clear label to show that they aim to pursue status via PK. Some pursue "international good citizenship", as a strategy of social creativity to signal

that they have a special niche. This label begins with middle powers, like Canada (Cooper 1997), Norway (Græger 2014), Australia, and New Zealand (McDougall 2017), but can extend to many other countries, including Fiji (McDougall 2017), Pakistan (Avezov 2014), etc. Some show a personalized label based on their own countries' context: Brazil as "responsible power" (Kenkel 2013); China as "legitimate great power" or "developing power" (Suzuki 2008, 2014); Nigeria as "responsible regional hegemon" (Bellamy and Williams 2013) etc. Some do not claim any label, but aim for status, including Argentina (Norden 1995), Rwanda (Beswick 2010), South Africa (Cilliers and Malan 1996), etc. The literature above claims that countries aim for status, but most of them does not show whether the claimed countries actually gain status.

Countries have many status-seeking tools. Their choice shows their inclination on different aspects of status. However, when countries choose PK as the status-seeking tool, they focus on status on military status. For example, Canada uses different tools to achieve different aspects of status. Canada's push for the WTO shows its aspiration of economic status, and its advance in women's rights aims for the status domain of human rights (Cooper 1997). Analogously, no one cared about Stephen Hawking's beauty prestige as he is not a movie star (Maoz 2010). It is also inappropriate to use on-the-ground PK troop contribution to advance economic status. Specifically, there are two reasons that PK advances military status. First, PK is mostly regarding countries' military action. Even though PK has experienced three generations, changing from observational missions to more multidimensional and integrative missions (Gizelis et al. 2016), security troops have played a significant role. A country's troop contribution still relies on its domestic security, military or defense department. The interactions among countries' troops and staffs should be firstly military interactions. Second, the claimed labels of senders show their inclination on military aspects. The label is either a "good international citizenship" or "responsible power". It shows that countries' aspirations

of wielding military peacefully and obeys international peace norm. PK is a tool characterized and restricted with a military aspect. After all, PK is not an international war, which can simultaneously change one country's status on many aspects (e.g., economy and military).

Furthermore, compared with other status-seeking tools, PK is easier to be implemented. In contemporary international relations, it is risky, expensive, and unlikely to initiate an interstate war to enhance status (Götz 2021). Though there are other policy options among quieter status-enhancement tools, not every country has the economic capacity to hold Olympic games and invest in foreign aid to advance status (Bezerra et al. 2015). UN PK is a viable option for most countries, because budgets are shared among countries while troops are voluntarily contributed, in which situation countries can contribute based on their capacity.

Theory: PK for Military Status Enhancement

Military credibility signals via UN PK: learning, performance and socialization

Each foreign policy decision implies countries' intention and purpose (Gartzke et al. 2017). Given that countries choose PK from various foreign policy options as a military-status-seeking tool (Neack 1995; Meiske and Ruggeri 2017), they will aim to achieve status in the on-the-ground military action. Countries can learn, perform, and socialize via the PK platform to signal their military credibility, and therefore change other countries' military perception and gain status. Countries can mix or separately use the strategies because strategies above are not mutually exclusive.

Countries can **learn** in UN PK. Learning is an important strategy and process before, during, and after foreign policy implementation. Learning is defined as "a change of beliefs (or the degree of confidence in one's beliefs) or the development of new beliefs, skills, or procedures as a result of the observation and interpretation of experience" (Levy 1994). There are two

layers in changing beliefs via learning: self-change and other-change. First, countries can learn military professional skills themselves, and change military beliefs about themselves. UN PK is a typical activity of military operations other than war (MOOTW). Participants can wield military power by conforming to peace norms. It is a treasured opportunity for countries' troops to legitimately get exposure in military environments, train military professions and change their military norms. Second, the self-change process can be observed by other countries, which updates other countries' military beliefs. It is a mutual-learning process. For example, after 1994 genocide, Rwanda wanted to re-establish its security apparatus, Rwandan Patriotic Front (RPF). Given that RPF was integrated with former combatants from different factions and backgrounds, Rwanda sent RPF to professionalize the troop and reinforce troops' morality authority (Jowell 2014; Beswick 2010). When former combatants from different groups fought together in UN PK, it helps forging a cohesive military troop (Jowell 2014). Rwanda troops also receive military training and logistical support in UN PK and gain more experience (Beswick 2010). The modernization of military is praised in Sudan, Haiti, and Central African Republic UN missions, and received recognition by the US and the UK (Jowell 2014; Beswick 2010). Furthermore, the learning process can be gradual and dynamic. Audience countries may assess the trajectory of one country's PK participation and evaluate it in a cross-mission way. For instance, China learned from previous PK and has been gradually increasing its depth of involvement. China made a contributing journey from only contributing non-combat enabler troops (logisticians, medical teams, and engineers) to contributing a "self-defensive security unit" to protect its own non-combat enabler troops, and finally contributed security troops in the Mali mission (Fung 2019b). This dynamic learning and participation process is praised by the UN officials (Fung 2019b).

Countries can **perform** in UN PK. Based on their military characteristic and capacity, countries can make distinctive contribution in UN PK. They can provide advanced military technology or good military logistics with their technological skills, or present the PK management with a distinctive manner. Though the UN manages the distribution of logistic supports, it does not have a standing stock of military equipment and requires participants to provide necessary equipment (Boutros-Ghali 1992). Under such circumstance, countries' voluntary provision of military equipment can signal their military capacity and credibility. For instance, the Netherlands and Sweden bring their new military technology and offer their uniformed personnel and units with technological skills, showing their technological prowess (Dorn 2016). China contributes "high-value, hard-to-source" enabler troops, which are welcomed and recognized by UN officials (Fung 2016). Not only technology matters, but countries' PK manner also influences their PK success (Chesterman 2004). For example, British troops are better trained in basic civil affairs and therefore, they utilize a softer approach to gain the respect of the local population and reduce the threats posed by local insurgents (Harman 2003; Watters 2018). The "low-tech, participatory, and community-oriented" approach is also used by Australian peacekeepers in Somalia during UNITAF, by Mongolian and Nepalese peacekeepers in UNMISS, and is welcomed and recognized by UN officials (Berdal 2000; Watters 2018).

One thing deserves a notice in the performance mechanism. Though the UN PK troops should be regarded as an integrated symbol, the preparation and conduct can vary considerably (Watters 2018). In a multi-country UN PK context, countries endeavour to perform their military profession to the best. It is because there exists an "inherent tension membership in the multinational forces and the membership in their national military establishments" (Elron 2009; Ben-Ari and Elron 2001). Most national armed forces have a strong identity and pride (Moelker et al. 2007). On a broader level, sending military troops

abroad can be regarded as a behaviour that nation-states signal their “state-ness” (Ben-Ari and Elron 2001). Countries are aware that they are observed and judged by not only national commanders and soldiers, but troops from other countries, civilian counterparts, and the local population (Elron 2009). They hold their accountability (Schlenker and Weigold 1989). Therefore, performance can signal credibility to influence other countries’ military beliefs.

Countries can **socialize** in UN PK. Countries use PK as a networking tool to make cooperation within UN PK continue. One way is directly building future bilateral trust ties. If a country successfully signs a military agreement after UN PK, it shows other countries’ updated military beliefs. Many scholars find this pattern in different areas. Murthy (2007) finds that South Asian senders begin to further PK cooperation. For example, India had PK cooperation with the US in the 1960s and 1990s. After UN PK, they had joint workshops to formalize the institutional linkages and to train peacekeepers and exchange observers, students and guest faculties (Murthy et al. 2007). Similar patterns are found in South America (Souza Neto 2013) and Germany (Koops 2016). South American countries directly used UN PK operations to network and signed defense cooperation agreement afterwards (Souza Neto 2013). Germany also signed defense cooperation treaties with the Netherlands after UN PK (Koops 2016).

Overall, countries are motivated by status, and therefore they use different strategies to signal their military capacity in UN PK. The learning, performance, and socialization mechanism can help them to gain military recognition. In the previous cases, they get the recognition in the form of praise and military agreement. In the next section, I present my three applied network hypotheses and illustrate why I use network hypotheses.

Applied Network Hypotheses

To test the theory, I set up three applied hypotheses (invitation continuation, cooperation closing, and signalling hypothesis) in a network way. Learning, performance, and socialization happens among different actors (including both PK senders and PK host countries) rather than dyads, and the concept of status also shows a collective belief of international standings. In other words, both PK participation and status share the “social” propriety. Therefore, PK participation can be set up in a PK network and the collective belief can be in a status network. Given that ties show countries willingness and choices (Maoz 2010), ties in the PK network shows countries interaction process in the PK participation while ties in the status network shows countries’ military choices based on their military perception. Gaining a new tie in a network means getting status enhancement, because status is accumulated step by step. I argue that the interaction among countries in the PK network can explain new formed military recognition ties in the status network, i.e., military status enhancement. In short, three applied hypotheses show the explanation of the sub-structures of the PK network on the formation of the status network.

Invitation continuation shows the interaction process between PK senders and host countries. It means that countries transform an existing PK relationship into a future military recognition. When building a new military recognition relationship, actors are more likely to build based on the existing social relationship, i.e., PK relationship, because it can minimize the transaction costs (Wang 2013; Leifeld and Schneider 2012). In the PK context, ideally speaking, the UN sends peacekeepers at the invitation of the host government and with the agreement of all warring parties (Autesserre 2019). Given that senders’ troop contribution is voluntary and costly, and senders endeavour to show its profession, host countries are easier to build a military recognition tie with the senders. Meanwhile, senders also want to gain praise or the military recognition from the host country, because it shows senders’ PK

success in the host country. For example, Chinese PK nurses in Liberia win praises from the local governments (Herman 2015).

Figure 2. 1: Hypothesis 1 - Invitation Continuation



Figure 1: Hypothesis 1 - Invitation Continuation

Hypothesis 1: *If an actor sends a PK tie to a host country, it is more likely for the sender to gain a recognition tie from the host country.*

Cooperation closing portrays relationship within senders in the same mission. Countries participate in UN PK and work under the institution of the UN. There exists direct or indirect coordination and cooperation among senders. The diversity of PK troops can complement each other (Bove and Ruggeri 2015). PK senders within the same mission get the opportunity to cooperate and therefore are likely to militarily recognize each other.

Figure 2. 2 : Hypothesis 2 - Cooperation Continuation



Figure 2: Hypothesis 2 - Cooperation Continuation

Hypothesis 2: *If actors participate in the same missions, senders are more likely to gain the recognition linkage with each other.*

Signalling hypothesis shows how many missions a country simultaneously participates in one year. It shows one country's PK participation frequency and its degree of conforming peace norms. The more missions that one country participates in one year, the more likely the country gets military exposure and interaction with other countries, and the more likely the country gets military recognition. Also, it shows countries' attachment to the international peace norms, which increases the chance of getting military recognition of other countries.

Figure 2. 3: Hypothesis 3 - Signalling Hypothesis

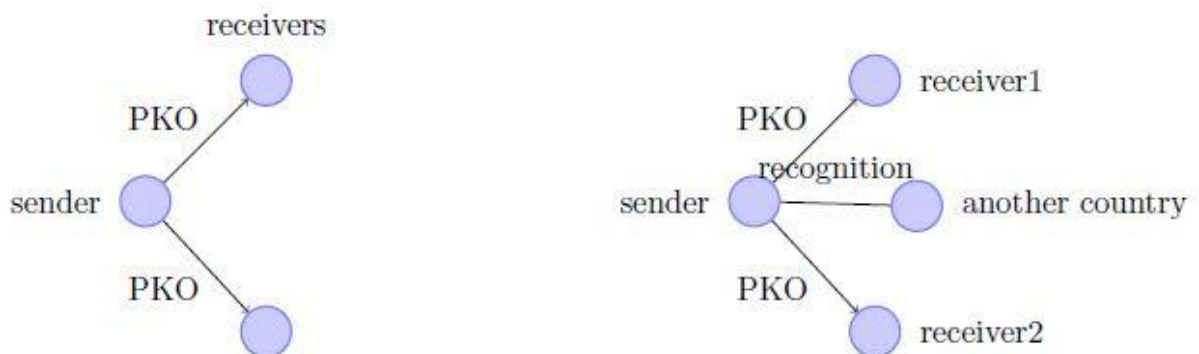


Figure 3: Hypothesis 3 - Signalling Hypothesis

Hypothesis 3: *If an actor sends more PK ties in different missions/host countries*

simultaneously, it is more likely for the sender to gain a recognition tie from other countries.

Methodology and Data

Dependent variable

The dependent variable is military status enhancement. It is in the form of the creation of a military recognition tie in a status network. Ties in a network can show countries' willingness and choices (Maoz 2010). A status network shows many countries' beliefs, which echoes the concept of status. Consequently, status enhancement is a creation of a new tie.

I use Defense Cooperation Agreement (DCA) network to measure the military status network and the creation of a DCA tie to measure military status enhancement. All recognition or status need to translate into an influence-related currency (Maoz 2010). I need a military influence-related currency that can be widely accepted in the post-Cold War era. DCA satisfies the demand. There are several reasons. First, it not only shows a symmetric military trust, but both *ex ante* and *ex post* trust (Kinne 2018). Especially, I focus on the creation of a DCA, and *ex ante* trust is a necessary condition for defense cooperation (Kinne 2018). Robust trust can be considered as a country's perceptual recognition or belief. Second, it is flexible in military recognition and has a wider geographic inclusion. DCA is an innovative form of defense cooperation that contains no mutual defense or non-aggression obligations. In other words, DCAs are not alliances (Kinne 2018). It is unlike defense cooperation that dominated by great-power politics during the Cold War. For instance, Indonesia's defense minister signed a controversial 2007 DCA with China but also stated clearly that "We only want to improve our defense cooperation with China. We have no intention of signing a defense treaty with China" (Kinne 2018; LKBNAntara 2007). The flexibility makes it more likely for more countries to join and become a new global security network (Kinne 2018). "In 2015

alone, nearly a hundred DCAs were signed between countries as diverse as Indonesia and Turkey, South Africa and Liberia, and Argentina and Russia" (Kinne 2018). Third, it captures the variation of the military recognition in the post-Cold War era. Security alliance can be used to show military status and is used by Maoz (2010), but it does not vary in the post-Cold War era (Kinne 2018; 2020). The previous literature uses diplomatic exchanges from the COW dataset (Singer and Small 1966; Bayer 2006) or embassies exchanges from the DIPCON dataset (Kinne 2014; Rhamey et al. 2013) to measure status. It is fine in the explanation of war and status because the literature usually has a longer time frame from the 1800s to the 2000s, in which period there are many variations of diplomatic and embassy exchanges. Also, a war is a dramatic status-seeking event that can change many aspects (economic, political, and military) of status, in which situation diplomatic exchanges make sense, though it suffers the problem that diplomatic exchanges are cheap to break (Maoz 2010). In my case, DCA is a suitable military influence-related currency that can be widely accepted in the post-Cold War era.

DCA has its limitation in measuring of status. I show limitations here, but I argue that it does not strongly influence this research and can be considered as a suitable measurement. First, DCA dataset is non-directional. However, security alliance is also non-directional. My figures in applied hypotheses section are plotted accordingly without directions (Figure 2.1, 2.2, 2.3). I will show that it is not a big problem in the alternative analysis section (Figure 2.5). Second, DCA's widely acceptance has its time limitation. DCA can be dated back to the 1950s and until the 1980s, the DCA network remained sparse, with activity limited to the US (Kimball 2017; Kinne 2018). Kinne codes the data since the 1950s, but begins his analysis since the 1980s, and argues that DCA becomes a global security network since the 1990s. I am interested in the post-Cold War era, which starts from the 1990s. I argue that since the 1990s, DCA can be used as a military influence-related currency. Third, DCA can have a

heterogeneous issue. Some countries sign a comprehensive DCA, while some sign a sectoral one.¹⁴ In PK context, it is not a big issue. After PK, countries sign DCA based on their specific needs. A sector DCA also represents military recognition. The current network inferential model cannot make a statistical analysis by weighting the formation of a new tie. Therefore, I treat the DCA tie homogeneously and do not distinguish between general and sector DCAs.

I argue that the dependent variable should be coded as the creation of a DCA tie rather than the incidence of a DCA tie, because I focus on status enhancement rather than status maintenance. DCA could have a second or third onset, which is also considered as a status enhancement in my empirical analysis. Kinne argues that “influences should be strongest for the first DCA and weaker for subsequent DCAs” and in his 2018 paper, he splits the samples and separately tests the first DCA onset and the post DCA onset. In PK context, I assume that as long as there is a new onset, it still shows some recognition and should be regarded as status enhancement.

I use data from the replication material of Kinne’s 2018 paper (Kinne 2018).

Independent variables

All three independent variables are countries’ interaction variables within the PK network. Three hypotheses represent three independent variables. The first variable reflects the invitation continuation hypothesis. It is a directional dummy variable. If a sender node sends a PK tie to a PK host country, it is coded as 1. The second variable reflects co-participation closing hypothesis and is a dummy variable. If two sender countries participate in the same host country’s PK mission, it is coded as 1. Though both first two variables are tie variables, they are different. The first one describes the tie between sender nodes and receiver nodes,

¹⁴ Sectors include procurement, training and exchange, research and commission.

which is a directional tie variable, while the second variable codes the tie between two-sender nodes, which is a non-directional tie variable. The third variable reflects the signalling hypothesis and is a node count variable. It codes how many PK ties that a sender node sends in each year. In short, the first two variables are dyadic covariates, while the last one is a monadic covariate. The first two variables are tie variables, while the third one is a node variable.

The data focuses on the time frame from 1990 to 2010. First, though using PK as a status-seeking tool can be dated back to the 1960s (the India example), PK before and during the Cold War is different from PK after the Cold War. Especially during the Cold War, the United Nations, including UN PK, was a battlefield of two ideological camps. Most empirical PK research focuses on the post-Cold War era. Second, there is not any flexibility of power relations and countries have ideological adherence to the USA and the Soviet Union (Azar and Farah 1981). An actor who claims to be adhering to one hegemonic power or accept its leadership would gain a better recognition. Third, geopolitics contests between major powers largely influence the formation of the DCA ties during the Cold War (Kinne 2018). From 1980 to 1990, DCA did not become a widely accepted influence-related currency. Therefore, I focus on the time frame from 1990 to 2010.

Furthermore, all three variables are lagged for one year to explain the DCA ties. The data is transformed from International Peace Institute (IPI) dataset (IPI 2017) into a binary variable dataset. IPI dataset starts from 1990. The time unit is year.

Control Variables

Control variables can be classified into self-network-effect variables and some other control variables. The network self-effects are Kinne's main variables (Kinne 2018), preferential attachment and triadic attachment. It illustrates the self-growth of the DCA network.

Preferential attachment means that “states favour partners that have large numbers of DCA ties” while triadic closures means that if two states indirectly share many different third parties via many DCA ties but not directly have a DCA ties by themselves, the two states are more likely to have a DCA tie. Preferential attachment is represented as *GWDegree* statistics, known as “geometrically weighted degree”. Triadic closure is represented as *GWESP* statistics, known as “geometrically weighted edgewise shared partners”. They are shape terms to capture the relevant concepts.¹⁵

The other control variables are all from Kinne’s replication. It can be broadly categorized into two types:

Economic power and relationship: mean power; the mean of two nodes’ log-transformed CINC scores; mean GDP per capita; the mean of two nodes’ log-transformed GDP per capita; bilateral trade;

Political and military relationship or treaties: mutual democracy; United Nations General Assembly (UNGA) idea policy position difference; NATO membership, non-NATO defense pacts, and joint NATO-PfP (Partnership for Peace) pairings.

Furthermore, the previous colony relationship and two countries’ distance are also included in the control covariates.

Model Choice

As previously mentioned, I use the sub-structures of the PK network to explain the formation of the status network. I use exponential random graph models (ERGMs), specifically Temporal ERGMs (TERGMs) to test my hypotheses. There are several reasons for using such models. First, ERGM is invented to explain how one network’s local structure on the

¹⁵ It is consistent with Kinne’s network model in his online appendix. For a more technical explanation on two terms, please refer to Hunter (2007) and Snijders et al (2006).

formation of another network (Robins et al. 2007). It is “a direct operationalization of the joint probability density from which the networks are thought to be generated, with minimal modelling assumptions” (Cranmer et al. 2017; Wasserman and Pattison 1996). It can explain the formation of a tie between two nodes by conditional depending on the rest of network structure (Cranmer and Desmarais 2011). Second, ERGM can integrate different types of units of analysis into one model. It not only explains the impact of the ties, but the impact of the attributes of a node on the formation of a new tie (Leifeld et al. 2018). In my case, my first two hypotheses are regarding the sub-structure of the PK network, and the third hypothesis is regarding the attribute of a node in the PK network. Specifically, the unit of analysis of the first tie variable is the relationship between senders and receivers, the unit of analysis of the second one is the relationship among senders, while the unit of analysis of the third variable is a node variable. ERGM can integrate three different units, which is beyond a traditional (dyadic) model. Third, I apply ERGM’s extension for longitudinal data, the TERGM. The extension incorporates parameters into an ERGM specification in the way that previous realizations of the network determine current features of the network (Leifeld et al. 2018). That is the memory term in my case. The memory term explains the inter-temporal dependency, i.e., the structure of last year’s DCA network’s influence on the current year’s. I estimate my models based on maximum pseudolikelihood with a bootstrap correction to the confidence intervals (Leifeld et al. 2018).

My research design follows the trend of using network analysis in the status literature, but also goes beyond it. The previous literature uses descriptive network analysis by measuring status via degree of centrality scores. For example, Renshon (2016) uses ranking score (based on a network centrality measure and Google’s PageRank algorithm) to measure a country’s status, and Maoz (2010) uses the degree of centrality network scores. A network-based approach of measuring status can capture core attributes of status, “positional, perceptual, and

social" (Renshon 2016). Countries show their willingness and choices in a community network (Maoz 2010), which shows a collective belief and captures the attributes of "perceptual and social". The country that enjoys more ties, i.e., a higher degree of centrality score, shows a higher "position". However, their method cannot be used in my research, because they treat status as an independent variable rather than a dependent variable. Degree of centrality scores cannot be directly used as a dependent variable because they are not independently and identically sampled from the underlying population. One country's centrality score can influence another country's. Accordingly, I explain a formation of a network process (status enhancement) rather than its outcome (status as in the form of degree of centrality scores). I use network analysis as a theoretical tool and an inferential tool, which is different from a measurement tool (Dorussen et al. 2016).

Empirical Result

I estimate a pooled TERGM from 1991 to 2010 as the DCA in 1990 cannot be explained by PK dyads in 1989 due to the data limitation.¹⁶

Table 2.1 shows the result. It shows a positive direction and statistical significance for the PK participation variable, which gives clear evidence that a country's PK participation can induce a DCA tie onset and shows that the country can get status enhancement. The odds of establishing a DCA tie are increased by around 57%. The homophily effect of hypothesis 1 is supported.

Hypothesis 2 is also supported. It also shows a positive direction and statistical significance. It means that if two countries co-participate in the same PK mission, it is likely for the two countries build a DCA tie and get status enhancement. The odds of establishing a DCA tie under this circumstance are increased by around 22%.

¹⁶ Peacekeeping data is from IPI dataset and starts from 1990.

Table 2. 1: Result for three hypotheses

	Model 1
PK participation	0.45 [0.11;0.67]*
PK co-participation	0.20 [0.02;0.35]*
Signalling	-0.03 [-0.06;-0.01]*
Preferential attachment	-1.71 [-1.92;-1.44]*
Triadic closure	0.00 [-0.15;0.12]
Mean power	0.07 [0.05;0.44]*
Mean GDP/capita	0.06 [0.04;0.12]*
Arms match	0.64 [0.28;0.87]*
Mutual enemy	-0.00 [-0.10;0.08]
Mutal terrorist threat	-0.02 [-0.11;-0.01]*
Mutual democracy	0.27 [0.12;0.48]*
UNGA ideal point diff.	-0.23 [-0.34;-0.14]*
Bilateral trade	0.19 [0.07;0.22]*
NATO membership	-1.39 [-1.96;-1.02]*
NATOPfP membership	0.34 [0.11;0.57]*
Defense pact (non-NATO)	0.56 [0.35;0.81]*
Distance	-0.44 [-0.61;-0.37]*
Colony	0.67 [0.30;0.97]*
edges	-0.06 [-0.94;8.08]
Memory term	0.08 [-0.11;0.23]
Num. obs.	545252

* Null hypothesis value outside the confidence interval.

However, Hypothesis 3 is not supported. On the contrary, it gives a negative relationship result. I speculate that Hypothesis 3 could be a non-linear relationship. In other words, if a country sends too many PK troops, other countries may suspect that the sender country is contributing PK troops to get financial reimbursement. Countries are aware that contributing the UN PK troops contains risks and costs because peacekeepers are risk of death and equipments can be destroyed (Salverda 2013; Duursma and Gledhill 2019). A country is unlikely to simultaneously distribute many military resources unless the country can get some material profits from UN PK. Especially, the UN does not have a standing stock of the military equipment, and PK senders sometimes need to provide the logistics support by themselves (Boutros-Ghali 1992). Not all governments, particularly Global South countries, can provide their troops with the necessary equipment for abroad missions (Krishnasamy 2002). Countries like Pakistan and Bangladesh face the challenge (Krishnasamy 2002, 2003) but still simultaneously contributes many troops in different missions. Consequently, I conduct an analysis same as the Model 1 but include an extra squared term of signalling variable. The result is presented in the Appendix A2.2. The squared signalling term shows a negative relationship. It is in line with my non-linear relationship speculation, but the non-linear relationship is also not statistically supported. In short, I do not find that the more missions that one country simultaneously participates in PK, the more likely the country gets military recognition. The quality of PK performance may explain the non-supportive result.

Regarding control variables, most variables are consistent with Kinne's previous network model findings.¹⁷ Some variables are inconsistent. Compared with his network model result, mutual terrorist threat variable gains the statistical significance. NATOPfP membership

¹⁷ See his network model in his appendix.

variable changes its direction and gain the significance. The triadic closure variable is not supported in my model.

I assess the goodness of fit of my models and present the figure in the Appendix A2.3. I simulate 100 networks based on the estimated quantity of interest and compare them with the original observed network. The figure plots several important network statistics of the original network (the thick black line) and the 100 simulated networks (the box plots) including indegree, minimum geodesic distance, edgewise shared partners etc. Overall, the estimated models seem to fit the data well.¹⁸



Figure 2. 4 : Coefficients of moving average for each five years with 95% confidence interval

I conduct an extra analysis to double check whether there may be any time heterogeneity for different periods between UN PK participation and status enhancement.¹⁹ I estimate a pooled TERGM for the years from 1991 to 1995, and then another pooled TERGM for the years from 1992 to 1996, and so on for the whole time from period 1991 to 2010. Figure 2.4 shows

¹⁸ I make a plot comparison between the model with and without endogenous term in Appendix A2.3 and A2.4. The comparison result shows that controlling the self-growing network terms is important.

¹⁹ The method is used by some previous literature (Turner et al. 2019).

the coefficients of moving average for each five years. Panel A, B and C show the three variables of “PK Participation”, “PK Co-participation”, and “Signalling Hypothesis”. The x-axis shows the end year of each 5 years. For example, the coefficient for 1997 in x-axis is the estimate of the pooled TERGM from 1993 to 1997. The y-axis is regarding the values of coefficients. The gray line shows the values of coefficients, while the gray bands capturing 95% confidence intervals. The results and confidence intervals are based on 1000 bootstrap iteration suggested by Leifeld et al. (2018). Any coefficient whose confidence interval does not cross zero is statistically significant. However, Figure 2.4 has to start with the year 1997 and end for 2009, because the models cannot converge in the first two 5 years and the last 5 years, which shows PK networks are orthogonal with DCA networks.

For PK Participation variable, we can see that since the period from 2001 to 2005, it starts to get statistical significance and the confidence interval become restricted. For PK Co-participation variable, it starts to get statistical significance since the period from 1996 to 2000. However, for the Signalling variable, it is robust in have a negative relationship with military recognition. The term’s confidence interval never crosses the zero. Furthermore, if we add the quadratic term of Signalling variable and refer to Appendix A2.1, we can see that neither Signalling term nor Signalling square term shows statistical significance in any time frame.

Additional Evidence

DCA ties do not have a direction and therefore, the statistical significance on Hypothesis 1 could also reflect that the PK host country gain the status rather than PK senders. However, it cannot be solved by methodology because it is an issue of data availability. I present some additional evidence of descriptive summary statistics and node level visualization to tackle the problem and strength my results. Three figures below illustrate the number of DCA ties from the perspective of PK host countries and PK senders: Figure 2.5 shows the perspective

of PK host countries; Figure 2.6 the perspective of Top 20 PK senders; Figure 2.7 the perspective of Top 6 PK senders from developed countries. I present the number of DCA ties (y-axis) over the time frame from 1990 to 2011 (x-axis). Here, I show the number of DCA ties in a duration format rather than an onset format, because it is easier to capture the accumulation trend. The orange rectangular shows the time period of host countries' PK mission or the time period PK senders' participation.

There are many factors that contribute to the growth of DCA ties, and summary statistics also cannot identify whether PK senders or PK host countries send DCA ties as military recognition, but it can help have a clear understanding on my arguments.

In Figure 2.5, I present all PK host countries except Burundi, Chad, Costa Rica, Haiti, Ivory Coast, Liberia, Nepal, Sierra Leone, South Sudan and Timor-Leste (10 countries in total). The listed countries are not presented, because from 1990 to 2011, they never have a DCA tie. It partially shows that many PK host countries do not get DCA ties out of PK hosting. Furthermore, most host countries do not gain DCA ties or only gain one tie within the PK missions. They are usually African and Middle East countries. Countries in the Balkens show a different pattern and have many DCA ties. I assume that it is out of their geo-strategic relationship with EU and NATO countries after their independence rather than out of PK hosting.



Figure 2. 5 :The number of PK host countries' DCA ties

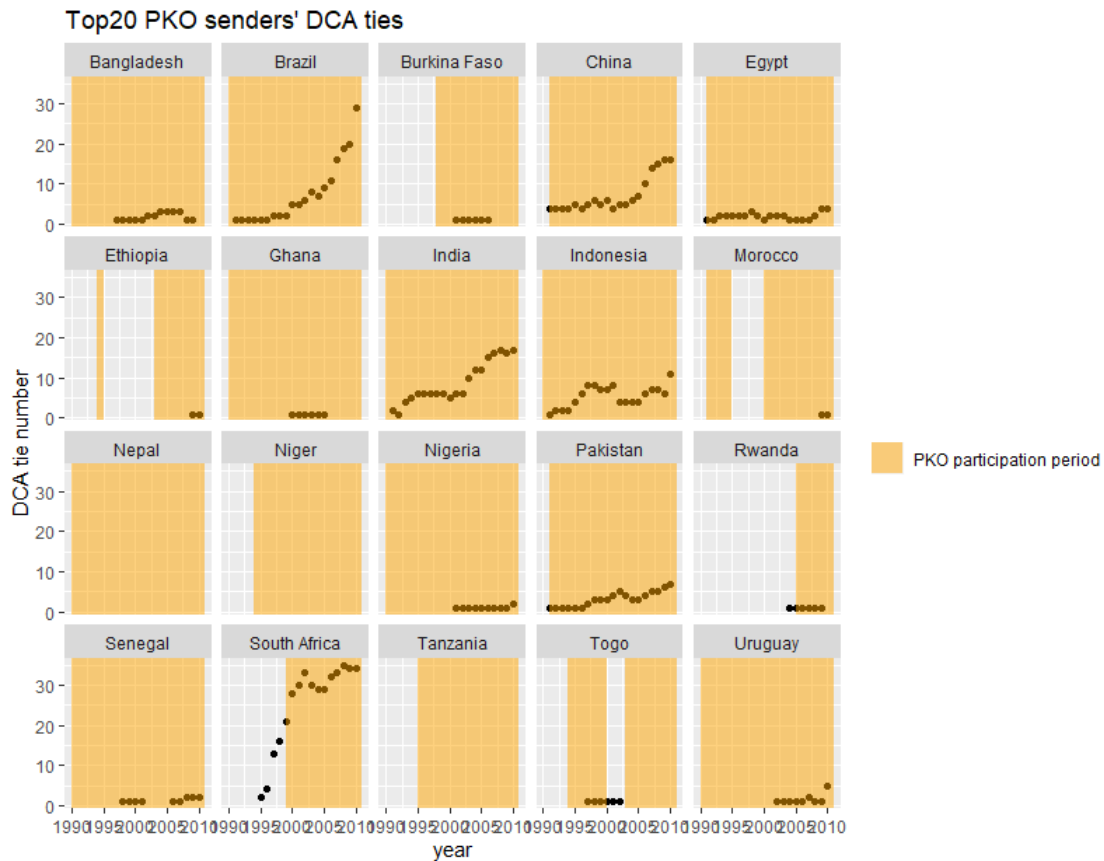


Figure 2. 6: The number of Top 20 PK senders' DCA ties

Senders get more DCA ties compared with PK host countries. In Figure 2.6,²⁰ Countries like Brazil, China, India, Indonesia, and South Africa get more DCA ties within their PK participation time. However, some other top contributors do not gain DCA ties. Some, like Bangladesh, Pakistan and Uruguay still gain some recognition, but do not gain a lot as Brazil, China, etc. I assume that they are motivated by UN financial reimbursement (Bellamy and Williams 2013). Countries including Ethiopia, Ghana, Nepal, Nigeria, Rwanda, and etc. only get minor recognition with few DCA ties. I assume that they are largely motivated by financial reimbursement (Bellamy and Williams 2013; IPI 2021). Though the argument of peacekeeping for profit is questionable and restricted (Coleman and Nyblade 2018), and sometimes, countries (like Nigeria and Tanzania) can lose more compared with the benefit from the UN reimbursement (Bellamy and Williams 2013; IPI 2021), the argument was

²⁰ Top 20 PKO contributors are selected based on the number of troops contribution, which is consistent with Coleman and Nyblade's 2018 peacekeeping for profit article.

popular among policy makers, journalists, and academics (Coleman and Nyblade 2018), and can influence other countries' perception of PK senders' motivation. If the PK sender countries' motivation is influenced by profit, it can diminish other countries' belief of the senders' conforming-peace-norm motivation and become less likely to build DCA ties.

Top UN PK contributors from developed countries gain many DCA ties. In Figure 2.7, in some years, some countries even simultaneously participate in various PK missions, but in a long-time frame, they still gain DCA ties. The developed countries are less likely motivated by the UN reimbursement. Their PK participation signals are stronger, and therefore are likely to gain DCA ties. Furthermore, I display Figure 2.7 to also show that, just like countries' motivation for status is not equal to their achievements in status, countries' achievements in status are not entirely equal to countries' motivation for status. Not all developed countries (except Canada, Norway, etc.) are motivated by status. Country studies regarding developed countries above do not specifically argue that they are motivated for status. Countries that already enjoy status may not be motivated by status, but could still get status.

In short, sender countries rather than host countries are likely to accumulate status.

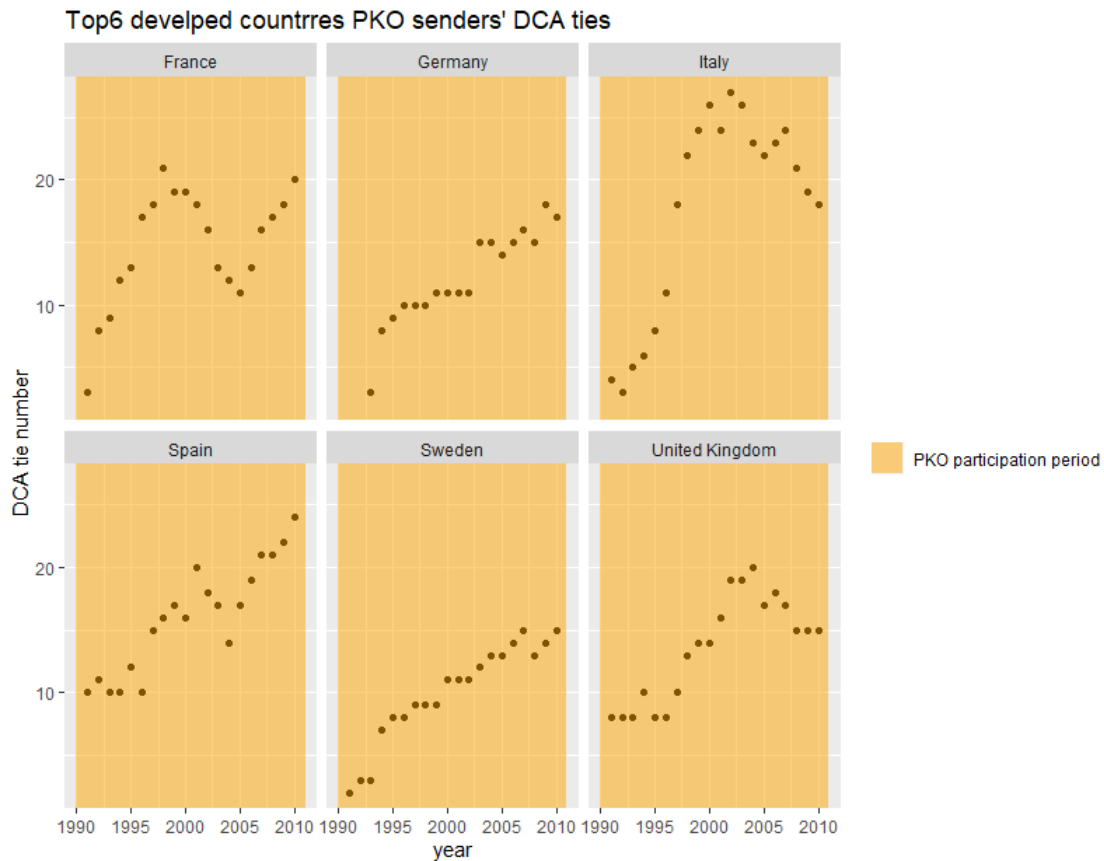


Figure 2. 7: The number of Top 6 developed PK senders' DCA ties

Conclusion

In this paper, I identify a puzzle not yet systematically examined in the scholarly literature. I examine whether UN PK influences status enhancement. I make a theoretical contribution on how exactly UN PK enhances status. I argue that PK as a status-seeking tool can enhance status via learning, performance and socialization. I use three applied hypotheses (invitation continuation, cooperation closing, signalling hypothesis) in a network format to test my theory and argue that the change of local structures in the UN PK network influences the formation of the status network, i.e., status enhancement.

From the perspective of methodology, I use gaining a DCA tie, i.e., DCA onset to measure the status enhancement. I argue that the DCA tie is a suitable measurement of capturing military status, because it shows a symmetric military trust, has a wider geographic inclusion and is flexible in recognition within the international community in the post-Cold War era. I

use a TERGM model to test my applied hypothesis. However, the empirical result gives a mixed result. The invitation continuation hypothesis and co-participation hypothesis are supported. The signalling hypothesis is not supported.

There are several future research directions. First, the future research can focus more on countries' PK performance for status enhancement. I show that countries which participate in UN PK are more likely to gain status enhancement than countries not participate in, and argue that countries endeavor to perform best in UN PK. However, not all countries perform well and some even conduct sexual violence within PK missions, which does not lead to the status enhancement. However, there is no systematic dataset regarding PK senders' sexual violence behaviour for the violent behaviours are selected reported by media and the UN only started to collect data in 2005 regarding allegations to the troops (Karim 2019). The future research could further investigate this question in an alternative research design. Second, not all countries focus on military status. Countries have different tools (foreign aid or winning Olympic medals) to achieve status. The future research could focus on when and why countries aim to maximize military status compared to other dimensions of status, such as economic status.

Appendix - UN Peacekeeping Contribution and Status Enhancement

A.2.1 TERGM 5 years with quadratic term

A.2.2 Result for three hypotheses with the squared signalling term

A.2.3 Goodness of fit

A.2.4 Model result without endogenous term with goodness of fit

A.2.1 TERGM 5 years with quadratic term

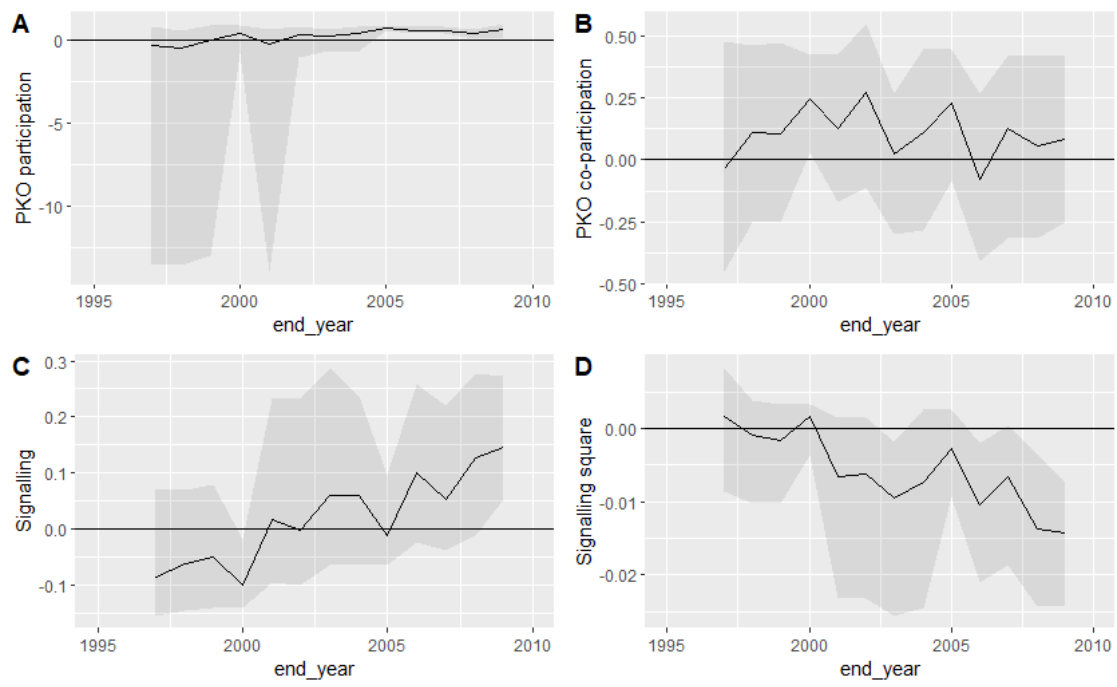


Figure A2.1 TERGM 5 years with quadratic term

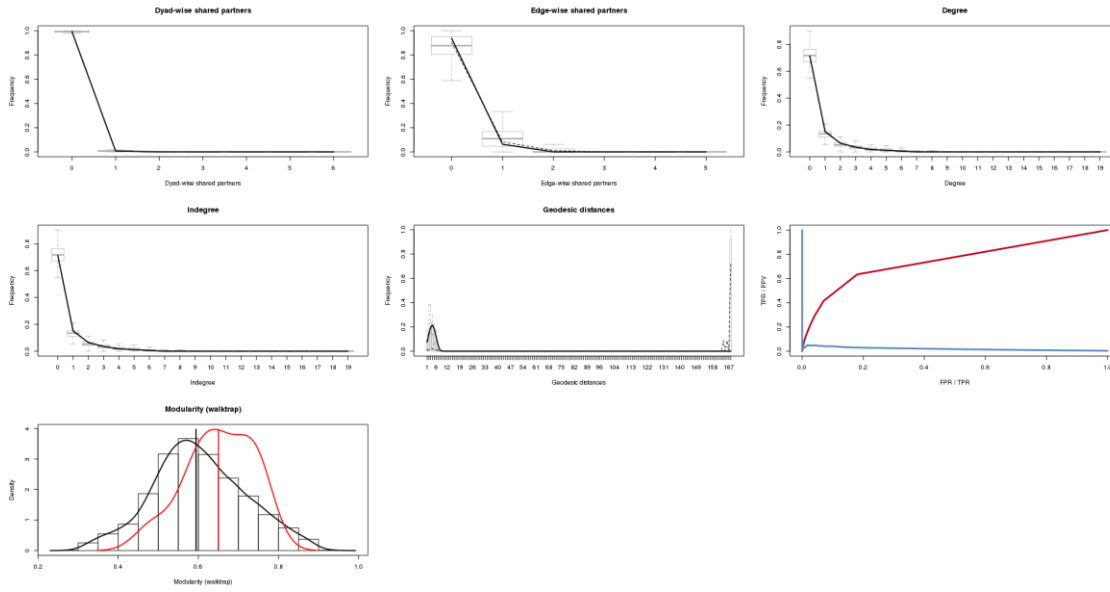
A.2.2 Result for three hypotheses with the squared signalling term

	Model 1
PK participation	0.42 [0.09;0.64]*
PK co-participation	0.09 [-0.09;0.27]
Signalling	0.03 [-0.04;0.09]
Signalling_square	-0.00 [-0.01;0.00]
Preferential attachment	-1.71 [-1.90;-1.41]*
Triadic closure	0.00 [-0.15;0.12]
Mean power	0.07 [0.05;0.43]*
Mean GDP/capita	0.06 [0.04;0.12]*
Arms match	0.63 [0.28;0.88]*
Mutual enemy	-0.00 [-0.09;0.08]
Mutal terrorist threat	-0.02 [-0.11;-0.01]*
Mutual democracy	0.24 [0.09;0.44]*
UNGA ideal point diff.	-0.24 [-0.35;-0.15]*
Bilateral trade	0.18 [0.07;0.22]*
NATO membership	-1.41 [-1.96;-1.05]*
NATOPfP membership	0.32 [0.10;0.54]*
Defense pact (non-NATO)	0.57 [0.36;0.80]*
Distance	-0.45 [-0.62;-0.38]*
Colony	0.67 [0.30;0.98]*
edges	-0.09 [-0.90;7.74]
Memory/lag term	0.07 [-0.13;0.23]
Num. obs.	545252

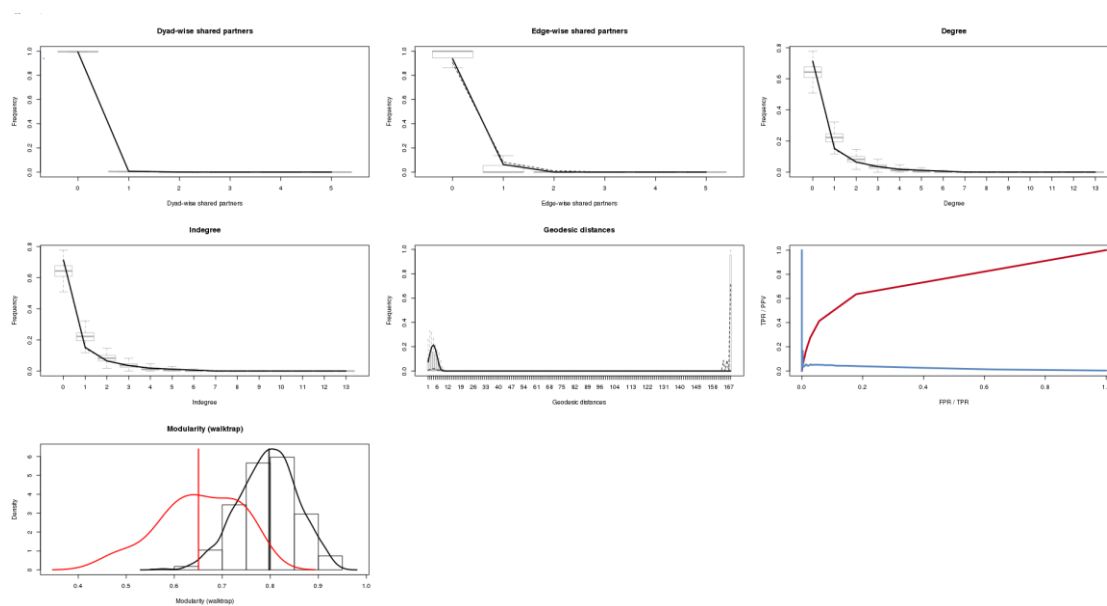
* Null hypothesis value outside the confidence interval.

Table A2.2 Result for three hypotheses with the squared signalling term

A.2.3 Goodness of fit



A.2.4 Model result without endogenous term with goodness of fit



I show the gof plot here firstly to make it easier to compare the simulated result between two plots. Without the endogenous term controlled, simulated networks are inconsistent with the observed network. Many estimations fall out of the confidence interval.

	Model 1
edges	-1.85 [-2.81;11.49]
PK participation	0.51 [0.05;0.80]*
PK co-participation	0.28 [0.05;0.45]*
Signalling	-0.02 [-0.05;0.01]
Mean power	0.08 [0.06;0.69]*
Mean GDP/capita	0.10 [0.06;0.18]*
Arms match	1.08 [0.49;1.42]*
Mutual enemy	0.02 [-0.07;0.10]
Mutal terrorist threat	-0.02 [-0.15;0.01]
Mutual democracy	0.46 [0.27;0.76]*
UNGA ideal point diff.	-0.15 [-0.29;-0.05]*
Bilateral trade	0.21 [0.02;0.25]*
NATO membership	-1.25 [-1.75;-0.87]*
NATOPfP membership	0.62 [0.35;0.92]*
Defense pact (non-NATO)	0.35 [0.13;0.59]*
Distance	-0.51 [-0.77;-0.44]*
Colony	0.89 [0.53;1.18]*

Memory/lag term	0.34 [0.14;0.46]*
Num. obs.	545252

* 0 outside the confidence interval.

Table A2.4 Result for three hypotheses without endogenous term

Chapter III - Peacekeeping, Aid and Violence: The Integrated Effect of Humanitarian Aid and UN Peacekeeping²¹

Introduction

The international community uses a range of instruments to reduce violence and address security and humanitarian concerns in conflict-affected areas. UN peacekeepers and police commonly operate alongside civilian officers and humanitarian agencies. Even though they share a common objective to build peace and to alleviate the impact of conflict on civilians, these agencies have different approaches to conflict resolution and commonly disagree on how best to deal with local actors. So far, the relationship between humanitarian agencies and UN peacekeepers has received most attention (Abiew and Keating 1999; Eckroth 2010; Metcalfe 2012). Humanitarian agencies differ markedly in their willingness to cooperate with UN peacekeepers (Dorussen and de Vooght 2017). While some agencies cooperate with UN peacekeepers to facilitate the delivery humanitarian aid (Hilhorst and Schmiemann 2002), others refrain from cooperation because they worry about compromising their impartiality and even the security of their staff on the ground (Eckroth 2010).

Recognizing the variation in cooperation between peacekeepers and providers of humanitarian aid, our research question is how this affects the security situation, in particular the level of violence against unarmed civilians. Some recent research has shown that UN peacekeeping operations generally reduce violence (Ruggeri et al. 2017; Fjelde et al. 2019; Walter et al. 2021). Yet the effect of aid on violence is indeterminate. Undoubtedly, humanitarian agencies aim to reduce violence or at least alleviate the consequences of conflict for civilians (Bradley 2016). However, aid may have unintended consequences; e.g., Wood and Sullivan (2015) argue that the humanitarian aid can exacerbate violence against

²¹ This chapter is co-authored with Prof. Han Dorussen. The noun is changed from I to we in this chapter.

civilians because it presents opportunities for looting and foreign aid can be considered to challenge the authority of local actors. In contrast, research on UN peacekeeping has highlighted mechanisms by which it can curb violence against civilians. Fjelde et al. (2019) argue that the presence of peacekeepers raises the costs for armed groups to use violence against civilians. Ruggeri et al. (2017) further argue that peacekeepers contain violence locally via policing and mediating between armed factions. Since peacekeepers and humanitarian actors commonly operate in the same conflict areas, it is interesting to explore the possible advantages and disadvantages of cooperation.

We propose two arguments for why there may be an integrated, complementary, effect of aid and peacekeeping. Firstly, humanitarian agencies and UN peacekeepers can *share information* allowing each of them to better carry out their activities and to reduce violence. Secondly, UN peacekeepers can provide local *security bubbles* enabling humanitarian agencies to carry out their activities without risking aid to become a target of violence. Is there indeed such an integrated effect of peacekeeping and aid on violence? Empirically, we set up the analysis at the subnational level using detailed information on the deployment of peacekeepers and the provision of humanitarian aid to examine a possible integrated effect on the reduction of one-sided violence. The analysis at the subnational level allows us to identify areas with only humanitarian agencies or peacekeeping presence and to contrast these with areas where both actors are active. Since we do not have complete and consistent information on cooperation between humanitarian agencies and UN peacekeepers, our analysis assumes that the joint presence of humanitarian agencies and UN peacekeepers at a location implies at least tacit cooperation. If humanitarian agencies are not willing to cooperate, they would “stay far away” from UN PKO deployments (Eckroth 2010).

Examining the integrated effect of humanitarian agencies and UN peacekeepers contributes to three strands of literature. Firstly, there is an emerging interest in the complementarity or substitution of different conflict management methods and actors. The UN itself has begun to consider the integration of its resources and to mandate multidimensional peacekeeping missions in support of a comprehensive peace. Howard (2019) highlights the use of economic instruments by peacekeepers, such as aid and trust funds, as inducements for peace. Other scholars research the integrated effect of peacekeeping operations and mediation (Greig and Diehl 2005; Beardsley et al. 2019; Clayton and Dorussen 2022). Secondly, it bridges the literature of civilian and military components in peacekeeping operations; for example, Seybolt et al. (2007), Ankersen (2007), Rietjens (2008), Lucius and Rietjens (2016), and Friis (2020) examine civil-military relationship in UN peacekeeping operations. Our research contributes by considering humanitarian agencies as civilian organizations separate, but related to, military peacekeeping. Thirdly, our research contributes to quantitative analyses of the effectiveness of various conflict resolution tools at the subnational level (Costalli 2014; Ruggeri et al. 2017; Fjelde et al. 2019). So far, research on subnational peacekeeping has not controlled for humanitarian aid. Wood and Sullivan (2015) and Wood and Molfino (2016) consider aid and peacekeeping, but their analysis regarding peacekeeping is at the country level.

In the next section, we review the literature on how peacekeeping operations keep peace, while humanitarian aid may exacerbate conflict. Yet, we also review arguments when humanitarian aid contributes to peace. Then, we summarize the normative and practical issues surrounding collaboration between peacekeeping operations and humanitarian aid projects, but we also identify opportunities for cooperation. Next, we show how possible cooperation mechanism, i.e., via information sharing and security bubbles, may reduce the

conflicts and derive our key hypothesis. In the remainder, we present the research design and demonstrate that there is indeed an integrated effect of peacekeeping and aid on one-sided violence. We also explore the robustness of this finding. The conclusion discusses the (policy) implications of our findings.

The Relation between Peacekeeping, Humanitarian Aid and Violence

UN peacekeeping operations and violence

In quantitative analyses, peacekeeping effectiveness is generally measured via different elements of negative peace, such as, the onset and duration of violent conflict, the death toll (battle-related deaths and one-sided violence), and the duration of peace following conflict. Except for some studies, for example Costalli (2014), most studies show that UN peacekeeping operations reduce conflict and violence (Hultman et. al 2013; 2014). Arguably, UN peacekeeping operations use deterrence, commitment, and providing information as methods to keep the peace. Empirically, Ruggeri et al. (2017) show that peacekeeping operations contain local hostilities. UN peacekeepers also increase the military costs and political costs of targeting civilians, and the presence of UN peacekeepers in (formerly) rebel-held areas thus poses a credible deterrent threat (Fjelde et al. 2019). Fjelde et. al (2019) show that UN peacekeepers indeed reduce violence against civilians by rebel actors, but they also find that peacekeepers are not necessarily effective in reducing one-sided violence committed by government actors.

Most research evaluates the effectiveness of (UN) peacekeeping based on its military and security functions alone. Yet the mandate of UN peacekeeping operations extends beyond security. Howard (2019) identifies persuasion and inducement as peacekeeping mechanisms that go beyond coercion, or the military dimension of peacekeeping. Persuasion relies on

peacekeepers providing reliable information allowing them to mediate in low-trust environments. Peacekeepers can provide inducements via economic methods, such as the provision of aid and supporting local projects. Howard (2019) also draws attention to the relevance of cooperation between multiple actors to realize the objective of resolving conflict. It is therefore important to be aware that peacekeepers conduct many jobs other than military and security tasks. Blair (2020) uses the distinction between UN civilian and uniformed personnel to explore their different engagement with promoting the rule of law. Gizelis and Xun (2019) explain the positive relationship between peacekeeping presence and maternal health success based on UN peacekeeping's direct effect of providing medical and training facilities, and an indirect security effect improving access to maternal health. Further, UN missions use quick impact projects (QIPs) to engage with local populations weakening the distinction between civilian and military aspects of UN involvement (Dorussen and de Vooght 2017). In short, there is increasing evidence that peacekeeping operations indeed keep the peace, and that peacekeepers do so by means of a variety of activities. UN peacekeepers and humanitarian agencies increasingly share not only common objectives but also develop similar activities. It is reasonable to assume that cooperation would allow synergies and enables both parties to be more effective.

Humanitarian aid and violence

Humanitarian aid “is designed to save lives, alleviate suffering, and maintain and protect human dignity during and in the aftermath of emergencies” (Zürcher 2017). We focus on humanitarian aid and humanitarian agencies rather than development aid. Humanitarian aid is more neutral and less politicalized (Hinds 2015). It commonly bypasses national governments and supports the delivery of goods and services directly to the population via third-party actors such as (I)NGOs (Campbell 2022), humanitarian agencies shoulder the main

responsibility of implementing humanitarian aid.²² In conflict situation, humanitarian aid direct aims are to save the lives of unarmed civilians.

Even though humanitarian agencies aim to reduce violence and many of their on-the-ground activities help victims of conflict, the actual impact of aid on conflict is not always obvious. Chaulia (2011) argues that agencies – and even the same agency based in different contexts – vary in their attitudes and practices on civilian protection and differ in the priority to give to the protection of civilians. Still, Howard (2019, 86) suggests that humanitarian agencies offer aid with a minimal intention of saving lives. Bradley (2016) also stipulates that humanitarian agencies generally aim at reducing violence and threats posed to civilians. Moreover, the presence of international humanitarian agencies, such as the International Committee of the Red Cross / Crescent (ICRC) or the UN Refugee Agency (UNHCR), offers some passive protection. Armed actors are less likely to threaten civilians when they risk being observed. Because of their activities on the ground, humanitarian agencies can monitor coercion and abuse of civilians. Humanitarian agencies can register and document violence and provide civilians with an opportunity to report abuse and to reduce their own vulnerability. Persons who are known to humanitarian agencies are less likely to be mistreated, killed or to disappear (Bradley 2016). Monitoring and reporting violence can also be used to change the behavior of armed factions and convince them to reduce levels of violence against civilians. Since reports of violence against civilians undermine the legitimacy of armed actors, humanitarian agencies can use “dialogue and advocacy” to engage with the perpetrators of violence, including the police and government security services, to influence their activities.

²² Data availability is another reason for including only humanitarian aid. Humanitarian aid is more time- and place-specific compared to development aid allowing us to identify the proximity to PKO deployment.

Lyall (2019) however argues that, depending on the context, aid can either increase or decrease levels of violence, or have no-net effect on violence. Aid decreases violence if it reduces grievances of groups that feel abandoned or discriminated. Aid can also make persons more willing to report abuse. Lyall (2019) points out that out of gratitude for receiving aid, victims may be more willing to provide intelligence and information, limiting the ability of rebel groups to operate. Yet it is important to remember that humanitarian aid is not the same as protecting civilians (Mahony 2013), and that treating aid as part of a strategy of “winning heart and mind” can even increase violence (Findley 2018). When civilians are perceived to collaborate with “foreigners” and to assist a counterinsurgency, they can become seen as legitimate targets. Aid can also have other unintended consequences; most notably, the influx of resources into an area also presents opportunities for looting and predation. Armed factions can target persons who have received aid and force them to hand over the resources. Aid workers, especially if they are foreign, can be targets of kidnapping for ransom. Finally, Wood and Sullivan (2015) argue that rebels can perceive (foreign) humanitarian agencies as a challenge to their authority over the local population. If so, they may want to expel these agencies from the area under their control or at least to dictate their activities, if necessary by means of force.

Empirically, the aid's influence on violence is also mixed. Studying Afghanistan, Lyall (2019) finds that aid reduces a certain type of insurgent violence, i.e., Taliban's attack towards ISAF. Yet Lyall (2019) also observes that humanitarian aid may reduce violence against civilians, or at least that it does not provoke the Taliban into targeting civilians (Lyall 2019). Yet, several cross-national studies have found that aid leads to increased levels of conflict and extends the duration of insurgencies (Narang 2015; Wood and Molfino 2016; Wood and Sullivan 2015). To summarize, both theoretically and empirically the impact of aid

on conflict is rather indeterminate. There is a risk that increased violence against civilians becomes an unintended consequence of providing aid. Humanitarian agencies have an obvious interest to minimize the risk, but they vary in their approach; in particular, regarding their willingness to collaborate with security providers such (UN) peacekeepers.

Civil-Military Engagement and the Principle of Distinction

Humanitarian agencies often advocate for a clear separation between humanitarian and military activities, or a strict adherence to the so-called principle of distinction. For example, in response to the policy recommendation made by Collier (2007; Collier and Sambanis 2005a; 2005b) to allocate foreign aid in combination with military intervention, Easterly (2008; 2009) writes that “the hubris of the military imperialists was bad enough without adding to it the hubris of the aid imperialists”. Even though UN peacekeeping operations aim to be impartial, NGOs tend to insist on full neutrality, impartiality, and independence. Invoking the principle of distinction, they prefer to refrain from collaborating with military missions to protect their neutrality (Eckroth 2010). NGOs are afraid that coordination with security services and even cooperation with UN peacekeepers will be seen as serving the interests of national authorities or the UN; in particular the major powers represented in the Security Council (Abiew and Keating 1999).

In contrast, advocates of “resilience humanitarianism” propose a more pragmatic approach and leave more room for NGOs to cooperate with government authorities and external interveners such as UN peacekeepers (Hilhorst 2018). To be able to operate more effectively – or even to be able to operate at all – humanitarian agencies often must be pragmatic and interpret principles differently and contextually rather than universally (Hilhorst and Schmiemann 2002). Resilience humanitarianism treats humanitarian spaces as interventions in which multiple actors operate which necessitates engaging with national and rebel

authorities, as well as local institutions and external actors, including UN peacekeepers. For example, the support of refugees and internally displaced people often requires NGOs to engage with host governments and UN agencies since they are formally responsible for their safety (Hilhorst 2018).

Some NGOs choose to directly engage with UN peacekeeping operation out of pragmatic considerations, such as the logistic support and security provided by UN peacekeepers. In *humanitarian and protection clusters* NGOs can exchange information with UN agencies such as the UNHCR, UN Women and UNDP. Some UN missions, such as MONUSCO in the DRC, have signed up to a framework of civil-military relations with regular meetings between NGO field officers and UN peacekeeping officers. Dorussen and de Vooght (2017, 5) still report that “NGOs often feel that communication remains one-sided where they are not provided with relevant information, e.g., on the caveats made by specific peacekeeping contingents, while information by NGOs can be used for military purposes”.

UN peacekeepers are also increasingly aware of the importance of cooperation with the humanitarian agencies. The establishment of the Inter-Agency Standing Committee (IASC) aims at coordinating the UN system for humanitarian action. So far, IASC does not include a representative from the UN’s Department of Peacekeeping Operations (DPKO) showing the reluctance of the humanitarian community to work with military officials (O’Neill and Tanner 2004). Yet since the 1990s, the protection of civilians has become a standard mandate for peacekeeping missions, which has encouraged UN peacekeeping missions to increase their contacts and collaboration with humanitarian agencies both inside and outside the UN system (O’Neill and Tanner 2004).

The changing attitudes can even be observed in the practices of the ICRC. Traditionally, the ICRC has strictly guarded its autonomy, resisted coordination, and only reluctantly attended protection cluster meetings (Natsios 1995). Compared to other IGOs and NGOs, the ICRC is most likely to “express reservation at the increasing “blending” of humanitarian action and military operations/personnel” (O’Neill and Tanner 2004). Regardless, even the ICRC has “begun engaging in violence-prevention and violence-reduction activities, compromising its neutrality and limiting dialogue with some armed groups” (Bradley 2020). In an article posted on the ICRC’s website, Sommaruga (1997) expresses the concern that engagement with UN peacekeeping risks integrating humanitarian efforts into a political process and becoming politicized, and “strongly advocated the creation of a humanitarian space, thereby emphasizing the need to leave room for independent humanitarian action in situations of conflict”. In 2018, however, the ICRC (2018) used its website to emphasize its close working relationship with armed forces including the UN peacekeeping operations at strategic, operational, and tactical level.

In short, although humanitarian agencies still commonly invoke the principle of distinction, in practice civil-military relations have become a key part of the effective delivery of humanitarian aid in conflict-affected areas. Both humanitarian agencies and UN peacekeepers have changed their attitudes, but not all missions have adopted a framework of civil-military relations and some humanitarian agencies remain reluctant to collaborate with UN peacekeepers, especially military personnel. As Dorussen and de Vooght (2017, 5) conclude “there is large variation in the NGO willingness to engage with UN peacekeeping missions, ranging from open-minded to extremely cautious attitudes”. The variation in attitudes explains the empirical variation of co-deployment of peacekeeping and humanitarian agency or aid and gives an opportunity to examine the integrated effect.

Peacekeeping and Aid: From Coexistence to Cooperation to Reduce Violence

Following De Coning (2007), relations between UN peacekeepers and humanitarian agencies can be conceptualized as a spectrum from coexistence to cooperation:

“...coexistence refers to a situation where the minimum necessary information is being shared between the humanitarian community and a military combatant force, ... cooperation refers to a maximum state of civil-military coordination where there is a range of cooperative relations between the humanitarian community and a military force that is not regarded as a combatant force, typically including joint planning, division of labour and sharing of information” (De Coning 2007, 7)

Accordingly, *information sharing* presents a minimal level of collaboration, while the provision of *security bubbles* by peacekeepers can be seen as fully cooperative civil-military relations. As we argue below, both mechanisms not only facilitate peacekeeping and the delivery of humanitarian aid but should also reduce levels of violence; in particular, violence that is linked to aid as a lootable resource.

Peacekeeping operations and humanitarian assistance both rely on the collection of timely and accurate information (O’Neill and Tanner 2004). Consequently, humanitarian agencies (Sagun et al. 2009) and UN peacekeepers (Abilova and Novosseloff 2016) invest in multiple sources for collecting relevant information. Information sharing between peacekeepers and humanitarian agencies allows them to collate pieces of information and to cross-check the quality of their information. Some of the information or security is directly relevant from a security point of view, such as the “location of anti-personnel landmines, illegal checkpoints, movements of at-risk populations, militia command and control structures, location of food

and supply warehouses and the existence of arms or drug trafficking networks” (O’Neill and Tanner 2004).

Depending on specific types of intelligence to be collected, either peacekeepers or humanitarian agency may be privileged. Humanitarian agencies with local presence have more “knowledge about beneficiaries and their needs and customs, something the military lack” (Heaslip 2012). For example, humanitarian agencies are better suited to collect information about circumstances in refugee hosting areas (RHAs), because of their direct and extensive experience in running activities there (Eriksson 1997). However, humanitarian agencies including UNHCR and NGOs may not be able to document everything and conduct monitor analysis because of their restricted access, limited staff capacity, or government objections against intelligence gathering. (Bradley 2016). Also, UN peacekeepers and agencies such as UNHCR and OCHA are often in a better position to collect information on population movements (O’Neill and Tanner 2004; Dorn 2005), including safe havens or refugee camps and possible violence there (Dorn 2007), and generally have direct responsibility for managing refugee flows (Uzonyi 2020). Information about refugee hosting areas has direct security relevance and is relevant as early warning for violence, especially one-sided violence.

It is important to notice that in the operational context, information, especially contextual information, is invaluable. In the worst case, the absence of intelligence can lead peacekeeping commander having to rely on BBC World Service to ascertain what is happening 200 meters away from his own headquarters (Gazette 1994). UN peacekeepers and humanitarian agencies are not likely to share everything with each other and some balance between secrecy and openness need to be struck. Both sides will have concerns about

possible misuse of sensitive information (Dorn 2005; Holt et. al 2010; Dorussen and de Vooght 2017). Regardless, sharing of information between UN peacekeepers and humanitarian agencies is often essential to enable both sides to carry out their jobs (“dialogue and advocacy” for NGOs and “deterrence” for peacekeepers) and to ease violence.

Beyond sharing information, the provision of security bubbles by UN peacekeepers is a further mechanism for cooperation. Mvukiyehe and Samii (2020) use the notion of security bubbles to argue that the peacekeepers lower the (perceived risk of) criminal victimization in those areas where they are deployed. UN peacekeeping troops provide protection from physical violence and help to establish a safe environment (Metcalf 2012). Humanitarian agencies also benefit from a more secure environment; for instance, in the 1990s, NGOs in Sierra Leone found it nearly impossible to fulfill their missions due to the lack of security. Therefore, peacekeepers in UNAMSIL “received a mandate to collect weapons from rebels, disarm them, integrate them into the national armed forces, while protecting humanitarian aid workers and NGOs in Sierra Leone” (Jackson 2017). A similar situation happened in East Timor when NGOs called for help from UNTAET (Jackson 2017).

Security bubbles can be triggered in different ways. Firstly, UN peacekeepers can provide direct security support to humanitarian agencies. Peacekeepers can be tasked to deliver humanitarian aid (as in UNPROFOR), or to escort the delivery of aid and to protect the safety of aid and aid workers. The deployment of UN troops does not necessarily solve aid obstruction problems, and Newland and Meyers (1998) report that casualty rates were higher in UNPROFOR escorted convoys compared to non-escorted convoys. The presence of UN peacekeepers can minimize opportunities for looting and ensure that the humanitarian aid is

delivered to the civilians. The effective delivery of humanitarian aid can also mitigate grievances that otherwise may have sparked violence.

Secondly, the security bubbles provided by UN peacekeepers may create a safe space for humanitarian agencies to implement their work. For example, in Somalia UN military troops, collaborating with WFP and NGOs, “restore sufficient order to allow for the relief and resettlement of displaced Somalis” (Hopkins 1998). Here the delivery of food aid is combined with robust peacekeeping. Therefore, the military component within UN peacekeepers can be important in deterring and countering perpetrators by its presence and proactive use of force. Furthermore, UN peacekeepers, as a military actor, are good at providing logistical help. They can provide reconstruction and engineering expertise to help building the infrastructure (Barber 2012). Better infrastructure helps the humanitarian supply chains and the transportation of humanitarian aid.

Depending on their specific mandate, UN peacekeeping missions vary in their authorization of the use of force and their security objects, or whom they are expected to protect (Friis 2015). Robust UN peacekeeping operations mandate peacekeepers to provide security to civilians and to suppress spoilers and criminals. Peacekeepers with a specific mandate to protect share the same goals as humanitarian agencies. If UN peacekeepers directly protect targeted civilians against violence by means of guarding and patrolling, they – at least indirectly – support the work of humanitarian agencies. Depending on the need to protect specific populations, for example refugees or vulnerable people, peacekeepers collaborate with different humanitarian agencies. Peacekeepers have to work with UNHCR to protect IDPs and to assist the return and reintegration of the displaced population (Oxfam 2010). Refugee-hosting areas (RHAs) are important predictors of one-sided violence in Africa (Fisk

2018). RHAs can make it easier for combatants to blend in among refugees (Lischer 2005). Food and medical aid are distributed within RHAs, and aid can be easily looted when humanitarian agencies without military capacity and the area is not protected.

Working with UNICEF and other child-focused NGOs helps peacekeepers to assist vulnerable persons, in particular women and children (Metcalf 2012). Furthermore, many peacekeeping missions have a role in demining, which leads to the close cooperation with humanitarian organizations in this area. We do not necessarily expect the reach of UN peacekeepers to extend beyond the specific area under their control, hence the use of the term, *security bubble*. Peacekeeping may thus well coincide with increased levels of criminal violence overall (Di Salvatore 2019), but we expect this to happen mainly beyond the immediate reach of UN peacekeepers. Therefore, the deterrence effect of UN peacekeepers can protect civilians from one-sided violence while help humanitarian agencies to conduct their work in a better fashion while also reduce overall violence.

Joint Protection Teams (JPTs) are another mechanism of cooperation between UN peacekeepers and humanitarian agencies. UN Security Council Resolution 1856 institutionalized JPT for the UN PKO to the DRC. A JPT includes staff members from different backgrounds and expertise in various MONUC departments. The experts such as “human rights, civil affairs, political, gender, or police officers” and including “humanitarian agencies” are deployed to locations where civilians may be at risk. The team analyzes and identifies threats of violence, and therefore, helps the military component develop more comprehensive protection plans or responses (Di Razza 2017, DPKO 2020). JPT models have been extensively used in in MONUC and MONUSCO but have so far not been instituted in other missions.

Even though JPT are not standard across missions, missions tend to explore ways to engage with humanitarian agencies leading to different degrees of civil-military cooperation. Dorussen and de Vooght (2017, 4) note “MONUSCO (DRC) has more experience with meeting with NGOs compared to MINUSCA (CAR) where NGOs and the UN still have to agree on a framework for civil-military relations”. Different coordination methods in various missions are usually supported by some institutions from both humanitarian spaces and UN peacekeeping operations. From the humanitarian space, The Office for the Coordination of Humanitarian Affairs (OCHA) and the United Nations Humanitarian Civil-Military Coordination (UN-CMCoord) are placed in the humanitarian staff structure (UN DPKO 2010; IASC 2004; De Coning 2007). From the perspective of a peace operation approach, the United Nation civil-military coordination (UN-CIMIC) is within the structure of the UN peacekeeping operations (De Coning 2007). All these different structures and activities are used to coordinate and to help protect civilians and reduce violence.

It should be noted that humanitarian agencies can also contribute to the security bubble mechanism. Humanitarian aid is not only a response to people in desperation, but a resource to bolstering peacekeeping efforts (Hopkins 1998). The humanitarian assistance provided by humanitarian agencies can make peacekeeping easier, because it can provide basic order and structure to people’s lives, when the temporary human needs are met (Hopkins 1998). In other words, security bubbles are easier to be set up and maintain with the presence of humanitarian aid and agencies.

To sum up, UN peacekeepers and humanitarian agencies coordinate and cooperate mainly by sharing information and security bubbles provided by UN peacekeepers. Coordination falls

on a spectrum varying from co-existence to cooperation. Although co-existence presents only modest coordination, it still allows for information sharing and reduction of violence. More extensive coordination allows aid to be protected within security bubbles, reducing the positive link between aid and violence. Therefore, we hypothesize that spatial overlap in the activities of humanitarian agencies and peacekeeping reduces violence. If humanitarian agencies are really concerned about any form of coordination with peacekeepers, they will decide to distance themselves from peacekeeping deployment.

Hypothesis: *If the location of humanitarian agencies overlaps with the sub-national UN peacekeeping deployment, it is likely to reduce violence against civilian.*

Research Design

To examine the local interaction effect of UN peacekeeping operations and humanitarian aid, we use disaggregated information to capture any effects subnationally. We use the subnational peacekeeping deployment dataset (Dorussen and Ruggeri 2014; Ruggeri et al. 2017; Cil et al. 2020) and geo-coded foreign aid subnational data (Findley et al. 2011; Tierney et al. 2011).²³ Limited because of data availability, our sample includes the time period from 1990 to 2007 – for subnational peacekeeping data covers period from 1990 to 2007,²⁴ while subnational aid data covers period from 1989 to 2008.²⁵ Also, the sample includes the following countries: Angola, Burundi, Democratic Republic of Congo, Ivory

²³ Aid data reflect aid commitment rather than actually distributed aid. Given that we only focus on the humanitarian agencies or humanitarian aid's influence, we use CRS code which is between 72010 and 74020 to identify humanitarian aid. <http://www.oecd.org/development/financing-sustainable-development/development-finance-standards/dacandcrscodelists.htm>

²⁴ We mainly use Ruggeri et al.'s dataset due to the overlapping time frame and use Cil et al.'s data only for only 2007.

²⁵ However, the countries' data that we focus on end mostly in 2007.

Coast, Liberia, Sierra Leone, Sudan.²⁶ The geographic unit of analysis is a grid cell of 0.5×0.5 decimal degrees with year as the temporal unit.

Dependent variable

Our dependent variable captures whether there are direct and deliberate attacks on civilians in a grid cell each year. We use data from the UCDP Geo-referenced Event Dataset (Sundberg and Melander 2013). We construct two versions of the dependent variable, the binary variable version of one-sided violence (OSV) and the continuous variable version of OSV. We set up the cutoff point at 25 for the binary measure of OSV. To reduce the impact of extreme outlier when we analyze OSV as a continuous variable, we take the natural log of OSV. To reduce the possibility of reverse causality, OSV is lagged forward by one year (which is equivalent to lagging all independent variables by one year).

Main independent variables

To examine the interaction effect of the UN peacekeepers and humanitarian agencies, we construct the variable of PKO presence as a dummy variable and the variable of aid presence as a dummy variable. Therefore, we can get we get four types of grids: with both PKO and aid presence, grids with only PKO presence, grids with only aid presence, and grids with none.

Furthermore, we preserve the continuous variable versions of PKO troops (in a hundred unit) and aid amount (in a million unit) in one grid. Though both variables are positively skewed, we only take a linear transformation. Especially, there are outliers in the aid variable. It could

²⁶ We focus on the country samples the data of which have both peacekeepers and humanitarian aid coded in the time frame.

achieve around 1200 million but with only one observation on this value. The literature tends to take the natural log to re-set the distribution of aid, but it does not apply here, because log-log model²⁷ will be used when the dependent variable, OSV is a continuous version. It can make the coefficient interpreted differently. The interpretation has to be done in percentage change (% increase in aid, leads to % decrease in OSV). We decide to recode the aid variable by setting an upper threshold of the mean of aid plus a 2 unit of standard deviation. Any values above the threshold will be recoded as the upper threshold value. The following histogram (Figure 3.1) shows that the distribution of aid when aid is in a million unit in an original format and in a recoded format.

The distribution of the aid variable

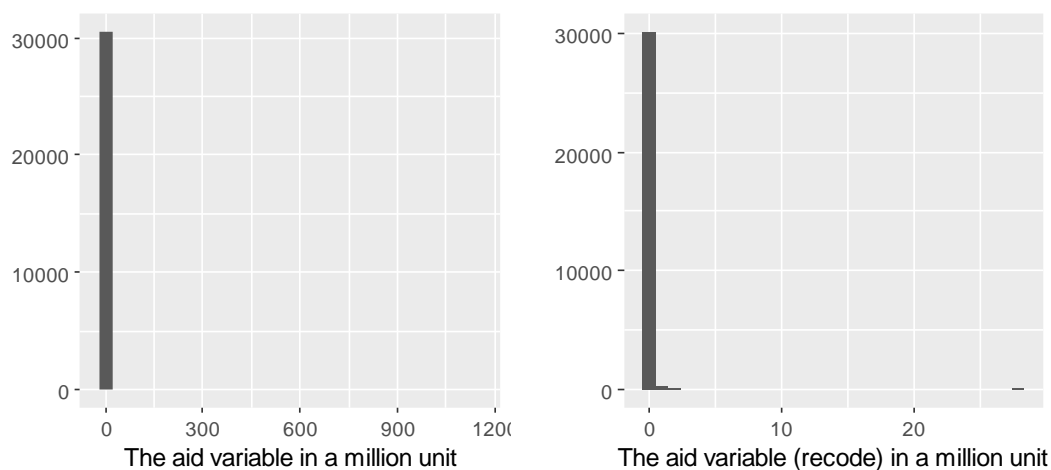


Figure 3. 1 : The distribution of the aid variable

Non-random application of UN peacekeeping and humanitarian aid

The deployment of UN peacekeepers and humanitarian agencies is not a random process, and the selection effects may influence the analysis of effectiveness of violence-reduction. Peacekeepers are generally deployed to so-called ‘hard cases’, areas and countries with

²⁷ We show the log-log model result in the appendix because the upper-threshold method still shows a big positive skewness.

higher conflict intensity or more civilian casualties (Gilligan and Stedman 2003; Gilligan et al. 2008; Fortna 2008; Hultman 2013). This pattern also holds at the subnational level (Ruggeri et al. 2017; Fjelde et al. 2019). Wood and Sullivan (2015) also find that humanitarian aid is sent to conflict-areas.

The previous peacekeeping and humanitarian aid research (Ruggeri et al. 2017; Fjelde et al. 2019; Wood and Sullivan 2015) uses various techniques for their observational studies to solve the non-random assignment issue. It uses matching²⁸ and recursive bivariate probit models with instrumental variables strategies,²⁹ but they are not suitable to our research and clear explanations are presented in the appendix.

The difficulty of our research is to solve the non-random assignments of UN peacekeepers and humanitarian aid simultaneously. Given that previous subnational studies cannot solve our problems, we decide to use simple models with fixed effects. The fixed effect model is used in the previous peacekeeping research when there is no better way to solve the non-random assignment problem in the cross-sectional peacekeeping research (see Blair 2020). We choose to use the simple linear model with fixed effects³⁰ and the linear probability model with fixed effects.³¹ Here, we conduct a two-way fixed effect, including a grid fixed

²⁸ Matching is not suitable. Firstly, matching should be used in a cross-sectional set up rather than a time series cross-sectional set up, though some scholars are aiming to solve this issue (Imai et al. 2019). Also, Coarsen Exact Matching method is preferred rather than Propensity Score Matching (Iacus et al. 2012). Here, our data suggests that we need a multi-treatment matching method with four levels (grid with none; grid with only PKO presence; grid with only aid presence; grid with both). However, to our best knowledge, we have not found an article or algorithm that can simultaneously solve all above problems together. Secondly, scholars become suspicious of matching method as it only matches on the observables. Lastly, matching method, though not satisfying all criterion above, prunes too many observations in our analysis. Therefore, we decide not to use this method.

²⁹ Explanations and relative results are presented in the appendix.

³⁰ We are aware that when the dependent variable is a continuous variable, there is a zero-inflated data generating process, i.e., the DV is largely positively skewed. We therefore take the natural log of the DV in this case to refrain from considering zero-inflated negative binomial model with fixed effect, due to the model complexity.

³¹ We choose linear probability model because logit or probit model with fixed effect has the incidental problem and separation problem.

effect and a year fixed effect. The grid fixed effect eliminates all time-invariant confounders, regardless of whether we can measure them, while the year fixed-effect reduces the bias from the serial correlation. Also, to preserve more observations and reduce the time variant bias or reverse causality issue, we forward our dependent variable for one year in our models.

Control variables

The models include standard confounding variables. Both one sided violence and UN peacekeeping deployment can be influenced by degree of feasibility and accessibility, geographic characteristics of a cell, various socio-economic characteristics of a grid cell.³²

Regarding degree of feasibility and accessibility, it can influence the deployment of UN peacekeepers and humanitarian agencies by the instrumental versus convenience logic (Ruggeri et al. 2018). Ruggeri et al. (2018) outline the logics for the deployment of UN peacekeepers, but they should equally apply to humanitarian agencies. The instrumental logic suggests that peacekeepers are primarily deployed to areas which are most in need for peacekeeping. Similarly, the priority for humanitarian aid would be areas where civilians are most in need, or where the conflict is most intense. Conflict intensity in a grid cell is measured by the battle-related death with the data source of UCDP event data (Sundberg and Melander 2013). Border areas are easier to have conflicts or violence due to the limited state capacities. Therefore, border distance is included measured as the geographical distance of the center of each grid cell (centroid) from international borders in kilometers (Tollefsen 2012; Weidmann et al. 2010). In contrast, the convenience logic suggests that UN peacekeepers are likely to be deployed areas that are more easily accessible, and a similar logic could apply to humanitarian agencies. Therefore, the models include capital distance

³² Though many geographic variables are eliminated by the fixed effect models, we introduce them here and keep them when we run models without fixed effect for a comparison purpose.

which measure the distance in kilometers from the capital (Tollefsen 2012; Weidmann et al. 2010). Further, the models include average travel time to the nearest city or town. Average travel time gives the estimated cell-average travel time (in minutes) by land transportation from the cell to the nearest major city with more than 50,000 inhabitants, the values of which are extracted from a global high-resolution raster map of accessibility (Tollefsen 2012; Uchida and Nelson 2009).

Further geographic characteristics of a cell are terrain and precipitation characteristics. Type of terrain is measured by the percentage of mountainous terrain within a cell (Blyth 2002). Precipitation not only influences accessibility but is also related with African agriculture and economy and linked to conflict and violence (Miguel et al. 2004). Relevant socio-economic characteristics of a cell are population density (Doxsey-Whitfield et al. 2015) and mortality rates (Storeygard et al. 2008; CIESIN 2005).

Empirical Results

Descriptive evidence

The six maps in Figure 3.2 show the location of peacekeeping forces, aid, and one-sided violence in the DRC from 2002 until 2007. Here, peacekeeping presence is indicated by blue dots, aid by yellow, and grids with one-sided violence are highlighted in red. As is well known, in the DRC persistent one-sided violence was concentrated in the eastern DRC, in North and South Kivu. Over time, the deployment of peacekeepers concentrated into these district, and patterns of one-sided violence become more sporadic over time. The provision of humanitarian aid not only covers a DRC more broadly but remains quite stable over time. In contrast to the deployment of peacekeepers, there is not an obvious increase of humanitarian aid into conflict-affected areas – although aid is also provided to the eastern DRC, so violence does not seem to deter (or make impossible) the provision of aid. A final noticeable

feature is that there is an only modest overlap between peacekeeping deployment and the provision of aid with only a low number of grids having both activities present. Grids with both peacekeeping and aid seem, however, to be areas where (in previous years) one-sided violence can be observed. The most likely explanation for this pattern is that peacekeepers are indeed deployed to areas with conflict and one-sided violence. This also suggests that we are dealing with intricate spatial and temporal dynamics that need to be disentangled with some care.

[Figure 3. 2 about here: Peacekeeping, aid and one-sided violence in the DRC]

Linear model with fixed effects

Models below are simple linear models with fixed effect estimated. The dependent variable here is $\log_OSV_{(t+1)}$.

Table 3. 1: Integrated effect of PKO and aid on $\log_OSV_{(t+1)}$

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
PKO binary	-0.44 *** (0.03)	-0.02 (0.02)	-0.40 *** (0.03)			
Aid binary	0.06 * (0.03)	0.35 *** (0.03)	0.05 (0.03)			
PKO:Aid (binary)	-0.01 (0.07)	-0.03 (0.07)	-0.02 (0.07)			
PKO continuous				-0.06 *** (0.00)	0.00 (0.00)	-0.05 *** (0.00)
Aid continuous				0.02 *** (0.00)	0.02 *** (0.00)	0.01 *** (0.00)
PKO:Aid (cont.)				0.00 (0.00)	-0.00 (0.00)	0.00 (0.00)
Distance to Capital		-0.06 *** (0.01)			-0.07 *** (0.01)	
Distance to Borders		-0.04 *** (0.00)			-0.04 *** (0.00)	
Ave Travel Time		-0.00 *** (0.00)			-0.00 *** (0.00)	
Population		0.02 *** (0.00)	-0.78 *** (0.09)		0.03 *** (0.00)	-0.75 *** (0.09)
Mountains		0.30 ***			0.32 ***	

		(0.02)		(0.02)		
Precipitation		0.00 ***	0.00	0.00 ***	0.00	(0.00)
		(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Infant Mortality		-0.00		-0.00		
		***		***		
		(0.00)		(0.00)		
Conflict Intensity		0.00 ***	0.00 ***	0.00 ***	0.00 ***	
		(0.00)	(0.00)	(0.00)	(0.00)	
Spatial lag PKO troop numbers		0.00	0.00	0.00	0.00	
		(0.00)	(0.00)	(0.00)	(0.00)	
Spatial lag OSV		-0.00	0.00	-0.00	0.00	
		(0.00)	(0.00)	(0.00)	(0.00)	
(Intercept)	-0.05	0.45 ***	6.30 ***	-0.04	0.46 ***	6.20 ***
	(0.17)	(0.06)	(0.73)	(0.17)	(0.06)	(0.73)
Fixed effect	Grid & year	None	Grid & year	Grid & year	None	Grid & year
R ²	0.26	0.08	0.27	0.26	0.08	0.27
Adj. R ²	0.20	0.08	0.21	0.20	0.08	0.21
Num. obs.	30596	27476	30596	30596	27476	30596

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$ ³³

Model 1, Model 3, Model 4, and Model 6 (in Table 3.1) shows a negative relationship between PKO variable and OSV. However, aid variable does not hold robust in other models. In Model 1 and Model 3 (in Table 3.1), the interaction term shows a negative effect but does not meet standard levels of statistical significance.

In Model 4 and Model 6 (in Table 3.1), both coefficients of the aid variable and the interaction term are non-statistically significant and tiny. We suspect that the positive skewness of the aid variable may still influence the result though we already take an upper threshold at around 27.80 million USD.

Linear probability model with fixed effects

³³ In all models, we do not cluster standard errors. Abadie, et. al (2017) argue that it is inappropriate to cluster standard error without considering unless it should. In our case, we already take a fixed effect at grid level, which excludes much variation. Also, there is no hierarchy under the grid level, except grid-year observations. Then the problem of correlation between observations within a grid unit is serial correlation, which is already solved by the year fixed effect.

Models below are linear probability models with fixed effect estimated. The dependent variable here is a binary variable.

Table 3. 2: Integrated effect of PKO and aid on binary version of OSV_(t+1)

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
PKO binary	-0.07 *** (0.01)	-0.01 * (0.00)	-0.07 *** (0.01)			
Aid binary	0.00 (0.01)	0.05 *** (0.01)	0.00 (0.01)			
PKO:Aid (binary)	-0.04 ** (0.01)	-0.03 * (0.01)	-0.04 ** (0.01)			
PKO continuous				-0.01 *** (0.00)	-0.00 (0.00)	-0.01 *** (0.00)
Aid continuous				0.00 (0.00)	0.00 *** (0.00)	0.00 * (0.00)
PKO:Aid (cont.)				0.00 (0.00)	-0.00 (0.00)	0.00 (0.00)
Distance to Capital		-0.01 *** (0.00)			-0.01 *** (0.00)	
Distance to Borders		-0.01 *** (0.00)			-0.01 *** (0.00)	
Ave Travel Time		-0.00 *** (0.00)			-0.00 *** (0.00)	
Population		0.00 *** (0.00)	-0.13 *** (0.02)		0.00 *** (0.00)	-0.15 *** (0.02)
Mountains		0.04 *** (0.00)			0.04 *** (0.00)	
Precipitation		0.00 *** (0.00)	0.00 (0.00)		0.00 *** (0.00)	0.00 (0.00)
Infant Mortality		-0.00 *** (0.00)			-0.00 *** (0.00)	0.00 * (0.00)
Conflict Intensity		0.00 *** (0.00)	0.00 *** (0.00)		0.00 *** (0.00)	0.00 *** (0.00)
Spatial lag PKO troop numbers		0.00 (0.00)	-0.00 (0.00)		0.00 (0.00)	-0.00 (0.00)
Spatial lag OSV		-0.00 (0.00)	0.00 (0.00)		-0.00 (0.00)	0.00 (0.00)
(Intercept)	-0.01 (0.03)	0.07 *** (0.01)	1.09 *** (0.14)	-0.01 (0.03)	0.07 *** (0.01)	0.18 (0.40)
Fixed effect	Grid & year	None	Grid & year	Grid & year	None	Grid & year
R ²	0.19	0.05	0.19	0.19	0.04	0.20
Adj. R ²	0.12	0.04	0.13	0.12	0.04	0.13
Num. obs.	30596	27476	30596	30596	27476	27644

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$ Standard errors are not clustered, see Abadie et al. (2017)

In all models above, only Model 1 and Model 3 (in Table 3.2) shows a statistical effect. The peacekeeping effect is still negatively robust while there is no effect of aid on OSV. The interaction effect is negative with statistical significance.

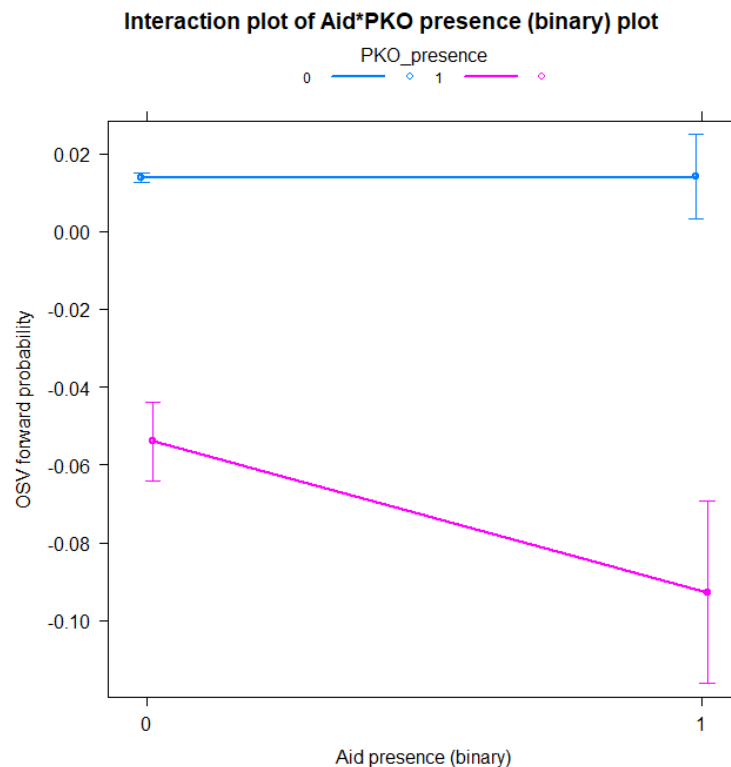


Figure 3. 3: The interaction plot of aid*PKO presence plot

In the plot (Figure 3.3) above (based on Model 3 in Table 3.2), the aid variable alone doesn't have an effect but with the help of peacekeepers, the integrated effect becomes negative. It could be both aid-inducing and aid-reducing OSV effect cancelling out like Lyall suggests (2019), but the integrated effect is statistically significant and shows reducing effect. In an interactive model, the main effect could be without any effect.

Model 4 and Model 6 in Table 3.2 share the same problem with Model 4 and Model 6 in Table 3.1.

Alternative Analysis

Treat the integrated effect as a nominal variable

All previous models treat the integrated effect of peacekeepers and aid as an interaction term. However, we could also see the integrated effect as a level of one variable. Then, we can construct a nominal variable with four levels: a grid with none, a grid with only PKO presence, a grid with only aid presence, and a grid with both PKO presence and aid presence. In this way, we consider our independent variable as a multiple treatment variable³⁴ and regard the data generating process as a multiple treatment experiment. We know that this is a bold assumption on the data generating process, because the PKO deployment could be influenced by aid deployment. Also, working on this issue requires a more refined dataset on the time unit and is another research question. However, as we mention previously, it is difficult to find a proper model to meet all criteria. We can at least have some empirical understandings to compare four different categories. In the following models in Table 3.4, Model 1, 2 and 3 use the binary dependent variable while Model 4, 5, 6 use the continuous version.

Table 3. 3: Categories with different types of grids

Category	What Grid?	Number of observations
Baseline category	Grid with none	29290
Category1	Grid with only aid	547
Category2	Grid with only PKO	667
Category3	Grid with both aid and PKO	92

³⁴ We get the idea from the inspiration of multiple-treatment matching, though we do not use multiple treatment matching method.

Table 3. 4: integrated effect as a nominal variable

	DV binary OSV(t+1)			DV log_OSV(t+1)		
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Catergory1 (aid only)	0.00 (0.01)	0.05 *** (0.01)	0.00 (0.01)	0.06 * (0.03)	0.35 *** (0.03)	0.05 (0.03)
Catergory2 (pko only)	-0.07 *** (0.01)	-0.01 * (0.00)	-0.07 *** (0.01)	-0.44 *** (0.03)	-0.02 (0.02)	-0.40 *** (0.03)
Catergory3 (pko & aid)	-0.11 *** (0.01)	0.01 (0.01)	-0.11 *** (0.01)	-0.39 *** (0.06)	0.30 *** (0.06)	-0.37 *** (0.06)
Distance to Capital		-0.01 *** (0.00)			-0.06 *** (0.01)	
Distance to Borders		-0.01 *** (0.00)			-0.04 *** (0.00)	
Ave Travel Time		-0.00 *** (0.00)			-0.00 *** (0.00)	
Population		0.00 *** (0.00)	-0.13 *** (0.02)		0.02 *** (0.00)	-0.78 *** (0.09)
Mountains		0.04 *** (0.00)			0.30 *** (0.02)	
Precipitation		0.00 *** (0.00)	0.00 (0.00)		0.00 *** (0.00)	0.00 (0.00)
Conflict Intensity		-0.00 *** (0.00)	0.00 *** (0.00)		-0.00 *** (0.00)	0.00 *** (0.00)
Infant Mortality		0.00 *** (0.00)			0.00 *** (0.00)	
Spatial lag PKO troop numbers		0.05 *** (0.01)	-0.00 (0.00)		0.00 (0.00)	0.00 (0.00)
Spatial lag OSV		-0.01 * (0.00)	0.00 (0.00)		-0.00 (0.00)	0.00 (0.00)
(Intercept)	-0.01 (0.03)	0.07 *** (0.01)	1.09 *** (0.14)	-0.05 (0.17)	0.45 *** (0.06)	6.30 *** (0.73)
Fixed effect		Grid & year & None	Grid & year	Grid & year & None	Grid & year & None	Grid & year
R^2	0.19	0.05	0.19	0.26	0.08	0.27
Adj. R^2	0.12	0.04	0.13	0.20	0.08	0.21
Num. obs.	30596	27476	30596	30596	27476	30596

* p<0.05; ** p<0.01; *** p<0.001 Standard errors are not clustered, see Abadie et al. (2017)

In Model 1 and Model 3 (of Table 3.4), compared with grids with none, grids with only the aid presence do not show a statistical significance effect and the quantity of interest is close to 0. Grids with only the PKO presence show a negative effect and grids with both also show a negative effect. Compared with Model 2 (of Table 3.4), grids with only PKO have a stronger negative effect, and grids with both even change its coefficient direction, which somehow shows that fixed effects models ease the non-random assignment issue. Furthermore, grids with both show a stronger violence-reducing effect compared with grids with only PKO.

In Model 4 and Model 6 (of Table 3.4), grids with aid shows a positive effect, but not a robust effect because it does not hold in Model 6 (of Table 3.4). Still, grids with only the PKO presence show a negative effect and grids with both also show a negative effect. However, compared with Model 1 and Model 3 (of Table 3.4), the integrated effect does not show a stronger reducing effect compared with the only PKO effect.³⁵ Aid cancels a little PKO violence-reducing effect but not that much, and the integrated effect is still negative.

Sensitivity analysis

Fixed effect models can ease the endogeneity problem but cannot solve non-random assignment problems. Given that our case is difficult to meet all assumptions of all different models, we therefore decide to conduct sensitivity analysis.

We use the framework of Cinelli and Hazlett (2020). They extend sensitivity analysis framework in omitted variable bias. Their method answers questions: a. how strong a

³⁵ It may be improper to directly compare two non-baseline categories. Therefore, we show some alternative results by changing different baseline category in Appendix A.3.3.

particular confounder could change the conclusion; b. how vulnerable the result to many or in the worst scenario all unobserved confounders are; c. whether the confounders alter the conclusion plausible (Cinelli and Hazlett, 2020). Cinelli and Hazlett (2020) argue that if a confounder explains all residual variance of the outcome variables, to bring down the estimated effect of treatment variable to 0, the partial R^2 of the treatment with the outcome should be equal to the partial R^2 of the confounder with the treatment. Their method assumes the “worst case scenario” that all explained variation in the outcome can be due to a specific confounder. They encourage the applied researchers to show the contour plot when the confounder is strengthened as three times.

In our case, the non-random assignment of PKO presence and aid presence can be considered as an unobserved treatment assignment variable that influences both PKO or aid presence and OSV. The literature argues that PKO is likely to choose the hard cases (Gilligan and Stedman 2003; Hultman et al. 2013). Peacekeepers are likely to go to the severe conflict areas (Gilligan and Stedman 2003) and places with more civilian casualty (Hultman et al. 2013). We could argue that conflict intensity is the most important confounder, and it probably explains more of the residual variation in assignment of peacekeepers. The same logic can be applied to the aid assignment. We can assume that the conflict intensity be the confounder that explains all partial variation expect the main terms.

We conduct the sensitivity analysis in two ways. Method 1 is treating interaction term as a separate term to see whether a particular confounder (conflict intensity measured by battled related death in our case) can change the direction of the interactive coefficient. Method 2 does not include an interaction term and to see if we exaggerate the effect of the aid variable coupled with the conflict intensity variable by assuming that it has an increasing effect on

OSV, whether it makes the PKO variable change its coefficient direction. If the effect of aid is strengthened three times without changing PKO's reducing effect, we can say that PKO variable is robust and infer that the integrated effect could be negative.

As previously mentioned, their method already assumes that a specific confounder explains all partial variation except the main independent variable. Therefore, there is no need to use fixed effects models here, but we do an extra plot to show this (based on Model 3 in Table 3.2). The models that we use for sensitivity analysis via Method 1 are based on Model 2 and Model 3 in Table 3.2. We display two extra models in Table 3.5 used for analysis via Method 2.

We only conduct the sensitivity analysis on linear probability models. Compared with models in Table 3.2, models in Table 3.5 do not include the interaction term.

Table 3. 5: Extra Models used for sensitivity analysis

	Model 1	Model 2
PKO binary	-0.01 *** (0.00)	-0.07 *** (0.00)
Aid binary	0.05 *** (0.00)	-0.01 (0.01)
Distance to Capital	-0.01 *** (0.00)	
Distance to Borders	-0.01 *** (0.00)	
Ave Travel Time	-0.00 *** (0.00)	
Population	0.00 *** (0.00)	-0.13 *** (0.02)
Mountains	0.04 *** (0.00)	
Precipitation	0.00 *** (0.00)	0.00 (0.00)
Infant Mortality	-0.00 *** (0.00)	
Conflict Intensity	0.00 *** (0.00)	0.00 *** (0.00)
Spatial lag PKO troop numbers	0.00 (0.00)	-0.00 (0.00)
Spatial lag OSV	-0.00 (0.00)	0.00 (0.00)
(Intercept)	0.07 *** (0.01)	1.08 *** (0.14)
Fixed effect	None	Grid & Year
R ²	0.04	0.19
Adj. R ²	0.04	0.13
Num. obs.	27476	30596

* p<0.05; ** p<0.01; *** p<0.001

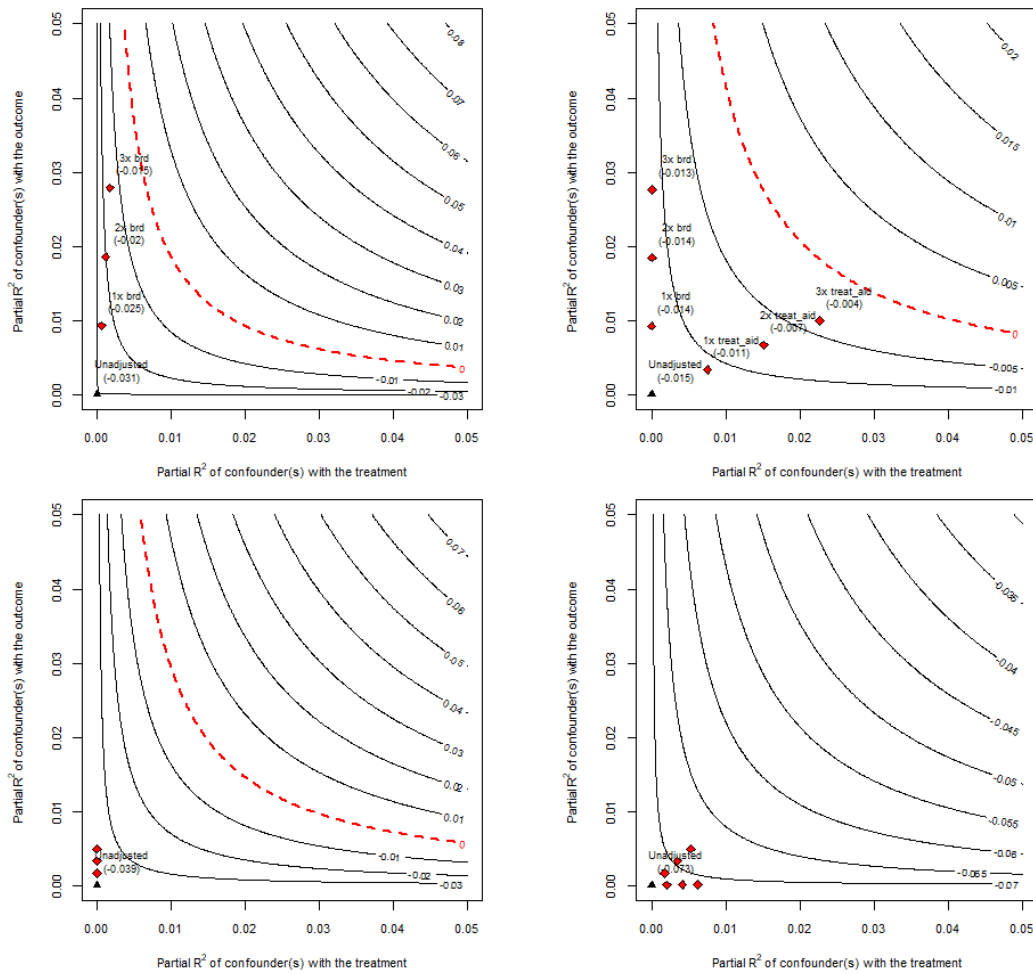


Figure 3. 4: Sensitivity analysis plots

Four plots (Figure 3.4) are presented. The upper two panels are without fixed effects and the two lower without. The left two panels conduct the sensitivity analysis on the interaction term with the strengthening effect only on Conflict Intensity (Battle related death/brd), while the right two on the treatment of PKO variable with the strengthening effect both on Conflict Intensity and the treatment of aid variable.

In the upper two panels, the strengthening effect of Conflict Intensity does not increase its partial correlation with the assignment of PKO, but only increase its partial correlation with OSV. The first one does not change the coefficient direction of the interaction term. In the

upper second panel, the treatment of aid influences both PKO treatment and OSV, but neither can reduce or flip the negative effect of PKO.

The bottom two panels are fixed effect models that already excluding residual variations. The coefficient values barely change³⁶. Therefore, the strengthening effect of Conflict Intensity and Aid variable does not even change the original coefficient.

Conclusion

The analyses above demonstrate that, as found in previous studies, that peacekeeping reduces one-sided violence while aid is associated with more (rather than less) violence. One contribution of our paper is that we show that these findings also hold in analyses fully executed at the subnational level. Our particular interest was, however, to explore a possible integrated effect of aid and peacekeeping. Does the presence of peacekeepers mitigate any risks of aid on conflict? We find some support for our main hypothesis that peacekeeping and aid have complementary effects. Admittedly, the support is somewhat dependent on model specification, but sensitivity analysis suggests they are robust and not simply result from selection bias.

Interestingly, we find relatively few instances where peacekeeping and aid overlap. This may result from humanitarian agencies indeed actively avoiding peacekeeping operations (as interviews with some aid agencies indeed suggest as reported by Dorussen and de Vooght 2017). It may also simply reflect the quality of our data on the activities of humanitarian

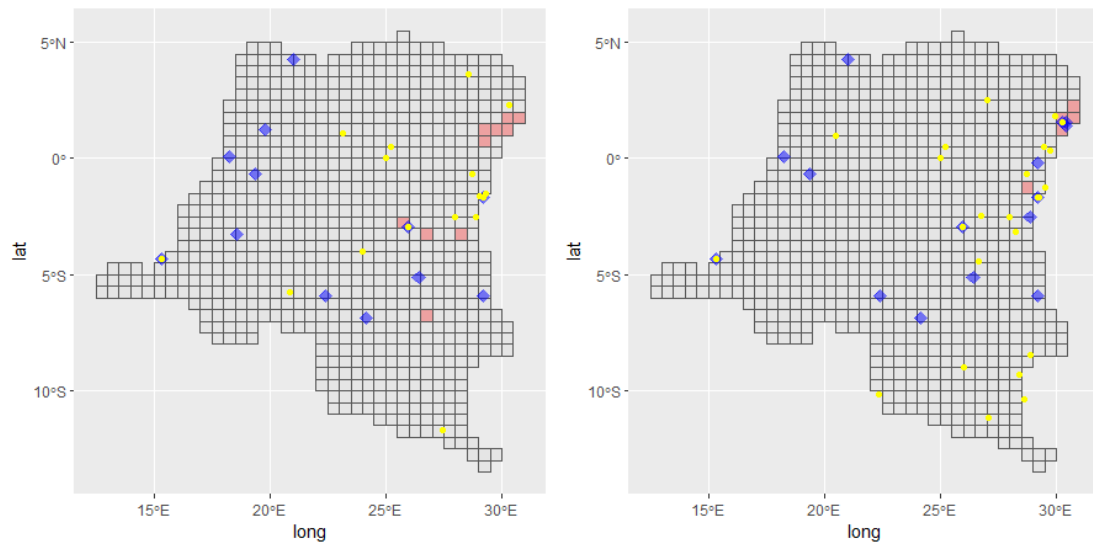
³⁶ Given that the change of the value is tiny, we do not show the value of points in bottom two panels to refrain from cluttering texts. In the bottom second panel, the markers go to the direction of northeast is the variable of conflict intensity (brd) while go to the direction of east is the variable of aid (treat_aid). Also, the bottom second panel does not show the red line of 0, but it is still under the red line of 0.

agencies. A further possibility is that aid and peacekeeping are primarily seen as alternate instruments where the application of one largely precludes the use of the other.

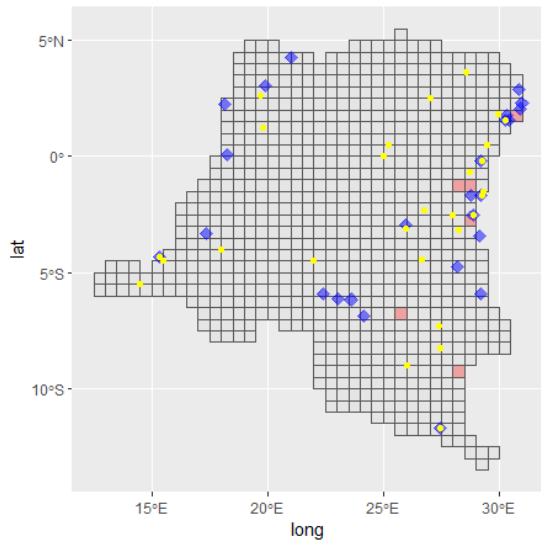
Figure 3.2 : Peacekeeping, aid and one-sided violence in the DRC

2002

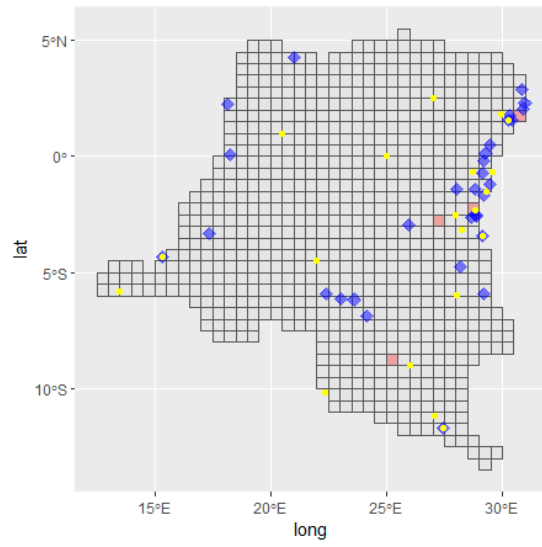
2003



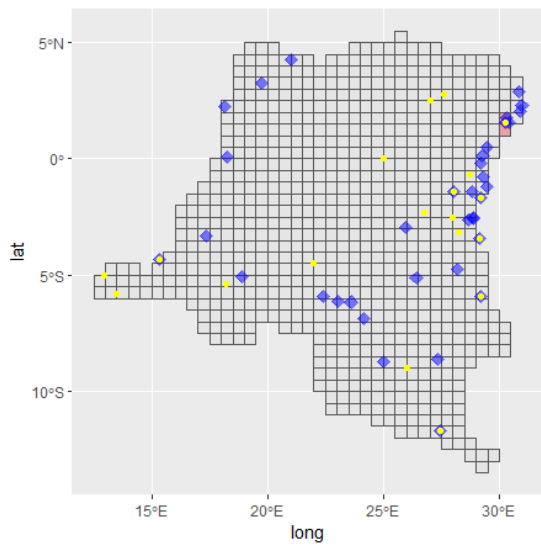
2004



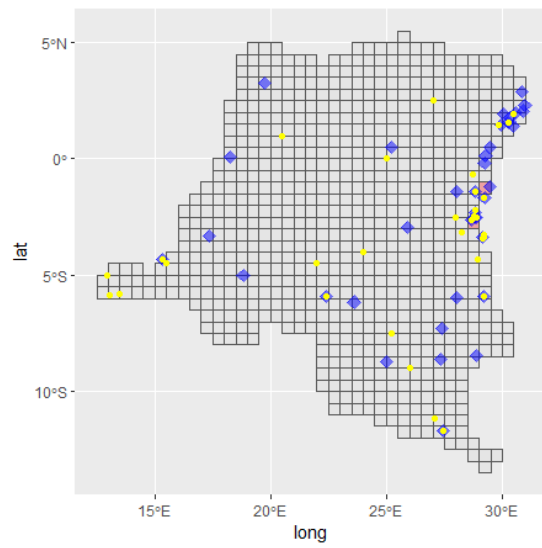
2005



2006



2007



Appendix - Peacekeeping, Aid and Violence

A.3.1: Why recursive bivariate probit model (RBPM) with instrumental variables (IV) strategy does not work in our case?

A.3.2: Models with log_aid variable

A.3.3: Models with the nominal variable but change the baseline

A.3.4: Models with DV is split into government OSV and rebel OSV

A.3.1: Why recursive bivariate probit model (RBPM) with instrumental variables (IV) strategy does not work in our case?

Recursive bivariate probit model with only one IV

Recursive bivariate probit model with instrument variables strategy is not suitable. We try to use recursive bivariate probit model with one instrumental variable to only solve one endogenous variable. In other word, we try to only solve one activity once by using one instrumental variable each time. Given that our focus is on the interaction term, we only interpret the interaction term based on one main term and do not interpret another main term for it is biased. For example, we are interested in whether humanitarian aid exacerbates one-side violence under the condition of UN peacekeepers. Then, the main term of humanitarian aid is dealt with an instrumental variable, which makes it unbiased and interpretable. The main of the presence of UN peacekeepers are still non-random assigned and we do not interpret its coefficient, but it should be fine to interpret the interaction term.

The instrumental variable for the UN peacekeeping deployment is the interaction between supply of peacekeepers in Africa and distance to the capital (Ruggeri et al. 2017; Fjelde et al. 2019). The logic is that there is always shortfall of peacekeeping contribution. The African peacekeeping supply should be the commitment of countries' supply, but actual contributions do not match commitments. Still, committed contributions influence the actual contribution, and finally influence the effectiveness of the peacekeeping operations. To account for the sub-national PKO deployment, the literature interacts the commitment contribution of countries of the whole African continent with the capital distance with each grid.

The instrumental variable for humanitarian aid is the interaction between the displacement of humanitarian aid and distance to the capital. The literature only uses the displacement of humanitarian aid as an instrumental variable for humanitarian aid supply in the national level

(Mary and Mishra 2020). The logic is that donors can be diverted by some other countries' crisis and re-allocate the humanitarian aid. Therefore, the displacement of the humanitarian aid to other countries (except $country_i$ influences the aid allocation in country i and finally, influences the conflicts in $country_i$. The displacement is calculated by humanitarian food aid received by all countries other than $country_i$ ($AID_t - AID_{it}$), to total aid received by all countries other than $country_i$ ($Total AID_t - Total AID_{it}$) (Mary and Mishra 2020). Again, to account for the sub-national humanitarian aid deployment, we interact the displacement of humanitarian aid in country i with the capital distance with each grid.

Also, dependent variable here are not forwarded because of the control of cubic terms in probit models.

However, both findings from the full statistical models not only fail to support our main hypothesis and are also quite counter-intuitive. Below, we only present the results when the dependent variable is OSV. Two tables are presented. In Table 1, the first stage dependent variable is PKO presence (so peacekeeping is instrumented), while in Table 2, the first stage dependent variable is aid presence (and aid is instrumented).

Table A.3.1.1: Interaction Effect of Peacekeeping and Aid Presence and the Onset and Continuation of OSV; Recursive Bivariate Probit; First stage DV: PKO presence

	(1)		(2)	
	PKO Presence	Onset of OSV	PKO Presence	Continuation of OSV
PKO Presence		0.595 (0.252)*		0.684 (0.835)
Aid Presence		0.466 (0.113)**		0.213 (0.220)
PKO*Aid Presence		-0.176 (0.297)		-0.443 (0.398)
Distance to Capital	-0.151 (0.038)**	0.025 (0.028)	0.092 (0.108)	-0.006 (0.079)
Distance to Borders	-0.133 (0.030)**	-0.051 (0.023)*	-0.153 (0.087)+	-0.054 (0.060)
Ave Travel Time	-0.001 (0.000)**	-0.001 (0.000)**	-0.001 (0.001)	-0.001 (0.000)*
Infant Mortality	0.001 (0.000)**	-0.000 (0.000)	0.005** (0.002)	-0.000 (0.000)
Population	0.230 (0.046)**	0.120 (0.033)**	0.437 (0.182)*	0.047 (0.090)
Mountains	-0.215 (0.155)	0.642 (0.098)**	-0.916 (0.415)*	0.378 (0.258)
Precipitation	0.000 (0.000)	0.000 (0.000)**	-0.000 (0.000)	0.000 (0.000)+
Conflict Intensity _{t-1}	0.001 (0.000)*	0.000 (0.000)	-0.001 (0.001)	0.001 (0.001)

Spatial lag PKO troop numbers _{t-1}	-1.421 (0.129)**	-1.127 (0.101)**	Omitted ³⁷	Omitted
Spatial lag OSV _{t-1}	0.001 (0.001)	-0.000 (0.002)	0.011 (0.004)*	0.003 (0.005)
Peace years	0.294 (0.053)**	-0.054 (0.047)		
(Peace years) ²	-0.034 (0.007)**	-0.004 (0.006)		
(Peace years) ³	0.001 (0.000)**	0.000 (0.000)+		
Conflict years			1.406 (0.325)**	-5.910 (0.545)**
(Conflict years) ²			-0.371 (0.098)**	1.275 (0.131)**
(Conflict years) ³			0.026 (0.007)**	-0.072 (0.008)**
African UN PKO supply	-0.000 (0.000)		-0.000 (0.000)	
Distance to capital*Africa UNPKO	0.000 (0.000)		0.000 (0.000)	
Constant	-4.963 (0.686)**	-3.198 (0.522)**	-9.865 (2.798)**	6.495 (1.446)**
Observations		27,381		613
athrho		-0.453		-0.560

³⁷ The analysis is conducted in both R and Stata. R and Stata produce consistent results with minor differences in quantity of interest. Here, we choose Stata for it is easier for Stata to produce regression table while for gfrm package in R, both stargazer and texreg package do not support produce regression table directly. However, Stata chooses to omit the analysis for this specific variable. Same reason in Table 2.

(0.123)**

(0.600)

 Robust standard errors in parentheses clustered on cell; + $p < 0.1$; * $p < 0.05$; ** $p < 0.01$

Models 1 and 2 (in Table A.3.1.1) control for the non-random assignment of peacekeepers and therefore we focus on the effect of peacekeepers and their interaction with aid. First, we observe a positive (rather than negative) effect for the deployment of peacekeepers on one-sided violence. These findings are the opposite of the findings of Fjelde et al. (2019) who use comparable models, but also Phayal and Prins (2020) who focus on a more restricted sample. Separating between rebel and government one-sided violence does not have an impact. We also find that peacekeepers increase the continuation of violence, but the positive coefficient is not significant. Note however the opposing finding of Ruggeri et al (2017), but they analyse the continuation of conflict (rather than violence against unarmed persons). The interaction between peacekeeping deployment and aid is negative (in line with our hypothesis) but not significant. Moreover, it is relatively small compared to the coefficients of peacekeeping and aid and won't therefore off-set the finding that these variables enhance conflict.

Table A.3.1.2: Interaction Effect of Peacekeeping and Aid Presence and the Onset and Continuation of OSV; Recursive Bivariate Probit; First stage DV: Aid presence

	(3)	(4)
	Aid Presence	Aid Presence
	Onset of OSV	Continuation of OSV
PKO Presence	-0.042 (0.048)	-0.211 (0.191)
Aid Presence	-1.275 (0.077)**	-1.405 (0.134)**
PKO*Aid Presence	-0.096 (0.194)	-0.242 (0.332)

Distance to Capital	-0.032 (0.087)	-0.086 (0.046)+	-0.173 (0.153)	-0.129 (0.070)+
Distance to Borders	-0.028 (0.036)	-0.054 (0.028)*	0.047 (0.064)	-0.082 (0.054)
Aver Travel Time	-0.001 (0.000)**	-0.001 (0.000)**	0.001 (0.001)	-0.001 (0.000)+
Infant Mortality	-0.000 (0.000)	-0.000 (0.000)	0.001 (0.000)**	0.000 (0.000)
Population	0.113 (0.059)+	0.142 (0.046)**	0.323 (0.110)**	0.188 (0.072)**
Mountains	0.725 (0.185)**	0.813 (0.134)**	-0.739 (0.332)*	-0.223 (0.234)
Precipitation	0.000 (0.000)	0.000 (0.000)**	-0.001 (0.000)**	0.000 (0.000)
Conflict Intensity _{t-1}	0.001 (0.001)	0.001 (0.000)*	-0.000 (0.001)	0.000 (0.000)
Spatial lag PKO troop numbers _{t-1}	-20.117 (0.000)	-19.938 (0.000)	Omitted (0.000)	Omitted (0.000)
Spatial lag OSV _{t-1}	0.001 (0.001)	0.001 (0.001)	-0.003 (0.008)	0.006 (0.009)
Peace years	-0.146 (0.062)*	-0.173 (0.039)**		
(Peace years) ²	0.017 (0.007)*	0.016 (0.006)**		
(Peace years) ³	-0.000 (0.000)*	-0.000 (0.000)+		
Conflict years			3.134 (0.448)**	-5.087 (0.465)**

(Conflict years) ²			-1.292	1.095
			(0.174)**	(0.117)**
(Conflict years) ³			0.154	-0.061
			(0.018)**	(0.007)**
Aid Displacement	17.036		19.577	
	(6.154)**		(14.476)	
Distance to capital* Aid Displacement	-2.244		-2.013	
	(0.945)*		(2.745)	
Constant	-2.769	-2.067	-6.706	5.370
	(1.003)**	(0.724)**	(1.916)**	(1.270)**
Observations		22,714		548
athrho		2.974		5.370
		(1.421)*		(1.270)**

Robust standard errors in parentheses clustered on cell; + $p < 0.1$; * $p < 0.05$; ** $p < 0.01$

In Models 3 and 4 (in Table A.3.1.2), we control for the non-random assignment of aid. The results are markedly different. Here, we find that aid significantly reduces the onset and duration of violence (contrary to Wood and Sullivan 2015), while the interaction between aid and peacekeepers remains negative but insignificant. Otherwise, the findings in Models 3 and 4 are consistent with those in Models 1 and 2 (and broadly in agreement with findings presented in earlier research).

We suspect that the results above are not convincing. Both instrumented main terms in the second stage show a counterintuitive result. A working paper (Lal et al., 2021) points out that the instrumental variable strategy used in observational studies could be problematic. It finds that the coefficient of a cleaned variable could still be biased and “the 2SLS estimates are

bigger than OLS estimates in magnitude” (Lal et al. 2021). Especially, “the ratio between the magnitudes of the 2SLS and OLS estimates is strongly negatively correlated with the replicated partial correlation coefficient between the instrument and the treatment among studies that use non-experimental IVs” (Lal et al. 2021).

Recursive bivariate probit model with only two IVs

Firstly, it is unrealistic to find two instrumental variables that separately or mutual exclusively explains PKO treatment (T1) and aid treatment (T2). When using two instrumental variables (Z1 and Z2) for two different endogenous variables (T1 and T2), Z1 and Z2 need to become orthogonal to meet the exclusion restriction assumption. Otherwise, Z2 can be contaminated by Z1 when cleaning the variable of T2. Then, both Z1 and Z2 cannot meet the exclusion restriction assumption. However, our research focuses on the subnational level. All the existing subnational peacekeeping research uses instrumental variables at the subnational level to refrain from ecological fallacy by interacting with distance variable. It could be the distance between grids and capital distance, (African UNPKO supply*ln Capital distance) (Fjelde et al. 2019; Ruggeri et al. 2017) or the distance between grids and field office, (Civilian personnel*Distance to field office) (Smidt 2020). Z1 and Z2 in our case both interact with or share the same component of capital distance variable. Furthermore, in our case, we focus on $T3 = T1 * T2$, which means that we need to have an instrumental variable $Z3 = Z1 * Z2$. Given that Z1 and Z2 are already interaction terms (African UNPKO supply*ln Capital distance and Aid displacement*ln Capital distance), it not only makes the model more complex, but makes it difficult to intuitively make sense on Z3. Also, again, according to latest research (Lal et al., 2021), the instrumental variable strategy is becoming less convincing in observational studies and has many problems. Therefore, we decide to not go on the direction of using two instrumental variables to clean two endogenous variables

A.3.2: Models with log_aid variable

The distribution of log_aid variable.

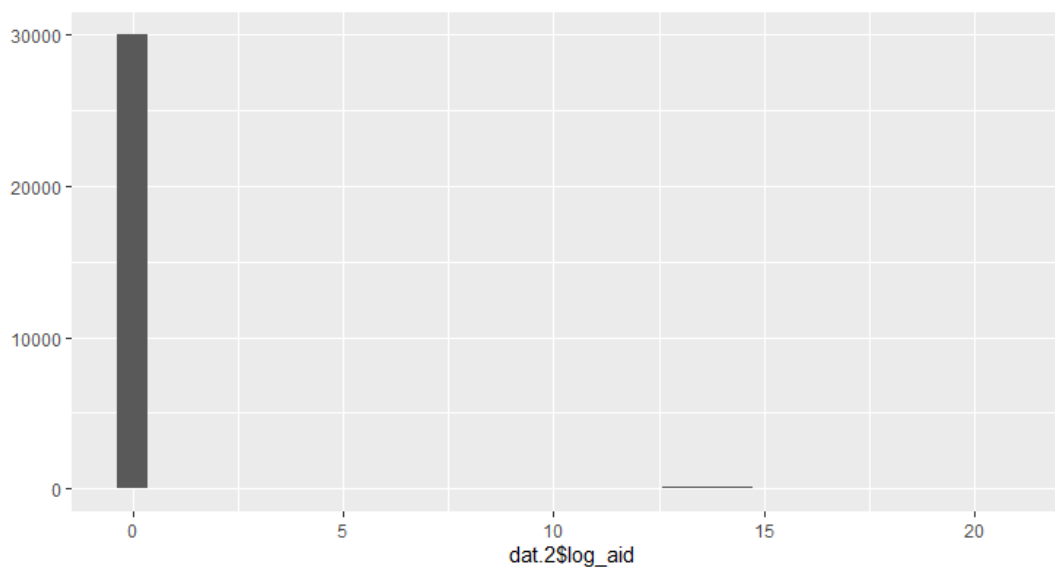


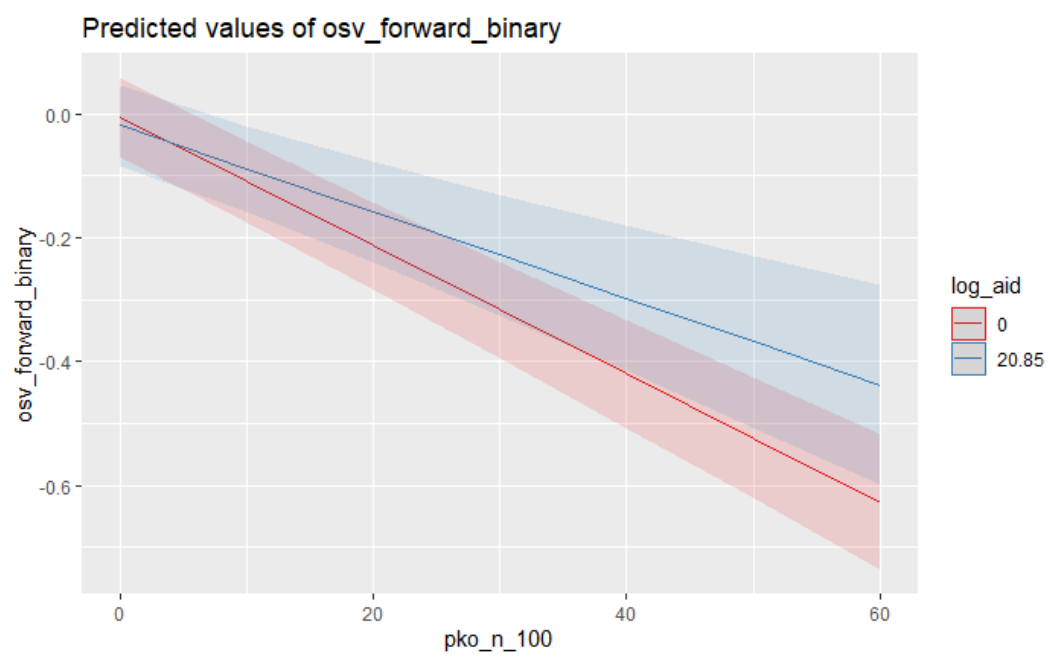
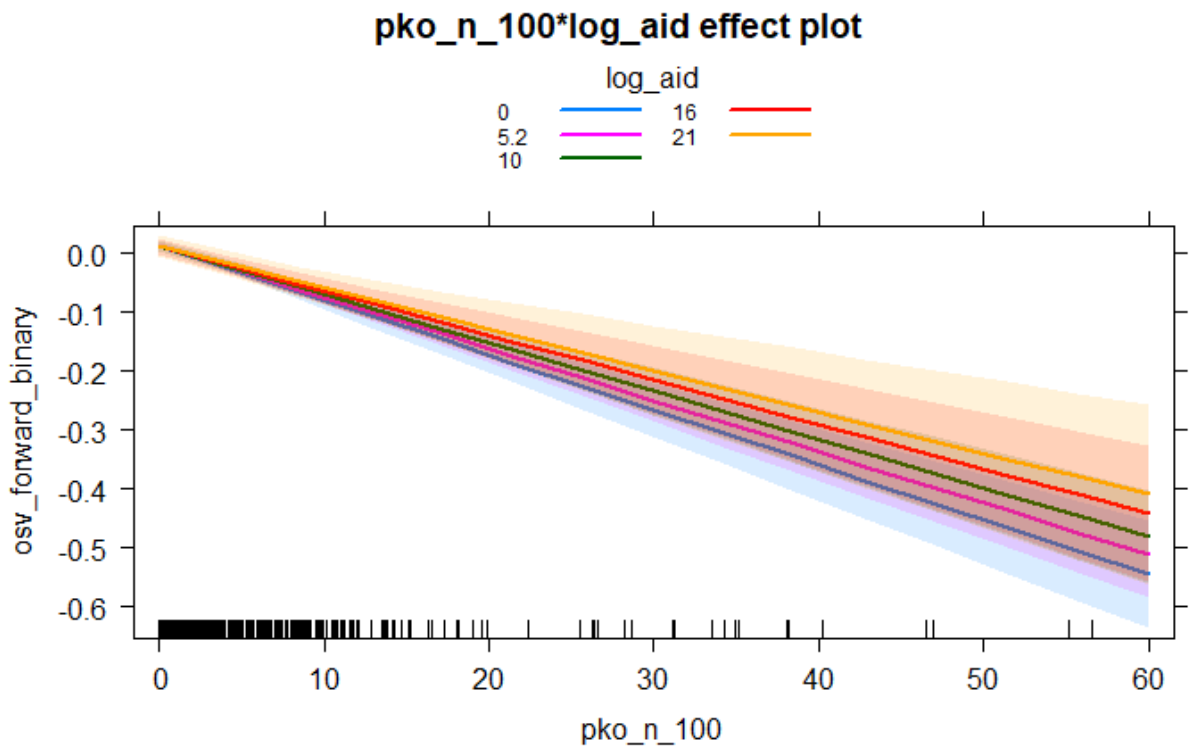
Table A.3.2.1: Models with log_aid variable

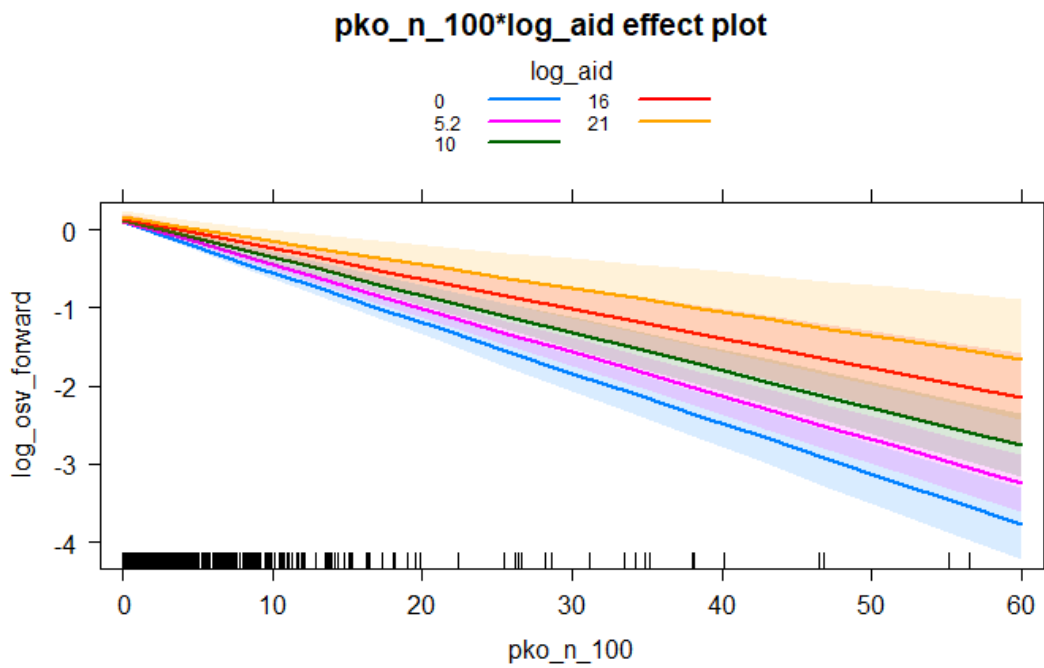
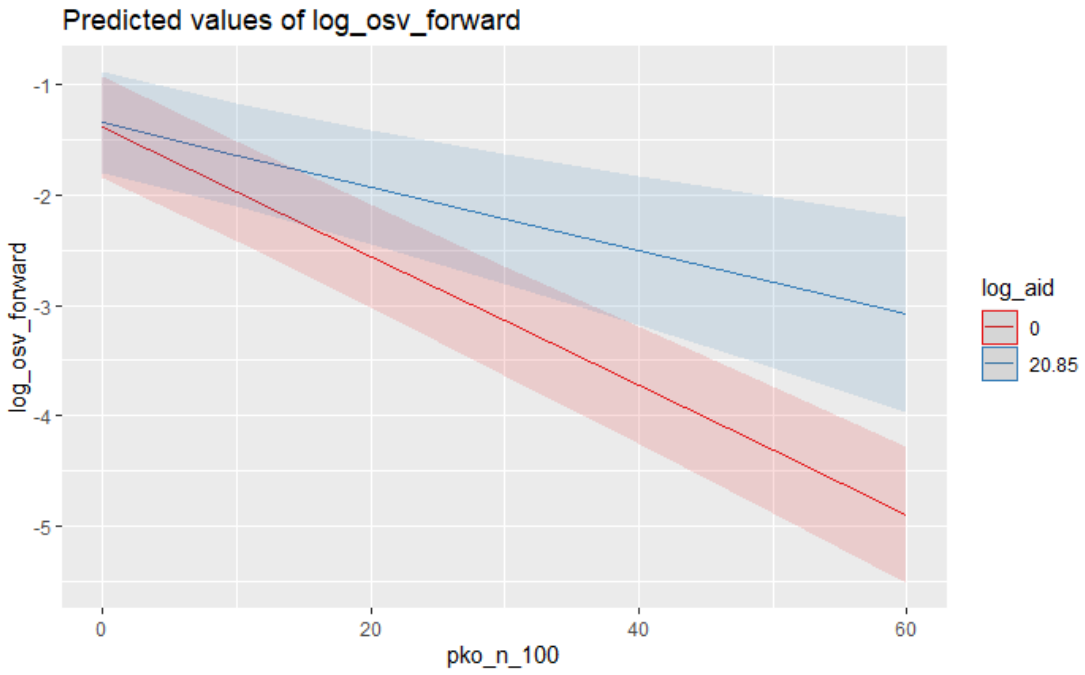
	DV binary OSV(t+1)			DV log_OSV(t+1)		
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
PKO (continuous)	-0.01 *** (0.00)	-0.00 * (0.00)	-0.01 *** (0.00)	-0.06 *** (0.00)	-0.01 (0.00)	-0.06 *** (0.00)
log_aid	-0.00 (0.00)	0.00 *** (0.00)	-0.00 (0.00)	0.00 (0.00)	0.02 *** (0.00)	0.00 (0.00)
PKO:log_aid (con.)	0.0 */ 1.614e-04	0.00	0.00	0.00 ***/ 1.634e-03	0.00	0.00 ***/ 1.416e-03
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Distance to Capital		-0.01 *** (0.00)			-0.06 *** (0.01)	
Distance to Borders		-0.01 *** (0.00)			-0.04 *** (0.00)	

Ave Travel Time		-0.00 ***			-0.00 ***	
		(0.00)			(0.00)	
Population		0.00 ***	-0.15 ***		0.02 ***	-0.75 ***
		(0.00)	(0.02)		(0.00)	(0.09)
Mountains		0.04 ***			0.31 ***	
		(0.00)			(0.02)	
Precipitation		0.00 ***	0.00		0.00 ***	0.00
		(0.00)	(0.00)		(0.00)	(0.00)
Conflict Intensity		-0.00 ***	0.00 *		-0.00 ***	
		(0.00)	(0.00)		(0.00)	
Infant Mortality		0.00 ***	0.00 ***		0.00 ***	0.00 ***
		(0.00)	(0.00)		(0.00)	(0.00)
Spatial lag PKO troop numbers		0.00	-0.00		0.00	0.00
		(0.00)	(0.00)		(0.00)	(0.00)
Spatial lag OSV		-0.00	0.00		-0.00	0.00
		(0.00)	(0.00)		(0.00)	(0.00)
(Intercept)	-0.01	0.07 ***	0.18	-0.04	0.45 ***	6.07 ***
	(0.03)	(0.01)	(0.40)	(0.17)	(0.06)	(0.73)
Fixed effect	Grid year	& None	Grid & year	Grid year	& None	Grid & year
R^2	0.19	0.04	0.20	0.26	0.08	0.27
Adj. R^2	0.12	0.04	0.13	0.20	0.08	0.21
Num. obs.	30596	27476	27644	30596	27476	30596

Though the interaction term in Model 1, Model 4, Model 6 in Table A.3.2.1 shows a positive effect with statistically significant, the coefficient is tiny, and the overall effect is still

negative. See the plots below. The first two plots are for Model 1 and the last two plots are for Model 6. The biggest value of `log_aid` doesn't change the negative effect on OSV.





A.3.3: Models with the nominal variable but change the baseline

Table A.3.3.1: Models with the nominal variable with different baseline category

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
	Category1 Baseline		Category2 Baseline		Category3 Baseline	
DV	DV_binary _{t+1}	DV_log _{t+1}	DV_binary _{t+1}	DV_log _{t+1}	DV_binary _{t+1}	DV_log _{t+1}
Category 0 (None in grid)	-0.00 (0.01)	-0.05 (0.03)	0.07 *** (0.01)	0.40 *** (0.03)	0.11 *** (0.01)	0.37 *** (0.06)
Category 1 (Aid only)			0.07 *** (0.01)	0.45 *** (0.04)	0.11 *** (0.01)	0.42 *** (0.07)
Category 2 (PKO only)	-0.07 *** (0.01)	-0.45 *** (0.04)			0.04 ** (0.01)	-0.03 (0.06)
Category 3 (Both aid&PKO)	-0.11 *** (0.01)	-0.42 *** (0.07)	-0.04 ** (0.01)	0.03 (0.06)		
Population	-0.13 *** (0.02)	-0.78 *** (0.09)	-0.13 *** (0.02)	-0.78 *** (0.09)	-0.13 *** (0.02)	-0.78 *** (0.09)
Precipitation	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
Conflict Intensity	0.00 *** (0.00)	0.00 *** (0.00)	0.00 *** (0.00)	0.00 *** (0.00)	0.00 *** (0.00)	0.00 *** (0.00)
Spatial lag OSV	-0.00	0.00	-0.00	0.00	-0.00	0.00

	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Spatial lag						
PKO	0.00	0.00	0.00	0.00	0.00	0.00
troop numbers						
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
(Intercept)	1.09 ***	6.35 ***	1.02 ***	5.90 ***	0.98 ***	5.93 ***
	(0.14)	(0.73)	(0.14)	(0.73)	(0.14)	(0.73)
R ²	0.19	0.27	0.19	0.27	0.19	0.27
Adj. R ²	0.13	0.21	0.13	0.21	0.13	0.21
Fixed effect	Grid & year	Grid year	& Grid & year	Grid year	& Grid & year	Grid year
Num. obs.	30596	30596	30596	30596	30596	30596

In Model 4 and Model 6 (in Table A.3.3.1), the Category 2 and Category 3 do not show statistical significance. It shows that when we directly compare grids with PKO and grids with both and the dependent variable is $\log(\text{OSV}+1)_{t+1}$. The models cannot show the difference between Category 2 and Category 3. However, it shows that when the dependent variable is binary, the violence-reducing effect of grids with both is stronger than grids with only PKO.

A.3.4 : Models with DV is split into government OSV and rebel OSV

Dependent variable is government OSV

Table A.3.4.1: Integrated effect of PKO and aid on binary version of GOV OSV_(t+1)

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
PKO binary	-0.02 *** (0.00)	-0.01 * (0.00)	-0.02 *** (0.00)			
Aid binary	0.00 (0.00)	0.02 *** (0.00)	0.00 (0.00)			
PKO:Aid (binary)	-0.03 ** (0.01)	-0.02 (0.01)	-0.03 ** (0.01)			
PKO continuous				-0.00 *** (0.00)	0.00 (0.00)	-0.00 *** (0.00)
Aid continuous				0.00 (0.00)	0.00 *** (0.00)	0.00 * (0.00)
PKO:Aid (cont.)				-0.00 (0.00)	-0.00 (0.00)	-0.00 (0.00)
Distance to Capital		-0.00 *** (0.00)			-0.00 *** (0.00)	
Distance to Borders		-0.00 *** (0.00)			-0.00 *** (0.00)	
Ave Travel Time		-0.00 (0.00)			-0.00 (0.00)	
Population		0.00 *** (0.00)	0.02 (0.01)		0.00 *** (0.00)	0.01 (0.01)
Mountains		0.02 *** (0.00)			0.02 *** (0.00)	
Precipitation		0.00 *** (0.00)	0.00 (0.00)		0.00 *** (0.00)	0.00 (0.00)
Infant Mortality		-0.00 ***			-0.00 ***	-0.00

		(0.00)			(0.00)	(0.00)
Conflict Intensity		0.00 ***	0.00 *		0.00 ***	0.00
		(0.00)	(0.00)		(0.00)	(0.00)
Spatial lag GOV OSV		-0.00	-0.00		-0.00	-0.00
		(0.00)	(0.00)		(0.00)	(0.00)
Spatial lag PKO troop numbers		-0.00	0.00		-0.00	0.00
		(0.00)	(0.00)		(0.00)	(0.00)
(Intercept)	-0.00	0.01	-0.16	-0.00	0.01	-0.00
	(0.02)	(0.01)	(0.09)	(0.02)	(0.01)	(0.26)
Fixed effect	Grid & year	None	Grid & year	Grid & year	None	Grid & year
R ²	0.12	0.02	0.12	0.12	0.02	0.12
Adj. R ²	0.05	0.02	0.05	0.05	0.02	0.05
Num. obs.	30596	27476	30596	30596	27476	27644

Table A.3.4.2: Integrated effect of PKO and aid on binary version of log_GOV OSV_(t+1)

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
PKO binary	-0.13 ***	0.01	-0.12 ***			
	(0.02)	(0.02)	(0.02)			
Aid binary	0.02	0.17 ***	0.02			
	(0.02)	(0.02)	(0.02)			
PKO:Aid (binary)	-0.02	-0.00	-0.02			
	(0.05)	(0.05)	(0.05)			
PKO continuous				-0.01 ***	0.01 ***	-0.01 ***
				(0.00)	(0.00)	(0.00)
Aid continuous				0.01 ***	0.01 ***	0.01 ***
				(0.00)	(0.00)	(0.00)
PKO:Aid (cont.)				-0.00	-0.00 *	-0.00
				(0.00)	(0.00)	(0.00)
Distance to Capital		-0.02 ***			-0.02 ***	

		(0.00)			(0.00)	
Distance to Borders		-0.02 ***			-0.02 ***	
		(0.00)			(0.00)	
Ave Travel Time		0.00			0.00	
		(0.00)			(0.00)	
Population		0.02 ***	0.10		0.02 ***	0.09
		(0.00)	(0.06)		(0.00)	(0.06)
Mountains		0.14 ***			0.15 ***	
		(0.01)			(0.01)	
Precipitation		0.00 ***	0.00 *		0.00 ***	0.00 *
		(0.00)	(0.00)		(0.00)	(0.00)
Infant Mortality		-0.00 ***			-0.00 ***	
		(0.00)			(0.00)	
Conflict Intensity		0.00 ***	0.00 ***		0.00 ***	0.00 ***
		(0.00)	(0.00)		(0.00)	(0.00)
Spatial lag GOV OSV		-0.00	-0.00		-0.00	0.00
		(0.00)	(0.00)		(0.00)	(0.00)
Spatial lag PKO troop numbers		-0.00	0.00		-0.00	0.00
		(0.00)	(0.00)		(0.00)	(0.00)
(Intercept)	-0.02	0.07	-0.82	-0.02	0.07	-0.82
	(0.11)	(0.04)	(0.49)	(0.11)	(0.04)	(0.49)
Fixed effect	Grid & year	None	Grid & year	Grid & year	None	Grid & year
R ²	0.18	0.04	0.18	0.18	0.04	0.18
Adj. R ²	0.11	0.04	0.11	0.11	0.04	0.11
Num. obs.	30596	27476	30596	30596	27476	30596

Dependent variable is rebel OSV

Table A.3.4.3: Integrated effect of PKO and aid on binary version of REB OSV_(t+1)

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
PKO binary	-0.06 *** (0.00)	-0.01 ** (0.00)	-0.05 *** (0.00)			
Aid binary	-0.01 (0.00)	0.03 *** (0.00)	-0.01 (0.00)			
PKO:Aid (binary)	-0.04 ** (0.01)	-0.02 * (0.01)	-0.04 *** (0.01)			
PKO continuous				-0.00 *** (0.00)	-0.01 *** (0.00)	-0.00 *** (0.00)
Aid continuous				0.00 *** (0.00)	0.00 (0.00)	0.00 *** (0.00)
PKO:Aid (cont.)				-0.00 (0.00)	0.00 (0.00)	-0.00 (0.00)
Distance to Capital		-0.01 *** (0.00)			-0.01 *** (0.00)	
Distance to Borders		-0.00 *** (0.00)			-0.00 *** (0.00)	
Ave Travel Time		-0.00 *** (0.00)			-0.00 *** (0.00)	
Population		0.00 (0.00)	-0.15 *** (0.01)		0.00 * (0.00)	-0.16 *** (0.02)
Mountains		0.03 *** (0.00)			0.03 *** (0.00)	
Precipitation		0.00 *** (0.00)	0.00 (0.00)		0.00 *** (0.00)	-0.00 (0.00)
Infant Mortality		-0.00 *** (0.00)			-0.00 *** (0.00)	0.00 ** (0.00)
Conflict Intensity		0.00 *** (0.00)	0.00 *** (0.00)		0.00 *** (0.00)	0.00 *** (0.00)
Spatial lag REB		0.00	0.00		0.00	0.00

OSV		(0.00)	(0.00)		(0.00)	(0.00)
Spatial lag PKO troop numbers		-0.00	0.00		-0.00	0.00
		(0.00)	(0.00)		(0.00)	(0.00)
(Intercept)	-0.00	0.08 ***	1.23 ***	-0.00	0.08 ***	0.18
	(0.03)	(0.01)	(0.12)	(0.03)	(0.01)	(0.34)
Fixed effect	Grid & year	None	Grid & year	Grid & year	None	Grid & year
R ²	0.18	0.04	0.19	0.18	0.04	0.20
Adj. R ²	0.12	0.04	0.12	0.12	0.04	0.13
Num. obs.	30596	27476	30596	30596	27476	27644

Table A.3.4.4: Integrated effect of PKO and aid on binary version of log_REB OSV_(t+1)

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
PKO binary	-0.34 ***	-0.03	-0.31 ***			
	(0.02)	(0.02)	(0.02)			
Aid binary	0.06 *	0.26 ***	0.05 *			
	(0.02)	(0.02)	(0.02)			
PKO:Aid (binary)	-0.09	-0.05	-0.10			
	(0.06)	(0.06)	(0.06)			
PKO continuous				-0.05 ***	-0.01 *	-0.05 ***
				(0.00)	(0.00)	(0.00)
Aid continuous				0.01 ***	0.01 ***	0.01 **
				(0.00)	(0.00)	(0.00)
PKO:Aid (cont.)				0.00 *	-0.00	0.00
				(0.00)	(0.00)	(0.00)
Distance to Capital		-0.06 ***			-0.06 ***	
		(0.00)			(0.00)	
Distance to Borders		-0.03 ***			-0.03 ***	
		(0.00)			(0.00)	

Ave Travel Time		-0.00 ***			-0.00 ***	
		(0.00)			(0.00)	
Population		0.01 **	-0.89 ***		0.01 ***	-0.85 ***
		(0.00)	(0.07)		(0.00)	(0.07)
Mountains		0.25 ***			0.26 ***	
		(0.02)			(0.02)	
Precipitation		0.00 ***	0.00		0.00 ***	0.00
		(0.00)	(0.00)		(0.00)	(0.00)
Infant Mortality		-0.00 ***			-0.00 ***	
		(0.00)			(0.00)	
Conflict Intensity		0.00 ***	0.00 ***		0.00 ***	0.00 ***
		(0.00)	(0.00)		(0.00)	(0.00)
Spatial lag REB OSV		0.00	0.00		0.00	0.00
		(0.00)	(0.00)		(0.00)	(0.00)
Spatial lag PKO troop numbers		-0.00	0.00		-0.00	0.00
		(0.00)	(0.00)		(0.00)	(0.00)
(Intercept)	-0.03	0.49 ***	7.25 ***	-0.02	0.50 ***	6.94 ***
	(0.14)	(0.05)	(0.61)	(0.14)	(0.05)	(0.61)
Fixed effect	Grid & year	None	Grid & year	Grid & year	None	Grid & year
R ²	0.25	0.07	0.25	0.25	0.07	0.25
Adj. R ²	0.19	0.07	0.19	0.19	0.07	0.20
Num. obs.	30596	27476	30596	30596	27476	30596

In short, when splitting the dependent variable into Reb OSV and Gov OSV, the results are consistent with the main result. The interaction effect holds when both IV and DV are binary variables.

Conclusion

UN peacekeeping is an important conflict resolution tool. It can be researched from different actors' perspectives. Across three chapters, this dissertation examines the dynamics of UN peacekeeping from the perspective of the country and the aid community. The first chapter examines why countries contribute to UN peacekeeping. The second chapter tests whether countries achieve their stated goal of status. The third chapter addresses the question of the integrated effect of UN peacekeeping and humanitarian aid, which not only considers the conflict management effectiveness from the UN peacekeeping' perspective, but from the aid community's perspective.

Summary of the Three Substantive Chapters

Chapter One argues that trade potential, rather than actual trade explains individual countries' UN peacekeeping participation. I use a gravity model to estimate expected trade and deduct the actual trade from the expected trade to get trade potential. I test the relationship between trade potential and UN peacekeeping participation from 1990 to 2012 and find a positive relationship. The relationship is found robust via different ways of the gravity model estimation strategy. The strategies include an Ordinal Least Square (OLS) strategy with a simple gravity model, a OLS strategy with a gravity model including three more variables (colonial ties, common language, and direct continuity), and a Poisson Pseudo-Maximum Likelihood Estimator (PPML) method (Silva and Tenregyro 2006). It is also robust when I examine the relationship between trade potential and the contribution of troop numbers, though the chapter is not designed to test trade potential's impact on the contribution of troop numbers. Furthermore, if I dissect the trade potential variable into the expected trade and the actual trade, the expected trade variable shows the statistical significance rather than the actual trade variable.

Chapter Two examines the relationship between UN peacekeeping participation and status enhancement. I argue that a country can learn, perform, and socialize to enhance its status regarding military aspects via UN peacekeeping. A country's participation can be regarded as a credible signal to the international community. To capture the interaction among countries within peacekeeping participation and the shared belief concept of status, I set up three applied hypotheses (i.e., invitation continuation, cooperation continuation, signalling hypothesis) based on learning, performance, and socialization. In other words, I test my theory in the way of the influence of the peacekeeping network on the status network. I use the Defense Cooperation Agreement (DCA) network to measure the status network, and use gaining a DCA tie to measure status enhancement. I use temporal exponential random graph model (TERGM) to test this network theory from 1990 to 2010 and find that the invitation continuation and co-participation continuation hypotheses are supported. However, the signalling hypothesis is not supported. I speculate that the signalling hypothesis could be a non-linear relationship. In other words, if a country sends too many PK ties, other countries may suspect that the sender country is contributing PK troops to get financial reimbursement. Though the test shows that the quadratic term has a negative quantity of interest, it still does not show a statistical significance. Therefore, I do not find that the more missions that one country simultaneously participates in PK, the more likely the country get military recognition. The quality of PK performance may explain the non-supportive result.

Chapter Three tests the integrated effect of UN peacekeeping and humanitarian aid on the one-sided violence at the local level. There are mainly two mechanisms: information sharing and security bubbles. UN peacekeeping and humanitarian aid can share information with each other. UN peacekeeping can provide security bubbles to humanitarian agencies, while humanitarian aid and agencies can provide some minimal order and structure to people's lives, when the temporary human needs are met. Both sides can bolster each other's efforts.

To examine these integrated effects, I set up the analysis at the subnational level using the PRIO-grid system and detailed information on the deployment of peacekeepers and the provision of humanitarian aid. I use two-way fixed effect (grid and year fixed effect) models to test the relationship from 1990 to 2007. I find some support for our main hypothesis that peacekeeping and aid have complementary effects. Admittedly, the support is somewhat dependent on model specification, but sensitivity analysis suggests they are robust and not simply result from selection bias. Furthermore, I find relatively few instances where peacekeeping and aid overlap. This may result from humanitarian agencies indeed actively avoiding peacekeeping operations (as interviews with some aid agencies indeed suggest as reported by Dorussen and de Vooght 2017). It may also simply reflect the quality of our data on the activities of humanitarian agencies. A further possibility is that aid and peacekeeping are primarily seen as alternate instruments where the application of one largely precludes the use of the other.

Contribution to the Existing Literature

In sum, the thesis provides clear contributions to the literature of the motivation of UN peacekeeping contribution, the foreign policy of UN peacekeeping, and the effectiveness of UN peacekeeping. Three chapters follow the above three strands of literature and also combine with some other subfields.

Chapter One follows the literature of motivation of UN peacekeeping. Among all motivations, it pursues the mixed result of trade's impact on peacekeeping participation (Stojek and Tir 2015; Rost and Greig 2011; Perkins and Neumayer 2008), and proposes a new estimator to represent the trade interest. Meanwhile, it also bridges the literature of economic integration. The gravity model method is usually used in East European countries' economic integration to the EU (Wang and Winters 1992) and then it is introduced in conflict studies to discuss

trade's impact on peace (Hegre 2009; Hegre et al. 2010). The chapter introduces the concept of trade potential and the method of gravity model into UN peacekeeping studies.

Chapter Two also follows different strands of literature. First, it follows the literature of UN peacekeeping as a tool of foreign policy (Meiske and Ruggeri 2017). Many papers examine the motivation of UN peacekeeping contribution when considering peacekeeping as a foreign policy tool, but do not test whether UN peacekeeping participation really help the countries achieve the stated goals. Chapter Two focuses on the most claimed purpose of UN peacekeeping status. Second, it examines a popular and viable foreign policy tool compared with other tools. The previous literature examines tools including inter-state wars (e.g., Renshon 2016), holding Olympic Games, foreign aid (Bezerra et al. 2015), and mediations (Baxter et al. 2018). However, inter-state wars are seldom used to pursue status in the Post-Cold War era, and not every country has the economic capacity and opportunity to use other tools. UN peacekeeping compared with other options are more viable. Third, it bridges the different approaches in studying status and bridges and furthers the connection with network analysis community. The previous literature usually either uses socio-psychological approach (e.g., Larson and Shevchenko 2019) or rational approach (O'Neil 2011) except a recent article (Renshon 2016). Chapter Two follows Renshon's approach using a rational-instrumental approach to measure status network to measure a social concept of status (Götz 2021). Furthermore, it goes beyond of descriptive network analysis on measuring status and uses a network inferential tool to test peacekeeping participation on status enhancement. Lastly, it innovatively uses Defense Cooperation Agreement (DCA) network to measure status, which expand the potential of the usage of DCA dataset.

Chapter Three follows the literature of the effectiveness of UN peacekeeping. First, it follows the trend of testing peacekeeping effectiveness in a subnational level (e.g., Ruggeri et al. 2017; Fjelde et al. 2019). Second, it follows the emerging interest in the integrated effect of

different conflict management methods and actors. Especially, the UN itself has begun to consider the integration of its resources and to mandate multidimensional peacekeeping missions in support of a comprehensive peace. Howard (2019) highlights the use of economic instruments by peacekeepers, such as aid and trust funds, as inducements for peace. Other scholars research the integrated effect of peacekeeping operations and mediation (Greig and Diehl 2005; Beardsley et al. 2019; Clayton and Dorussen 2021). Lastly, it bridges the literature of civilian and military components in peacekeeping operations.

In short, all three chapters build on the existing peacekeeping literature and also contribute to some other subfields.

Limitations and Directions for Future Research

However, the chapters can only provide some initial progress in the knowledge of UN peacekeeping. First, due to time and resources limitations, the time frame coverages of the data in three chapters could not be longer. Even though the peacekeeping dataset from IPI institute reaches to 2017, many other variables cannot cover up to 2017. In Chapter One, many control variables are from previous literature's replication material, which therefore are restricted to the time frame of the previous literature. In Chapter Two, though DCA dataset are available from the 1950s, it cannot be examined from the 1950s, because most UN peacekeeping data is from the 1990s. Also, DCA does not become a main influenced-related currency since the 1990s and UN peacekeeping can be different in the pre-Cold War age, especially during the Cold War age. Therefore, Chapter Two only examines from 1990 to 2010. Chapter Three has the same problem. In order to preserve the longer time frame, I choose Ruggeri et al.'s dataset (2017) rather than a newer one (Cil et al. 2020). It is because the subnational humanitarian aid data is from 1990 to 2008 (Findley et al. 2011) with no more new updates.

Second, if more disaggregated data are available, more interesting empirical findings could have been found. The concept of trade potential is illustrated from the perspective of countries rather than firms. From the perspective of countries, the gravity model is a best and suitable strategy. However, it also applies to the perspective of firms. Firms' economic activities have more variation and are more sensitive to the conflict situations. However, the disaggregated data in the firm level could have the problem of sample selections, i.e., some firms are selected while some firms do not appear in the dataset and currently is not the mainstream of conflict studies in civil wars and peacekeeping. Some scholars are going to this direction (Melin 2021). In Chapter Two, if the dataset of specific countries' sexual violence behaviours in UN peacekeeping is available, there could have been more examination between UN peacekeeping participation with weighted performance and status enhancement. However, the UN only started to collect data in 2005 regarding allegations to the troops (Karim 2019), which restricts Chapter Two's research. In Chapter Three, if the subnational humanitarian aid dataset is disaggregated into a month level, the temporal spatial dynamics could be examined further. The research question could also ask whether the deployment of humanitarian aid influences the deployment of UN peacekeeping. Given that the nature of deployment of two activities are quick conflict-responsive, it is inappropriate to examine the question in a year level.

Third, estimation strategies keep updating. The dissertation does not aim to make a methodological contribution and therefore chooses the best and suitable strategy which is widely accepted in the peacekeeping and conflict study community at the relevant research time. In Chapter One, some scholars (Ward et al. 2013) question the empirical workhouse of gravity model and use a latent space model to modify it. The chapter use a gravity model with a PPML method to do a robust check. After the comparison, there is no difference and therefore, the chapter does not pursue the direction of a latent space model. In Chapter Two,

the network inferential tool has been changing, such as relational event model (Butts 2008). However, TERGM is only recently used by several scholars in security and conflict studies (Turner et al. 2019). Therefore, Chapter Two does not go to that direction. In Chapter Three, the two-way fixed effect model is used after considering different estimation strategies including recursive bivariate probit model with an instrumental strategy, and matching (See Chapter Three Appendix for detailed information). I choose two-way fixed effect models because the above strategies do not work in my case.

Future of Peacekeeping and Policy Implications

The quantitative empirical peacekeeping research reaches a consensus that UN peacekeeping does keep peace, and Walter et al. (2021) call it as an “extraordinary” relationship. However, it is also undeniable that UN peacekeeping (not only for policy makers and for researchers) is facing dilemma and the UN peacekeeping effectiveness is still debatable. I discuss here what the dilemmas are and how my research contributes in a broad peacekeeping literature, and point out some policy implications and future research directions.

First, though UN peacekeeping is cost-effective (Walter et al. 2021), UN peacekeeping contribution is facing shortfall (Passmore et al. 2017). Especially, the Covid-19 pandemic strengthens the trend that countries, especially major and regional powers pursue the self-interest and contribute less in UN peacekeeping (Dorussen 2020). Furthermore, the UN is increasingly financially constrained (Dorussen 2020). Chapter One and Chapter Two can be the research to motivate peacekeeping senders or non-senders’ future contribution. After all, UN peacekeeping is a joint product model including both private and public interests (Khanna et al. 1999). The emphasis on private goods such as trade potential and status enhancement may help more in persuading more UN peacekeeping participation.

Second, there exist the inconsistent findings between quantitative peacekeeping research and qualitative peacekeeping research. On the one hand, there are large-n quantitative studies showing that peacekeeping reduces violence. On the other hand, there are the studies such as Autesserre's, which show systematic patterns of the UN peacebuilding malfunction. Chapter Three shows a bridge between two types of studies. First, it explores the internal Peacelanders' cooperation.³⁸ Autesserre's book *Peaceland* (2014) emphasizes the cultural difference between the Peacelanders and the locals in peacekeeping host countries rather than the differences within the internal Peacelander circles, though she mentions that Peacelanders themselves focus on their differences rather than similarities. Chapter Three follows the pathway and find that there are actually varying cooperative attitudes among UN peacekeepers and different humanitarian agencies. Especially, humanitarian agencies could have a changing attitude towards UN peacekeepers from time to time. Second, Chapter Three makes a cross-examination of Autesserre's argument on peacekeeping effectiveness. Autesserre argues that the internal tension among military actors (from different countries) and civilian actors impedes the peacebuilding to reach its full potentials. The result of Chapter Three partially supports Autesserre's argument while also partially support large-n studies. Chapter Three finds that the integrated effect does reduce one-sided violence risks, which is in line with the large-n studies. However, it is sensitive on the model specifications. In the descriptive analysis of Chapter Three, it finds that relatively few instances where peacekeeping and aid overlap. This may result from humanitarian agencies indeed actively avoiding peacekeeping operations (as interviews with some aid agencies indeed suggest as reported by Dorussen and de Vooght 2017). Especially, it tests (un)coordinated or internal tension argument on a negative peace indicator. Chapter Three suggests that there could be more coordinated conflict management efforts. Otherwise, it is cost ineffective.

³⁸ Following Apthorpe's approach (2005; Harrison 2013) of "Aidland" that "aid workers inhabit a separate world with its own time, space, and economics", Autesserre coins the terms, "Peaceland" and "Peacelander".

The future research could still follow the pathway of bridging different peacekeeping research communities between large-n studies and qualitative studies. First, it could use a quantitative method while reflecting on the local community's perspective. It is relatively objective to measure peacekeeping effectiveness as reducing negative peace and achieve effectiveness, but it is still a top-to-bottom approach. However, there could be more research that uses local people's perception to measure UN peacekeeping effectiveness (e.g., Dorussen 2015). Second, it could measure peacekeeping effectiveness in a more diverse quantifiable way rather than merely criticize that quantifiable measurements cannot capture many peacekeeping components. Many issues argued in Autesserre's book could be re-examined by a diverse peacekeeping effectiveness indicator rather than a merely negative peace indicator. For instance, everyday peace indicators (Firchow 2018) can be integrated in UN peacekeeping research. Gender norms could also be included to examine peacekeeping effectiveness, given that the UN aims for the agenda of female (Gizelis 2009). Lastly, more research could focus on different actors' integrated effect on different peacekeeping or peacebuilding effectiveness. After all, conflict or post conflict countries are an ecology, which consists of many different actors.

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