Evaluating the Conflict-Reducing Effect of UN Peacekeeping Operations

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Several studies show a beneficial effect of peacekeeping operations (PKOs). However, by looking at individual effect pathways (intensity, duration, recurrence, diffusion) in isolation, they underestimate the peacekeeping impact of PKOs. We propose a novel method of evaluating the combined impact across all pathways based on a statistical model of the efficacy of UN PKOs in preventing the onset, escalation, continuation, and recurrence of internal armed conflict. We run a set of simulations based on the statistical estimates to assess the impact of alternative UN policies for the 2001–13 period. If the UN had invested US$200 billion in PKOs with strong mandates, major armed conflict would have been reduced by up to two-thirds relative to a scenario without PKOs and 150,000 lives would have been saved over the 13-year period compared to a no-PKO scenario. UN peacekeeping is clearly a cost-effective way of increasing global security.

The conflict in Syria has led to a devastating humanitarian situation with several hundred thousands of people killed and over 4 million refugees. What would have happened if the United Nations Security Council (UNSC) had managed to come to an agreement and deployed a peacekeeping operation early in the conflict? How much sooner would the conflict have ended? How would such a deployment have affected the security situation in the region in the future? For policy makers, such counterfactual questions are of critical importance when deciding on future routes for peacekeeping. This paper evaluates the effect of peacekeeping operations (PKOs) and their potential for reducing conflict by constructing and estimating the counterfactual global incidence of internal armed conflict under different peacekeeping policies.

This exercise is complicated since PKOs affect conflict through several pathways. PKOs increase the duration of postconflict peace (Doyle and Sambanis 2006a; Fortna 2004, 2008), reduce the lethality of ongoing conflicts (Hultman, Kathman, and Shannon 2014), increase the chances of conflict ending (Doyle and Sambanis 2000), and prevent contagion to neighboring countries (Beardsley 2011). Moreover, the impact of a PKO is likely to last for a long time. Internal conflicts that break out typically last 5–10 years, and the risk of conflict recurrence is high for at least a decade after the war ends. Recurrent wars also tend to drag out for years. A successful conflict prevention will benefit the country and its neighborhood for decades relative to the counterfactual. Several studies have shown a beneficial effect of PKOs along one of these pathways. However, no study assesses the total

effect of PKOs along all pathways. As we demonstrate below, they consequently severely underestimate the benefits of PKOs.

We propose a novel approach to avoid these shortcomings and thereby obtain a much more complete assessment of the efficacy of PKOs. This entails using simulations to assess the joint effect of different PKO policies along all these pathways. We build on the knowledge accumulated through previous studies on peacekeeping and the risk of armed conflict by first training our model by estimating the effect of PKO budgets and the type of mandate using data for the 1960–2013 period. Based on those findings, we simulate the total impact of peacekeeping by specifying five scenarios reflecting different potential policies regarding how much to spend on peacekeeping, what mandates to provide, and which countries to target. To present our results, we estimate the impact of these peacekeeping scenarios for the 2001–13 period. An advantage of this procedure over standard regression models is that it allows us to compare our predictions with the actual occurrence of conflict for the same period, thus creating a counterfactual comparison of recent history. We are also able to compare the effect of our predicted PKO scenarios with the real PKO commitments during this period.

Our findings indicate that peacekeeping is much more effective than found in previous studies. In a scenario where the UN completely shuts down its peacekeeping practice from 2001 and onward, we estimate that three to four more countries had been in major conflict in 2013 relative to what the world saw given the actual level of peacekeeping activity.[1] The effect of peacekeeping in the short run is to limit the amount of violence, but we also find clear evidence that less violent conflicts are easier to end conclusively a few years down the road. In a given year, this means that for each conflict that the UN manages to transform from a major conflict to a minor one, another conflict ends.

We find that UN peacekeeping policies over the last 15 years have been effective; however, we also show that the United Nations could have done considerably better. The more the UN is willing to spend on peacekeeping, and the more missions are provided with a strong mandate, the greater is the conflict-reducing effect. In the most ambitious scenario we explore, in terms of budgets and mandates, we find that the UN could have transformed another four to five conflicts from major conflict to minor conflict in 2013. This represents a 70% reduction from the six major conflicts in Afghanistan, Democratic Republic of Congo, Iraq, Nigeria, Syria, and Pakistan recorded in 2013 to only two or three. Over the 13-year

period, the ambitious policy could have transformed 60 more country-years of major conflict into minor conflict compared to the observed policy, and at least as many minor-conflict years would have been turned into peace-years of less than 25 deaths.[2]

This ambitious but effective scenario would not be exorbitantly expensive—according to our simulations, it would require maintaining a UN peacekeeping budget at about US $17 billion every year, or twice the level of what it spent in 2012.[3] Accumulated over the 13-year period the simulated peacekeeping costs would have amounted to US$205 billion compared to US$59 billion in actual budget expenses over the 13 years. This is a substantial investment, but the required budget would decline in the future since peacekeeping considerably reduces the global future risk of conflict.

While the countries that contribute to UN peacekeeping with troops or funds are not necessarily those that reap the direct benefits, the humanitarian gains alone would be worth the expenses. A typical major conflict causes about 2,500 direct battle-related deaths per year. Over the 2001–13 period, the 60 country-years of minor and major conflict removed by the ambitious scenario would have saved about 150,000 direct deaths. Massive indirect deaths due to conflict violence would also have been averted (Gates et al. 2012). In addition, by reducing conflict peacekeeping can prevent the displacement of civilians, thus further reducing the humanitarian suffering that extends beyond the conflict countries. Moreover, as discussed at length in Collier et al. (2003), the negative externalities of internal conflicts repercuss across the globe, be it in the form of massive refugee flows, reduced trade and economic growth, or acts of terrorism in countries far from the location of the original conflict.

The article details how we reach these conclusions. We begin by providing a review of previous research on the conflict-reducing effect of PKOs. Subsequently, the methodology as well as the data used are presented. We present the results of the effect of our peacekeeping variables in the period 1960–2013, based on our statistical analysis. We then discuss and assess the determinants of PKO deployment in order to formulate a number of likely future PKO scenarios. Thereafter, the simulation results for the various scenarios for the period 2001–13 are presented. The last section offers some conclusions. An appendix, available online, provides more detail on the methodology and the data.

THE CONFLICT-REDUCING EFFICACY OF PKOS

The literature has identified three pathways through which PKOs may be effective. First, PKOs prevent conflict from

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1. The PKO policies that we simulate generate roughly the same number of conflict countries as the observed outcome. Fig. 3 below and fig. A-4 in the online appendix illustrate these results. Table A-13 in the online appendix reports the estimated proportion of countries in conflict.

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2. These figures compare scenarios S2 and S5, which are explained below.
3. The simulated budget figures are reported in figure 5 and table A-14.

breaking out or recurring. The task of maintaining peace in a postconflict situation was the original intention of peacekeeping and remains the most studied effect of PKOs. Doyle and Sambanis (2000) were the first to quantitatively analyze the effect of PKOs on the duration of postconflict peace. The authors find a significant and substantial positive effect of peacekeepers on peace building, measured two, five, or 10 years after the end of the conflict. This conclusion holds in several later studies. Fortna (2004, 2008) finds that the risk of repeat war drops "by 75%–85% or more when peacekeepers are present" (Fortna 2008, 125).

Fortna (2004) identifies a marked difference between the effectiveness of PKOs during and after the Cold War. She finds no significant effect of PKOs on peace duration for the full post–World War II period but a substantial and significant effect of all types of PKOs after the cold war (Fortna 2004, 283). Similarly, Sambanis (2008, 29) concludes from analyzing the short- and long-term effects of UN PKOs that "the UN has actually become better at peacekeeping over time." More generally, he finds that the effect of PKOs is strongest in the first few years, but in the long run only local economic recovery and institution building can ensure a lasting peace. The same conclusion is reached by Collier, Hoeffler, and Söderbom (2008). They argue that economic recovery is the best way to achieve a stable peace, but that PKOs can make a substantial difference. Looking more broadly at third-party enforcement of peace settlements, Hartzell, Hoddie, and Rothchild (2001, 200) find that five years after "the signing of a peace agreement, the survivor rate among settlements with an external assurance is 68% compared with 32% for arrangements lacking such promise."

A second pathway by which peacekeeping benefits peace is by enabling the cessation of fighting or by reducing the intensity of violence in an ongoing conflict. Hultman et al. (2014) show that when peacekeepers are deployed in contentious situations, they are effective in reducing fighting between the warring parties if deployed in larger numbers. According to Beardsley and Gleditsch (2015), peacekeepers reduce the scope of violence by containing conflicts geographically, and Ruggeri, Dorussen, and Gizelis (2017) show that peacekeepers also reduce the duration of conflict locally. Likewise, Doyle and Sambanis (2000) find that UN PKOs can serve to end ongoing violent conflict, at least when provided with a strong enforcement mandate. PKOs with strong mandates or high capacity are also effective in managing violence against civilians in ongoing armed conflicts (Hultman, Kathman, and Shannon 2013; Kreps and Wallace 2009), which may in turn have positive effects on the prospects of peace.

A third pathway through which peacekeeping works is by limiting the spatial and temporal contagion of conflict.

Beardsley (2011) argues that the effect of peacekeeping goes beyond the mandated scope of the mission and shows that PKOs are effective in reducing the likelihood of conflict in neighboring countries. By creating stability in one country, the risk of conflict contagion demonstrated by other studies (Kathman and Wood 2011) is thus strongly reduced.

One methodological challenge for studies of peacekeeping effects is the issue of selection bias—if the United Nations only sends missions to the easiest conflicts, the success rate of missions will be overestimated. This seems not to be a major problem, however. Both Fortna (2008) and Gilligan and Stedman (2003) show that peacekeepers in fact tend to be deployed to the more difficult cases. Estimating the effect of peacekeeping, both Doyle and Sambanis (2006a) and Gilligan and Sergenti (2008) explicitly address the nonrandom way in which PKOs are deployed and utilize a matching model to guard against selection bias. Cases of countries in which PKOs were deployed are matched to similar cases in which PKOs were not. Both studies find a clear peace-prolonging effect of UN PKOs (Doyle and Sambanis 2006a; Gilligan and Sergenti 2008). According to Gilligan and Sergenti (2008), this effect is even stronger than in the nonmatched data set, meaning that previous research most probably underestimated the effect of PKOs—at least on peace duration after war. Likewise, Vivalt (2014) finds support for a peace-prolonging effect by using an instrumental variable approach to account for nonrandom deployment, and Melander (2009) demonstrates that peacekeeping can also prevent genocidal violence breaking out by modeling a seemingly unrelated probit. In appendix A.1 we explore endogeneity problems in the context of our own analysis and concur with these studies that bias is limited.

From previous research we can conclude that peacekeeping in general has a conflict-reducing effect. However, all peacekeeping operations are not equally effective. The two characteristics that seem to be the most important are the operations' mandate and their size in terms of budget and troop strength. These are also the main aspects of PKOs that are politically established by the UN Security Council. Doyle and Sambanis (2000) find that traditional PKOs, characterized by unarmed or lightly armed troops with very limited mandates, do not have any effect on peace duration.[4] Multidimensional PKOs, on the other hand, "are extremely significant and positively associated with" peace-building success

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4. Interestingly, Fortna (2004, 238) finds that "traditional peacekeeping missions and observer missions have been the most successful," while Doyle and Sambanis (2006a, 111) find that "traditional peacekeeping does not work well, and may even have negative effects."

(Doyle and Sambanis 2000, 791).[5] Similarly, Doyle and Sambanis (2006a) find that multidimensional and enforcement missions have a significant and substantial positive effect on peace-building success. Differentiating between a strict and a lenient definition of peace, they find that multidimensional PKOs "work well with respect to both measures, [but] UN missions in general seem to have their greatest effect in preventing lower-level violence and enabling countries to democratize and rebuild institutions after civil war rather than prevent the resumption of full-scale war" (Doyle and Sambanis 2006a, 110).

Many studies indicate that the number of troops deployed is important. Hultman et al. (2014) show that the more armed personnel that are deployed to UN missions, the better they are in reducing violence between the combatants. Stronger missions have also been shown to enhance cooperation by the conflict parties (Ruggeri, Gizelis, and Dorussen 2013) and increase the chance of overall success (Kreps 2010). Moreover, larger missions are better at protecting civilians during and after conflict (Hultman et al. 2013; Kathman and Wood 2016). The global trend also suggests that increase in the number of UN troops deployed in peace operations during the 1990s coincided with a decrease in the number of intrastate armed conflicts (Heldt and Wallensteen 2006). In addition, when estimating the determinants of postconflict risk, Collier et al. (2008, 461) find that "doubling [PKO] expenditure reduces the risk from 40% to 31%." While some missions receive an annual budget of well over US$1 billion, other budgets are limited to less than US$50 million. Since the budget sets clear limits to the number of troops that can be employed, it should influence the prospects for peace. Nevertheless, Doyle and Sambanis (2006a) argue that the number of peacekeeping troops is a poor predictor of peace-building success; the number of "boots on the ground" must be considered in relation to the PKO's mandate. The reason for this, they argue, is that a "large troop deployment with a weak mandate is a sure sign of lack of commitment by the Security Council. . . . This suggests a mismatch between the nature of the problem and the treatment assigned by the UN" (Doyle and Sambanis 2006a, 113). This highlights the importance of including both mandate and mission size in statistical models.

In sum, PKOs are effective—and they are effective in generating peace through different pathways. While selection bias may lead scholars to underestimate the effect of peacekeeping,

so does a focus on single pathways to peace. It is thus possible that PKOs are even more effective than previously suggested. But how much more successful can we expect them to be? In order to address that question in a comprehensive way, we use a simulation approach to make predictions about the effectiveness of various PKO policies in reducing armed conflict taking all the possible pathways into account. Below we formulate different PKO scenarios in which we vary the crucial PKO components of mandate and budget. Before turning to these scenarios, we introduce the methodology we use to estimate and simulate the effectiveness of PKOs.

METHODOLOGY

We use a methodological approach that allows us to assess the effect of PKOs along all of the onset, escalation, continuation, and recurrence pathways. To this end, we first estimate a model of the effect of PKO in the period 1960–2000 and conclude that PKO variables contribute significantly to predicting (out-of-sample) internal armed conflict for the 2001–13 period. This gives us confidence that we have identified useful peacekeeping variables. We then reestimate this model using data for 1960–2013 (thus using all the data on peacekeeping operations for more efficient estimates). We use these estimates to simulate over multiple years for 2001–13 to evaluate the impact of a number of hypothetical peacekeeping scenarios on the risk of armed conflict. The simulation enables us to model the effect that PKOs have both over time and across borders. Another advantage of the simulation is that we are not limited to observing only the outcome of PKOs in the past but that we are also able to estimate the effect of PKOs relative to a counterfactual. What would the effect have been if a PKO were not deployed? Or what would have happened if a PKO with a stronger mandate were deployed? The estimated effects of our policy scenarios are then compared to the actual incidence of armed conflict and the observed peacekeeping policy of the UN. In this sense, our methodology provides a more realistic test of the impact of these peacekeeping scenarios compared to empirical models based only on historical data.

Statistical model and simulation procedure

Based on insights from previous research, we have reason to believe that a PKO that succeeds in limiting conflict intensity may also shorten the conflict, increase the postconflict duration and even decrease the duration and intensity of any recurrence that occurs, as well as decreasing the risk and intensity of contagion to other countries. In principle, potential contagion has no limits. If the Afghan internal armed conflict could have been restrained in the mid-1970s, there might have been no attack on the World Trade Center in New York in 2001. To assess the total effect of PKOs along all the

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5. Discussing the problem of counterfactuals, King and Zeng (2007) argue that some of the Doyle and Sambanis (2000) findings are model dependent and unsupported by empirical evidence. Sambanis and Doyle (2007) dispute this claim.

pathways, we must analyze all country-years within the period we are studying, not only those where PKOs are deployed. In this sense, our empirical approach is more comprehensive than other studies of peacekeeping effectiveness that restrict the sample based on conflict and/or peacekeeping involvement.

In order to assess the effectiveness of PKOs along all the different pathways, we need a dependent variable that not only captures the presence of conflict but also uses available information on the intensity of armed conflict. We estimate the probability of onset, escalation, deescalation, and termination of internal armed conflict (with our dependent variable taking the values of no conflict, low-intensity conflict, and high-intensity conflict). For this purpose, we estimate a multinomial logit model with lagged dependent variables and interaction terms between explanatory variables and the lagged dependent variables.[6] We estimate the statistical relationship between the incidence of conflict and the presence of PKOs of various types and budget sizes, controlling for other factors that affect the risk of conflict.[7] The models are estimated on data for all countries for the 1960–2013 period.[8]

Our statistical model captures directly the effects of PKOs along all three pathways for individual years, but further analysis is required to assess the effects along all the pathways seen over multiple years. To this end, we make use of the "dynamic simulation" procedure presented in Hegre et al. (2013). With this procedure, we estimate the underlying risk of conflict for the period 2001–13 based on known predictors of armed conflict for which we have data for the same period. We simulate the impact of PKOs based on the coefficients that we estimate using historical data in the statistical model for 1960–2013. The model updates the risk of conflict each year based on the simulated outcome in the previous year, both in the same country and in surrounding countries.

More specifically, the procedure involves the following steps: (1) specify and estimate the underlying statistical model (as shown in table 2); (2) assume that the values for predictor variables are exogenous to conflict and use the observed ones for 2001–13; (3) formulate a set of scenarios for policies that the UN Security Council can adopt with regard to the budget and mandate for PKOs as well as the type of situations where the UN would deploy a PKO (see the section Description and motivation of scenarios); (4) draw a realization of the coefficients of the multinomial logit model based on the estimated

coefficients and the variance-covariance matrix for the estimates; (5) calculate the probabilities of transition between levels for all countries for 2001, based on the realized coefficients and the predictor variables; (6) randomly draw whether a country experiences conflict based on these; (7) update the values for the variables measuring historical experience of conflict in the country and neighborhood; (8) repeat steps 4–7 for each year in the forecast period 2001–13, and record the simulated outcome; and (9) repeat steps 4–8 a number of times to even out the impact of individual realizations of the multinomial logit coefficients and individual realizations of the probability distributions. Steps 5 and 6 are similar to the simulation of "quantities of interest" for time $t + 1$ using the Clarify or Zelig packages (Tomz, Wittenberg, and King 2003). We label this a "dynamic simulation" since the outcomes we draw affect the incidence of conflict at time steps $t + 2$, $t + 3$, and so on. See appendix A.2 for a flowchart and Hegre et al. (2013) for further details.

This procedure allows us to estimate the impact of peacekeeping across all pathways. If a minor conflict breaks out in a hitherto peaceful country, this increases the estimated risk of conflict in that country in many years afterward as well as the risk of conflict in neighboring countries. If our statistical model finds that a PKO prevents the onset (or recurrence or escalation) of such a conflict, that is reflected in several subsequent transitions, too. By comparing the global and regional incidence of conflict under these scenarios, we can aggregate the short-term effects identified by the statistical model up to a level that is much more useful for decision makers.

Description of data

Dependent variable. We are interested in evaluating the efficacy of PKOs in ending armed conflicts as well as in preventing escalation and future recurrences. Therefore, the dependent variable in this study is a three-category variable denoting whether there is a minor conflict (25–999 battle-related deaths), a major conflict (1,000– battle-related deaths), or no conflict going on in a country in a given year. The data are from the 2014 update of the UCDP/PRIO armed conflict data set produced by the Uppsala Conflict Data Program and Peace Research Institute Oslo (Gleditsch et al. 2002; Themnér and Wallensteen 2014) that defines an internal armed conflict as a contested incompatibility that concerns government and/or territory where the use of armed force between two parties, of which at least one is the government of a state, results in at least 25 battle-related deaths.

PKO variables. We base our coding of PKOs on the categorization in Doyle and Sambanis (2006a, 11–18) (hereafter Doyle-Sambanis). We code two types of mandates:

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6. Such models are often referred to as "dynamic" (Przeworski et al. 2000) or "transition" models (Amemiya 1985).

7. For a review of conflict risk variables, see Hegre and Sambanis (2006).

8. In what follows, we treat the deployment of peacekeeping operations as an exogenous variable. In app. A.1, we discuss this issue and test formally that the assumption of exogeneity indeed holds.

Traditional PKO

1. Observer missions—restricted to observing actions such as a truce, troop withdrawal, or a buffer zone. Always deployed with the consent of the parties to the conflict. Examples are United Nations Mission of Observers in Tajikistan (UNMOT) and United Nations Mission of Observers in Prevlaka (UNMOP) in Croatia.
2. Traditional missions—also deployed with the consent of the parties, but with somewhat extended mandates such as policing a buffer zone and assisting in negotiating a peace agreement. Examples are United Nations Preventive Deployment Force (UNPRESEP) in Macedonia and United Nations Interim Force in Lebanon (UNIFIL).

Transformational PKO

1. Multidimensional missions—referred to as "second-generation operations," the mandates, also consent based, are extended with activities intended to go to the roots of the conflict, such as economic reconstruction, institutional transformation (reform of police, army, judicial system, elections). Examples are United Nations Observer Mission in El Salvador (UNOSAL) and United Nations Mission in Timor-Leste (UNMIT).
2. Enforcement missions—"third-generation operations" that do not require the consent of both parties and therefore must draw on the authority of UN Charter articles 25, 42, and 43 to apply force to protect the activities of the operation. Examples are United Nations Protection Force (UNPROFOR) in former Yugoslavia and United Nations Mission in Sudan (UNMIS).

The simplification of creating two categories out of the original four is based on the finding by Doyle-Sambanis that the latter two are significantly more effective than the two former types. Furthermore, many missions nowadays are more mixed, incorporating aspects of both enforcement and state building. Therefore, it makes sense to estimate the effect of those more comprehensive mandates aimed at transforming the conflict in comparison to those missions with more limited goals such as preserving or observing a situation. While there may be essential differences between multidimensional and enforcement missions, they are not important for our results. In goodness of fit and out-of-sample tests

we show that our categorization performs as well as or better than a model including dummy variables for the four different mandate types.[9]

The Doyle-Sambanis data set does not cover all of the missions included in our study. Therefore, we have coded the mandate for all remaining missions on the basis of the definitions provided by Doyle-Sambanis, using UN Security Council resolutions and mandate information available at the UN Department of Peacekeeping Operations website.[10] Moreover, since the Doyle-Sambanis data set is not time varying, we have coded changes in mandates based on the comments on adjustments to the mandate in Doyle and Sambanis (2006b). There are 50 PKOs in our data set—appendix A.3 gives a list of all of them by mandate. The PKOs are distributed fairly evenly across the mandate types, and the conflicts they are deployed in display sufficient variation in terms of intensity to carry the statistical model reported below.

To capture the size of the PKO, we have coded the yearly budget for each mission, based on United Nations General Assembly published appropriation resolutions from 1946 to 2013. The variable gives the log of the yearly amount allocated by the UN for each specific mission. In the section Description and motivation of scenarios, we provide more detailed statistics for our PKO variables.

Additional PKO variables. To measure the potential decrease in the risk of conflict contagion from one country to another we include a variable marking whether a PKO was deployed in any of the country's neighboring countries.

Other predictor variables. To predict the incidence of conflict under different PKO scenarios, we add predictor variables that are associated with the risk of conflict. Detailed information on these variables is given in appendix A.4.

We model the incidence of conflict, that is, whether the country is in a minor or major conflict in a given year. To model this appropriately, we include information on conflict status (no conflict, minor, or major conflict) at $t - 1$, the year before the year of observation in the estimation phase in order to model the probability of transitions between each conflict level. The log of the number of years in peace up to $t - 2$ is also included. We refer to this set of variables jointly as "conflict history" variables.

We include the same information on conflicts in the country's neighborhood in order to model and simulate the

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9. In terms of goodness of fit, for instance, the Akaike information criterion (AIC), which considers the log likelihood but also penalizes larger models, is indistinguishable for a model with all four dummy variables and a model with our two preferred types, respectively 3,734 vs. 3,729.
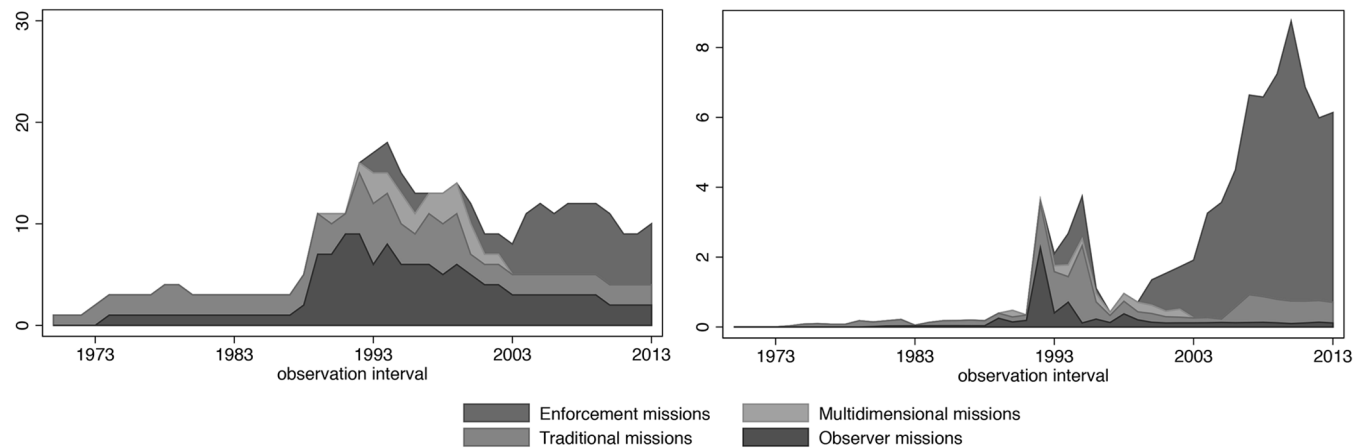
10. See http://www.un.org/en/peacekeeping.

Figure 1. Count (*left panel*) and total budget in billion US$ (*right panel*) of UN PKO missions by mandate type, 1970–2014. The mandate types are stacked with observer missions at the bottom, traditional and multidimensional in the middle, and enforcement missions at top.

spatial diffusion of conflicts. This is also necessary to deal with situations in which a clustering of conflict is associated with events such as the Arab Spring or the US invasion of Iraq. To take into account the potential that neighboring conflict might increase the risk of both the onset or escalation of conflict, we include interaction terms between the conflict status in the country and in neighboring countries.[11]

Socioeconomic development has been shown to have a strong and robust relationship with the risk of conflict, and we include as a measure of development gross domestic product (GDP) per capita (Collier and Hoeffler 2004; Fearon and Laitin 2003; Hegre and Sambanis 2006). To take into account the deleterious effect of conflict on GDP (Collier et al. 2003), we augment the observed GDP levels with a model that takes the effect of a forecasted conflict on GDP levels into account—thus partly endogenizing GDP per capita. The conflict-to-GDP model is explained in more detail in appendix A.6.

Countries with larger populations have more conflict (Raleigh and Hegre 2009). We therefore include a variable measuring the country's total population. The demographic variables originate from the World Population Prospects 2006 (United Nations 2007).

We also control for the log of the number of years the country has been independent. This represents aspects of state consolidation not captured by socioeconomic development. We fit a random-effects model and include two parameters that measure, respectively, the propensity of minor and major conflict for each individual country.[12]

Our control variables may not have the same effect on the probability of conflict onset as on conflict termination. To model this "dynamic," we include multiplicative interaction terms between the control variables and the conflict history variables.[13]

We do not include a dummy variable for the Cold War period in our specification. As has been repeatedly noted in the literature, there was a major shift in UN PKO policies after the end of the Cold War. This shift, however, is to a great extent reflected in our independent variables, since extensive mandates and larger missions are much more common after 1989, as we document below (fig. 1). Moreover, the fact that we focus on internal armed conflicts also means that the main bulk of the peacekeeping missions that are included in our analyses take place after 1989. Hence, our analysis to a considerable extent takes this historical shift into account. We consequently assume that the Cold War effect works through this measurable shift in PKO policies.

DESCRIPTION AND MOTIVATION OF SCENARIOS

In our simulations, future conflicts occur randomly albeit with probability distributions according to the statistical model (see table 2). Since we do not know where conflicts will occur, we cannot know where PKOs will be needed. We

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11. We define neighbors as pairs of countries that share a common border. Islands are defined as their own neighborhood. Data from Weidmann, Dorussen and Gleditsch (2010).

12. Ideally we would have fit a fixed-effects model that would take into account nonobserved time-constant country characteristics. Given the

nature of our data, that, however, is not feasible (Beck and Katz 1995, 2001). For technical reasons, the random effects are estimated in two separate random-effects logistic regression model estimations, one for minor and one for major conflict compared to no conflict, and entered as covariates in the simulation model.

13. The sizable number of interaction terms entails some loss of efficiency but also improves the predictive performance of the model (see the out-of-sample evaluation in Hegre et al. [2013]). Since we assess the total impact of our variables by means of simulations, the high number of parameters does not give rise to interpretational or collinearity problems.

therefore have to specify rules for where our simulations will deploy PKOs.

PKO deployment rules for simulations

We want the rules to be realistic but also to reflect a policy framework that is committed to PKOs. The idea is to identify the most likely pattern of peacekeeping deployment and to rule out deployment to cases that would never receive peace-keepers in reality. These rules are based on empirical findings in previous research and our own analysis of where and when the UN is more likely to intervene in internal conflicts.

Gilligan and Stedman (2003, 38) argue that since "the UN acts in ways that corroborate its humanitarian and security missions . . . one of the best predictors of UN intervention is the number of deaths in a conflict." In our analysis of where PKOs are deployed (reported and discussed in app. A.7), we confirm that PKOs indeed are more frequently deployed to major conflicts than to minor ones in our data set. Given limited resources, the UN prioritizes the most intense conflict areas that constitute the greatest threats to regional stability. Reflecting this trend, our first rule is accordingly:

Rule 1. PKOs are initiated if the conflict is major (more than 1,000 battle deaths in the previous year.

The second rule specifies the duration of PKOs. The exact number of years chosen is somewhat arbitrary but is supported by the estimates in appendix A.7 (table A-9).

Rule 2. PKOs remain for five years after the last year with conflict activity (more than 25 battle-related deaths within a calendar year). This rule also applies to all PKOs active at the start of the simulation.

The third and fourth rules restrict PKOs from being deployed in certain countries. Mullenbach (2005) finds that third-party interventions are significantly less likely when the target state is a major power (Mullenbach 2005, 549–52). Major powers are reluctant to welcome international involvement in their internal affairs, and as permanent members of the Security Council (P5) they have authority to veto decisions about UN intervention.

Rule 3. PKOs are never deployed in permanent UN Security Council members.

Moreover, the UN is also highly unlikely to establish a PKO in states with very large populations (Gilligan and Stedman 2003; and our analysis in table A-9). The largest country ever to attract a PKO is Sudan, with a population of 37 million

Table 1. Overview of PKO Policy Scenarios

Scenario	Description
1	PKO deployment ceases
2	PKO deployment as observed
3	PKO, traditional mandate, US$100 million/year, no large countries
4	PKO, transformational mandate, US$800 million/year, no large countries
5	PKO, transformational mandate, US$800 million/year, all countries

in 2005. Therefore, our simulations adhere to a final rule (except in S5 where we drop this rule):[14]

Rule 4. For most scenarios, PKOs are deployed only in countries that have a population smaller than 100 million in 2000.

Specifying PKO scenarios

While the rules identify where and when peacekeeping is deployed, we also need to specify how the UN responds. To evaluate the effectiveness of PKOs on the global-, regional-, and country-level incidence of conflict we specify five scenarios reflecting various general UN policies, summarized in table 1. We then simulate conflict trajectories under these five policy scenarios. The first scenario (S1) is a comparison scenario where the UN is assumed to terminate all PKO activity in 2001. Here, the only policy rule is no deployment of PKOs. For the second scenario (S2) we use the observed UN PKO deployments for the entire simulation period as the operationalization of the policy.

In addition to these two we specify three scenarios where we use various rules for what kind of mandate a PKO receives and the size of the annual budget, two factors that substantially affect the effectiveness of the mission. UN PKOs have recently undergone a major change with respect to the mandates of missions. While observer missions and traditional peacekeeping mandates used to dominate the actions of the UN, recent operations have seen more multidimensional and enforcement mandates.

Figure 1 depicts the number of and total budgets of UN PKO missions in our data set by mandate type. Multidimensional and enforcement missions were inventions of the early 1990s. Complex situations in, for example, the Balkans, Somalia, and Rwanda, led to a surge of PKOs with more ro-

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14. This precludes PKOs in Bangladesh, Brazil, India, Indonesia, Japan, Mexico, Nigeria, and Pakistan in addition to the permanent UNSC members.

bust mandates, but the perceived failures of several such missions led to a slight decrease in UN peacekeeping initiatives (Durch and Berkman 2006). At the turn of the century, the Brahimi Report (United Nations 2000) set the agenda for the future of UN peacekeeping, and the UN again initiated a number of enforcement missions in conflict situations.

Several facts are readily apparent from figure 1: both the frequency and types of PKOs changed after the end of the Cold War—in terms of frequency (left panel), the traditional and observer missions were supplemented by multidimensional and enforcement missions. The right panel clearly shows that enforcement missions account for an increasing share of the total UN PKO budget. Missions with more robust mandates are more complex and require larger budgets. In 2000, the Brahimi report emphasized the need for more robust mandates and an increase in resources (United Nations 2000). This marked a shift in both the nature of and the resources spent on peacekeeping.[15] Consequently, figure 1 shows that the increase in the number of peace enforcement missions since 2000 has been accompanied by a dramatic increase in the total UN peacekeeping budget.

In our third scenario (S3) the UN deploys only limited PKOs—all major conflicts, except those that occur in large countries and in permanent UNSC member states, receive a traditional mandate PKO with a budget of US$100 million per year (S4). Scenarios S4–S5 are more expansive. They both involve the UN deploying PKOs with a transformational mandate and a budget of US$800 million per year. Scenario 5 differs in that we drop rule 4 and let the UN deploy also to large countries with more than 100 million inhabitants. These scenarios reflect the empirical correlation between the type of mandate and the budget. In the appendix, we also report results for two additional scenarios where we vary the budget for each of the two mandate types. Those results demonstrate that the predictions are much less affected by changes in the budget level than by changes in the mandate.

RESULTS FROM STATISTICAL ESTIMATION

Table 2 shows the results of estimating a multinomial logistic regression model including the log of annual PKO expenditures, dummy variables marking traditional and transformational mandates, a variable capturing PKOs deployed to a country's neighbors, as well as our control and interaction variables.[16]

Transformational PKOs directly affect the risk of major conflict only. The estimate for the transformational PKO is large and negative in the major conflict equation but much smaller in the minor conflict equation.[17] The estimates for traditional PKOs are negative but substantially smaller.[18]

As the model includes variables for both the PKO mandate and budget variables, table 2 does not provide direct information about the relative importance of budget and mandate.[19] The effect of the budget variable is positive, but since that variable can only be nonzero when either of the mandate variables are nonzero, the effect of the budget must be interpreted conditional on the effect of the mandate variables. To illustrate the effect of the PKO mandate and budget variables, figure 2 shows the estimated probability distribution for major conflict as box plots and histograms. The four pairs of plots in the figure represent each combination of mandates (traditional vs. transformational) and size of budget (PKO budget of US$35 million, 25th percentile, vs. US$340 million, 75th percentile).[20]

The figure shows that the predicted probability of major armed conflict is considerably lower if the PKO has a trans-

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15. The strong correlation between mandate types and budget is shown in app. A.8, fig. A-2.

16. In app. A.1 we discuss the results of an instrumental-variable regression to explore potential selection effects in where PKOs are deployed and conclude that such selection may be safely ignored.

17. Note that because of high collinearity between the PKO budget and mandate variables, the estimated coefficients and standard errors should be interpreted with caution. Likelihood-ratio tests reported in table A-7 show that the model reported here provides better fit to the data than models that iteratively exclude (1) PKO budget variable, (2) PKO mandate variables, (3) mandate and budget variables, and (4) all PKO variables. Removing either the budget or the mandate variables from the main model reduces the goodness of fit of the model (significant at the 10% level). Removing both budget and mandate variables clearly reduces the fit to the data—the likelihood ratio test is significant at the 5% level. Our simulation algorithm is not sensitive to these collinearity issues, since it produces estimated probabilities taking all parameter estimates and the correlation between these into account simultaneously (cf. Tomz et al. 2003).

18. Although the categorizations are different, these findings are slightly different from Fortna (2008), who finds that consent-based missions are in general more successful than enforcement missions. However, this discrepancy is likely to be a result of different designs, since she only measures the duration of peace given a cease-fire agreement, which leads to a particular selection of cases. Our results show the general ability of peacekeeping to reduce the likelihood of conflict along all pathways, and in that context it is not surprising that more extensive mandates are more successful; see, e.g., Doyle and Sambanis (2000).

19. We have also estimated models with a squared log expenditure variable to investigate whether the relationship between log PKO expenditure and the risk of conflict might be curvilinear. The squared variable did not improve the goodness of fit of the model.

20. Note that the budget is entered in log form, implying a diminishing marginal return to the budget. We have also tested whether the relationship between budget size and risk of conflict is nonmonotonic (or returns nondiminishing) by adding the square of the (logged) variable, but this does not add to the goodness of fit nor the predictive power of the model.

Table 2. Estimation Results, Multinomial Logistic Regression of PKO Variables, and Controls on Risk of Conflict, All Country-Years 1960–2013

	Minor Conflict		Major Conflict	
PKO traditional$_{t-1}$	−.0456	(−.11)	−.384	(−.64)
PKO transformational$_{t-1}$	−.495	(−.72)	−1.619	(−1.68)
log(PKO budget)$_{t-1}$	.0617	(.56)	.0943	(.62)
PKO neighbor$_{t-1}$	−.0158	(−.08)	−.752*	(−2.35)
Minor conflict$_{t-1}$ (c1)	−3.082***	(−3.50)	−.992	(−.65)
Major conflict$_{t-1}$ (c2)	−.793	(−.50)	2.715	(1.43)
log(time in peace)$_{t-2}$ (lts)	−.432***	(−4.24)	−.405	(−1.85)
Neighbor conflict$_{t-1}$ (nc)	−1.383***	(−6.63)	−2.485***	(−5.33)
nc × c1$_{t-1}$	2.254***	(10.22)	2.889***	(6.01)
nc × c2$_{t-1}$	2.417***	(6.45)	5.344***	(9.95)
log(time in neighbor peace)$_{t-2}$	.0262	(.51)	.0432	(.57)
nc × lts$_{t-1}$	−.635***	(−6.40)	−.910***	(−3.72)
log(population)$_{t-1}$	.269***	(6.36)	.351***	(5.25)
log(GDP per capita)$_{t-1}$	−.406***	(−5.18)	−.463**	(−2.97)
GDP × c1$_{t-1}$	.567***	(4.87)	.268	(1.32)
GDP × c2$_{t-1}$	.312	(1.49)	−.0436	(−.17)
GDP × lts$_{t-1}$	.0211*	(2.07)	.0123	(.69)
Time independent$_{t-1}$	.179**	(3.10)	.0308	(.35)
Random effect$_{minor}$	1.147***	(10.36)	.681***	(3.92)
Random effect$_{major}$	−.145	(−1.40)	1.074***	(6.35)
Constant	−1.407*	(−2.16)	−2.194	(−1.76)
N	7,591			
AIC	3,732.5			
ll	−1,824.3			

Note. Dependent variable: no conflict (reference outcome), minor conflict, and major conflict; t-statistics in parentheses. See app. A.9 for out-of-sample evaluation of the PKO variables. AIC = Akaike information criterion.
* $p < .05$.
** $p < .01$.
*** $p < .001$.

formational mandate than if it is traditional. The mean predicted probability of major conflict for the traditional case is about 0.13, whereas that for the transformational is 0.05. On the other hand, the figure also shows that there is no independent effect of budget over and beyond the mandates of the missions. The (mean) predicted probability of major armed conflict is very similar across budget sizes but very different across mandates. The mean budget for a traditional mandate PKO is US$97 million per year while the mean budget for a transformational mandate PKO is US$530 million.[21]

The fact that we do not find any direct or short-term effects of peacekeeping operations on minor conflict does not

mean that PKOs only reduce the intensity of major conflicts. The predicted probability of no conflict in a year is 0.182 after a minor conflict, but only 0.077 after a major conflict. The probability of minor conflict in a year after major conflict is 0.264.[22] Given that PKOs increase the probability of transitions from major to minor conflict in year t, they will also increase indirectly the probability of no conflict at $t + 1$. Our simulation routine takes such indirect effects into account.

The estimates for the conflict history variables in table 2 show that this holds more generally. The probability of minor conflict is much higher if there was a minor or major conflict the year before.[23] Moreover, the estimates for the

21. The variance in budget for both mandate types is considerable. The 25th and 75th percentile budget for a traditional PKO is, respectively, US$21 million and US$67 million, while the corresponding figures for transformational mandate PKOs is US$139 million and US$642 million.

22. See the transition probability matrix in table A-5 for all transition probabilities.
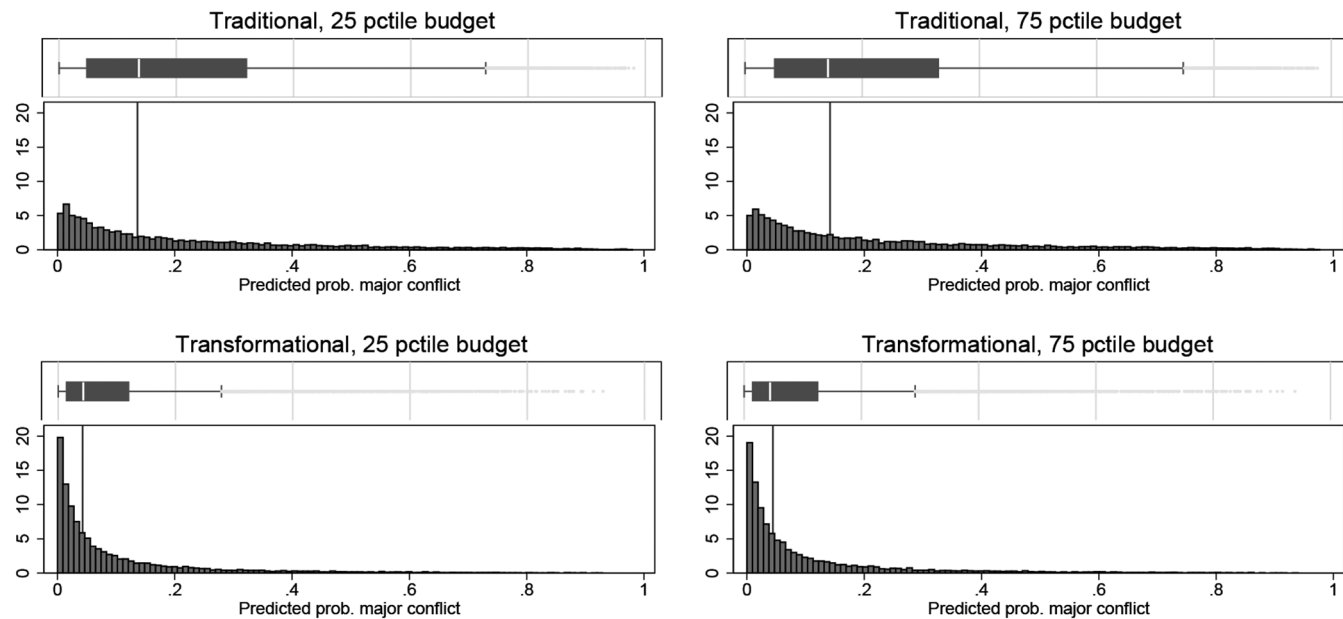23. This inference is based on the multiple interaction terms involving conflict at $t − 1$.

Figure 2. Estimated effect of budget and mandate type on predicted probability of major armed conflict. The histograms and box plots both represent the distribution of predicted probabilities of major armed conflict. The predictions were obtained using Clarify (Tomz et al. 2003). Simulations are based on a country with lagged major armed conflict; all other explanatory variables have been set to the mean for countries with lagged major conflict. The outsides of the boxes in the box plots represent the 25th and 75th percentiles, the outsides of the whiskers the 90% confidence intervals, and the dots probabilities outside this interval. The mean predicted probabilities are marked as vertical lines in both plots.

"$\log(\text{time in peace})_{t-2}$" terms show that the probability of conflict is much lower if the country has been at peace for several years. Effective prevention of major conflict reduces the incidence of minor conflicts since minor conflicts more easily come to an end. The best way to assess the combined effects of these estimates is by examining the simulated results; we do this below.

OUT-OF-SAMPLE ESTIMATION RESULTS

Given the limited number of UN PKOs deployed over the past decades, the model reported in table 2 may suffer from overfitting. To evaluate the extent to which the PKO variables add to the predictive power of the model rather than the idiosyncrasies of the data we perform out-of-sample analysis. We estimate two models for the 1960–2000 period, one similar to the one in table 2 and one that has the same set of variables except for the four PKO terms (two mandate terms, budget, and neighboring PKOs). Estimation results for the latter models are reported in appendix A.9, tables A-10 and A-11, along with some more details about the procedure. Based on these estimates, we obtain predictions by means of our simulation routine for 2001 to 2013. We then compare predicted with observed conflict levels for each of these models by means of the area under the receiver operator curve (AUC). Since this metric is defined only for binary outcomes, we calculate it separately for major and for minor conflict as

compared to the no conflict outcome. For major conflict, the model with PKO terms does much better than the one without (AUC of .821 vs. .806). In terms of predicting peace or minor conflict, on the other hand, there is no difference between the two models, just as indicated by the estimates in table 2. For peace, the AUC are .930 (with) and .929 (without PKO terms). For minor conflict the corresponding figures are .936 and .937.

THE SIMULATED EFFECT OF PKOS

Figure 3 shows the simulated and observed proportion of countries in conflict under the different PKO scenarios for the period 1990 to 2013.[24] The two thick solid lines report the observed proportion of countries in conflict—the top line shows countries in either minor or major conflict while the bottom line shows only major conflict. In 2001, about 17% of all countries in the world had a conflict. In 6% there was a major conflict. The short-dashed line shows the simulated proportion of countries in conflict given the actual UN peacekeeping policy (scenario 2). Here, we use the observed data for UN budgets and mandates but simulate the conflicts in order to obtain a baseline. The simulated proportion for S2 is somewhat higher than the observed proportion, indicating

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24. The numbers underlying fig. 3 are reported in app. A.10, table A-13.

Proportion in conflict (either or major), Globally, all scenarios
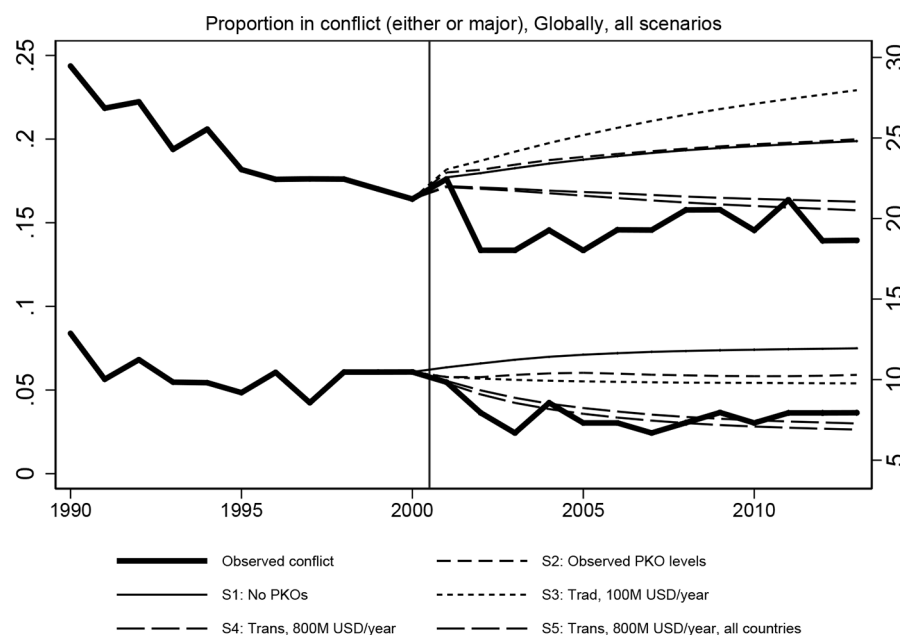

Figure 3. Global observed and simulated proportion of countries in conflict (left axis shows proportion of countries and right axis the number of countries), 1990–2013, all scenarios.

that we are underestimating the effect of PKOs or other risk-reducing factors.

The solid thin line shows the simulated proportions in conflict given S1. As for observed conflict, the upper set of lines refer to "either minor or major conflict," and the lower lines to "major conflict" only. The complete and abrupt termination of UN peacekeeping in 2001 in S1 would have increased the conflict proportion considerably. By 2013, the excess relative to S2 would have amounted to 1.7% of all countries, or about three conflicts.[25] The difference is about the same for major conflict, implying that all of these extra three conflicts would have been major ones, and the global number of minor conflicts would have been roughly the same. Without UN peacekeeping, our results indicate that we would have seen considerably more deadly conflicts in the world.

The dotted line represents scenario S3 with traditional mandates and a US$100 million budget per mandate year. The long-dashed line represents S4—a transformational mandate scenario with a budget of US$800 million per year. The long dashes line shows the most expansive scenario (S5) where a PKO with the same budget is deployed to every major conflict, including in large countries.

The traditional-mandate scenario (S3) implies a reduction in the incidence of conflict compared to S1, the no-PKO scenario. The simulated proportion under S3 is very close to

that of the S2 baseline. Compared to the observed UN policy, S3 stipulates a larger number of missions, but with less ambitious mandates.

The transformational-mandate scenarios yield conflict levels considerably lower than S2 based on observed PKO deployment patterns. Under S4 and S5 (long dashed lines, S5 consistently below S4), the incidence of conflict is clearly lower than under the baseline scenario. Seen as a proportional reduction in the incidence of conflict, this is particularly true for major conflict.

Looking at the effect of traditional mandates relative to the no-PKO scenario, the simulated reduction from S1 to S3 in the incidence of both levels of conflict is about 3%, and the reduction in the incidence of major conflict is about the same. This means that the most extensive scenario reduces the risk of major conflict in 2013 with a little more than two-thirds—from 6% to 2%.

Turning to the effect of transformational mandates, comparing S1 and S4, we find that the incidence of minor conflict is reduced considerably, although less than for major conflicts in relative terms (cf. the difference between the top and bottom set of lines in fig. 3). However, it is not so that PKOs merely reduce the intensity of conflict without increasing the chance of peace. If that was the case, the simulated reduction would have been restricted to major conflict, as implied by only studying table 2. Our simulations imply that for every successful transition from major to minor conflict due to the presence of a PKO, there is one transition from minor conflict to no conflict. In sum, these results imply that UN PKO policy

25. As shown in table A-10, the simulated proportion in 2013 under S2 is 0.169, and that under S1 is 0.186. Multiplied by the 171 countries in our data set in 2013, the difference of 0.017 amounts to 2.9 countries.

matters significantly and that the UNSC has the power to substantively enhance global security.

Our model allows for capturing long-term and spatial effects of conflict. The estimates for the "log time in status" variables indicate that the probability of no conflict increases strongly with several consecutive years of peace and decreases with several consecutive years of conflict. Likewise, conflicts in neighboring countries increase the risk that conflicts erupt. Given that we find that PKOs have a clear short-term effect, we might expect the difference between scenarios to increase over time. Our results show a strong, indirect effect of ambitious PKO policies. The direct short-term effect of a change in policies is the difference seen in the first two to three years in figure 3. The difference for the overall incidence of conflict between the no-PKO and PKO scenarios in figure 3 widen considerably from these first years of simulation up to 2013. The indirect effect over time and space is the main reason for the strengthened response over time to the various scenarios.[26]

Country-specific simulations

In appendix A.11 we show that the difference between the ambitious and nonambitious PKO scenarios is strongest in the Middle East/North Africa, Central Asia, and the East Africa region. Here we look more closely at the simulated impact of peacekeeping for countries in the East Africa region.

Figure 4 reports the difference in predicted levels of conflict between the no-PKO scenario (S1, thin line) and scenario S2 with observed PKO deployment levels (thick solid line), S3 (dotted line), and S5 (dashed line) for a set of countries—Burundi, Rwanda, the Democratic Republic of Congo (DRC), Tanzania, Kenya, and Uganda. Of these countries, Kenya and Tanzania have not seen any armed conflict since 1982. The simulation model predicts continued low risks of conflict in these countries, and the effectiveness of simulated PKOs here is therefore very limited. The largest effects are seen in the DRC and Burundi. Both of these countries have recent or ongoing armed conflict, and both countries have seen PKOs deployed. For Burundi, the PKO that was deployed from 2004 to 2007 (S2) reduced the (counterfactual) risk of conflict by close to one-fifth at its peak deployment. As the solid line shows the effect also persisted after the PKO left. If the UN had opted for a large PKO (in this case, a budget increase from US$300 million to US$800 million but no change in mandate), the risk of

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26. The gradual widening of the difference between PKO and no-PKO scenarios is also due to a gradual readjustment to a new steady-state equilibrium for the incidence of conflict in a probabilistic model, so it is not straightforward to quantify the long-term effect of PKOs in this manner.

conflict could have been reduced by an additional 10 percentage points.

The DRC presently has the largest PKO in history deployed. Since 2005 the yearly budget of the MONUSCO operation was more than US$2,000 million. Naturally, for this country our more limited scenario is less effective in reducing the risk of conflict than the observed mission. The observed mission, however, has decreased the risk of conflict in the DRC by more than 40% relative to the counterfactual.

For Rwanda and Uganda, two countries with ample recent conflict history, we again find that PKO deployment decreases the risk of renewed conflict by about 10%. For both countries there is no difference between the observed and the US$800 million scenario. Given that neither of these two countries had a PKO deployed in the period 2001–14 this may seem strange. Both countries, however, had PKOs deployed in neighboring countries throughout the simulation period. In table 2 we report a negative effect of PKOs in neighboring countries on the country's own conflict propensity. Given that rebel groups in both Rwanda and Uganda have routinely taken shelter across borders, it is not surprising that we find a strong dampening effect of neighboring PKOs on these two countries in particular.

Costs and benefits of PKO deployment

We find that ambitious PKO policies can reduce the risk of major conflict with about two-thirds relative to a no-PKO scenario and by about 45% compared to the observed UN PKO policy for 2001–13. Such conflict reduction has enormous potential to decrease human suffering. How much would the UN budget increase in the scenarios we have specified? This would be a function of the budget of the PKOs and the frequency of deployment, which in the long run would depend on the effectiveness of the missions. Figure 5 shows the average simulated total budgets for UN PKOs under the same scenarios as above and with the same line characteristics. The low-budget S3 scenario (US$100 million) would imply a strong reduction in UN peacekeeping expenditures compared to the actuals for 2001–13 (S2, thick solid line), whereas the more extensive US$800 million scenarios (S5, dashed line) represent approximately a doubling of total annual expenditures compared to what the UN spent in reality in the years 2009–13. The initial increase in PKO expenditure will not persist indefinitely but will decrease as the proportion of countries in conflict in the world starts to decrease. In the most extensive scenario in our simulation, the peak in UN PKO spending happens after about six to seven years, and then the costs gradually recede.

These are significant increases in expenditures, especially since the UN is already struggling to get the funds and the
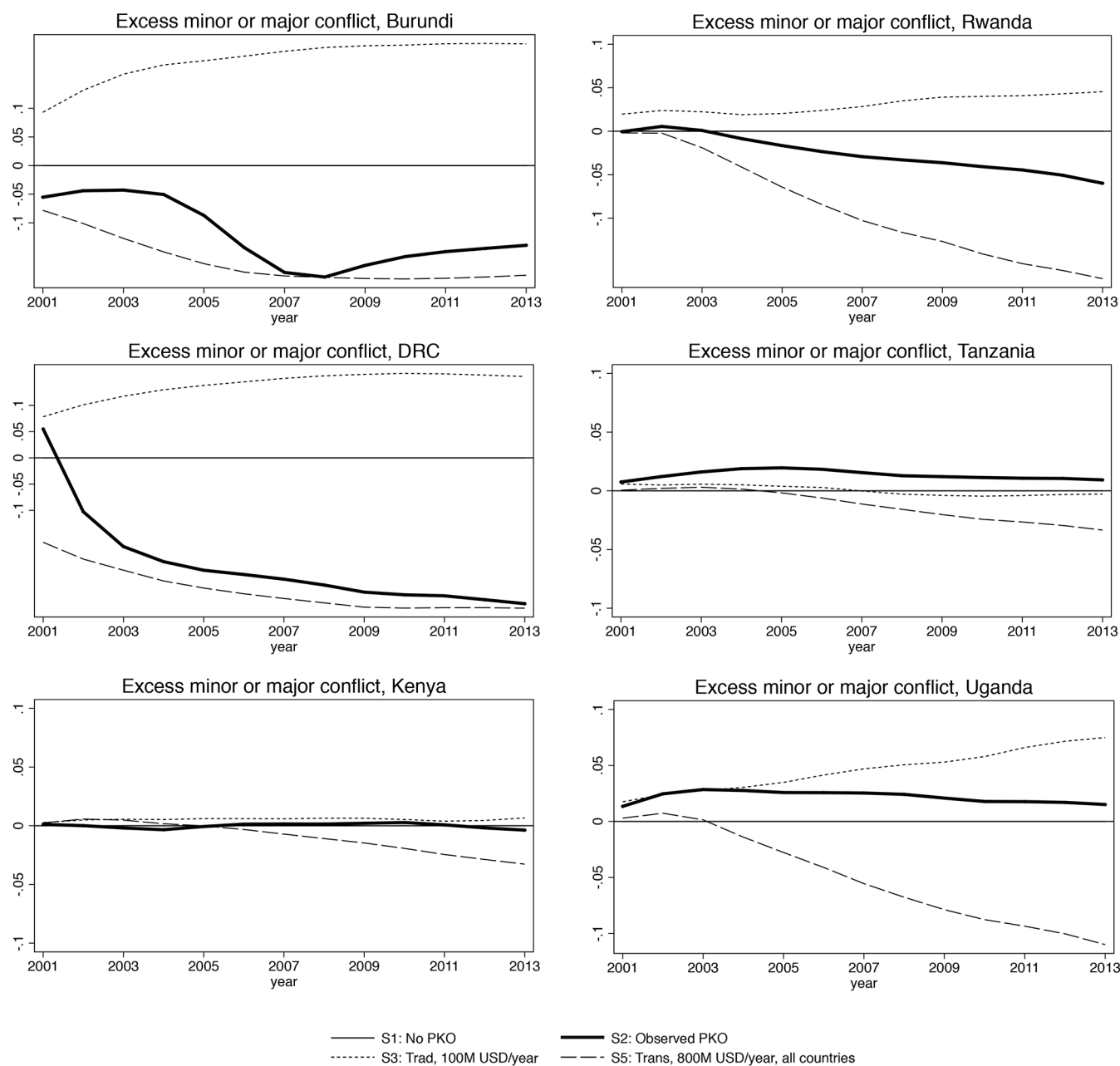
Figure 4. Excess conflict relative to no PKO scenario, scenarios 3 and 5

troop commitments required to carry out the current missions.[27] Nevertheless, it is misleading to consider only the direct costs of peacekeeping. Would the member states of the UN be willing to increase their support for PKOs, there is much to be gained—not only in terms of global security but also in terms of development and economic growth. Consider, for instance, De Groot, Bozzoli, and Brück (2015), who find that the world would have seen a 16% larger global GDP in the absence of war in the last five decades. They particularly emphasize the economic gains of ending wars earlier, which is what we find PKOs are well designed to do.

We can also consider other development gains. Using the estimates from Gates et al. (2012), we calculate what a two-thirds reduction in major conflict would translate into in benefits as measured by the Millennium Development Goals.[28]

27. All of these costs do not have to be borne by the UN. As was pointed out in United Nations (2009), the UN needs to strengthen partnership with, e.g., the African Union and the European Union. Parts of the budget could thus be borne by these partners in joint operations, as the one in Darfur.

28. Gates et al. (2012) estimate the consequence of conflict across all of the UN Millennium Development Goals. They find, for instance, that a conflict of average intensity (2,500 battle deaths over five years) in a medium-sized
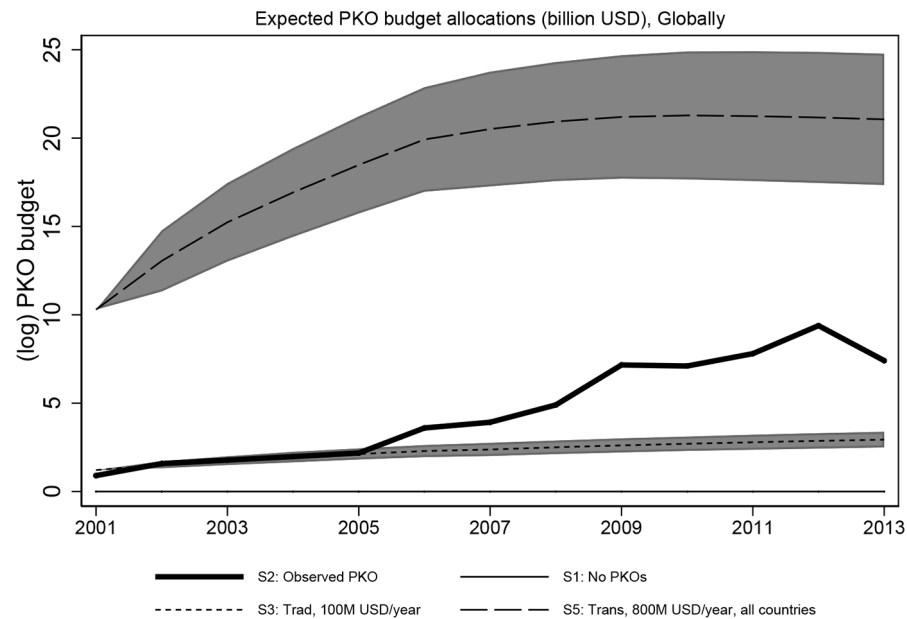
Figure 5. Total global expected (log) PKO budget allocation

In 2013, there were seven active major conflicts. A two-thirds reduction would mean 4.5 fewer conflicts. We assume, for simplicity, that all of these would be average conflicts in median-sized countries. We then calculate that doubling the PKO budget (scenarios 4 and 5) would mean 57,500 fewer infant deaths, 900,000 fewer people without adequate access to potable water, and 1,380,000 fewer undernourished people. Considering the enormous negative externalities of armed conflict, a doubling of the UN PKO budget is a relatively cheap way of investing in future global security and development.

According to Gilligan and Stedman (2003), there is a regional bias in where PKOs are deployed. The risk of armed conflict also varies across regions. Here, we further break down these estimated costs and benefits by region. Figure 6 shows the estimated proportion in conflict (top panel of each pair) and cost of the PKO (bottom panel of each pair) over time across a set of regions. The figures show proportion in conflict and UN PKO budget across scenarios 1 (solid line), 2 (dashed line), 3 (dotted line), and 5 (long dashes line). The shaded regions around the lines show 1 standard deviation simulation uncertainty.[29] The regional results in figure 6 all exhibit the same general tendency—UN PKO budget spending

in the most extensive scenario increases rapidly in the first few years, in most cases overtaking observed PKO spending, reaches a peak, and then starts a gradual slow decline as the investment in PKOs results in fewer armed conflicts. This, in turn, is associated with a substantial decrease in estimated proportion in conflict.

This initial investment in PKO spending translates into substantially lower incidences of conflict in all regions. This benefit of increased PKO spending is seen most clearly, not surprisingly, in the regions where we expect the highest incidence of conflict. In East Africa, for example, expected proportion in major conflict is at least 20% lower in the most extensive PKO deployment scenario compared to if the UN were to follow observed deployment patterns. In West Africa, similarly, incidence of major conflict is close to 50% lower in the most extensive scenario compared to observed PKO levels. The effect is particularly clearly visible after around 2006—the year the combined effect of the PKOs in Liberia and the Ivory Coast is felt on the region.[30] Both these missions have transformational mandates and relatively large budgets (respectively around US$500 million and US$600 million in 2013).

UN PKO deployment continues to cluster in, especially, South Saharan Africa. The largest proportional differences in estimated incidence of major conflict in our most extensive PKO scenario compared to observed levels is thus found outside of Africa in the regions where there are relatively fewer PKO deployments. This is especially true for Middle

country of 10 million inhabitants increases the proportion of the country that is undernourished by about 300,000 people (Gates et al. 2012, 1717).

29. We follow Brandt and Freeman (2006) and Sims and Zha (1999) and use 1 standard deviation instead of the more common 95% confidence intervals since "the former are much more indicative of the relevant range of uncertainty than the latter, which are indicative of pretesting and data mining" (Brandt and Freeman 2006, 5).

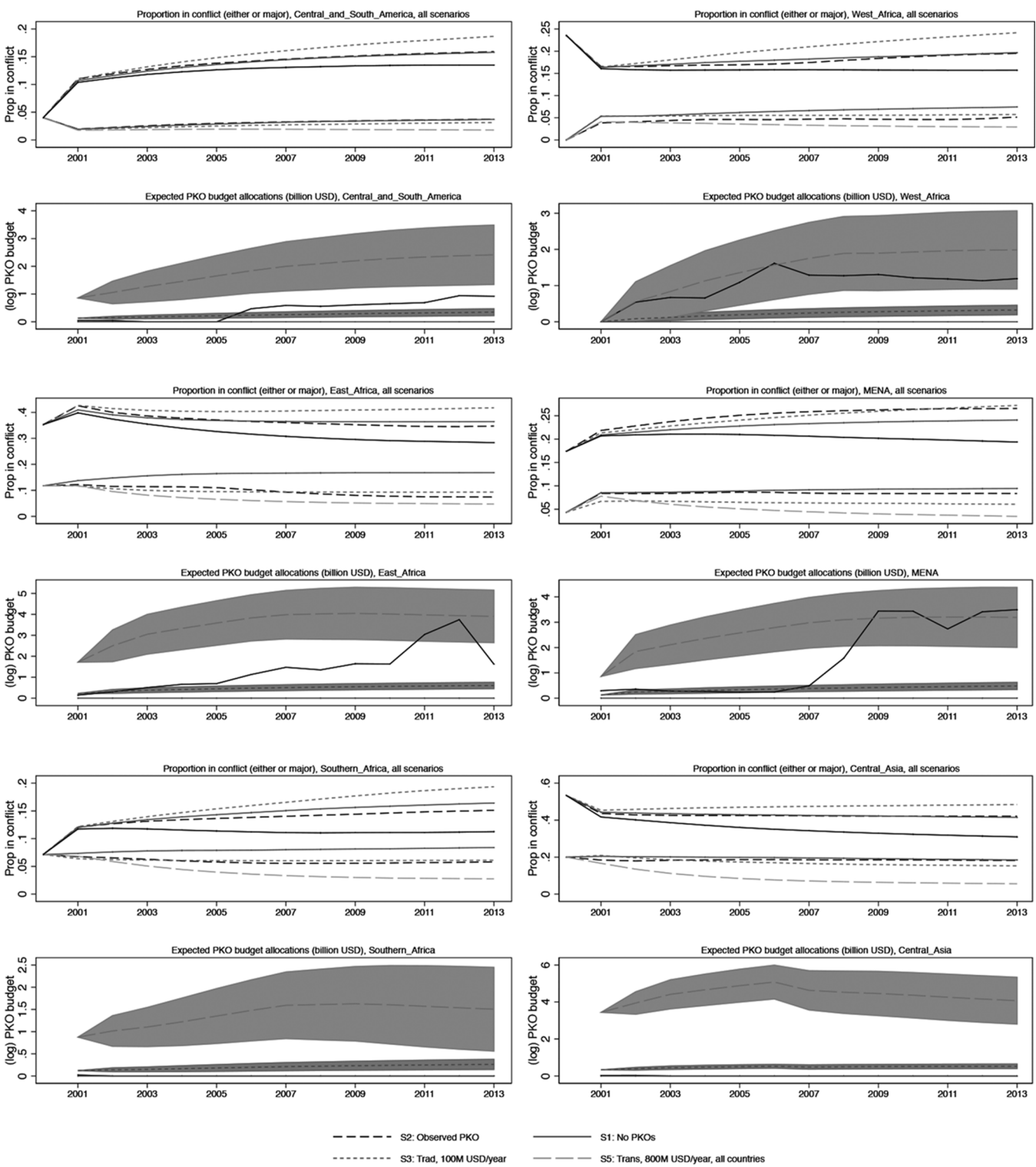30. West Africa now has one additional deployed PKO in Mali.

Figure 6. Observed and simulated incidence of conflict and expected budget allocation, regional (axis reports proportion of countries and log PKO budget)

East and North Africa and Central Asia. In both these regions we see around a two-thirds reduction in major conflict from observed PKO levels to the most extensive scenario. The same is true for Southern Africa, which also has seen comparably fewer PKO deployments.

CONCLUSION

In this paper, we have evaluated a number of potential UN PKO scenarios and their prospects in reducing conflict. The UN's new peace-building agenda, spearheaded by the newly appointed Secretary General António Guterres, puts the focus

squarely on managing the outbreak, escalation, continuation, and recurrence of conflict. We have shown that PKOs are an efficient tool for managing these pathways. By simulating different scenarios, we have estimated the effect on the future incidence of conflict of different types of missions and of varying the money spent on PKOs. The results show that PKOs have a clear conflict-reducing effect. The effect of PKOs is largely limited to preventing major armed conflicts. However, there is a discernible indirect effect since the reduction of conflict intensity also tends to increase the chances of peace in following years. There are also some interesting regional differences. PKOs have the strongest effect in three regions that have been particularly afflicted by conflict: West Asia and North Africa; East, Central, and Southern Africa; South and Central Asia.

These findings have clear policy implications, since they illustrate the effect of different PKO policies. We also estimate the cost of those different policies. In one of the most extensive scenarios—in which major armed conflicts receive a PKO with an annual budget of US$800 million—the total UN peacekeeping budget is estimated to approximately double. However, in this scenario, the risk of major armed conflict is reduced by two-thirds relative to a scenario without any PKO. This indicates that a large UN peacekeeping budget is money well spent. Moreover, the total PKO budget would increase for about 10 years and then start decreasing again as a result of a reduced number of conflicts in the world. In another scenario, which specifies that major conflicts get a PKO with a transformational mandate in the first year, the risk of conflict is reduced by two-thirds in 2013 compared to a scenario without any PKO. If the UN is serious about maintaining international peace and security, it is important to consider the impact of different policies regarding mandates and budgets, as well as the reaction time from a conflict outbreak to the deployment of a mission.

The methodology used here opens up new interesting questions and possible extensions to the research presented. One pertinent question is whether the quality of PKOs may not be equally important for its efficiency as the mandate and the budget. Troop-contributing countries have varying levels of military training, and a large number of countries contributing troops to a single mission may introduce coordination problems. Another relevant issue is the impact of regional security actors. In this paper, we have evaluated the effect of UN PKOs, but the UN is not the only actor doing peacekeeping. For example, the African Union and NATO have been involved in several conflict and postconflict situations. Therefore it would be interesting to assess whether these actors differ in their peacekeeping efficacy and subsequently simulate a future scenario that takes into account the involvement of regional actors in peacekeeping. The simulation procedure used here offers a useful tool for evaluating the practical relevance of theoretical insights as well as assessing the impact of different policies.

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