Online appendix: Evaluating the conflict-reducing effect of UN peacekeeping operations

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June 21, 2018

Supplement to article forthcoming in *Journal of Politics*
Preprint at `http://www.pcr.uu.se/research/views/publications`

A Online Appendix

A.1 When do they go? Exploring potential endogeneity

Several studies have looked at whether PKOs are subject to a selection effect such that they are sent to the 'easy' conflicts. So far there is little or no evidence that would support such a claim (Fortna 2004; Gilligan and Sergenti 2008; Gilligan and Stedman 2003). Being sent to particularly intense conflicts would, however, not be the only way a selection effect could influence the estimated efficiency of PKOs. Another possible mechanism would be one were peacekeepers are sent to conflicts after the conflicts have passed their intensity peak. PKOs would then be deployed only when the 'moment is ripe' (Zartman 2001) and conflicts would nevertheless have deescalated without the intervention. If so, it is untenable to attribute any causal effect of the PKO – it would simply signal the beginning of the end.

We investigate this claim in two ways and find little evidence in its favor. First we construct a five-category conflict variable that distinguishes between five levels of battle deaths incurred in a given year.[1] From this, we create an 11-category 'change in conflict intensity' variable. This variable tracks the escalatory process of conflicts by comparing the conflict level at t with the level at $t-1$. A conflict which stays at the same level scores 0 on this variable. A conflict which escalates gets a positive score, and a conflict which de-escalates a negative score. Table A-1 tabulates change in conflict intensity against onset of PKOs for all country years in conflict or within three years

[1]The five categories are: 0–99, 100–499, 500–999, 1000–9999, 10,000–max. Data on annual battle deaths come from the UCDP Battle Deaths Dataset (UCDP 2012).

Table A-1: Onset of PKOs across changes in conflict intensity, 1970–2009

	PKO onset							
Change in conflict	No PKO		Traditional		Transformational		Total	
intensity	No.	%	No.	%	No.	%	No.	%
-5 (strong de-escalation)	3	75.0%	1	25.0%	0	0.0%	4	100.0%
-4	18	100.0%	0	0.0%	0	0.0%	18	100.0%
-3	22	88.0%	1	4.0%	2	8.0%	25	100.0%
-2	83	97.6%	1	1.2%	1	1.2%	85	100.0%
-1	101	96.2%	1	1.0%	3	2.9%	105	100.0%
0 (neutral)	712	97.9%	11	1.5%	4	0.6%	727	100.0%
1	84	96.6%	2	2.3%	1	1.1%	87	100.0%
2	75	96.2%	1	1.3%	2	2.6%	78	100.0%
3	13	100.0%	0	0.0%	0	0.0%	13	100.0%
4	22	100.0%	0	0.0%	0	0.0%	22	100.0%
5 (strong escalation)	4	100.0%	0	0.0%	0	0.0%	4	100.0%
Total	1,137	97.3%	18	1.5%	13	1.1%	1,168	100.0%

after the end of a conflict. The column to the right shows the total number of conflict years. These have an approximately normal distribution across the trajectory categories. The second and third columns reports the distribution of PKO onsets across the change in conflict intensity categories. There is only slight evidence for the hypothesis that PKOs are deployed as the conflict is winding down. Half of the 31 PKO onsets were deployed in years where the intensity level was the same as the preceding years, and 27 of the deployments happened in years when the conflict trajectory was between –2 and 2. Only four cases break this pattern: The operations in Cambodia (1992), El Salvador (1993), Lebanon (1978), and Morocco (1991) were initiated following a noticeable decrease in conflict intensity.

Next, we conduct an instrumental variable analysis. In this, we follow Vivalt (2014) and use rotating membership on the UN Security Council as an instrument for PKO deployment. Five countries a year are elected to serve on the Security Council for a two-year period. To ensure geographical representation the five different regional groups in the UN, i.e. Africa, Asia-Pacific, Eastern Europe, Latin-America and the Caribbean, and Western Europe, have security council membership quotas. The Security Council members are de facto elected in a two-stage process. First the different regional groups elect their set of candidates, and then the full General Assembly votes for which candidate will represent which regional group. Formally, the Security Council decides on all PKO deployment by majority vote, but in practice such decisions are almost always made by consensus. This gives every member of the Council, permanent and temporary, influence over where PKOs are deployed (Vivalt 2014). Vivalt (2014) demonstrates that as consequence, PKOs are almost never deployed to serving members on the Security Council. Indeed, in our data, there are only two cases in which PKOs are deployed to a country while that country serves on the Security Council.

Table A-2 reports all conflicts that occurred in country-years in which the country was also a Security Council member. Column 4 reports if a PKO was deployed. There are only two examples of PKOs being deployed in such situations: in Rwanda in 1994, and to Pakistan or India at various times in the period between 1967 and the present. In this period India and Pakistan have both seen substantial amounts on intra-state conflict. The PKO in questions, however, is the United Nations Military Observer Group in India and Pakistan (UNMOGIP) which was deployed in 1949 to oversee the cease-fire between Pakistan. UNMOGIP has no role in these countries' civil armed conflicts. UN Security Council membership therefore appears to satisfy the relevance criteria for an instrument (Kennedy 2008; Greene 2003): Security Council membership is highly correlated with the treatment (PKO deployment)

Vivalt (2014) argues that the instrument also satisfies the exclusion criteria. Most importantly, receiving a seat on the Security Council does not appear to be related to whether the country is or has experienced armed conflict. In their analysis of the determinants of election to the United Nations Security Council (Dreher et al. 2014), do not find any evidence that country engaged in internal or international armed conflict are significantly more (or less) likely to get a seat on the Council. Table A-3 investigates this using the same set of independent variables as our main model above. The Table shows the results of a logistic regression where Security Council membership is regressed on the same variables as above. Conflict history does not appear to be significant related to being getting a seat on the Security Council. The last two columns of the Table also includes our PKOs budget (column 2) and mandate (column 3) variables. Adding these does not change the result.

Table A-2: Security Council membership, conflict, and PKO deployment

Country	*Year*	*Conflict*	*PKOs*
United States of America	2001	2	0
Nicaragua	1983–84	2	0
Nicaragua	1984	2	0
Colombia	1969–70, 1989–90	1	0
Colombia	2001–02	2	0
Colombia	2011–12	1	0
Venezuela	1962, 1992	1	0
Peru	1984–85	2	0
Peru	2007	1	0
United Kingdom	1971–91, 1998	1	0
France	1961–62	2	0
Spain	1981–82	1	0
Russia (Soviet Union)	1990–91	1	0
Russia	1993–94	1	0
Russia	1995–96	2	0
Russia	1999–2000	2	0
Russia	2001–03	1	0
Russia	2004	2	0
Russia	2005–13	1	0
Azerbaijan	2012	1	0
Mauritania	1975	1	0
Nigeria	1966	1	0
Nigeria	1967	2	0
Nigeria	2011	1	0
Uganda	1981–82	2	0
Uganda	2009–10	1	0
Rwanda	1994	2	1
Djibouti	1993–94	1	0
Ethiopia	1967–68	1	0
Ethiopia	1989–90	2	0
Angola	2004	1	0
Algeria	2004–05	1	0
Tunisia	1980	1	0
Sudan	1972	2	0
Turkey	2009–2010	1	0
Iraq	1974–75	2	0
Egypt	1996–97	1	0
China	2008	1	0
India	1967–68	1	1
India	1984–85	1	1
India	1991–92	2	1
India	2011–12	1	1
Pakistan	1976–77	1	1
Pakistan	1994	1	1
Pakistan	2004	1	1
Pakistan	2012–13	2	1
Bangladesh	1979–80	1	0
Malaysia	1965	1	0
Philippines	1980	1	0
Philippines	1981	2	0
Philippines	2004–05	1	0

Table A-3: Logistic regression, Security council membership and internal armed conflict, 1960–2013

	(1) Conflict		(2) Budget		(3) Mandate	
securitycouncilmember						
Minor, t-1	-0.0902	(-0.29)	-0.0930	(-0.30)	-0.117	(-0.37)
Major, t-1	-0.220	(-0.48)	-0.219	(-0.47)	-0.249	(-0.54)
ln(Time in peace)	-0.0309	(-0.24)	-0.0356	(-0.28)	-0.0479	(-0.38)
Neighboring conflict, t-1	-0.441	(-1.72)	-0.431	(-1.68)	-0.444	(-1.72)
nc · conflict, t-1	-0.527	(-1.49)	-0.530	(-1.50)	-0.516	(-1.46)
nc · war, t-1	-0.171	(-0.33)	-0.184	(-0.35)	-0.166	(-0.32)
ln(Time since nc)	-0.0812*	(-2.00)	-0.0764	(-1.88)	-0.0787	(-1.93)
ncts0	-0.0757	(-0.98)	-0.0757	(-0.98)	-0.0752	(-0.97)
ln(population)	0.651***	(19.99)	0.648***	(19.83)	0.648***	(19.83)
ln(GDP per capita)	0.381***	(6.60)	0.385***	(6.59)	0.379***	(6.47)
ln(GDP) · conflict, t-1	-0.0416	(-1.47)	-0.0420	(-1.49)	-0.0411	(-1.45)
ln(GDP) · war, t-1	-0.0849	(-1.90)	-0.0844	(-1.89)	-0.0837	(-1.87)
ln(GDP) · ln(Time in peace)	-0.00758	(-0.60)	-0.00737	(-0.58)	-0.00642	(-0.51)
ln(Time since independence)	0.296***	(6.01)	0.295***	(6.00)	0.299***	(6.04)
1960s	0.647***	(4.43)	0.669***	(4.47)	0.665***	(4.44)
1970s	0.545***	(4.19)	0.565***	(4.21)	0.563***	(4.20)
1980s	0.423***	(3.32)	0.441***	(3.37)	0.441***	(3.37)
1990s	0.249*	(2.00)	0.264*	(2.10)	0.261*	(2.07)
Random effect, minor	-0.240**	(-2.84)	-0.236**	(-2.78)	-0.240**	(-2.83)
Random effect, major	-0.227**	(-3.14)	-0.215**	(-2.96)	-0.208**	(-2.86)
ln(PKO budget)$_{t-1}$			-0.116	(-1.35)		
PKO neighbor$_{t-1}$			0.252	(1.17)	0.297	(1.37)
PKO transformational$_{t-1}$					0	(.)
PKO traditional$_{t-1}$					-0.0232	(-0.07)
_cons	-12.39***	(-20.79)	-12.41***	(-20.36)	-12.36***	(-20.23)
N	7621		7621		7621	

t statistics in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Proving exclusion is always difficult, but we believe, following Vivalt (2014), that this at least shows that the instrument is highly plausible. We therefor process to run a IV-probit model (Newey 1987) with this instrument in the first stage of the model and the incidence of major conflict as the dependent variable.[2] We include the same control variables as in the analysis in section . The results of the estimation are shown in Table A-4. The results from the first-stage estimation is reported at the bottom of the table, those from the second stage at the top. The first-stage results show that the instrument have a significant effect on the onset of PKOs.

In the second stage, the instrumented PKO variable has a negative and significant effect on the incidence of major conflict. The magnitude of the estimate is fairly large for a relatively imprecise instrumented variable. The Wald test for exogenity however is not significant, indicating that the original variable is not really endogenous and that it is 'safe' to conduct classical inferences (Wooldridge 2010, 472–77). All in all, we conclude that endogenity is a minor problem for our analysis, and proceed to analyzing the impact of different scenarios for PKO involvement.

[2]We restrict attention to the effect on major conflicts given what we find in Table 2 in the main paper – PKOs are effective in reducing the intensity of conflict, not in preventing them. We also ran a two-stage probit model given that the dependent variable is dichotomous.

Table A-4: When do they come: Instrumental variable regression

	(1) Conflict	
Conflict		
ln(PKO budget)	-0.933***	(-4.91)
Minor, t-1	0.684	(1.29)
Major, t-1	1.260	(1.23)
ln(Time in peace)	-0.181**	(-3.11)
Neighboring conflict, t-1	0.583**	(2.63)
nc · conflict, t-1	-0.236	(-0.99)
nc · war, t-1	-0.333	(-1.56)
ln(Time since nc)	0.0516*	(2.17)
ncts0	0.158*	(1.98)
ln(population)	0.0141	(0.25)
ln(GDP per capita)	-0.142*	(-2.10)
ln(GDP) · conflict, t-1	-0.000123	(-0.01)
ln(GDP) · war, t-1	0.0226	(1.21)
ln(GDP) · ln(Time in peace)	-0.00428	(-0.64)
ln(Time since independence)	-0.0305	(-0.66)
1960s	-0.281	(-1.89)
1970s	-0.290	(-1.80)
1980s	-0.207	(-1.15)
1990s	-0.0748	(-0.82)
Random effect, minor	-0.0643	(-1.84)
Random effect, major	0.396	(1.74)
_cons	-0.0134	(-0.01)
log(PKO budget)		
Minor, t-1	0.0288	(0.32)
Major, t-1	-0.0408	(-0.33)
ln(Time in peace)	-0.151***	(-4.57)
Neighboring conflict, t-1	0.336***	(5.29)
nc · conflict, t-1	-0.0496	(-0.53)
nc · war, t-1	-0.237	(-1.88)
ln(Time since nc)	0.0536***	(4.89)
ncts0	0.0815***	(4.00)
ln(population)	-0.0421***	(-4.80)
ln(GDP per capita)	-0.0480***	(-3.36)
ln(GDP) · conflict, t-1	0.000948	(0.12)
ln(GDP) · war, t-1	0.00728	(0.64)
ln(GDP) · ln(Time in peace)	0.000216	(0.06)
ln(Time since independence)	0.0201	(1.53)
1960s	-0.368***	(-9.54)
1970s	-0.401***	(-11.66)
1980s	-0.357***	(-10.67)
1990s	-0.133***	(-4.12)
Random effect, minor	-0.0482**	(-3.29)
Random effect, major	0.0862***	(5.42)
Sec. council member	-0.0863*	(-2.25)
_cons	1.123***	(7.90)
athrho		
_cons	1.350	(1.53)
lnsigma		
_cons	-0.0303***	(-3.74)
N	7602	

t statistics in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

A.2 Simulation methodology

A central feature in our modeling is the (annual) transition probability matrix for the transitions between peace, minor, and major conflict. The observed transition probability matrix is given in Table A-5. The relative frequency of transition in a given year from minor conflict to major conflict, for instance, have been 0.103, whereas the relative frequency of transition from major to minor conflict was 0.205.

Table A-5: Transition probability matrix: Conflict at t vs. at $t-1$, 1970–2009

	(Conflict level at t)			
Conflict at t-1	No conflict	Minor conflict	Major conflict	Total
No conflict	5078 (0.965)	155 (0.029)	21 (0.004)	5254 (1.000)
Minor conflict	145 (0.207)	481 (0.689)	72 (0.103)	698 (1.000)
Major conflict	24 (0.077)	70 (0.205)	247 (0.724)	299 (1.000)
Observations	5247	706	340	6239

Row proportions in parentheses.

To simultaneously determine how PKOs (and other explanatory variables) have affected the probability of onset, escalation, deescalation and termination of armed conflict in the 1970–2009 period, we estimate a multinomial logit model with lagged dependent variables and interaction terms between explanatory variables and the lagged dependent variables.[3] This model allows representing the transition probabilities in Table A-5 as functions of the explanatory variables we describe in the next section.[4]

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 have been shown to affect the risk of conflict.[5] The models are estimated on data for all countries for the 1970–2009 period.

Our statistical model is able to capture 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 do so, we have developed a simulation routine that takes the estimated annual transition probabilities described above as its point of departure, but repeats the transitions for several consecutive years.[6]

This allows us to estimate the complete effect of PKOs. If a minor conflict breaks out in a

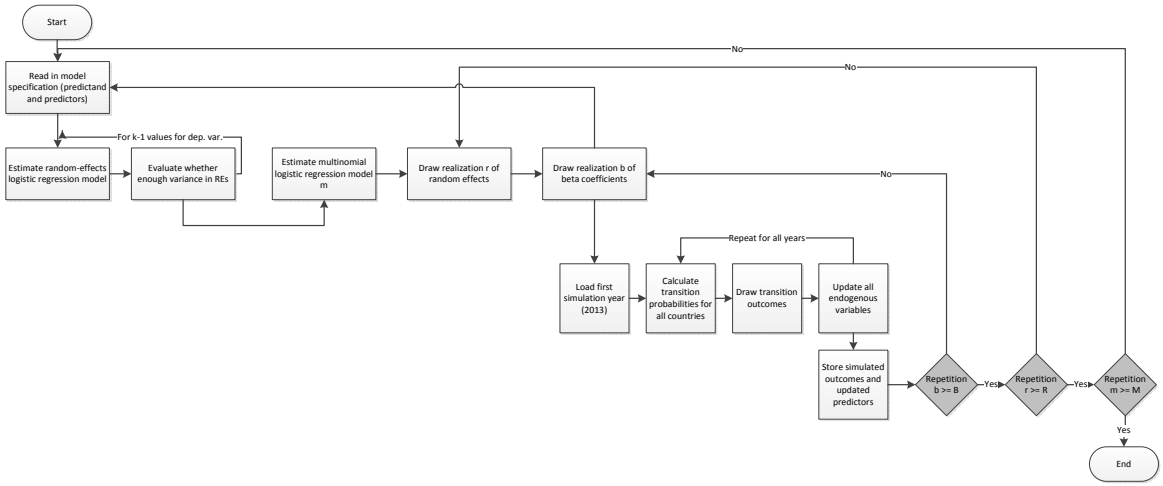
[3]Such models are often referred to as 'dynamic' models, e.g. in Przeworski et al. (2000).

[4]We also make use of information of conflict history before $t-1$, see the data description section in the main article.

[5]See Hegre and Sambanis (2006) for a review of conflict risk variables.

[6]To illustrate using the transition probabilities in Table A-5: The probability of going from no conflict to minor conflict is 0.033. If that happens, the probability that this country sees an escalation to major conflict is 0.103. If that happens, the probability of sustaining major conflict is 0.724. Over two years, countries can go from no conflict to major conflict through several intermediate steps. Matrix calculation on the transition probability matrix shows that the probability of going from no conflict to major conflict over 2 years through all possible pathways is 0.010.

Figure A-1: Simulation flow chart



hitherto peaceful country, this increases the estimated risk of conflict in that country every year for a couple of decades afterwards, as well as the risks 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. Our simulation procedure allows us to estimate the probability of conflict for every country for every year over a 25-year period under different scenarios presented below, such as one where the UN stops deploying PKOs whatsoever, or one where the UN expands its level of ambition further. 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 which makes more sense for decision makers.

Evaluating the effect over as much as 25 years may seem excessive, but the effects of large-scale violent conflict do frequently last for at least as long as that (Collier et al. 2003). Hence, the beneficial effects of PKOs should be seen in a long perspective.

The general setup of the simulation procedure is illustrated in Figure A-1 and summarized below. We use the methodology developed by Hegre et al. (2013). We perform the following steps: (1) Specify and estimate the underlying statistical model; (2) Make assumptions about the distribution of values for all exogenous predictor variables for the first year of simulation and about future changes to these. In this paper, we base the simulations for the predictor variables on UN projections for demographic variables and IIASA projections for education (see the data description section in the published article); (3) Formulate a set of scenarios for future values of PKO variables (see the section 'Description and motivation of scenarios' in the main article); (4) Start simulation in first year. We start in 2010 for the forecasts presented in Section A.1: (5) Draw a realization of the coefficients of the multinomial logit model based on the estimated coefficients and the variance-covariance matrix for the estimates; (6) Calculate the probabilities of

transition between levels for all countries for the first year, based on the realized coefficients and the projected values for the predictor variables; (7) Randomly draw whether a country experiences conflict, based on the estimated probabilities; (8) Update the values for the explanatory variables. A number of these variables, most notably those measuring historical experience of conflict and the neighborhood conflict variables, are contingent upon the outcome of step 6; (9) Repeat (4)–(7) for each year in the forecast period, e.g. for 2010–2035, and record the simulated outcome; and (10)Repeat (3)–(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.

The simulation methodology is reasonably accurate. Hegre et al. (2013) show that the model specification used in this paper is able to predict about 63% of conflicts (minor or major) 7–9 years after the last year of data, with about 4% false positives.[7]

A.3 List of peacekeeping operations

Since the DS dataset is not time-varying, we have coded changes in mandate based on the comments on adjustments to the mandate in Doyle and Sambanis (2006). Our list of PKOs is given below.

In some unclear cases, Fortna (2008)'s version of the DS data was consulted (which is time-varying but not annual). The DS data are coded up to 1999. For the years 2000–2009, we have coded the mandate on the basis of the definitions provided by DS, using UNSC resolutions and mandate information available at the DPKO website.[8] Table A-6 gives a list of all PKOs by mandate, the dates they were active, which countries they were deployed in, and an indication of the conflict intensity during the mission period.

In order to capture the size of the PKO, we have coded the yearly expenditure for each mission, based on United Nations General Assembly published *appropriation* resolutions from 1946 to the present. The variable gives the yearly amount allocated by the UN for each specific mission. UN PKOs are mostly funded outside the ordinary UN budget, and appropriation resolutions were therefore quite straightforward to collect and code. A small number of missions, e.g. the United Nations Truce Supervision Organization (UNTSO), are funded directly through the UN's operating budget, and yearly expenditure data are harder to single out from other budget items. These missions, however, are all small and limited. For PKO years without expenditure data we use the average for the mission type as our best guess.

We have removed international PKOs such as the UNIKOM mission monitoring the Iraq-Kuwait conflict 1991–2003 – i.e. UN PKOs that are deployed in more than one country simultaneously under the same mandate. There are only four such missions and they are listed below.

[7] Hegre et al. (2013) estimate the relationship between predictors and risk of conflict based on data for 1970–2000, simulates up to 2009 and compares simulation results for 2007–2009 with the most recent conflict data available for the same years (Harbom and Wallensteen 2010).

[8] http://www.un.org/en/peacekeeping

Table A-6: List of United Nations peace-keeping operations, 1970–2013

Acronym	Mission name	Start date	Closing date	Countries	Conflict[9]
Observer missions					
UNDOF	United Nations Disengagement Observer Force	Jun-74	Present	Syria	MM
UNAVEM I	United Nations Angola Verification Mission I	Jan-89	Jun-91	Angola	MM
ONUCA	United Nations Observer Group in Central America	Nov-89	Jan-92	Costa Rica,	NC
				El Salvador,	M
				Guatemala,	m
				Honduras	NC
MINURSO	United Nations Mission for the Referendum in Western Sahara	Apr-91	present	Morocco (Western Sahara)	m
UNAMIC	United Nations Advance Mission in Cambodia	Oct-91	Mar-92	Cambodia	m
UNOMUR	United Nations Observer Mission Uganda-Rwanda	Jun-93	Sep-94	Rwanda, Uganda	M
UNOMIG	United Nations Observer Mission in Georgia	Aug-93	Jun-09	Georgia	M
UNOMIL	United Nations Observer Mission in Liberia	Sep-93	Sep-97	Liberia	m
UNASOG	United Nations Aouzou Strip Observer Group	May-94	Jun-94	Chad	m
UNMOT	United Nations Mission of Observers in Tajikistan	Dec-94	May-00	Tajikistan	M
UNMOP	United Nations Mission of Observers in Prevlaka	Jan-96	Dec-02	Croatia, Federal	
				Republic of Yugoslavia	NC
MIPONUH	United Nations Civilian Police Mission in Haiti	Dec-97	Mar-00	Haiti	NC
UNPSG	UN Civilian Police Support Group	Jan-98	Oct-98	Croatia	NC
Traditional missions					

[9]The rightmost column reports the intensity of conflict in the countries the PKOs were deployed to. The categories in this variable are

- NC: no conflict
- m: Minor conflict
- M: One year of major conflict, possibly also years with minor conflict
- MM: At least two years of major conflict, possibly also years with minor conflict

Conflict data were taken from the `http://ucpd.uu.se` (these data are also reported in Melander, Pettersson and Themnér 2016). Conflict is coded as minor if there are between 25 and 999 battle-related deaths per year for every year in the period of the mission. The conflict is coded as major conflict when there are at least 1000 battle-related deaths per year in at least one year (the M category) or two years (MM). Only UCDP state-based conflicts are included – in several cases there was also extensive violence againts civilians.

UNFICYP	United Nations Peacekeeping Force in Cyprus	Mar-64	Present	Cyprus	m
UNIFIL	United Nations Interim Force in Lebanon	Mar-78	Present	Lebanon	m
UNGOMAP[10]	United Nations Good Offices Mission in Afghanistan and Pakistan	May-88	Mar-90	Afghanistan, Pakistan	M
UNAVEM II	United Nations Angola Verification Mission II	Jun-91	Feb-95	Angola	M
UNOSOM I	United Nations Operation in Somalia I	Apr-92	Mar-93	Somalia	M
UNAMIR	United Nations Assistance Mission for Rwanda	Oct-93	Mar-96	Rwanda	M
UNAVEM III	United Nations Angola Verification Mission III	Feb-95	Jun-97	Angola	m
UNPREDEP	United Nations Preventive Deployment Force	Mar-95	Feb-99	Macedonia	m
UNCRO	United Nations Confidence Restoration Operation in Croatia	May-95	Jan-96	Croatia	m
UNSMIH	United Nations Support Mission in Haiti	Jul-96	Jul-97	Haiti	NC
MINUGUA	United Nations Verification Mission in Guatemala	Jan-97	May-97	Guatemala	m
MONUA	United Nations Observer Mission in Angola	Jun-97	Feb-99	Angola	M
UNTMIH	United Nations Transition Mission in Haiti	Aug-97	Dec-97	Haiti	NC
UNOMSIL	United Nations Observer Mission in Sierra Leone	Jul-98	Oct-99	Sierra Leone	M
Multi-dimensional missions					
UNTAG	United Nations Transition Assistance Group	Apr-89	Mar-90	Namibia	NC
ONUSAL	United Nations Observer Mission in El Salvador	Jul-91	Apr-95	El Salvador	m
UNTAC	United Nations Transitional Authority in Cambodia	Mar-92	Sep-93	Cambodia	m
ONUMOZ	United Nations Operation in Mozambique	Dec-92	Dec-94	Mozambique	m
UNMIBH	United Nations Mission in Bosnia and Herzegovina	Dec-95	Dec-02	Bosnia & Herzegovina	M
MINURCA	United Nations Mission in the Central African Republic	Apr-98	Feb-00	Central African Republic	m
UNMISET	United Nations Mission of Support in East Timor	May-02	May-05	Timor-Leste	NC
UNMIT	United Nations Integrated Mission in Timor-Leste	Aug-06	Present	Timor-Leste	NC
Enforcement missions					
UNPROFOR	United Nations Protection Force	Feb-92	Mar-95	Croatia, Bosnia & Herzegovina, Macedonia	m MM NC
UNOSOM II	United Nations Operation in Somalia II	Mar-93	Mar-95	Somalia	m
UNMIH	United Nations Mission in Haiti	Sep-93	Jun-96	Haiti	m
UNTAES	United Nations Transitional Administration for Eastern Slavonia, Baranja and Western Sirmium	Jan-96	Jan-98	Croatia	m

[10]UNGOMAP is coded as active only in Afghanistan

UNMIK	United Nations Interim Administration Mission in Kosovo	Jun-99	Present	Kosovo	NC
UNTAET	United Nations Transitional Administration in East Timor	Oct-99	May-02	Timor-Leste	m
UNAMSIL	United Nations Mission in Sierra Leone	Oct-99	Dec-05	Sierra Leone	M
MONUC	United Nations Organization Mission in the Democratic Republic of the Congo	Nov-99	Present	Democratic Republic of Congo	MM
UNMIL	United Nations Mission in Liberia	Sep-03	Present	Liberia	M
UNOCI	United Nations Operation in Cï¿½te d'Ivoire	Apr-04	Present	Cote d'Ivoire	m
MINUSTAH	United Nations Stabilization Mission in Haiti	Jun-04	Present	Haiti	m
ONUB	United Nations Operation in Burundi	Jun-04	Dec-06	Burundi	m
UNMIS	United Nations Mission in the Sudan	Mar-05	Dec- 11	Sudan	MM
UNAMID	African Union-United Nations Hybrid Operation in Darfur	Jul-07	Present	Sudan	MM
MINURCAT	United Nations Mission in the Central African Republic and Chad	Sep-07	Des-10	Central African Republic, Chad	m
MINUSMA	United Nations Multidimensional Integrated Stabilization Mission in Mali	Apr-13	Present	Mali	m
MONUSCO	United Nations Organization Stabilization Mission in the Democratic Republic of the Congo	Jul-10	present	D.R Congo	M
UNMISS	United Nations Mission in the Republic of South Sudan	Jul-11	present	South Sudan	M
Missions associated with international conflicts that are excluded from our analysis					
UNEF II	Second United Nations Emergency Force	Oct-73	Jul-79	Egypt	
UNIIMOG	United Nations Iran-Iraq Military Observer Group	Aug-88	Feb-91	Iran, Iraq	m
UNIKOM	United Nations Iraq-Kuwait Observation Mission	Apr-91	Oct-03	Iraq, Kuwait	MM
UNMEE	United Nations Mission in Ethiopia and Eritrea	Jul-00	Jul-08	Ethiopia, Eritrea	M

In this dataset PKOs stay in the country on average 4.8 years after the conflict has ended.

A.4 Detailed description of predictor variables

To predict the future incidence of conflict, we add predictor variables that are associated with the risk of conflict and for which we have good projections for the 2010–2035 period.[11] As our baseline model, we use the model specification that was shown to produce the most accurate out-of-sample predictions in Hegre et al. (2013). For more information see this article.

Conflict History We model the *incidence* of conflict, i.e. 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 each of these states up to $t-2$ is also included. We refer to this set of variables jointly as 'conflict history' variables.

Neighborhood We include information on conflicts in the neighborhood in order to model and simulate the spatial diffusion of conflicts. The neighborhood of a country A is defined as all n countries $[B_1...B_n]$ that share a border with A, as defined by Gleditsch and Ward (2000). More specifically, we define 'sharing a border' as having less than 100 km between any points of their territories. Islands with no borders are considered as their own neighborhood when coding the exogenous predictor variables, but have by definition no neighboring conflicts. The spatial lag of conflict is a dummy variable measuring whether there is conflict in the neighborhood or not. Hegre et al. (2013) does not find any difference between minor and major conflicts in terms of their diffusion potential.[12]

Socio-economic data We use two indicators of socio-economic development, given development's strong relationship with the risk of conflict (Collier and Hoeffler 2004; Fearon and Laitin 2003; Hegre et al. 2001): The extent of secondary education and the infant mortality rates. Both variables are highly correlated with GDP per capita, for which we have no authoritative projections.

We use the education data of Lutz et al. (2007), providing historical estimates for 120 countries for the 1970–2000 period. The dataset is based on individual-level educational attainment data from recent Demographic Health Surveys (DHS), Labour Force Surveys (LFS), and national censuses. Historical estimates are constructed by five-year age groups and gender using demographic multi-state methods for back projections, and taking into account gender and education-specific differences in mortality. We employ a measure of male secondary education, defined as the proportion of males aged 20–24 years with secondary or higher education of all males aged 20–24. For the 2001– period (including forecasts) we

[11] Plausible and authoritative forecasts are required for our simulation exercise. This precludes including numerous interesting variables to the model, such as level of democracy, or characteristics of the termination of a previous conflict such as military victories or aspects of peace agreements. Taking these factors fully into account would require specifying a forecasting model also for these.

[12] Beardsley (2011) does not analyze this particular question.

use the accompanying scenario for educational attainment until 2050 (Samir and Lutz 2008). Our base scenario is their General Trend Scenario.

Infant mortality is defined as the probability of dying between birth and exact age 1 year, expressed as the number of infant deaths per 1000 live births. We use the medium scenario from the population projections, where total fertility rates for all countries are assumed to converge towards 1.85 children per woman according to a path similar to historical experiences of fertility decline.

Demographic data The demographic variables originate from the World Population Prospects 2006 (United Nations 2007), the most authoritative global population data set which covers all states in the international system between 1950 and 2005 and provides projections for the 2005–2050 period. Two key demographic indicators are used in this study. Total population is defined as the *de facto* population in a country, expressed in thousands. The measure has been log-transformed following an expectation of a declining marginal effect on conflict risk of increasing population size (see Raleigh and Hegre 2009).

We treat the demographic variables as exogenous here. It is clear that internal armed conflicts leads to surplus mortality and to out-migration. However, even in cases that are horrific in a humanitarian sense such as Lebanon's civil war, the population rarely amounts to more than the natural population growth over a few years. The endogeneity bias there is should attenuate the results found here, since countries with large populations have a high risk of armed conflict. Countries with a large young (male) population also have a high risk of conflict, at the same time as young people, and young males in particular, are most likely to die in war or migrate out of the country.

Temporal dummies We could fit the model better to the data by adding yearly fixed effects – there are good reasons to believe that the underlying transition probability matrix for a country with a given set of characteristics is fluctuating over the observed period. Hegre et al. (2013), however, are unable to find temporal dummies that unambiguously improve the predictive performance of the model. Consequently, we do not include such terms in the model for this paper.

Interaction terms Our control variables may not have the same effect on the probability of conflict onset as on conflict termination. To model this 'dynamic' model (Przeworski et al. 2000), we include multiplicative interaction terms between the control variables and the conflict history variables.[13]

A.5 Likelihood-ratio tests of PKO variables

The PKO mandate and budget variables are highly correlated and it is therefore difficult to assess the explanatory power of each of them in a model that includes all terms. To be able to assess the extent to which the different PKO variables add explanatory power to the model individually, we run four

[13]The sizeable number of interaction terms entails some loss of efficiency, but also improves the predictive performance of the model (Hegre et al. 2013). Since we assess the total impact of our variables by means of simulations, the high number of parameters do not give rise to interpretational or collinearity problems. The only concern is whether the complexity of the model gives rise to 'empty cell' problems. As can be seen from the frequencies in Table A-5, this is not likely to be a problem. The estimates obtained above (e.g., Table3 in the main article) do not indicate any such difficulties.

likelihood-ratio tests. The log likelihood of the full model, (reported in Table 3 in the main paper) is compared to those of three smaller models that exclude, respectively: (1) the PKO budget variable, (2) the PKO mandate variables, (3) the PKO neighbor variable, and (4) PKO mandate, neighbor, and budget variables. The results are reported in Table A-7. It shows that the full model provides a better fit to the data than the four smaller models.

Table A-7: Results of likelihood-ratio tests, comparing full model to models without PKO variables

Model	df	LR χ^2	Prob $> \chi^2$
Remove budget	2	4.25	0.0960
Remove mandate	4	8.33	0.0803
Remove mandate and neighbor	6	12.86	0.0453
No PKO variables	8	17.87	0.0022

A.6 GDP per capita fixed-effects model

The simulation algorithm allows us to endogenize the effect of conflict on variables of interest such as GDP per capita. To do this we first need to build a model estimating the effect of conflict on GDP. For this we utilize log GDP per capita (referred to as y below) from the World Bank's World Development Indicators (World Bank 2010). The data cover the period 1960 to 2012. Growth g is the difference $y_t - y_{t-1}$.[14] For the forecasts we construct a standard growth model (Acemoglu 2008) in which y which is a function of a country's lagged GDP level y_{t-1}, lagged minor and major conflict from $t-1$ to $t-5$, a dummy for whether the country is an oil producer, population size, and the proportion of a country's population made up of youths between the ages 20–25 (all three variables discussed below). In addition we add a country fixed effect μ_i , resulting in the following growth model:

$$g_{i,t,t-1} = \mathbf{X}_{i,t}^T \beta + y_{t-1} + \mu_i + \epsilon_{i,t} \tag{1}$$

where t, T indexes years, and i countries. X is a n by k matrix of data, β is a k by 1 vector of parameters to be estimated, ϵ is a n by 1 vector of disturbances.

Table A-8 shows the results from estimating this growth regression. The conflict variables have considerable effect on growth here as in the studies reviewed above: A minor conflict cuts about 1% off annual growth in the conflict country, and a major conflict more than 3%, for every year the conflict lasts. Conflicts in a neighboring country also leads to about a 1% annual loss. The lagged conflict terms indicate that post-conflict recovery is weak on average, such that most of the growth loss is permanent.

In the simulation below, the values for GDP per capita used are calculated as

$$y_t = y_{t-1} + \hat{g}_{i,t,t-1} \tag{2}$$

[14]Growth g is the difference $y_t - y_{t-1}$ since y is measured in log form. A growth rate of 0.01 in this metric corresponds to a 1% growth rate.

Table A-8: Fixed-effects regression of conflict on GDP

	log(GDP growth)	
log(GDP per capita)$_{t-1}$	-0.0221***	(-10.24)
Time independen	0.0153***	(7.46)
Minor conflict$_{t-1}$ (c1)	-0.0110*	(-2.07)
Major conflict$_{t-1}$ (c2)	-0.0199**	(-2.64)
log(time in peace)$_{t-2}$	0.00111	(0.98)
Neigh. conflict$_{t-1}$ (nc)	-0.00839***	(-3.39)
nc * c1$_{t-1}$	-0.000646	(-0.12)
nc * c2$_{t-1}$	0.000663	(0.08)
log(population)$_{t-1}$	-0.0155***	(-4.23)
PKO traditional$_{t-1}$	0.0167	(1.69)
PKO transformational$_{t-1}$	0.0447***	(3.36)
log(PKO budget)$_{t-1}$	-0.00903	(-1.74)
log(PKO budget^2)$_{t-1}$	0.000924	(1.19)
PKO neighbor$_{t-1}$	0.0208***	(5.26)
N	7591	

Standard errors in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

where $\hat{g}_{i,t,t-1}$ is the predicted growth rate based on Equation 1 and Table A-8. To account for the uncertainties in this model, we draw 50 different random realizations of the β and μ estimates (using Clarify Tomz, Wittenberg and King 2003) for use in the simulations.

A.7 Where do peacekeepers go?

Table A-9 shows the results from estimating a multinomial regression model with a simplified version of the categorical Doyle-Sambanis mandate variable as the dependent variable. As explained in Section **??**, we have merged the 'observer' and 'traditional' categories into a new 'traditional operation' category, and the 'multidimensional' and 'enforcement' categories into 'transformational operations'. The model is estimated only for the post-1989 period, and only for country years where the country is either in conflict or has had a conflict within the last 10 years. We have excluded the permanent members of the UNSC from the data set used here, since these countries are very likely to veto PKOs in own internal conflicts.

Model 1 – onset – is restricted to PKO onsets, i.e. conflict/post-conflict country years where a peacekeeping operation continued from the previous with the same mandate have ben removed from the data set. Model 2 – incidence – includes all conflict/post-conflict country years for the 1990–2009 period.

As noted by previous studies, it is difficult to identify circumstances in which conflict countries will receive PKOs, but Model 1 give some indications. First, both traditional and transformational PKOs are about six times more likely to be initiated in countries with major conflict (more than 1,000 battle deaths) than in conflicts that are less intense or just have ended. The UN occasionally starts up PKOs in countries that have had up to three years after conflict, but almost never after that.[15] There is some indication that conflicts that have lasted a year or more have a larger probability of attracting PKOs.

[15]Estimates for the coefficients for 'Post-conflict year 4–6/7–10' are typically smaller than –30, reflecting the almost perfect absence of such cases. Given the estimation problems associated with such relationships we opted not to present these results.

Table A-9: Where do they go: Determinants of peace-keeping operations, 1990–2009

	(1) Onset		(2) Incidence	
	Traditional	Transformational	Traditional	Transformational
Traditional operation t–1	0	4.733***	6.168***	4.676***
	(.)	(6.90)	(13.77)	(7.59)
Transformational operation t–1	3.028***	0	2.726**	6.878***
	(3.30)	(.)	(3.17)	(11.79)
Major conflict t	1.882*	1.600*	1.232	1.932**
	(2.38)	(2.00)	(1.78)	(2.85)
Minor conflict t–1	0.286	1.080	0.0936	-0.700
	(0.38)	(1.43)	(0.14)	(-1.05)
Major conflict t–1	-0.0883	-0.547	-0.610	-1.536
	(-0.09)	(-0.47)	(-0.65)	(-1.65)
Post-conflict year 1–3	0.509	0.182	0.0138	-0.739
	(0.56)	(0.19)	(0.02)	(-0.99)
Post-conflict year 4–6			-0.293	-1.898*
			(-0.37)	(-2.36)
Post-conflict year 7–10			-0.326	-3.741**
			(-0.43)	(-2.75)
Log population	-0.387	-0.494	-0.295	-0.391
	(-1.81)	(-1.92)	(-1.70)	(-1.83)
Log infant mortality rate	0.0611	0.515	-0.126	0.250
	(0.17)	(1.38)	(-0.52)	(0.96)
1990s	21.56***	-0.819	0.982*	-0.754
	(9.08)	(-1.35)	(2.25)	(-1.69)
_cons	-22.49	-2.531	-1.693	-1.031
	(.)	(-0.89)	(-0.86)	(-0.45)
N	1002		1152	

t statistics in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Unit of observation: Country years at conflict or in post-conflict state (less than 10 years after end of conflict).

Secondly, PKOs are less frequent in large countries. This is particularly true for transformational operations. The odds of PKO initiation in a country with 10 million inhabitants is more than three times higher than in a country with 100 million inhabitants. This is also evident from the list of all PKOs (Table A-6).

Thirdly, transformational PKOs are more likely in under-developed countries, but the relationship is not very strong. A conflict country with an infant mortality rate at 100 (per 1,000 live births) is about twice as likely to receive PKOs as one with 20.

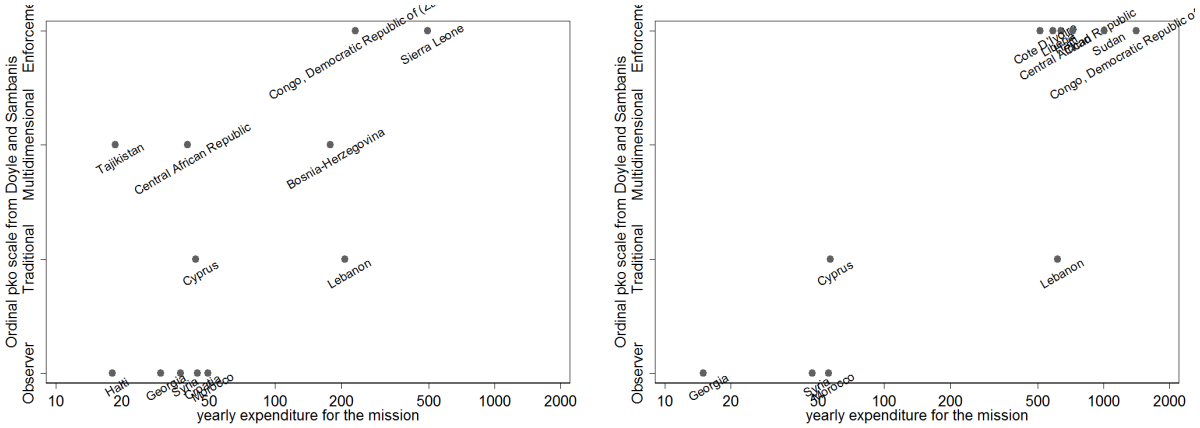
Finally, traditional operations often initiate after transformational ones, and vice versa. Moreover, as evident from Figure 1 in the main article, traditional PKOs were more frequent in the 1990s than in the 2000s, whereas transformational operations became more numerous in the most recent decade.

Model 2 – incidence – complements this picture by showing that PKOs also tend to continue if the conflict remains at the major conflict level. The probability of continuation decreases quickly over the post-conflict period.

A.8 Mandate types and budget allocations

Figure A-2 shows the budgets of all PKOs active in 2000 (left figure) and 2009 (left figure) plotted against mandate type. The correlation between robust mandates and large budgets is evident in 2000 and even stronger in 2009.

Figure A-2: Budget of UN PKO missions by mandate type, 2000 (left) and 2009 (right)



A.9 Out-of-sample evaluation

Tables A-10 and A-11 show the estimation results for the two models used for out-of-sample evaluation. Table A-10 is similar to the model reported in the main paper, but without the PKO variables and estimated on data up until 2000 only. Table A-11 is identical to the one in the main paper in terms of parameters, but similarly estimated on data up until 2000. To evaluate the extent to which the PKO variables add to the predictive power of the model rather than the ideosyncracies of the data we evaluate the out-of-sample predictive performance of the two models. We estimate these two models for the 1960–2000 period. 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). The AUC plots the true positive rate against the false positive rate. A perfect model would yield an AUC of 1. 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.

Table A-10: Estimation results, out-of-sample evaluation, model without PKO variables, 1970–2000

	minor		major	
Minor conflict$_{t-1}$ (c1)	3.049***	(9.33)	3.831***	(4.80)
Major conflict$_{t-1}$ (c2)	2.577***	(5.26)	5.806***	(6.96)
log(time in peace)$_{t-2}$	-0.128	(-1.10)	-0.119	(-0.44)
Neigh. conflict$_{t-1}$(nc)	0.474	(1.47)	1.053	(1.23)
nc * c1$_{t-1}$	-0.251	(-0.64)	-0.645	(-0.70)
nc * c2$_{t-1}$	0.0859	(0.14)	-0.137	(-0.14)
log(time in neigh. peace)$_{t-2}$	-0.00852	(-0.14)	-0.0692	(-0.75)
nc * lts$_{t-1}$	0.00965	(0.08)	0.424	(1.22)
log(population)$_{t-1}$	0.128**	(2.65)	0.302***	(3.90)
log(GDP per capita)$_{t-1}$	-0.415***	(-5.52)	-0.512***	(-4.47)
GDP * c1$_{t-1}$	0.119***	(4.14)	0.0716	(1.39)
GDP * c2$_{t-1}$	0.132**	(3.17)	0.134*	(2.32)
GDP * lts$_{t-1}$	-0.0159	(-1.36)	-0.0396	(-1.77)
Time independent$_{t-1}$	0.198**	(3.03)	-0.0392	(-0.39)
Random effect$_{minor}$	0.957***	(9.11)	0.413*	(2.54)
Random effect$_{major}$	0.135	(1.34)	0.959***	(6.02)
_cons	-1.877**	(-2.69)	-4.077***	(-3.37)
N	5972			
AIC	2854.6			
ll	-1393.3			

t statistics in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

As noted in the paper above, because of the high level of multicollinearity between the PKO terms, as well as among many of the others terms, directly interpreting the effect of individual parameters in Tables A-10 and A-11 should be done with the outmost caution. To be able to compare the substantive

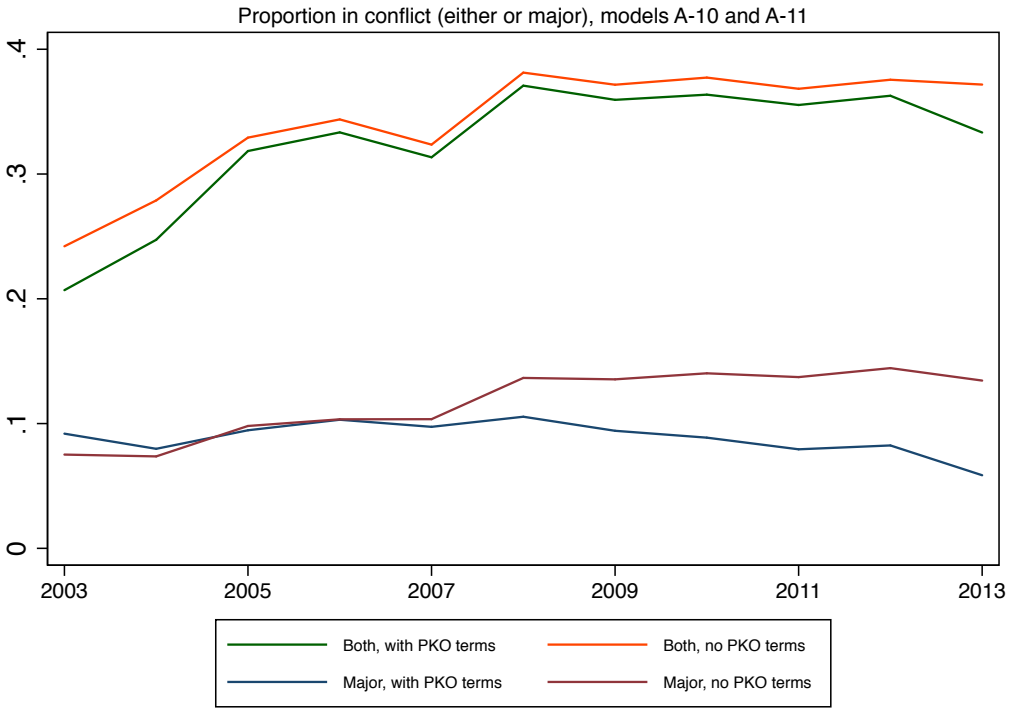
Table A-11: Estimation results, out-of-sample evaluation, model with PKO variables, 1970–2000

	minor		najor	
Minor conflict$_{t-1}$ (c1)	2.919***	(8.87)	3.872***	(4.92)
Major conflict$_{t-1}$ (c2)	2.512***	(5.08)	5.859***	(7.07)
log(time in peace)$_{t-2}$	-0.134	(-1.13)	-0.102	(-0.38)
Neigh. conflict$_{t-1}$(nc)	0.442	(1.35)	1.044	(1.24)
nc * c1$_{t-1}$	-0.184	(-0.47)	-0.707	(-0.78)
nc * c2$_{t-1}$	0.154	(0.26)	-0.176	(-0.18)
log(time in neigh. peace)$_{t-2}$	-0.0234	(-0.37)	-0.0235	(-0.25)
nc * lts$_{t-1}$	0.00990	(0.08)	0.428	(1.27)
log(population)$_{t-1}$	0.237***	(4.74)	0.355***	(4.43)
log(GDP per capita)$_{t-1}$	-0.411***	(-5.46)	-0.474***	(-4.10)
GDP * c1$_{t-1}$	0.119***	(4.07)	0.0857	(1.66)
GDP * c2$_{t-1}$	0.143***	(3.36)	0.145*	(2.48)
GDP * lts$_{t-1}$	-0.00666	(-0.56)	-0.0382	(-1.71)
Time independent$_{t-1}$	0.155*	(2.25)	-0.145	(-1.35)
PKO traditional$_{t-1}$	-0.310	(-0.60)	0.320	(0.48)
PKO transformational$_{t-1}$	-0.869	(-1.10)	-0.578	(-0.56)
log(PKO budget)$_{t-1}$	0.145	(1.07)	-0.197	(-1.04)
PKO neighbor$_{t-1}$	0.463	(1.57)	0.343	(0.84)
Random effect$_{minor}$	1.088***	(10.76)	0.394**	(2.58)
Random effect$_{major}$	0.0563	(0.51)	0.974***	(5.48)
_cons	-2.914***	(-4.23)	-4.680***	(-3.90)
N	5972			
AIC	2829.2			
ll	-1372.6			

t statistics in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Figure A-3: Simulated proportion of countries in conflict, comparing models reported in Tables A-10 and A-11, only countries with observed PKO deployment, 2003–2013



difference or similarity of the two out-of-sample models we therefore report the simulated proportion of countries in conflict from the two models across the 2001–2013 simulation period. This is shown in Figure A-3, which mirrors the type of information reported in Figure 3 in the article.

The figure is limited to the set of countries with observed PKO deployment. It shows the average simulated proportion of these countries in conflict (major conflict or either level) for each of the two models in Tables A-10 and A-11. The figure shows that the model that includes the set of PKO variables (reported in Table A-11) predicts a markedly lower end-of-period incidence of major armed conflict than the model that excludes the PKO variables (reported in Table A-10). In line with the discussion above, we find a smaller, but still discernible, difference when comparing the incidence of armed conflict combining the two intensity levels. In aggregate, the coefficients for the PKO variables in Table A-11 yield the same substantial effect of PKOs as the full-sample analysis reported in Table 3 in the main article.

The PKO variables also contribute significantly to the out-of-sample ability of the modelto predict major armed conflict. Table A-12 report the AUCs for the three different binary comparisons as well as AUCs for the incidence of the conflict state, and for onset and for termination. Given that armed conflict is persistent over time, and therefore that the conflict state at $t-1$ always is a very good predictor of conflict at t, we also report a metric were we discard the first 10 years of the out of sample period, and only evaluate the AUC for the remaining three years. Overall, we find that the model with PKO variables outperforms a model without these terms.

Specifically, for major conflict, the model with PKO terms does much better (AUC of .821) than the

one without (AUC of .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 3 in the main article. For peace, the AUC are .930 (with) and .929 (without PKO terms). For minor conflict the corresponding figures are .936 and .937.

Table A-12: Out of Sample Area Under the Curve statistics. Models without PKOs (left column) and with PKO variables (right column). Table reports AUC statistics for three conflict state comparisons: peace vs. all other states, minor conflict vs. all other states, and major conflict vs. all other states. Figures in bold mark the best score per row.

State	No PKO variables	PKO variables
Peace incidence	**0.930**	0.929
Peace onset	**0.750**	0.743
Peace termination	**0.755**	0.253
Peace 10 years	**0.930**	0.926
Minor incidence	0.936	**0.937**
Minor onset	0.777	**0.779**
Minor termination	**0.769**	0.762
Minor 10 years	0.929	**0.936**
Major incidence	0.806	**0.821**
Major onset	0.740	**0.758**
Major termination	0.788	**0.803**
Major 10 years	0.799	**0.807**

A.10 Simulation results in number form

Table A-13: Proportion of countries in conflict globally across scenarios, 2001–2013

	Observed conflict	S2: Observed PKOs	S1: No PKOs	S3: Trad 100M USD/year	S4: Trans 800M USD/year	S5: Trans 800M USD/year, all
Year	Major Both	Major Both	Major Both	Major Both	Major Both	Major Both
2001	.054 .176	.051 .169	.054 .170	.051 .169	.041 .161	.04 .14
2002	.036 .133	.048 .168	.054 .171	.050 .168	.035 .156	.032 .155
2003	.024 .133	.047 .169	.055 .173	.049 .169	.030 .152	.026 .149
2004	.042 .145	.047 .169	.056 .175	.048 .170	.026 .148	.022 .145
2005	.030 .133	.046 .169	.057 .177	.047 .170	.023 .145	.020 .141
2006	.030 .145	.045 .168	.057 .176	.047 .170	.021 .142	.018 .138
2007	.024 .145	.044 .168	.058 .180	.045 .169	.020 .141	.017 .135
2008	.030 .157	.042 .168	.058 .181	.044 .169	.019 .139	.016 .134
2009	.036 .157	.041 .168	.059 .182	.043 .169	.018 .137	.015 .132
2010	.030 .145	.041 .168	.059 .183	.043 .169	.017 .137	.014 .131
2011	.036 .163	.040 .168	.060 .184	.043 .169	.016 .136	.014 .130
2012	.036 .139	.041 .168	.059 .185	.042 .169	.017 .135	.014 .129
2013	.036 .139	.040 .169	.060 .186	.042 .171	.016 .134	.014 .128

Table A-14: Observed and Simulated PKO Budget, billion USD/year

	S2: Observed PKOs	S1: No PKOs	S3: Trad 100M USD/year	S4: Trans 800M USD/year	S5: Trans 800M USD/year, all
Year	Budget	Budget	Budget	Budget	Budget
2001	.902	0	1.215	8.601	10.295
2002	1.582	0	1.443	10.429	12.290
2003	1.780	0	1.606	11.870	13.909
2004	1.976	0	1.758	13.081	15.227
2005	2.180	0	1.897	14.216	16.432
2006	3.596	0	2.023	15.251	17.543
2007	3.920	0	2.056	15.336	17.670
2008	4.901	0	2.124	15.305	17.624
2009	7.162	0	2.162	15.176	17.458
2010	7.103	0	2.205	14.928	17.172
2011	7.803	0	2.242	14.656	16.848
2012	9.387	0	2.267	14.425	16.579
2013	7.409	0	2.283	14.181	16.303

Table A-13 reports the simulated global proportion of countries in conflict for each of the scenarios. These are the numbers that underlie Figure 3 in the main article. There were 171 countries in our dataset. Hence, the simulated proportions can be translated into number of countries in conflict by multiplying the proportion with 171. In 2013, the UCDP recorded 6 countries in major conflict and 24 countries in minor or major conflict for our 171 countries. Given the no-PKO scenario (S1), our simulations yield 10.3 countries in major conflict and 31.8 conflict countries overall. Given the peacekeeping as observed scenario (S2), we simulate 6.8 countries in major conflict and 28.9 in minor or major conflict. If the UN had opted for the most ambitious scenario (S5), we simulate 2.4 countries in major conflict and 21.9 in minor or major conflict.

A.11 Regional effects

Here we present a regional analysis of the effects of UN PKOs. We define 8 regions as listed in Table A-15. The list is a condensed version of the UN region definition.[16] In Figure A-4 we show simulated and observed incidence of conflict in six of these regions, across the same scenarios as in Figure 3 in the main article.

Not surprisingly, the set of regional graphs show the largest impact of PKOs in regions that saw considerable amounts of conflict in the 2001–2013 period. Given that there are only a handful of conflicts within each region, individual conflicts are discernible in the plots. In West Africa (top right panel), for instance, there were no major conflicts from 1995 to 1997, and one conflict in 1998–99. In the 1995–2004 period the total number of conflicts fluctuated between 2 and 4.

The simulated proportion in conflict in that region is about 13% for S1 and somewhat lower for S3–5. This corresponds to a little over 2 conflicts every year. In the no-PKO scenario (S1), in contrast, we

[16]The UN list is found at http://www.un.org/depts/dhl/maplib/worldregions.htm.

Table A-15: List of regions

Number	Region Name
1	South America, Central America, and the Caribbean
2	Western and Southern Europe, North America, and Oceania
3	Eastern Europe
4	Western Asia and North Africa
5	Western Africa
6	East, Central, and Southern Africa
7	South and Central Asia
8	Eastern and South-East Asia

simulate around 18 % of countries in conflict in 2013 – or about 50% more. The expected annual number of major conflicts (more than 1,000 battle-related deaths) is less than about 1 for this region under the no-PKO scenario, but less than 0.5 for the various PKO scenarios.

In all regions, PKOs have a clear conflict-dampening effect, and strong-mandate PKOs do best everywhere. In many regions, there were few major conflicts in the post-Cold war period, so the model predicts a continued low incidence of these conflicts. Since PKOs in our scenarios are initiated only in major conflicts, we consequently predict fewer deployments in these regions, and they therefore only marginally affect the regional incidence of conflict. Our PKO scenarios applied uniformly would have the strongest impact in the 'MENA', 'East Africa' and 'Central Asia' regions (4, 6, and 7). In the 'MENA – West Asia and North Africa' region, we predict a clear decline in the incidence of conflict because of the relatively high levels of socio-economic development in the region. Particularly in the first 5 years of the simulation, PKOs with strong mandates would according to our model reinforce this declining trend. Since there are few large countries in the region, there is little difference between S4 and S5 for this region.[17]

In addition to the African regions, 'East and South Asia' and 'Central Asia' regions are the ones with the highest observed and simulated incidence of conflict in the post-Cold War period. In these regions, the extensive mandate scenarios reduce the predicted incidence of major conflict from about 5% of the countries to about 2%, corresponding to going from more than two conflicts every year to less than one. In 'Central Asia', the predicted incidence of conflict is about 40% in 2001 and slowly decreasing under the no-PKO scenario. The most extensive scenario with transformational mandates for all conflicts in smaller countries, reduces the predicted incidence in this region to about 20%. If Gilligan and Stedman (2003) are correct that the UN is less inclined to intervene in Asian conflicts, the UNSC has strong reasons to reconsider this policy. The potential effect of PKOs is strong in this area, and a policy shift would substantially decrease the incidence of armed conflict.

Table A-16 reports the average simulated years in conflict (minor or major) for every country for the 2001-2013 period, as well as simulated PKO expenditure (in million USD) over the same period.

[17] Our model fails to predict the Arab Spring conflicts. The failure to deploy ambitious PKOs until 2008, however, may be a partial reason for the poor forecasts.

Figure A-4: Regional observed and simulated incidence of conflict, 1990–2013, all scenarios

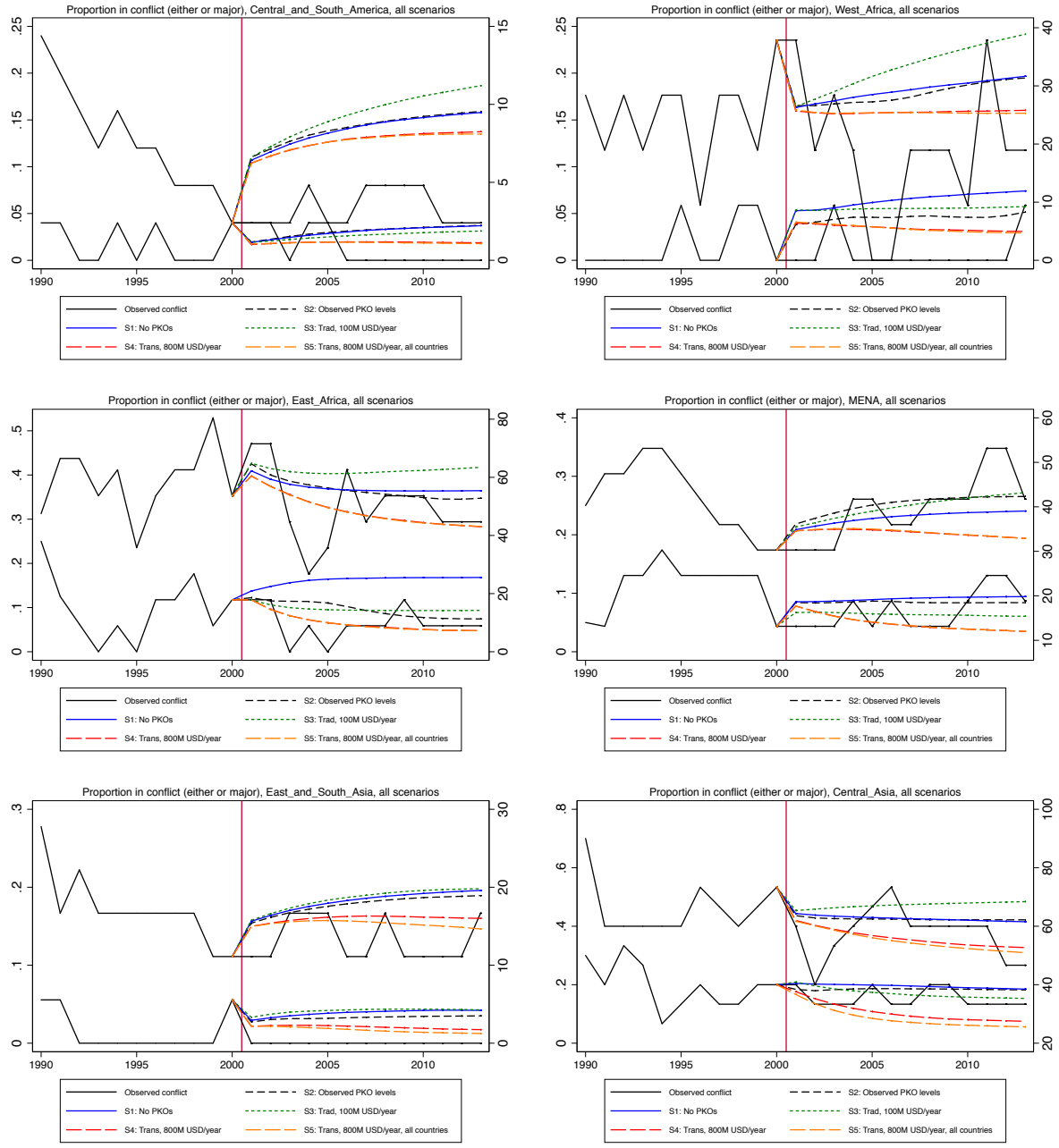


Table A-16: Simulated mean years of conflict and observed and simulated PKO expenditures (in Million USD) over the 2001–2013 period

	S1: No PKOs		S2: Observed PKO levels		S3: Trad, 100M USD/year		S4: Trans 800M USD/year		S5: Trans 800M USD/year all countries	
Country	Conflict	PKO	Conflict	PKO	Conflict	PKO	Conflict	PKO	Conflict	PKO
United States	.040	0	.037	0	.042	0	.041	0	.038	8.636
Canada	.007	0	.007	0	.007	1.191	.007	2.540	.007	2.491
Cuba	.013	0	.017	0	.014	1.604	.012	5.611	.012	5.715

Haiti	.093	0	.066	325.692	.048	6.557	.076	36.410	.078	36.619
Dom. Rep	.027	0	.015	0	.028	1.916	.028	8.528	.026	8.667
Jamaica	.010	0	.009	0	.011	1.469	.009	3.933	.009	4.234
Trinidad	.013	0	.018	0	.012	1.525	.013	5.531	.012	5.156
Mexico	.180	0	.199	0	.183	0	.182	0	.173	47.778
Guatemala	.522	0	.511	0	.530	10.265	.511	76.870	.515	76.158
Honduras	.027	0	.041	0	.029	1.693	.026	6.063	.027	6.103
El Salvador	.101	0	.106	0	.105	6.055	.087	41.556	.090	40.541
Nicaragua	.105	0	.083	0	.113	7.191	.091	49.401	.091	50.253
Costa Rica	.011	0	.010	0	.0107	1.273	.010	3.318	.010	3.552
Panama	.039	0	.045	0	.038	1.630	.035	5.630	.035	5.691
Colombia	.817	0	.808	0	.864	90.730	.689	693.025	.689	693.412
Venezuela	.094	0	.0854	0	.085	2.650	.083	14.238	.082	14.262
Guyana	.010	0	.010	0	.011	1.374	.010	4.068	.010	4.375
Suriname	.017	0	.012	0	.018	1.956	.017	7.837	.017	8.305
Ecuador	.057	0	.074	0	.052	1.874	.048	6.524	.051	7.730
Peru	.556	0	.570	0	.586	32.385	.482	242.432	.482	242.214
Brazil	.146	0	.149	0	.129	0	.127	0	.121	20.918
Bolivia	.058	0	.05	0	.056	2.314	.051	11.567	.052	11.219
Paraguay	.046	0	.050	0	.045	2.688	.043	15.987	.041	14.604
Chile	.056	0	.049	0	.058	2.546	.050	12.854	.05	12.596
Argentina	.067	0	.059	0	.066	2.651	.0612	15.136	.060	14.373
Uruguay	.02	0	.017	0	.021	1.631	.019	5.599	.02	5.814
UK	.348	0	.352	0	.349	0	.347	0	.330	80.713
Ireland	.014	0	.016	0	.013	1.282	.013	3.736	.012	3.26
Netherlands	.009	0	.009	0	.01	1.278	.009	2.955	.008	2.820
Belgium	.006	0	.009	0	.005	1.129	.005	2.192	.005	1.88
Luxembourg	.003	0	.002	0	.003	1.067	.003	1.802	.002	1.639
France	.024	0	.025	0	.024	0	.024	0	.022	7.979
Switzerland	.006	0	.005	0	.006	1.138	.006	2.079	.006	2.199
Spain	.087	0	.094	0	.0888	3.294	.083	19.193	.081	18.864
Portugal	.010	0	.009	0	.010	1.282	.009	2.998	.010	2.881
Germany	.023	0	.020	0	.022	1.597	.021	5.322	.020	5.365
Poland	.085	0	.094	0	.087	3.197	.081	17.730	.069	11.541
Austria	.008	0	.006	0	.009	1.256	.007	2.749	.007	2.979
Hungary	.021	0	.026	0	.021	1.325	.021	4.025	.022	4.092
Czech Rep	.041	0	.0615	0	.045	3.228	.037	17.164	.038	17.757
Slovakia	.032	0	.037	0	.036	3.114	.030	15.799	.031	15.947
Italy	.01	0	.017	0	.01	1.317	.011	3.567	.009	2.909
Albania	.023	0	.016	0	.022	1.514	.021	5.592	.021	4.818
Macedonia	.044	0	.021	5.153	.044	5.028	.038	17.56	.037	16.859
Croatia	.069	0	.055	0	.065	3.475	.054	16.057	.054	15.396
Bosnia	.042	0	.022	73.133	.022	24.99	.033	104.049	.032	102.9
Slovenia	.02	0	.018	0	.02	1.828	.021	8.83	.02	8.476
Greece	.031	0	.054	0	.029	1.590	.026	6.002	.026	5.153
Cyprus	.007	0	.007	45.046	.007	4.638	.005	6.068	.004	6.127
Bulgaria	.051	0	.039	0	.047	1.965	.045	8.9	.043	8.393
Moldova Rep	.094	0	.083	0	.1	6.687	.081	44.547	.079	42.779
Romania	.097	0	.102	0	.101	4.162	.094	24.619	.095	26.092
Russia	.6956	0	.657	0	.677	0	.691	0	.515	651.915
Estonia	.030	0	.028	0	.031	2.217	.027	10.782	.023	6.711
Latvia	.038	0	.029	0	.039	2.439	.035	11.999	.029	8.587
Lithuania	.026	0	.0412	0	.028	2.115	.025	10.524	.02	6.598
Ukraine	.132	0	.121	0	.123	6.498	.109	47.830	.095	33.144
Belarus	.053	0	.062	0	.055	2.916	.049	14.311	.043	11.062
Armenia	.039	0	.036	0	.043	3.733	.034	22.243	.035	22.559

Georgia	.098	0	.139	29.138	.09	6.66	.05	23.899	.049	20.668
Azerbaijan	.092	0	.119	0	.081	3.927	.075	26.854	.071	21.692
Finland	.029	0	.045	0	.029	1.666	.029	6.361	.023	4.32
Sweden	.007	0	.007	0	.007	1.14	.007	2.165	.006	2.005
Norway	.021	0	.026	0	.022	1.446	.021	3.610	.017	3.207
Denmark	.003	0	.002	0	.003	1.142	.003	1.836	.003	1.67
Cape Verde Is	.012	0	.006	0	.013	1.835	.012	8.648	.011	7.431
Guinea Bissau	.195	0	.281	0	.208	14.444	.171	101.027	.168	102.328
Eq. Guinea	.005	0	.006	0	.005	1.188	.006	2.7	.005	2.638
Gambia The	.032	0	.026	0	.031	2.262	.028	10.717	.029	11.209
Mali	.186	0	.160	0	.176	5.633	.161	36.246	.161	37.556
Senegal	.316	0	.271	0	.32	13.157	.281	95.998	.282	96.791
Benin	.029	0	.036	0	.033	2.252	.027	10.53	.027	10.25
Mauritania	.087	0	.094	0	.079	2.897	.074	16.835	.075	17.146
Niger	.244	0	.171	0	.235	8.264	.212	58.123	.211	59.149
Cote d'Ivoire	.108	0	.057	250 .567	.048	3.465	.092	27.054	.092	27.743
Guinea	.109	0	.094	0	.102	4.689	.084	20.315	.084	20.251
Burkina Faso	.055	0	.073	0	.058	3.773	.05	20.905	.05	21.766
Liberia	.346	0	.244	418.5	.179	19.548	.282	195.352	.283	193.311
Sierra Leone	.518	0	.326	187.453	.253	31.072	.257	260.062	.257	257.963
Ghana	.092	0	.062	0	.097	4.962	.086	31.204	.085	31.327
Togo	.047	0	.068	0	.05	3.466	.041	20.094	.041	20.478
Cameroon	.079	0	.061	0	.067	2.135	.065	9.288	.065	9.838
Nigeria	.179	0	.238	0	.173	0	.174	0	.152	67.834
Gabon	.015	0	.017	0	.016	1.391	.014	4.074	.014	4.055
CAR	.128	0	.072	147.135	.056	7.043	.104	21.646	.104	22.624
Chad	.704	0	.634	134.164	.586	15.078	.651	119.937	.652	122.062
Congo	.196	0	.182	0	.168	8.494	.15	57.191	.151	57.139
DR Congo	.811	0	.508	848.168	.402	86.76	.503	690.168	.505	691.576
Uganda	.736	0	.656	0	.702	23.999	.6566	207.348	.655	204.551
Kenya	.084	0	.084	0	.07	3.345	.06	18.744	.061	18.615
Tanzania	.104	0	.082	0	.078	3.686	.074	24.136	.076	25.689
Burundi	.551	0	.467	51.636	.473	81.5	.349	589.498	.349	590.175
Rwanda	.618	0	.488	0	.568	29.01	.481	241.534	.478	239.032
Somalia	.428	0	.351	0	.446	22.749	.382	174.638	.383	173.999
Djibouti	.215	0	.212	0	.218	11.98	.182	82.535	.184	81.721
Ethiopia	.82	0	.797	0	.797	27.381	.75	217.699	.75	211.393
Eritrea	.35	0	.386	0	.324	14.735	.287	107.136	.286	109.023
Angola	.808	0	.655	2.015	.773	90.433	.434	647.11	.436	647.864
Mozambique	.261	0	.316	0	.27	16.091	.213	119.583	.212	121.763
Zambia	.068	0	.053	0	.056	2.934	.047	16.122	.047	15.695
Zimbabwe	.101	0	.086	0	.102	5.768	.088	38.3	.084	37.661
Malawi	.041	0	.042	0	.038	2.476	.034	13.582	.035	14.299
South Africa	.216	0	.245	0	.218	8.216	.201	60.416	.196	60.475
Namibia	.038	0	.035	0	.032	1.914	.028	8.568	.029	8.728
Lesotho	.104	0	.079	0	.114	8.982	.095	59.361	.095	58.772
Botswana	.011	0	.01	0	.011	1.376	.009	3.437	.009	3.152
Swaziland	.015	0	.012	0	.015	1.451	.014	4.329	.014	4.172
Madagascar	.042	0	.051	0	.043	2.992	.038	17.204	.038	17.438
Comoros	.086	0	.083	0	.092	7.073	.076	46.314	.079	46.843
Mauritius	.006	0	.008	0	.006	1.228	.006	2.706	.006	2.946
Morocco	.249	0	.311	48.663	.245	11.436	.161	51.584	.162	53.641
Algeria	.661	0	.651	0	.687	43.567	.567	344.076	.565	339.628
Tunisia	.047	0	.076	0	.045	2.474	.038	12.384	.037	11.935
Libya	.012	0	.009	0	.012	1.579	.011	5.867	.011	5.918
Sudan	.857	0	.664	806.091	.656	89.104	.426	633.03	.422	631.729

Iran	.588	0	.583	0	.571	16.158	.533	115.304	.533	119.461
Turkey	.803	0	.762	0	.828	60.713	.687	468.507	.687	467.994
Iraq	.378	0	.382	0	.353	12.481	.328	97.928	.327	98.466
Egypt	.179	0	.203	0	.164	5.677	.153	36.673	.157	36.802
Syrian	.141	0	.149	41.213	.126	7.992	.077	34.348	.077	34.388
Lebanon	.068	0	.123	314.478	.071	14.677	.045	28.061	.045	28.519
Jordan	.042	0	.044	0	.043	2.127	.04	10.05	.04	9.884
Israel	.769	0	.811	0	.776	11.526	.759	92.539	.759	92.982
Saudi Arabia	.063	0	.049	0	.066	2.602	.059	13.469	.061	12.439
Yemen	.281	0	.233	0	.302	17.101	.246	126.439	.243	124.832
Kuwait	.009	0	.008	0	.009	1.224	.009	3.051	.009	2.814
Bahrain	.005	0	.004	0	.005	1.159	.004	2.346	.005	2.589
Quatar	.004	0	.004	0	.004	1.134	.004	2.036	.004	2.279
UAE	.008	0	.007	0	.008	1.305	.008	3.561	.007	3.807
Oman	.022	0	.028	0	.023	1.452	.021	4.575	.021	4.323
Afghanistan	.721	0	.714	0	.835	91.162	.351	627.509	.351	627.638
Turkmenistan	.037	0	.047	0	.031	2.136	.028	10.766	.026	9.826
Tajikistan	.251	0	.166	4.726	.265	65.932	.145	463.649	.144	464.027
Kyrgyzstan	.082	0	.095	0	.082	4.493	.062	18.557	.062	18.136
Uzbekistan	.424	0	.449	0	.376	19.026	.326	130.925	.325	132.696
Kazakhstan	.079	0	.059	0	.076	3.972	.066	23.248	.06	17.847
China	.109	0	.094	0	.092	0	.089	0	.084	19.433
Mongolia	.061	0	.044	0	.059	2.681	.056	14.376	.046	8.698
Taiwan	.009	0	.014	0	.009	1.425	.009	3.994	.009	4.234
Korea, North	.051	0	.033	0	.055	3.566	.046	22.178	.044	21.225
Korea, South	.015	0	.017	0	.014	1.541	.013	5.236	.013	5.632
Japan	.026	0	.016	0	.028	0	.027	0	.026	7.022
India	.852	0	.862	0	.832	0	.837	0	.681	698.211
Bhutan	.017	0	.015	0	.018	1.673	.015	6.647	.012	4.535
Pakistan	.273	0	.303	0	.225	0	.228	0	.205	69.663
Bangladesh	.376	0	.352	0	.3698	0	.367	0	.351	44.365
Myanmar	.759	0	.743	0	.8	48.716	.666	380.359	.665	378.809
Sri Lanka	.535	0	.548	0	.674	88.171	.277	589.443	.279	590.147
Nepal	.4203923	0	.454	0	.445	25.405	.351	190.377	.325	153.591
Thailand	.228	0	.259	0	.218	3.421	.214	19.602	.216	20.208
Cambodia	.556	0	.572	0	.576	28.325	.503	212.519	.503	212.783
Lao	.061	0	.066	0	.056	3.967	.042	21.302	.043	21.935
Vietnam	.097	0	.092	0	.089	4.478	.078	27.961	.074	26.765
Malaysia	.142	0	.121	0	.143	3.891	.136	23.728	.133	22.206
Singapore	.028	0	.028	0	.029	1.575	.028	5.546	.026	5.196
Phillippines	.785	0	.787	0	.848	91.531	.597	695.463	.599	695.807
Indonesia	.706	0	.665	0	.707	0	.709	0	.639	276.347
Australia	.008	0	.007	0	.008	1.231	.008	3.053	.007	2.506
Papua N. G.	.145	0	.138	0	.144	5.397	.135	37.257	.132	34.181
New Zealand	.006	0	.006	0	.007	1.259	.007	3.491	.006	3.155
Solomon Is	.011	0	.01	0	.012	1.668	.01	5.888	.01	5.288
Fiji	.009	0	.013	0	.009	1.415	.009	4.424	.009	4.502

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