

# Post-conflict Stabilization in Africa

Anke Hoeffler

[anke.hoeffler@economics.ox.ac.uk](mailto:anke.hoeffler@economics.ox.ac.uk)

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## Abstract

Post-conflict peace is fragile, about half of all conflicts break out again during the twelve post-conflict years. In Africa this risk is even higher. Using survival analysis this paper suggests that while it is difficult to find correlates of peace stabilization, there are some policy relevant results. How a conflict ends is important. Negotiated settlements are fragile but the chances of peace surviving can be significantly improved through the deployment of UN peacekeeping operations. The data suggest that many operations start before the end of the armed conflict, thus they should be viewed as 'peace preparation' operations. The paper recommends the use of additional case studies, given that the small sample size prevents further quantitative examination of these important issues.

## 1. Introduction

This paper forms part of the AERC's Collaborative Research Project entitled 'Growth in Fragile States in Africa'. The project comprises of two phases: In the first phase framework papers tackle the issues of macro- and microeconomic management the relationship to growth and inequality in fragile states. In the second phase case study authors will be able to use these issue lead papers to discuss the challenges that one particular fragile state faces.

As a first step in this collaborative project it is important to define what we mean by 'state fragility'. The World Bank publishes a 'harmonized list of fragile situations'. In 2015 out of the 33 countries and territories, about half (17) are in Sub-Saharan Africa: Burundi, Central African Republic, Chad, Comoros, Democratic Republic of the Congo, Cote d'Ivoire, Eritrea, Guinea Bissau, Liberia, Madagascar, Mali, Sierra Leone, Somalia, South Sudan, Sudan, Togo and Zimbabwe. Thus, the issues of state fragility are of particular importance in the region of Sub-Saharan Africa. The World Bank defines "Fragile Situations" as having a low Country Policy and Institutional Assessment Rating (CPIA) or to have had a UN or regional peace-building mission during the past three years.<sup>1</sup> In assessing a country's policy and institutions the World Bank uses a set of 16 criteria grouped in four clusters: economic management, structural policies, policies for social inclusion and equity, and public sector management and institutions. Thus, the World Bank's definition centres on (1) state capacity understood in terms of economic policies and outcomes and (2) being a post-conflict country. For the purpose of this framework paper I advance a slightly more general definition (for more discussion see Hoeffler, 2012a). States can 'fail' in two distinct senses: they can fail to provide (1) security and (2) economic development opportunities. The most basic role of the state is to provide physical security to its citizens through maintaining a monopoly of organized violence within the society. Where the government fails to do this and rival organizations of violence emerge, the state descends into armed conflict. However, in the modern world citizens do not only demand security but also economic opportunities. Governments play some role as regulators of private economic activity, and as suppliers of public goods such as transport infrastructure,

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<sup>1</sup> More specifically the World Bank states: "Fragile Situations" have: either a) a harmonized average CPIA country rating of 3.2 or less, or b) the presence of a UN and/or regional peace-keeping or peace-building mission during the past three years. This list includes only IDA eligible countries and non-member or inactive territories/countries without CPIA data. IBRD countries with CPIA ratings below 3.2 do not qualify on this list due to non disclosure of CPIA ratings; IBRD countries that are included here qualify only by the presence of a peacekeeping, political or peace-building mission - and their CPIA ratings are thus not disclosed. Source: <http://siteresources.worldbank.org/EXTLICUS/Resources/511777-1269623894864/FY15FragileSituationList.pdf>, accessed 14 November 2016

health and education. The quality of regulation and public goods is crucial for the capacity of citizens to earn an income and thus escape poverty.

As documented in a number of UN speeches and debates, it is now widely acknowledged that these two main functions of government are closely related: There is no security without development and no development without security. The World Bank's 'harmonized list of fragile situations' includes some states that have not recently experienced armed conflict, however, in my framework paper I will concentrate on the analysis of countries that have experienced armed conflict. These countries are at a particularly high risk of conflict recidivism, in about 40 per cent of all post-conflict states the peace does not hold and armed conflict breaks out again (Collier et al 2008; Walter 2014). Without peace states are not able to provide the security needed for productive economic activities and I concentrate on the peace stabilization aspect in my paper. The work by Dunne & Tian, McKay & Thorbecke, Ngepah & Ngepah as well as Chuku & Onye discuss the drivers of economic growth in more detail. I suggest that although the challenges of post-conflict stabilization and recovery are closely linked, the policy instruments to tackle these challenges are distinct. For example, empirical studies show that post-conflict stabilization depends on how the conflict ended, formal settlements and victories make it less likely for the peace to break down. Armed conflicts that are never formally ended are much more likely to scale up again (e.g. Toft 2010a&b, Caplan & Hoeffler, 2017). In contrast, the higher growth rates that countries experience during the post-conflict period are independent of the type of settlement. Thus, the policy instrument of peace mediation (to achieve a formal settlement) will stabilize the peace but it will not enhance post-conflict growth. On the other hand, free and fair elections promote growth (Collier & Hoeffler, 2015) but they do not significantly increase the duration of peace (Collier et al 2008).

In this paper I examine post-conflict stabilization using the global data set of Caplan & Hoeffler (2017) with a focus on African peace episodes. There are two reasons why I use a global sample. First, the sample of post-conflict peace spells is small and would be even smaller if I reduced it to African countries only. Second, as I will argue below the estimations provide weak evidence for the hypothesis that Africa is different from other regions and thus it appears justified to use a global sample. The paper is structured as follows. The second section provides an overview of the cross-country literature on post-war peace. The concept of peace and the data are discussed in Section 3. One of the main issues is that the definition of peace in quantitative work is the absence of armed conflict. Thus, it is a negative definition of peace

that often sits uneasily with country experts. The quality of peace varies widely across the countries that are deemed to be ‘at peace’ in this type of study. Section 4 discusses the statistical method employed, namely survival analysis. The statistical results are presented in Section 5. In general it appears to be difficult to explain the duration of peace, very few variables are significant. How the conflict ended is an important determinant of how stable the ensuing peace will be. Settlements are relatively more likely to break down than military victories but the deployment of UNPKOs strengthens peace settlements considerably. Settlements buttressed by UN peacekeeping operations are about 44 per cent less likely to break down than military victories. The last section provides a discussion of the results and some suggestions for research questions to the case study authors.

## **2. Background**

By now there is a large literature on the causes of conflict onset. (Seminal articles include Collier & Hoeffler 2004b; Fearon & Laitin 2003; Hegre et al 2001 and overviews of this literature are provided by Blattman & Miguel 2010; Hoeffler 2012b). Typically these studies use global panel data to determine the risk of conflict onset by applying logit or probit analysis, the sample includes all countries, irrespective of whether they experienced an armed conflict or not. In contrast, for the purpose of this framework paper I want to concentrate on countries that have experienced at least one episode of armed conflict. One main characteristic of post-conflict countries is that they face a high risk of conflict recurrence, they seem to be stuck in a “conflict trap” (Collier et al 2003). During the first post-conflict decade about half of the conflicts will recur and one important policy question is ‘what makes peace last?’. There is a smaller body of literature that applies regression analysis to the study of the duration of peace<sup>2</sup>. The sample is limited to countries that have experienced at least one spell of armed conflict and the estimation method is survival analysis. Commonly cited causes of peace failure centre on the following:

- Grievances, including those that started the first armed conflict and were not resolved, cause the peace to break down;
- Opportunities for armed conflict are better in some countries: poverty, lack of other gainful employment, geographic characteristics such as forests, mountains and dispersed populations make it easier to rebel;

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<sup>2</sup> Examples of this literature include Fortna 2004, 2008; Hartzell & Hoddie 2003; Collier, Hoeffler & Söderbom 2008; Walter 2014.

- Bargaining and/or commitment problems: information about the other side's military strength has been revealed, combatants did not or could not divide the stakes (indivisibilities), governments are not able to commit to reforms, to DDR and/or power sharing.

Unlike in the onset literature, there is currently no consent as to which determinants are most important to reduce the hazard of renewed conflict (see discussion in Caplan & Hoeffler 2017). My take on the existing literature is that it appears to be difficult to explain the duration of peace. A number of variables that one might expect to have an impact on the duration of peace is in fact not significant: e.g. a variety of polity measures, elections, the duration and intensity of the previous conflict, aid, remittances, military expenditure, inequality (Walter 2014; Caplan & Hoeffler 2017). In general there seems to be little evidence suggesting that unresolved grievances have a significant effect on the duration of peace. There is some evidence to suggest that improved economic opportunities, proxied by higher income and growth, reduce the hazard of conflict recurrence (Collier, Hoeffler & Söderbom 2008). Furthermore, the peace process can be supported by the deployment of UN Peacekeepers (Fortna, 2004, 2008). The type of conflict termination also appears to be important (Walter 2014). Conflicts that ended in military victories and negotiated settlements are much less likely to recur than conflicts that were neither won, nor formally settled, i.e. 'rumble on' at low levels.

### **3. Concepts and Data**

In this section I first introduce my definition of post-conflict peace and present a first glance of the data. This includes a description of the preceding armed conflict (duration, battle deaths, settlement) and the characteristics of the subsequent peace spell (duration, peace keeping operations).

#### **3.1 Definition of post-conflict peace**

For this study I define 'post-conflict' as the period after an armed conflict, i.e. when armed conflict is absent. In some of the literature this is also referred to as 'negative' peace. Most quantitative studies of armed conflict employ a negative conception of peace where many post-conflict situations in fact are not entirely peaceful but, rather, are characterised by ongoing,

sporadic violence. However, if the level of violence is below the definitional threshold of armed conflict, the situation is defined as ‘post-conflict’.

My definition of armed conflict is based on the Armed Conflict Dataset (ACD). It is the most commonly used data set and is a collaboration between the Uppsala Conflict Data Program (UCDP) and the Peace Research Institute Oslo (PRIO). The most recent version of the ACD that includes information on how armed conflicts ended starts at the conclusion of World War II and ends on 31 December 2014.<sup>3</sup> Only very few armed conflicts are international conflicts between states and I disregard these conflicts. The focus is on conflicts that are internal to a country: these conflicts may or may not receive support from beyond the national borders. In the ACD coders also distinguish between ‘major’ and ‘minor’ armed conflicts. Major armed conflicts or wars cause at least 1,000 battle-related deaths a year. Military as well as civilian deaths are counted as ‘battle related’. A further part of the definition is that there is organised effective violent opposition to the government in order to distinguish this type of violence from genocides, pogroms, and communal violence. Minor armed conflict is defined as above but is limited to 25 to 999 battle deaths per year. I include both minor and major armed conflicts in this study.

The ACD provides detailed information for each armed conflict. One relatively straightforward example is the civil war in Sierra Leone that started on 1<sup>st</sup> April 1991 and ended on 20.12.2001, which is recorded as one conflict episode. For Burundi the Palipehutu rebellion against the government is listed as one conflict with four distinct episodes (1965, 1991-92, 1994-2006, 2008) because there have been either few or no battle deaths in the intervening periods. Other countries have experienced a number of distinct armed conflicts with one or more episodes each, e.g. Nigeria (Biafra 1967-70; Niger Delta 2004; Boko Haram 2009, 2011-ongoing). Other countries, such as Ethiopia, have experienced a number of distinct conflicts at the same time (for example the regional rebellions in Ogaden, Oromiya, Afar, Sidamaland, Eritrea). As a unit of observation I focus on the conflict episode, and the post-conflict episode (peace) starts when the conflict episode ends. This is irrespective of whether there is another ongoing conflict in the same country or whether this same conflict resumes at some later point in time. I investigate the duration of peace following each conflict episode.

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<sup>3</sup> The version used for this research is the UCDP Conflict Termination Data set, version 2015.

Some case study authors will take issue with the judgement made by the authors of the ACD data set. For example, the 1972 purges in Burundi are not included in the ACD data set but are considered by many analysts to be an important part of the cycle of violence. The 1972 violence is probably not recorded as a conflict episode because it fails to satisfy the requirement that the opposition must be a ‘formally organised opposition group’. However, the crisis is widely regarded as evidence of the failure of the peace to hold. This examples suggests the limitation of the statistical analysis: the use of uniform definitions of terms allows for comparability but it obscures unique features of a given conflict. Detailed knowledge of specific armed conflicts, which case study analysis permits, is therefore a useful complement to the statistical analysis. The question is whether and to what extent these ‘distortions’ have a bearing on the findings that emerge from the statistical analysis.

### **3.2 Conflict Intensity**

The ACD dataset provides information on the intensity of the armed conflict for each conflict episode and the data are described in Pettersson & Wallensteen (2015) and Gleditsch et al. (2002). An episode is defined as armed conflict with continuous activity. A new episode is recorded whenever conflict activities recommence after one or more year(s) of inactivity. Thus, peace episodes have a minimum length of one year. A conflict episode starts when the threshold of 25 battle-related deaths is crossed. The start of a conflict episode is often connected to a particular event. For example when the plane carrying the presidents of Burundi and Rwanda was shot down on 6 April 1994, armed conflict activity rapidly escalated and the ACD start date for the war in Burundi is given as 18 October 1994. When it is unclear when the episode reached the threshold, the start date is set to 31<sup>st</sup> December. In some cases a conflict comes to an end with a peace agreement, for example the peace agreement in Zimbabwe also defines the end of the armed conflict<sup>4</sup>. However, sometimes the killing does not immediately stop when an agreement is signed and it does take time for the conflict to end. Examples include the signing of the peace agreement between Renamo and the government of Mozambique<sup>5</sup> and the peace process in Sierra Leone<sup>6</sup>. In other cases the conflict end predates the peace agreement, one example is Somalia<sup>7</sup>. However, sometimes the end of the activities cannot be dated

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<sup>4</sup> The agreement was signed on 21st December 1979.

<sup>5</sup> The agreement was signed on 4 October 1992 but the end of the conflict episode is coded for 19 October 1992.

<sup>6</sup> A ceasefire started on 10 November 2000, the signing of the peace agreement followed on 15 May 2001 and the end of the conflict is dated as 20 December 2001.

<sup>7</sup> The end of a conflict episode in Somalia is dated as 20 December 1996 and the signing of the peace agreement took place on 22<sup>nd</sup> December 1997 (this peace episode broke down in 2001).

precisely, mainly when the fatalities are fewer than 25, in which case the end is dated as 31<sup>st</sup> December.

The number of battle related deaths is also provided in the UCDP/PRIO data collection effort. Gleditsch & Lacina (2005) provide the number of battle related deaths per year, the last year for which they provide data is 2008 and the UCDP Battle-Related Deaths Dataset v.5-2015 was used for the subsequent years. Although there are some discrepancies between the data sources, I decided to concatenate these two data series mainly due to the lack of alternative data sources. Battle deaths include includes military as well as civilian victims, but they only include deaths from the use of direct force. Deaths due to hunger and disease are not counted in these estimate but it is perhaps worth keeping in mind that battle deaths only make up a small fraction of the total war deaths, in many conflicts battle are only about ten per cent of the total fatalities (Gleditsch & Lacina, 2005). The data collection on battle deaths is based on reported evidence and the resulting numbers appear conservative, in particular when they are compared to the survey based methods used by scientists<sup>8</sup>.

Some of the descriptive statistics of the previous wars are presented in Table 1. About half of all previous conflicts were minor armed conflict, the others were wars. For Africa this ratio is slightly different, there were more minor conflicts than wars. However, these armed conflicts caused more battle related deaths on average. Almost 10,000 in Africa while those outside the region caused fewer than 7,000. On average these armed conflict episodes did not last as long in Africa (about 1,000 days) than elsewhere (about 1,300 days).

--- Table 1 about here ---

### **3.3 Conflict Termination**

For this study, the end of the armed conflict is the beginning of the post-conflict period or peace spell and it is thus important to focus on conflict termination. As discussed above, defining the end of an armed conflict can be difficult. This is in particular the case when the activities do not cease after a military victory or settlement. Many conflicts continue at a lower level but are not recorded because they result in fewer than 25 battle-related deaths per year. Thus, I record 'peace' when there may still be ongoing low level violence.

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<sup>8</sup> For a critical debate of war death and war wounded see Spagat (2010) and Fazal (2014).

The termination of an armed conflict is categorized by Kreutz (2010). He distinguishes between military victory, peace agreements, ceasefires, and ‘other outcomes’. Victory is when one side is either defeated or eliminated, capitulates, or surrenders. A peace agreement is defined as an agreement between the main actors concerned with the resolution of the conflict and may be accepted while armed activity is ongoing. Conflicts are coded as having terminated by peace agreement if this agreement is followed by military inactivity. By contrast, ceasefires are agreements that terminate military operations but do not entail a resolution of the conflict. However, a large number of armed conflicts do not end in either victory or settlement but ‘rumble on’ without producing the required 25 battle-related deaths. This category makes up 43 percent of all observations and is termed ‘low or no activity’. The remaining category are cases in which other criteria are not met, e.g. one side in a conflict ceases to exist or is defeated in another simultaneous conflict. For the 205 conflict episodes that ended after 1989, Table 2 presents the frequencies for the various outcomes in Africa and elsewhere.

--- Table 2 about here ---

Peace agreements are more common in Africa but ceasefires are less common. Military victories end 17 per cent of all conflict episodes and the rebels are almost as likely to win as the government. Rebels are far less likely to win outside Africa. Like in the general sample a large proportion of conflicts are not formally terminated but ‘rumble on’, this is the case for about 43 per cent of all conflict episodes.

### **3.4 UN Peacekeeping Operations**

One important question in the context of peace stabilization is whether the deployment of UNPKOs improves the chances of peace. A number of UNPKOs, such as in Somalia (1992-93) and Rwanda (1993-96), failed to secure the peace and did not prevent the genocide. Other UNPKOs have been accused of sexual violence against women and children in the former Yugoslavia, Haiti, Dafur and the DRC.<sup>9</sup> While some authors find that UNPKOs keep the peace (e.g. Fortna 2004&2008) others find no evidence (Caplan & Hoeffler, 2017).<sup>10</sup> Here I present

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<sup>9</sup> <http://www.codebluecampaign.com>, The Code Blue Campaign is a pressure group with the aim to end immunity for sexual exploitation and abuse by UN peacekeeping personnel. Accessed 22nd Nov 2016.

<sup>10</sup> Others that find evidence for a peace enhancing effect of UNPKOs include: Hultman et al (2016) , Mason et al (2011), Gilligan& Sergenti (2008) and Collier et al (2008). On the other hand Rudloff&Findley (2016) and Walter (2015) find no evidence.

a short description of the deployment of peacekeepers. A UNPKO is defined as an operation led by the UN Department of Peacekeeping Operations (DPKO). This excludes special political missions, for example UNAMA in Afghanistan (2002-ongoing) and UNSMIL in Libya (2011-ongoing). The appendix lists all of the UNPKOs. During the Cold War only one mission took place in Africa, namely ONUC in the now DRC (1960-64). Towards the end of the Cold War the number of operations increased worldwide and throughout Africa. The first operations included UNAVEM in Angola (1989-97), UNTAG in Namibia (1989-1990) and MINUSO in Western Sahara (1991-ongoing). Since the end of the Cold War Africa has been the site of most UN peacekeepers (for further discussion see Williams, 2017). Thus, if UNPKO stabilize the peace this may be of particular importance for Africa. Figure 1 provides an overview of the UNPKOs over time, the darker colour shows the UNPKOs in Africa.

--- Figure 1 about here ---

Table 3 lists the current UNPKOs (as of January 2017). About 83 per cent of all blue helmets are deployed in Africa and almost 85 per cent of the entire UNPKOs budget is spent in the region.

--- Table 3 about here ---

### **3.5 A First Look at the Survival of Peace**

Using the ACD war termination data set we focus on the post-Cold War period. Thus, we only consider armed conflict episodes that ended in or after 1990; the last year we can observe is 2013. This provides us with 210 peace spells as discussed above. Of these peace spells 62 were single spell episodes, i.e. the peace started and then either lasted until the end of the period or ended due to conflict that lasted until 2013. The other 148 peace spells are multiple spells in which the conflict recurred, then ended, and at least one further spell of peace was observed.

Before turning to the regression analysis we want to examine the empirical patterns of the peace spell data: how many peace spells break down and when does this happen? This information is provided by the Kaplan-Meier survival estimates as shown in Figure 1. Figure 1 shows peace spells measured in days. In the beginning all of our observations are at peace and as time passes, some peace spells come to an end and some continue. Recall that conflict episodes are defined

by a minimum of 25 battle-related deaths per year and that a peace period cannot be shorter than one year; this accounts for the first flat bit of the Kaplan-Meier graph. From the end of the first year until approximately 5.5 years (2000 peace days) the survivor estimates drop more sharply than after. This suggests that peace spells are more likely to break down within the first five years than in the following five years. After two years 98 percent of all peace spells survive, i.e. 2 percent of the peace spells have failed (war recurred). After three years only 82 percent of the peace spells have survived. After 12 years only about half of the peace spells have survived (50 percent).

--- Figure 2 about here ---

As a second exploratory step I investigate whether peace episodes are more likely to endure in Africa. Figure 2 shows two lines, the top line shows the survival estimates for non-African peace spells, while the lower line represents the estimates for Africa. Lower lying lines mean that those peace spells are more likely to break down, i.e. peace is less likely to endure in Africa. The survival rates are statistically significantly different ( $\chi^2=3.76$ ,  $p=0.0524$ ).

--- Figure 3 about here ---

#### **4. Method**

In the statistical analysis I want to examine which factors stabilize post-conflict peace. Survival analysis allows me to estimate a hazard function  $h(t)$ , which gives the probability that the event (end of peace) will occur, given that the peace has lasted up to a specified time.

The hazard function can include a number of explanatory variables and there are different options when modelling the hazard of an event occurring. If the survival times follow a known distribution, for example, if the risk of the peace ending falls over time, we may want to use a distribution function that accounts for such a relationship. When social scientists have a theoretical expectation regarding the shape of this hazard they can parameterize the hazard function. These are referred to as parametric models. However, since there is no theory to guide us in the choice of distribution we follow Box-Steffensmeier and Jones (2004) and use a semi-

parametric model, the Cox proportional hazards model. Here, a particular distributional form of the duration times is left unspecified but the assumption is made that the explanatory variables shift the hazard rate proportionately. The use of the Cox proportional hazard model is popular in the study of the duration of peace, e.g. it is used by Walter (2014) and Fortna (2004). The appropriateness of the application of the Cox proportional hazard model rests on the assumption of proportionality and I test whether this assumption holds.

In our estimations we should also consider how to treat multiple spells, i.e. peace spells that ended because the conflicts recurred, then the conflict ended, and a new peace episode was recorded. In order to account for possible interdependence between these peace spells the standard errors are clustered by the conflict identifier.

More formally the hazard function,  $h(t)$ , can be written as follows:

$$h(t) = h_0(t)\exp(x_j\beta_0)$$

where  $h_0(t)$  denotes the baseline hazard, the hazard common to all peace spells,  $j$ . The function  $\exp()$  multiplies this baseline hazard, i.e. models how the explanatory variables,  $x$ , shift the baseline hazard. The function  $\exp()$  prevents the hazard  $h(t)$  from taking negative values.<sup>11</sup>

The main aim of the paper is to explain peace stabilization and on the basis of the survival analysis I want to draw causal inferences.<sup>12</sup> Following on from this I want to make policy recommendations so that peace is more likely to endure. However, one should be careful in the design and interpretation of the statistical analysis. When event A predates event B it is easier to justify the conclusion that A causes B than in the situation when event A and B occur simultaneously. When event A and B occur simultaneously it could be that A causes B or that B causes A, or that an unknown event C drives both A and B. It is therefore important to consider simultaneity and endogeneity. In our case the characteristics of the conflict, such as fighting over territory and ethnic recruitment, happened before the event of peace. Similarly, the outcome of the conflict (victory, settlement, other) occurred before the event of peace. Thus, it is straightforward to include these variables in our model and to interpret them. On the other hand, income and peace are measured at the same time; they occur simultaneously. Peace is more likely to last if incomes are higher but incomes are also likely to be higher the longer the peace lasts, hence we have a problem of endogeneity. In order to guard against this

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<sup>11</sup> For an overview of modelling choices see Cleves et al (2010 : ch. 3).

<sup>12</sup> For a detailed discussion of causal inference see Box-Steffensmeier and Jones (2010: ch. 7).

endogeneity problem one can include lagged income, i.e. income that predates the event. The theoretical justification would be that past and current income are highly correlated.

The inclusion of UNPKOs in our model raises a number of potential problems. We observe UNPKOs and peace simultaneously. While UNPKOs may have an effect on the duration of peace it is also likely that the (expected) duration of peace has an effect on the decision to deploy a UNPKO and on the duration of the mission. The first issue is a problem of selection; if UNPKOs are predominantly sent to easier (harder) peace situations this would bias our results.<sup>13</sup> A positive coefficient would overestimate (underestimate) the impact of UNPKOs. Furthermore, the process that affects the changes in the UNPKO variable may be influenced by the duration of peace. Under this circumstance the usual interpretations of the explanatory variables in survival analysis do not hold. One solution would be to exclude such problematic variables. However, excluding explanatory variables that are theoretically relevant leads to model misspecification, i.e. potentially larger problems. From a policy advisory perspective, if we only used explanatory variables that are strictly exogenous, we would not be able to analyse a number of important policy issues. One statistical solution to the problem of endogeneity and simultaneity issues is the use of instrumental variables, but this option is not available for hazard models. For our study we simply flag these statistical problems and proceed with them in mind.

## 5. Results

The study by Caplan & Hoeffler (2017) forms the departure point for the statistical analysis. The duration of peace spells is investigated by examining the impact of a number of key variables, namely conflict outcome, severity of the armed conflict, deployment of UNPKOs and a number of socio-economic characteristics. The model presented in the first column of Table 4 only includes explanatory variables that predate the start of the peace spell: the outcome of the conflict, the duration of the conflict, and the total number of battle deaths. This has two advantages, there are almost no missing data points, thus all of the observations can be included in this model. Second, these variables predate the peace spells and therefore limiting problems due to endogeneity and simultaneity. The regression tables report hazard ratios, not coefficients. A hazard ratio greater than one suggests that this variable increases the hazard (or

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<sup>13</sup> Fortna (2004) finds no evidence that UNPKOs are deployed to the easier cases.

risk) of peace ending. The interpretation of hazard ratios is straightforward: a ratio of 1.5 suggests that a one unit change of the explanatory variable increases the hazard of the peace breaking down by 50 percent ( $1-1.5=-0.5$ ). A hazard ratio of less than one suggests a decrease of the hazard ratio, i.e. making peace more durable. A hazard ratio of 0.4 suggests a 60 percent reduction when the explanatory variable changes by one unit ( $1-0.4=0.6$ ).

--- Table 4 about here ---

The first model includes a dummy variables for the conflict outcome. Our category ‘settlement’ includes peace agreements as well as ceasefires. The category ‘other’ includes cases of low or no activity as well as cases that do not meet other ACD criteria, e.g. one side ceased to exist. ‘Victory’ is the omitted category. The hazard ratios indicate that the hazard of a peace spell breaking down if the outcome is ‘other’ is 308 percent higher than in the case of victory. Peace spells that ended with a settlement are 276 percent more likely to break down than the comparison category, victory. Neither the duration of the conflict, nor the intensity of the conflict (measured by the total number of battle deaths) are significant. I also test whether the choice of modelling the duration of peace by using the Cox proportional hazard model is appropriate. The null hypothesis that the hazards are proportional cannot be rejected and I thus conclude that the modelling choice is appropriate.

The second model includes a dummy for the peace spells in Sub-Saharan Africa. As indicated in Figure 3, African peace spells are more likely to break down than the peace spells outside the region. In column 2 the hazard ratio of the Africa dummy is significant and greater than one, peace spells in Africa are about 50 per cent more likely to break down.

The model in column 3 investigates the effect of income, which is added to the model presented in column 1. Income per capita is measured in purchasing power parity constant US dollars, measured with a lag of two years, and I take the natural logarithm of this variable. The inclusion of income reduces our sample size to 178 peace episodes (corresponding to 1659 observations). The main reason is that data collection is difficult during armed conflict or in fragile situations. Thus, there are fewer socio-economic variables available than political variables. Social scientists can determine that a country is at armed conflict (e.g. Somalia) but they are not able to collect data on population size, income, health, etc. The reduction in sample size is unlikely to be random, data availability from countries with long and particularly deadly conflicts are

more likely to be absent. One potential solution is the use of algorithms to fill in missing data. Here, I am just mindful of the problem and check that the main empirical results are qualitatively similar when the sample size is reduced. Running the first model on the reduced sample of column 3 suggests that the main results still hold and I thus decide to include income per capita. Income has a positive effect on the duration of peace: societies with higher per capita income have a more lasting peace. The hazard ratio is significantly below one, and an evaluation of the effect suggests that only large income changes are associated with a large reduction in the hazard of conflict recurrence. If a country with the minimum income (\$142) increases its income to the average income (\$3,605) the hazard decreases by 18.1 percent. If a country increases its income from the average to the maximum income (\$37,123) the hazard decreases by 7.9 percent.

An Africa dummy is added to this model and the results are presented in column 4. The hazard ratio of the Africa dummy is no longer statistically significant at the conventional levels ( $p=0.139$ ) and income is also no longer statistically significant. This suggests that in Africa peace spells are less likely to endure because the countries are on average much poorer. African income is on average \$1,636, if it increased to the average non-African income of \$6,087 the hazard of peace failing would decrease by 7 per cent. Thus, accounting for income goes some way towards explaining why African peace is more likely to fail. Peace is less likely to endure in Africa because the region is less wealthy, not because it is intrinsically more violent. Another factor that contributes to making peace less stable in Africa is the fact that there are slightly fewer conflicts that end in military victories. In models (1) and (3) the hazard ratio of the settlement dummy is higher than in models (2) and (4) that include an Africa dummy.

In addition to income Caplan & Hoeffler (2017) investigate a number of other explanatory variables in their core model. These variables include: Territorial conflict, ethnic conflict, growth, remittances, aid, polity indicators, regional autonomy, elections as well as measures of vertical and horizontal inequality<sup>14</sup>. However, the inclusion of additional explanatory variables results in reducing the sample size and none of these variables appeared to be consistently correlated with the duration of peace. Whether or not a peace spell endures appears to be very

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<sup>14</sup> *Vertical inequality* consists in *inequality* among individuals or households; *horizontal inequality* is defined as *inequality* among groups.

difficult to describe. One factor that has received a lot of attention are peace keeping operations and Table 5 presents the impact of UNPKOs.

--- Table 5 about here ---

Caplan & Hoeffler (2017) investigate a number of aspects of UNPKOs. They simply include a dummy variable, but they also examine the impact of all uniformed personnel, the impact of troops, police, observers, their mandate, the nature of the mission (e.g. disarmament demobilization and reintegration) and the number of contributors. However, they find mainly insignificant relationships or if they are significant they only have a very small impact. Here I reproduce the model that includes a dummy variable for the presence of a UNPKO (column 1). The UNPKO presence appears to reduce the risk of conflict recurrence but the hazard ratio is not significant at conventional levels ( $p=0.166$ ). In column 2 an Africa dummy is included but the results from the previous model are qualitatively unchanged. In column 3 I replicate the Caplan & Hoeffler (2017) main result: UNPKOs significantly reduce the hazard of peace failing when they are deployed in cases where the armed conflict was settled. The interaction term of peace settlements and UNPKOs has a hazard ratio of less than 1, indicating that the deployment of UNPKOs support peace settlements. The effect is large, for peace settlements without UNPKOs the hazard of peace ending is 167 percent higher but for peace settlements that are supported by UNPKOs the hazard of peace ending is about 44 percent lower.<sup>15</sup> However, the reader should keep in mind that this result rests on a relatively small number of observations. Only 33 out of 205 peace episodes had a UNPKO, of which 20 were deployed when the conflict episode ended in a settlement. In the last column I investigate whether the inclusion of an Africa dummy has a significant impact on this result, but this does not appear to be the case. A further step in the investigation could be to interact the Africa dummy with the interaction term of UNPKO and settlements. Given the very small number of observations that pertain to this triple interaction it may instead be more useful to consider the qualitative analysis of settlements and UNPKOs in Africa in case studies. Another interesting aspect is that out of the 33 UNPKOs that are included in the regression model, 20 started before the end

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<sup>15</sup> Cleves et al (2010) provide a guide to the interpretation of interaction terms (see pp. 186-89). They stress that the inclusion of interaction terms does not necessitate the inclusion of the corresponding main effects. The shift of the baseline hazard is calculated in the following way: the coefficient estimates are simply the natural logarithms of the hazard ratios. For settlement the coefficient is  $\ln(2.6714)=0.9826$  and for the interaction term UNPKO\*settlement the coefficient is  $\ln(0.2091)=-1.5651$ . The hazard ratio for observations that experienced a settlement and a UNPKO is thus  $\exp(0.9826 - 1.5651)=0.558$ .

of the armed conflict as coded in the Armed Conflict Dataset. This runs counter to impression that these operations are deployed for peace ‘keeping’, they may also have the aim of peace ‘preparation’. This suggestion ties in with the research by Hegre et al (2104). They examine the likelihood of transitions between peace, minor conflict and war and their results suggest that UNPKOs make an ‘upward’ transition out of peace less likely. Violence is depressed and minor conflicts do not scale up into major conflicts and the presence of peace keepers makes the transition from minor conflicts to peace more likely. It may therefore be of particular interest to study the cases where (1) the conflict episode ended with a settlement and (2) the UNPKO started before the conflict episode ended. Examples include: Burundi, Côte d’Ivoire, Liberia and Sierra Leone.

## **6. Discussion**

This paper focuses on a specific aspect of state fragility, namely what makes peace endure in post-conflict countries. This is a pertinent topic because the chance of conflict recidivism is high. About half of all peace spells break down during the first twelve years of post-conflict. The data suggest that peace in African countries is even more fragile. In order to examine what makes peace endure in Africa and beyond, I use survival analysis. This analysis suggest that very few variables appear to be correlated with the duration of peace. None of the measures of intensity of the armed conflict, such as the length of the conflict and the number of battle deaths, are statistically significant. Whether the conflict had an ethnic base, was fought over territorial or governmental control, was also found to be insignificant. However, the type of conflict termination appears to have some predictive power as to whether the peace will endure.

Military victories, and to some extent peace settlements, make the peace last longer. About 40 per cent of all conflicts are neither settled nor won, the following peace spells are most likely to break down. Lagged per capita income stabilizes the peace. Caplan & Hoeffler (2017) investigate a large number of political, social and economic variables but found that the following had no statistical influence on the survival of peace: Measures of democracy, elections, economic growth, development aid, remittances, vertical and horizontal inequality. There are of course a number of drivers of peace that cannot be easily quantified and thus are excluded from this type of study. These drivers include strategic conditions (e.g., stalemate), national leadership qualities, elite political cooperation and cohesion among parties to the conflict, the behaviour of regional actors, transitional justice, and inclusive

settlements/governance. There are also explanatory factors that can be measured but we lack comprehensive cross-country data. These factors include corruption, impunity, elite political rivalries, lack of inclusiveness, unresolved property disputes, and youth unemployment. Case studies of peace will be able to examine (1) the factors that are found to be significant in the survival analysis, (2) drivers that cannot be easily measured and (3) factors that are measurable but for which we only have data for some countries.

The survival model included a dummy variable for Africa and this dummy is statistically significant, peace spells in Africa are 50 per cent more likely to break down. As always when an Africa dummy is included in a cross-country regression model, the question is whether is due to an African exceptionalism. Is Africa simply more violent due to her history and culture? This does not appear to be the case. When the model accounts for income per capita the Africa effect becomes insignificant. African peace episodes are more likely to break down because Africa is poor. It is therefore of particular importance to the research and development community to find specific strategies to encourage income growth in post-conflict states in Africa.

The survival analysis suggests that UN peacekeeping operations on their own do not appear to stabilize the peace but that they do have a peace enhancing effect in conjunction with peace settlements. A number of these UN peacekeeping operations appears to be deployed before the conflict activities had come to an end. This suggests that many operations have a peace 'preparation' effect, not solely a peace 'keeping' effect. Due to the quantitative method used and the small number of observations, the use of case studies is a valuable method in future research on this topic. One interesting question that case study authors could investigate is why UNPKOs might matter in relation to a political settlement. It appears possible that a UNPKO can raise the profile of a conflict-affected country, thus generating greater regional/international interest in and support for peacebuilding there. UN forces can play an important role in the verification of arms and other agreements and therefore provide an external commitment device. The UN presence can also create a secure environment for civil society to engage in, thus helping to build a more inclusive society. However, much depends on the precise role a UNPKO performs, which varies from case to case.

## 7. Tables

**Table 1: Armed Conflicts 1990-2013**

	Sample	SSA	Non-SSA
Intensity (0/1)	106/107	44/35	62/72
Battle Deaths	7,396	9,999	5,861
Duration (days)	1,178	986	1,291
International involvement (yes/no)	18/195	10/69	8/126

Source: UCDP Termination Dataset version 2.0-2015. SSA denote Sub-Saharan Africa, World Bank definition.

**Table 2: Armed Conflict Outcomes 1990-2013**

Outcome	Count (%)		
	Sample	SSA	Non-SSA
1 Peace agreement	31 (15%)	18 (23%)	13 (9%)
2 Ceasefire	41 (20%)	10 (13%)	31 (24%)
3 Government victory	30 (14%)	7 (9%)	23 (18%)
4 Rebel victory	9 (4%)	6 (8%)	3 (2%)
5 No or low activity	91 (44%)	33 (43%)	58 (44%)
6 Actor ceases to exist	6 (3%)	3 (4%)	3 (2%)
Total	208 (100%)	77(100%)	131(100%)

Source: UCDP Termination Dataset version 2.0-2015 and Kreutz (2010). SSA denote Sub-Saharan Africa, World Bank definition.

**Table 3: Current UNPKOs (January 2017)**

Mission	Host Country/Region	Established	Troops	Military Observers	Police	Budget in USD millions
UNTSO	Middle East	May 1948	0	151	0	68.9
UNMOGIP	India/Pakistan	January 1949	0	44	0	21.1
UNFICYP	Cyprus	March 1964	885	0	69	55.6
UNDOF	Syria	June 1974	830	0	0	47.7
UNIFIL	Lebanon	March 1978	10,577	0	0	488.7
UNMIK	Kosovo	June 1999	0	8	7	36.5
MINUSTAH	Haiti	June 2004	2,344	0	2,460	345.9
MINURSO	Western Sahara	April 1991	27	200	0	56.6
UNMIL	Liberia	September 2003	1,158	30	502	187.2
UNOCI	Cote d'Ivoire	April 2004	1,805	72	519	153
UNAMID	Darfur	July 2007	13,614	176	3,466	1039.6
MONUSCO	DRC	July 2010	16,885	475	1,332	1235.7
UNISFA	Abayei	June 2011	4,382	89	20	268.6
UNMISS	South Sudan	July 2011	11,292	176	1,455	1081.8
MINUSMA	Mali	March 2013	10,582	39	1,259	933.4
MINUSCA	CAR	April 2014	10,027	380	1,697	920.7
<b>Total</b>			<b>84,408</b>	<b>1,840</b>	<b>12,786</b>	<b>6,941.1</b>
<b>SSA</b>			<b>69,772</b>	<b>1,637</b>	<b>10,250</b>	<b>5,876.6</b>
<b>SSA (% of Total)</b>			<b>82.66</b>	<b>88.97</b>	<b>80.17</b>	<b>84.66</b>

Source: United Nations <http://www.un.org/en/peacekeeping/resources/statistics/factsheet.shtml>, accessed 25 February 2017

**Table 4: The Duration of Post-Conflict Peace - Globally and in Africa**

	<b>(1)</b>	<b>(2)</b>	<b>(3)</b>	<b>(4)</b>
<b>Outcome=Other</b>	4.080*** (0.000)	3.991*** (0.001)	3.374*** (0.004)	3.231*** (0.006)
<b>Settlement</b>	2.764** (0.009)	2.637** (0.013)	2.145** (0.052)	2.145** (0.058)
<b>Conflict Duration</b>	0.999 (0.705)	0.999 (0.921)	0.999 (0.731)	0.999 (0.984)
<b>Conflict Battle Deaths</b>	1.000 (0.813)	0.999 (0.907)	0.999 (0.575)	0.999 (0.404)
<b>SSA (dummy)</b>		1.500* (0.101)		1.795 (0.139)
<b>Income (GDP) per capita</b>			0.836* (0.098)	0.996 (0.981)
<b>Peace Episodes</b>	205	205	178	178
<b>Number of Observations</b>	1925	1925	1659	1659
<b>Number of Failures</b>	94	94	77	77

Note: Hazard Ratios reported, p-values in parentheses, dependent variable peace duration

\* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%

When (2) is run on the same sample as (3)&(4) SSA remains significant

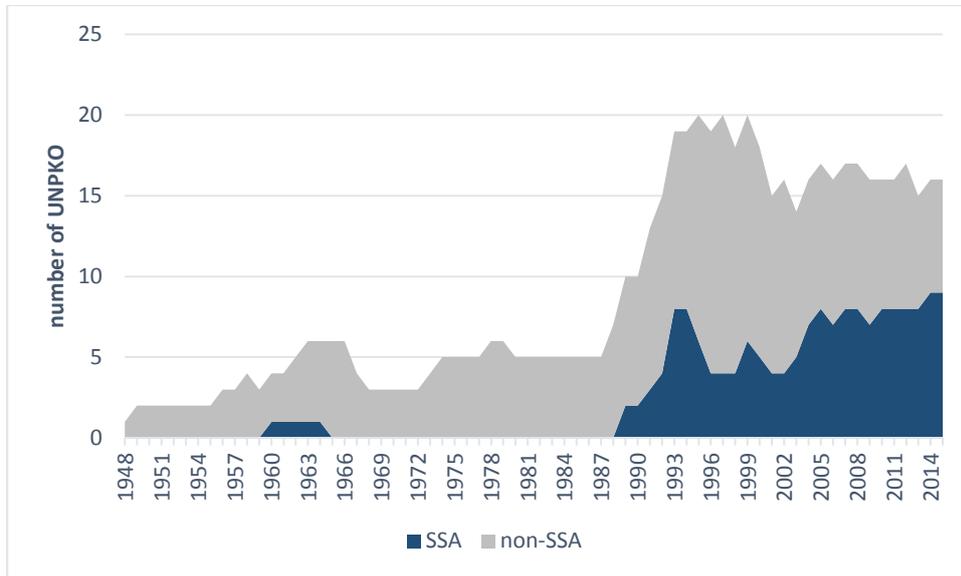
**Table 5: Post-Conflict Peace and UNPKOs - Globally and in Africa**

	(1)	(2)	(3)	(4)
<b>Outcome=Other</b>	3.406*** (0.004)	3.266*** (0.006)	3.372*** (0.004)	3.233*** (0.006)
<b>Settlement</b>	2.341** (0.040)	2.325** (0.048)	2.672** (0.013)	2.643** (0.016)
<b>Conflict Duration</b>	0.999 (0.708)	0.999 (0.964)	0.999 (0.581)	0.999 (0.943)
<b>Conflict Battle Deaths</b>	0.999 (0.611)	0.999 (0.445)	0.999 (0.581)	0.999 (0.404)
<b>SSA (dummy)</b>		1.750 (0.148)		1.716 (0.153)
<b>Income (GDP) per capita</b>	0.834* (0.105)	0.989 (0.942)	0.819* (0.082)	0.964 (0.815)
<b>UNPKO (dummy)</b>	0.583 (0.166)	0.606 (0.184)		
<b>Settlement*UNPKO</b>			0.209** (0.017)	0.217* (0.063)
<b>Peace Episodes</b>	178	178	178	178
<b>Number of Observations</b>	1659	1659	1659	1659
<b>Number of Failures</b>	77	77	77	77

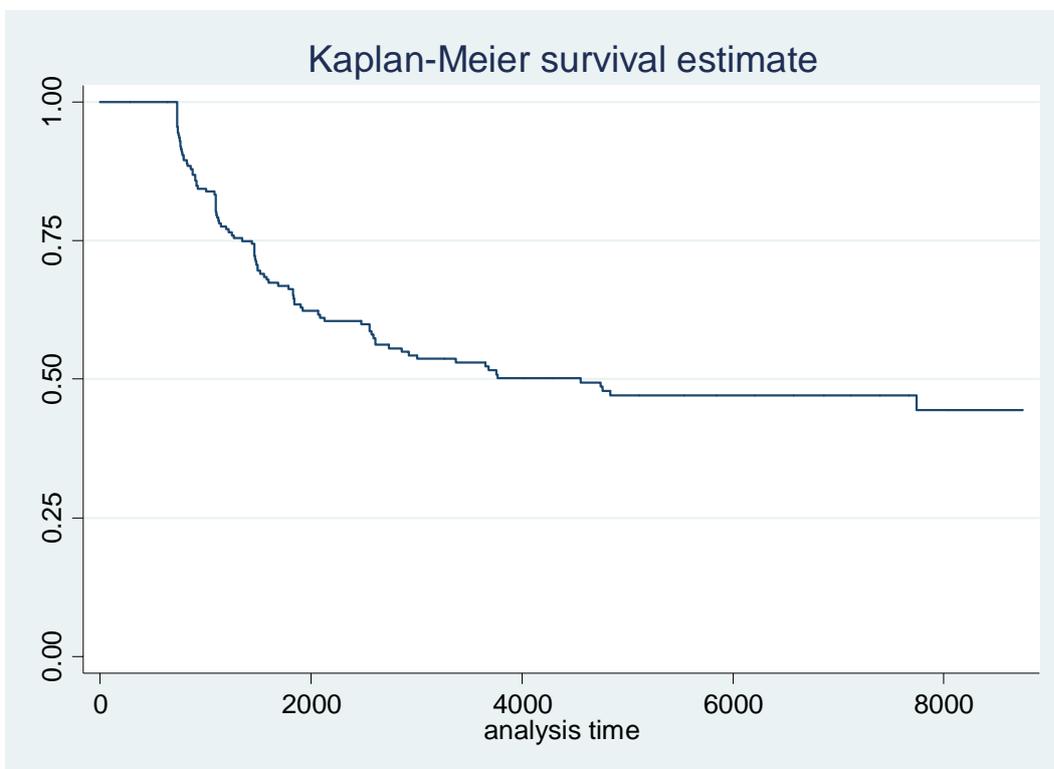
Note: Hazard Ratios reported, p-values in parentheses, dependent variable peace duration  
\* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%

## 8. Figures

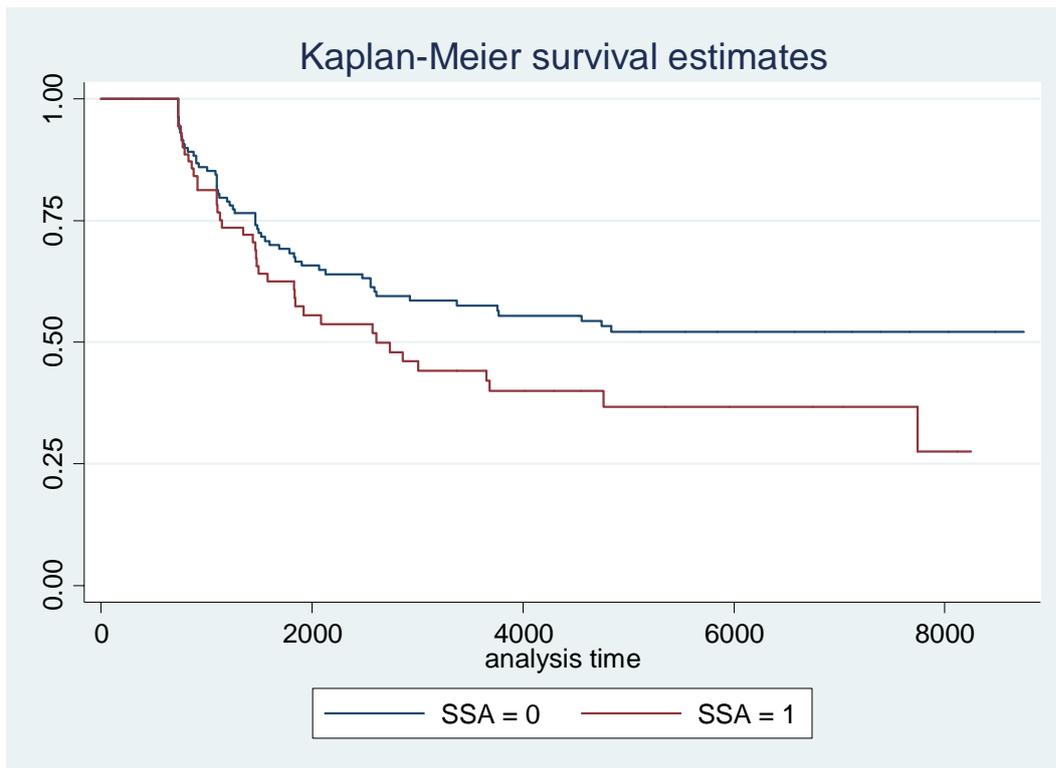
**Figure 1: Number of UN Peacekeeping Operations**



**Figure 2: Peace Spell Survival Estimates**



**Figure 3: Are Peace Spells in Africa less likely to survive?**



$\chi^2(1) = 3.76, Pr > \chi^2 = 0.0524$

## 9. Appendix

**Table: UN Peacekeeping Operations**

Host Country/Region	Mission Abbreviation	Start date	End date	SSA
Middle East	UNTSO	01/05/1948	01/04/2015	0
India/Pakistan	UNMOGIP	01/01/1949	01/04/2015	0
Egypt/Israel	UNEF I	01/11/1956	01/06/1967	0
Lebanon	UNOGIL	01/06/1958	01/12/1958	0
Congo	ONUC	01/07/1960	01/06/1964	1
West New Guinea	UNSF	01/10/1962	01/04/1963	0
Yemen	UNYOM	01/07/1963	01/09/1964	0
Cyprus	UNFICYP	01/03/1964	01/04/2015	0
Dominican Republic	DOMREP	01/05/1965	01/10/1966	0
India/Pak	UNIPOM	01/09/1965	01/03/1966	0
Egypt/Israel	UNEF II	01/10/1973	01/07/1979	0
Syria/Israel	UNDOF	01/06/1974	01/04/2015	0
Lebanon/Israel	UNIFIL	01/03/1978	01/04/2015	0
Afghanistan	UNGOMAP	01/05/1988	01/02/1990	0
Iran/Iraq	UNIMOG	01/08/1988	01/02/1991	0
Angola	UNAVEM I	01/01/1989	01/06/1991	1
Namibia	UNTAG	01/04/1989	01/05/1990	1
Central America	ONUCA	01/11/1989	01/01/1992	0
Angola	UNAVEM II	01/03/1991	01/02/1995	1
W. Sahara	MINURSO	01/04/1991	01/04/2015	1
Iraq/Kuwait	UNIKOM	01/04/1991	01/10/2003	0
El Salvador	ONUSAL	01/07/1991	01/04/1995	0
Cambodia	UNAMIC	01/11/1991	01/03/1992	0
Bosnia/Croatia	UNPROFOR	01/02/1992	01/05/1995	0
Cambodia	UNTAC	01/02/1992	01/09/1993	0
Somalia	UNOSOM I	01/04/1992	01/05/1993	1
Mozambique	UNOMOZ	01/12/1992	01/12/1994	1
Somalia	UNOSOM II	01/05/1993	01/05/1995	1
Uganda/Rwanda	UNOMUR	01/06/1993	01/09/1994	1
Georgia	UNOMIG	01/08/1993	01/06/2009	0
Haiti	UNMIH	01/09/1993	01/06/1996	0
Liberia	UNOMIL	01/09/1993	01/09/1997	1
Rwanda	UNAMIR	01/10/1993	01/05/1996	1
Chad/Libya	UNASOG	01/05/1994	01/06/1994	1
Tajikistan	UNMOT	01/12/1994	01/05/2000	0
Angola	UNAVEM III	01/02/1995	01/06/1997	1
Croatia	UNCRO	01/05/1995	01/01/1996	0
Bosnia	UNMIBH	01/05/1995	01/12/2002	0
Macedonia	UNPREDEP	01/05/1995	01/02/1999	0

Croatia (Prevl.)	UNMOP	01/01/1996	01/12/2002	0
Croatia (E. Slavonia)	UNTAES	01/01/1996	01/01/1998	0
Haiti	UNSMIH	01/07/1996	01/07/1997	0
Guatemala	MINUGUA	01/01/1997	01/05/1997	0
Angola	MONUA	01/07/1997	01/02/1999	1
Haiti	UNTMIH	01/08/1997	01/12/1997	0
Haiti	MIPONUH	01/12/1997	01/03/2000	0
Croatia (E. Slavonia)	UNPSG	01/01/1998	01/10/1998	0
C. African Rep.	MINURCA	01/04/1998	01/02/2000	1
Sierra Leone	UNOMSIL	01/07/1998	01/10/1999	1
Kosovo	UNMIK	01/06/1999	01/04/2015	0
Sierra Leone	UNAMSIL	01/10/1999	01/12/2005	1
E. Timor	UNTAET	01/10/1999	01/05/2002	0
Dem. Rep. of Congo	MONUC	01/11/1999	01/06/2010	1
Ethiopia/Eritrea	UNMEE	01/07/2000	01/07/2008	1
E. Timor	UNMISSET	01/05/2002	01/05/2005	0
Liberia	UNMIL	10/03/2003	01/04/2015	1
Cote D'Ivoire	UNOCI	01/04/2004	01/04/2015	1
Burundi	ONUB	01/05/2004	01/12/2006	1
Haiti	MINUSTAH	01/06/2004	01/04/2015	0
Sudan	UNMIS	01/05/2005	01/07/2012	1
E. Timor	UNMIT	01/08/2006	01/12/2012	0
Sudan (Darfur)	UNAMID	01/07/2007	01/04/2015	1
CAR/Chad	MINURCAT	01/09/2007	01/12/2010	1
Dem. Rep. of Congo	MONUSCO	01/07/2010	01/04/2015	1
Sudan (Abyei)	UNISFA	01/06/2011	01/04/2015	1
South Sudan	UNMISS	01/07/2011	01/04/2015	1
Syria	UNSMIS	01/04/2012	01/08/2012	0
Mali	MINUSMA	01/07/2013	01/04/2015	1
Central African Republic	MINUSCA	01/04/2014	01/04/2015	1

Source: UN <http://www.un.org/en/peacekeeping/documents/operationslist.pdf> and recent updates from the UNPKO website, accessed 14 November 2016.

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