

# **AN ANALYSIS OF POST-CONFLICT STABILIZATION**

**(REPORT September 2015)**

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We would like to thank Lise Howard for the use of her UN peacekeeping operations (UNPKO) data and to Kate Roll for updating it. Chris Perry gave advice on the use of the International Peace Institute (IPI) data on UN peacekeeping. Joakim Kreutz kindly made new unpublished conflict termination data available and FHI 360 Education Policy and Data Center provided data on horizontal inequality. Adele Breytenbach provided research assistance. Ron Smith, Daniel Gutknecht, Måns Söderbom and the participants in the project meeting in Oxford on 6 February 2015 provided useful comments and suggestions.

This research has been funded by UK aid from the UK government; however the views expressed do not necessarily reflect the UK government's official policies. We are also grateful to the Folke Bernadotte Academy for their support of this project.

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\* Writing in a personal capacity. The views expressed in this report do not necessarily reflect the views of the United Nations.

## Executive Summary

This project is concerned with explaining why peace endures in countries that have experienced a civil war. A statistical analysis (Cox Proportional Hazard models) was employed to identify factors that contribute significantly to the duration of peace. Six qualitative case studies of post-conflict peace stabilization were also produced and examined alongside the regression results. The main findings are:

- The duration of peace is difficult to explain. Many variables are insignificant in the regressions.
- The outcome of the conflict is significant: military victories, especially by governments, last longer than other outcomes.
- Settlements are more likely to break down than military victories.
- UN peacekeeping operation (UNPKO) variables (dummy, treatment, total number of uniformed personnel, troops, type of mission) are not significant.
- Settlements that are buttressed by UNPKOs are less likely to break down.
- The case studies provide important additional insights and identify a number of factors that were important for the consolidation of peace. However, many of these variables are difficult if not impossible to measure using statistical methods either because the data are not available/reliable or because the variables elude measurement.

## Background

The UK Government has a strong commitment to building and maintaining stability overseas.<sup>1</sup> That commitment is shared by numerous multilateral organisations of which the UK is a leading member or participant, notably the United Nations (UN), the World Bank, the North Atlantic Treaty Organization (NATO) and the Organization for Security and Co-operation in Europe (OSCE), among others.

Violent internal conflict represents a major threat to stability overseas and the UK Government, together with its partners, have devoted considerable resources in support of efforts to consolidate the peace in countries emerging from violent conflict. The challenge is a

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<sup>1</sup> FCO, MOD & DFID (2011), *Building Stability Overseas Strategy (BSOS)*, London.

formidable one in view of the fact that of the 105 countries that suffered a civil war between 1945 and 2013, more than half (59 countries) experienced a relapse into violent conflict—in some cases more than once—after peace had been established.<sup>2</sup>

The challenges facing the UN Peacebuilding Commission (PBC), of which the UK is a member, are emblematic of this problem. There are currently six countries on the agenda of the PBC: Burundi, Central African Republic, Guinea, Guinea-Bissau, Liberia and Sierra Leone. No country has yet ‘graduated’ or transitioned from the PBC. As of September 2015, there are no precedents, procedures or decision criteria for transitioning. The founding resolutions recommended that ‘the Commission terminate its consideration of a country-specific situation when foundations for sustainable peace and development are established or upon the request of national authorities of the country under consideration’ (A/RES/60/180 and S/RES/1645 (2005), para. 22), yet no guidance exists to assist the Commission or its Member States in determining when the ‘foundations for sustainable peace and development’ have been established.

A key issue to consider, which this project addresses, is how we can know that the peace that has been established in the aftermath of violent conflict is a stable peace so that donor governments, multilateral organisations and non-governmental organisations (NGOs) engaged in peacebuilding can re-calibrate their commitments without jeopardizing the peace that they have helped to establish.

## **Project purpose**

This project endeavours to identify factors that may contribute significantly to the maintenance of peace in countries emerging from violent internal conflict. More specifically, its purpose is to evaluate the salience of a number of factors in relation to the ‘survival’ (duration) of peace in all countries that have experienced civil war since 1990. The findings, it is hoped, will assist the UK Government and its partners, including host countries, in their discussions and deliberations about peacebuilding planning insofar as they will have better developed criteria on which to base decisions about transition.

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<sup>2</sup> Uppsala Conflict Data Program (UCDP), International Peace Research Institute, Oslo (PRIO), UCDP/PRIO Armed Conflict Dataset v.4-2014a, 1946–2013.

## Research activities

The project to date has undertaken the following research activities:

- An examination of the relevant scholarship for what it reveals about the determinants of a durable peace;
- The production of six case studies of conflict-affected countries, with particular attention to the factors that have been responsible for the establishment and maintenance of peace and/or reversion to conflict, and the risk factors that threaten sustainable peace/stability;
- A statistical analysis, employing a hazard model of peace duration and using newly available data, to identify which (combination of) covariates have been important in securing the peace.

## What the literature tells us

This study is concerned with explaining why peace endures in countries that have experienced civil war. Most of the relevant social science literature is concerned with explaining civil war onset or civil war recurrence. There is a small body of literature that applies regression analysis to the study of the duration of peace (Call 2012; Collier, Hoeffler and Söderbom 2008; Fortna 2004, 2008; Hartzell & Hoddie 2003; Hoddie & Hartzell 2005; Walter 2014). The sample is limited to countries that have experienced at least one spell of armed conflict. This is in contrast to the onset literature which includes countries that have never experienced armed conflict (e.g. Collier and Hoeffler 2004; Fearon and Laitin 2003; Hegre et al. 2001). Commonly tested hypotheses for why peace fails and conflict recurs include 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, weak states, geographic characteristics such as forests, mountains and dispersed populations, make it easier to rebel;
- **Bargaining and/or commitment problems**: information about the other side's military strength has been revealed, perhaps war was too short to gather sufficient information, combatants did not or could not divide the stakes (indivisibilities), governments are not able to commit to reforms, to DDR, inclusive political processes and/or power sharing.

Fortna's seminal work on the impact of UN peacekeeping operations (UNPKOs) on the duration of peace (Fortna, 2004 & 2008) suggests that the presence of UNPKOs significantly improves the hazard of peace surviving. UNPKOs reduce the risk of the peace breaking down by about 50 per cent. Most other variables such as the outcome of the conflict, the nature of the conflict (identity), democracy and the size of the government army are insignificant. Only the presence of UNPKOs, the duration of the previous conflict, the death toll in the previous conflict and economic development are significant. However, as Fortna (2004) points out herself, her sample size is small and results have to be interpreted with caution. In her sample she is able to analyse 51 peace spells. She employs the same estimation method as we do, namely Cox Proportional Hazard models.

Hoddie and Hartzell also employ a Cox Proportional Hazard model to study the duration of peace (Hoddie & Hartzell 2005). They examine the effects of power-sharing arrangements on the 38 civil wars that ended in a negotiated settlement in the period 1948-1998. They find that negotiated civil war settlement provisions that promise power sharing (territorial or military) increase the likelihood that peace will endure.

The more recent study by Walter (2014) also uses Cox Proportional Hazard models to analyse the duration of peace. She concludes that peace spells that end with a peace agreement, followed territorial conflicts and include good government accountability measures (participation, written constitution, free press, rule of law) increase the survival of peace. None of the other variables in her analysis are significant, e.g. she finds that a dummy signifying UNPKO presence is not significant. Other variables, such as income, polity measures and the duration and intensity of the previous conflict are insignificant.

Walter's results (2014) are very similar to ours. Like us, she uses the UCDP/PRIO data; Fortna uses the Doyle and Sambanis data (2006) and she only considers peace spells up to 1999; Hoddie and Hartzell use the CoW data and limit the period of examination to 1998.

Looking at the literature that uses the same method as we do, not many variables are significant in the duration of peace regressions. This suggests that it is hard to explain the duration of peace in general. Indeed, as one of our case study writers (Mike McGovern) observed aptly: 'It has been well documented that countries that have experienced civil wars have a high probability of falling back into war....We know less about how long a peace must last until it is likely to "stick", and still less about how and why that dynamic pertains. For the moment,

the state of our knowledge appears something like the opening of *Anna Karenina* turned on its head: “All failed peaces are alike; every successful peace succeeds in its own way.””

It is important to note that most quantitative studies of armed conflict employ a ‘negative’ conception of peace— i.e., the absence of armed conflict—with armed conflict being defined variably depending on which data set is adopted. For the sake of comparability, we also use a negative conception of peace in our quantitative analysis. However, peacebuilding organisations (notably the United Nations) often employ a broader ‘positive’ conception of peace that implies a degree of stability and sustainability and is marked by not just the absence of armed conflict but also the absence of major threats to public security, such as political repression and discrimination against vulnerable groups (e.g., women, ethnic and other minorities), torture, and widespread serious crime.<sup>3</sup> Indeed, most peacebuilding organisations take the view that peace, if it is to be sustainable, needs to be a ‘comprehensive peace’—one that achieves the consolidation of security (internal and external); the strengthening of political institutions, norms, and practices; and the fostering of economic and social rehabilitation, transformation, and development.<sup>4</sup> The positive peace is largely underspecified, however, and unlike with the negative conception of peace, there are as yet no agreed indicators for measuring a positive peace.<sup>5</sup> This lack of agreement is one reason why scholars may diverge in their assessments of the success of peace operations.

## Data

### Dependent Variable: Peace Spells

For our statistical analysis we need to define ‘conflict’ and ‘post-conflict’. Our definition of ‘post-conflict’, as indicated above, is the absence of armed conflict. Many of these situations are not entirely peaceful but characterised by ongoing (sporadic) violence. However, if the

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<sup>3</sup> United Nations. 2008. *Measuring Peace Consolidation and Supporting Transition*, Inter-Agency Briefing Paper Prepared for the United Nations Peacebuilding Commission.

<sup>4</sup> As reflected in the landmark document ‘No Exit without Strategy: Security Council Decision-making and the Closure or Transition of United Nations Peacekeeping Operations’, Report of the UN Secretary-General, 20 April 2001, Doc. S/2001/394, paras.11, 20.

<sup>5</sup> The Institute for Economics and Peace’s Pillars of Peace may be useful in this regard: <http://economicsandpeace.org/research/understanding-peace/structures-of-peace>.

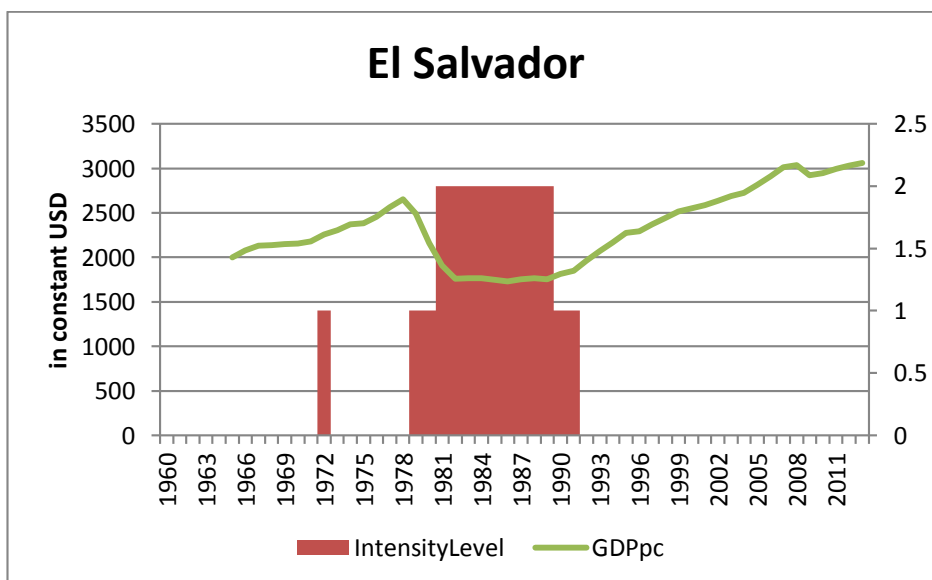
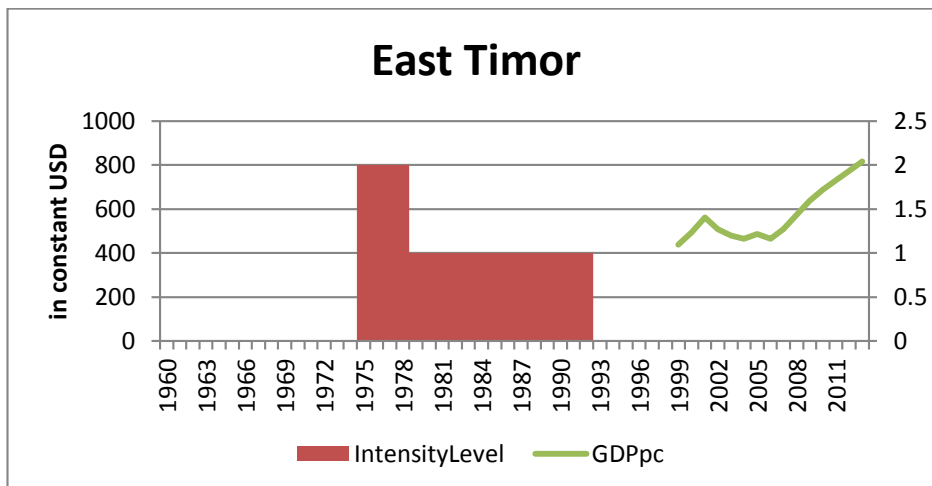
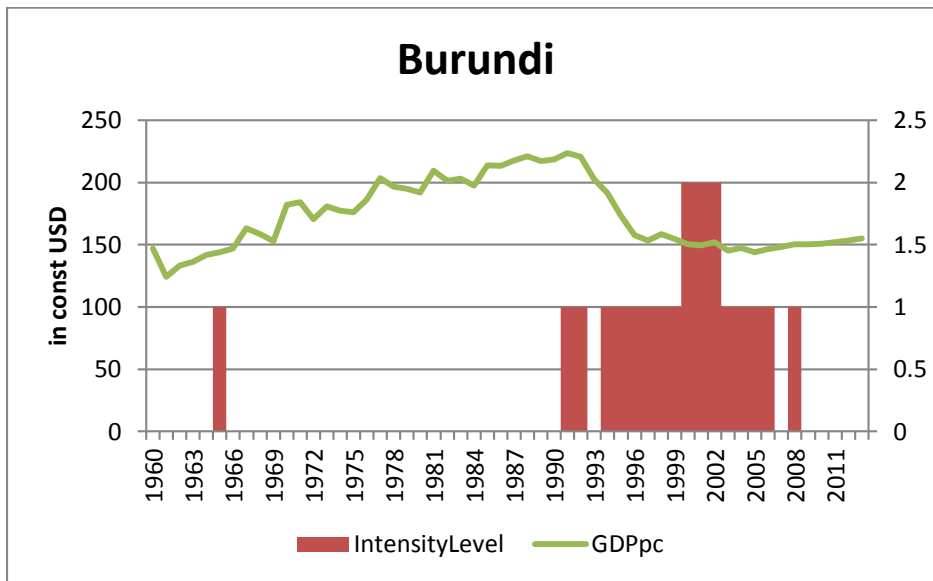
level of violence is below the threshold of armed conflict, we define these situations as ‘post-conflict’.

### *Armed Conflict*

Our definition of armed conflict is based on the Armed Conflict Dataset (ACD). It is the most commonly used dataset and is a collaboration between the Uppsala Conflict Data Program (UCDP) and the Peace Research Institute Oslo (PRIO) (Themnér and Wallensteen 2011; Gleditsch et al 2002). The most recent version of the ACD provides conflict data from the end of World War II until 31 December 2013. Only very few armed conflicts are international conflicts between states and we disregard these conflicts. We focus 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. This distinguishes 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. We define major as well as minor armed conflicts as ‘conflicts’.

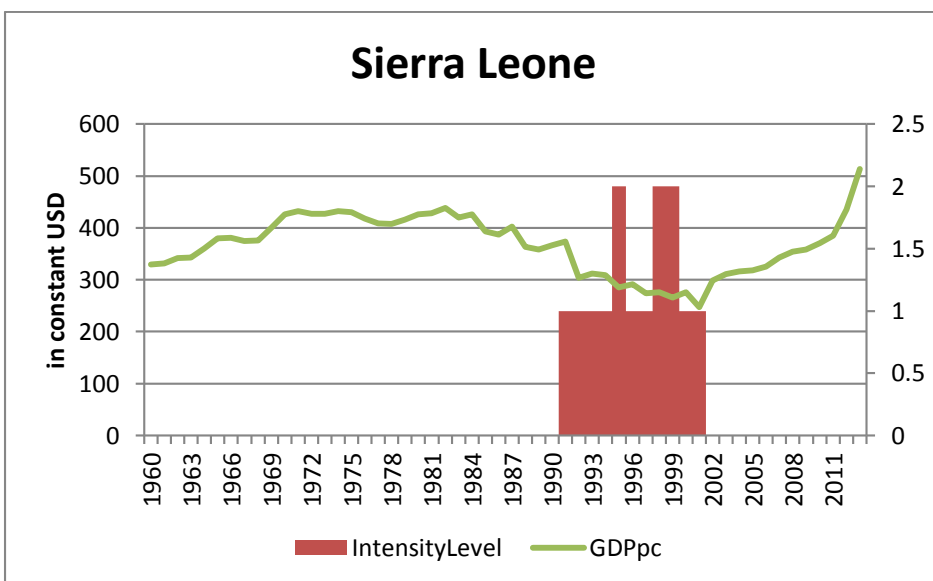
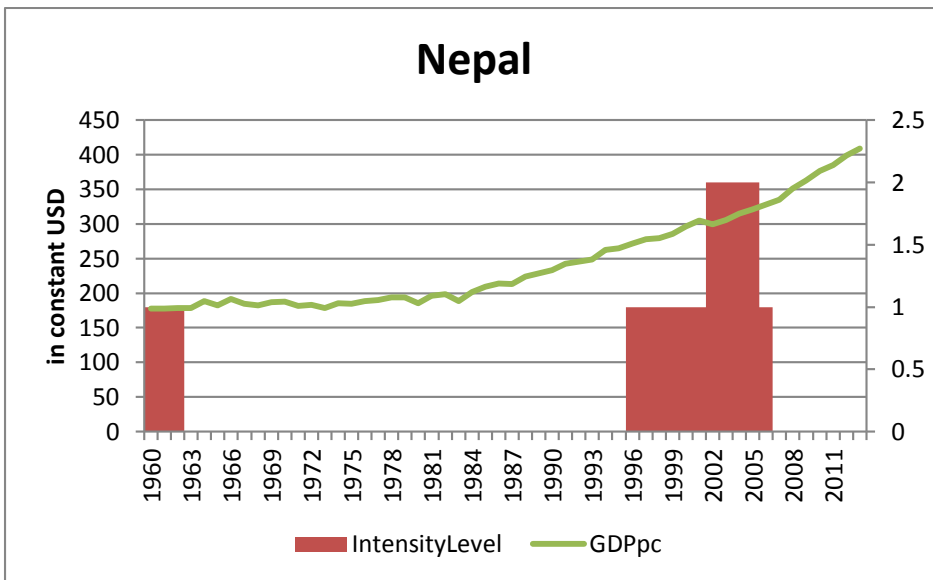
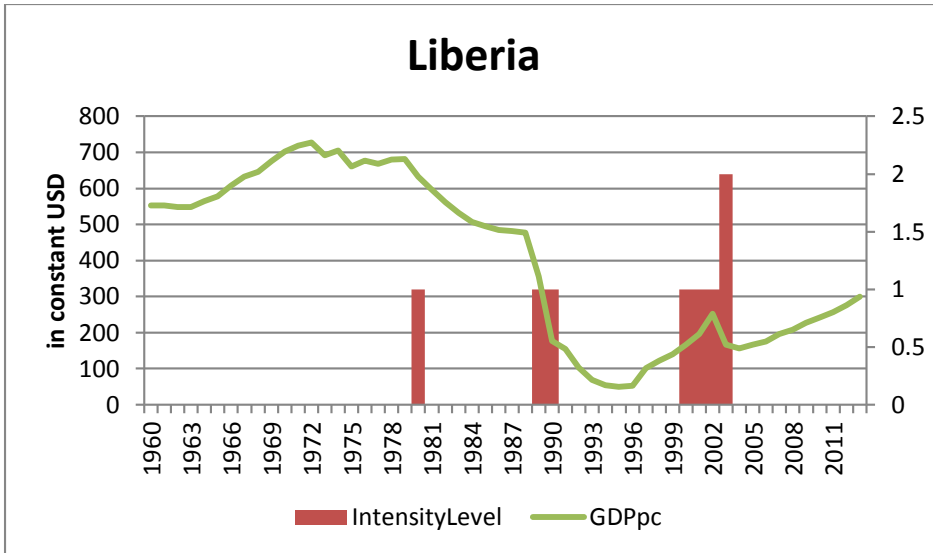
The ACD provides information by armed conflict. One example would be the FARC rebellion against the government of Colombia where the conflict has lasted a long time and has only one conflict episode (1964-2013, i.e. ongoing at the end of the coding period). The Palipehutu rebellion against the government of Burundi is listed as one conflict with four distinct episodes (1965, 1991-92, 1994-2006, 2008). Other countries experience 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 Burma (Myanmar), experienced a number of distinct conflicts at the same time (e.g. the rebellions by the Karen, Karenni, Shan, Kokang, Kachin). As a unit of observation we focus on the conflict episode, i.e. the post-conflict episode 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. For our six country cases we depict the armed conflict and peace episodes as provided by the ACD in Figures 1 to 6.

**Figures 1-6: Conflict, Peace and Income**



**Income (primary x-axis) and Armed Conflict (=1) and Civil War (=2) on secondary x-axis**





Income (primary x-axis) and Armed Conflict (=1) and Civil War (=2) on secondary x-axis

Some analysts will disagree with the judgement made by the authors of the ACD data set. Among the cases our authors examined, for instance, the violence in East Timor in 2006 that left 38 dead and forced 150,000 to flee their homes is not noted by ACD perhaps 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 (Kate Roll’s study for this report). Similarly, purges in Burundi in 1972 are not captured by the armed conflict definition in the ACD data set but are considered by many analysts to be an important part of the cycle of violence (Janvier Nukurunziza’s study for this report).

### *Conflict Termination*

In our definition, the end of the armed conflict is the beginning of the post-conflict period or peace spell. Defining the end of an armed conflict is problematic. While some armed conflicts end in settlements or military victories, many conflicts continue at a lower level. ACD does not record an ongoing armed conflict if there are fewer than 25 battle-related deaths per year. The dataset by Kreutz (2010) provides information on the termination of armed conflict. Kreutz kindly made an unpublished updated version of the data set available to us. 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. The remaining category, ‘other outcomes’, are cases that either end without a victory or any type of agreement, or continue but fall below the 25 death threshold. For the 202 conflict episodes that ended after 1989, 89 (44 per cent) of armed conflicts are other outcomes, 70 (35 per cent) peace agreements and ceasefires and 43 (21 per cent) victories.

### **A First Look at the Data**

Using the ACD we focus on the post-Cold War period. Thus, we only consider armed conflicts that ended in or after 1990; the last year we can observe is 2013. This provides us with 202 peace spells as discussed above. Of these peace spells 61 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 141 peace spells are multiple spells, i.e. 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 7 and Table 1. In Figure 7 the x-axis shows peace time 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. From 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 the following five years. Table 1 provides the same information. After two years 98 per cent of all peace spells survive, i.e. two per cent of the peace spells have failed (war recurred). After three years only 82 per cent of the peace spells have survived. After 15 years only about half of the peace spells have survived (50 per cent).

**Figure 7**

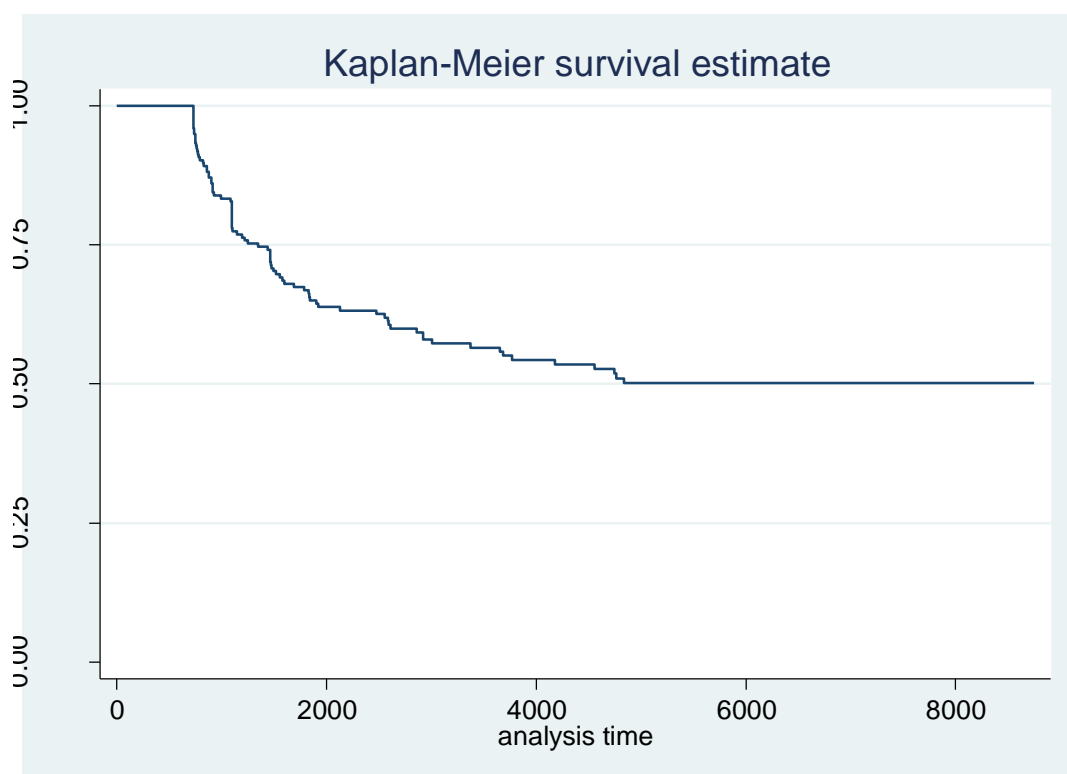
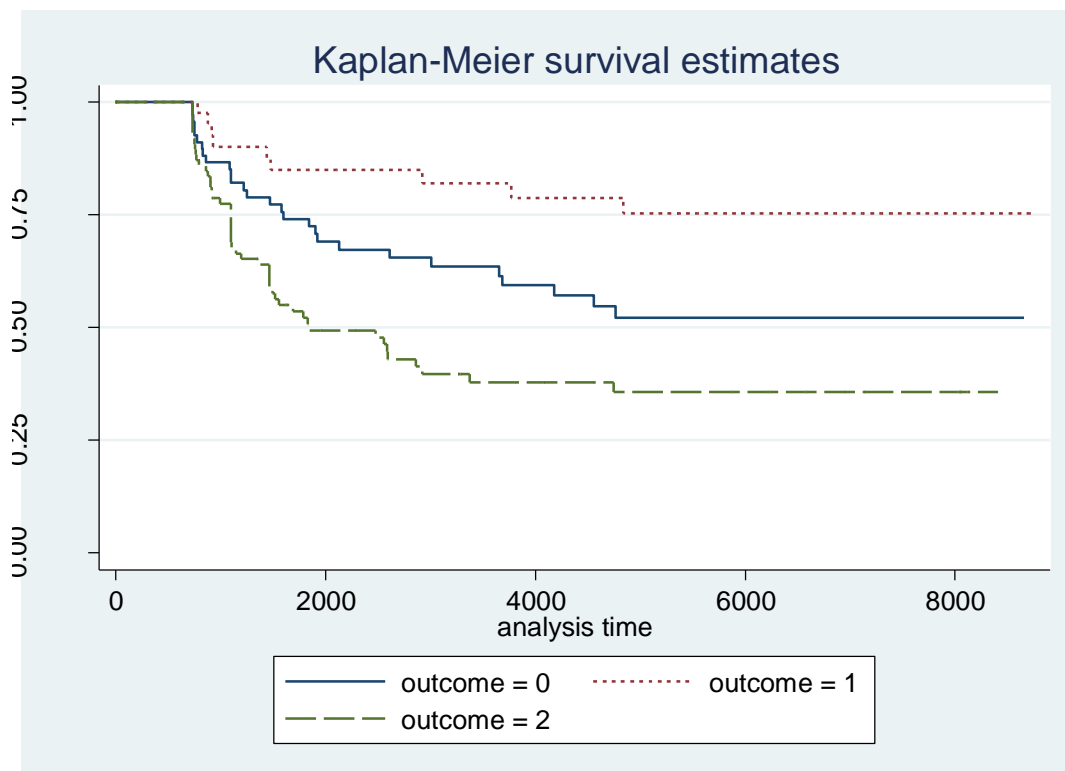


Table 1: How Many Peace Spells Survive the First Fifteen Years? (Kaplan-Meier Survivor Function)

| End of Year | # peace spells | fail | Survivor Function (%) |
|-------------|----------------|------|-----------------------|
| 1           | 202            | 0    | 100                   |
| 2           | 197            | 3    | 98.48                 |
| 3           | 154            | 32   | 81.75                 |
| 4           | 135            | 14   | 74.15                 |
| 5           | 115            | 13   | 66.81                 |
| 6           | 102            | 6    | 63.22                 |
| 7           | 99             | 1    | 62.58                 |
| 8           | 89             | 5    | 59.30                 |
| 9           | 83             | 3    | 57.26                 |
| 10          | 78             | 1    | 56.55                 |
| 12          | 73             | 3    | 54.33                 |
| 13          | 69             | 1    | 53.56                 |
| 14          | 64             | 1    | 52.72                 |
| 15          | 60             | 3    | 50.18                 |

Figure 8



Note: Outcome = 0 refers to settlement, outcome = 1 refers to victory and outcome = 2 refers to 'other', Log-rank test for equality of survivor functions  $\chi^2(2) = 17.89$   $Pr > \chi^2 = 0.0001$

Figure 8 graphs the survivor functions by outcome of the previous armed conflict. We distinguish between settlement (outcome=0), victory (outcome=1) and low activity ('other') (outcome=2). Higher lines represent longer survival, i.e. a lower hazard of failure (armed conflict breaking out again). According to Figure 8 victories are associated with longer peace spells, followed by settlements, while peace spells after low activity are most likely to break down. Employing a formal test suggests that these survivor functions are significantly different from each other. We report the log-rank test for the equality of the survivor functions at the bottom of the graph.

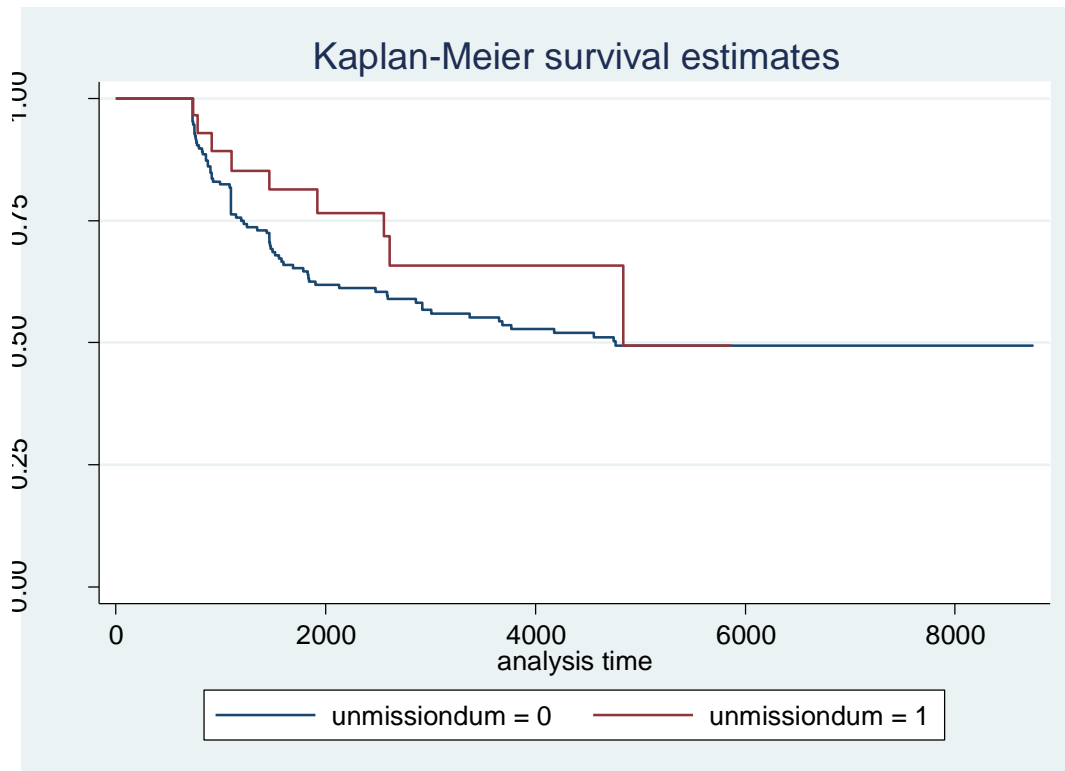
In Figure 9 we graph the peace spells with UN peacekeeping operations (UNPKOs) and without. UNPKOs are UN peacekeeping operations (including some special political missions) led by the UN Department of Peacekeeping Operations. We define UNPKO as a dummy variable taking a value of 1 for the years during which the UNPKO is present. Although the line for peace spells with UNPKOs is above the line for those without, i.e. suggesting that UNPKOs are associated with longer peace spells, the formal test suggests that there is no significant difference between the spells with UNPKOs and those without.<sup>6</sup>

We also considered alternative definitions of UNPKO involvement. For example we defined UNPKOs as a 'treatment' variable that 'innoculates' a country against conflict recurrence by virtue of having hosted a UNPKO not only for the time that the UNPKO is present, but for all subsequent years. Here we set the UNPKO variable equal to 1 for ongoing missions and for all the subsequent years. The results are qualitatively similar, i.e. there is no statistically significant difference between the duration of peace spells with and without UNPKOs; in other words, UNPKOs do not 'innoculate' against conflict recurrence.

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<sup>6</sup> This is also the case when we only consider peace spells that lasted for a maximum of 4000 days.

**Figure 9**



Log-rank test for equality of survivor functions  $\chi^2(1) = 0.93$ ,  $\text{Pr} > \chi^2 = 0.3339$

## Method

The method most commonly applied to the study of conflict recurrence is limited dependent variable analysis, i.e. where the recurrence of conflict is coded as a dummy variable. Logit or probit regressions are applied to determine which factors affect the recurrence of war (e.g. Toft 2010; Kreutz 2010; Call 2012). A multivariate logit model is used by Hegre, Hultman and Nygård (2013) to examine the likelihood of transitions between peace, minor conflict and major conflict. In contrast to (multinomial) logit regressions, the use of survival analysis allows an examination of how the risk of conflict reversion evolves over time. Each post-conflict peace spell is recorded from the time the peace spell started, i.e. the armed conflict ended. For each additional year of peace we gain one additional observation for this peace spell. The inclusion of time varying explanatory variables can inform how policy choices affect the risk of conflict recurrence.

In contrast to these studies we use survival analysis to study the stabilization of the peace. By using the method of survival analysis we have to make a number of choices regarding the

distribution of the hazard rates and how to consider multiple spells. All of these technical details are discussed in the Appendix. We decided to use Cox Proportional Hazard models and to cluster the standard errors by conflict.

On the basis of our survival analysis we want to draw causal inferences (for a detailed discussion see Box-Steffensmeier and Jones 2004: chapter 7). 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 endogeneity problem we 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 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. 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 lead to model misspecification, i.e. potentially larger problems. For our study we simply wanted to flag these statistical problems and proceed with these in mind.

## Results

As a starting point we present a model which only uses characteristics that occurred before the beginning of the peace spell: the outcome of the conflict, whether the conflict was fought over territory as opposed to governmental control, the duration of the conflict and the total number of battle deaths. This has two advantages, first it allows us to include all of the observations. Second, the variables predate our core model and we do not have to worry about endogeneity and simultaneity issues. Rather than reporting coefficients, we report the hazard ratios. A hazard ratio greater than one suggests that this variable increases the hazard 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 per cent reduction when the explanatory variable changes by one unit ( $1-0.4=0.6$ ).

In our first model (Table 2, column 1) we include the dummy variables for settlement and other; the omitted category is victory. Thus, the hazard of a peace spell breaking down if the outcome were 'other' is 264 per cent higher than in the case of victory. Peace spells that ended with a settlement are about 108 per cent more likely to break down than the comparison category, victory. None of the other variables are statistically significant, neither the incompatibility (territorial versus governmental conflict), the duration of the conflict, nor the intensity of the conflict (total number of battle deaths).

We also test whether our choice of modelling the duration of peace by using the Cox Proportional Hazard model is appropriate by testing for the proportionality of the hazards. We cannot reject the null hypothesis that the hazards are proportional and thus conclude that our modelling choice is appropriate.

We then investigate the nature of the victory. First, we change the reference category from victory to settlement in Table 2, column 2. The results remain the same, changing the reference category means that we have to interpret the coefficient on the dummy variable victory as the inverse to the hazard ratio on settlement ( $1/2.084=0.480$ ). In the next column we include dummy variables for settlement, government victory and rebel victory (settlement is the excluded category). The results suggest that although peace episodes are more likely to break down after settlements than government victories, they are not more likely to break down than after rebel victories.



**Table 2: Duration of Peace – Past Conflict Characteristics**

|                        | (1)                 | (2)                 | (3)                 |
|------------------------|---------------------|---------------------|---------------------|
| Outcome=Other          | 3.642***<br>(0.001) | 1.747***<br>(0.005) | 1.738***<br>(0.006) |
| Settlement             | 2.084**<br>(0.057)  |                     |                     |
| Victory                |                     | 0.480**<br>(0.057)  |                     |
| Government Victory     |                     |                     | 0.347**<br>(0.046)  |
| Rebel Victory          |                     |                     | 0.930<br>(0.896)    |
| Territorial Conflict   | 1.108<br>(0.648)    | 1.108<br>(0.648)    | 1.103<br>(0.664)    |
| Conflict Duration      | 1.000<br>(0.201)    | 1.000<br>(0.201)    | 1.000<br>(0.241)    |
| Conflict Battle deaths | 0.999<br>(0.501)    | 0.999<br>(0.501)    | 0.999<br>(0.385)    |
| Peace Episodes         | 202                 | 202                 | 202                 |
| Number of observations | 1943                | 1943                | 1943                |
| Number of Failures     | 86                  | 86                  | 86                  |

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

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

In the case of victory either the government or the rebels win. Rebel victories are less common, out of the 43 cases of victory only 11 were won by the rebels. The results in column 3 suggest that only government victories are more likely to produce a more stable peace, after government victory, the peace is 64 per cent more likely to survive than after peace settlements. Rebel victories do not significantly increase the duration of the peace spells.

So far we only considered information available from the ACD or associated data sets. We found that any concatenation with other data sets causes a loss of observations. One of the key questions is whether our first cut results remain intact when the sample size is reduced. Often additional variables are not collected for the same conflicts, because the definition of conflict varies across data sets. Another reason is that data collection is difficult during armed conflict or in volatile situations. Thus, there are fewer 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. In Table 3 we investigate how the inclusion of two variables, namely ethnic wars and income per capita affects our first

cut results. For ease of comparison we repeat our first cut results (Table 3, column 1). Then, we add a dummy variable on whether the war was an ethnic war. The data are available from Wucherpfennig et al (2012) and we code a conflict as ethnic if (1) the group makes a claim to operate on behalf of an ethnic group and (2) recruitment follows ethnic lines. The results are presented in column 2 and the inclusion of ethnic conflicts changes the results considerably. Only territorial conflict is now statistically significant at conventional levels. However, the inclusion of the ethnic war dummy reduces the sample size, instead of 202 peace episodes (corresponding to 1943 observations) we can only consider 135 peace episodes (corresponding to 1437 observations). In order to investigate whether our previous results still hold in this reduced sample, we repeat our first cut regression on this reduced sample in column 3. On this reduced sample we see that the results from column 1 do not hold any longer. It appears that the reduction in sample size affects the results significantly.

However, a cross tabulation of territorial and ethnic wars shows a big overlap between these two variables. Most conflicts that are fought over territory are ethnic conflicts and most conflicts that are fought over government control are non-ethnic. Out of the 202 conflict episodes there is a 75 per cent overlap of the categories. In other words, the territorial conflict variable can also be interpreted as an approximation for ethnic wars and we prefer to use the territorial conflict dummy because it preserves sample size.

**Table 3: Deriving a Core Model: Examining Ethnic Conflicts and Income**

|                        | (1)                 | (2)                | (3)               | (4)                 | (5)                 |
|------------------------|---------------------|--------------------|-------------------|---------------------|---------------------|
| Outcome=Other          | 3.642***<br>(0.001) | 2.031<br>(0.119)   | 2.152*<br>(0.078) | 1.737***<br>(0.012) | 1.655***<br>(0.018) |
| Settlement             | 2.084**<br>(0.057)  | 1.177<br>(0.690)   | 1.285<br>(0.508)  | 0.559<br>(0.131)    | 0.546<br>(0.115)    |
| Territorial Conflict   | 1.108<br>(0.648)    | 0.511**<br>(0.040) | 0.579*<br>(0.066) | 1.102<br>(0.720)    | 1.041<br>(0.877)    |
| Conflict Duration      | 1.000<br>(0.201)    | 0.999<br>(0.422)   | 0.999<br>(0.418)  | 1.000<br>(0.319)    | 1.000<br>(0.413)    |
| Conflict Battleddeaths | 0.999<br>(0.501)    | 0.999<br>(0.518)   | 0.999<br>(0.562)  | 0.999<br>(0.457)    | 0.999<br>(0.510)    |
| Ethnic Conflict        |                     | 1.416<br>(0.311)   |                   |                     |                     |
| ln GDP per capita      |                     |                    |                   | 0.836*<br>(0.063)   |                     |
| Peace Episodes         | 202                 | 135                | 135               | 176                 | 176                 |
| Number of observations | 1943                | 1437               | 1437              | 1665                | 1665                |
| Number of Failures     | 86                  | 44                 | 44                | 72                  | 72                  |

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

Robust standard errors in parentheses

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

We then turn to an examination of the effect of income. In column 4 we include per capita income. This variable is measured in purchasing power parity constant US dollars, measured with a lag of two years and we take the natural logarithm of this variable. Again, the inclusion of income reduces our sample size to 176 peace episodes (corresponding to 1665 observations). We check the impact of this sample size reduction by examining our first cut results in column 5. Although settlement is not significant at conventional levels ( $p=0.11$ ), the main story still holds. Outcome of the conflict is important, but none of the other variables have an impact on the duration of the peace. Since our previous results hold on this reduced sample, we decide to include income per capita in our core model. Income has a positive effect on the duration of peace, societies with higher per capita income have a more lasting peace. A one unit difference in our measure of income per capita corresponds to a reduction of 16 per cent in risk of the peace breaking down. To illustrate, this would be a shift from current Liberian log income of 6.6 to East Timor (7.6) or Nepal (7.6). As a reference outside our six country sample, the Philippines have a log income figure of about 8.6.

We now turn to the investigation of inequality (Table 4). For some conflicts inequality has been cited as a root cause of conflict; Nepal is the prominent example. The Maoist insurgency is

often interpreted as a response to inequalities within the country (Paul Jackson's case study for this report, Murshed and Gates, 2006; Macours, 2010). In the large-n literature there is little evidence that vertical inequality has any impact on the risk of a war breaking out (e.g. Collier and Hoeffler, 2004, Fearon and Laitin, 2003). However, there is some evidence that horizontal inequality may increase the risk of an armed conflict (Østby, 2008). (Vertical inequality consists in inequality among individuals or households; horizontal inequality is defined as inequality among groups.) We use new data on horizontal inequality from the Education Inequalities and Conflict (EIC) database provided by FHI 360 Education Policy and Data Center, which was commissioned by UNICEF. This data set offers a measure of between group inequality in terms of education. This appears to be a good measure to proxy what Regan (2009) terms 'structural' poverty. Some groups face inequality of opportunity resulting in social and economic exclusion. The resulting group grievances may then be a catalyst for armed conflict. In Table 3 we investigate different measures of inequality. First, we have to note that including the horizontal inequality measures leads to a substantial loss of observations. In order to preserve the sample size we follow Collier et al. (2008) and set missing values to zero and account for this 'missingness' by including a dummy indicating that the 'true' data are not zero but missing. In column 1 we use inequality in school attainment, where attainment is irrespective of schooling level (primary and secondary) and groups are defined along ethnic lines. In column 2 we use a measure that is defined along religious groups. The measures on horizontal inequality are not significant in either regression model. We also tried a number of different education inequality measures: only primary or secondary attainment and different methods of measuring inequality as presented in the EIC database. We do not find any significant results.

We then investigate two measures of vertical inequality. In column 3 we find evidence that inequality measured as the Gini coefficient of the distribution of net incomes (i.e. after tax) is statistically significant. A ten point increase in the Gini corresponds to a 37 per cent increase in the probability of peace survival, *ceteris paribus*. To illustrate, the difference in this inequality proxy is about 10 for Burundi (32) and El Salvador (42).

We repeat this regression model, this time using the Gini measure prior to tax, the 'market' Gini (column 4). Here the evidence is not as strong. This measure of inequality also reduces the risk of the peace ending, but the coefficient is not statistically significant at conventional levels ( $p=0.13$ ). However, this is an interesting result because it suggests that taxation in post-conflict societies does not stabilize the peace.

**Table 4: Peace Duration and Inequality**

|   | (1)                 | (2)                 | (3)                 | (4)                 |
|---|---------------------|---------------------|---------------------|---------------------|
| Outcome=Other                               | 3.128***<br>(0.004) | 3.157***<br>(0.005) | 4.111***<br>(0.001) | 4.343***<br>(0.000) |
| Settlement                                  | 1.789<br>(0.131)    | 1.837<br>(0.143)    | 2.064<br>(0.111)    | 2.157<br>(0.076)    |
| Territorial Conflict                        | 1.114<br>(0.688)    | 1.085<br>(0.784)    | 1.179<br>(0.574)    | 1.132<br>(0.676)    |
| Conflict Duration                           | 1.000<br>(0.367)    | 1.000<br>(0.319)    | 1.000<br>(0.660)    | 1.000<br>(0.679)    |
| Conflict Battleddeaths                      | 0.999<br>(0.491)    | 0.999<br>(0.473)    | 0.999<br>(0.890)    | 0.999<br>(0.919)    |
| ln GDP per capita                           | 0.820**<br>(0.035)  | 0.851<br>(0.127)    | 0.852<br>(0.139)    | 0.819*<br>(0.069)   |
| Horizontal Inequality<br>(ethnic groups)    | 0.240<br>(0.808)    |                     |                     |                     |
| Horizontal Inequality<br>(religious groups) |                     | 5.171<br>(0.781)    |                     |                     |
| Vertical Inequality<br>(net GINI)           |                     |                     | 1.037**<br>(0.064)  |                     |
| Vertical Inequality<br>(market GINI)        |                     |                     |                     | 1.030<br>(0.131)    |
| Missing Variable<br>(dummy)                 | 0.999<br>(0.998)    | 1.054<br>(0.895)    |                     |                     |
| Peace Episodes                              | 176                 | 176                 | 142                 | 142                 |
| Number of observations                      | 1665                | 1665                | 1120                | 1120                |
| Number of Failures                          | 72                  | 72                  | 57                  | 57                  |

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

Robust standard errors in parentheses

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

In Table 5 we investigate the impact of UNPKOs. We investigate a number of different variables. In column 1 we add a dummy variable if a UNPKO was present; this dummy is insignificant. We then include the number of observers, police and troops. There is some evidence that the presence of police stabilizes the peace (column 2). We also investigate whether it is the number of troops per population in the host country that is significant (column 3) and find no significant evidence ( $p=0.18$ ). However, we have to keep in mind that the ratio of blue helmets to population is a crude measure because we only divide the number of peacekeepers by the total population of the country, not the population of the area in which the UN peacekeepers operate.

We have a lot of information on UNPKOs, quantitative data from the International Peace Institute (IPI) database and qualitative data from Howard (2008) updated by Kate Roll. We

tried further variants on the UNPKO variable, e.g. we tried a dummy variable that indicated that a UNPKO had been present at some time ('inoculation effect'), whether the mission had troops, whether they were confined to base, whether the mission contained a DDR component, whether it was a peace enforcement mission, how many contributors there were, the type of contributor countries (G77, G20). None of these variants were significant, neither in the model including per capita income nor in the model without per capita income.

The only significant result on UNPKOs we could establish is that although UNPKOs by themselves are not stabilizing the peace, they appear to support peace settlements. In column 4 we include as before a dummy variable for settlements and for UNPKOs but also include an interaction of these two variables. The hazard ratio is less than one, indicating that in the presence of a UNPKO the peace is more likely to last. To calculate the joint effect, we used the coefficients of the survival analysis (here we only report the hazard ratios). These calculations suggest that a settlement with a UNPKO is 68 per cent more likely to survive when compared to victory. Even though this is an interesting result, it rests on a relatively small number of observations. Only 34 out of 202 peace episodes had a UNPKO, of which 19 were deployed after settlements<sup>7</sup>; in the regression these are compared to 43 victories.

In order to make this statistical result meaningful it is instructive to consider the case studies as to why UNPKOs make the peace last longer. Five of the six cases examined for this study were host to a UNPKO of varying size, duration and mandate (Nepal was a special political mission not led by DPKO). All of the operations were deployed in support of a peace agreement. In El Salvador, the UN mission (ONUSAL) played a key role keeping implementation of the 1992 peace agreement on track, notably with regard to demobilization and demilitarization, arms control and human rights verification. In the case of Burundi, a peacekeeping force was deployed in 2003 after the conclusion of the Arusha Agreement. Without foreign troops (first African Union forces [AMID] and then UN peacekeepers [ONUB]) to protect Burundian politicians who came back from exile, it is doubtful that Burundi would have experienced the political transition which ended the 40-year long rule by a minority of elites. In Liberia, the UN mission (UNMIL) provided a crucial security guarantee that assured civil society the safety it needed after the 2003 Accra Accord to participate effectively in political life. In East Timor, the UN-authorized, Australian-led international force

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<sup>7</sup> In total there were 34 peace episodes that received UNPKOs at some stage: 19 after settlements, five after government victories, three after rebel victories and seven in situations of 'other'.

(INTERFET) helped to stabilize the territory following the violence wrought by Indonesian-backed militia. (Subsequent UNPKOs were important for the pursuit of serious crimes and the creation of order during the transitional period in the absence of national police and military.) However, while in these and other cases, UNPKOs helped to restore or maintain the peace, they were certainly not the only relevant factor; nor is it evident that the peace that has been established in these cases is a self-sustaining peace.

**Table 5: Peace Duration and UNPKOs**

|                        | (1)                 | (2)                 | (3)                 | (4)                 |
|------------------------|---------------------|---------------------|---------------------|---------------------|
| Outcome=Other          | 3.135***<br>(0.005) | 3.079***<br>(0.004) | 3.127***<br>(0.004) | 3.066***<br>(0.005) |
| Settlement             | 1.886<br>(0.122)    | 1.840<br>(0.121)    | 1.852<br>(0.112)    | 2.300<br>(0.027)    |
| Territorial Conflict   | 1.101<br>(0.718)    | 1.101<br>(0.710)    | 1.094<br>(0.740)    | 1.105<br>(0.707)    |
| Conflict Duration      | 1.000<br>(0.321)    | 1.000<br>(0.422)    | 1.000<br>(0.302)    | 1.000<br>(0.447)    |
| Conflict Battle deaths | 0.999<br>(0.523)    | 0.999<br>(0.481)    | 0.999<br>(0.451)    | 0.999<br>(0.345)    |
| In GDP per capita      | 0.837**<br>(0.065)  | 0.837**<br>(0.053)  | 0.830**<br>(0.055)  | 0.811**<br>(0.040)  |
| UNPKO<br>(dummy)       | 0.721<br>(0.357)    |                     |                     | 1.759<br>(0.130)    |
| Police                 |                     | 0.999***<br>(0.013) |                     |                     |
| Observers              |                     | 0.999<br>(0.601)    |                     |                     |
| Troops                 |                     | 1.000<br>(0.110)    |                     |                     |
| Troops per capita      |                     |                     | 0.778<br>(0.185)    |                     |
| Settlement*UNPKO       |                     |                     |                     | 0.138***<br>(0.010) |
| Peace Episodes         | 176                 | 176                 | 176                 | 176                 |
| Number of observations | 1665                | 1665                | 1665                | 1665                |
| Number of Failures     | 72                  | 72                  | 72                  | 72                  |

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

Robust standard errors in parentheses

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

In the appendix we present some robustness checks for our core model. We (1) cluster the standard errors by country rather than by conflict, (2) only consider peace spells after wars (armed conflicts that reached a cumulative intensity of more than 1,000 battle-related deaths)

and (3) investigate the first peace spell only. These robustness checks receive more discussion in the appendix but they all indicate that our core model is valid.

There were a number of other variables that we tried but found no statistical significance for. Economic variables included economic growth, development aid and remittances. Political indicators included the polity indicator from the Polity IV data and elections.

There were also a number of factors that our case study authors considered important for their role in sustaining the peace, which we found too difficult to measure or for which there was a lack of comprehensive data. These included strategic conditions (e.g., stalemate), national leadership, elite political cooperation and cohesion among parties to the conflict, the behaviour of regional actors, transitional justice and inclusive settlements/governance. Some of these factors have been examined in the literature, largely through comparative case study analysis.

Finally, there were also a number of variables emerging from the case studies that undermined or threatened to undermine the peace, notably corruption/bad governance, impunity, elite political rivalries, lack of inclusiveness, unresolved property disputes and youth unemployment. These factors also bear further systematic consideration.

## **Conclusions and suggestions for further research**

Our quantitative analysis provides some interesting results. First, it appears very difficult to find the determinants of peace stability. A number of conflict specific variables are not statistically significant, e.g. measures of the severity of the conflict (armed conflict duration and number of battle deaths). Conflicts are fought over government or territorial control, but whether the fighting is over territorial control or to take over government does not appear to have an impact on the duration of the peace. However, there is some indication that the type of conflict termination is a predictor of the stability of the peace. Military victories, in particular by the government, make the peace last longer. Income appears to stabilize the peace but there are the usual concerns regarding endogeneity and simultaneity, even though we lag per capita income. Other economic variables, such as growth, aid, and remittances were not found to be statistically significant. Our investigation of inequality suggests that horizontal inequality, measured as between group educational inequality, is not significant either. However, there is some evidence that vertical inequality impacts negatively on peace duration. Interestingly, our results regarding inequality before and after government interventions (taxation) suggest that



these interventions make it less likely for the peace to survive. The market Gini has little or no impact on the duration of peace whereas the net Gini has a negative impact on the duration of peace. Further exploration of the redistribution policies and the relationship between horizontal and vertical income inequality in post-conflict society would make for interesting future research.

We also examined the impact of UN peacekeeping operations. There is some previous work suggesting that UNPKOs in their own right stabilize the peace (Fortna, 2004 and Collier et al 2008) but we found no such evidence. This may be due to different definitions of conflict (we use ACD data) or the larger number of observations. In any case, we find some evidence that settlements are made more stable by UNPKOs. However, we have to keep in mind that the sample size is relatively small and that the results are sensitive to small changes in sample size. This is not uncommon when using cross-country data.<sup>8</sup>

Why might UNPKOs matter in relation to a political settlement? One reason is that a UNPKO can raise the profile of a conflict-affected country, generating greater regional/international interest in and support for peacebuilding there. Much also depends on the precise role a UNPKO performs, which will vary from case to case. UN forces can play an important role in the verification of arms and other agreements, in fostering conditions conducive to the holding of elections, and in creating a secure environment for civil society to engage, among other positive contributions. In order to find out more about the relationship between UNPKOs and their stabilizing role in post-conflict situations after settlement it is instructive to look at our country case studies. Five of the six cases involved the deployment of a UNPKO after a settlement. In each case it is possible to identify specific contributions that the PKO contributed to peace stabilization. As there are only 19 peace episodes that see UNPKOs deployed after a settlement, it would be possible to conduct a more focused examination of all of them to establish the nature and the extent of any causal links.

Another suggestion for future research is to make our peace analysis more informative by matching economic and political data better to specific conflicts. Many of the proxies used are country wide economic, political and social data. This information is not specific to the conflict or conflict area. One possible improvement could be to measure local income. Light emitted

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<sup>8</sup> For example the work by Burnside and Dollar (2000) receive a lot of attention from policy makers but a number of studies criticised the econometric methods. Among other problems the choice of sample and treatment of outliers significantly alter the main conclusion of the research, see Roodman (2007a&b) and Beynon (2002, 2003).

during night time (captured by satellite imagery) provides some indication of economic activity and development. This may be one possible way forward because it does not rely on the conditions in the country to collect economic data and would have the additional advantage of providing us with regional data rather than averages for the entire country.

## **Appendix**

### **Estimation Method**

In survival analysis a choice has to be made on how to model the time dependency exhibited in the peace spell data. For example if the risk of the peace ending falls over time, i.e. peace stabilises, we may want to use a distribution function that accounts for such a relationship. When social scientists have a strong theoretical expectation regarding the shape of this risk (or hazard as it is referred to in this literature) they can parameterize the hazard function. Collier et al (2008) use such a parametric model, the exponential model which assumes that the baseline hazard rate is flat. However, Box-Steffensmeier and Jones (2004: chapter 4) suggest that the strong theory required to choose a specific distribution is almost always lacking and advise the use of the Cox Proportional Hazards model. 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. Like Walter (2014) and Fortna (2004) we apply this method. We test for this proportionality assumption and find that we cannot reject the hypothesis of proportionality in any of our models. Like Wucherpfennig et al (2012) we use the Efron method for ties.

Our data exhibit 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 we cluster the standard errors by the conflict identifier. As an alternative we also cluster the standard errors at the country level, because the peace spells following different conflicts in the same country may not be independent of each other. We found that the results were qualitatively very similar.

## Appendix Table: Robustness Checks

|                        | (1)                 | (2)                 | (3)                | (4)               |
|------------------------|---------------------|---------------------|--------------------|-------------------|
| Outcome=Other          | 1.737***<br>(0.012) | 1.737<br>(0.169)    | 1.113<br>(0.864)   | 2.062<br>(0.175)  |
| Settlement             | 0.559<br>(0.131)    | 0.559***<br>(0.004) | 3.803**<br>(0.031) | 2.289<br>(0.135)  |
| Territorial Conflict   | 1.102<br>(0.720)    | 1.102<br>(0.750)    | 0.799<br>(0.518)   | 0.486*<br>(0.070) |
| Conflict Duration      | 1.000<br>(0.319)    | 1.000<br>(0.206)    | 1.000<br>(0.625)   | 1.000<br>(0.268)  |
| Conflict Battle deaths | 0.999<br>(0.457)    | 0.999<br>(0.476)    | 0.999<br>(0.416)   | 0.999<br>(0.472)  |
| ln GDP per capita      | 0.836*<br>(0.063)   | 0.836<br>(0.160)    | 0.857<br>(0.192)   | 1.034<br>(0.856)  |
| Peace Episodes         | 176                 | 176                 | 84                 | 70                |
| Number of observations | 1665                | 1665                | 821                | 779               |
| Number of Failures     | 72                  | 72                  | 32                 | 28                |

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

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

column 2: standard errors clustered by country

column 3 peace spells after wars only (cumulative intensity equals to 1)

column 4 only the peace spells after the first episode of conflict

## **Explanatory Variables**

### *Territorial Conflict*

In the ACD there is a coding on whether the conflict is an incompatibility over government or over territory. It is coded 1 if the incompatibility is over territory and 0 over government.

### *Ethnic Conflict*

Using the data discussed in Wucherpfennig et al (2012) we code a conflict as ethnic if (1) the group makes a claim to operate on behalf of an ethnic group and (2) recruitment follows ethnic lines.

### *Conflict Outcome*

Kreutz (2010) lists information based on the final year of the conflict episode activity and the subsequent first year of non-activity. (0= No termination; 1= Peace agreement, 2= Ceasefire with conflict regulatory mechanisms; 3= Ceasefire; 4= Victory; 5= No or low activity; 6= Other circumstances). We code our dummy variable ‘settlement’ as equal to one when the outcome variable takes the values 1, 2 or 3. Our ‘victory’ dummy takes a value of one if the outcome variable is equal to 4 and we code our dummy variable ‘other’ as equal to one when the outcome variable is equal to 5.

### *Income*

We measure income by using per capita GDP from the World Bank’s Development Indicators. In order to ensure comparability across countries we use the purchasing power parity (PPP) adjusted series. In the regressions we follow previous studies and use the natural logarithm of per capita income. Income can be potentially endogenous: income may affect the duration of peace but the duration of peace also affects the level of income. To address any possible endogeneity concerns we lag income by two years as in Collier et al. (2008). One concern we cannot address is that we only have national data. The average per capita income may be unrepresentative of the per capita income for the conflict region. However, regional income data are not available for a wide cross section of countries.

### *UN Peacekeeping Operations*

We define a UN Peacekeeping Operation (UNPKO) as an operation led by the UN Department of Peacekeeping Operations (UNDPKO). We used the UNPKO data presented in Howard

(2008) to code whether a mission took place. The data also provide us with qualitative information on PKOs. For example dummy variables indicate whether the UN peacekeepers were sent on an enforcement mission, whether they were confined to the base, whether there was a DDR component to the mission, whether elections were monitored etc. We updated this information by coding more recent missions not covered by Howard. We excluded special political missions not led by UNDPKO (e.g. UNMIN), which may precede or follow peacekeeping operations, as these are not included in the Howard database.

#### *UN troops, observers and police*

The number of total uniformed UN personnel, the number of troops, observers, police and the number of contributing states were obtained from the International Peace Institute (IPI). The data are described in Perry and Smith (2013).

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