

## **Variables Affecting the Outbreak of Civil Conflict in Africa:**

### **A Regression Analysis**

Using panel data that combined the presence or lack of civil conflicts in each sub-Saharan African country with the corresponding social and economic indicators in those countries from the years 1960-2006, I performed a regression analysis to test the predictive marginal effects of historical conflict levels on future conflict, as well as to search for demographic and economic factors that can reduce the risk of violent outbreaks. For conflict data, I used the Armed Conflict Version 4-2007 dataset from the Uppsalla Conflict Data Program at the International Peace Research Institute, Oslo,<sup>1</sup> and withdrew data on all post-independence African civil conflicts for the period 1960-2006.<sup>2</sup> For economic and social indicators, I drew from the World Bank's World Development Indicators database.<sup>3</sup> Due to the fact that the regression was being performed on a binomial dummy variable (the presence of war in any given country and year), I was limited to only using social and economic indicators for which data had been collected in every sub-Saharan country consistently since 1960. This led to a small but varied number of social and economic explanatory variables: aid per capita (external development assistance received per citizen, in US dollars), fertility rate (the average number of children born per childbearing female), external debt (as a percentage of the Gross National Income), and urban population (as a percentage of the total population). Combined with the past-war predictor variables of independence war (a dummy variable indicating whether there was conflict surrounding the country's pursuit of independence), years of war (the number of years the

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<sup>1</sup> Dataset available <http://new.prio.no/CSCW-Datasets/Data-on-Armed-Conflict/UppsalaPRIO-Armed-Conflicts-Dataset/Armed-Conflicts-Version-4-2007/>

<sup>2</sup> In order to focus on civil conflicts, it was necessary to narrow my data to the post-independence period for each respective country. To account for any effect of independence wars on future conflict outbreak, I added a dummy variable that indicated whether the country experienced a war of independence (=1) or whether the independence process was either nonexistent or a peaceful one (=0)

<sup>3</sup> Database available to institutional subscribers at [http://www.worldbank.org/data/online\\_databases/online\\_databases.html](http://www.worldbank.org/data/online_databases/online_databases.html)

country had experienced war since independence), and years of violence (the number of years the country had experienced violence that did not escalate to war since independence).<sup>4</sup> The marginal effects results of the logit regression are listed below:

$$y = \text{Pr}(\text{war}) (\text{predict}) = .02472079$$

Variable	dy/dx	Std. Error	P>z	95% confidence interval		X
Independence War*	.0367295	.00942	.000	.018275	.055184	.269054
Cumulative Years War	.0042064	.00074	.000	.002752	.005661	1.81023
Cumulative Years Violence	-.0002188	.00056	.698	-.001325	.000887	1.86547
Aid per capita	-.0007442	.00011	.000	-.000956	-.000532	42.4087
External Debt	.0000984	.00003	.001	.000038	.000158	64.4347
Fertility Rate	.0015434	.00322	.632	-.004773	.00786	6.1373
Urban Population Rate	-.0008084	.00026	.002	-.001316	-.000301	27.377
Number of Observations: 1955      Prob > Chi2 = 0.000 LR Chi2(7) = 359.4                      Pseudo R2 = .3231 *dy/dx is for a discrete variable change of 0 to 1						

From this regression data, two things stand out. The first regards the variables of ‘war at independence’ and ‘cumulative years war’, both of which are positively correlated with the increased risk of war at a highly statistically-significant level. The fact that the years of war that the country experienced since independence and whether the country experienced a war for independence are both so strongly significant with high coefficients provides strong evidence for the cyclical nature of conflict. The second important feature of this regression is that several of the socio-economic explanatory variables have statistically-significant effects: the amount of aid per capita and the urban population rate are both negatively correlated with the probability of war (at a .000 level and .002 level, respectively), and the external debt as a percentage of GNI is

<sup>4</sup> See Appendix A for a full description on how the variables War, Years War, Years Violence, and Civil Conflict are defined for the purposes of this analysis.

positively associated with the incidence of war at a .001 level. The fertility rate also has a positive coefficient, but has a high standard error and large p-value of .631. These second findings indicate that, while war often becomes an entrenched phenomenon, there are external and internal interventions that can be utilized to decrease the risk of war's reoccurrence.

## Appendix A

### Definition of “War”, “Violence”, and Civil Conflict:

The Armed Conflict Database was developed by the International Peace Research Institute of Oslo, Norway, and the University of Uppsala, Sweden. In this database an armed conflict is defined as follows: “an *armed conflict* is a contested incompatibility which concerns government and/or territory where the use of armed force between two parties, of which at least one is the government of a state, results in at least 25 battle-related deaths.” For the purpose of my analysis, I treated as “war” only the conflicts that resulted in a minimum of 1000 deaths. I treated as “violence” the conflicts that resulted in 25-999 deaths. The elements of the definition are operationalized as follows:

1. *Use of armed force*: use of arms in order to promote the parties’ general position in the conflict, resulting in deaths.

1.1. *Arms*: any material means, e.g. manufactured weapons but also sticks, stones, fire, water, etc.

2. *25 (1000) deaths*: a minimum of 25 (1000) battle-related deaths per year and per incompatibility.

3. *Party*: a government of a state or any opposition organization or alliance of opposition organizations.

3.1. *Government*: the party controlling the capital of the state.

3.2. *Opposition organization*: any nongovernmental group of people having announced a name for their group and using armed force.

4. *State*: a state is

4.1. an internationally recognized sovereign government controlling a specified territory, *or*

4.2. an internationally unrecognized government controlling a specified territory whose sovereignty is not disputed by another internationally recognized sovereign government previously controlling the same territory.

5. *Incompatibility concerning government and/or territory*: the incompatibility, as stated by the parties, must concern government and/or territory.

5.1. *Incompatibility*: the stated generally incompatible positions.

5.2. *Incompatibility concerning government*: incompatibility concerning type of political system, the replacement of the central government or the change of its composition.

5.3. *Incompatibility concerning territory*: incompatibility concerning the status of a territory, e.g. the change of the state in control of a certain territory (interstate conflict), secession or autonomy (intrastate conflict).

This database also includes data on interstate, intrastate, and extrastate conflicts. However, this paper focused exclusively on the categories of conflict that can be classified as being civil wars (categories 3 and 4, which cover intrastate conflict). The precise number of deaths per conflict-year is not publicly available.