

Have Gun Give Food: Nutrition, Agriculture, and the Onset of Civil Wars in Sub-Saharan Africa

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Abstract

Why do civil wars erupt in some sub-Sahara African states while others are free of rebels? Explanations like regime type, ethnic fractionalization, poverty in terms of GDP/c, and resource dependency tend to treat Africa as a relatively homogeneous entity. If, however, African countries did hardly differ from each other, it is a puzzle, why we observed civil wars in some African countries while in others, though very similar, we did not.

In this paper, we present evidence for agriculture and nutrition as a cause of civil war. A substantial part of the African population depended on agriculture for their livelihood. African governments discriminated agriculture and chose policies, which undermined food security in the long-run. Moreover, Africa is so poor that nutrition might be a likely motivation for poor people to join the rank-and-file of a rebel group. The results of a panel-analysis support our hypothesis; nutritional crises significantly preceded civil wars. In contrast, we do not find a significant impact of conventional explanations.

1. Introduction

Civil wars cause an immense humanitarian burden and impair a country's development prospects. When civil wars erupt, they are rarely a short-term affair and a final resolution is difficult to achieve. Much scientific effort was spent on analyzing the causes of civil wars. The political literature emphasized the regime type's role arguing that semi-democracies are more prone to civil wars, because they are neither autocratic enough to suppress rebellion nor democratic enough to resolve conflicts peacefully (Hegre et al., 2001). Others hypothesized that ethnic heterogeneity influences the risk of civil war. With social polarisation along ethnic lines ethnicity can be easily instrumentalized by rebels (Gurr, 1994). Collier and Hoeffler (1998) argued instead that ethnic fractionalization reduces the ability of organisations to function and that rebel groups are no exception to this rule; if recruitment is limited to a single ethnic group, it is more difficult to reach the critical mass of rebels. Explanatory models also included poverty in terms of GDP/c as it reflects low opportunity costs (Collier and Hoeffler, 1998) and a low state capacity (Gurr, 1994), both of which increase the probability of civil war. Last but not least, scholars identified looting of mineral resources as a major motivation of rebels. Collier and Hoeffler (1998) approximated the abundance of natural resources with the share of primary commodity exports in GDP and found a positive impact on the likelihood of civil war for most values.

The hypotheses were tested using a global sample of countries. How does sub-Saharan Africa (SSA) fit into these explanations? According to the POLITY-index, which describes the regime type in a single measure ranging from -10 (strongly autocratic) to +10 (strongly democratic), the political system of most African countries did not vary much (Marshall and Jaggers, 2002). Almost 40% of observations of the African sample have a POLITY-score of -7 and about 70% are clustered between -6 and -9. The colonial era left ethnically highly fractionalized states in SSA. Thus, even though rebels instrumentalize nationalist sentiments,

ethnic antagonisms are common and do not necessarily distinguish the cases where civil war broke out. In poverty and economic growth, SSA holds an exceptional poor record and differs significantly from other regions of the world (Easterly and Levine, 1997). Negative per capita growth rates are clustered in SSA including countries, in which no civil war occurred. The share of primary commodity exports in GDP does also not describe distinct differences between the countries as the sample of African countries has a significantly 46% lower standard deviation than the remaining sample.

The prominent explanations of civil wars draw a rather homogeneous picture of SSA. If, however, African countries did hardly differ from each other, it is a puzzle, why we observed civil wars in some African countries while in others, though very similar, we did not. In this paper, we argue, that for explaining civil wars *within* SSA, agriculture and nutrition must be taken into account. The remainder of the paper is organized as follows. In Section 2, we briefly give our motivation of extending the explanatory model by nutritional and agricultural factors. In section 3, we describe the data and regression model and in section 4, we present the results of a panel-analysis. Section 5 concludes.

2. The case for nutrition and agriculture

In SSA the hungriest 25% of countries live from a daily food supply per capita of less than 2000 calories (FAOSTAT).¹ Food is vital and gains from a marginal improvement from poor nutritional conditions are high indeed. Hence, nutrition could be a major motivation for poor people to join the rank-and-file of a rebel group. In fact, there is evidence of food as a crucial recruitment incentive; British military officers doing their service in colonial Africa reported that ‘good food’ was pulling African men into the British colonial army (Killingray,

¹ Since individual availability of calories and energy needs vary, many people in these countries are undernourished.

1985). There need not necessarily be a political motivation. If hunger is present, the possibility to get food by force could be sufficient motivation.

African governments were well aware of the threat hunger creates. They frequently fixed food prices below market levels subsidizing and appeasing the politically more active urban population (Bates, 1981). However, producers facing low prices respond with reducing supply. Consequently, such a policy undermines food security in the long-run. Moreover, in their struggle for industrialization many African countries followed an import substitution policy, under which overvalued exchange rates and the monopsony parastatal marketing boards held further discriminated agricultural producers. The effect on nutrition was negative as Moradi and Baten (2005) found that monoculture cash-cropping increased nutritional inequality and lowered net nutritional status. The significance of these aspects is obvious. Most people in SSA depended on agriculture for their livelihood, about 85% of the population in 1960 and still 70% in 1990 (FAOSTAT).

Although agriculture was discriminated in general, heterogeneity in agricultural activities increased discriminatory practices and the potential for conflict over scarce resources, like land or water. Especially pastoralists were treated as a backward element. In Chad, for example, excessive taxes on cattle triggered a *rural* based insurrection in 1965 and the conflict resulted in a long-lasting civil war (Azam and Morrisson, 1999).

3. Data and regression model

The civil war database we use here is the third version of the Correlates of War Project (Sarkees, 2000). Accordingly, a civil war is defined as any internal conflict, in which at least 1000 battle related deaths occurred per year.² In our test strategy, we follow Collier and Hoeffler (1998) and apply Grangerian strategies to reduce problems of endogeneity.

² We also included wars of decolonization.

Levels are measured at the beginning of each sub-period; growth rates are calculated by averaging the annual growth rates of the *preceding* sub-period. Ongoing civil wars are coded as missing values and therefore are excluded from the regression. The panel data set consists of 40 countries and eight five-year sub-periods (1960-64, 1965-69, ..., 1995-99). Since the onset of civil wars is a dichotomous dependent variable, we apply a maximum-likelihood probit model for estimating the probabilities of civil war starts.

The established explanations of civil wars should not be rejected in advance. We test the hypothesis that semi-democracies are more prone to civil wars by including the POLITY-score and its square. Moreover, we control for ethnic heterogeneity by using the population share of the largest ethnic group and we consider poverty in terms of GDP/c. For testing the case of looting we include the share of primary commodity exports in GDP.

Our set of variables consists of the rate of urbanization. On the one hand, urbanization could indicate an excess food supply in rural areas, as the increased number of urban consumers must be sustained. Urban areas also offer better access to public goods, like schooling and health, and imply better income prospects, which increase opportunity costs of starting a rebellion. On the other hand, factors pushing people into cities, like lower wages or unemployment in rural areas, reduce opportunity costs of the rural population. Because migration offers an opportunity to escape from rural poverty, we would expect a negative relationship between urbanization and the onset of civil war. A good proxy of agricultural heterogeneity is the coefficient of variation in cattle per capita of a country's administrative regions. Specialization in livestock occurred as an adaptation to environmental constraints and hence, variations within a country indicate antagonisms in agriculture.

Given the prominence of rain-fed agriculture in SSA, rainfall affects agricultural output (Miguel et al., 2004) and food supply positively. We therefore include (lagged) growth in rainfall. Firstly, when droughts occur, governments are either not responsible or they can

credibly blame exogenous factors for food shortages. Moreover, food might then be generally short in supply, so that potential rebel groups find it difficult to acquire food for starting their activities. Additionally, rainfall is stationary for most African countries and thus, growth in rainfall is negatively autocorrelated (p-value: 0.000). Therefore, a shortfall in precipitation partly predicts growth in agricultural output in the period, for which we code the onset of civil wars. For these reasons, we would expect a positive regression coefficient for our rainfall variable.

We consider nutrition with calorie supply available for human consumption from the FAO Food Balance Sheets (FAOSTAT). By expressing food supply in calories, the vast differences in the kind of staple food between the countries are standardized by their nutritional value. Though FAO is confident that their figures provide an approximate picture of the countries' *overall* food situation, their data was criticized, because 'primitive' methods of surveying agricultural production were applied. Furthermore, aggregate food supply does not display nutritional stress of certain groups and a population's nutritional status is not only determined by food *availability* but also by nutritional needs. However, the FAO calorie figures were used in anthropometric studies and turned out to be a significant (though weak) predictor of net nutritional status. Moreover, similar caveats apply to the GDP/c variable.

4. Regression results

Our regression analysis demonstrates that the prominent hypotheses fail to explain the conflict history within SSA. Most determinants do not have an impact like in a global sample (first model, Table I). Economic growth is insignificant and the level of GDP/c is only significant at the 10% level. The dependence on primary commodity exports does not have any explanatory power. This is an important result insofar, as the variable is the main pillar of the hypothesis that the rebels' motivation is greed seeking the easy lootable rents generated by

mineral resources. Moreover, the regression results point to an effect of ethnicity and regime type opposite to what was hypothesized. The risk of civil war is increasing with the size of the largest ethnic group (significant at the 10% level); the more democratic an African country the more probable is a civil war.³ The polity variables, however, are jointly insignificant (p-value: 0.38). Because they restrict the sample size, we exclude them in the following. Only the peace duration since the end of the previous conflict (starting point is the end of WWII) and the population size have an effect on civil wars similar to the one when using a global sample of countries. The peace duration approximates conflict history and indicates that the risk of civil war is gradually decreasing over time with civil wars likely to recur. The positive effect of the population size is assumed to reflect a larger recruitment pool, from which only a small absolute number of rebels need to be drawn for posing an effective threat to the government.

In the next regression we include the agricultural and nutritional variables from our list (second model, Table I). The coefficients have the expected sign. A growing urban population makes countries safer. Agricultural heterogeneity measured by variations in cattle holdings increases the probability of civil war. Rainfall has a positive effect, which reflects the paralyzing role of droughts and the impact on future agricultural output. The calorie supply indicates that a sufficient food supply reduces the risk of a civil war.⁴ In the subsequent regression, we add lagged growth in food supply (third model, Table I). The regression coefficient is significantly negative indicating that nutritional crises preceded civil wars. When reducing the regression model our nutritional and agricultural variables are still highly significant (fourth model, Table I). The goodness of fit is excellent and demonstrates that our variables are powerful in explaining the war experience in SSA.

³ Coding the regime type with dummy variables (POLITY-scores lower than -5 as autocracies/ higher than +5 as democracies) does not alter this result.

5. Conclusions

The prominent hypotheses of civil wars treat SSA as a very homogenous entity and they cannot explain civil wars *within* SSA. In this paper, we argued that poor nutrition is motivating people to join the rank-and-file of a rebel group. The results of our panel-analysis support this view. The effects food supply, rainfall and agricultural heterogeneity have on civil war starts point to nutritional and agricultural crises triggering civil wars in SSA. Overall, however, the real curse is the failure of African governments to implement effective, non-discriminatory policies in favour of a secure and sufficient food supply for their people.

Our results are good news in that measures for preventing civil wars do not compete with broader development goals. Economic policies, which raise the availability of vital goods, are simultaneously a promising strategy for preventing civil wars. Because civil wars aggravate nutritional problems and nutritional crises in turn increase the risk of civil war, a vicious circle could follow. For preventing countries to become locked in a war trap, the international community should temporarily give every assistance to ensure that the people's most basic needs are met.

⁴ Missing values in cattle per capita reduce the sample size and make the level of calories insignificant.

Table I Probit estimates of civil war starts 1960-1997

	(1)	(2)	(3)	(4)
LN(GDP/c)	-0.489* (-1.78)	0.127 (0.34)	-0.218 (-0.54)	
Δ GDP/c _{t-1}	-0.032 (-0.86)	-0.024 (-0.66)	-0.019 (-0.51)	
Primary commodity exports/GDP	1.612 (0.44)	1.888 (0.53)	1.898 (0.52)	
(Primary commodity exports/GDP) ²	1.252 (0.19)	-2.317 (-0.36)	-2.286 (-0.34)	
Percentage of largest ethnic group	0.011* (1.85)	0.021*** (2.64)	0.020** (2.31)	0.020** (2.39)
POLITY-score	0.033 (1.37)			
(POLITY-score) ²	0.004 (0.77)			
Peace duration (in months)	-0.002*** (-2.55)	-0.002** (-2.50)	-0.002** (-2.54)	-0.002*** (-2.67)
LN(population in 1000)	0.363*** (2.90)	0.452*** (3.33)	0.365** (2.44)	0.396*** (2.87)
Δ Urbanization (in %)		-0.199** (-2.31)	-0.157* (-1.85)	-0.161** (-2.10)
Regional heterogeneity in cattle per capita 1960		1.307*** (3.27)	1.524*** (3.41)	1.535*** (3.99)
Δ Rainfall _{t-1}		0.063** (2.06)	0.072** (2.11)	0.068** (1.98)
Calorie supply/ cap/ day (in 100)		-0.929 (-1.42)	-0.005 (-0.07)	
Δ Calories _{t-1}			-0.179** (-2.07)	-0.188*** (-2.56)
Pseudo R ²	0.170	0.232	0.254	0.254
N	252	256	226	233
N civil wars	25	29	24	24

Notes: All regressions include a constant. Standard errors were estimated using the Huber/White/sandwich estimator of variance; z-values in parentheses. *, **, *** indicates significance at the 10, 5, and 1 percent level.

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