



CREPOL

**Center for Research on Political Economy
Centre de recherche en économie politique**

CREPOL RESEARCH PAPERS

CRP002

**Title :
An Economic Theory of Civil War in Africa**

**Author :
Diery Seck**

This is a reprint from the publication
Growth and Development in Africa
by Africa World Press
www.africaworldpressbooks.com

July 2009

CHAPTER 14

AN ECONOMIC THEORY OF CIVIL WAR IN AFRICA

Diery Seck

INTRODUCTION

There is general consensus that Africa has not benefited from world economic growth over the last half century. Compared to Asian countries that were in similar or even more unfavorable situations in the early 1960s, African countries have not kept up with the pace of economic development and have, in many cases, regressed with respect to per capita gross domestic product (GDP), life expectancy, and rate of literacy. The general debate on the Asian miracle and the African demise has pointed to a variety of causes that seek to explain Asia's success and Africa's failure. They revolve around key factors such as quality of policies, quality of management, and quality of population skills. This debate is still unresolved.

It is noteworthy that, during the same period, Africa, more than any other region of the world, has experienced internal unrest and conflict that halted the process of economic development and, in the worst cases, thrown countries into a spiral of institutional chaos and

social decay. Therefore, it can be argued that Africa's post-colonial efforts to develop have been marred by internal conflict and that its future prospects cannot be considered hopeful if it does not put an end to its civil wars. The purpose of this chapter is to propose a theoretical rationale aimed at explaining the process that leads to civil war and suggest ways to minimize the likelihood of future conflicts and lessen or stop wars being currently fought on the continent.

One of the striking features of the mechanisms designed to address civil wars is that there seems to be a preference for efforts to stop ongoing war over prevention. Furthermore, countries that are afflicted by war and are among the poorest of the continent, with no natural resources of interest for the world economy, tend to attract little or no remedial action from the international community, and bear a higher social and economic cost. As a result, their chances for recovery and future growth are more likely to be compromised. One of the postulates motivating the present study is that it costs more to stop a civil war than to prevent one. Consequently, efforts should aim at understanding the causes of civil war to avert future internal conflict in Africa. While considerable literature in political science, sociology, and psychology has tried to uncover the causes of civil war in general and in Africa in particular, the economic factors that cause it need to be fully understood as part of a comprehensive agenda for Africa's development. The theoretical analysis proposed in this chapter seeks to contribute to the conceptual understanding of the causes of civil war in Africa.

The remainder of the study is organized as follows. In the next section a review of the economic literature on civil wars is undertaken and, in that light, the underlying rationale of the study is spelled out. In section three, the typical African country at war is described through a number of assumptions and implications are drawn on its behavior. Section four portrays the country's optimization problem and the conditions that give rise to civil war. It also examines the stake and severity of war and its predictability. In the last section, possible remedies for civil war that derive from the analysis are explored and a few concluding comments will close the chapter.

CONCEPTUAL UNDERSTANDING OF CIVIL WAR IN AFRICA

The literature that addresses civil war can be arbitrarily organized along four strands. Grossman (1991, 1999) proposes a theoretical

model in which insurrection is a possible adverse outcome for a government in power. The government can divert resources to military expenditures to reduce the probability of being overthrown. Neary (1997) examines the respective explanatory powers of a rent-seeking model and a simple economic model of conflict. Azam and Mesnard (2003) propose a game-theoretic model of a dominant group that seeks to avoid the advent of war by way of transfer of resources to its rivals. The motivations of parties to a civil war and other determinants of civil strife are discussed by Azam (2001), Azam and Koidou (2003), Collier and Hoeffler (1998, 2003), Elbadawi and Sambanis (2000), Ngaruko and Nkurunziza (2000), and Hirshleifer (1995, 2001).

Strategies for waging civil war or staging insurrection are examined by Kuran (1989), Azam and Hoeffler (2002), and Herbst (2000a, b). The characteristics of individuals and groups most likely to engage in civil conflict are discussed by Fearon and Laitin (1999) and Esteban and Ray (1999). The theoretical literature reviewed above is general in its approach and does not capture the essence of the African context. As a result, the solutions that it arrives at may not allow for an easy conceptual understanding of civil war on the continent. The studies that seek to uncover the determinants of civil war or the characteristics of warring parties provide useful descriptions of regularities that can be associated with civil strife in Africa but not the real causes of the conflicts.

The theoretical rationale proposed in chapter is to start from a set of assumptions that illustrate the African context and derive a model that seeks to identify the economic causes of civil war. The implicit argument underlying the model is that game-theoretic bargaining between parties, strategies for building up military dominance, and of conduct of civil war are resultants of deep-rooted causes for which they are second-generation optimization problems. In other words, they come into play once the situation is in the vicinity of a point of balance of power at which each party may assess favorably its chances of winning civil confrontation.

DESCRIPTION OF THE COUNTRY AT WAR

Assumptions

The African country that is most likely to be at civil war has a low per capita GDP even by African standards, a predominantly rural population living on subsistence farming, which, coupled with a high

illiteracy rate, results in low productivity per worker. This in turn leads to low per capita consumption and savings and consequently low investment per worker and low physical capital. The country may have large reserves in primary commodities with a sizable world market value such as natural gas, oil, or diamonds, but a large proportion of the population will have little involvement in their exploitation. This situation is characteristic of countries with commodity exploitation enclaves notable for high disparities in income distribution and a significant difference between gross domestic product and gross national product, owing to the disproportionate share of nonresidents in aggregate output. There is rivalry between distinct groups regarding their respective shares of national income. These characterizations can be summarized with the following assumptions.

A1: The country's average productivity is low and typical of an agriculture-based economy where subsistence farming is pervasive. As a result there is population pressure on arable land.

$$\gamma = \frac{N_R}{L_R} \geq \bar{\gamma} \quad (1)$$

γ = Measure of the population pressure on arable land for country R
 N_R = Total population of country R
 L_R = Total arable land of country R
 $\bar{\gamma}$ = Threshold value at which land pressure is considered unsustainable given the current technology.

A2: The country has low productivity increase relative to population growth.

Let the productivity of country R be defined by $q = \frac{Q_R}{L_R}$

Q_R = Total output of country R

and n be the rate of growth of the population of country R. Then the country's productivity gap is given by:

$$\alpha = \Delta q - n \leq 0 \quad (2)$$

α = Productivity gap of country R

Δq = Rate of change of country R's productivity

The combination of low productivity given by eq. (1) and a non-positive per capita productivity increase implies that the county's total output is consumed and that there are no savings and consequently no investments.¹

A3: Country R has a dualistic society composed of two groups, a dominant group denoted T and a dominated group denoted B. Group T enjoys military superiority over group B.

$$\delta - \frac{N_B}{N_T} > 0 \quad (3)$$

δ = Military dominance factor of group T over group B

N_B = Population size of group B

N_T = Population size of group T.

The military dominance factor is a parameter that is determined by a number of variables such as the level of military and security spending of group T, the quality of its civil and military leadership, and the determination of group T to maintain its domination over group B.

A4: The dominant group extracts an economic rent from the income of the dominated group.

$$\frac{Q_B}{L_B} = \frac{Q_T}{L_T} = q \quad (4)$$

Q and L are as defined above and subscripts B and T refer to the two groups respectively. According to eq. (4) the two groups have equal productivities. However,

$$C_T = Q_T + \beta Q_B \quad (5a)$$

$$C_B = (1 - \beta)Q_B \quad 0 \leq \beta \leq 1 \quad (5b)$$

C_T = Total consumption of group T

C_B = Total consumption of group B

β = Rent factor

According to eq. (4) and eq. (5a, 5b), the two groups have equal per capita income but group T uses a portion of group B's income for its own consumption, which is made possible by the military dominance that it enjoys. The amount of the rent is given by βQ_B

Implications of the Assumptions

Based on the assumed description of the African country at civil war, the determinants that may lead to internal conflict are summa-

ized by the four following parameters, γ , α , δ , and β . Considering that the economy is based on subsistence farming, mobility of labor across sectors is limited and land is the only productive asset available. However its short supply, measured by γ , leads to possible competition between groups in their respective bids to increase output. The country seeks to prevent currently low levels of per capita income from declining in the face of a growing population, but is hindered by a low rate of increase in productivity, which may cause it to fall behind and experience a downward trend in living standards. Parameter α captures the country's challenge in this respect.

Being in power, group T has an incentive to establish military dominance, δ to keep it. It does so not by using all or part of a portion of its aggregate income, considering that it consumes it all, but by funding such dominance with a portion β of the income of the dominated group, B. Since high levels of military dominance must be funded with high levels of rent extracted by group T from group B, the rent being assigned to the consumption of group T in the form of dominance and other consumption items, it follows that, on average, members of group T have a higher level of consumption than members of group B. Their average per capita consumption is also higher than their average per capita income by: $\frac{\beta Q_B}{N_T}$.

In summary, the first two parameters, γ and α , portray the conditions related to income level that create a fertile ground for internal conflict, while the last two, δ and β , constitute factors that may trigger civil war if their observed levels exacerbate direct confrontation.

The foregoing analysis has helped identify two parameters that indicate the country's economic conditions, α and γ , and whose respective values are given by eqs. (1) and (2). Arguably, the rent factor, β , is a policy variable that is determined by the dominant group T. As for the military dominance factor, δ , it is a variable whose value depends on prevailing economic conditions, α and γ , and the rent factor β . The combination of these three factors makes δ potentially highly variable, which could be a cause for concern for the dominant group because if the condition depicted by eq. (3) is not verified, its military dominance is lost and military confrontation with group B may ensue.

Consequently, it is hypothesized that, in the context of the present analysis, the main determinants of military dominance are given by:

$$\delta = \delta(\beta Q_B, \alpha, \gamma) \quad (6a)$$

Substituting eq. (4) into eq. (6) gives

$$\delta = \delta(\beta q L_B, \alpha, \gamma) \quad (6b)$$

The following partial derivatives indicate how, in accordance with the hypothesis underlying eq. (6), the arguments of δ impact upon it.

$$\frac{\partial \delta}{\partial \beta} > 0 \quad \frac{\partial \delta}{\partial q} > 0 \quad \frac{\partial \delta}{\partial L_B} > 0 \quad \frac{\partial \delta}{\partial \alpha} > 0 \quad \frac{\partial \delta}{\partial \gamma} < 0$$

An increase in the level of the rent, $\beta q L_B$ and an improvement in the productivity gap, α , will strengthen group T's military dominance while an increase in the land pressure, γ , will weaken it.

BREAK OUT OF CIVIL WAR

The Optimization Problem

For the purpose of the analysis, the dominant group is considered to be in power and therefore in a position to make policy. In this regard, military dominance is the target variable, while its arguments β, α, γ are the policy instruments. It can be argued that once military dominance is attained, group T's policy will aim to minimize the risk of losing it. This is made possible by a rent that will serve to sustain the dominance. Considering that δ is a random variable, for ease of exposition, it is assumed to follow a normal distribution.² In order to avoid civil war the group in power is assumed to seek to:

$$\text{Minimize Var}(\delta) \quad (7)$$

Subject to:

1. $C_T = Q_T + \beta Q_B$
2. $0 \leq \beta \leq 1$

Var(δ) = Variance of δ

While the optimization problem that group T faces to avoid civil war is given by eq. (7), an analytical solution is not readily obtain-

able because the functional relationship of δ with its determinants as portrayed in eq. (6a, 6b), is not known. This relationship requires empirical measurement to be fully understood and may vary between countries or even over time for the same country. Given this limitation, a graphical representation of the remainder of the argument will serve to complete the analysis.

Characteristics of Civil War

Conditions for Breakout of War

As was indicated in eq. (3), the condition for breakout of civil war is verified when the level of military dominance is not higher than the ratio of the respective populations of groups B and T. In such a case the dominated group outnumbered the dominant group so much that it compensates for the military dominance enjoyed by the latter. This situation is illustrated in Figure 14.1.

Consider the two alternative normal probabilistic distributions of military dominance denoted A and B. They have the same expected value $E(\delta)$ but distribution A has a higher variance than distribution B. The range of values of δ at which civil war can break out is given by $\left[-\infty, \frac{N_B}{N_T}\right]$, the length of the shaded area. The cumulative probability for all the values of δ in this range is higher under the curve A than under curve B.

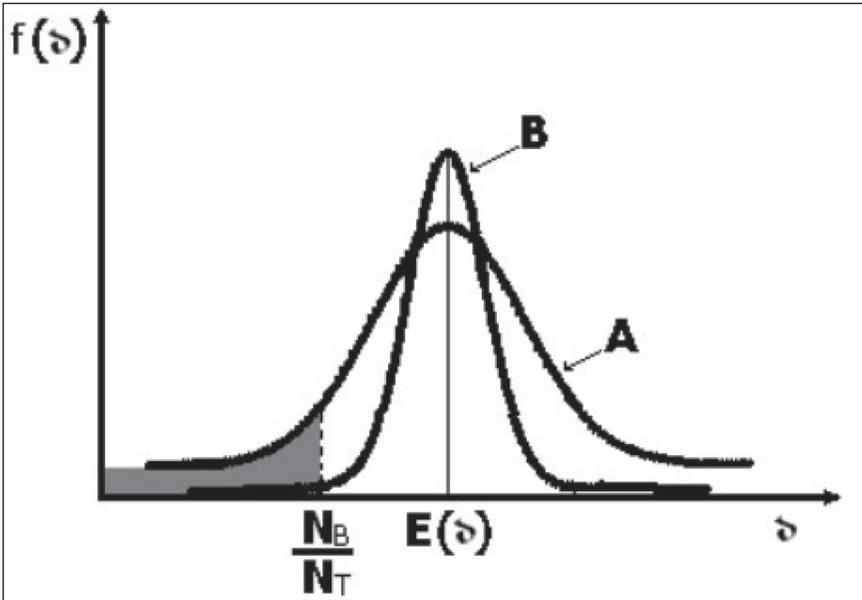
In other words, the higher the variance of δ , the higher the probability that civil war will break out. Given the assumption of normality, the density function of δ is:

$$f(\delta) = \frac{1}{\sqrt{2\pi \text{var}(\delta)}} \exp \left[-\frac{1}{2 \text{var}(\delta)} (\delta - E(\delta))^2 \right] \quad (8)$$

and the probability of verifying conditions of civil war break out is :

$$P\left(\delta \leq \frac{N_B}{N_T}\right) = \int_{-\infty}^{\frac{N_B}{N_T}} f(\delta) d\delta \quad (9)$$

Figure 14.1: Probability Distribution of Military Dominance and Condition for War Breakout



In light of eqs. (8) and (9) the logic underlying the objective function given by eq. (7), which states that the dominant group seeks to minimize the variance of δ , becomes clearer.

The Stake and Severity of Civil War

The stake of war is depicted by eq. (5a, 5b). It is the rent that the dominant group, T, extracts from the dominated group B. This very rent is also the means with which it establishes and maintains its military dominance. As a result, the higher the rent, the higher the incentive of group B to enter into conflict with group T to recapture all or part of the rent. Conversely with high levels of rent, group T can and has an incentive to, attain higher levels of military dominance which may be conducive to a military state or an increasingly repressive situation against group B.

The severity of the civil war, once it breaks out, will depend on the extent to which confrontation leads to a sharing of the rent. The percentage of the rent captured by each group will determine its capacity to sustain the war effort in intensity and in duration. For instance if each of the camps in a civil war controls a lucrative primary commod-

ity enclave, the war is likely to be more intense than if only one camp has such an advantage and more so if neither camp has it.

Predictability of Civil War

Predictability of civil war can be taken to have two possible meanings. The first one relates to the date at which eq. (3) will not be verified i.e.:

$$\delta - \frac{N_B}{N_T} > 0$$

$\frac{N_B}{N_T}$ If one can predict a future lower value of δ or a higher value of $\frac{N_B}{N_T}$, or both, that will result in a violation of eq. (3), the date at which the condition is expected to no longer hold can be predicted as the potential start of civil war. Eq. (6b) and its hypothesized partial derivatives provide indications on possible causes of the violation of eq. (3) through a decline in δ . Table 14.1 gives a non-exhaustive list of factors that can lead to the violation.

The second possible meaning of the predictability of civil war refers to the likelihood of a future war breakout. Consider an exercise in which the prediction horizon is increased incrementally and that for each specific horizon the parameters of the elements of eq. (3) are estimated. As the prediction horizon extends further out in the future, the estimated parameters result in probability distributions that will yield specific probabilities of civil war breakout each one associated with a given prediction horizon. In this case the prediction will take the form of a probabilistic statement such as: "In the next 10 years, there is a 25 percent chance of civil war in country R".

Table 14.1: Possible Sources of Violation of Military

Dominance Condition: $\delta - \frac{N_B}{N_T} > 0$

Variable	Source of violation
Q	<ul style="list-style-type: none"> - Crop failure - Shortage of labor (disease, emigration, fear)
L_B, L_R	<ul style="list-style-type: none"> - Environmental degradation - Land confiscation - Forbidden or dangerous access (war zone, land mines)
$\frac{N_B}{N_T}, N_R$	<ul style="list-style-type: none"> - Population exile - Genocide - Differential birth/death rate - Large population increase

REMEDIES FOR CIVIL WAR

Analysis of the remedies follows from the very causes of civil war. In this regard, remedial action can take three forms: prevention, reduction of intensity, or reduction of duration. Once civil war breaks out, it can be reduced only in intensity or in duration. Under conditions of active war, no meaningful corrective action can be taken on prevailing economic conditions as captured by α and γ . However, if the size of the economic rent, βqL_B , is increased enough, either through a higher rent factor, β , or of the output of the dominated group, qL_B , military dominance of group T over B could be restored and the dominated group would no longer have an incentive to wage war. Conversely, if the ratio of the population of group B over that of group T increases substantially through for instance a genocide of group T by group B, military dominance can be upset and the war would come to an end.

Prevention of future wars not only takes the above discussion into account, it also allows for possible changes of parameters that can be constant in the short run. In this context, the long-term factors of prevention will be the focus, particularly α and γ . Excessive land pressure can result in internal conflict. However, if alternative cultivation techniques that increase yields and output with the same amount of land are adopted, tension can be lessened. The same result can be obtained if the economy diversifies its output and attracts the excess labor of the agricultural sector into other sectors, thereby reducing land pressure. Civil war can be averted if the supply of labor in a given country is reduced by way of emigration into other countries thanks to, say, freedom of mobility and settlement into low-land-pressure areas made possible by integration or agreements between countries. To a lesser extent, access to new areas formerly unavailable because of unrest, land mines, and implementation of land rehabilitation programs could also reduce the likelihood of war.

As for the productivity gap, it can be readily reduced if the rate of growth of the population is reduced or if a significant increase in productivity more than makes up for demographic expansion. This underscores the importance of education for poor African countries because with literacy, workers can not only increase their productivity in their current sectors of employment, they also have a better chance for mobility across sectors thanks to their higher human capital.

CONCLUSION

The purpose of this study is to propose a conceptual understanding of the causes of civil war in Africa. Its rationale is based on the postulate that economic factors are at the root of civil strife in an African context that is characterized by poverty, low increase in productivity, and use of military power by dominant groups to extract an economic rent from groups that are dominated. The economic situation of the country likely to be at war is depicted by agriculture-based subsistence farming and excessive population pressure on the land. Rival groups have comparable degrees of productivity, negligible rates of savings and of investment, and face a situation of direct rivalry for the only productive asset available, arable land.

The military dominance enjoyed by one group over the other makes it possible to extract economic rent from the dominated group, part of which serves to maintain the dominance. Given that the military dominance factor is a random variable, the dominant group will seek to minimize its variability under the constraints of its target consumption level and a non-negative rent. The model yields answers regarding the conditions for breakout of civil war. The stake, intensity, and predictability of civil war are also examined in light of the model. Finally, remedies for ongoing and future civil war are discussed and possible avenues for lessening or averting civil war in Africa are proposed.

Notes

1. The implicit assumption is that country R's economy is closed, because its low productivity and subsistence farming system do not facilitate foreign trade.
2. The results that follow are not specific to the assumption of normality of the dominance factor. They could obtain under other probabilistic distributions but calculations would be more tedious.

References

- Alesina, A., R. Baqir, and W. Easterly 1999. "Public Goods and Ethnic Divisions." *Quarterly Journal of Economics*, 114(4):1243-1284.
- Alesina, A., S. Oetzler, N. Roubini, and P. Swagel. 1996. "Political Instability and Economic Growth." *Journal of Economic Growth*, 1:189-211.

AN ECONOMIC THEORY OF CIVIL WAR IN AFRICA

- Alesina, A., and E. Spolaore, 1997. "On the Number and the Size of Nations," *Quarterly Journal of Economics*, 112: 1027-1056.
- Ali, A. G. A. 2000. "The Economics of Conflicts in Africa: An Overview." *Journal of African Economies*, 9(3): 235-243.
- Angoustures, A. and V. Pascal. 1996. "Diasporas et financement des conflits." In F. Jean and J.-C. Rufin (eds.), *Economie des Guerres Civiles*, Paris: Hachette.
- Azam J. P. 2002. "Looting and Conflict between Ethno-Regional Groups: Lessons for State Formation in Africa." *Journal of Conflict Resolution*, 46(1): 131-153.
- Azam J. P. 2001. "The Redistributive State and Conflicts in Africa." *Journal of Peace Research*, 38 (4): 429-444.
- Azam J. P. and C. Koidou. 2003. "Rising Threats: Containing Political Violence in Côte d'Ivoire." *Working Paper*.
- Azam J. P. and A. Hoeffler. 2002. "Violence Against Civilians: Looting or Terror," *Journal of Peace Research*, 39(4): 461-485.
- Azam J. P. and N. Djimtoingar. 2002. "Cotton, War and Growth in Chad (1996-2000)," *Working Paper*.
- Azam J. P. and A. Mesnard. 2003. "Civil War and the Social Contract," *Public Choice*, 115: 455-475.
- Azam J. P. and T. Saadi-Sedik. 2004. "Aid v. Sanctions for Taming Oppressors: Theory and Case Study of the Iraqi Kurds," *Working Paper*.
- Barro, R. J. 1991. "Economic Growth in a Cross Section of Countries," *The Quarterly Journal of Economics*, 106: 407-443.
- _____. ed. 1997. *Determinants of Economic Growth*. Cambridge, MA: MIT Press.
- Buchanan, J. M. and R. L. Faith. 1987. "Secession and the Limits of Taxation: Towards a Theory of Internal Exit," *American Economic Review*, 77:1023-1031.
- Collier, P. 2000. "Rebellion as a Quasi-Criminal Activity," *Journal of Conflict Resolution*, 44: 839-853.
- _____. 2001. "Ethnic Diversity: An Economic Analysis of its Implications," *Economic Policy*, 32: 129-166.
- Collier, P. and A. Hoeffler. 1998. "On the Economic Causes of Civil War," *Oxford Economic Papers*, 50: 563-573.
- Collier, P. and A. Hoeffler. 2000. "On the Incidence of Civil War in Africa," *CSAE Working Paper*.
- Collier, P. and A. Hoeffler. 2002. "Aid, Policy and Growth in Post-Conflict Societies," *World Bank Policy Research Working Paper 2902*.
- Collier, P. and A. Hoeffler. 2003. "Greed and Grievance in Civil War," *CSAE Working Paper*.
- Collier, P., A. Hoeffler, and M. Söderbom. 2003. "On the Duration of Civil War," mimeo. <http://users.ox.ac.uk/~ball0144>.

- Deininger, K., and L. Squire. 1996. "A New Data Set Measuring Income Inequality," *World Bank Economic Review*, 10: 565-591.
- _____. 1998. "New Ways of Looking at Old Issues: Inequality and Growth," *Journal of Development Economics*, 57: 249-287.
- Easterly, W. and R. Levine. 1997. "Africa's Growth Tragedy: Policies and Ethnic Divisions," *Quarterly Journal of Economics*, 113:1203-1249.
- Elbadawi, I. and N. Sambanis. 2000. "Why Are There So Many Civil Wars in Africa? Understanding and Preventing Violent Conflict," *Journal of African Economies*, 9(3): 244-269.
- Esteban, J.-M., and D. Ray. 1994. "On the Measurement of Polarization," *Econometrica*, 62(4): 819-51.
- Esteban, J. and D. Ray. 1999. "Conflict and Distribution," *Journal of Economic Theory*, 87: 379-415.
- Fearon, J. D. and D. D. Laitin. 1999. "Weak States, Rough Terrain, and Large-Scale Ethnic Violence since 1945," *Working Paper*.
- Gleditsch, N. P., P. Wallensteen, M. Eriksson, M. Sollenberg and H. Strand, 2001. "Armed Conflict 1946-2000: A New Dataset," *Working Paper*.
- Grossman, H. I. 1991. "A General Equilibrium Model of Insurrections," *American Economic Review*, 81: 912-921.
- _____. 1999. "Kleptocracy and Revolutions," *Oxford Economic Papers* 51: 267-283.
- Hegre, H., T. Ellingsen, S. Gates, and N.-P. Gleditsch. 2001. "Toward a Democratic Civil Peace? Democracy, Political Change, and Civil War, 1816-1992," *American Political Science Review*, 95: 33-48.
- Herbst, J., 2000a. *States and Power in Africa*. Princeton: Princeton University Press.
- Herbst, J., 2000b. "Economic Incentives, Natural Resources and Conflict in Africa," *Journal of African Economies*, 9(3): 270-294.
- Hirshleifer, J. 1995. "Theorizing about Conflict," In *Handbook of Defense Economics*, ed. K. Hartley and T. Sandler, 165-189. Vol.1, Amsterdam: Elsevier Science.
- _____. 2001. *The Dark Side of the Force: Economic Foundations of Conflict Theory*. Cambridge, UK: Cambridge University Press.
- Jagers, K. and T. R. Gurr. 1995. "Tracking Democracy's Third Wave with the Polity III Data," *Journal of Peace Research* 32: 469-482.
- Klare, M.T., 2001. *Natural Resource Wars: The New Landscape of Global Conflict*. New York: Metropolitan Books.
- Kuran, T., 1989. "Sparks and Prairie Fires: A Theory of Unanticipated Political Revolution," *Public Choice*, 61(1): 41-74.
- Lane A. and P. R. Tornell. 1999. "The Voracity Effect," *American Economic Review*, 89: 22-46.
- Londregan, J.B. and K. T. Poole. 1996. "Does High Income Promote Democracy?" *World Politics*, 49: 1-30.

AN ECONOMIC THEORY OF CIVIL WAR IN AFRICA

- Mauro, P. 1995. "Corruption and Growth," *The Quarterly Journal of Economics*, 110: 681-712.
- Neary, H. M. 1997. "A Comparison of Rent-seeking Models and Economic Models of Conflict," *Public Choice*, 93(2): 373-388.
- Ngaruko, F. and J. D. Nkurunziza. 2000. "An Economic Interpretation of Conflict in Burundi," *Journal of African Economies*, 9(3): 370-409.
- Reynal-Querol, M. 2002. "Ethnicity, Political Systems and Civil War," *Journal of Conflict Resolution*, 46(1):29-54.
- Sachs, J. and A.M. Warner. 2000. "Natural Resource Abundance and Economic Growth," In *Leading Issues in Economic Development*, 7th ed. G. M. Meier and J.E. Rauch, eds. Oxford: Oxford University Press.
- Sen, A. 1973. *On Economic Inequality*. Oxford: Clarendon Press.
- Singer, D. J. and M. Small. 1994. *Correlates of War Project: International and Civil War Data, 1816-1992*. Inter-University Consortium for Political and Social Research, Ann Arbor, Michigan.
- Skaperdas, S. 1992. "Cooperation, Conflict, and Power in the Absence of Property Rights," *American Economic Review*, 82, 720-739.
- Small, M., and J. D. Singer. 1982. *Resort to Arms: International and Civil War, 1816-1980*. Beverly Hills: Sage.
- The Stockholm International Peace Research Institute. 2002. *Yearbook of World Armaments and Disarmaments*. Oxford: Oxford University Press.

Annex: History of Civil War in Africa

Country	Start of the War	End of the War
Algeria *	11/54	12/62
Algeria	05/91	Ongoing
Angola *	02/61	11/75
Angola	11/75	05/91
Angola	09/92	02/02
Burundi	04/72	12/73
Burundi	08/88	08/88
Burundi	11/91	Ongoing
Chad	03/80	08/88
Congo	97	10/97
Ethiopia	07/74	05/91
Guinea-Bissau *	12/62	12/74
Ivory Coast	09/02	Ongoing
Liberia	12/89	11/91
Liberia	10/92	11/96
Morocco	10/75	11/89
Mozambique *	10/64	11/75
Mozambique	07/76	10/92
Nigeria	01/66	01/70
Nigeria	12/80	08/84
Rwanda	11/63	02/64
Rwanda	10/90	07/94
Sierra Leone	03/91	11/96
Sierra Leone	05/97	07/99
Sudan	10/63	02/72
Sudan	07/83	Ongoing
Uganda	05/66	06/66
Uganda	10/80	04/88
Zaire/Dem. Rep. of Congo	07/60	09/65
Zaire/Dem. Rep. of Congo	09/91	12/96
Zaire/Dem. Rep. of Congo	09/97	09/99
Zimbabwe *	12/72	12/79

Note: * indicates anti colonial struggle for independence.

Source: Adapted from Collier and Hoeffler (2003).