

Ethnic conflict, Institutions and the tragedy of the commons: when human diversity hinders economic growth.

Empirical evidence from a sample of African countries.

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Introduction

This last decade has witnessed all over the world confrontations of different ethnic groups in diverse countries, particularly in the developing world. The most apparent form of ethnic conflict has been the genocide, defined as statesponsored extermination of a racial community. Since 1990, this has happened in the Central African Great Lakes region between Hutus and Tutsi groups who struggle for power in Burundi and Rwanda; meantime, Banyamulenge or the Tutsi population of D.R.Congo has been reported as a mistreated ethnic minority. Recently in Western Africa, Ivory Coast and Nigeria have also experienced clashes opposing Christians to Muslims respectively over the Ivoirian citizenship and the introduction of the Islamic sharia law.

These events shed light on how multi-ethnic societies are subject to “the tragedy of the commons” as each ethnic group seeks to benefit alone from common resources. In other words, a rent-seeking competition takes place between ethnic groups for the economy’s natural resources which are easily “lootable”. In many countries, ethnic membership influences one’s political affiliation and social class.

Inspired from the economics and politics literature on ethnic conflict, the purpose of our paper is to analyze the effect of ethnic conflict on economic growth. In our econometric approach, we develop a simple growth’s model with 4 ethnic variables and institutional regressors- a democratic and a rule of law index-, along with 2 production factors, capital and labor.

Our results suggest that language rather than ethnic minorities or religion fragmentation explains ethnic disputes. Moreover, population growth and tongues’ diversity adversely affect economic growth, while private investment and rule of law foster wealth accumulation. Public investment has had no significant effect on growth. We also find that developing rights which state clearly rules applicable to all substantially reduce ethnic competition and at least mitigate the pervasive effects of ethnic diversity.

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Ethnic conflict and economic growth.

Human diversity and the tragedy of the commons

Multi-ethnic societies experience the tragedy of the commons, that is, ethnic groups form alliances to control country' riches because of the high cost of assimilating into the dominant group. Conversely, in ethnically homogeneous nations, alliances for power are often based on adherence to ideas or principles. And so, adherents of a losing party can turn on their allies to join the winners at low expense; the ease of infiltration explains why it is not optimal for the stronger alliance to initiate a dispute in these later communities.

Ethnic group membership can be based on various features unique to a group, such as ancestry, customs, homeland, language, religion, race.

The economy's wealth influences the probability of occurrence of the ethnic conflict. The 1990's coincide with the dramatic economic downturn in D.R.Congo, with an inflation running over 10,000 %. This situation favored an "ethnic hunt" in the province of Katanga, known as the economic lungs of D.R.Congo thanks to its mining industry. From 1993 to 1994, the governor of that province initiated hunting against Kasai people immigrants- who have been living there for more than 200 years. In fact, immigrants from that neighboring province occupied major positions and were wealthier than the natives. This led to hundreds of murders and thousands of expulsions, inducing a shortage of skilled workers and a shrinkage of the mining industry's production¹.

The ethnic conflict in Katanga can be viewed as a response to a perceived threat by the immigrants from Kasai (the stronger group) to exclude the autochthons of Katanga (the weaker group) from access to the province riches.

In this case, one can invoke different culturally approaches to resource use and management as another potential cause of conflict, since they lead to different practices that are not necessary compatibles when applied upon the current social context of Katanga.

Comparing Rwanda with its colonizer, Belgium, we can see that prosperity serves to the cohesion of the later country, while low economic prospects set the condition for the ethnic war in the Rwandan case: both countries are dominated by two groups of population. In the one hand, Belgium with the Flemish and the French (Wallons) communities and in the other, Rwanda with Tutsis and Hutus.

In Rwanda, the economic decline sets the pre-condition for ethnic cleansing between Hutus and Tutsis

¹ The production of copper slumped from 442,000 tons to 33,000 tons between 1989 – 1995.

The opposite logic was taking place in South Africa. Even though white people constituted a minority, they were wealthier and better armed, so that they could put the Apartheid in place to exploit the country's mineral resources.

The increasing cost of excluding blacks outweighed the advantages from maintaining the Apartheid, as the economy grew and diversified over time.

Our previous examples show that a negative economic growth influences the probability of the occurrence of ethnic tension, which also affects the level aggregate output (in a vicious circle); and conversely, economic prosperity reduces incentives for ethnic disputes.

In order to quantify the relationship between the 2 phenomena, we develop a basic model of growth in which we introduce ethnic variables.

The model specification.

In our econometric analysis, we want to see the effect of ethnic conflict on economic growth. Therefore, we develop a simple model of growth in which we introduce ethnic variables.

In the subsequent section, we proceed to the estimations of our model.

Consider a Cobb-Douglas production function, given by the following equation:

$$(1) \quad Y = A K^\beta L^{1-\beta},$$

where Y represents aggregate output, (K, L) are the 2 factors of production: K is the stock of physical capital, L the labor. A encompasses technological progress and improvements in the quality of labor induced by a better education, while β is a production function parameter.

We can obtain a log-linear version of (1) by introducing natural logarithms in both sides of the equation to account for growth:

$$(2) \quad \ln Y = \ln (A K^\beta L^{1-\beta}), \Rightarrow \ln Y = \ln A + \beta \ln K + (1-\beta) \ln L.$$

Since $\ln X \approx \Delta X/X$, (2) can be written as

$$(3) \quad \Delta Y/Y = (\Delta A/A) + \beta (\Delta K/K) + (1-\beta)(\Delta L/L).$$

From equation (3), we divide output growth into changes in the factors of production, in one side, and changes not attributed to factors of production. The latter changes in output growth result from factors such as : the level of school attainment, political regime (authoritarian, democracy, or mixed), socio-ethnic division, the state of the legal system (enforcement of property rights and the respect of the rule of law), and technology's improvements.

We can develop further equation (3) by breaking down the term $\Delta K/K$ - which is the total investment in the economy- into public and private investments:

$$(3') \quad \Delta Y/Y = (\Delta A/A) + \beta_1 (\Delta K/K)_{\text{private}} + \beta_2 (\Delta K/K)_{\text{public}} + (1-\beta)(\Delta L/L).$$

To see the effect of ethnic diversity on economic growth, we split the term $(\Delta A/A)$ into 4 variables; we obtain:

$$(3'') \quad (\Delta A/A) = \alpha \text{ Education} + \lambda \text{ ETHNIC} + \gamma \text{ DEMOCRACY} + \rho \text{ RULELAW}$$

Putting (3'') into (3') gives (3''')

$$(3''') \quad \Delta Y/Y = \alpha \text{ Education} + \lambda \text{ ETHNIC} + \gamma \text{ DEMOCRACY} + \rho \text{ RULELAW} + \beta_1 \text{ INV}_{\text{private}} + \beta_2 \text{ INV}_{\text{public}} + (1-\beta)(\Delta L/L).$$

Sample, Data sources and empirical results

Our sample consists of 47 African countries, which are: Algeria, Angola, Benin, Burkina Faso, Burundi, Cameroon, Central African Republic, Chad, Cote D'Ivoire, Congo, Djibouti, D.R.Congo, Egypt, Eritrea, Ethiopia, Gabon, Gambia, Ghana, Guinea, The Guinea-Bissau, Kenya, Lesotho, Liberia, Libya, Madagascar, Malawi, Mali, Mauritania, Mauritius, Morocco, Mozambique, Namibia, Niger, Nigeria, Rwanda, Senegal, Sierra Leone, Somalia, South Africa, Sudan, Swaziland, Togo, Tunisia, Tanzania, Uganda, Zambia, Zimbabwe.

The variables used in our regressions are:

- **DEMOC**: measure of democracy (Gastil's Political Rights), source: Easterly and Levine (1997);
- **ELF60**: Index of ethnolinguistic fractionalization, 1960 measures probability that two randomly selected people from a given country will not belong to the same ethnolinguistic group. Source: Easterly and Levine (1997);
- **GDPgrowth 62-99**: Average GDP Growth for 1960-1999 period computed from annual data on GDP per capita growth; source IMF: Global Development Finance & World Development Indicators, IMF;
- **GUNN1**: Percent of population not speaking the official language. Source: Easterly and Levine (1997);
- **INV_{private} 70-98**: Average Private investment (% of GDP) for 1970-1998 period, computed from time series on Private investment (% of GDP) used by Guy P. Pfeffermann, Gregory V. Kisunko, and Mariusz A. Sumlinski, "Trends in Private Investment in Developing Countries: Statistics for 1970-97";

- **INV_{public} 70-98**: Average Public investment (% of GDP) for 1970-1998 period, computed from time series data on Public investment (% of GDP); source: Easterly, Rodriguez, and Schmidt-Hebbel "Public Sector Deficits and Macroeconomic Performance." Statistical appendix 1994 and Bruno and Easterly JME 1998;
- **LSCHOOL**: "Log of Schooling": Log of 1 + average years of school attainment for 1980-85. Source: Easterly and Levine (1997);
- **POPgrowth 60-99**: Average Population growth (annual %) for 1960-1999 period, computed from annual series on Population growth (annual %); source: Global Development Finance & World Development Indicators, IMF;
- **PROP90**: Proportion of population belonging to minorities at risk in 1990 (Gurr, 1993). Source: Easterly and Levine (1997) ²;
- **RELG**: Josef S. Baer's index of religious fragmentation, measures probability that two randomly selected people from a given country will not belong to the same religious group. Source: Ankar, Carsten & Eriksson, Marten (1998) ;
- **RULELAW**: law and order tradition (Kaufmann, Kraay, and Zoido-Lobaton (1999)), source: Dollar D. and A. Kray (2000), " Property rights, Political rights and the development of poor countries in the post colonial period".

We estimate equation (3'') by:

$$\begin{aligned}
 \text{GDPgrowth 62-99} = & \alpha \text{LSCHOOL} + \lambda_1 \text{ELF60} + \lambda_2 \text{GUNN1} + \lambda_3 \\
 & \text{PROP90} + \lambda_4 \text{RELG} + \gamma \text{DEMOC} + \rho \text{RULELAW} + \beta_1 \text{INV}_{\text{private}} \text{70-98} + \\
 & \beta_2 \text{INV}_{\text{public}} \text{70-98} + \gamma \text{POP growth 60-99} + \xi .
 \end{aligned}$$

The table I below gives the values of the parameters obtained by applying OLS estimation:

² The data from Easterly and Levine has been used in the paper: "Africa's Growth Tragedy: Policies and Ethnic Divisions".

Table I

The dependant variable: GDPgrowth , $R^2 = 0.4856$, adj. $R^2 = 0.3427$						
	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
DEMOC	.0372534	.1538491	0.242	0.810	-.274767	.3492738
ELF60	3.153813	1.464584	2.153	0.038	.1834986	6.124128
GUNN1	-2.672034	.9152293	-2.920	0.006	-4.528205	-.8158631
INV_{private} 70-98	.1320354	.0415543	3.177	0.003	.0477594	.2163114
INV_{public} 70-98	.0381069	.0613571	0.621	0.538	-.0863311	.162545
LSCHOOL	-.4151156	.5906095	-0.703	0.487	-1.612927	.7826959
POPGROWTH	-.5405948	.3907212	-1.384	0.175	-1.333014	.2518246
PROP90	-.5470342	.9461932	-0.578	0.567	-2.466003	1.371935
RELG	.8671219	.9340149	0.928	0.359	-1.027148	2.761392
RULELAW	.8173199	.3472859	2.353	0.024	.1129915	1.521648
CONSTANT	3.359899	2.024968	1.659	0.106	-.7469268	7.466725

Firstly, let us examine the behavior of production factors.

POPGROWTH has a negative but insignificant effect on economic growth: as African economies create very low riches, an increasing population tends to reduce sharply income per capita, and so doing, raises concern about wealth redistribution among citizens. Therefore, there is a room for ethnic mobilization against the “others”.

One has to recall that in the case of Rwanda, the country was experiencing demographic pressures before the genocide took place. That is, excess population pressure on the land created a risk of famine, and so doing, a land competition between Hutus and Tutsis.

Moreover, the age structure of African populations dominated by young people, whose important proportions are illiterate and unemployed, is a source of concern.

As they can't find economic opportunities, most of those young are tempted by juvenile delinquency, and are the target of ethnic leaders who attract them with simplistic solutions to fulfill their high ideals.

The fact that **INV_{public} 70-98** is not conducive to growth in African countries can be perceived as an indirect consequence of ethnic diversity on public policy choices. In an ethnically diverse environment, the heterogeneity of preferences tends to reduce the amount and affects the nature of public investment, since people are willing to pay fewer taxes to fund public projects.

This situation favors not only growth-reducing macroeconomic policies, but also rent-seeking competition, since one representative has to give bribes to obtain the favor of multi-ethnic voters. All this lead to “white elephants” through out the continent.

A well-conceived public invesment in infrastructures such as roads, will foster growth along with socio-economic integration at the national level, by providing access to markets of goods lacking in ethnic groups' territories.

Indeed, the more ethnic groups trade with one another, the less the incentives for ethnic disputes since everyone is to lose from the economic system's breakdown.

Furthermore, policies aimed at economic diversification would reduce incentives for "loot-seeking" rebellions to control natural resources- which is the main cause of wars throughout Africa.

Private investment leads to a slight but statistically strong increase in growth.

Despite the small size of the private sector in Africa and the overwhelming share of the public sector in the economy, our coefficients show that $INV_{private}$ 70-98 has over threefold effect on growth than INV_{public} 70-98.

This underlines the fact that the private sector is always the motor of economic growth; therefore, public authorities have to create incentives for the private sector by removing financial repression mechanisms, while guaranteeing the respect of property rights.

We unfortunately notice the current lack of economic opportunities outside the political system so that controlling the country's riches – even by using violence- becomes all-important.

LSCHOOL seems to dampen wealth accumulation; the reasons behind is the mistreatment of intellectuals in most African countries. Indeed, many presidents consider intellectuals as a threat to their power.

To remain in office, African leaders usually promote the less qualified chosen among their ethnic fellows to execute their will- after they are told to of serve a "patriotic cause". Furthermore, politicians have succeeded to have intellectuals in their pay. The example of D.R.Congo underlines the importance of political clientelism: after starving professors by paying them very low salaries, worth some dozens of US dollars, politicians often proposed them political positions to bear the responsibility of socio-economic downfalls. Moreover, universities across the country have been frequently closed, because they were perceived as centres of protest³.

Bearing this in mind, it is no longer surprising why educational attainment has not been conducive to growth in Africa when economic policies are implemented in such ways.

We believe that education campaigns aimed at fighting illiteracy are essential to remove misconceptions among the youth about the benefits of engaging in armed conflict; furthermore, improving school attainment with better job opportunities will rise the opportunity cost of rebel labor.

PROP90 has a negative but insignificant effect on economic growth.

³ In the 1970s, president Mobutu ordered a compulsory enrollment of universities' students into the national army, as a way to silence their claims and contestations. During may 11th and 12th 1990 occurred on the campus of university of Lubumbashi a sponsored killing of students, some few days after the democratic process started.

As most of ethnic groups in Africa are found in many bordering countries, one could expect a military support across national borders from an ethnic group in power in a given country to their disadvantaged kin living in another country. This leads to a probable armed conflict between states involved. Therefore, ethnic linkage could explain the potential spillover effect of ethnic war within a given state to a whole region, worsening its economic prospects.

At first glance, this seems to have been at work in the Central African Great Lakes region., as the Tutsi regime in Rwanda supported the Banyamulenge- Tutsi living in Mulenge's mountains in the Congo- and provides military support to their rebellion against the central government.

However, this is far to be the rule of thumb: the presence of minorities at risk is not the primary driving force behind conflict behavior between states in Africa.

Our belief is that states make incursions in others countries as security measures against their rebels hosted in those neighboring countries- with which there is not necessarily ethnic linkages⁴.

For instance, Mobutu's regime was perceived as a threat to the political stability of Central Africa, since he supported rebellions against his neighbors. Therefore, the military support given to Mobutu's enemies by bordering had for intention Mobutu's eviction⁵.

But, as the allies found riches they could grab for themselves, they use the artefact of Banyamulenge and supported rebellions against Kabila's regime to remain in the D.R.Congo.

This has been recognized as the very cause of the tragedy of the Congolese commons⁶.

Nevertheless, our point is not to deny the role of ethnic minorities in escalating conflict at the national level, as the conventionnal wisdom suggests. We cite hereafter two cases, D.R.Congo and Ivory Coast, where the central power denies certain minorities the right of citizenship and protection from the government.

After long peaceful living in ex-Zaire where they arrived some 200 years ago, Banyamulenge or the Congolese took up arms to overthrow Mobutu, after an ultimatum was given to force them to leave the country, as they were eagerly opposed to his regime.

⁴ Namibia and Zimbabwe made some incursions in Tanzania to search for their rebels trained by mercenaries; after gaining power in Rwanda in 1994, new regime in Kigali continued to fight authors of the 1994 genocide (Interhamwe milice and ex-FAR) who were attacking from the neighboring Congo.

⁵ Davis and Moore (1998) claim that "... several African states harbored no particular love for Mobutu (especially Angola and Uganda)".

⁶ See UN plunder report of D.R.C natural resources : "Report of the Panel of Experts on the Illegal Exploitation of Natural Resources of the DRC" (October 16, 2002). However, an alternative explanation advanced is the attempt to create a Tutsiland by uniting all lands where Tutsi live; Somalia tried the same thing by the end of 1970s when it invaded the Ethiopian region of Ogaden.

After the 1994 genocide in Rwanda, the flow of refugees in the Congo, belonging to a national Tutsi movement, provided them the military support. But Banyamulenge had a different goal from their allies: the former engaged military conflict to defend their rights, while the latter are suspected to establish a Tutsi dominion in Burundi, D.R.Congo, Uganda and Rwanda.

Ivory Coast has fallen in a wave of crimes and xenophobia after 2000's presidential elections that Laurent Gbagbo in the highest office in the country, when military forces began screening civilians according to their religion and national origin.

This rooted back to 1995, when president Henri Konan Bédié first raised the issue of "Ivoirité" to distinguish descendants of immigrants- who add up to one-quarter of the population- from the autochthonous.

After taking power, General Guei passed a constitutional amendment in 1999, requiring any potential candidate to the presidential elections to have both parents born in Ivory Coast. This subterfuge reduced competition for elections as fourteen of the nineteen candidates were disqualified, including Alasane Ouattara, the chief of the strongest opposition party, the Rassemblement des Republicains, whose main party voters came from the Muslim north occupied by descendants of immigrants.

From these examples, we can draw 2 interesting lessons that may account for the poor performance of **PROP90** :

- political leaders can manipulate ethnic identities to secure an electorate. In other words, ethnic disputes are not spontaneous but require mobilization.
- In a multicultural society, people can bear more than one identity, and choose the appropriate one according to opportunities⁷.

We then turn to the impact of religion on growth. Our finding suggest that religious fragmentation has a slight positive and insignificant effect on growth.

This opposes the belief of some scholars that religious fragmented societies experience more intense conflict than states where groups compete for country's riches according to their linguistic features, assuming that religious membership is fixed and non-negotiable.

The explanation we can invoke to explain the positive coefficient of **RELG** lies behind the basic teachings of most religions which profess "tolerance of the difference" and then ethnic disputes that seem religious at first glance have for very reasons local and national struggles over power and riches.

Quite surprising, an increase of 1% in **ELF60** - the probability in 1960 of two randomly chosen people to belong to different ethnolinguistic groups induces a 3.15 % increase in the rate of growth, at level of confidence of 5 %.

⁷ The case of south Africa shows how this worked in the opposite direction: the 1993 Nobel Peace Price laureates, N. Mandela and F.W. de Clerk mobilize their people to reduce ethnic tensions, in a period of increasing economic opportunities, resulting from a growing diversified economy.

Indeed, as most of African countries were granted their independence in the 1960's, their ethnic diversity made impossible for major single ethnic groups to gain elections while relying on their own members.

If power was to be earned by transparent elections, it would imply cooperation among them with mutual tolerance, and the establishment of the rule of law so that no group might be hurt.

Elbadawi Ibrahim and Nicholas Sambanis (2000) conclude that Africa's ethno-linguistic fragmentation, *"in fact helps -it does not impede- the emergence of stable development as it necessitates inter-group bargaining processes. These processes can be peaceful if ethnic groups feel adequately represented by their national political institutions and if the economy provides opportunity for productive activity"*.

The challenge here is unity in diversity: that is, a process of integration- not assimilation- where ethnolinguistic groups negotiate power-sharing, privileges and resources to ensure their survival, without threatening the unity of the state. A balanced federalism could achieve that goal: giving more responsibility to regions would reduce ethnic competition of state control, and thus rent-seeking behavior.

Furthermore, imposing rules that require political parties to meet minimum membership requirements across the country to obtain credentials might favor ethnic cooperation.

Unfortunately, all African countries virtually chose authoritarian regimes. Many scholars acknowledge the pervasive role of colonial heritage- that we have not accounted for in our regressions- in laying the basis for ethnic disputes and authoritarianism.

Most of the empirical studies account for colonial heritage by constructing dummies. We decide not to follow this practice since a same colonial authority could have applied different policies that would have led to different outcomes.

Klugman J., B. Neyapti and F. Stewart (1999) shed light on differences of the British rule in Kenya, Tanzania and Uganda.

It must none the less be pointed out that in a multi-ethnic context, speaking the same language could be the cement of the national identity.

We suspect that inability of fraction of a population to speak the official language impedes cooperation among ethnic groups, and thus economic growth.

Indeed, **GUNNI** appears to have the strongest negative effect on economic growth, compared to our previous ethnic conflict indexes.

In Tanzania, the use of Swahili as a common language to 120 tribes has prevented the domination of particular group neither in the economy nor in state affairs; moreover, it dampens the distinction introduced by the use of English between the Tanzanian elite and the rest of society.

We can find something strange about this when looking at either Burundi or Rwanda: although in both countries people speak the same language, respectively Kinyarwanda and Kirundi, they have recently experienced the most severe ethnic disputes.

The reason is the high degree of polarization among ethnic groups: Hutus account for respectively 80 %, 86% of population in Burundi and Rwanda, while Tutsi

constitutes the minority in both countries. Therefore, the dominant group tends to lay down the law.

Once again, we have to account for the explosive colonial heritage that created a spiral of hatred: Belgians favored the Tutsi minority at the expense of the majority Hutu. Then, at independence, Hutu took their revenge against Tutsi, who thereafter organized themselves for their survival.

However, language can play an important role in generating conflict, since it is more perceptible than religion or any other ethnic feature.

An interesting tale in this regard is the “tower of Babel” from Genesis chapter 11, the first book of the Bible, which attributes the division of nations not neither to skin color nor to religion but to the “confusion of tongues”, that is, the inability of people to understand one another. As a result, men could no longer live together. Instead, they had to divide themselves into linguistic lines.

Our interest in that tale comes from the fact that the previous unified people could no longer join their effort together to build the tower as long as they could not assure communication. Therefore, it is important to “speak the same language”.

This issue is not specific to African countries; the United States welcomes immigrants from all over the world, attracted by economic opportunities. Despite their native languages, all of them such as Chinese, Hispanics have to learn English to improve their chance to live their “American dream”.

But which language is to be chosen to ensure communication in a multicultural society? Many countries had chosen their colonial language along with some local tongues; this policy could have mitigated human diversity if accompanied by education of masses.

So what can be done to mitigate the pervasive effects of human diversity? The literature suggests to basic institutional arrangements: democracy and rule of law.

As expected, our variable capturing democracy, **DEMOC**, has a positive effect on growth but proves not to be an efficient institutional design for mitigating ethnic conflict.

The case of Ivory Coast raised earlier shows how a dominant group can use the legal and the electoral system to implement ethnic discrimination and to give a room for ethnic antagonisms and persecution of minorities.

Despite the trend of African countries to become democracies, only very few have experienced fundamental changes because that they had been required to by their western donors as a conditionality prior to receive foreign aid.

However, they always find subterfuges to extend the process of political transition, by delaying elections that might bring new administrations in office. At the same time, political parties are denied the right of assembly and free speech; many NGOs reported violations of freedom such as arbitrary detentions.

This suggests that it is the change in civil, political and socio-economic rights rather than democratization that can overcome the negative implications of multi-ethnic societies; a the most difficult step that many countries have not been yet able to achieve. Indeed, **RULELAW** has a small but positive effect on growth.

Institutional reforms such as clear property rights, same rules of law for all, abolition of state economic repressions, freedom from expropriation are many effective measures that help everyone to find his place within one society.

To ensure everybody participation, legal protection and promotion of minorities in fields where they are under-represented are essential.

Certain studies conclude that ethnic diversity has insignificant effect on public policies and economic growth, once a threshold level of institutional development is achieved. Furthermore, a decentralized political system with decision-making processes at the local and national levels enable different members of a society to resolve conflicts peacefully, and makes violence unnecessary to bring change.

The emergence of ethno-nationalism throughout the world suggests the ineluctability of the rights of self-determination to peoples to ensure regional stability and peace; a lesson the warring parties in Central African Great Lakes region has to understand, instead of their attempt to reinvent the wheel.

Much is to be done to strengthen the role of regional and international institutions to solve ethnic conflicts.

Concluding remarks.

This empirical study examines determinants of growth for a sample of African countries and sheds light on the role of ethnic conflict.

We find that public investment and school attainment have not been conducive to economic prosperity.

Our explanations are as follow: ethnic diversity hampers agreements on the scope and the nature of public investments, in the one hand; in the other, the exploitation of ethnic divisions to secure political power in Africa prevents the efficient use of human capital, but instead, favors the less qualified chosen among ethnic kins.

As expected, private investment fosters growth and stability, since individuals have much to lose from ethnic disputes and then would favor peace.

Neither ethnic minorities nor religious fragmentation fail to be a strong cause of low growth in Africa, since it is subject to manipulation from leaders.

Instead, the lack of a common language proves to be the main impediment to growth; it is clear that linguistic assimilation lowers social fractionalization by allowing cultural integration.

The “Tower of Babel” shows how linguistic fractionalization leads to divisions among men and impedes the pursuit of common goals.

Our results suggest that the 1960’s ethnolinguistic fractionalization could have favored growth, only if a federalism system that guarantees the respect of rules of laws and legal protection and promotion of minorities had been adopted. Indeed, the provision of minimum membership requirements across the state to national political parties for certification renders ethnic cooperation sine qua non.

Democracy does not affect growth, unless it is accompanied by deep changes; we notice many African countries had become democracies but violations of freedom such as arbitrary detentions, lack of free speech, prohibition for political parties to gather remain.

We propose below two avenues for further research:

- one is to investigate on the effect of economic integration on the probability of ethnic disputes, since an economic downturn induced by conflict would be harmful as long as individuals could not generate wealth without trading with one another;
- the other is to study the impact of groups’ distinctive features on the probability of disputes: groups are more likely to express themselves as ethnic entities the more pronounced are their differences from one another.

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Appendices I : F-Test of nullity of parameters

The Unrestricted Model (UM) is given by :

$$- \text{GDPgrowth 62-99} = \alpha \text{LSCHOOL} + \lambda_1 \text{ELF60} + \lambda_2 \text{GUNN1} + \lambda_3 \text{PROP90} + \lambda_4 \text{RELG} + \gamma \text{DEMOC} + \rho \text{RULELAW} + \beta_1 \text{INV}_{\text{private}} \text{70-98} + \beta_2 \text{INV}_{\text{public}} \text{70-98} + \gamma \text{POP growth 60-99} + \xi .$$

Whose results are contained in Table I.

The null hypothesis is : $HO: \alpha = \lambda_3 = \lambda_4 = \gamma = \beta_2 = 0$.

The Restricted Model (RM):

$$- \text{GDPgrowth 62-99} = \lambda_1 \text{ELF60} + \lambda_2 \text{GUNN1} + \rho \text{RULELAW} + \beta_1 \text{INV}_{\text{private}} \text{70-98} + \mu ,$$

Whose results are contained in Table II below.

The dependant variable: GDPgrowth , $R^2 = 0.4096$, adj. $R^2 = 0.3534$					
	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]
ELF60	2.333759	1.324925	1.761	0.085	-.3400485 5.007566
GUNN1	-2.189337	.8250285	-2.654	0.011	-3.854312 -5243625
INV_{private} 70-98	.1364231	.0379706	3.593	0.001	.0597953 .213051
RULELAW	.7323032	.2943914	2.488	0.017	.1381973 1.326409
Constant	2.361355	.6758963	3.494	0.001	.9973414 3.725369

We can compute the F_{observed} :

$$[(R_{\text{UM}}^2 - R_{\text{RM}}^2) / q] / [(1 - R_{\text{UM}}^2) / (n - k)] \sim F(q, n - k)$$

$$[(0.4856 - 0.4096) / 5] / [(1 - 0.4856) / (57 - 10)] \sim F(5, 47)$$

$$1.382 < 2.45 \Rightarrow \text{we do not reject } HO.$$

Therefore, we conclude the Restricted Model explains better **GDPgrowth**.

Appendices II. Data set

	PopGrowth	INV_{public} 70-98	INV_{private} 70-98	LSCHOOL	PROP90	GUNNI	ELF60	DEMOC	RULELAW	RELG
3.862	2.6525	10.972	25.2596	1.054311991	0.21	0.153846154	0.430000007	6	-1.1	0.0179
1.658	2.3950	8.692	7.179311	0.500775278	0.47	1	0.779999971	7	-1.23	
3.259	2.7900	10.366	2.3504		1.01	0	0.620000005	7	-0.42	0.5649
3.487	2.2100	8.868	12.4256	1.015230656	0.69	1	0.680000007	6	-0.35	0.5808
2.618	2.0950	8.268	4.4276	0.593326867	1	1	0.039999999	7	-0.88	0.5106
3.474	2.5950	7.644	2.824		1	0.7	0.889999986	6	-1.02	0.7342
1.523	2.1300	5.53	8.494	1.007957935	0.55	1	0.689999998	7	0.6062	0.6062
1.918	2.2725	9.549	20.9968	1.187843442	0.115	1	0.829999983	6	-0.83	0.6969
0.229	3.0025	7.742	9.806877		0.0134	1	0.899999976	6	-2.15	0.6803
4.328	2.7100	12.377	11.366897		0.085	0.017857143	0.660000026	7	-1.44	0.6114
4.649	3.4800	10.832					0.860000014	6	-0.33	
-2.143	5.2300					1		2		0.1146
5.521	2.2575						0.039999999	5	0.13	0.18
4.529	2.6425									
2.872	2.5900									
5.346	2.2875									
3.973	3.2300	6.519	24.2728	-0.53	0.681	0.660377358	0.689999998	7	0.27	0.6107
2.508	2.6525	12.686	8.131071	0.500775278		1	0.689999998	6	0.27	0.5241
4.169	2.1450	5.565	5.2108	1.217875719	0.57	1	0.730000019	2	-0.01	0.1818
2.434	1.9725	7.298	9.90556		0.76	1	0.709999979	2	-0.76	0.8167
4.797	3.2725	22.622	8.233571	0.23111172		1	0.75	7	-0.76	0.2748
5.495	2.2550	8.229	13.988621	1.235471487	0.416	1	0.829999983	6	-1.61	0.485
2.000	2.7525	7.831	23.2732	1.451613784		1	0.219999999	5	-1.22	0.8243
7.076	3.5675		12.664118	0.850150943	0.0285	1	0.829999983	5	-0.24	0.7049
1.538	2.6400	6.592	4.133793			0.069767442		6		0.5226
4.382	2.8475	10.418	10.624138	1.184790015	0.26	0	0.059999999	6	-0.82	0.0591
2.888	2.3475	5.622	10.5772	0.451075613	0.477	1	0.623655914	6	-0.41	0.6595
3.985	2.4575	13.159	12.665172		0.2	0.25	0.620000005	6	-0.41	0.7479
5.149	1.5025	7.41	17.760345	1.669591784		1	0.779999971	7	-0.47	0.8515
4.200	2.2875	10.651	12.394483		0.376	0.24	0.330000013	7	-0.56	0.1195
							0.579999983	2	1.28	0.6397
							0.529999971	4	0.68	0.0257

3.247	2.1475	17.308	0.620576501	1	0.649999976	7	-1.05	0.62
2.421	2.5600	9.353	9.720526	0.99	0.0765		0.95	0.6356
1.744	3.1675	5.72	8.198	1	0.76	7	-1.14	0.32
3.474	2.8350	8.844	10.9984	1	0.46	2	-1.1	0.6989
3.323	2.8400	7.137	6.1528	0	0.11	6		0.6614
2.533	2.7350	4.895	8.6732	1	0.08	4	-0.1	0.114
1.185	2.0175	4.861	4.485	1	0.409	5	-0.91	0.5767
2.513	3.0625			0	0.25	7		0.004
3.210	2.2725	9.443	13.281724	0.825	0.9941	5	-0.35	0.3894
3.362	2.4325	4.59	9.77	0.48	0.26	5	-1.35	0.4355
5.272	2.9025		1.391281843	0		5	0.06	0.722
3.382	2.9950	8.285	14.1	0.925925926	0.930000007	6	0.16	0.7755
4.051	2.7950	10.196	11.946	1	0.362	7	-0.8	0.46
5.308	2.0625	13.417	13.585862	0		6	0.65	0.0119
5.294	3.0475	3.763	6.4868	1	0.528	5	-0.01	0.6673
1.869	2.9300	14.871	6.406	1	0.63	5	-0.4	0.7346
4.174	2.9250	6.519	12.0892	0.990909091	0.235	3	-0.15	0.6736
			1.220829964	0.540000021				