Economia i conflicte
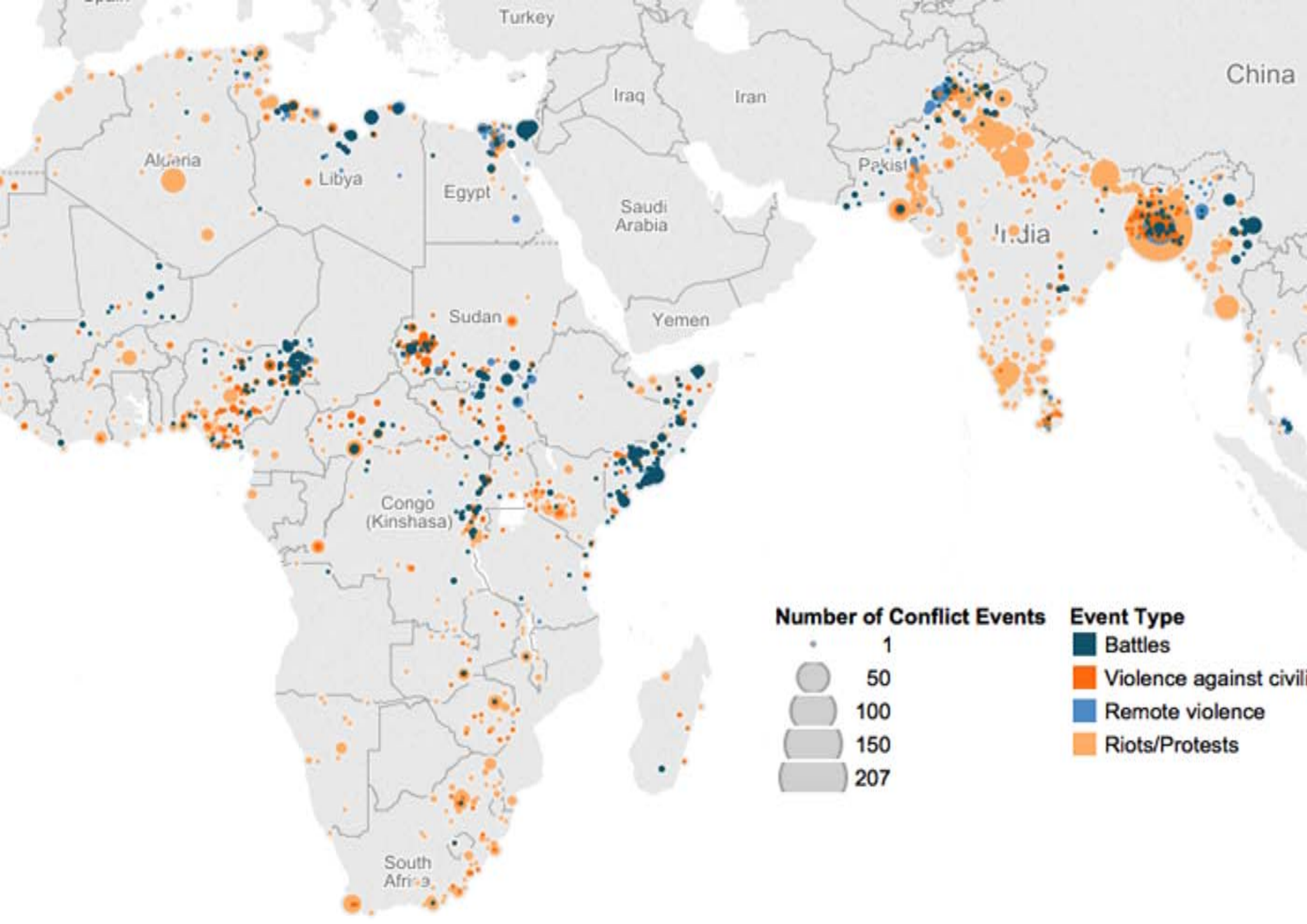
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Bojos per l'Economia

Barcelona, 4 Març 2017

	Number of Conflict Events	Event Type
·	1	■ Battles
●	50	■ Violence against civili
●	100	■ Remote violence
●	150	■ Riots/Protests
●	207	

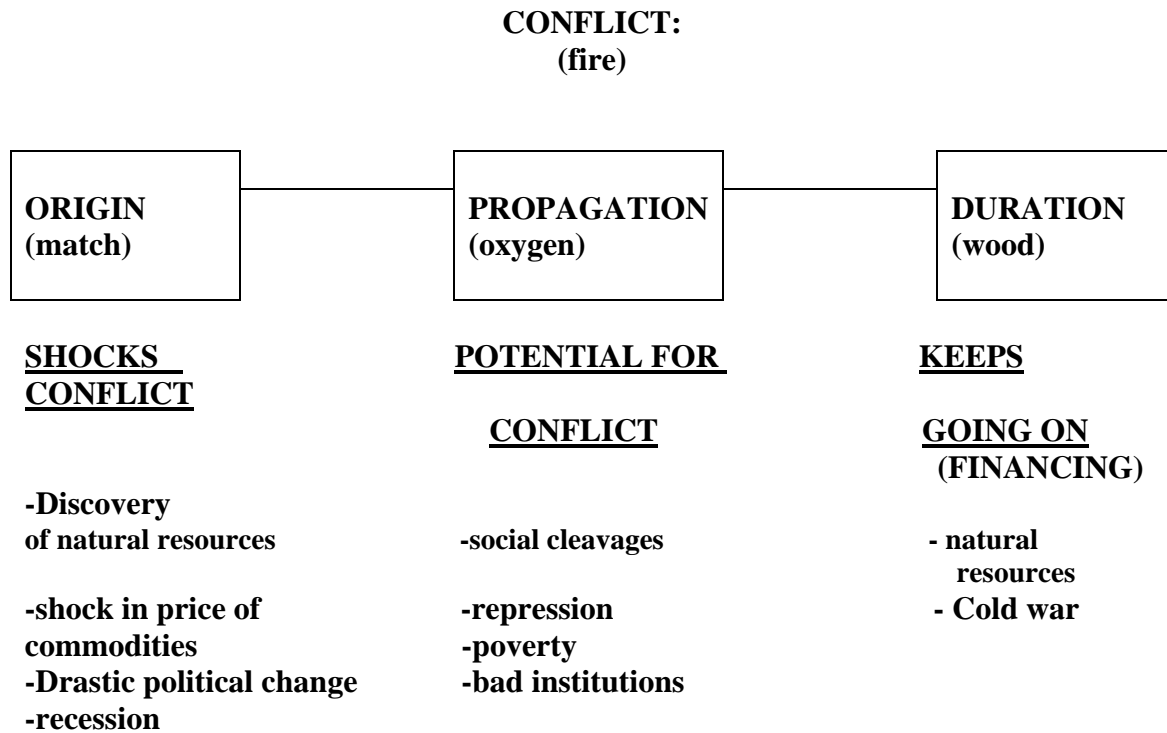# 1) **Introduction to the empirical analysis of civil wars.**

We can create an analogy with the analysis of macroeconomic cycles.

Researchers in that field distinguish between shocks and its propagation mechanism as two different and independently interesting issues.

For instance, a cycle could be caused by a productivity shock that it is propagated through many alternative mechanisms.

In the case of civil wars the situation is similar although the identification is more difficult.

1.a) *A crucial issue in this topic to understand the process of conflict.*

CONFLICT:
(fire)

ORIGIN (match)	PROPAGATION (oxygen)	DURATION (wood)

<u>SHOCKS</u>   <u>POTENTIAL FOR</u>   <u>KEEPS</u>
<u>CONFLICT</u>
                                        <u>CONFLICT</u>   <u>GOING ON</u>
                                                                (FINANCING)

-Discovery
of natural resources   -social cleavages   - natural
                                                                  resources
-shock in price of   -repression   - Cold war
commodities   -poverty
-Drastic political change   -bad institutions
-recession

In order for a conflict to exist, we need not only an origin that brings conflict about, but also a propagation mechanism that allows conflict to exist and propagate.

Therefore, given the process of conflict (shocks, propagation mechanism and financing), there are three types of policies that could be applied in order to reduce the probability of conflict:

The policies that try to avoid shocks, for example diversification policies;

The policies that try to reduce the propagation mechanism, like institutions that try to reduce the intensity of social cleavages;

The policies that try to cut the source of financing, like the Kimberly process.

Since onset of conflict is usually produced by unexpected shocks, trying to find measures to prevent them is an impossible task, given the unexpected characteristics of shocks.

While diversification can protect countries against shocks concerning the price of some products, it is not possible to predict and avoid unexpected shocks like for example 9/11.

Also, policies that address the financing are policies with a very short-term effect, because rebel groups look for other alternative sources of financing.

Some of this evidence is explained in the work of Michael Ross who describes this phenomenon very well with an example of Angola (Pag.20):

"Before the end of the Cold War, successful rebel groups in the developing world were typically financed by one of the great powers. Since the Cold War ended, insurgent groups have been forced to find other ways to bankroll themselves; many have turned to the natural resources sector" Keen 1998

"In Angola, for example, UNITA (National Union for the Total Independence of Angola) was backed by the United States and South Africa for most of the 1970s and 1980s. But the end of the Cold War, and the end of the apartheid in South Africa, left UNITA with no outside sponsors; as a consequence, it began to rely much more heavily on diamond revenue to support itself" (Le Billon 2001).

This is indicative that policies that try to avoid conflict by cutting the sources of financing are policies with a short-term effect.

Therefore if we want to find measures to prevent conflict in the long run, we need to look for policies that address the propagation mechanism for conflict.

1.b) *What do we mean by Conflict?*

There are many phenomena that can be classified as conflict:

riots, demonstrations, …..coup d'état, political assassination, ….terrorist attacks……civil wars, genocide, mass killing

The literature on the causes of all these conflicts is very recent.

This is basically due to the lack of reliable data on conflict.

Recently there has been a huge effort in trying to have good data on civil war.

We will basically concentrate on the empirical studies that work with civil war data.

What is a civil war?

A traditional source for the data on civil wars is the Armed Conflict Dataset, a joint project between the Department of Peace and Conflict Studies, Uppsala University and the Center for the Study of Civil War at the International Peace Research Institute, Oslo (PRIO).

An armed conflict is defined as a contested incompatibility that 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.

Other thresholds: 1000 per year
                          1000 over the civil war

Importance of the threshold

2) Empirical analysis on the causes of Civil wars

"Greed and Grievance in Civil War" Collier and Hoeffler, Oxford Economic Papers (2004)

"Ethnicity, Insurgency and Civil War" Fearon and Laitin, American Political Science Review 2004.

In this paper they develop an econometric model, which tries to predict the probability of civil war

Any rebellion needs:

motive and opportunity

Political Science approach

Political science offers an account of conflict in terms of motive: rebellion occurs because of grievances.

Economic approach

The economic approach (Herschell Grossman 1991 AER, Jack Hirshleifer) models rebellion as an industry that generates profits from looting.

Such rebellions are motivated by greed.

The political science and the economic approaches to rebellion have assumed different motivations: greed versus grievances.

The authors test empirically both models.

2.a) *How to measure empirically opportunity:*

Opportunities for financing rebellion:

Natural resources (diamonds ..etc):
They proxy natural resources by the ration of primary commodity exports to GDP

Diasporas
They proxy the size of a country's diasporas by its emigrants living in the US.

Subventions from hostile governments:
The proxy for the willingness of foreign governments to finance military opposition to the incumbent governments is the Cold War.
During the Cold War each great power supported rebellions in countries allied to the opposing power.

Recruits must be paid.
Rebellions may occur when income is unusually low.
Proxies: Mean income per capita
Male secondary schooling
Growth rate of the economy

The opportunity of rebellion: the conflict-specific capital is cheap

They proxy this by the time since the most recent previous conflict. Because this captures the legacy of weapons stock, …

Another dimension of opportunity is a weak government military capability. They proxy this with the idea that some terrain may be favorable to rebels: forest and mountains
Percentage of terrain which is forest
Percentage of terrain which is mountain

A higher per capita income should be associated with a lower risk of civil war onset because
  a) it is a proxy for a state's overall financial, administrative, police and military capabilities, and
  b) it will mark more developed countries with terrain more "disciplined" by roads and rural society more penetrated by central administration.

There is another reason why a lower per capita income should favor the technology of insurgency:

 c) Recruiting young men to the life of a guerrilla is easier when the economic alternatives are worse.

It is difficult to find measures to distinguish among these three mechanisms associating a low per capita income and civil war onset.

2.b) *How to measure grievances:*

Ethnic or religious hatred: fractionalization measures

Political repression:
Measures of political democracy and civil liberties should be associated with the lower risks of civil war onset.

Economic inequality: Gini index
Greater income inequality should be associated with higher risks of civil war onset.

2.c) *From these two papers two ideas emerge:*

Poverty (per capita income) is the main cause of conflict

Ethnic diversity and democracy do not play any role

Problems:

1) The current consensus, which emerges from those analyses, is that poverty is the single, most important determinant of civil wars.
This result could be an artifact of simultaneity problems: the incidence of civil wars and poverty may be driven by the same determinants, some of which are probably missing in the typical econometric specifications

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2) This literature does not use the appropriate index to capture the potential for conflict. Theoretical models of conflict suggest that Polarization measure could be better proxies.

3) They do not address the endogeniety problems between institutions and civil wars

3) Revising the relationship between income and civil wars

Table 1: civil wars in OECD and non-OECD countries.

	OECD	Non-OECD
Civil wars	**2**	**92**
No-conflict	26	91
All countries	28	183
Major conflict	**2**	**53**
No-conflict	26	130
All countries	28	183

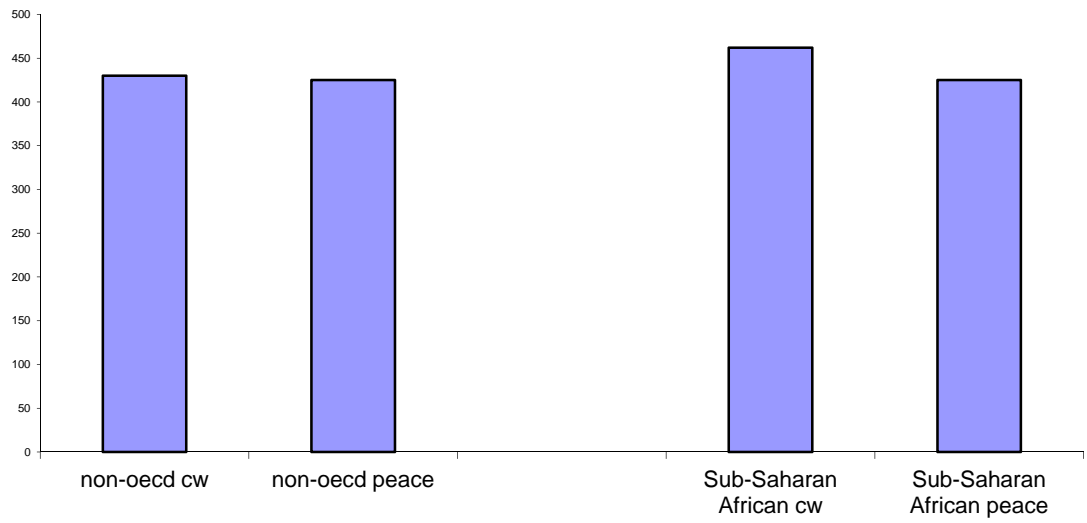**Table 2: Ranking of the 15 poorest and the 15 richest non-OECD countries in 1960.**

15 poorest	Conflict	15 richest	conflict
Ethiopia	**Major**	Bahamas, The	
Lesotho	Minor	Venezuela	Minor
Myanmar	**Major**	Bermuda	
Tanzania		Trinidad &Tobago	Minor
Togo	Minor	Argentina	**Major**
Malawi		Uruguay	Minor
Romania	Minor	Saudi Arabia	Minor
Burkina Faso	Minor	Israel	**Major**
Cape Verde		Iraq	**Major**
Congo, Dem. Rep.	**Major**	Puerto Rico	
Guinea-Bissau	**Major**	Iran	**Major**
Niger	Minor	Chile	Minor
Mali	Minor	Mauritius	
Botswana		Barbados	
Rwanda	**Major**	Hong-Kong	

Table 3: Ranking of the 15 poorest and the 15 richest Sub-Saharan African countries in 1960.

15 poorest	Conflict	15 richest	Conflict
Ethiopia	**Major**	Mauritius	
Lesotho	Minor	South Africa	**Major**
Tanzania		Namibia	
Togo	Minor	Gabon	Minor
Malawi		Algeria	**Major**
Burkina Faso	Minor	Seychelles	
Cape Verde		Swaziland	
Congo, Dem. Rep.	**Major**	Madagascar	Minor
Guinea-Bissau	**Major**	Mozambique	**Major**
Niger	Minor	Congo, Rep.	**Major**
Mali	Minor	Cote d'Ivoire	Minor
Botswana		Somalia	**Major**
Rwanda	**Major**	Tunisia	Minor
Comoros	Minor	Benin	
Guinea	Minor	Senegal	**Major**

average gdp60 among the 15 poorest countries

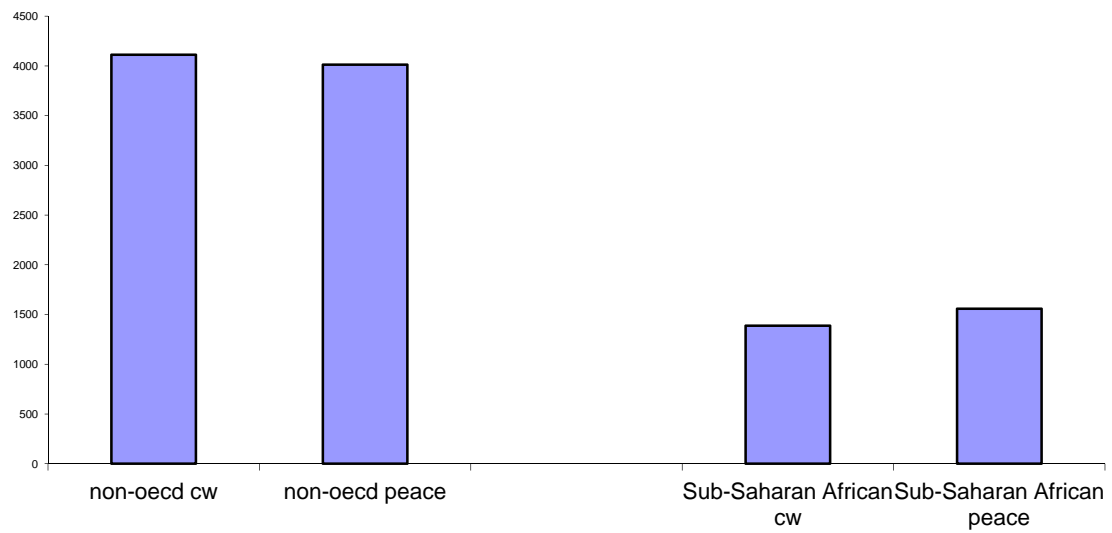## average gdp60 among the 15 richest countries

Table 4: Ranking of the 15 countries with the lowest quality of institutions and the 15 countries with the highest quality of institutions in 1984-99.

15 worst	Conflict 85-06	15 best	Conflict 85-06
Guinea-Bissau	**Major**	Unites States	**Major (Sept. 11)**
Congo, Dem. Rep.	**Major**	Canada	
Colombia	**Major**	Switzerland	
Liberia	**Major**	Norway	
Haiti	Minor	Australia	
Iraq	**Major**	Sweden	
Suriname	Minor	Luxemburg	
Bolivia	Minor	Denmark	
Sri Lanka	**Major**	Iceland	
Guatemala	**Major**	Finland	
Angola	**Major**	New Zealand	
Bangladesh	**Major**	Netherlands	
El Salvador	**Major**	Austria	
Peru	**Major**	Germany W	
New Caledonia		Belgium	

Table 5: Ranking of the 15 countries with the lowest quality of institutions and the 15 countries with the highest quality of institutions in 1984-99.

Sample of Non-OECD countries

15 worst	Conflict 85-06	15 best	Conflict 85-06
Guinea-Bissau	**Major**	Singapore	
Congo, Dem. Rep.	**Major**	Moldova	Minor
Colombia	**Major**	Slovenia	
Liberia	**Major**	Croatia	Minor
Haiti	Minor	Hong-Kong	
Iraq	**Major**	Cuba	
Suriname	Minor	Taiwan	
Bolivia		Bulgaria	
Sri Lanka	**Major**	Namibia	
Guatemala	**Major**	Botswana	
Angola	**Major**	Brunei	
Bangladesh	**Major**	Bahrain	
El Salvador	**Major**	Saudi Arabia	
Peru	**Major**	Chile	
New Caledonia		Qatar	

Table 6 : Ranking of the 15 countries with the lowest quality of institutions and the 15 countries with the highest quality of institutions in 1984-99.

Sub-Saharan African countries

15 worst	Conflict 85-06	15 best	Conflict 85-06
Guinea-Bissau	**Major**	Namibia	
Congo, Dem. Rep.	**Major**	Botswana	
Liberia	**Major**	Gambia	
Angola	**Major**	Tanzania	
Somalia	**Major**	Morocco	**Major**
Sudan	**Major**	Kenya	
Nigeria	Minor	Burkina Faso	Minor
Congo, Rep.	**Major**	Tunisia	
Algeria	**Major**	Cote d'Ivoire	Minor
Uganda	**Major**	Madagascar	
Togo	Minor	Ethiopia	**Major**
Senegal	**Major**	Egypt	Minor
Ghana		Libya	
Mali	Minor	Guinea	Minor
Mozambique	**Major**	Zimbabwe	

- *poor with good institutions in 1984:Botswana ($1947), Tanzania ($463), Gambia ($801)*

- *Rich with bad institutions in 1984: Colombia ($2949), Iraq ($4927), Suriname ($3277), Algeria ($2962)*

4) __Revising the relationship between ethnic diversity and civil wars__

How to measure ethnic diversity:

It is common in recent work to include as a regressor in empirical growth estimations an index of ethnic fractionalization.

$$FRAG = 1 - \sum_{i=1}^{N} \pi_i^2$$

However many empirical studies find no relationship between ethnic fractionalization, measured by the index of ethnolinguistic fractionalization (ELF) using the data of the Atlas Nadorov Mira, and conflict.

There are at least two alternative explanations for this lack of explanatory power:

First, it could be the case that the classification of ethnic groups in the Atlas Nadorov Mira (ANM), source of the traditional index of ethnolinguistic fractionalization (ELF), is not properly constructed.

Some authors have used other sources, different from the ANM, to construct datasets of ethnic groups for a large sample of countries. In general the correlation between the index of fractionalization obtained using these alternative data sources is very high (over 0.8).

The second alternative is that up to now the alternative data on ethnic diversity in a country have been aggregated using indices of fractionalization.

However, it is not clear to what extent an index of diversity could capture potential ethnic conflict.

In principle claiming a positive relationship between an index of fractionalization and conflicts implies that the more ethnic groups there are the higher is the probability of a conflict.

Many authors would dispute such an argument. Horowitz (1985), which is the seminal reference on the issue of ethnic groups in conflict, argues that the relationship between ethnic diversity and civil wars is not monotonic: there is less violence in highly homogeneous and highly heterogeneous societies, and more conflicts

in societies where a large ethnic minority faces an ethnic majority.

If this is so then an index of polarization should capture better the likelihood of conflicts, or the intensity of potential conflict, than an index of fractionalization.

Ethnic Polarization measure

The original purpose of this index was to capture how far is the distribution of the ethnic groups from the (1/2, 0,0..0, 1/2) distribution (bipolar), which represents the highest level of polarization.

$$Polarization = RQ = 1 - \sum_{i=1}^{N} (\frac{0.5 - \pi_i}{0.5})^2 \pi_i$$

Comparing Fragmentation versus polarization

The relationship between social heterogeneity and social conflict is not an easy one.

Initially, one could think that the increase in diversity increases the likelihood of social conflicts. However, this does not have to be the case.

In fact many researchers agree that the increase in ethnic heterogeneity initially increases potential conflict but, after some point, more diversity implies less potential conflict.
Horowitz (1985)

Figure 1 shows the graph of the fractionalization index and the polarization index as a function of the number of groups, when all of them have the same size.
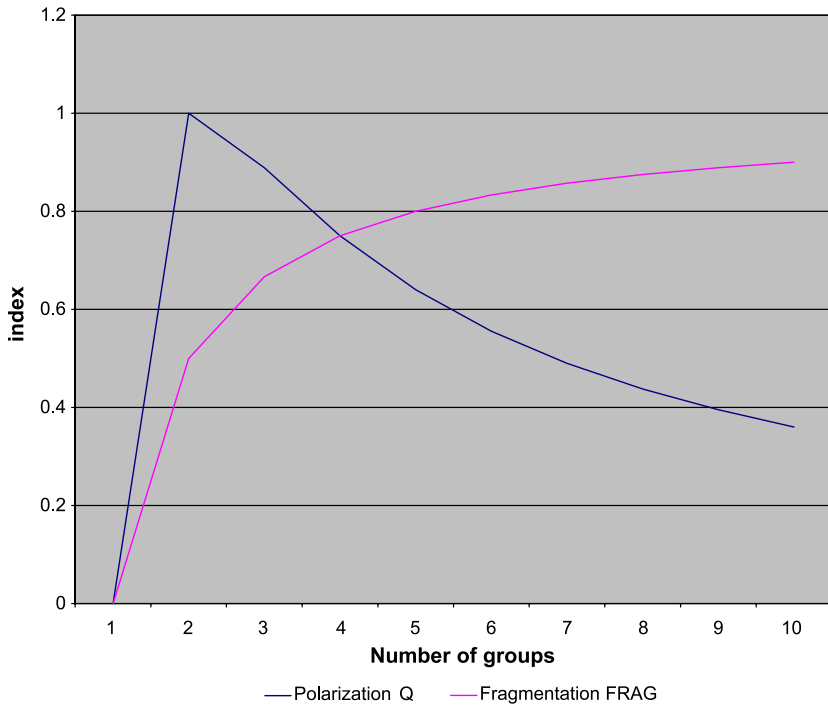
Fig. 1. Polarization and fractionalization as a function of the number of equal size groups.

While the polarization index has a maximum at two groups the fractionalization index grows with the number of groups.

Are empirical measures of polarization and fractionalization very different when they are compared?

In principle polarization and fractionalization should have a high correlation when the number of groups is two.
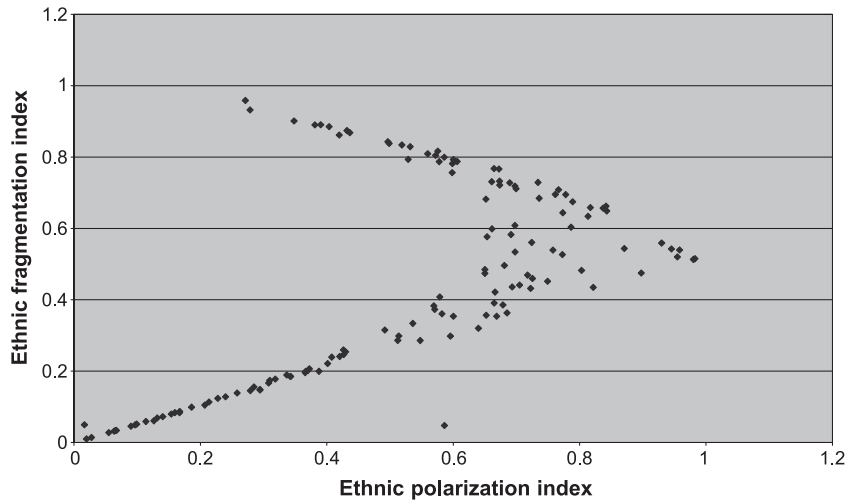
But they may be very different if the number of groups is greater than two.

Figure 2

Fig. 2. Ethnic polarization versus fractionalization. Source: WCE.

Figure 2 presents the relationship between ethnic polarization and ethnic fractionalization for a sample of 138 countries using WCE dataset on ethnolinguistic diversity.

It shows that, for low levels of fractionalization, the relationship between ethnic fractionalization and ethnic polarization is positive and close to linear.

However for the medium range the correlation is basically zero and for high levels of fractionalization the relationship with polarization is negative
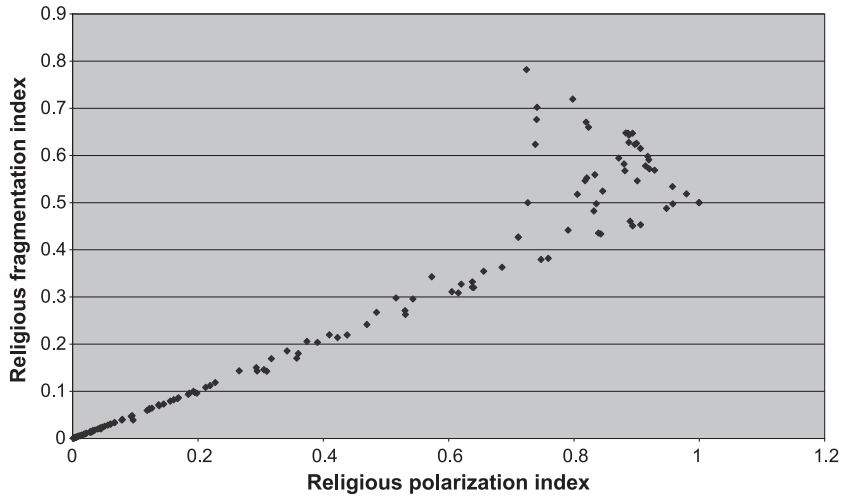
Figure 3

Fig. 3. Religious fractionalization versus polarization. Source: ET.

Figure 3 presents the scatterplot of religious fractionalization versus religious polarization.

It shows a similar pattern: for low levels of religious fractionalization the relationship with polarization is positive and close to linear.

However for intermediate and higher levels of religious fractionalization the relationship is zero.

Therefore the correlation is low when there is high religious heterogeneity, which is the interesting case.

A Rent-seeking modelof conflict, and links to polarization

Rent-seeking models provide a second justifications for using the RQ index in the context of conflicts.

From a theoretical perspective rent-seeking models point out that social costs are higher and social tensions emerge more easily when the population is distributed in two groups of equal size.

We show that the RQ index can be derived from a simple model of rent-seeking.

Let's assume that the society is composed by N individuals distributed in M groups.

Let's normalize $\sum n_i = N = 1.$

Then π_i, the proportion of individuals in group i, will be equal to n_i, $\pi_i = n_i.$

Society chooses an outcome over the M possible issues.

We identify issue i as the outcome most preferred by group i.

We think of each outcome as a pure public good for the group members.

Define u_{ij} as the utility derived by a member of group i if issue j is chosen by society.

As we want to describe a pure contest case then $u_{ii} > u_{ij} = 0$ for all i, j with $i \neq j$.

Therefore, individuals will only spend resources in their most preferred outcome, i.

Because of the rent-seeking nature of the model we assume that agents can try to alter the outcome by spending resources in favor of their preferred outcome.

Therefore there will be M possible outcomes depending on the resources spend by each of the M groups.

Let's define x_i as the effort or the resources expended by an individual or group i

We assume, that the individuals in each group act in a coordinated fashion. Therefore, we ignore the possibility of free riding within each group.

The total resources devoted to lobbying are $R = \sum_{i=1}^{M} \pi_i x_i$.

Following this interpretation R can be thought of as a measure of the intensity of social conflict.

The cost of resources, or effort, x for each individual is $c(x)$.

We are going to assume that the cost function, or effort disutility, is quadratic, $c(x) = (1/2)x^2$.

WHAT IS THE INTERPRETATION OF THIS COST FUNCTION?

The basic element of any rent-seeking model is the contest success function, which defines the probability of success.

We are going to use the traditional ratio form for the contest success function

and define p_j as the probability that issue j is chosen, which depends on the resources spent by each group in favor of each outcome $j = 1,...M$, provided that $R > 0$.

$$p_j = \frac{\pi_j x_j}{\sum_{j=1}^{M} \pi_j x_j} = \frac{\pi_j x_j}{R}$$

This is a particular case of the ratio form of the contest success function.

In general the ratio form of the contest success function takes the form

$p_1/p_2 = (x_1/x_2)^z$

where z defines if there are diminishing returns ($z \leq 1$) to competitive efforts (x)
or there are increasing returns ($z > 1$).

In our case we set $z = 1$.

Then each member of group i has to decide the amount of resources she wants to expend in order to maximize the expected utility function taken into account that she doesn't care about non-preferred outcomes and the contest success function is of the ratio form.

$$Eu_i = \sum_{j=1}^{M} p_j u_{ij} - c(x_i) = \sum_{j=1}^{M} p_j u_{ij} - (1/2)x_i^2 = p_i u_{ii} - (1/2)x_i^2$$

subject to $p_j = \pi_j x_j / R$.

As we assume a pure contest case and, $u_{ij} = 0$ for all $j \neq i$, and at least one group expend positive resources, $x_j > 0$, for some $j \neq i$,

the first order conditions that solve the problem are

$$\pi_i^2(u_{ii} - u_{ii} p_i) = \pi_i x_i R$$

notes 1

$$P_i \, M_{ii} - \frac{1}{2} x_i^2$$

$$\left[\text{Remind that} \quad P_i = \frac{\pi_i \, x_i}{R} = \frac{\pi_i \, x_i}{\sum\limits_{j=1}^{M} \pi_j \, x_j} = \right.$$

$$\left. = \frac{\pi_i \, x_i}{\pi_1 x_1 + \cdots + \pi_i x_i + \cdots + \pi_M x_M} \right]$$

$$\frac{d}{d x_i} = \frac{\pi_i \, R - \pi_i \, x_i \, \pi_i}{R^2} \, M_{ii} - x_i = 0$$

$$\frac{\pi_i \, R - \pi_i \, x_i \, \pi_i}{R} \, M_{ii} = x_i \, R$$

$$\frac{\pi_i \, R}{R} \, M_{ii} - \frac{\pi_i \, \overbrace{x_i \, \pi_i}^{P_i}}{R} \, M_{ii} = x_i R$$

$$\pi_i \, M_{ii} - \pi_i \, P_i \, M_{ii} = x_i R$$

*π_i

$$\boxed{\pi_i^2 \left[M_{ii} - P_i \, M_{ii} \right] = \pi_i \, x_i \, R}$$

Adding all the first-order conditions we obtain the following expression:

$$\sum_{i=1}^{M} \pi_i^2 (u_{ii} - u_{ii} p_i) \;=\; R^2$$

notes 2

$$\sum_{i=1}^{M} \pi_i^2 \left[u_{ii} - u_{ii} P_i \right] = \sum_{f=1}^{M} \pi_i x_i R$$

$$\sum_{i=1}^{M} \pi_i^2 \left[u_{ii} - u_{ii} P_i \right] = R \left(\sum_{i=1}^{M} \pi_i x_i \right) \quad \longrightarrow R$$

$$\boxed{\sum_{i=1}^{M} \pi_i^2 \left[u_{ii} - u_{ii} P_i \right] = R^2}$$

In the pure contest case the individuals only have a positive utility from their most preferred issue. Say that the utility $u_{ii} = k$
Therefore

$$R^2 = \sum_{i=1}^{M} \pi_i^2 (k - kp_i)$$

Proposition 1: If there are only two groups the normalize (squared) total cost can be written as $R^2 = 1 - \sum_{i=1}^{2} \left(\frac{0.5 - \pi_i}{0.5} \right)^2 \pi_i$, which is the RQ index of polarization.

Proof:
It is easy to show that if M=2 then the resources spend by each individual of any group are the same, $x_1 = x_2$, therefore $p_i = \pi_i$.
Therefore

$$R^2 = \sum_{i=1}^{2} \pi_i^2 (k - k\pi_i) \quad = \sum_{i=1}^{2} \pi_i (k\pi_i - k\pi_i^2) \quad = \sum_{i=1}^{2} \pi_i (1 - 1 + k\pi_i - k\pi_i^2)$$

$$= \sum_{i=1}^{2} \pi_i (1 - (1 - k\pi_i + k\pi_i^2)) \quad = \sum_{i=1}^{2} \pi_i (1 - k(\tfrac{1}{k} - \pi_i + \pi_i^2))$$

$$= \sum_{i=1}^{2} \pi_i - \sum_{i=1}^{2} k(\tfrac{1}{k} - \pi_i + \pi_i^2)\pi_i = 1 - \sum_{i=1}^{2} k(\tfrac{1}{k} - \pi_i + \pi_i^2)\pi_i$$

As R is a measure of the total resources spent, or effort, for lobbying purposes, then it can be interpreted as an index of (potential) conflict. Notice that for $k = 4$ this index is normalized between 0 and 1, and can be rewritten as

$$R^2 = 1 - \sum_{i=1}^{2} 4(\tfrac{1}{4} - \pi_i + \pi_i^2)\pi_i = 1 - \sum_{i=1}^{2} \left(\frac{0.5 - \pi_i}{0.5} \right)^2 \pi_i$$

which is precisely the RQ index.∎

Proposition 2: If there are M groups of equal size, $n_1 = \ldots = n_M$, the normalized (squared) total cost can be written as

$$R^2 = 1 - \sum_{i=1}^{M} \left(\frac{0.5 - \pi_i}{0.5} \right)^2 \pi_i$$

Proof:
Since all the groups have the same size then $p_i = \pi_i$.

Therefore

$$R^2 = \sum_{i=1}^{N} \pi_i^2 (k - k\pi_i) \quad = \sum_{i=1}^{N} \pi_i (k\pi_i - k\pi_i^2) \quad = \sum_{i=1}^{N} \pi_i (1 - 1 + k\pi_i - k\pi_i^2)$$

For $k = 4$ the index is normalized between 0 and 1.

$$R^2 = \sum_{i=1}^{N} \pi_i (1 - 1 + 4\pi_i - 4\pi_i^2) \quad = \sum_{i=1}^{N} \pi_i (1 - (1 - 4\pi_i + 4\pi_i^2))$$
$$= \sum_{i=1}^{N} \pi_i (1 - (1 - 2\pi_i)^2) \quad = 1 - \sum_{i=1}^{N} \left[\frac{0.5 - \pi_i}{0.5} \right]^2 \pi_i$$

which is again the RQ index.■

We should notice that this derivation is constrained by many assumptions (pure contest and equal size groups) and, therefore, should be taken as an application that illustrates the relationship between the RQ index and the rent-seeking literature.

However we should also point out that the usual derivation of Herfindahl's index in the industrial organization literature uses a very constrained set-up and relies strongly on the symmetry of the participants.