Segregation and the onset of civil war

Lesley-Ann Daniels

INSTITUT
CATALÀ
INTERNACIONAL

PER LA PAU

Segregation and the onset of civil war

Lesley-Ann Daniels

THE AUTHOR

Lesley-Ann Daniels has a BA(Hons) in Social and Political Sciences from the University of Cambridge, a master's degree in European Integration from Queen's University, Belfast, and a master's degree in Research Methods in Political Science from Universitat Pompeu Fabra (Barcelona). She is currently a pre-doctoral researcher at Institut Barcelona d'Estudis Internacionals and Universitat Pompeu Fabra (2011-). She holds a pre-doctoral grant from Institut Català Internacional per la Pau. Her current main interest is in post-conflict peace-building.

ABSTRACT

The ethnic characteristics of a country have long been considered a factor in the onset of civil war. This has been extensively studied using indices of ethnic fractionalization (how many different groups there are) and polarization (the number and relative size of groups) but with inconclusive results. An aspect that has been previously ignored has been the physical distribution of groups within a country. This article takes an index of segregation and tests it against civil war onset in three well-established datasets, two with a high threshold and one with a low threshold of deaths. It finds that an index of segregation is significant in predicting the onset of civil war. While segregation must depend on fractionalization and is probably conditioned by polarization, this analysis finds that fractionalization and polarization are not significant in predicting civil conflict in the high threshold datasets once segregation is controlled for. The paper argues that segregation has effects due to the physical separation from other ethnic groups, the physical within-group proximity and homogeneity within a territory, with each of these three factors having effects on both the motivation and the feasibility of rebellion. The significance of segregation shows that the impact of ethnic characteristics on conflict is complex and the concept of segregation adds a useful dimension to the specification of ethnicity.

Keywords: segregation; ethnic fractionalization; polarization; civil wars; ethnic conflict

RESUM

Tradicionalment, s'ha considerat que les característiques ètniques d'un país són un factor rellevant per a l'esclat d'una guerra civil. Aquest article selecciona un índex de segregació i n'analitza la relació amb l'esclat de guerres civils a través de tres bases de dades consolidades, dues amb un llindar alt de víctimes mortals i una amb un llindar baix. La recerca revela que l'índex de segregació és significatiu per predir l'inici d'una guerra civil: un cop s'introdueix la segregació com a variable de control, el fraccionament i la polarització deixen de ser significatius a l'hora de calcular les probabilitats de conflicte civil a través de les bases de dades de llindar alt. L'article sosté que els efectes de la segregació es desenvolupen a través de la separació física respecte d'altres grups ètnics, la proximitat física dins d'un mateix grup i l'homogeneïtat en el si d'un territori, i que aquests factors influeixen tant sobre la motivació per rebel·lar-se com sobre la viabilitat de la rebel·lió. L'impacte de les característiques ètniques sobre el conflicte és complex i el concepte de segregació aporta una dimensió útil a l'especificació de l'etnicitat.

Paraules clau: segregació; fraccionament ètnic; polarització; guerres civils; conflicte ètnic

RESUMEN

Tradicionalmente, se ha considerado que las características étnicas de un país constituyen un factor relevante para el estallido de una guerra civil. El presente artículo selecciona un índice de segregación y analiza su relación con el estallido de guerras civiles mediante tres bases de datos consolidadas, dos con un umbral alto de víctimas mortales y una con un umbral bajo. La investigación desvela que el índice de segregación es significativo para predecir el inicio de una guerra civil: si se introduce la segregación como variable de control, ni el fraccionamiento ni la polarización resultan significativos a la hora de predecir el conflicto civil a través de las bases de datos de umbral alto. El artículo sostiene que el efecto de la segregación se desarrolla a través de la separación física respecto a otros grupos étnicos, la proximidad física dentro de un mismo grupo y la homogeneidad en el seno de un territorio, y que estos factores tienen efectos tanto sobre la motivación para la rebelión como sobre su viabilidad. El impacto de las características étnicas sobre el conflicto es complejo y el concepto de segregación aporta una dimensión útil a la especificación de la etnicidad.

Palabras clave: segregación; fraccionamiento étnico; polarización; guerras civiles; conflicto étnico

CONTENTS

1. INTRODUCTION

Ethnic differences have long been considered a factor in the onset of civil war and different theoretical explanations of the onset of civil war have included some form of ethnicity as a causal factor. Attention increased with the collapse of the communist system and the implosion of previously unified states such as Yugoslavia. However, as yet, the results from empirical analysis of civil war onset are not clear-cut, and this factor does not seem yet to be adequately specified.

The traditional aspect of ethnicity that is used in empirical analysis is the absolute number of groups within a country or the fractionalization index. The significance of this measure has been interpreted in different ways. In neorealist theories of civil war, ancient hatreds between ethnic groups erupt when the state becomes weak and unable to keep control therefore, having more groups means more probability of conflict. Alternatively, in neoliberal theories of civil war, ethnic identities drive nationalist aspirations, so an increased number of ethnic groups in a country means more aspiring nations. Some theories look at how ethnicity affects the motivation to initiate conflict. For example, Gurr (2000) argues that an ethnic group may be motivated to start a civil war due to political or economic discrimination against that ethnic group. Having more ethnic groups within a country means more opportunities for grievances to arise. An alternative interpretation is that ethnic groups can exploit the feasibility of initiating conflict. For example, ethnic groups can bring increased in-group communication and control that makes prosecuting a civil conflict more successful.

However, while there have been well-argued theoretical connections between ethnic groups and conflicts, these arguments do not translate to a clear-cut empirical connection between the number of groups and the probability of conflict. The empirical evidence is ambiguous on the significance of fractionalization. For example, if we look at the twenty most fractionalized countries in the world, eleven of

them have experienced a major civil war since 1946[1]. This gives a rate of 55% and thus higher than by chance, but not impressively more than the rate of 44% for all countries in the world. Results in regressions on the probability of civil war onset are similarly inconclusive, with fractionalization often not significant.

Attention has also focused on the demographic balance between groups. Horowitz (1985) argued that more conflict occurs in countries where a majority faces a large minority, thus, as groups approach demographic balance conflict is more likely. This was examined with a polarization index (Montalvo & Reynal-Querol 2005, Reynal-Querol 2002). The authors hypothesized that civil war onset would be most probable in countries where the polarization index was just below its maximum, representing a large minority facing a majority. However, only eight of the 20 most polarized countries[2] have experienced a major civil war since 1946, giving a rate of 40%, which is actually below the global average of 44%.

It would appear that ethnicity and the links to civil conflict are not yet clearly specified. Let us look at one specific example. Indonesia has the dubious pleasure of registering the most outbreaks of civil war[3]. Yet the country lies in the bottom third of polarized countries and its fractionalization value is just over two-thirds of the maximum. Why do the indices of fractionalization and polarization do so little to explain the incidence of conflict in Indonesia? Does this mean that ethnicity is irrelevant in the conflicts in Indonesia, or is there some element of the ethnic make-up of the country that the existing measures do not capture?

Perhaps part of the answer can be found by looking at the Acehnese. This ethnic group comprises just over two million out of a total popu-

---

1. The 20 most fractionalized countries are Zambia, Cameroon, Uganda, Kenya, South Africa, Gabon, Guinea, Benin, Bolivia, Tanzania, Pakistan, Senegal, India, Togo, and Ethiopia. All definitions are taken from Hegre & Sambanis (2006).
2. The 20 most polarized countries are Jordan, Kuwait, Guatemala, Grenada, Fiji, Morocco, Belgium, Ecuador, Guinea, Cape Verde, Peru, Guyana, Mauritius, Afghanistan, Colombia, Ethiopia, Brazil, Bolivia, Malaysia.
3. Hegre & Sambanis (2006) list seven onsets of civil war in Indonesia between 1946 and 2000. Fearon & Laitin (2003) list six outbreaks between 1946 and 1999.

lation of 245 million in Indonesia, or about 1% of the population[4]. Yet this group comprises 50% of the population in Aceh, where an insurgency was fought from 1990 to 2005. The population of this group is therefore highly concentrated in one part of the country and so the distribution of this group does not reflect that of the country as a whole. This aspect of ethnicity is captured by segregation, which will be examined in this paper.

Segregation measures how physically separated different ethnic groups are from each other. An index of segregation that uses data from each region of each country and compares the ethnic composition of the region with that of the country as a whole is used (Alesina & Zhuravskaya 2011). By contrast with polarization, 13 of the 20 countries with highest indices of segregation[5], which includes Indonesia, have experienced a civil war in the period from 1946 to 2000, which signifies a 65% rate.

Using logit regression the significance of segregation on the probability of civil war onset is tested in three well-established databases, using data from 1960-1997. The index is found to be significant in predicting the onset of civil wars, and particularly in major rebellions and wars over territory. The concept of segregation seems to add a useful dimension to the specification of ethnicity. Consideration is given to the causal effects of segregation and it is hypothesized that these act though three different though overlapping concepts - physical proximity to others of the same ethnicity within a territory, physical separation from other ethnic groups, and homogeneity within a territory. These could have effects on both the motivation and the feasibility of initiating civil war.

The paper is arranged as follows. The first section reviews the major theories of civil war onset and the following section looks at the role of

---

4. Information taken from the Indonesia census of 2010 (http://www.bps.go.id retrieved 25.06.2011), the CIA factbook (www.cia.gov, retrieved 25.06.2011) and the Permanent Committee on Geographic Names (http://www.pcgn.org.uk/ retrieved 25.06.2011)

5. The 20 most segregated countries are Uganda, Afghanistan, Pakistan, Zimbabwe, Guatemala, Ethiopia, Turkey, Indonesia, Spain, Ecuador, Burkina Faso, Colombia, Kenya, Tanzania, South Africa, Morocco, Russia, Guinea, Honduras, and Benin.

ethnicity in theories of civil war onset considering fractionalization, polarization and segregation separately. Hypotheses on the impact of segregation are developed. The next section details the data and method of testing these hypotheses and the following section reviews the results. The final section concludes.

2. THEORIES ON THE ONSET OF CIVIL WAR

Theories of the onset of civil war draw on many diverse causal explanations. This variety in part reflects the impact of different disciplines, with economists, political scientists and experts in international relations all contributing theoretical input. However, it also reflects the difficulty of creating any clear-cut parsimonious model that explains a phenomenon that is rare, contentiously defined and with many interrelated causes. A further difficulty is that the same indicator has been used to proxy different theoretical mechanisms. This review will look briefly at the different groups of causes and will then focus on the disputed contribution of ethnicity.

In some theories of civil war onset emphasis is placed on systemic factors such as weak states or the end of the Cold War. In these theories, civil war is preceded by the collapse of the state and arises through security dilemmas, where defensive arming by one group is seen as an offensive action and leads to further arming by other groups (typically assumed to be different ethnic groups). This process escalates until some misunderstanding leads to violence breaking out between the groups. (Fearon 1998, Posen 1993).

Early economic theories of civil war looked at the processes of economic modernization and argued that rapid social changes and competition for scarce resources cause people to feel threatened. These insecurities lead people to seek refuge in more stable and reassuring sources of identity, i.e. their ethnic identities. Ancient hatreds are then re-ignited and conflicts are pursued along ethnic lines. These theories

have been criticized as having many obvious exclusions, since countries with low levels of modernization are also prone to civil wars. (Horowitz 1985). However, the mechanism may be convincing as an explanation of certain wars, and the idea of grievances has been further developed in other theories.

One area of grievances is political oppression or lack of political rights. Gurr (2000) argues that political grievance is the primary motive for civil war. Two of his four factors that contribute to the onset of civil war are specifically related to ethnicity. The first is the strength of the ethnocultural identity, particularly in reference to socio-economic identity. The second is the increased opportunity for coordination that comes from ethnopolitical cohesion. Hegre et al (2001) look at the links between the lack of political rights and conflict risk and finds that repression increases conflict, except when it is severe.

The grievance idea was also examined by Collier and Hoeffler in 2004. They separated out misperceived grievance and objective grievance. The latter encompasses ethnic or religious hatred, political repression, political exclusion, and economic inequality. They find that ethnic dominance had an adverse effect on the probability of civil war, which I will consider further below, but find that no other grievance had a significant effect.

They contrast grievances with what they call a "greed" agenda, based on the idea that civil war is a rational choice that depends on costs and offers benefits. The authors consider the ways in which rebellion may have a lower "cost" in certain countries - through cheap "labour" (fighters), cheap military equipment, weak opponents (the government), or because the groups rebelling have more social cohesion. The authors find that "greed" is a more significant cause of civil war than grievance, particularly in countries rich in natural resources. Higher risks of civil war have been found in countries rich in oil (Fearon & Laitin 2003) and this link has been confirmed in geo-referencing studies that look specifically at areas where conflict have broken out (Lujala, Gleditsch & Gilmore 2005, Lujala 2009).

A further area of research has focused on the aspects that make civil war success feasible for the rebels. Fearon and Laitin (2003) focus

on civil war as insurgency and introduce factors that favour rebel recruitment. These factors include poverty, which makes fighters "cheap" but which they also use as an indicator of a weak state. Goldstone et al (2010) find that weak states combined with factional struggles for political power are the strongest causes for severe political crises, including civil war. Other factors are political instability, large populations, and rough terrain. Mountains, forests and desert areas have all been tested, and mountains have been found to be the only feature that has a sustained significant effect on the risk of civil war. Geo-referencing studies concentrated on the geographical location of conflicts find mountains significant (Cederman, Buhaug & Rød 2009).

3. THE ROLE OF ETHNICITY IN CIVIL WAR

Ethnic groups have been defined by "ascriptive differences, whether the indicium is color, appearance, language, religion, some other indicator of common origin or some combination thereof" (Horowitz, 1985,17-18). Fearon (2003) develops a different method, based on radial categories, as used by linguists and cognitive scientists. The prototypical ethnic group would display the features of all the categories, though not all are required to acquire the status of ethnic group.

3.1. FRACTIONALIZATION

Fractionalization is an index of the ethnic cleavages in a country and is the measure of the number of different ethnic groups in a country. Ethnic differences establish cleavages within a society that can fracture and thus supply opposing groups. In neorealist theories of civil war ancient hatreds are ready to break out when not kept in control by the state. In neoliberal theories of civil war, conflict is viewed as an

expression of nationalist aspirations, driven by ethnic identity. Both theories imply that an increased number of ethnic groups in a country leads to an increased number of conflicts.

A further mechanism whereby ethnicity impacts on civil war is through its effects on the feasibility. Ethnic network theory states that a common ethnicity improves coordination within a group (Congleton 1995, Gurr 2000). Members of the same ethnic group can have an expectation of trust between members of the group. Common ethnicity also serves as a substitute for information or certainty about motives and so makes the creation and enforcement of agreements easier, for example between rebel leaders and their followers. Action that is undertaken by a closed group is more efficient, and this applies equally to rebellion, which would suggest that countries with a large number of ethnic groups would have a higher risk of civil war. However, if groups have to band together to launch a civil war, then there will be collective action problems. Thus, a country that is more ethnically diverse would have a lower probability of civil war. This is reflected in empirical results that show a parabolic relationship between ethnicity and the risk of civil war (Elbadawi & Sambanis 2000).

Fractionalization has been criticized because the empirical evidence does not show a clear link between ethnic diversity and the risk of civil war, and some theories have used different methods to explain the apparent disparity between high levels of ethnic diversity and increased probability of civil war. One solution has been to disaggregate the concept of civil war into different types of war. Sambanis (2001) argues that if we look only at ethnic wars then ethnic diversity does have an impact on the likelihood of war onset. He argues that ethnic wars are more concerned with identity and arise from political grievances rather than from economic factors. Identity may be such a powerful motivation for conflict that they effectively override economic considerations. A second consideration is that in ethnic civil wars, a single group does not have to ally with other groups. Even small groups can mount a challenge to the state. Therefore, there is no necessity to coordinate across groups.

3.2. POLARIZATION

Fractionalization has also been criticized because two countries with very different population distributions can have the same fractionalization, although the power dynamics between these different configurations will be very different (Posner 2004). On theoretical grounds, group-level discrimination is often directed at ethnic, linguistic or religious minorities and civil wars can be interpreted as minorities seeking changes in their status (Gurr 2000). Horowitz, in his highly influential study in 1985, stated that more conflict happens in societies where a large ethnic minority faces an ethnic majority. Grievances may arise when one ethnic group dominates another, or a large ethnic minority may feel justified by demographic size to have their turn at controlling the state. This line of argument states that as groups approach a bipolar symmetry in a country, civil war is more likely.

Different measures have been used as a way to capture this. The index of polarization was first developed by Esteban and Ray with reference to income polarization (1994, 1999).[6] This gives a continuous value and includes a measure of inter-group distances. Reynal-Querol creates an index that replaces the inter-group distances with a discrete binary metric of belong/do not belong that ranges between zero and one (Montalvo & Reynal-Querol 2005, Reynal-Querol 2002). This index therefore takes into account only the relative sizes and the number of groups. Reynal-Querol uses the discrete index of polarization to find that ethnic polarization increases the probability of civil wars (2005). Esteban, Mayoral and Ray (2011) use the continuous index (along with fractionalization and a Greenberg-Gini index constructed across ethnic groups) and find that polarization is significant both on intensity and onset of civil war. Geo-referencing studies confirm the importance of this factor at a local level (Cederman, Buhaug & Rød 2009). Cunningham and Weidmann (2010) find that regions that have one demographically dominant ethnic group among many are more prone to conflicts. How-

---

6. Measures of polarization were independently developed by Esteban and Ray (1994) and Wolfson (1994).

ever Collier and Hoeffler (2004) did not find polarization significant, but found a measure of ethnic dominance to be significant.

3.3. SEGREGATION

A further factor of ethnicity that has been explored theoretically is the degree of separation of different ethnic groups. Posner (2004) criticized the fractionalization index for not reflecting the degree of concentration of ethnic groups. He quotes a body of literature that suggests that the spatial distribution of groups within a country can give rise to very different effects from a distribution that is more evenly disbursed. (Busch & Reinhardt 1999, Mozaffar, Scarritt & Galaich 2003, Toft 2003) One aspect of segregation, that of geographic concentration, was first considered as a source of conflict by Horowitz (1985) and has frequently been stressed as a factor in the onset of conflict (Posen 1993, Cornell 2002) Do countries where different ethnic groups are concentrated into specific territories have a different risk of civil war from countries where ethnic groups are homogeneously dispersed through the country?

The different possible impacts of segregation and the hypotheses to which it gives rise will be examined.

The effects of segregation on the twin causal factors of motivation and feasibility will be considered, although as a final cause these act together. It will be argued that segregation captures three overlapping but conceptually different aspects - physical proximity with others in the own group, physical separation from other groups, and increasing homogeneity within a territory.

MOTIVATION

Looking firstly at how physical proximity with others in the own group, or population concentration, can affect motivation, Lichbach (1995) argues that geographical proximity leads to the formation of a "cognitive proximity". This leads to a collective viewpoint, including collective grievances. Segregation implies a clustering of a population

into a specific territory. Proximity can also increase ethnic saliency by reinforcing similarities.

By contrast and secondly, the obverse of this captures physical separation between groups and this can lead to a sense of "us" and "them", and increased suspicions and misunderstandings. Bhavnani and Miodownik (2009) use a computer model to examine the impact of different strengths of ethnic feeling. In the model they allow strengths of feelings to vary, which they argue is a more realistic and instrumentalist interpretation of ethnicity. They find that conflict increases when the majority with which minority group is making income comparisons is geographically farther away.

The third aspect of segregation is homogeneity within a territory. This leads to a conceptual link between an ethnicity and a specific territory, which gives a sense of homeland. Fearon (2003) includes homeland as one of his categories defining the prototypical ethnic group. Toft (2003) argues that territory has a value to ethnic groups as their homeland which is independent of the actual objective value of the territory.

FEASIBILITY

Segregation also increases feasibility through its impacts on the ability to coordinate. This arises through the three different effects of segregation. Firstly, physical proximity allows for coordination strengths that increase the opportunity for civil war. Toft (2003) distinguishes between four settlement patterns, which affect the capacity of groups to mobilize fighters, resources, control media, etc. She finds concentrated minorities to have one of the strongest capacities. Gates (2002) looks at the micro-processes of rebel recruitment and argues that recruitment is easier when the rebels are close, including physically close, to the leader. Proximity or clustering therefore makes coordinated endeavours more feasible by making organization such as mobilization of fighters and weapons easier and so reducing organization costs. Rebel groups may also take advantage of the physical attributes of their territory, such as mountainous terrain.

Secondly, physical separation from other groups makes prosecuting a civil war more feasible. Physical distance makes it more difficult for the state to attack a rebel group. Recent geo-referencing studies find that distance from the capital increases the possibility of civil war due to an intra-state loss-of-strength gradient of state power (Buhaug & Rød 2006, Buhaug, Cederman & Rød 2008).

Thirdly, increasing homogeneity within a territory brings stronger possibilities for more efficient joint action in line with ethnic network theory (Congleton 1995). Specifically, it increases the trust that can be extended to other members of the group. Actors can trust other "in-group" members to abide by collective norms and behaviour. Likewise, actors can rely on "in-group" policing to maintain these norms and behaviour. The impact of this on rebellion is that within-group trust makes the creation and enforcements of contracts between rebel leaders and followers easier to initiate and maintain.

All the above considerations lead to the first hypothesis:

H1: Segregation increases the likelihood of civil war.

It does not make sense to speak of segregation in isolation, since without different ethnic groups (fractionalization) there would be no segregation. Likewise, segregation is likely to be affected by the relative size and number of groups (polarization). Introducing all three factors in an analysis allows us to investigate the relative effects of each factor.

Fractionalization has been assumed to increase the likelihood of civil war onset, though the empirical results are mixed, as has been discussed above. This paper argues that the motivations, opportunities and feasibility that have been assumed to be attached to fractionalization are augmented in ethnic groups that are segregated. The index of segregation therefore picks up the increased sense of grievance, increased nationalist aspirations, increased desire for secession, increased "in-group" trust and coordination advantages.

Furthermore, it is known that high levels of fractionalization decrease the probability of civil war (Elbadawi & Smbanis 2000). When

groups have to coordinate it is likely that each group will need to make concessions in order to forge a strong alliance. Segregation increases these problems of coordination by introducing physical separation. In addition, the way the territory has been treated by the state will affect each group's reaction to the state. For example, local riches may be expropriated in a way perceived to be unjust only to that local group. Alternatively, areas may be supported by the state through fiscal transfers. Therefore groups that are physically separated will have different motivations for rebellion. These points lead to the next hypothesis:

H2: Segregation is more significant than fractionalization in predicting civil war onset.

The impact of segregation on civil war onset is also highly probably conditioned by polarization, i.e. the number of ethnic groups and their relative size. However, if we take separately the two aspects of polarization, we can see that there may be situations where the effects of segregation have more impact than those of polarization. Polarization reaches its maximum when there are only two ethnic groups in a country and they are evenly sized. Looking first at the number of groups, a situation where these two groups are evenly dispersed throughout a country is likely to have much less probability of civil war than a situation where these two groups are located in different parts of the country, the condition captured by segregation. In this situation it is the element captured by the segregation index that affects the probability of conflict onset, and not the element captured by polarization. Secondly, considering the relative size of groups, polarization reaches its maximum when two groups are evenly sized. Yet the combination of smaller groups and conditions conducive to insurgency have been shown to increase the probability of civil wars in territories where these conditions prevail, since small groups can maintain long-term, low-intensity struggles (Cunningham, Gleditsch & Salehyan 2009). Collier and Hoeffler (2004) found ethnic dominance to affect the probability of the onset of civil war, while polarization did not. Therefore there may be situations where segregation plays a more impor-

tant role, but it is not clear theoretically that it should be more significant in all situations. This leads therefore the next two hypotheses:

H3: Segregation is more significant than polarization in predicting civil war onset.
H4: Polarization is more significant than segregation in predicting civil war onset.

Segregation should have different effects in major rebellions and in small-scale conflicts. Countries with a high index of segregation should be more likely to suffer major rebellions as high segregation will give rise to autonomy struggles or contests for governmental control that involve major uprisings. The level of polarization in the country is expected to play a strong role here also. These considerations lead to the next hypotheses:

H5: Segregation is more significant in major rebellions
H6: Polarization is also more significant in major rebellions

Considering only ethnic wars, it is argued that the points made above about segregation hold true for ethnic wars, plus there is the added impact of the increased ethnic trust within an ethnic group, and the ability of ethnicity to overcome coordination problems (Gurr 2000). The next hypothesis therefore states:

H7: Ethnic wars are more likely in countries with a high index of segregation.

Analysis of civil war has also been disaggregated into the aims of the war, given as wars over government or wars over territory. Wars over territory include conflicts aiming for autonomy or secession. Wimmer and Min (2006) argue that the spread of the nationalist doctrine leads to a demand by ethno-nationalist groups for their own homogeneous state. This desire is driven by an ethnically homogeneous territory. Toft (2003) also considers wars of secession and argues that territory

holds a special value for ethnic groups as their homeland, independent of any quantifiable resource value. Along with a demographic majority this leads to a belief in an ancient and just right for the group to control this territory. The state, however, would also interpret territory as part of its self-definition, even if the territory itself is worthless. What is more, the state fears setting a precedent that will lead to other secessionist claims. Toft considers that unless the ethnic group is willing to settle for less than independence, or the state is willing to divide its territory, this conflict will proceed to civil war. This will hold true for both major rebellions and smaller-scale conflicts, since Cunningham, Gleditsch and Salehyan (2009) have shown that small groups can maintain long-term, low-intensity struggles. These considerations lead to the next hypotheses:

H8: Segregation is significant in civil wars relating to territory.
H9: This is also true for smaller-scale conflicts relating to territory.

4. DATA AND METHODS

4.1. DEPENDENT VARIABLES

In order to examine the impact of segregation on the onset of civil war, a model including the measure is tested against three well-established datasets. Summary statistics for the datasets are presented below. The first dataset is compiled by Hegre and Sambanis (2006) and covers 172 countries from 1945 to 2000. It uses the definition of civil war from Sambanis (2004): "an armed conflict between an internationally recognized state and (mainly) domestic challengers able to mount an organized military opposition to the state." (Hegre & Sambanis 2006, 523) The war must have caused more than 1,000 deaths in total and in at least a three-year period.

The second dataset is from Fearon and Laitin (2003) and takes a similar definition to Sambanis, including a death threshold of 1,000 in total, but with the differences of a yearly death average of at least 100

Table I. Summary statistics of datasets

	Hegre & Sambanis	Fearon & Laitin	UCDP/ PRIO
No. of conflicts	145	111	278
No. of countries affected	75	69	97
No. of ethnic wars	87	72	161
No. of wars of territory (or both)	56	52	116
No. of wars of government (or both)	103	75	162
Correlation with Fearon & Laitin	0.66		
Correlation with UCDP/PRIO	0.32	0.31	

and at least 100 killed on each side (to eliminate massacres). Although this second database uses a similar coding level to the first and serves as a robustness check, the correlation between the two is only 0.66.

The third dataset is constructed from the UCDP/PRIO Armed Conflict Dataset of 2009 (UCDP/PRIO Armed Conflict Dataset, 2009; Gleditsch et al, 2002), coded into the Hegre and Sambanis dataset. The differences in their definition are that data are not limited to civil war and there is a lower death threshold of 25 or over battle deaths per year. In some cases this database codes conflicts that do not appear in the other databases since they do not meet the death threshold requirement. This is reflected in the greatly increased number of countries affected. In other cases, conflicts that ultimately cross the Hegre and Sambanis or the Fearon and Laitin death threshold are here coded earlier.

The measure of civil war was disaggregated in order to analyse the impact of segregation on particular types of civil war. The first of these was to analyse only ethnic wars. In the Hegre and Sambanis dataset the coding used was from Doyle and Sambanis where they code "identity wars (i.e. ethnic and religious wars)" (2000: 783). Fearon and Lai-

tin code for ethnic wars, which they define as "conflicts in which fighters were mobilized primarily along ethnic lines" (2003: 79). These two sources were used to code the UCDP/PRIO dataset. In cases of contradiction or confusion the conflict was coded as non-ethnic, to err on the conservative side.

The second disaggregation carried out was by the stated cause of the conflict. In the UCDP/PRIO dataset all intrastate conflicts are coded as being over territory or government, as stated by the parties to the conflict. A conflict over territory concerns "the status of the territory e.g. secession or autonomy". (UCDP/PRIO Codebook 2009: 2) Conflicts over government concern the "type of political system, the replacement of the central government, or the change of its composition" (2009:2) Fearon and Laitin code for rebels' aims with codings for territory ("rebels aim at exit or autonomy"), government ("rebels aim at centre"), and mixed or ambiguous. These two sources were used to code the Hegre and Sambanis dataset. The total for each cause was constructed to include the variable of interest and those conflicts that were mixed or ambiguous. This may make the results more conservative.

4.2. INDEPENDENT VARIABLES

FRACTIONALIZATION

Fractionalization is a measure of the population share of each of the ethnic groups within a country. The index most commonly used in the empirical literature is the Ethno/Linguistic Fragmentation or ELF index. It uses one minus the Herfindahl measure of the proportion of each ethnic group in the society, and the formula is as follows:

$$\text{FRACT A2003} = 1 - \sum_{i=1}^{N} s_{ij}^2 \qquad (1)$$

where s is the share of the group i in the population of country j. The index ranges from zero to one and reaches its theoretical maximum of one when each person belongs to a different group. It reflects the probability that two people chosen at random from a country's popu-

lation have the same ethnic background. Note that in the fractionalization index, these probabilities have the same weight in each of the terms of the fractionalization index. Therefore, the proportional contribution of a large group to the index is less than its relative size, while small groups contribute proportionally more.

The data on groups have traditionally been drawn from the Atlas Narodov Mira of 1964. These data largely rely on linguistic differences and as a result ethnic differences may be lost. In 2011 Alesina and Zhuravskaya followed Alesina *et al* (2003) in separating the fractionalization index into its constituent parts - ethnic, linguistic and religious fractionalization. They treat the ethnic definition as broadly as possible and take into account other factors such as skin colour. They also compile these at the regional level, which they define as "a subnational administrative unit of each country" (2011, 9). They draw their information firstly from the census nearest to the year 2000. If this is not available, they use statistics from the relevant national statistical office. Failing this, they rely on regionally representative demographic and health surveys (www.measuredhs.com)[7]. In the case of countries that did not ask about ethnic identity (some countries in Western Europe post WWII) the authors proxy ethnicity from the birthplace of naturalized migrants and the citizenship of non-naturalized migrants. They designate these countries as low data quality[8], but find that results do not differ much when these countries are eliminated from analysis.

$$\text{FRACT A2011} = 1 - \sum \pi^{i}_{jm}\left(1 - \pi^{i}_{jm}\right) \qquad (2)$$

where j indexes regions and π^{i}_{jm} is the fraction of group m in region j of country i.

This regional data was aggregated into a national figure and the correlations between two measures are very high and in many cases the scores are identical. The Alesina and Zhuravskaya index is the one

---

7. The data sources are described in detail in Alesina & Zhuravskaya (2011).
8. There are 12 countries with low data quality for ethnicity.

used in this paper, though other measures of fractionalization were explored (See Appendix 1.3).

POLARIZATION

Polarization takes the various population figures for the different ethnic groups in a country and measures how far a population distribution lies from the (½, 0, 0 ... 0, 0, ½) distribution which would give the maximum polarization value. The index ranges between zero and one and the maximum is reached in a bipolar situation when there are two groups with symmetric populations. The formula is as follows:

$$\text{RQ} = 4\sum_{i=1}^{N} \pi_i^2 \left(1 - \pi_i\right) \qquad (3)$$

The polarization index also captures the probability of being in a group, but weights these probabilities by the relative size of the group. In contrast to fractionalization, large groups in the polarization index contribute proportionately more to the index and small ones less. Thus the index captures the relative impact of different sizes of groups within a country.

SEGREGATION

Segregation measures the degree of separateness of each group within regions. If all groups are spread homogeneously throughout the country so that each region has the same fraction of each group as the country as a whole, the index is equal to zero and there is no segregation. At the other extreme, if each group lives separately within its own region and the region within itself is homogeneous, then the segregation index would reach its maximum and have a value of one. Segregation captures a different aspect of ethnicity from fractionalization (correlation 0.49) and polarization (correlation 0.47). Alesina and Zhuravskaya (2011) compile the index of segregation from their data on ethnic groups at the regional level, described above under fractionalization. The formula is as follows:

$$S^i = \frac{1}{M^{i-1}} \sum_{m=1}^{M^i} \sum_{j=1}^{J^i} \frac{t_j^i}{T^i} \frac{(\pi_{jm}^i - \pi_m^i)^2}{\pi_m^i} \qquad (4)$$

where T_i is the total population in the country i, and t_j is the population of the region j in that country and J_i is the total number of regions in country i. π_m^i is the fraction of group m in country i and π_{jm}^i is the fraction of group m in region j of country i. The index gives more weight to differences from the national average in bigger regions than in small and is scaled by the total number of groups to keep the index between zero and one.

This paper considers only the index for ethnic segregation. North America has the least segregated countries, with a mean of 0.038, while sub-Saharan Africa has the highest mean for segregation, of 0.187, and summary statistics for all regions are given in Table II.

As is customary with data on fractionalization and polarization, the value for the country is extended through all the years of analysis. This could be open to charges of endogeneity, since ethnic identity can be developed, hardened or transformed by conflict. One consequence of

Table II. Segregation summary statistics by region

	No. of countries	Mean	sd	Minimum	Maximum
World	97	.116	.113	.002	.489
N. America	6	.038	.044	.007	.068
Europe and central Asia	37	.062	.092	.002	.357
East Asia and Pacific	10	.093	.109	.002	.357
Middle East and N. Africa	6	.120	.103	.019	.253
Latin America and Caribbean	14	.146	.123	.011	.384
South Asia	6	.176	.181	.005	.412
Sub-Saharan Africa	22	.187	.128	.002	.489

this is that data on ethnic group may be more optimally collected in countries that have experienced civil wars. This is a criticism that can be directed at all the measures of ethnicity, i.e. fractionalization, polarization, and segregation, and is particularly a problem with any self-declared data where ethnic saliency can affect response. With specific reference to segregation, civil wars can cause the physical displacement of people. However, most of the factors that make up the definition of ethnicity are time invariant. Nevertheless, to explore this issue further, I analyse how the fractionalization index that is developed from the same data as the segregation index compares to the traditional fractionalization index taken from the Atlas Narodov Mira (1964), since I cannot test whether segregation values have changed over time. The index of fractionalization (FRACT A2011) from which the index of segregation is drawn is correlated at .87, one of the highest degrees of correlation with the data from the 1960s. This correlation holds even when looking only at countries that have experienced civil war, which would be those where data could be expected to be different.[9]

There are a number of countries for which the segregation data are missing (see Appendix 1.4)[10]. Analyzing the underlying hazard for having a civil war in the group of countries for which segregation data are available and the group for which data are not shows a significant difference in the probability of having a civil war in the Hegre and Sambanis dataset, but no difference in both the Fearon and Laitin dataset and the UCDP/PRIO dataset. This highlights how small differences in measurement can affect results when dealing with rare events such as civil wars, and the advantages of looking at the different datasets. Still, given the number of missing observations, until further data for segregation are available the results presented here can only be considered provisional.

_____

9.   The correlation is also .87.
10. These constitute almost 40% of the observations analysed and half the civil wars included.

Large population has been suggested as a proxy for motivation as there is more chance of there being different ethnic groups who are prepared to fight within the country. Others see it as contributing to the feasibility of civil war as fighters are easier to come by. Following convention, population is logged.

Poverty and slow economic growth give some of the most robust correlations with civil war onset and they are robust to different econometric methods and different time periods. The log of GDP per capita is therefore included along with a measure for economic growth[11].

The form of the state can be a significant factor in the onset of civil war because it can mitigate or accommodate conflict. Specifically, democracy provides an outlet for conflict within the democratic system and so should be associated with fewer civil wars. At the other end of the scale, dictatorships, similar to countries with large militaries, can deter or repress outbreaks of violence. Political scientists have therefore argued that anocracies should be the form of state most prone to civil wars. Hegre et al (2001) explore this argument and find that states in the middle of the democracy-autocracy scale are most likely to experience civil wars, regardless of the time since the last change in state status. Vreeland (2008) has drawn attention to the importance of choosing a polity index that does not include political violence in its definition, which would create endogeneity problems, and so I use the Scalar Index of Polities developed by Gates et al (2006)[12].

Other feasibility factors are accounted for with variables for oil and for mountains. Oil is coded one for country-years where a country has received more than one third of its total export revenues from oil exports, and zero otherwise. The concept of mountains is measured by the percentage of the terrain that is mountainous and the value is logged. On the one hand neorealists argue that civil wars emerged due to the instability in many regimes following the end of the Cold War, others

---

11. In my base dataset this economic information is only available from 1960 to 1997, so this limits the number of country-years analysed.
12. I am grateful to referee B for drawing my attention to this point.

argue that the end of the Cold War unleashed ethnic conflict (Sambanis 2001, Fearon & Laitin 2003). Kalyvas and Balcells (2010) assess the impact of the international system and find that, while the end of the Cold War does not impact on civil war onset, it affects strongly the ways that civil wars are prosecuted. Following their arguments I take the end of the Cold War as 1991, when the Soviet Union dissolved and new states emerged, and the dummy variable for Cold War takes the value of one for country-years 1991 and prior and zero otherwise.

Finally, diffusion and contagion may transmit civil war beyond national borders (Lake & Rothschild 1998). The former acts through information flows to ethnic groups in other societies, while the latter arises from cross-border alliances of ethnic groups divided by a border. Sambanis (2001) finds that living in a "bad" neighbourhood, i.e. one where neighbouring countries are undemocratic and have civil wars, increases the likelihood of civil wars. This effect is therefore controlled for.

4.4. METHOD

Logit regressions are run separately on each of the dependent variables. To deal with possible temporal dependence between observations in discrete-time data the method developed by Beck, Katz & Tucker (1998) is used to include natural cubic splines in the right hand side of the equation to be estimated (Tucker 1999). Dependence within country is controlled for by clustering on country[13]. Although some countries that do not have segregation or polarization data are lost (see Appendix 1.4 and 1.5), regressions are run on 74 countries.

5. RESULTS

The first assessment is of the impact of segregation on civil war onset. Table III shows the results of both the baseline model and the model

---

13. Clustering controls for correlation of variables within countries. This gives robust standard errors and so smaller t-statistics, giving more conservative results.

including segregation for each of the three databases. The Hegre and Sambanis (2006) database is referred to as HS, the Fearon and Laitin (2003) database is referred to as FL and the UCDP/PRIO Armed Conflict Dataset (2009) is referred to as PRIO.

Table III. Impact of segregation on civil war onset

Independent variables	HSa	HSb	FLa	FLb	PRIOa	PRIOb
intercept	-4.811***	-5.193**	-5.064***	-6.080**	-3.971**	-4.995**
	(1.31)	(1.88)	(1.31)	(1.90)	(1.33)	(1.76)
nlog population	0.191**	0.201*	0.192**	0.225**	0.219**	0.293**
	(0.07)	(0.08)	(0.07)	(0.08)	(0.08)	(0.10)
nlog gdp per capita	-0.490***	-0.576***	-0.412***	-0.541***	-0.388***	-0.415***
	(0.09)	(0.13)	(0.10)	(0.15)	(0.07)	(0.10)
change in GDPcap	-0.794	-2.125	-2.045*	-1.002	-0.863	-0.542
	(1.14)	(1.25)	(0.97)	(1.43)	(0.63)	(0.85)
Scalar Index of Polities	0.150	1.151**	0.251	1.247**	0.450	0.853*
	(0.36)	(0.39)	(0.38)	(0.47)	(0.28)	(0.40)
oil exports/GDP	0.857**	0.512	0.448	0.264	0.753**	0.280
	(0.33)	(0.55)	(0.38)	(0.57)	(0.27)	(0.32)
rough terrain	0.147	0.006	0.215*	0.019	0.015	-0.121
	(0.08)	(0.14)	(0.09)	(0.13)	(0.07)	(0.09)
Cold War 1991	0.162	0.324	-0.285	0.125	-0.355	-0.666*
	(0.31)	(0.41)	(0.34)	(0.49)	(0.25)	(0.32)
neighbour at war	0.686**	0.428	0.314	0.234	0.373*	0.216
	(0.24)	(0.28)	(0.28)	(0.33)	(0.18)	(0.25)
ethnic segregation		3.548*		3.373*		2.123*
		(1.38)		(1.36)		(0.83)
Observations	3833	2522	3833	2522	3833	2522
Pseudo loglikelihood	-318.932	-186.621	-278.210	-174.736	-563.081	-334.833
Pseudo R2	0.087	0.126	0.075	0.094	0.092	0.13

Logit regression, robust standard errors in parenthesis, splines included in analysis but not reported

* p<0.05, ** p<0.01, *** p<0.001

In Table III, we see that segregation is significant at the 5% level in each of the three datasets. In each dataset, the pseudo log likelihood and the pseudo R-squared increase when segregation is introduced into the model. These results support hypothesis 1, that segregation causes an increase in the probability of civil war. Oil is significant at the 1% level in two of the databases in the baseline model, yet loses its significance when segregation is introduced. This supports the idea that territory has an intrinsic value regardless of specific resources.

Next all the measures of ethnicity – fractionalization, polarization and segregation – are included, and Table IV shows the results for each of the three databases. With respect to the models with only segregation in Table III the pseudo log likelihoods and the pseudo R-squared measures have increased.

In the two higher threshold datasets (HS and FL) fractionalization is not significant and is negative, supporting hypothesis 2 that segregation captures those attributes conventionally attributed to fractionalization. However, in the UCDP/PRIO dataset fractionalization is significant to the 5% level while segregation is not. This is an interesting difference. There is also a negative correlation with Cold War year, so here we are looking at smaller scale struggles that have happened since the end of the Cold War. This is discussed further in the conclusion. With regards to the hypothesis, the results suggest that segregation is more important than fractionalization in major rebellions, but in line with expectations both factors should be considered as they both contribute to the impact on the probability of civil war.[14]

Polarization is not significant in any of the three datasets[15]. Taking the model with the first dataset, if polarization were to change from its

_____

14. Interaction terms between segregation and fractionalization were tested but found not to be significant.
15. It is surprising that polarization is not significant, given that there are results showing polarization to be significant (Reynal-Querol 2002, Esteban, Mayoral & Ray forthcoming). The difference may be due to the construction of the database which is here analysed on a country-year basis but in the mentioned papers the data are grouped into 5-year periods, though Collier and Hoeffler (2004) also used 5-year grouped data and did not find polarization significant.

Table IV. Models including all measures of ethnicity

Independent variables	HS	FL	PRIO
intercept	-5.451*	-6.589**	-6.548***
	(2.44)	(2.08)	(1.94)
nlog population	0.239*	0.292**	0.315**
	(0.10)	(0.09)	(0.10)
nlog gdp per capita	-0.703***	-0.780***	-0.349***
	(0.15)	(0.17)	(0.10)
change in GDPcap	-1.084	0.554	-0.412
	(1.18)	(1.40)	(0.88)
Scalar Index of Polities	1.200**	1.527**	0.925*
	(0.44)	(0.53)	(0.39)
oil exports/GDP	0.134	-0.264	0.081
	(0.68)	(0.77)	(0.35)
rough terrain	-0.128	-0.183	-0.134
	(0.15)	(0.15)	(0.11)
Cold War 1991	0.682	0.565	-0.707*
	(0.45)	(0.56)	(0.34)
neighbour at war	0.301	0.084	0.158
	(0.31)	(0.37)	(0.25)
ethnic fractionalization	-0.302	-0.839	1.000*
	(0.50)	(0.58)	(0.46)
ethnic polarization	0.174	0.882	0.696
	(0.93)	(1.05)	(0.58)
ethnic segregation	4.897**	5.097**	1.590
	(1.53)	(1.81)	(0.98)
Observations	2413	2413	2413
Pseudo loglikelihood	-172.405	-157.516	-303.894
Pseudo R2	0.136	0.118	0.151

Logit regression, robust standard errors in parenthesis, splines included in analysis but not reported

* p<0.05, ** p<0.01, *** p<0.001

minimum to its maximum value, there would be a 0.1% increase in the probability of civil war onset. If segregation were to increase from its minimum to its maximum value, there would be a 2.5% increase. Between the hypothetical minimum of zero of segregation and its hypothetical maximum of one, there is a 17% increase in the probability of civil war onset, whereas with polarization this value is 0.1%. These results support the hypothesis 3 that segregation is more significant than polarization in predicting civil war onset over hypothesis 4. Expectations lead us to believe that both should be considered, and this is supported by the finding that eliminating the polarization measure decreases the pseudo log likelihood and the pseudo R-squared.

Figure 1, based on the results from the Hegre and Sambanis dataset, shows a comparison of the predicted values of segregation, polarization and fractionalization.

In the two databases of civil wars with a higher death threshold, (HS and FL), segregation is significant at the 1% level and is the only eth-

Figure 1. Impact of measures of ethnicity on probability of civil war onset
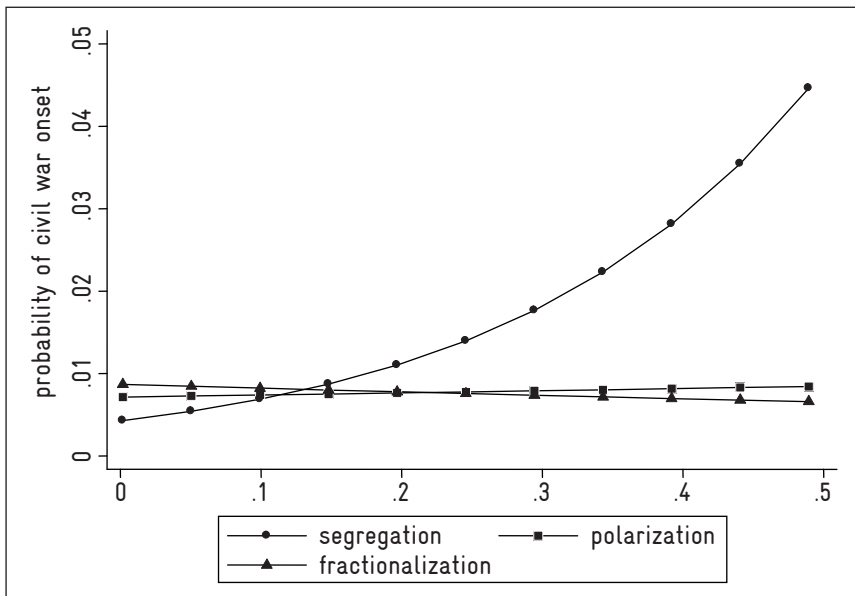
Table V. Ethnic wars

Independent variables	HS	FL	PRIO
intercept	-8.083*	-9.124**	-8.297**
	(3.78)	(3.42)	(3.19)
nlog population	0.311*	0.412**	0.378**
	(0.15)	(0.16)	(0.13)
nlog gdp per capita	-0.517**	-0.728***	-0.296*
	(0.17)	(0.19)	(0.13)
change in GDPcap	-0.777	-0.577	-0.015
	(1.15)	(1.34)	(1.07)
Scalar Index of Polities	0.782*	1.323*	0.975
	(0.39)	(0.56)	(0.55)
oil exports/GDP	0.438	0.432	0.427
	(0.56)	(0.65)	(0.40)
rough terrain	-0.257	-0.433	-0.189
	(0.23)	(0.24)	(0.17)
Cold War 1991	1.159	0.437	-1.074**
	(0.65)	(0.66)	(0.34)
neighbour at war	0.552	0.147	0.467
	(0.38)	(0.47)	(0.33)
ethnic fractionalization	-0.270	-0.333	1.418*
	(0.54)	(0.78)	(0.55)
ethnic polarization	-0.582	0.002	0.426
	(0.91)	(1.11)	(0.75)
ethnic segregation	6.381**	7.121**	1.983
	(2.11)	(2.65)	(1.32)
Observations	2413	2413	2413
Pseudo loglikelihood	-138.919	-114.316	-217.193
Pseudo R2	0.162	0.15	0.217

Logit regression, robust standard errors in parenthesis, splines included in analysis but not reported

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

nicity variable that is significant. In the dataset with lower threshold (PRIO), segregation is insignificant. These results suggest that segregation impacts on the factors required to mount a major rebellion, such as increased motivation and supports hypothesis 5. Polarization is not significant so hypothesis 6 is not supported.

Hypothesis 7 is the first to disaggregate the concept of civil war and considers solely ethnic wars. The results are shown in Table V. Again we see that the pseudo log likelihood increases and the pseudo R-squared also increases. Similar to the results in Table IV segregation is significant at the 1% level in the two higher threshold databases (HS and FL), while fractionalization is negative and neither fractionalization nor polarization are significant. In the lower threshold database (PRIO) segregation is insignificant and fractionalization is significant at the 5% level. Hypothesis 7, that segregation is particularly significant in ethnic wars, is therefore supported for major conflicts but not when smaller conflicts are included in the analysis. This will be further discussed in the conclusion.

Hypotheses 8 and 9 also disaggregate civil war, this time into wars over territory[16]. In all three datasets we see that the pseudo log likelihood is significantly higher than against the broad definition of civil war. The pseudo R-squared has also increased, particularly in the dataset with a lower death threshold (PRIO), which was previously 0.151 and is now 0.282. Segregation is significant in all three datasets and at 0.1% in the Fearon and Laitin dataset, which strongly supports hypothesis 8 that segregation increases the probability of wars over territory and hypothesis 9 that this effect also holds in smaller-scale conflicts. Again, we have the same story with fractionalization negative and insignificant in the two high threshold datasets, but significant at the 5% level in the low threshold database. Polarization is not significant. It is interesting to note that mountainous terrain is for the first time significant in two of the datasets, but is negative in all of them. This supports the hypothesis that the separation of a group into its

---

16. Ethnic wars and wars over territory are highly correlated, with correlations of .63 for the HS dataset, .73 for the FL dataset, and .76 for the UCDP/PRIO dataset.

Table VI. Wars over territory

Independent variables	HS	FL	PRIO
intercept	-16.902***	-16.279***	-10.094***
	(2.92)	(2.71)	(2.60)
nlog population	0.752***	0.756***	0.492***
	(0.11)	(0.11)	(0.11)
nlog gdp per capita	-0.465	-0.620*	-0.379*
	(0.28)	(0.29)	(0.19)
change in GDPcap	0.641	-0.300	-0.311
	(1.74)	(1.94)	(1.32)
Scalar Index of Polities	0.925	1.525**	1.552*
	(0.58)	(0.59)	(0.62)
oil exports/GDP	0.924	0.391	-0.019
	(0.56)	(0.69)	(0.55)
rough terrain	-0.607**	-0.488	-0.447**
	(0.23)	(0.25)	(0.17)
Cold War 1991	1.435	1.392	-1.143*
	(1.04)	(1.13)	(0.47)
neighbour at war	0.418	-0.351	0.351
	(0.58)	(0.65)	(0.41)
ethnic fractionalization	-0.202	-1.122	1.414*
	(0.88)	(0.93)	(0.60)
ethnic polarization	0.474	0.047	0.873
	(1.13)	(1.11)	(0.87)
ethnic segregation	5.408**	7.534***	3.744**
	(1.95)	(1.99)	(1.42)
Observations	2413	2413	2413
Pseudo loglikelihood	-84.357	-86.752	-149.103
Pseudo R2	0.205	0.182	0.282

Logit regression, robust standard errors in parenthesis, splines included in analysis but not reported

* p<0.05, ** p<0.01, *** p<0.001

Table VII. Wars over government

Independent variables	HS	FL	PRIO
intercept	2.514	0.183	-3.765
	(3.01)	(3.17)	(1.96)
nlog population	-0.351*	-0.216	0.070
	(0.16)	(0.15)	(0.09)
nlog gdp per capita	-0.738**	-0.910***	-0.280*
	(0.23)	(0.27)	(0.14)
Scalar Index of Polities	1.642	2.330*	0.179
	(0.84)	(1.00)	(0.55)
rough terrain	0.197	0.078	0.063
	(0.18)	(0.19)	(0.14)
Cold War 1991	-0.196	-0.264	-0.654
	(0.47)	(0.74)	(0.51)
neighbour at war	0.498	0.276	-0.130
	(0.46)	(0.54)	(0.30)
ethnic fractionalization	0.213	-0.937	0.531
	(0.84)	(0.86)	(0.55)
ethnic polarization	0.522	1.457	1.078
	(1.52)	(1.79)	(0.63)
ethnic segregation	5.896**	6.261*	1.500
	(2.20)	(2.87)	(1.01)
change in GDPcap		1.089	-0.676
		(1.75)	(1.23)
oil exports/GDP			0.065
			(0.53)
Observations	2276	2220	2413
Pseudo loglikelihood	-105.103	-92.569	-192.829
Pseudo R2	0.152	0.154	0.053

Logit regression, robust standard errors in parenthesis, splines included in analysis but not reported

* $p<0.05$, ** $p<0.01$, *** $p<0.001$

own territory provides sufficient advantages when considering the opportunity for rebellion. Segregation renders conditions previously considered important for insurgencies, such as rough terrain, less important. These wars are also more likely in large countries, a result that is not surprising.

The corresponding table for wars over government is given in Table VII. In this table, segregation is significant in the two high threshold datasets, at the 1% level in the HS dataset and at the 5% level in the FL dataset, and not significant in the low threshold dataset. This result shows that although segregation is highly significant in wars over territory it is not unique to these, but rather has effects in all civil wars. This gives support to hypothesis 1. Polarization and fractionalization are not significant. It is interesting to note that unlike wars over territory, conflicts over government are taking place in small countries. Population is negative in the two high threshold datasets and not significant in the FL and PRIO datasets, contrary to one of the most robust correlations of civil war. This reinforces that civil wars have multiple causal mechanisms and different disaggregations can give us different information.

ROBUSTNESS CHECKS

As a robustness check each of the specifications considered above is run on the Fearon & Laitin dataset using their original model (2003). These results confirm the conclusions reached above, with segregation significant at 5% in ethnic wars and 0.1% in wars over territory. It is also interesting to note that when segregation is included oil becomes insignificant and mountains become negative in wars over territory. This supports the findings above for wars of territory. The full results are given in Appendix 2.

Different definitions of the key variables were also considered. Segregation can be remeasured to distribute proportionately among each of the groups the residual category of "other groups". When this revised measure was used, the segregation variable remained significant, though at a lower level. The effect of different measures of frac-

tionalization were also investigated and when using these different measures segregation remained significant, and highly significant in wars of territory.

Other studies have included the length of time a country has been at peace. Peace years and polynominal transformations of peace years were tested, but once temporal dependence using splines is controlled for, these were found to be insignificant and did not affect the size or significance of the estimate for segregation. They were therefore not included in the model.

6. CONCLUSION

A measure of ethnic segregation is tested for the first time on the probability of civil war onset in three well-established databases, using data from 1960-1997 using logit regression. These tests find that segregation is significant in predicting the onset of civil war in major rebellions (i.e. over 1,000 deaths), and that this significance holds also in ethnic wars, wars over government, and is increased in wars over territory. In wars over territory segregation is also significant in smaller-scale conflicts. Fractionalization is significant when small scale conflicts are also included in the analysis, though not in wars over government. By contrast, polarization is not significant.

Taking all the results together, is it possible to say anything about which ethnic configuration gives an increased probability of civil war? It seems that countries most likely to have major rebellions are those that do not have many ethnic groups, where these groups are not highly polarized, but where they are separated from each other. By contrast, countries that are most likely to have a civil conflict when small conflicts are included are those with many groups, again not highly polarized but also not separated from each other. These rebellions are also significantly correlated with the end of the Cold War. Kalyvas and Balcells (2010) find very different types of conflict during and after the Cold War, finding that more conventional and symmetrical non-conventional wars (SNC) are fought after the end of the Cold War. Certainly, SNC

wars would fit the stereotype of the failed state with warlords from rival ethnicities competing for control, a scenario compatible with an ethnic configuration of high fractionalization found in the analysis.

While there has been theoretical speculation on the impact of segregation on civil war, this is the first time to my knowledge that it has been tested on a large-N analysis covering countries that have not experienced conflicts as well as those that have. The model is robust to the redefinitions of core variables and alternative specifications and datasets.

Segregation could work through three separate mechanisms that may each increase the probability of civil war onset. These are the physical clustering of the group in question, physical separation from other groups, and homogeneity within a territory. Each of these mechanisms can have effects by providing more motivation or more opportunities.

Looking firstly at motivation, it can arise from increased ethnic saliency brought about by physical proximity and by homogeneity. Physical proximity can also help reinforce a sense of collective grievance. The separation from other groups can increase a sense of "us" and "them" and increase resentment over perceived grievances. Ethnic homogeneity within a territory creates a sense of territorial belonging and homeland.

Turning now to consider feasibility, rebellion becomes more feasible through the coordination advantages brought by physical clustering such as being able to mobilize and coordinate fighters and weapons. Physical separation from other groups and particularly the capital bring resistance advantages. There are also advantages from ethnic trust and control brought by increased homogeneity, which increases internal trust and policing. Factors previously thought to be important for feasibility, such as mountainous terrain and a weak state, lose their significance when segregation is controlled for and particularly so when segregation is included in wars of territory.

These results must be considered provisional, given the number of countries for which we are missing the segregation index. However, this study has suggested a new and exciting contribution to the un-

derstanding of the role of ethnicity in civil war onset. A further stage of study would be to include the types of civil wars – conventional, insurgency, and symmetric non-conventional wars and thus learn more about the dynamics of civil war. It would also be interesting to combine the macro-level understanding that we get with the index of segregation with the micro-level work being done with geo-referencing studies. Combining both sources will give more detailed information about the precise processes at work in the onset of civil wars and may help specify the connection between the micro and the macro level.

Data replication: The dataset, codebook, and do-files for the empirical analysis in this article are available from the author. The empirical analysis was carried out with stata.

REFERENCES

- Alesina, Alberto, Arnaud Devleeschauwer, William Easterly, Sergio Kurlat, & Romain Wacziarg. 2003. "Fractionalization". *Journal of Economic Growth*. 8(2): 155-94.
- Alesina, Alberto & Ekaterina Zhuravskaya. 2011. "Segregation and the quality of government in a cross-section of countries". *American Economic Review* 101(5): 1872-1911.
- Beck, Nathaniel, Jonathan N Katz & Richard Tucker. 1998. "Taking time seriously: Time-series-cross-section analysis with a binary dependent variable". *American Journal of Political Science* 42(4):1260-1288.
- Bhavnani, Ravi & Dan Miodownik. 2009. "Ethnic polarization, ethnic salience, and civil war". *Journal of Conflict Resolution* 53(1) 30-49.
- Buhaug, Halvard & Jan Ketil Rød. 2006. "Local determinants of African civil wars, 1970-2001". *Political Geography* 25(3): 315-335.
- Buhaug, Halvard, Lars-Erik Cederman, & Jan Ketil Rød. 2008. "Disaggregating ethno-nationalist civil wars: A dyadic test of exclusion theory". *International Organization* 62(3): 531-551.

- Busch, Marc L & Eric Reinhardt. 1999. "Industrial location and protection: The political and economic geography of US nontariff barriers" *American Journal of Political Science* 43(4): 1028-1050.
- Cederman, Lars-Erikson, Halvard Buhaug & Jan Ketil Rød. 2009. "Ethno-nationalist dyads and civil war: A GIS-based analysis". *Journal of Conflict Resolution* 53(4): 496-525.
- Collier, Paul & Anke Hoeffler. 2004. "Greed and grievance in civil war". *Oxford Economic Papers* 56: 563-595.
- Congleton, Roger D. 1995. "Ethnic clubs, ethnic conflict, and the rise of ethnic nationalism". In: Albert Breton, Gianluigi Galeotti, Pierre Salmon & Ronald Wintrobe (eds) *Nationality and Rationality* New York: Cambridge University Press, 71-97.
- Cornell, Svante E. 2002. "Autonomy as a source of conflict: Caucasian conflicts in theoretical perspective". *World Politics* 54(2): 245-276 .
- Cunningham, David E, Kristian Skrede Gleditsch & Idean Salehyan. 2009. "It takes two: A dyadic analysis of civil war duration and outcome". *Journal of Conflict Resolution* 53(4): 570-597.
- Cunningham, Kathleen Gallagher & Nils B Weidmann. 2010. "Shared space: Ethnic groups, state accommodation, and localized conflict" *International Studies Quarterly* 54(4): 1035-1054.
- Doyle, Michael W & Nicholas Sambanis. 2000. "International peacebuilding: A theoretical and quantitative analysis" *American Political Science Review* 94(4): 779-801
- Elbadawi, Ibrahim & Nicholas 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, Joan-María & Debraj Ray. 1994. "On the measurement of polarization" *Econometrica* 62(4) 819-851.
- Esteban, Joan-María & Debraj Ray. 1999. "Conflict and distribution" *Journal of Economic Theory* 87(2) 379-415.
- Esteban, Joan-María, Laura Mayoral & Debraj Ray. 2011. "Ethnicity and conflict: An empirical study" Barcelona GSE Working Papers Series No. 482

- Fearon, James D. 1998. "Commitment problems and the spread of ethnic conflict". In: David A Lake and Donald Rothschild (eds) *The International Spread of Ethnic Conflict: Fear, Diffusion and Escalation* Princeton NJ: Princeton University Press.
- Fearon, James D. 2003. "Ethnic and cultural diversity by country" *Journal of Economic Growth* 8(2): 195-222.
- Fearon, James D & David D Laitin. 2003. "Ethnicity, Insurgency, and Civil War". *American Political Science Review* 97(1): 75-90.
- Gates, Scott. 2002. "Recruitment and allegiance: the microfoundations of rebellion". *Journal of Conflict Resolution* 46(1): 111-130.
- Gates, Scott G., Håvard Hegre, Mark P. Jones, & Håvard Strand. 2006. "Institutional Inconsistency and Political Instability: Persistence and Change in Political Systems Revisited, 1800-2000", *American Journal of Political Science:* 50(4).
- Gleditsch, Nils Petter, Peter Wallensteen, Mikael Eriksson, Margareta Sollenberg & Håvard Strand. 2002. "Armed conflict 1946-2001: A new dataset" *Journal of Peace Research* 39 (5): 615-637.
- Goldstone, Jack A, Robert H Gates, David L Epstein, Ted Robert Gurr, Michael B Lustick, Monty G Marshall, Jay Ulfelder, & Mark Woodward. 2010. "A global model for forecasting political instability". *American Journal of Political Science* 54(1): 190-208.
- Gurr, Ted Robert. 2000. *Peoples versus States: Minorities at Risk in the New Century*. Washington DC: US Institute of Peace.
- Harbom, Lotta & Peter Wallensteen. 2009. "Armed conflict, 1946-2008". *Journal of Peace Research* 46(4): 577-587.
- Hegre, Håvard, Tanja Ellingsen, Scott Gates & Nils Petter Gleditsch. 2001. "Towards a democratic civil peace? Democracy, political change and civil war, 1816-1992". *American Political Science Review* 95(1): 33-48.
- Hegre, Håvard & Nicholas Sambanis. 2006. "Sensitivity Analysis of Empirical Results on Civil War Onset". *Journal of Conflict Resolution* 50(4): 508-535.

- Horowitz, Donald L. 1985. *Ethnic Groups in Conflict* Berkeley and Los Angeles CA: University of California Press.
- *Journal of Conflict Resolution*. 2009. Disaggregating civil war 53(4).
- Kalyvas, Stathis N & Laia Balcells. 2010. "International system and technologies of rebellion: How the end of the Cold War shaped internal conflict". *American Political Science Review* 104(3): 415-429
- Lake, David A and Donald Rothschild (eds). 1998. *The International Spread of Ethnic Conflict: Fear, Diffusion and Escalation* Princeton NJ: Princeton University Press.
- Lichbach, Mark. 1995. *The Rebel's Dilemma* Ann Arbor: University of Michigan Press.
- Lujala, Paivi. 2009. "Deadly combat over natural resources: Gems, petroleum, drugs, and the severity of armed conflict". *Journal of Conflict Resolution* 53(1): 50-71.
- Lujala, Paivi, Nils Petter Gleditsch & Elisabeth Gilmore. 2005. "A diamond curse? Civil war and a lootable resource". *Journal of Conflict Resolution* 49(4): 538-562.
- Montalvo, José G & Marta Reynal-Querol. 2005. "Ethnic polarization, potential conflict, and civil wars". *The American Economic Review* 95(3): 796-816.
- Mozaffar, Shaheen, James R Scarritt & Glen Galaich. 2003. "Electoral institutions, ethnopolitical cleavages, and party systems in Africa's emerging democracies". *American Political Science Review* 97(3): 379-390.
- Posen, Barry R. 1993. "The security dilemma and ethnic conflict". *Survival 35* (1): 27-47.
- Posner, Daniel N. 2004. "Measuring ethnic fractionalization in Africa". *American Journal of Political Science* 48(4) 849-863.
- Reynal-Querol, Marta. 2002. "Ethnicity, political systems, and civil war". *Journal of Conflict Resolution* 46(1): 29-54.
- Sambanis, Nicholas. 2001. "Do ethnic and nonethnic civil wars have the same causes? A theoretical and empirical enquiry (Part 1)". *Journal of Conflict Resolution* 45(3): 259-282.

- Sambanis, Nicholas. 2004. "What is civil war? Conceptual and empirical complexities of an operational definition". *Journal of Conflict Resolution* 48(6): 814-858.
- Toft, Monica Duffy. 2003. *The Geography of Ethnic Violence: Identity, Interests and the Indivisibility of Territory* Princeton, NJ: Princeton University Press.
- Tucker, Richard. 1999. "BTSCS: A Binary Time-Series Cross-Section Data Analysis Utility. Version 4.0.4." Cambridge, MA: Harvard University. Retrieved 15/06/2011 from http://www.fas.harvard.edu/~rtucker/programs/btscs/btscs.html .
- UCDP/PRIO Armed Conflict Dataset, version 4-2009, Retrieved 23/06/2011 from http://www.prio.no/CSCW/Datasets/Armed-Conflict/UCDP-PRIO/Armed-Conflicts-Version-X-2009/ .
- UCDP/PRIO Armed Conflict Datasetv4_2009 Codebook. 2009. Retrieved from http://www.prio.no 23/06/2011.
- Vreeland, James Raymond. 2008. "The effect of political regime on civil war: Unpacking anocracy". *Journal of Conflict Resolution* 52(3): 401-425
- Wimmer, Andreas & Brian Min. 2006. "From Empire to Nation-State: Explaining Wars" *American Sociological Review* 71(6): 867-897.
- Wolfson, Michael C. 1994. "When inequalities diverge" *American Economic Review* 84(2): 353-358

APPENDIX 1. DATA

1.1. DATA SOURCES

Variable	Label	Information	Source
Dependent variables			
warstnb	Civil war onset	Civil war onset, coded 1 in onset year and 0 in all other years	Sambanis 2004
FLonset	FL onset	Civil war onset, coded 1 in onset year and 0 in all other years	Fearon and Laitin 2003
PRIOwar_D	PRIO conflict onset Dummy	Civil war onset, coded 1 in onset year and 0 in all other years	UCDP/PRIO Armed Conflict Dataset 2009
HSeth	HS ethnic war	Civil war onset, coded 1 in onset year and 0 in all other years, where conflict is over identity	Doyle and Sambanis 2000
FLethwar	FL ethnic war	Civil war onset, coded 1 in onset year and 0 in all other years, where fighters are mobilized on ethnic lines	Fearon and Laitin 2003
PRIOeth	PRIO ethnic war	Civil war onset, coded 1 in onset year and 0 in all other years, where conflict is over identity	UCDP/PRIO Armed Conflict Dataset 2009, using coding from Doyle and Sambanis 2000, Fearon and Laitin 2003
warstnsterr	HS territory	Civil war onset, coded 1 in onset year and 0 in all other years, where aim is territory or mixed	Sambanis 2004, using coding from UCDP/PRIO Armed Conflict Dataset 2009 and Fearon and Laitin 2003

FLstterr	FL onset territory	Civil war onset, coded 1 in onset year and 0 in all other years, where aim is territory or mixed	Fearon and Laitin 2003
PRIOwarterr	PRIO conflict onset territory	Civil war onset, coded 1 in onset year and 0 in all other years, where incompatibility is territory or both	UCDP/PRIO Armed Conflict Dataset 2009
warstnsgov	HS government	Civil war onset, coded 1 in onset year and 0 in all other years, where aim is government or mixed	Sambanis 2004 using coding from UCDP/PRIO Armed Conflict Dataset 2009 and Fearon and Laitin 2003
FLstgov	FL onset government	Civil war onset, coded 1 in onset year and 0 in all other years, where aim is government or mixed	Fearon and Laitin 2003
PRIOwargov	PRIO conflict onset government	Civil war onset, coded 1 in onset year and 0 in all other years, where incompatibility is government or both	UCDP/PRIO Armed Conflict Dataset 2009
Key explanatory variables			
ethnicity_I	Ethnic fractionalization – A2011	Ethnic fractionalization, 0 if no different groups, 1 at highest level of groups	Alesina and Zhuravskaya 2011
eth_pol_ Reynal	Ethnic polarization – MRQ2005	Ethnic polarization, 0 if no polarization, 1 at maximum where large minority faces majority	Montalvo and Reynal-Querol 2005
ethnicity_C	Ethnic segregation – A2011	Ethnic segregation, 0 if region reflects country as a whole, 1 if composition of region is different from country as a whole	Alesina and Zhuravskaya 2011

Control variables			
lpopns	Natural log population size	Natural log of population	Sambanis 2004
ln_gdpcap		Natural log of per capita gross domestic product (GDP) Data from 1960 to 1997	Computed from data in Hegre and Sambanis 2006
gdpcap_growth	Annual change in GDP, %		Computed from Hegre and Sambanis 2006,
oil	Oil exports/GDP	Dummy variable: code 1 for countries that receive greater than 1/3 of their exports from fuels	Fearon and Laitin 2003; Sambanis (2004a)
sip2	SIP	A index that runs from 0 to 1. From Scalar Index of Polities	Hegre and Sambanis 2006
lmtnest	Rough terrain	Natural log of percentage of mountainous terrain	Fearon and Laitin 2003
coldl1	Cold war	Dummy variable: code 1 for Cold War year, i.e. before 1991	Hegre and Sambanis 2006
nat_war	Whether a neighbour is at war in a given year		Hegre and Sambanis 2006

ethnicity_C	Ethnic segregation index	Alesina and Zhuraskaya 2011
ethnicity_I	Ethnic fractionalization index	Alesina and Zhuraskaya 2011
eth_pol_Reynal	Polarization index	Montalvo and Reynal-Querol 2005
eth_frac_Reynal	Ethnic fractionalization index	Montalvo and Reynal-Querol 2005
elfo	Ethnolinguistic diversity, taken from the original data from the Atlas Naradov Mira of 1964	Collier and Hoeffler 2004
ethnicity_AEpaper	Ethnic fractionalization index	Alesina et al. 2003
ef	Ethnic fractionalization index	Fearon 2003
ehet	Ethnic heterogeneity index	Vanhanen 1999

1.3. FRACTIONALIZATION

In total I had 7 different indices of fractionalization available. They were closely correlated to one another, with the least correlated being .73 (see table 1.3.1). The index elfo gives the values from the original data source, the Altas Naradov Mira, from 1964. Table 1.3.2 gives correlations between the indices for only countries that have suffered civil war.

Table 1.3.1. Correlation between different indices of fractionalization

	Ethnic AEpaper	ethfrac	ef	ethnic~I	elfo	ehet	eth_fr Reynal
ethnicity_AEpaper	1.0000						
ethfrac	0.8398	1.0000					
ef	0.9262	0.8316	1.0000				
ethnicity_I	0.8270	0.8815	0.8188	1.0000			
elfo	0.8144	0.9781	0.8184	0.8604	1.0000		
ehet	0.7904	0.8391	0.8216	0.8223	0.8294	1.0000	
eth_frac_Reynal	0.8561	0.8623	0.8431	0.8109	0.8399	0.7366	1.0000

Table 1.3.2. Correlation between different indices of fractionalization in countries that have experienced war

	Ethnic AE paper	ethfrac	ef	ethnic~I	elfo	ehet	eth_fr Reynal
ethnicity_AEpaper	1.0000						
ethfrac	0.6731	1.0000					
ef	0.8704	0.7626	1.0000				
ethnicity_I	0.7321	0.9109	0.7365	1.0000			
elfo	0.5958	0.9451	0.7284	0.8669	1.0000		
ehet	0.5308	0.8067	0.7499	0.6970	0.7836	1.0000	
eth_frac_Reynal	0.6542	0.8404	0.7421	0.8130	0.7659	0.6165	1.0000

1.4. SEGREGATION MISSING COUNTRIES

Segregation information is not available for the following countries:

Albania	Grenada	Nigeria
Algeria	Guinea-Bissau	North Korea
Andorra	Guyana	Oman
Angola	Haiti	Palau
Antigua & Barbuda	Iran	Papua New Guinea
Azerbaijan	Iraq	Poland
Bahamas	Jamaica	Republic of Vietnam
Barbados	Kiribati	Samoa
Bhutan	Kosovo	Sao Tome
Bosnia and Herzegovina	Kuwait	Seychelles
Botswana	Laos	Sierra Leone
Brunei	Lebanon	Singapore
Burundi	Liberia	Solomon Islands
Cape Verde	Libya	Somalia
Chad	Liechtenstein	St. Kitts and Nevis
Comoros	Luxembourg	St. Lucia
Congo	Madagascar	St. Vincent and the
Cuba	Malaysia	Grenadines
Cyprus	Maldives	Sudan
Democratic Republic of	Malta	Suriname
the Congo	Marshall Islands	Swaziland
Djibouti	Mauritania	Syria
Dominica	Mauritius	Thailand
Dominican Republic	Moldova	Tonga
East Timor	Monaco	Trinidad and Tobago
El Salvador	Mongolia	Tunisia
Equatorial Guinea	Montenegro	Turkmenistan
Egypt	Mozambique	Tuvalu
Eritrea	Myanmar	United Arab Emirates
Federated States of	Namibia	Uruguay
Micronesia	Nauru	Vanuatu
Fiji	Nicaragua	Venezuela
Gambia		Yemen
Georgia		

1.5. POLARIZATION MISSING COUNTRIES

Polarization information is not available for the following countries:

Albania	Eritrea	Mongolia
Andorra	Estonia	Montenegro
Antigua & Barbuda	Federated States of	Nauru
Armenia	Micronesia	North Korea
Azerbaijan	Georgia	Palau
Belarus	Kiribati	Portugal
Belize	Kosovo	Republic of Vietnam
Bhutan	Laos	Romania
Bosnia and Herzegovina	Latvia	Russia
Brunei	Lebanon	Sao Tome and Principe
Bulgaria	Libya	Slovakia
Burkina Faso	Liechtenstein	Slovenia
Croatia	Lithuania	Solomon Islands
Cuba	Macedonia	St. Kitts and Nevis
Czech Republic	Maldives	Turkmenistan
Djibouti	Marshall Islands	Tuvalu
East Timor	Moldova	Ukraine
Equatorial Guinea	Monaco	

APPENDIX 2. ROBUSTNESS CHECKS

Results using Fearon and Laitin model

	baseline model	all measures of ethnicity	ethnic wars	wars for territory
Prior war	-0.901***	-0.940**	-1.116*	-1.621*
	(0.27)	(0.31)	(0.47)	(0.66)
Per capita income[a,b]	-0.339***	-0.512***	-0.572**	-0.555
	(0.08)	(0.15)	(0.21)	(0.32)
Log(population)[a,b]	0.278***	0.335***	0.612**	1.094***
	(0.06)	(0.09)	(0.22)	(0.21)
Log(% mountainous)	0.207*	0.040	-0.252	-0.491*
	(0.09)	(0.14)	(0.26)	(0.25)
noncontiguous state	0.495	0.461	0.171	0.266
	(0.27)	(0.38)	(0.52)	(0.72)
Oil exporter	0.779**	0.696	1.251*	1.093
	(0.28)	(0.55)	(0.62)	(0.66)
New state	1.793***	1.172*	0.967	0.232
	(0.36)	(0.56)	(0.84)	(0.59)
Instability [a]	0.621**	-0.013	0.074	0.407
	(0.21)	(0.31)	(0.39)	(0.43)
Democracy [a,c]	0.022	0.060*	0.061	0.068*
	(0.02)	(0.03)	(0.03)	(0.03)
ethnic fractionalization	0.381	-1.132*	-1.046	-0.269
	(0.40)	(0.56)	(0.95)	(0.88)
religious fractionalization	0.189	-0.025	0.676	-3.183
	(0.58)	(0.86)	(1.62)	(2.94)
ethnic polarization		0.858	0.342	0.933
		(0.79)	(0.99)	(1.25)
ethnic segregation		2.175	5.339*	4.969***
		(1.29)	(2.37)	(1.40)

Constant	-7.008***	-6.726***	-10.259***	-14.633***
	(0.68)	(1.11)	(2.28)	(1.88)
Observations	6239	3584	3584	3584
Pseudo loglikelihood	-463.296	-234.119	-157.315	-106.317
Pseudo R2	0.11	0.151	0.219	0.31

Logit regression, robust standard errors in parenthesis, splines included in analysis but not reported

* p<0.05, ** p<0.01, *** p<0.001

[a] Lagged one year

[b] In 1000's

[c] Polity IV; varies from -10 to 10

International Catalan Institute for Peace (ICIP)

■ The principle purpose of the ICIP is to promote a culture of peace in Catalonia as well as throughout the world, to endorse peaceful solutions and conflict resolutions and to endow Catalonia with an active role as an agent of peace and peace research. The ICIP, seeking consistency between ends and means, is governed by the principles of promoting peace, democracy, justice, equality and equity in relationships between individuals, peoples, cultures, nations and states. It holds the aim of working for human security, disarmament, the prevention and peaceful resolution of conflicts and social tensions, and strengthening the roots of peace and coexistence, peace building and advocacy of human rights.

Objectives of the Publication

■ The ICIP wants to create an open forum on topics related to peace, conflict and security. It aims to open up debate and discussion on both theoretical and contemporary issues associated with the pursuit and maintenance of peace in our world. It strives to connect an eclectic group of voices including career academics, PhD students, NGO representatives, institutional representatives, and field workers and field writers to celebrate ground-breaking and constructive approaches to peace and conflict resolution.

Scope of the Publication (List of Themes)

■ The ICIP is interested in works related to peace, conflict and security research. It aims to provide an innovative and pluralist insight on topics of methodology of peace research, the history and development of peace research, peace education,

peace-keeping and peace-creating, conflict resolution, human security, human rights, global security, environmental security, development studies related to peace and security, international law related to peace, democracy, justice and equality, disarmament, gender, identity and ethics related to peace, science and technology associated with peace and security.

Audience:

- The ICP aims to provide accessible, valuable and well-researched material for all those interested in the promotion of peace. Our audience includes fellow academics and researchers, student of peace ands security, field workers, institutional and governmental representatives as well as the general public.

The review process

- Peer reviewed. Submissions should be sent directly to the series editor (recerca.icip@gencat.cat), who will check whether the paper meets the formal and general criteria for a working paper and will commission a review.
- The review procedure is double-blind. The series editor will choose two anonymous reviewers, generally from the Editorial Board, but may also commission an external review from outside the ICIP.
- Reviewers are asked to write a review within a month after having received the paper. Reviews should clearly indicate one of four options: (1) accept without changes; (2) accept with minor changes; (3) allow for resubmission after major changes (4) reject. Options 2 to 4 require some detailed comments. If a paper is accepted (option 1 or 2), reviewers are kindly asked to help authors correct minor linguistic or other errors by making notes in the manuscript. If they use the track changes function for this purpose they should make sure that their comments are anonymized.

Who may submit working papers?

- The main criterion for the submission of Working Papers is whether this text could be submitted to a good academic journal.
- ICIP staff and other fellows and visitors affiliated with the ICIP are expected to submit a working paper related to their research while at the ICIP.

Submission System

- All submissions can be made to the ICIP e-mail address: recerca.icip@gencat.cat with *Working Papers – submission* in the subject line.

Author Biographical Statement

- Authors must all provide a short biographical note including full name, affiliation, e-mail address, other contact information if necessary and a brief professional history. This information should be provided on a separate sheet with the title. All other personal references should be removed from the submission to ensure anonymity.

Abstract

- All papers must include English language abstracts (150 words max.)

Keywords

- A list of four to six keywords is also required.

Language and Style

- Authors may submit in Catalan, Spanish or English. The submission must be clearly written and easy to follow with headings demarcating the beginning of each section. Submission must in be Arial 11, double spaced and pages must be numbered.

- Papers should not be longer than 15.000 words (incl. footnotes and references). Longer papers may be returned with a request to shorten them. Papers that require more extensive presentation of data may add these in an appendix that will count separately. Appendices should, however, present data in a reader-friendly and condensed format.
- Papers that will require extensive linguistic editing will not be accepted for review. Minor linguistic corrections (as well as required revisions) suggested by the reviewer must be implemented by the author before the final editing of the paper.

Footnotes
- Footnotes may be used to provide the reader with substantive information related to the topic of the paper. Footnotes will be part of the word count.

References
- The Harvard author-date system. In this system, sources are briefly cited in the text, usually in parentheses, by author's last name and date of publication. The short citations are amplified in a list of references in alphabetical list, where full bibliographic information is provided. Bibliographic references must follow *The Chicago Manual of Style* (15th edition). See a *Chicago-Style citation quick guide* at: http://www.chicagomanualofstyle.org/tools_citationguide.html Citation generators: http://www.workscited4u.com/ http://citationmachine.net/

2011/5

Una anàlisi comparativa de la despesa militar espanyola en el molt llarg termini (1850–2009)
by Alonso Herranz, Oriol Sabaté and Gregori Galofré-Vilà
(available in Catalan and English)

2011/4

El foro social mundial y los movimientos antisistémicos
by Jordi Calvo
(available in Catalan and English)

2011/3

Cultural Relativism in the Universal Periodic Review of the Human Rights Council
by Roger Llovet Blackburn
(available in Catalan and English)

2011/2

Nuevas tendencias en la construcción de la paz. Otra forma de innovación Social
by Paul Ríos and Gorka Espiau
(available in Spanish and English)

2011/1

La lucha contra la impunidad de los crímenes internacionales en España: de la persecución a Pinochet a la inculpación del juez Garzón
by Claudia Jiménez Cortés
(available in Spanish and English)

2010/9

The Security Council and the Legitimacy of the Use of Force: Legal, Normative, and Social Aspects
by Matilde Pérez Herranz
(available in Spanish and English)

2010/8

Conflict, Peace and Security in Africa: an Assessment and New Questions After 50 Years of African Independence
by Rafael Grasa and Oscar Mateos
(available in Catalan and English)

2010/7

La OEA y la promoción de la democracia en las Américas: un objetivo en construcción
by Neus Ramis
(available in Spanish and English)

2010/6

The Evolution of the Climate Change Regime: Beyond a North–South Divide?
by Daniel Abreu Mejía
(available in Catalan and English)

2010/5

Participation of Women in Peace Processes. The Other Tables
by María Villellas
(available in Catalan, Spanish and English)

All numbers available at / Tots els números disponibles a:
http://www.gencat.cat/icip/eng/icip_wp.html