Proportional election systems and ethnic armed conflict

An empirical investigation

Katrine Heggedal

II

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II

Abstract

In the thesis I discuss the accommodationist claim that proportional election systems can contribute in reducing the risk of intrastate armed conflict in divided societies. I contend that if proportional systems reduce the risk of conflict anywhere, it is where ethnic differences are salient – where there are severe ethnic conflicts to absorb into politics. I look at groups that have large demographic power on the one hand, or are marked by high levels of negative horizontal economic inequality on the other. I discuss a theoretical model unpacking central mechanisms suggested by conflict regulation theory and comparative political science.

By the use of the rare events logistic model I find support for my hypothesis that proportional election systems reduce the risk of conflict for relatively large ethnic groups. I hypothesize that economic inequality is less of a threat to peace under proportional systems than under majoritarian. The result from regression suggest the opposite: Increasing levels of inequality is a greater danger under proportional systems than under majoritarian.

Further, my empirical investigation gives support to previous research contending that horizontal economic inequalities are a threat to intrastate peace. I also find that regulations allowing ethnic parties to compete for legislative power are associated with decline in conflict risk.

Moving beyond an interpretation of coefficient strength and significance, I discover that the marginal effects of proportional election systems are close to zero, contrary to the claims of the advocates of both majoritarianism and proportionalism regarding divided societies. My benign test evidences that neither the majoritarian nor the proportional election system is superior; Any reduction in risk of armed conflict induced by the election systems is negligible.

IV

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I alone am responsible for the content of this thesis.

VI

Contents

List of Tables

List of Figures

Chapter 1

Introduction

Some of the most intractable and damaging intrastate armed conflicts are about political and economic equality in ethnically divided societies. At the same time one of the main determinants of how preferences in society are translated into power and policies is the electoral system. The proportional vision of election systems entails dispersion of political power between groups in society, and a common, but contested, claim is that proportional election systems contribute in reducing the risk of intrastate armed conflict in divided societies. For instance, Lijphart's recommendation is very clear: "For divided societies, ensuring the election of a broadly representative legislature should be the crucial consideration, and PR is undoubtedly the optimal way of doing so" (Lijphart 2004:100). This thesis is an empirical investigation of implications of theories on proportional election systems as peace preserving for ethnically divided societies.

The conception of what constitutes a *divided society* differs between scholars of intrastate conflict. I present a simple theoretical model proposing the basic concept that a proportional election (PR) system reduces the risk of intrastate armed conflict where ethnic divisions are salient. I highlight two features of ethnic groups deciding the salience of ethnic divisions: The ethnic composition of the state – more specifically the relative sizes of groups and the level of ethnic polarization – and the level of horizontal economic inequalities. Where these divisions are salient, I propose, a proportional system of elections has a substantial and negative conditional effect on the probability of armed conflict onset. Taken together, the mechanisms linking demographic power balance and economic inequality to conflict creates a scenario where some combinations of group composition and economic inequalities increase

the risk of intrastate armed conflict. Other combinations will be conducive to lasting peace between ethnic groups. For example, large and economically deprived groups living under PR systems, are hypothesized to be most at risk of armed conflict, whereas small and economically privileged groups living in proportional states, will have nothing to gain from launching rebellion against the state.

My predictions receive partial support from regression analyses, but I also find evidence suggesting that under some circumstances, majoritarian institutions are better at containing conflict. However, the uncovered effects are very small, and for some levels of independent variable values inseparable from zero. This leads me to conclude that the conditional effect of proportional election systems on intrastate armed conflict is negligible. Scholars should be cautious in universally recommending proportional systems as an outright remedy for lasting peace.

This thesis can be placed within a large strain of research investigating how and whether institutional arrangements can contribute to hinder the outbreak of intrastate armed conflict between ethnic groups. In UN's Human Development Report (Murphy and Ross-Larson 2004), it is claimed that one of the most difficult and important questions of contemporary politics is: How should societies respond to the opportunities and challenges raised by ethno-cultural divisions, and simultaneously promote democracy, social justice, stability and peace? Also, the global movement towards more democratic governance in the world, from the 1980s to the still ongoing "Arab Spring" stimulate the search for enduring models of appropriate representative institutions. Indeed the "seismic political events of late 2010 and early 2011 have set off a wave of actual and proposed electoral reforms throughout the Middle East and North Africa" (Carey and Reynolds 2011:36).

The electoral system has long been recognized as one of the most important institutional mechanisms for shaping the nature of political competition, because it is, to quote one electoral authority, "the most specific manipulable instrument of politics" (Sartori 1968:273). The question becomes which election systems are best suited for ameliorating ethnic conflict between salient ethnic actors. Differently composed groups will perceive the utility of a given electoral system differently. Posner (2004b:529-530) argues that whether or not ethnic cleavages become politically salient depends on "the sizes of the groups that it defines relative to the size of the arena in which political competition is taking place." This logic, I argue, applies to ethnic mobilization for armed conflict. If an ethnic group is large enough to

constitute a viable coalition in competition for state power, and they are not satisfied with the level of political influence achievable through peaceful means, then they might turn to arms. Large and territoriality concentrated groups are the groups suspected to be the least supportive of proportionality. According to the median voter theorem these groups have more to gain in terms of political power from a majoritarian system. Smaller groups, on the other hand, have more to gain politically from proportional representation, and will have incentives, though not necessarily the means, to launch violent undertakings against the state.

The link between economic (in)equality and politics has been debated for centuries. In recent years the scholarly focus has shifted from inequality between individuals, vertical inequality, to that between groups within society - horizontal inequality (HI). Cederman, Weidmann, and Gleditsch presented the first world wide statistical study of horizontal inequalities and civil war in 2011, investigating the relationship between economic group inequalities, de facto exclusion from power, and civil war. The evidence pinpointed economic and political horizontal inequalities as factors increasing the probability of ethnonationalist civil war.

Cederman et al. (2011) investigated politically relevant ethnic groups' *de facto* access to executive power, and found that access to power was one determinant of civil war: Did the group share power with other groups, or was it excluded altogether[1]? The evidence supported their hypotheses that political HIs is associated with a higher risk of civil war; Groups that were politically excluded were, all other things equal, much more likely to experience armed conflict than the included ones. They also investigated to role of economic HIs, and showed that the probability of civil war increased for groups with wealth levels substantially lower or higher than the country average (Cederman et al. 2011:487-489).

What is not addressed in their article, and rarely in general in the quantitative literature is whether *de jure* institutions play a part in determining the risk of war in societies with salient ethnic divisions. This is surprising given the old and rich theoretical and comparative traditions on the role of electoral institutions in divided societies. The study of civil war has much to gain from bringing international relations perspectives on ethnicity, economic perspectives, and comparative analyses of states together[2]. One crucial institutional deter-

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[1] Dominant and monopoly groups were not included or discussed, since a group in these categories is the state, and thus cannot rebel against themselves.

[2] See for example Kalyvas (2007).

minant of how power is shared between ethnic groups in society is the division of political power in the legislature. The legislative election system to a large degree decides the the potential to achieve explicit representation and power in the legislature (Cohen 1997:612). The choice between a majoritarian and a proportional election system is therefore often put forth as the most fundamental institution in representative democracies, and the most important choice facing constitution writers (Persson and Tabellini 2003).

Most noted in debates on proportionalism versus majoritarianism is the work of the comparative political scientists Seymour Martin Lipset and Arend Lijphart. While the former put forth the notion of cleavage structures in society, the latter gave name to an ideal system of power-sharing and consensus: consociationalism. The institutional arrangements advocated by members of the consociationalist school are multifaceted, but among them proportionalism is the most prominent arrangement. Being considered the leading scholar of consociationalism, Lijphart has even claimed that there is a "strong scholarly consensus" in favour of these institutions for divided societies, and that there is "solid empirical evidence" (Lijphart 2004:107) of their superior efficacy in mitigating ethnic divisions (Lijphart 2004).

While the claim of consensus may be exaggerated, as many scholars disagree with the view (for example Chandra (2005); Horowitz (1985; 1992; 2003); Reilly (2006); Selway and Templeman (2009)), the arguments in favour of proportionalism over majoritarianism in divided societies are dominant in both number and strength, and have gained some empirical support.

Previous quantitative studies have shown that being a consociational democracy significantly reduces the incidence of ethnic civil war (Reynal-Querol 2002) and that power sharing institutions increase the probability of lasting peace following civil war (Binningsbø 2005). A proportional representation system in the legislature has been hypothesized and shown to secure participation in the decision making process, and decentralization of power to reduce tensions and contribute positively to the likelihood of lasting peace (Binningsbø 2005:22-29).

By the use of newly available data on the settlement and affiliations of ethnic groups, the mapping of economic inequalities and group compositions, and nuanced and disaggregated data on electoral institutions across the world, I am able to contribute to a this line of research with empirical evidence. . In short, what I aim to do in this thesis, is provide a theoretical discussion surrounding the role of proportional election systems in divided societies, and empirical results answering the following questions:

Do proportional election systems reduce the risk of intrastate armed conflict onset where ethnic differences are salient? More specifically:

- *Do PR systems reduce the risk of intrastate armed conflict onset where the demographic power balance is baleful?*

- *Do PR systems reduce the risk of conflict onset that follows from economic inequality?*

1.1 Definitions

In this section some of the key concepts in the thesis are defined. I then provide a short roadmap for the remainder of the thesis.

1.1.1 Ethnic groups

An ethnic group is defined in accordance with the constructivist tradition after Max Weber (1978, in Wucherpfennig et al. 2011:5); Ethnicity is "a subjectively experienced sense of commonality based on a belief in common ancestry and shared culture"(Wimmer et al. 2009:325). Included in this definition are ethnosomatic (racial) groups, ethnolinguistic groups, and ethnoreligious groups [3]

I choose to approach ethnicity as a societal institution. Institutions are simply norms, rules, laws and procedures that the members converge upon (for instance Abdelal et al. (2009); Martin (2004). Then, what we are dealing with here is the overlapping or crossing of institution membership: As member of an ethnic group, you also relate to the institutions of the state. If the larger state institution does not present modes of behaviour and that serve in the interest of the ethnic group, than members may come to view their membership in the state less binding and even threatening to the institution of ethnicity.

An ethnic group is politically relevant if at least one significant political actor claims to represent its interest in the national political arena, or if its members are systematically discriminated against in the domain of public politics. A *significant* political actor refers to an actor (for instance a party) that is active in the national political arena. Discrimination is political exclusion directly targeted at an ethnic community (Wimmer et al. 2009).[4]

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[3]Tribes and clans defined on the bases of a conception of genealogical (family historical) commonality, and regions without perceptions of shared ancestry, are not included in this definition (Wimmer et al. 2009).

[4]This definition disregards indirect discrimination based, for example, on educational disadvantage or

1.1.2   Horizontal economic inequalities

Inequality is a multidimensional concept consisting of economic, social, political and cultural inequalities. When such inequalities are present between communal groups within a state, they are defined as horizontal inequalities (Stewart 2008). The concept partly overlap with what, after Lipset and Rokkan (1967) may be labelled economic and social cleavages, a distinction I will return to in the analysis.

Economic horizontal inequality is defined as differences in distribution of economic assets and income between ethnic groups. Economic inequality is, simply put, caused by a function of the assets one owns and the employment and productivity of those assets (Stewart and Langer 2008:57).

1.1.3   The electoral system

The electoral system is any set of rules governing elections, more precisely how votes are translated into political representation. Election systems are political institutions, defined here as formal rules deciding the way in which constituent preferences are translated into legislative and executive power; They manifest the "the rules of the game", as laid down in constitutions or other laws. Throughout this thesis the concepts *electoral institution* or *election system* always refer to these *de jure* institutions, the institutional setup, what is often referred to in the literature as components of the institutional design of states[5]. Institutions may be empty shells, and especially so in weak or undemocratic states, and *De jure* election systems must not be thought to denote the level of actual participation and fairness of elections, the *de facto elections*.

The literature in general separates between four types of electoral systems: Plurality, majority, proportional and mixed systems. The aim of a plurality system (also called "First-past-the-post") is to create "manufactured majorities". Elections are usually held in single-member districts,where the candidate receiving the highest proportions of votes is returned to office, and the party having the majority of representatives get to control the government: "The winner takes all" (Norris 1997:299-302).

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discrimination in the labour or credit markets (Wucherpfennig et al. 2011:6).

[5]This latter term implies the drawing up and construction of politics, which stands in contrast to the long term process the creation and change of institutions really are. As the formation or coming to be of institutions is only treated very briefly, the term setup is more appropriate in this context

Majoritarian systems, on the other hand, are built to secure that the winner has a majority of votes, and not simply a plurality. This can be achieved for instance through arranging elections in two rounds, or by the use of alternative vote systems, systematically disfavouring parties or candidates with few votes, securing a majority of seats for the party with the largest share of the vote.(McGary et al. 2008; Norris 1997:302).

Proportional systems are based on party lists in multi-member constituencies. The parties are then given seats in the legislature proportionally to the number of votes they receive in each district. The electoral formula and the size of districts vary among countries. Mixed systems are systems where some combination of majoritarian and proportional rules are present. For instance, in elections for the German Bundestag, there is a combination single-member and multi-member districts (Norris 1997:303-304).

I concentrate here on a dichotomous division between majoritarian and proportional (PR) systems of election, as these two categories are theorized to have diverging political outcomes and thus result in different economic and social policies. As majoritarian I define those electoral system based on single-member plurality or majority, and as PR systems I define both strictly proportional systems and mixed systems of election.

1.1.4   Onset of ethnic armed conflict

Ethnic intrastate armed conflicts I define as organized violent events between actors that fight with the support of an ethnic group, and the state, following the definition from Cederman et al. (2011) and the standard of the UCDP/PRIO Armed Conflicts Database (ACD) (Gleditsch et al. 2002). I use the terms *ethnic armed conflict*, *intrastate armed conflict* and *armed conflict* interchangeably, and I discuss theories on both ethnic and non-ethnic intrastate armed conflict. Some intrastate armed conflicts are also civil wars. The mechanisms behind minor and major conflicts are generally assumed the same, allowing me use theories on civil war in building a theoretical framework in the ext chapter.

What makes these armed conflict *ethnic* is the aim of one of the organized parties; that is, achieving ethnonationalist self-determination, a more favourable ethnic balance-of power in government, ethnoregional autonomy, to end discrimination or other goals on behalf of the ethnic group Wimmer et al. (2009:326).

In one sense, investigating the conditional effect of election systems on probability of intrastate armed conflict, is investigating the most extreme of consequences. Before the defi-

nite onset of armed conflict, a range of social and political outcomes may already have taken hold, or taken its course; imagine political campaigns, riots, violence, crime or migration. However, at the threshold where frustration over a socio-political status quo results in armed conflict onset, we can distinguish between the states that to some extent succeeded in keeping monopoly over violence and the coherence of the state, and the states who failed in fulfilling their main task – to hold monopoly over violence, and to safeguard their population.

When do civil wars start? Contemporary intrastate wars are not declared, in most cases they do not follow from a clear or official decision to go to war. It is therefore not obvious whether a group is in fact "at war with the government". To arrive at an exclusive measure for onset, most contemporary literature operates with a threshold of battle related deaths. In this case I use a low threshold, as I find that even a minor intrastate conflict is a clear sign that the institutional make up of a state, among other factors, has failed to meet the demands of all ethnic groups living within its borders. And of course, even small armed conflicts have tragic consequences, far beyond the reported battle deaths.

I do not discriminate between types of ethnic conflicts[6] in my analysis. Treating different types of intrastate armed conflicts as being similarly in terms of the effect from electoral institutions is parsimonious and demands less from data. Further, whether a salient ethnic group aims at secession or government overthrow, PR electoral systems can be argued to contribute to mitigate conflicting goals, as they entail a promise of future political representation and broader resource distribution.

In chapter 2 I present the theoretical framework, before discussing a theoretical model and presenting hypotheses in chapter 3.

In chapter 4 I present and discuss statistical methods and operationalization of the theoretical model. I also provide descriptive statistics, and central bivariate and multivariate relationships in the data.

I proceed by presenting the results from rare events regression models in chapter 5. Interpretations of the results from the empirical analysis are presented in the last chapter.

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[6] There are three types of ethnic conflict recognized in the literature: Rebellions, infighting and secessionist warfare. For a discussion see Wimmer et al. (2009:322).

Chapter 2

Theoretical framework

What are the main theoretical explanations of civil war? And what does political theorists say about the merits of different electoral systems for divided societies? The first part of this chapter gives brief answers to the question of what causes intrastate war, and a deeper account of an institutionalist-configurative theory. Here, the role of economic inequalities is also considered. These accounts provide a framework for discussing the role of election systems.

In the second part of this chapter I present some reputable theoretical perspectives on electoral systems, before turning to literature on election systems as "conflict regulating" – these are the perspectives from which I will model theoretical expectations and testable implications in the following chapter.

2.1   Causes of (ethnic) civil war

What causes[1] civil war is a tremendously important question, and at the same time methodologically and theoretically demanding. Many quantitative projects have taken place during the last decades, but theories are not always sufficiently developed, and still there seems to be little consensus. Especially the greed-grievance debate seems intractable.

One might separate three main strains of theoretical explanations of civil war common in statistical research: 1) The greed-and-opportunity perspective 2) the diversity-breeds-conflict

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[1]Using the term *cause* I adhere to the notion of probabilistic causality, and hence do not refer to any necessary or sufficient factors producing civil war, but rather the idea that the presence of a cause should raise the probability of intrastate armed conflict. See for instance Eells (1991).

tradition and, 3) the minority-mobilization school. In addition to this Wimmer, Cederman, and Min (2009) proposes a fourth approach, an institutionalist-configurative perspective of ethnicity and civil war.

Below I give a very brief outline of main theories and findings from these perspectives, before providing a more full account of the theory of Wimmer et al. (2009). I then discuss shortly the usefulness of these perspectives in the context of my research question.

2.1.1   Greed and opportunity theory

Greed and opportunity theory claims that conditions that favour insurgency is what makes up the main determinants of conflict. In particular state weakness, marked by poverty, large populations and instability, predicts countries' proneness to conflict.

As proponents for the greed-and opportunity perspective two of the most referenced articles and frameworks within the civil war literature should be mentioned, one by Fearon and Laitin (2003) and the other one Collier and Hoeffler (2004). Fearon and Laitin (2003), testing the implications of what they label "perennialist" and "modernist" arguments find no empirical support for the claim that ethnic differences increase the likelihood of conflict.

Collier and Hoeffler (2004) also investigate and find support for an opportunity based explanation for civil war, showing that factors affecting the opportunity for rebellion are availability of finances, the cost of rebellion, and military advantages such as a dispersed population. They find little evidence to support grievance-based[2] explanations.

2.1.2   Diversity as a cause of war?

The "diversity breeds conflict" - tradition emphasize ethnic heterogeneity as a cause of ethnic conflict. The main claim within this tradition is that the more ethnically fragmented a society is, the more conflicts we will see along ethnic lines.

According to Sambanis (2001) a motive for ethnic rebellion is preservation of one's ethnic identity. More importantly, he says, is the reduction of collective action problems associated with shared identity.

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[2]The term *grievance* is much used in the literature. Grievances are associated with "a deprivation of basic needs of some sort, claims of rights based on identity, react to discrimination"(Arnson and Zartman 2005:262). I employ the term as a "bag of factors"; It hence contains the more specific factors of horizontal economic inequalities, discrimination, deprivation, painful histories of the group and so on.

A quite different explanation is Vanhanen's "socio-biological theory of ethnic nepotism". Vanhanen draws on Darwin's theory of natural selection, and promotes the idea that ethnic group members support each other in order not to be left out in the struggle for survival of one's kin. People tend to "favour their group members over non-members because they are more related to their group members than to the remainder of the population" (Vanhanen 1999:57). From this reasoning he derives the hypothesis that the more different ethnic groups are from each other (for instance the less genetically related they are), the higher is the probability and intensity of conflict between them.

2.1.3 Minorities mobilize?

The "minority- mobilization school", is largely equivalent to the work of Gurr (1970; 1993) and colleagues, who shifted the focus from the state to the group level in investigating ethnic conflicts. Gurr emphasizes the strength of ethnic grievances and the political opportunity structure for rebellion provided by different political regimes (Gurr 1993).

The minority approach draws on explanations developed by social psychologist. Gurr theorizes that relative deprivation leads to frustration. He states that "the *value capabilities* of a collectivity are the average value positions, how much of some good, its members perceive themselves capable of attaining or maintaining"(Gurr 1970:27). If this value potential is low, whether actual value position is low or not, people will be frustrated.

Gurr and Moore (1997) investigated the claims of the perspective empirically by the use of the Minorities at Risk (MAR) data (Gurr 1993), which can be seen as an improvement over earlier datasets, due to its capturing of group level-factors. The authors found that group inequalities have an indirect positive effect on the likelihood of ethno-political rebellion.

Why should frustration over deprivation[3] trigger violent behaviour and civil war? The explanation put forth by Gurr build on psychological theories stating that negative affect, such as frustrations, can trigger "fight" responses. The response chosen in such instances depends on surrounding circumstances (Berkowitz 1962). In the case of horizontal inequality, whether or not people fight would hence be determined by both the level of frustration felt, and by assessments of the specific situation and opportunity-cost of rebellion.

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[3]*Relative deprivation* is generally equated with grievance in the ethnic politics literature (se for instance Arnson and Zartman 2005). I use (relatively) deprived restrictively as synonymous to being (part of) the under-privileged group in a state characterized by HIs

2.1.4   The institutionalist-configurative perspective

We now see a renewed attention to economic inequalities as a cause of civil war, and several authors have given evidence that inequalities between ethnic groups increases the risk of civil war. Where earlier studies focusing on individual inequality failed to prove that inequalities matter, the newer projects focus on horizontal inequality. This research agenda is based on an institutionalist-configurational (IC) perspective, after Wimmer, Cederman, and Min (2009).

The IC framework's proximity to the minority-mobilization perspective is evident in it's focus on group features, and it's emphasis on the political environment of groups. This is it's configurational part, aiming to explain when we can expect ethnic politics to lead to armed violence (Wimmer et al. 2009:320). However, while the minority perspective is rather narrowly focused on features of groups, the IC approach incorporates distribution of state power, the conditions under which political preferences run along ethnic lines. This is the institutional part: the specific conditions surrounding a group. As Wimmer et al. (2009) put it: "ethnic politics is not exclusively a struggle to rectify the grievances of minority groups [. . .] but it is more generally and fundamentally about the distribution of state power along ethnic lines" (Wimmer et al. 2009:317).

The nationstate can be described as relying on ethnonational principles of political legitimacy, and is often ruled in the name of an ethnically defined people. Rulers should therefore be expected to take care of "their own". This is the concept of *ethnic politics*: the struggle over control over the state between ethnically defined actors (Wimmer et al. 2009:321). Accordingly, some conditions are deemed conducive to the alignment of political loyalties along ethnic lines. Especially when the nationstate relies on ethnonational principles of political legitimacy, or the state is ruled in the name of an ethnically defined people, the incentives of rulers is to underline ethnicity and take special care of the ethnic group to which they belong. In practice this can take the form of choices to distribute resources in a manner favouring the group, the adoption of laws that correspond to the norms and culture of the group, and granting access to bureaucratic and decision-making power for those of ethnic kin (Wimmer et al. 2009).

Examples of the parliament becoming the ground for ethnic contest, after a capturing of control over parliament by one ethnically dominant group, are incidents of democracy breakdown in African states: Outnumbered oppositions have been left with violence as the

only route towards political influence. It can be argued that this is what happened with the with the Ibo in Nigeria (1970), the Muslims in Chad(1965), the southerners in Sudan (1955 and 1983) (Horowitz 1992), and the Northerners in Cote d'Ivoire (2002) (Langer 2005).

2.2 Discussion of theories and recent evidence

The researchers within the "Greed and opportunity school" have made great contributions to the field of conflict studies; Not only have they provided substantial knowledge of the role of economies in civil conflict, they have also contributed in sharpening the methodological tools used for empirical investigation. Still, the literature can be criticized regarding the conception of ethnic politics and "grievance". For instance, the operationalization of ethnic grievances in terms of *fractionalization* can be claimed not to capture the role of ethnicity in politics. As Wimmer et al. (2009:318) articulates it: "Not all ethnic groups matter for politics", and hence more fractionalization does not automatically imply more political conflict. Further, economic inequality in terms of *vertical* inequality is not a valid measure of ethnic grievances, as there is no saying whether deprivations and privileges run along ethnic lines.

We saw in section 2.1.2 how ethnicity has been interpreted in terms of diversity; a contention that differences and cultural antagonism should lead to violence between ethnic groups. These claims of the "Diversity breeds conflict" tradition can be criticized for being deterministic and too general. As Posner (2004*b*:529) puts it: "The mere presence of cultural differences cannot possibly be a sufficient condition for the emergence of political or social strife, for there are far more cultural cleavages in the world than there are conflicts."

The minorities-mobilize perspective, I claim, provide a more compelling story of ethnic conflict. It lends attention to how inequalities between groups, and not simply ethnic differences by on of itself, produce incentives for civil warfare. The approach also considers, not only the opportunity to exploit differences for economic gain, but also the ethnic group as a marker for economic and social status, and the inherent potential for conflict between those privileged and those not.

Further, the contention of the minority-perspective that grievances generate frustration is supported by socio-psychological experiments. One example is an experimental study performed by Shaykhutdinov and Bragg (2011). They find that individuals who experience higher levels of grievance show higher levels of frustration. In their experiment participants

are first deprived of a good[4] that is considered important for their identity. They are then asked to indicate their frustration levels on a scale. Not surprisinlgy, the result is a higher average level of frustration between individuals whose good have been reduced.

A major critique of the minority-approach, however, is the neglectful treatment of the ethnic groups in demographic majority; the choice not to theorize the role of such groups leaves a gap in the the theory. More specifically, the state will be treated as a neutral actor if the group in power is an ethnic majority, a premise that is not reasonable, as a state captured by one ethnic group will be lenient to promote policies favouring that group. A related problem is the failure to account for majority groups in opposition, excluded from political power. These groups may also be frustrated and turn to warfare. The source of civil war cannot be illuminated by looking at only some of the ethnic parties to a conflict.

The perspective of Wimmer, Cederman, and Min is the more useful starting point for further theorizing in the context of this thesis, since it incorporates insights from both opportunity- and grievance based perspectives. My further reasoning is heavily indebted to this perspective. Opportunity based explanations and insights concerning the mobilizations of minorities will also be incorporated and modelled.

How then are group incentives or frustrations translated into civil war? What makes a whole group of people support a dangerous rebellion? The question of collective action and mobilization are treated only swiftly in Wimmer et al.'s (2009) presentation of the IC approach, focusing mainly on power constellations. In section 2.1.3 we saw how the minorities-mobilize perspective provides leverage in explaining these mechanisms: the sum of frustration and low opportunity-costs make deprived groups rebel[5]. Assuming that groups are unitary and rational[6], groups attain a higher value to having power and wealth then the opposite. They try to overcome their low status by the use of available means, one of which may be warfare.

The goal of a deprived group and the corresponding means may be products of intellectual ideas, material position, emotions and group psychology. War is rational if the cost of it is outweighed by the probability of achieving a better future for one's group and future

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[4]The good removed is the football team of Texas University, which is first shown to be valued highly by the university students.

[5]Another important feature in this respect, group coherence, can be explained partly by an ability to punish defectors. The shorter the distance to a member of the rebellion, the less benefit the leader of the rebellion has to promise (Gates 2002).

[6]By rationality I simply mean the human ability to have complete and transitive preferences (McCarty and Meirowitz 2007)

generations. Accepting a position of powerlessness is rational if the alternative is costly defeat by a resourceful incumbent, leaving your group and your family in even deeper despair than at present. This reasoning is in line with *bargaining models* of war, where asymmetric information and commitment problems are proposed mechanisms (Fearon 1995). If frustration is a result of inequality, then the removal of the inequality is a rational solution. If no peaceful means are available, then violence comes to play.

The propositions of the IC perspective, and questions regarding the role of horizontal inequalities in intrastate armed conflict, have in recent years been subject to quantitative investigation.

In a study from 2006, Østby addresses the interplay between socio-economic and identity-related factors in civil conflict, using data from surveys in developing countries[7]. Østby also asks whether HIs are particularly conflict provoking under certain political conditions. While she finds little support for a hypothesis that political exclusion alone increases the risk of civil war, she does discover a strong interaction between political exclusion and economic inequality. This suggests that societies experiencing economic inequality in tandem with political exclusion are particularly conflict prone. Østby's (2006) study incorporates only developing countries, and is based on health surveys. The number of responses for some ethnic groups may be very low, and there is hence no guarantee that the sample is representative. Another concern is the potential response bias attached to survey data, due to respondents, consciously or unconsciously, making overstatements or understatements regarding their social or economic situation. The results are therefore not definite and are amenable for further research.

The first worldwide study of HIs and its effect on civil war was conducted and presented by Cederman, Weidmann, and Gleditsch in 2011. The authors put forth, among others, the hypothesis that economic HIs increase the risk of civil war. They disaggregate their research to the group level. By the help of geographically coded data on politically relevant ethnic groups and spatial wealth estimates they discover that in societies where HIs are considerable, both the relatively richer and poorer groups are more likely to engage in violent conflict against the state. They also find evidence that political HIs (exclusion from executive power) is associated with a higher risk of civil war(Cederman et al. 2011:487-492).

The literature seems to be moving towards a convergence on deeming HIs a factor increas-

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[7]DHS data

ing the risk of civil war in divided societies. What is not addressed in the mentioned studies, is the role of specific institutions designed to overcome economic and political inequalities. Neither do they present precise theoretical models including features of the group and the effect of these on the opportunity cost of intrastate armed conflict. As for the latter, I merge the logic from Posner (2004a) and Wimmer et al. (2009), and propose that the relative sizes of group, and their economic status quo are main determinants for decisions to mobilize against the state. Regarding the former, a rich literature provides a range of propositions.

How do electoral institutions generally perform under conditions of horizontal inequalities and salient diversity? In states characterized by both economic HIs along ethnic lines, and a division of power between ethnic groups we should perhaps expect more peace than in states where HIs are present both in the economic and the political dimension. Or do some other mechanism come into play when these two inequalities meet? What role does the demographic power balance of groups play? Can specific political institutions, in this case features of the electoral system, disturb the chain from frustration to civil war? In the next section I first give a brief outline of the theoretical debate on majoritarianism versus proportionalism in divided societies, before I proceed by articulating the debate on the role of election systems as a means to conflict regulation.

2.3 Electoral systems in ethnically divided societies

There are two well-developed theoretical approaches as to the effect of electoral systems in divided societies, useful in the context of this analysis. These lines of thought both originate from democracy theory, indebted to Schumpeter (2008), and the legacy of modern political thinkers such as Dahl (1989), Lipset (1960) and Tingsten and especially Lijphart (1979; 1999; 2004). One line of research is that of democracy as contest, and theoretical models on majoritarian and proportional visions of democracy. The other is that of conflict regulation theory, the question of how to organize political institutions, especially in war-torn or conflict-prone states. The most established line of research on political institutions is comparative politics, focusing on the political outcomes of institutions. This tradition emphasize accountability and representativeness as desirable attributes of political systems. The discussion of how these two attributes should be balanced is the foundation from which theoretical concerns over appropriate democratic setups has been build (Persson

and Tabellini 2003:12); a discussion that by and large can be summarized as one between majoritarianism and proportionalism.

The conception, and normative ideal, of democracy as inherently competitive has, and is, subject to a variety of criticisms, but with little doubt it is the most applicable and minimal model of how democracy works[8] (Strøm 1992:32-35).

Within the democracy as contest tradition, there are two approaches "as old as the world" (Tocqueville 2003 [1835]), to elections and democratic contest. These are visions of democracy reflecting diverging goals; Concentration of power and control of decision makers, versus dispersion of political power and the allowance of shifting policy coalitions. Differently stated: "The two primary types of constitutional designs in contemporary democracies can be understood as having election rules that reflect either the majoritarian or proportional vision" (Powell 2000:4).

The majoritarian vision entails both a normative claim and an empirical hypothesis. The effectiveness of a majority government is the most important normative criterion among proponents of majoritarian democracy. The creation of "manufactured majorities" makes the election results decisive for the outcome, as there is no need for post-election negotiations when one party hold the majority of seats (Norris 1997:304). Majoritariansim also creates an identifiable link between the electorate and the government, ensuring that governments can be held accountable and "punished" in the subsequent election if it adopts policies not appreciated by the citizens (Norris 1997:304-305).

The empirical hypothesis is the median voter theorem (Hotelling 1929; Downs 1957). It states that in competitions over votes, the party that appeals to the median voter will be the victor in elections, assuming single peaked preferences[9] and a one-dimensional policy space[10]. Politicians' knowledge of the power of the median voter encourages them to advocate and pursue moderate politics. This is the reasoning behind the contention many share with Lipset (1960); Majoritarian systems cause moderate politics.

The proportional vision is producing parliaments that better reflect the composition of the electorate (Norris 1995). PR systems therefore are more "fair" to minor parties, otherwise excluded from the possibility of forming government (Norris 1997:305). The advocates

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[8]That said, conceptions of democratic competition are not uniform. See for instance Marks and Diamond (1992) for discussions.

[9]Voters have one ideal point fr policy, and the utility of the adopted policy declines with equal rate for deviation form ideal policy in both direction.

[10]There is only one conflict dimension in society − and this conflict runs along ethnic lines.

of proportional systems hold the process of conciliation and coalition-building within government, and policies based on consensus, as major goals for the electoral system (Norris 1997:310).

A PR electoral institution makes way for the formation of a multi-party system, and they are also associated with what Lijphart (1999) labels "'cross-community power-sharing executives". As the proportion of votes needed to be elected into parliament decreases, the number of parties generally increase, and the possibility of political representation increases for smaller ethnic groups. A majoritarian election system, on the other hand, tends to produce two-party systems, from which minority candidates will often be excluded (Lijphart 2004; 1999). Duverger's Law (Duverger 1963) explains why majoritarian election systems favours a two-party system with larger and independent parties as a consequence of two parallel effects, where the first is a "mechanical effect" that causes the second, third, fourth, and so forth, placed parties to receive a much smaller number of seats in parliament compared to their share of the vote, benefiting the largest party disproportionately. The second effect is psychological; Potential voters for smaller parties give their vote to one of the larger parties for tactical reasons, so that their vote is not lost (Vatter 2003:447).

2.3.1   PR systems and ethnic conflict

Clear recommendations regarding electoral systems as a means to conflict regulation are frequent in the literature, and they are not unison. For instance is majoritarian democracy viewed by many as a superior kind of democracy (Hartzell et al. 2001), and was considered the best choice for most of the former British colonies after independence (Lijphart 1999:10). At the same time PR systems are often advocated by scholars of conflict regulation theory. Lijphart's theory of consociationalism has been widely influential in shaping these debates, and particularly the one concerning what is the most appropriate electoral arrangements to adopt in divided societies (Norris 2008). While the arguments in favour of majoritarianism are compelling, the claim of a peace preserving effect of proportionalism in divided societies resonate with the my theoretical framework. Recent empirical research also suggest that proportionalism might be the more peace promoting alternative. In this section I present the key points of dissent in the debate on proportional election systems and its mitigating effects, and I will argue that the arguments in favour of proportionalism are more compelling than those in disfavour.

When discussing the effect of the electoral system on intrastate peace, I am leaping over the intermediate steps of political outcomes of elections and the different policies produced by these various types of government. Two theoretical predictions discussed in the above section is important in this context. Firstly, PR election systems produce inter-party cooperation and coalition governments, while majoritarian systems produce two-party systems and majority governments, and therefore exclude some ethnic groups form political power altogether. The prediction concerning policies produced is that we will observe less spending on broad programs under majoritarian election systems than under PR systems. Majoritarian electoral competition discourages public-good provision in favour of targeted redistribution (Persson and Tabellini 2003:30). In other words, we can expect more distribution across ethnic lines in PR systems, both politically and economically. This will reduce ethnic tension and competition.

Conflict regulation theory is one label for the line of research investigating and recommending institutional and political solutions[11] for divided societies. Within this line of research there are two main strains of thought: integration and accommodation. Integrationists have as their preamble the nation-state and the rights of the individual. Collective diversity and national, ethnic and cultural differences, are to be left to the private realm; Ethnic differences should not be reflected in party politics. They favour majoritarian election systems, and state-wide parties, producing parliamentary systems based on majoritarian principles (McGary et al. 2008:45-50).

Accommodationists hold as their leading star the *plurinational* state, and the rights of both individuals and groups. Cultural differences should be accommodated through laws and institutions. They propose power sharing in the executive, proportional election system and acceptance of ethnic or sub-state parties (McGary et al. 2008:51-67).

Horowitz (2003), belonging to the integrationist strain, is one of the major critics of proportionalism. He supports the notion that choices "of one electoral system or another involves a decision about what goals decision-makers wish to foster", but is critical to the goals fostered by PR systems, on the ground that they may contribute in producing *polarized pluralism* (after Sartori 1976), and less moderate candidates than majoritarian systems. [12].

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[11]We might picture the debate on institutions in divided societies as residing on a continuum of systemic responses to ethnic conflicts; from full assimilation to partition of the state (McGary et al. 2008).

[12]Horowitz (1992; 2003) proposes design of various electoral mechanisms as a better alternative for encouraging the election of moderate representatives, and hence reduce the tension associated with cleavages between communal groups. Horowitz's (2003) *alternative vote* (AV) system has been much debated, but has

Horowitz's (2003) main quality determinant of an election systems is whether or not it leads to moderate politics. Majoritarian elections encourage moderate politicians and party politics. The winner in PR elections, on the other hand, may be moderate or not, exactly because the whole "thrust of PR is to represent all opinions, regardless of their position on the political spectrum" (Horowitz 2003:122). The view held by Horowitz is a common theoretical concern over proportional systems of elections; That such systems may spark violence in the circumstance of ethnically divided societies. Proportional elections can lead to an ethnicization and polarization of politics. The public institutional recognition of group identities that a PR system could entail may add fuel to the fire. As more or less populous groups in society get the opportunity to form parties and have their voices heard in the parliament, we will see more centrifugal party systems, with ethnic and religious parties on extreme policy positions. Such parties and their agendas could exacerbate ethnic and economic conflicts and thus threaten the state. A majoritarian election system, on the other hand, favours (non-ethnic) state wide parties. It is a type of system ensuring parties to cross-cut religious and ethnic alignments and induce stability.

Lipset (1960:90), also advocating an integrationist view, argues that potentially dangerous overlapping cleavages can be dealt with through promoting state wide party organizations under a two-party system[13].

Others recommend a banning of ethnic parties to hinder political polarization (Teshome 2008). In many contemporary African democracies, some post-communist countries in Eastern Europe, and Asian countries like Afghanistan, Iraq, Turkey and Algeria, ethnic, religious and regional parties are illegal (Basedau et al. 2007:617). The bans on ethnic parties may be a response to various challenges, but, as documented from African countries, the most important reason is often to avoid ethnic conflicts and wars (Teshome 2008:797).

An accommodationist qualification to the concern over ethnic parties, is, as suggested by Chandra (2005), that ethnic parties may be *more stable* than other types of parties since the elites that hold the leadership of the party belong to the same ethnic group. Democratic stability should therefore not be challenged by ethnic parties[14].

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only been implemented once – Fiji tried this systems, and according to Lijphart, the collapse of this regime in 2000 proved the inability of AV to moderate ethnic politics (Lijphart 2002).

[13]In cross-cutting societies individuals will be pulled among their various memberships such that loyalty to any one group will be minimized. Cross-cutting cleavages create mechanisms for consensus, while overlapping cleavages must be dealt with explicitly in the political system (Lipset 1960:88-92). See also Gubler and Selway (2012) for an empirical investigation.

[14]See Birnir (2006); Gunther and Diamond (2001); Chandra (2007) for further discussion of ethnicity and

Carey and Reynolds (2011), criticising advocates of majoritarianism, contend that "elections should avoid the danger of a large "winner's bonus' whereby the biggest party or coalition receives a share of seats that far outstrips its share of the popular vote" (Carey and Reynolds 2011:37).

This argument resonates with Lijphart's claim the answer for ethnically divided societies is consociational democracy[15], and in particular proportional election systems (Lijphart 2004; 1979). In Lijphart's consociational model there are three key regulating institutional features: 1) A cross-community power-sharing executive 2) Proportionality in the public sector (in the executive, the legislature, the judiciary, and other elite levels) often induced through PR systems of elections, and 3) community self-government (Lijphart 1979:501).

The consociational institutional set-up, after Lijphart's mould has often been recommended but is, however, rarely seen in it's pure form[16], and never in the world regions most plagued by civil war. Assuming Lijphart's theory catches the essence, *the more* consociational a system is, the more viable may an absorption of conflicts into politics be. In other words, we will observe less civil war onsets in states where the specific trait of consociationalism - a proportional election system - is present, than where power sharing institutions are absent.

We see that various claims over the merits of election systems are contested and have sometimes proved controversial. There is, as Ginsburg (2012:4) puts it, "less consensus on the major issues of institutional design than might be hoped", and systematic quantitative evidence has been lacking to test the evidence for some of the core contentions of theorized effects of electoral systems (Norris 2008:Chapter 5). Also, the belief in the existence of some "one-size fits all" system is mostly abandoned in institutional theory (for instance Bakke and Wibbels 2006:2), a point that is highlighted in this thesis; The fit of an electoral systems depends on the mode and the depth of ethnic cleavages.

The question must be, as pointed out in the introduction: Which electoral systems are the most peace-promoting for salient ethnic differences, as they appear in the form of relative demographic power? Trusting the claim that "The choice of electoral system can effectively determine who is elected and which party gains power" (Reynolds et al. 2005:5), the other

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electoral politics

[15]Confusingly, Lijphart equates power sharing democracy with consociational systems in the article from 2004. However I stick with his earlier, and more strict definition discussed below.

[16]Switzerland, Belgium and the European Union are, according to Lijphart, the only instances that approximate the pure model.

important question regards economic inequality and electoral systems: If deprived groups are empowered by means of the system of elections, are peaceful resolutions of conflicts more likely?

Though the quantitative evidence on this topic is meagre, recent studies are suggesting that proportionality might be the better option for divided societies. Reynal-Querol (2001) shows formally that proportional, inclusive, systems have a lower probability of intrastate armed conflict than majoritarian systems, due to the higher opportunity costs of rebellion associated with political inclusion (Reynal-Querol 2001:4). Empirically, she discovers that the more inclusive the system, the smaller the probability of civil war (Reynal-Querol 2001).

Østby (2006) follows the reasoning of Horowitz (2003) and hypothesize that the conflict potential of socio-economic HIs increases with more inclusive electoral systems. She does however not find support for this claim, indicating that proportionalism is no threat to peace.

Others, testing the conditional effects of election systems, find support for PR systems being the better option in divided societies. The conclusion in Schneider and Wiesehomeier (2008:198) is that "especially ethnic fractionalization and polarization combined with majoritarian voting rules make civil war more likely". However, these results must be treated with some caution due to potential methodological weaknesses[17].

My theoretical framework based on the IC perspective, contends that one of the main challenges to peaceful coexistence in ethnically and economically divided societies is the capturing of control of the state by one or a few ethnic groups. Controlling the state means controlling resource allocation and investment. Combined with the ability to enact policies in the cultural and social domains, the state may turn into an instrument for achieving group goals rather than population goals. The modern state can therefore be perceived by its citizens, not as a neutral actor, but as captured by ethnic groups, and as an actor biased towards securing the long-term and short term interests of the groups in power. The political contest for state power can therefore under some circumstances be perceived as a zero-sum game between groups[18] (Fjelde and Østby 2012; Wimmer et al. 2009). A proportional election system take the edge off this contest.

Claims regarding violent ethnic competition over power have been well assessed in case

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[17]Their conclusions are based on suspiciously large coefficients from regression analysis.

[18]This point is made explicit in theories on neo-patrimonialism in African states, where the political leader do not separate state and household economy, and were her ethnic group is treated as an "extended family",, (see Dokken 2008).

based research. For instance Spears (2000) studied how exclusion of political parties affected the prospects for peace in the wake of the Arusha Accords in Rwanda in 1993. The process to build a new and power sharing government failed to include the extremist Hutus, which produced an unstable situation, followed by the massive genocide in 1994[19]. The genocide has been interpreted as the culmination of long standing ethnic competition and tensions between the minority Tutsi, who had controlled power for centuries, and the majority Hutu peoples, who had come to power in the rebellion of 1959-62. Spears conclude that the case of Rwanda shows that "the threat of a net loss in power may force extremists to take violent preventative action" (Spears 2000:110). This case-based evidence gives support for the proportional system allowing broad inclusion of ethnic parties in legislative elections.

Côte d'Ivoire at the end of the 1990s, is another example of how salient ethnicities and the lack of political representation resulted in violent group mobilization (Langer 2005). Here the presence of political and economic horizontal inequalities formed an explosive situations. The excluded political elites had strong incentives to mobilize along ethnic lines to fight ethnic discrimination forced by the majoritarian government, and gaining support from their ethnic group was easy (Langer 2005:44). Commenting the Ivorian struggles Langer (2005:39) states that "a more ethnically equal distribution of government positions is likely to improve ethnic groups' perceptions and attitudes towards a political regime".

In light of the theoretical discussion on causes of ethnic armed conflicts, the strong arguments in favour of proportional systems, and the cases briefly visited, I find the claim that proportional election systems are better apt for ethnically divided societies compelling. The power sharing that comes with PR systems ensures policies benefit not only one ethnic group (in power), but work in the interest of a broader segment of society, and sometimes for the society as a whole. These are main claims in theory advocating PR election systems as conflict reducing mechanisms.

However, conflict is not ripe in all ethnically divided societies, as the IC perspective highlights, but more so where motives and opportunities are present. Indeed most theoretical explanations of civil war stress the importance of not only motives, such as reducing inequality, but also opportunities and expected utilities from engaging in warfare. If the latter is not present – if there is little chance of intrastate conflict in the first place– then it does not make sense to speak of any conflict reducing effect of electoral systems.

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[19]Estimates of the death toll have ranged from 500,000 - 1,000,000, or as much as 20% of the country's total population.

In this chapter I have presented a general theoretical framework, and I now highlight one particular claim from the IC perspective; The claim that the risk of civil war increases with higher levels of inequality, and where the composition of groups is particularly baleful. If there is any peace preserving effect of PR systems, then it should be visible under such circumstances. However, the presented theoretical frameworks and arguments are overarching and general and hence not amenable to empirical investigation as is. In the next chapter, investigating the the IC framework and the belief in proportional systems as peace promoting for ethnically divided societies, I develop a more specific, and narrow, theoretical model leading to falsifiable claims.

Chapter 3

Theoretical expectations

In this chapter I derive specific expectations about the ameliorating effects of proportional election systems in states with salient ethnic cleavages – where baleful group compositions and horizontal economic inequality exist. I arrive at observable implications and present four hypotheses. I also present regression functions containing the parameters that are implied by the hypotheses – the parameters that will be operationalized in the next chapter.

If electoral systems are decisive for political representation and inclusion as discussed in the previous chapter, the theorized risk of civil war that horizontal inequalities present, will be affected by the ability of the electoral system to steer societal conflicts into competitions for political power. The same goes for volatile ethnic compositions. In divided societies, then, electoral processes need to result in an incorporation of politically relevant ethnic groups into the legislature in order to contain conflicts within the peaceful political domain. The election system more apt to accomplish this, I contend, is a proportional system.

3.1   A theoretical model

Since the tripartite relationship between group features, electoral system and intrastate armed conflict now becomes complex, I turn to discussing a simple theoretical model. I approach it as an adaptation and development of the modelling in Reynal-Querol's (2001) paper, and its primary purpose is heuristic. I present it for perceptual leverage and clarity in my further reasoning. Of course this is a simplification of the real-world relationships. The aim is presenting specific observable implications that follow from the chosen theories

of civil war and electoral institutions, allowing for precise evaluation of the data. Limiting assumptions are always necessary in order to put forth theoretical hypotheses. Regarding theory as a semantic tool[1], I develop theoretical models consisting of plausible and empirically supported mechanisms. I will return to a discussion of the limitations and consequences of the theoretical model in chapter 6.

Following the implications of the IC perspective and its focus on the combination of institutional and configurational factors, the utility of a group can be simplified to a function of their economic status, the ethnic composition and the institutional setup, all else equal. Denoting a group's utility u, the institutional setup θ, the economic status γ and the size of the group ζ, the utility of a group can be written as the function:

$$u_i = f(\theta), \gamma, \zeta + \epsilon) \tag{3.1}$$

$$u_(\theta, \gamma, \zeta, \epsilon) \tag{3.2}$$

where i denotes any group in the set of politically relevant groups G, and ϵ is a parameter of unknown societal and group features that may affect how the current political-economic status is perceived.

I have already defined two types of election systems, majoritarian (θ_{Maj}) and proportional (θ_{PR}). The median voter theorem states that in a majoritarian system the policy implemented will be the one chosen by the median voter m (after Reynal-Querol 2001:9). I let α denote the set of policies implemented, and α_m^* is the most preferred policy of the median voter.

$$\alpha^{\theta_{maj}} = \alpha_m^*, \tag{3.3}$$

In a proportional system the policy chosen will be the sum of the product of group preferences and group share in the population. Note that to by assuming the group as a whole have particular and common preferences, we also view legislative elections as "elections by census" in which each group's share of the electorate is closely reflected in the votes going to each

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[1]Assumptions and theory can be viewed in terms of their usefulness for the purpose of deriving testable hypotheses (see for instance Morton 1999; Clarke and Primo 2007).

political party (Horowitz 1985:326). I also assume that preferences are linear in policy space[2]. The policy chosen in a PR systems is formalized in the *PR theorem*:

$$\alpha^{\theta_{PR}} = \sum_{i=1}^{n} \alpha_i^* \frac{\zeta_g}{\zeta_G}, \tag{3.4}$$

where α_i^* is any group in G's most preferred set of policies. Put differently the national policy implemented is a function of the election system, and the relative sizes of groups in a country,

$$\alpha = m(\theta, \zeta). \tag{3.5}$$

The net utility v for a group of a particular policy is the difference between a group's most preferred policy, α^*, and any prevailing policy:

$$v_i = -|\alpha - \alpha^*|, \tag{3.6}$$

Following the median voter theorem and the PR theorem v_i will be smaller for small groups under majoritarian systems than under PR systems. For large groups, v_i should be smaller under PR, as a large group will be able to decide the policy solely under majoritarianism. The exclusive features of majoritarian election systems, may be costly for the smaller groups. Not only can excluded groups be negatively affected by the targeted redistribution (that is, they are not targeted), they may also experience a limitation in access to political leaders and power holders, to important information and most importantly, to any influence in determining policies and priorities. In addition, excluded groups can feel suspicious towards their political leaders, a suspicion that they will be discriminated against (Hartzell et al. 2001:186). More dramatically, as Lijphart (1985:18-19) puts it: "Minorities that are excluded from power will probably remain excluded and will almost inevitably lose their allegiance to the regime" (Lijphart 1985:18-19).

The utility for a group is, however, not decided by policies alone. Inserting the net utility of a policy into the first equation we get the utility of a group as a sum of 1) the net utility of the policy and 2) a function of their relative economic position and "all other things"

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[2]This assumption is false, as will be discussed later. However, it is helpful in terms of deriving clear and simple expectations in the following.

affecting a group's well being.

$$u_i = v_i(\alpha) + z(\gamma_i, \epsilon) \tag{3.7}$$

Then for simplicity let us assume three possible economic statuses, γ, of a group: they are either privileged (γ_{high}), have median GDP per capita ($\gamma_{average}$) or they are deprived (γ_{low}). This is their net economic position, regardless of political system. I further assume there are three types ζ of groups $\in G$. ζ_L, which is a relatively large group demographically, and ζ_S, a small group, and ζ_M, which is a medium sized group. Following from equations (3.3), (3.4) and (3.7), we can derive which systems are better for groups with various sizes and economic statuses. For instance:

$$u_L(\theta_{maj}, \zeta_L, \gamma_{high}) > u_L(\theta_{PR}, \zeta_L, \gamma_{high}) \tag{3.8}$$

$$u_S(\theta_{maj}, \zeta_S, \gamma_{high}) < u_S(\theta_{PR}, \zeta_S, \gamma_{high}) \tag{3.9}$$

$$u_S(\theta_{maj}, \zeta_S, \gamma_{high}) > u_S(\theta_{maj}, \zeta_S, \gamma_{low}) \tag{3.10}$$

The optimal position of a group I denote u^*. Under what conditions then, is it rational for an ethnic group to engage in violent conflict against the state to achieve or approach u^*? The expected gain from a rebellion is affected not only by a negative discrepancy between u^* and u, but also by the chances of success, and the costs of war. I let π denote the uncertainty regarding succeeding with the rebellion and actually improving the status quo, c denotes a cost from loosing a rebellion and κ the fixed cost assigned to organizing a rebellion[3]. As Fearon (1995) argues, wars are committed despite high costs due to commitment- and information-problems[4], and I assume that wars will be fought despite their costs and uncertainty, as long as the distance between value capabilities and value expectations is sufficiently high, and the expected costs are such that:

$$\pi u^* + (1 - \pi)(u^{sq} - c) - \kappa + > u^{sq}. \tag{3.11}$$

This implies that the probability of conflict onset decreases where the sum of the expected

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[3]These parameters and Equation (3.11) are largely similar to Reynal-Querol (equation 5 in 2001:9-10)

[4]Both groups have incentives to misrepresent their own power ability, and they have have difficulties credibly committing to some peaceful alternative to war. See also Wucherpfennig (2009) for a good discussion of information-problems in intrastate war.

gain and the costs of armed conflict exceeds the value of the status quo.

In order to reach to these expectations regarding the conditional effects of election systems, I have made some simplifying assumptions:

Assumption 1 *Each group's share of the electorate is closely reflected in the number of votes going to each political party.*

Assumption 2 *All ethnic actors are aware of the costs of fighting.*

What do we learn from equation 3.11? For one; small groups under majoritarian systems are the least privileged, all else equal, and should be more prone to rebel. They have little influence over politics under majoritarian systems. In a majoritarian system, the probability that a small group, where $\frac{s_g}{\zeta_G} << \frac{\zeta_G}{2}$, will rebel is higher than it is under a proportional system, all other things equal. The distance between the preferred policy (α_i^*) and the status quo policy (α_i^{sq}) is likely to be greater than in proportional systems, due to the tendency for majoritarian systems to produce policies preferred by the median voters α_m^* which benefit the group in demographic power (see equations (3.3) and (3.4)). This situation is one where (as I discussed in section 2.1.4) the state does not present an institutional-configurational setup that serves the interests of most ethnic groups. We can expect the politically excluded group to view their membership in the state as less binding and even threatening for their political and economic future.

Second; Equation 3.11 tells us that all else is not equal − π is likely to be low for small groups since they have a smaller demographic base from which to mobilize rebels, and they may choose a bad status quo over an even worse post-conflict status after loosing a war. When power sharing institutions are present, the incentives for small groups to contain conflict within the political sphere will be even greater; knowing that warfare will be costly and perhaps counterproductive to the goal of a betterment of the group's economical position and well-being, the group will choose sustained political conflict over violence.

Median sized groups will also prefer proportionality over majoritarianism, since they cannot be certain to get their representatives elected. They also have a larger probability of success in war, and we can therefore expect such groups to rebel more often than smaller groups. The larger groups will according to bargaining theory be able to receive concessions from the state without turning to violence, since the state fears engaging in armed conflict with them (Wucherpfennig et al. 2011; Walter 2006). Therefore we can expect the increasing

risk of onset that follows from relatively larger group sizes to decline at the highest range of relative sizes.

According to the relevant theories I presented, proportional election systems will, all else equal, dampen the frustration of economically deprived ethnic groups within the state: As I discussed earlier (section 2.2), one consequence of persistent economic HIs is frustration, which in turn can produce violent behaviour. If, however, a deprived group has *de jure* access to power, or potential access to power, they will not perceive of the economic inequality as an infinite condition; When the state is not fully captured by one or more ethnic groups, all groups within the state have the opportunity to take part in shaping the future of the state, and hence their own economic and political future. When a proportional election system is in effect, the relatively greater potential for inclusion that such a system offers, reduces frustrations.

When institutionalized political HIs, in the form of a majoritarian election system, and economic HIs are both present, the risk of civil war is, all else equal, larger than when only one of the inequalities is present. The more accommodated a poor group is, the less prominent are the negative effects of being economically deprived. Reversely, economically privileged groups that are discontent with the institutional setup, have less to gain from rebellion than poor and discontented groups. This has been shown empirically to be the case; Cederman et al. (2011:488-489) find that the conflict potential for relatively poorer groups is larger than that of richer groups.

On the other hand, Cederman et al. (2011:488-489) also find that both privileged and deprived groups experience higher risk of civil war than those at country average. Why do rich groups rebel? Following the reasoning here, rich groups will only rebel if the value of θ is low for them, that is, if the institutional setup does not profit them or if the group fears loosing wealth under the current system. We can therefore expect different incentives for groups above and below the country average. The relatively poorer, the greater the frustration. We see in equation (3.11) that people will only rebel if they find the expected gain of rebellion to outweigh the expected loss. Being a little less wealthy than other groups will not be as conducive to intrastate peace as greater levels of inequality. Only when the sum of HIs is considerable is it rational for an ethnic group to rebel.

Since the tendency for one party to gain the majority of seats in the legislature is weakened in PR systems, the solution is often power-sharing between political parties in the executive.

Electing members of parliament proportionally enhances minority representation, and allows greater segments of society to voice their preferences.

3.2 Hypotheses

To sum up the theoretical expectations, I divide them into four hypotheses. Since the theoretical model above articulate a conditional effect of proportionality my expectations are conditioned on the compositions and the economies of groups. The hypotheses consider these features both separately and combined, while the overall and general proposition is:

The negative effect of proportional electoral systems on the risk of intrastate armed conflict is not uniform across differently composed states and ethnic groups. Rather, the effect is conditional on salient ethnic cleavages.

This general proposition implies, in line with my theoretical model, four specific hypotheses.

Hypothesis 1 *An increase in relative group size is associated with an increase in probability of intrastate armed conflict onset, with a reducing rate for very large sizes, but under PR systems the risk of conflict only increases for very large sizes.*

This can be written as a regression function, where β denotes the coefficients:

$$P(Y = 1) = f(\beta_{Intercept} + \beta_\theta \theta * \beta_\zeta \zeta + \beta_\gamma \gamma + \beta_\pi \pi + \epsilon). \tag{3.12}$$

Exchanging the parameters for variables, and including $\boldsymbol{X}$ to denote the set of control variables capturing the strength of parties and probability of success, the regression function becomes

$$P(Y = 1) = f(\beta_0 + \beta_1 PR + \beta_2 Size + \beta_3 size^2 + \beta_4 (Size \times PR) + \beta_5 (Size^2 \times PR) \tag{3.13}$$
$$+ \boldsymbol{\beta X} + \epsilon).$$

Simplifying this equation, the conditional effect of PR can be rewritten to the function

$$P(Y = 1) = f(\beta_0 + \beta_1 + (\beta_2 + \beta_4)Size + (\beta_3 + \beta_5)Size^2 + \boldsymbol{\beta X} + \epsilon), \tag{3.14}$$

where a PR systems is in place, whereas in a non-proportional system, the equation simplifies to:

$$P(Y = 1) = f(\beta_0 + \beta_2 Size + \beta_3 Size^2 + \boldsymbol{\beta X} + \epsilon). \tag{3.15}$$

If hypothesis 1 is correct, we should see a negative β_3 and a positive β_5, meaning that the conditional effect of PR systems and size is increasingly negative with larger ethnic groups, and not linear.

Another way of assessing the effect demographic power is to consider the overall level of polarization in a country. Polarization as a determinant of civil war is supported in the literature (for example Montalvo and Reynal-Querol 2005). For instance, polarization is high where two ethnic groups are of similar size, $\zeta_A \approx \zeta_B$. If they live under a majoritarian systems, they might alternate over political power from election to election, or one of the groups may be able to secure legislative power repeatedly, *making the ethnic difference salient*. This is a combination of group features and an institutional setup where my model predicts an increased risk of intrastate armed conflict (assuming the constant cost κ and c are negligible). The opportunity cost of rebellion if these groups operated under a PR system, would be higher, and therefore I hypothesize:

Hypothesis 2 *An increased risk of rebellion associated with higher ethnic polarization is less prominent under PR than under other election systems.*

$$P(Y = 1) = f(\beta_0 + \beta_1 PR + \beta_2 Polarization + \beta_3(PR \times Polarization) + \boldsymbol{\beta X} + \epsilon) \tag{3.16}$$

When $PR = 1$, the equation is

$$P(Y = 1) = f(\beta_0 + \beta_1 + (\beta_2 + \beta_3)Polarization + \boldsymbol{\beta X} + \epsilon), \tag{3.17}$$

an when $PR = 0$ equation 3.16 simplifies to

$$P(Y = 1) = f(\beta_0 + \beta_2 Polarization + \boldsymbol{\beta X} + \epsilon), \tag{3.18}$$

Inequality will also exacerbate ethnic cleavages and increase the risk of conflict. PR systems are conceived to result in political inclusion and broader economic programs and redistribution, therefore:

Hypothesis 3 *An increase in economic inequality is associated with an increased risk of rebellion, but this increase in risk has a less steep slope in PR systems.*

$$P(Y = 1) = f(\beta_0 + \beta_1 PR + \beta_2 Inequality + \beta_3(PR \times Inequality) + \boldsymbol{\beta X} + \epsilon) \qquad (3.19)$$

When $P = 1$ and $P = 0$, the respective equations become

$$P(Y = 1) = f(\beta_0 + \beta_1 + (\beta_2 + \beta_3)Inequality + \boldsymbol{\beta X} + \epsilon) \qquad (3.20)$$

$$P(Y = 1) = f(\beta_0 + \beta_2 Inequality + \boldsymbol{\beta X} + \epsilon). \qquad (3.21)$$

Finally, the combined presence of larger groups and economic deprivation is the most explosive mixture. Small groups under majoritarian systems with γ_{low} are the least privileged of all groups. But as we saw above, they are less likely to rebel than larger groups due to their smaller chances of success. Also, larger groups dissatisfied with the institutional setup might choose not to go to war, if they are in a privileged economic position.

Hypothesis 4 *The risk of intrastate armed conflict increases with higher relative size and negative economic inequality, and the combination of larger sizes and high levels of deprivation is the greatest treat to ethnic peace. However, under PR systems, there is no increase in risk with increases in inequality or size.*

$$
\begin{aligned}
P(Y = 1) =& f(\beta_0 + \beta_1 PR + \beta_2 Size + \beta_3 Size^2 + \beta_4 Inequality + \beta_5(PR \times Size) \qquad (3.22) \\
& + \beta_6(PR \times Size^2) + \beta_7(PR \times Inequality) + \beta_8(Size \times Inequality) \\
& + \beta_9(Size^2 \times Inequality) + \beta_{10}(PR \times Inequality \times Size) \\
& + \beta_{11}(PR \times Inequality \times Size^2) \\
& + \boldsymbol{\beta X} + \epsilon)
\end{aligned}
$$

When $P = 0$, the risk of intrastate armed conflict is the simplified function:

$$
\begin{aligned}
P(Y = 1) = & f(\beta_0 + \beta_2 Size + \beta_3 Size^2 + \beta_4 Inequality + \beta_8 (Size \times Inequality) \\
& + \beta_9 (Size^2 \times Inequality) \\
& + \boldsymbol{\beta X} + \epsilon)
\end{aligned}
\tag{3.23}
$$

Chapter 4

Empirical strategy

I will test my theoretical model by the use of regression analysis. Approaching my research question statistically, is neither easy nor unproblematic; There are few onsets of intrastate armed conflict, many causes in consideration and little institutional variation over time within states. Still, the often universal claims regarding the peace-preserving effects of PR systems, deserve to be assessed quantitatively.

The remainder of this chapter concerns valid and reliable operationalization and statistical methods. I will provide the reader with the main bivariate and multivariate relationships in the data, as a primer for the estimated results presented in the next chapter. Econometric concerns will be addressed alongside the presentation of the data. I devote a section to addressing missingness in the dataset, before discussing the choice of statistical model – the rare event logit. Lastly, I discuss the main statistical challenges.

Keeping the parameters and expectations from chapter 3 in mind, I first turn to the units of observation, and the operationalization of dependent, independent and control variables.

4.1   Units of observation

My hypotheses concern both politically relevant ethnic groups and the states in which they live throughout the world. I therefore need to consider both groups and states as the unit of analysis.

Data on relevant ethnic groups and their states are derived from the Ethnic Power Relations dataset (EPR) (Cederman et al. 2009), and from replication data for Cederman

et al.'s (2011) article. The EPR data identifies all politically relevant groups and measures how access to state power differs among them. The EPR dataset might be considered an improvement over previous datasets on access to power, due to the coding of ethnically relevant groups.

I have access to data on a yearly basis and the units of observation are group-years. The use of this panel data allows me to deal with unobserved heterogeneity in the units, and potential time trends affecting all units. It also gives more variability in the data alleviating multicollinearity problems and providing more efficient estimation (Kennedy 2008:281-282). I will study the temporal range from 1972 to 2005. Committing analysis on this time-frame enables me to include many onsets of intrastate armed conflict, and allow for variation over time. The time period is also one in which most colonial empires were dissolved, and within which we can expect election systems to function approximately the same across time.

In the dataframes I have developed there are data from 95 different countries, 284 relevant ethnic groups, measured over 34 years. All groups are not coded all years, and I exclude groups smaller than 500.000 members, since the coding for these groups is less reliable (Nordhaus et al. 2006). This makes for a total of 6632 observations of group-years.

4.2   Operationalization

The goal of the operationalization is to capture the theoretical concept into valid indicators, so that my results reflect in a meaningful manner the theoretical framework and the defined concepts in my models (Adcock and Collier 2001). I will first account for the operationalization of the dependent variable, armed conflict onset, before moving on to measures for institutions, economic inequality and the group and state features hypothesized to influence propensity to warfare. I will lastly present control variables on both the country and group level

4.2.1   Dependent variable: onset of intrastate armed conflict

I ask what effect various factors have on the probability of the onset of intrastate armed ethnic conflict. Hence the dependent variable is binary - either there was the onset of internal armed conflict or there was not; More specifically I use a variable coded 1 for an ethnic group that has links to a rebel organization that was actively involved in fighting;

that is if "a rebel organization expresses its political aims (at least partly) in the name of the group *and* a significant number of members of the group were participating in the conflict" (Cederman et al. 2011:484).

Data on conflict onsets is derived from the Cederman et al. replication data and from EPR. These sources base their coding on the UCDP/PRIO Armed Conflicts Data Set (ACD)[1] (Gleditsch et al. 2002). ACD defines armed conflict as "any armed and organized confrontation between government troops and rebel organizations or between army factions that reaches an annual battle death threshold of twenty-five"[2] (Cederman et al. 2010), and an observation is coded 1 the year the conflict began, and 0 for subsequent years of conflict.

Though I determine the threshold for an armed conflict in terms of battle-deaths, this must not be confused by an assessment of the impact or consequences of a civil war, which can be disastrous, both during and after the conflict. For example, the war in Angola (1975-2002) caused around 1.5 million war deaths, and only about 11% of these were battle-related (Weidmann 2009:1).

In my dataframe covering the years 1972 through 2005, there are 77 armed conflict onsets. In the specification where non-democracies are excluded the corresponding number is 18.

Though we observe onset or not in absolute terms, there is reason to expect that all outcomes are not associated with similar certainty; In one case there might be great willingness to fight, and perhaps even some small-scale violence resulting in a few deaths, but not enough so to define the event as an internal conflict onset. In other cases there is no incentive or attempts to organize a rebellion at all. Still these two cases are observed as being in the same state. I therefore find it more appropriate to understand onset of civil war as a latent variable, where an underlying propensity for armed conflict onset Y^* is what generates the observed outcome Y (Long 1997:40-41) (See also section 4.5.)

4.2.2   Operationalizing election systems

As indicator for the parameter θ, election system, I use the election system variable from the Institutions and Elections Project (IAEP) dataset (Regan and Clark 2007; Regan et al.

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[1] The link between the organizations and the EPR groups is provided by NSA2EPR, a conflict resource that identifies organizations fighting for, and recruiting from, particular EPR groups (Cederman et al. 2011:484).

[2] Other violent encounters, such as massacres, genocides, communal riots and pogroms are excluded, either because both parties are not organized, or because the government is not involved.

2009a). The IAEP data[3] is comprehensive and offers detailed information on the rules states have constructed for governance.

In the IAEP data the system of a country in a given year is recorded as being one of the four categories *Plurality* (also called "First past the post"), *Majority, Proportional Representation* and *Mixed System.* As indicator of PR systems I collapse strictly proportional systems and mixed systems of election. As indicators for majoritarian systems I observe whether the system is majoritarian or pluralist, since these types will be subject to the same conflict mechanisms, as discussed in section 1.1.3.

There is a general tendency for fewer states to use a plurality system; In 1972, 32% of the countries where legislatures were elected used a plurality system and 25% a proportional system. By 2005, only 15% of countries used a plurality system and 35% determined winners based on proportional representation (Regan et al. 2009b:291).

Banned parties capture another dimension of party dynamics as discussed in section 2.3.1. When political parties cross-cut ethnic lines, we will see less violence and civil war. Cross-cuttingness of parties may be visible where ethnic and religious parties are banned, but at the same time such banning of parties can be interpreted in terms of policies aiming exactly at excluding some groups in society from power. I will discuss this further in chapter 6. The variable for banned parties is a dummy, and is obtained from the IAEP dataset.

	Occurences	N
Proportional election system	2010	6632
Proportional systems excluding the mixed systems	948	6632
Democracy	2321	6632
Banned parties	3396	6632
Onset of intrastate armed conflict	77	6632

Table 4.1: Descriptive statistics on categorical variables after imputation. Temporal range 1972-2005. Monopoly and dominant groups excluded.

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[3]The IAEP presents two distinct dataset. However as I do not employ the second one (on the population of elections), when mentioning IAEP data I refer to the country-year data on constitutional arrangements and institutions.
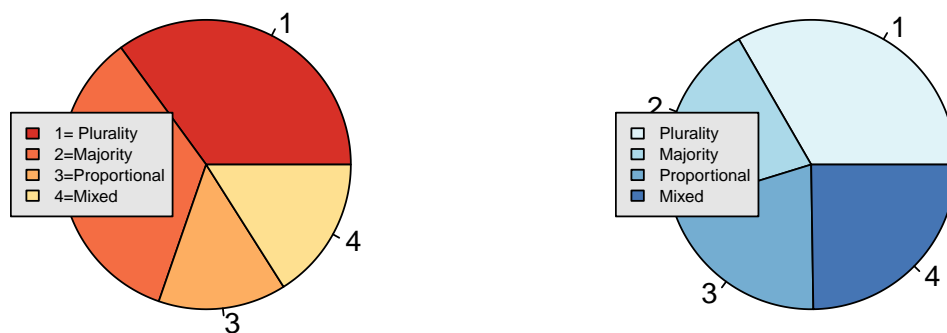
Figure 4.1: Pie chart of election systems

The red pie charts shows distribution over election systems by number of observations. The blue pie shows distribution of election systems by country for a random year (1995).

4.2.3   Economic inequalities

There is a distinction between the economic inequalities internally perceived by an ethnic group, and the externally observable ones. While the former are the ones that motivate groups to rebel, the latter are measurable, and hence in operationalizing economic horizontal inequalities I rely on estimates based on observations of economic performance. These estimates are derived from Cederman et al.'s (2011) replication data, and are constructed on the basis of the GeoEPR data, which is a geographically coded version of the EPR groups, giving spatial estimates of economic performance for politically relevant ethnic groups (Cederman et al. 2011:484).

I use two types of measures[4] to capture γ, economic inequality, from the theoretical model: 1) A symmetric logged form, and 2) an asymmetric, non-logged form. The former I name *Inequality (sq. log)*, and it is calculated in the following manner:

$$Inequality(sq.log) = [log(w/W)]^2, \tag{4.1}$$

where w denotes the GDP per capita of the ethnic group, and W denotes the average GDP per capita of all the groups in the country. This measure captures both positive and negative deviation from country average, and groups close to average GDP per capita will have a value close to 0 on this variable. I follow Cederman et al. (2011) in refraining from including the unsquared measure for inequality, since it's effect cannot be separated from zero. I theorized that being a little less wealthy than other groups will not be as conducive to intrastate war as greater levels of inequality. Only when the sum of HIs is considerable it is rational for an ethnic group to rebel, and therefore the squared measure is a more valid operationalization of inequality.

For the asymmetric measures, which I name *Negative inequality* and *Positive inequality* the equations are:

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[4]See for instance Stewart (2008:chapter 5), for a discussion on general principles of measurement of economic inequalities.

Figure 4.2: Distribution of deprivation
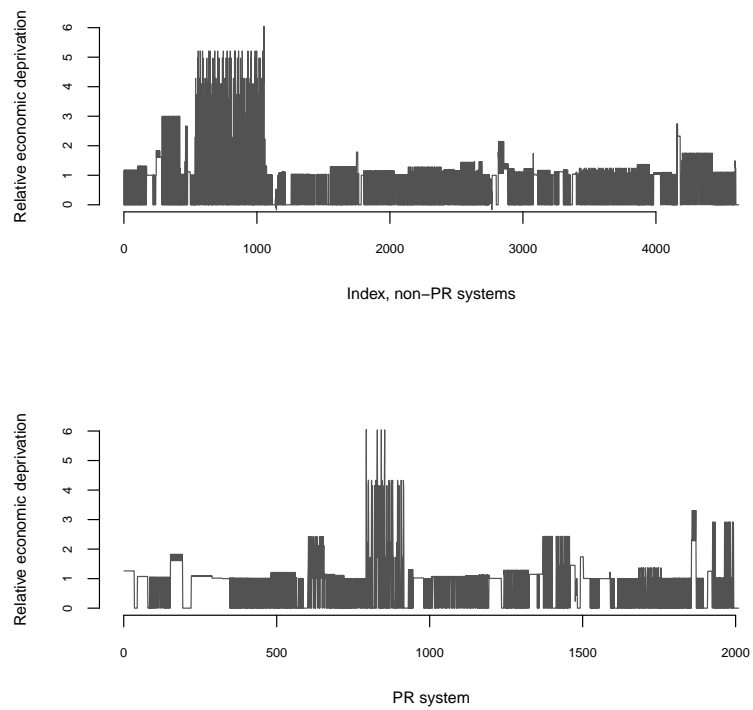
$$Negative \quad inequality = W/w \quad if \quad w < W, \qquad\qquad 0 \quad otherwise \qquad (4.2)$$

$$Positive \quad inequality = w/W \quad if \quad w > W, \qquad\qquad 0 \quad otherwise \qquad (4.3)$$

The negative inequality measure will have positive values if a group is poorer than the average group, and the positive inequality value will be positive if the group is wealthier. For example a group that is three times poorer than the country average will be coded as *Negative Inequality* = 3.

GeoEPR are based on Nordhaus et al. (2006) who assemble the best available data on local economic activity within countries for geographical grid cells (1°), and convert these to comparable figures into purchasing power parity (PPP), based on regional gross product data, estimates of regional income by industry, estimates of rural population and agricultural income[5]. The temporal scope of the inequality data is limited to one year – 1990 (Wucherpfennig et al. 2011).

Figure 4.2 shows that the frequency of high level deprivation is greater in majoritarian than proportional systems. In general, the data for high-income countries are the most reliable, while those for low-income countries are the least reliable (Nordhaus et al. 2006:10).

Though PR systems are considered to diminish inequality in the long run (Knutsen 2011; Persson and Tabellini 2003:22-30), I follow Cederman et al. (2011:484) in assuming economic inequality quite persistent over time[6]. Key features sustaining group economic inequality include dependence of the returns of one type of capital on the availability of other types, asymmetries in social capital and present and past discrimination by individuals and non-governmental institutions, as well as discrimination by governments (Stewart and Langer 2008:79).

4.2.4   The sizes and compositions of groups

According to my theoretical model relative size of groups, the ζ, is detrimental to the salience of ethnic cleavages, and the strength of an ethnic group, affecting the opportunity cost of rebellion. I use four different measures to capture different aspects of the parameter: 1)

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[5]see http://gecon.yale.edu/data-and-documentation-g-econ-project for country files and details.

[6]See section 5.4 for a methodological discussion
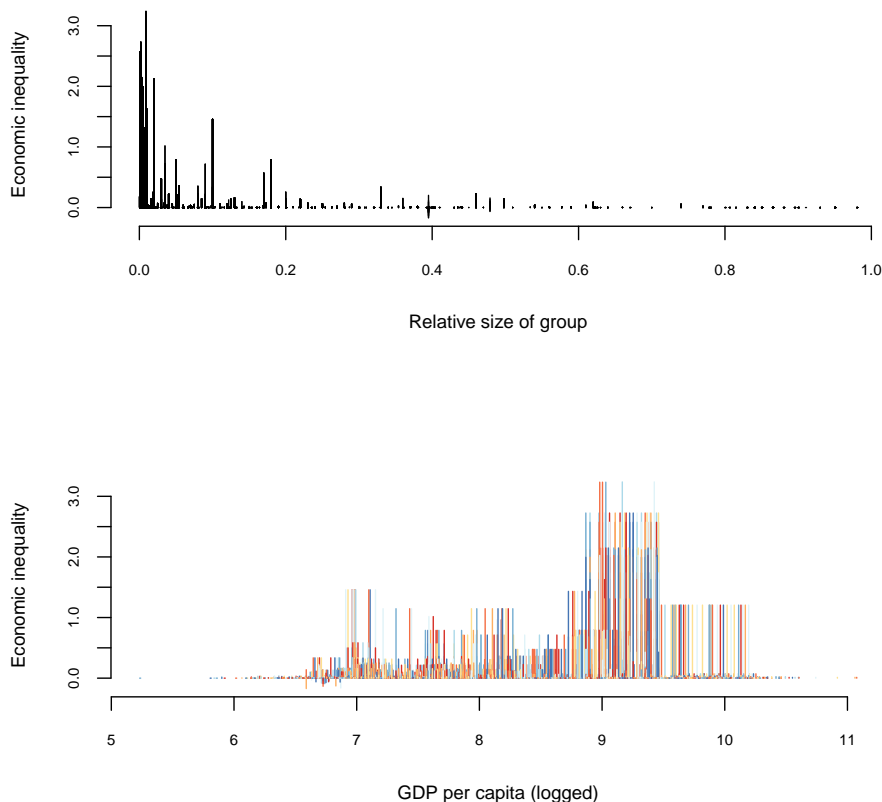
Figure 4.3: The top plot depicts the bivariate relationship between relative sizes of groups and the level of the economic inequality (the square of the log), the plot below shows the relationship between logged GDP per capita and inequality.

The relative sizes of groups, 2) demographic power balance, 3) logged size and 4) ethnic polarization. For the first three of these, the natural log of the variables are also used.

Relative size is a proxy for how large the ethnic group in question is relative to the total population. In order to operationalize this variable, the population estimate for each ethnically relevant group is divided by the sum of the population for each country. I derived the values from measure from the EPR dataset (Cederman et al. 2009). *Realtive size*^{2} is the square of this measure. The top plot in Figure 4.3 shows the bivariate distribution of symmetric inequality and relative size.

Log of relative size is a variable obtained from the EPR dataset measuring $ln(\frac{Group-pop}{Total-pop})$. The logged measure for relative group size allows for more variation in the effect between the smaller groups.

I include a measure for *demographic balance between groups* also named b from Cederman et al.'s (2011) data. Denoting the size of an ethnic group s and the size of the ethnic group(s) in central power (EGIP) S, the balance is:

$$b = s/S \quad if \quad GE, \tag{4.4}$$

$$b = s/(s + S) \quad if \quad GI, \tag{4.5}$$

Where GE is a group excluded from power, and GI is an included group. In this manner, groups with $b >0,5$ are larger than the EGIP, and smaller groups have $0<b<0,5$.

Dem. power(sq.) is the the square of the demographic power balance, and is employed in due to my expectation that the results will be in line with bargaining theory, such that groups with very high or low power compared to the EGIP will not resort to violence. Employing both measures allows for two different coefficient estimates, and hence allow for a non-linear effect of demographic power balance.

Polarization is measured by use of Reynal-Querol's (2005) polarization measure after Esteban and Ray's (1994) measure of income polarization, which is defined as:

$$EP = 1 - \sum_{i=1}^{G} \left(\frac{0.5 - \zeta_i}{0.5}\right)^2 \zeta_i \tag{4.6}$$

where ζ_i is the proportion of individuals who belong to group i and there are G groups. This measure assumes that the distance between all groups is one. The EP runs from 0, which means no polarization, up to 1 for maximum polarization[7]. The measure used in the analysis is from EPR.

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[7]If there were two groups with $\zeta_i = 0.5$ the EP would be 1.

4.2.5 Control variables

Democracy

Democracy is another key explanatory variable in my models, important in two respects. First, democracies are often perceived as more peaceful than other regime types, and theory on the democratic civil peace has long influenced empirical investigation of civil war. However, there is convergence towards a consensus in the quantitative literature that democracy in itself does not reduce the risk of civil war onset (Hegre and Nygard 2012:5)[8].

Second, the effect and the content of political institutions differ across regime types, and it is the effect of primarily democratic institutions that are addressed in my theoretical framework. However, institutions are present and important in some autocratic regimes as well. Gandhi and Przeworski (2007), for instance, claim that authoritarian rulers rely on nominally democratic institutions to neutralize threats from larger groups within society and to solicit the cooperation of outsiders, but there is nevertheless little reason to believe that autocratic election systems share the theorized effects of election systems in democratic states, and I therefore run models on two different datasets: One excluding non-democracies, and the other inducing all regime types. Due to restrictions in the data, and especially the low number of onsets in democracies, I settle with simply controlling for democracy in most models. (See sections 5.4 and 6.2 for discussions.)

I employ a procedural measure for democracy derived from Cheibub et al. (2010). This proxy is based on the definition that democracies are regimes in which governmental offices are filled as a consequence of contested elections (Cheibub et al. 2010:69). The definition highlights that for a regime to be democratic both the chief executive office and the legislative body must be filled by elections, and contestation "occurs when there exists an opposition that has some chance of winning office as a consequence of elections" (Cheibub et al. 2010:69).

Employing this trivial measure ensures that not too many states in the data are considered non-democracies, securing heterogeneity in the observations of onsets in democracies, for those models where I exclude non-democracies.

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[8]See also Hegre et al. (2001); Fearon and Laitin (2003); Collier and Hoeffler (2004).

The strength of the state

The factor best capturing the parameter π (the probability of success in armed conflict) in the theoretical model of intrastate war (see page 28), is the strength of the state[9].

Most civil wars occur in less developed countries (Collier et al. 2003), and development may interfere with inequalities and institutions. Therefore GDP per capita is one important proxy for state strength. I expect development to mitigate the intensity of the will to control government; If possibilities for prosperity exist apart from control over government resources, the "government is not the sole objective of all groups and individuals" (Spears 2000:115). For instance, Bermeo (2002) runs a regression separating states on the grounds of level of wealth. She finds that there are different effects of political institutions across the range of economic development.

My measure for GDP per capita is logged, since the effect of development level on risk of conflict is likely to be non-linear. There is reason to expect that the effect increases more rapidly with changes in GDP at the low range than for higher levels of development.

Another proxy for state strength is the *Logged Population size*. Other things equal, central governments in larger societies will find it more difficult to satisfy divergent preferences over redistribution and public goods (Garrett and Rodden 2003; Alesina and Spolaore 1997:1029).

The number of *Excluded groups* will affect a governments resolve towards ethnic concessions. Walter (2006) argues that governments facing a large number of ethnic groups will be less willing to make concessions, in fear of domino effects. A large number of excluded groups leads to lower probability of civil war since groups living in such countries will face a harder time receiving grants from the government. I use measures of the number of excluded groups within a country from the Cederman et al. (2011) replication data.

Controlling for time dependencies

Peace years is the number of years a group has lived in peace. These are included to model temporal dependence. I expect a positive effect of previous wars to decline over time, but I have no theoretical expectation as to the *form* of this decline. Taking time seriously can be achieved in this instance through the use of splines or polynomial of time (Beck et al. 1998). The data-generating process is temporally dependent, and the use of a rare events

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[9]Strictly speaking, the stronger the state, the lower the π, so that increases in the variables capturing state strength are operationalizations of $(1 - \pi)$.

model with only a linear specification of peace years would be inappropriate since it implies a constant hazard (Carter and Signorino 2010:274).

Carter and Signorino (2010) discourage the use of time dummies and splines, and recommend the use of cubic polynomials as an approach to account for time dependence in binary data. I therefore include a variable for *Peace years*, along with its squared and cubed values ($peaceyears^2$ and $peaceyears^3$). Though splines are "not necessarily problematic", they are often not fully understood by political scientists, which potentially can lead to biases "as serious as biased hazard"(Carter and Signorino 2010:14). Carter and Signorino show using Monte Carlo experiments and replication analyses that cubic polynomials perform just as well as splines.

Time trends in intrastate armed conflict onsets are controlled for by including a proxy for calendar year. We live in an increasingly more peaceful world, due to factors such as increasing interstate cooperation and political and economic development (Gurr 2000), and one might argue that an expansion of the understanding of "humanity" produces more benign foreign policies and international affairs (Finnemore 2003), and also affects a decrease in the level of intrastate violence between groups.

	mean	st.d	min	max	N
Inequality (square of log)	0.125	0.372	-0.172	3.238	6632
Negative inequality	0.796	0.864	-0.175	6.046	6632
Positive inequaltiy	0.514	0.621	0.000	3.344	6632
Demographic power balance	0.255	0.268	0.001	1.000	6632
Power balance (squared)	0.136	0.231	0.000	1.000	6632
Relative size	0.186	0.222	0.000	0.980	6632
Log of realitve size	2.121	1.621	-3.159	4.605	6632
Polarization	0.671	0.159	0.078	0.988	6632
GDP per cap (log)	8.054	1.036	5.231	11.076	6632
Excluded groups	7.984	14.619	0.000	55.000	6632
Log of population size	14.977	1.371	13.141	20.308	6632
Year	1989.478	9.882	1972.000	2005.000	6632
Peace years	29.582	15.645	0.000	59.000	6632
Disproportionality	8.854	4.196	0.018	34.520	6632

Table 4.2: Descriptive statistics on numeric variables after imputation. Temporal range 1972-2005. Monopoly and dominant groups excluded.

4.3   Missing values and imputation

In my data there is some missingness, which could lead to bias if not addressed. I assume that observations are missing at random (MAR)[10], meaning that the missingness only depends on the observed part of the data-set and the parameter. In other words, the values of the variables that are missing depend on the values of the other variables in the dataset (Høyland and Nygård 2012:9). This assumption allows for the use of multiple imputation.

There is no definite way to test whether the assumption of MAR is true, so there is a possibility that some of these values are NMAR, and hence depend on some unrecorded information, such as the value of some variable not included in the dataset, or on the variable itself (Høyland and Nygård 2012:9), making imputations biased. It is not unthinkable that for instance missing values on economic inequality depend on some particular traits within the bureaucracy of states, not present in my data. Still, missing reports on economic factors quite likely correlate with factors like a low GDP, and past and present conflicts, making the assumption of MAR reasonable.

The multiple imputation procedure involves allowing the software Amelia II (Honaker et al. 2011) taking one missing observation in my data and replacing it with five constructed values, by use of all the information available in my dataset. In doing so Amelia construct five datasets. In constructing the imputed data polynomials of time interacted with ethnic groups, allowing the patterns over time to vary between the cross-sectional units. Allowing for variation this way is reasonable since we can expect different ethnic groups not to have the same patterns over time in independent variables.

Figure A.1 in Appendix A depicts a comparison of the density of continuous variables in the imputed data with the density of those in the original data. For economic inequality, for instance, with 37 missing observations, the density changes somewhat after imputations, as visible in Figure 4.4, but is similar across the five imputed datasets.

Since the variance of the imputed values is directly interpretable as the imputation uncertainty, one can run analyses on all the imputed data-sets and then find estimates with the correct uncertainty by taking the average of them. An alternative recommended approach is to combine the imputed datasets and analyse them as one (Little 2002:86). Since the

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[10]Little (2002:12-13) distinguish between three types of missing data. Data missing completely at random (MCAR), data missing at random (MAR) and data not missing at random (NMAR).

Figure 4.4: Inequality (sq. log)'s distribution after imputation
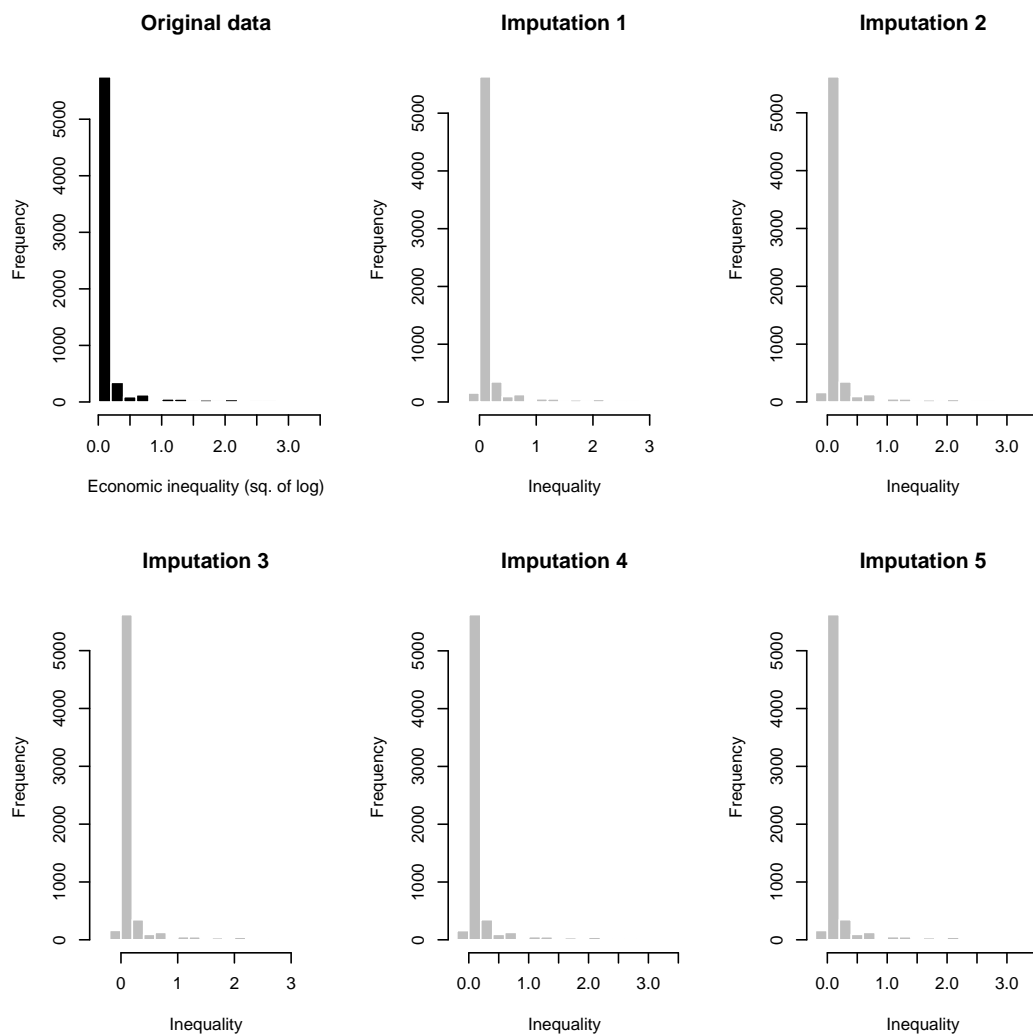
amount of missingness in my data is limited, and my estimates are almost exactly similar across imputed datasets, I chose to present regressions run on only one of the datasets. This approach does not alter results significantly, and it is parsimonious.

4.4 Election systems and political outcomes

Theory of election systems stress how proportional election systems produce multi party systems and make legislatures more proportional. This is also an important assumption in my theoretical model and for the hypotheses. Do electoral systems affect the degree of proportionality in the legislature? Do we see less political exclusion in proportional systems of elections? Figure 4.5 gives a clear picture of the empirical relationships in my data.

The top of Figure4.5 portrays the number of parties with more than 5% of the seats in the legislature (IAEP data) under PR and majoritarian systems. We see that whereas within majoritarian states one- party systems are the rule, we very seldom find only one effective party under PR systems. Under PR systems a majority of legislatures consisted of more than three parties.

The bottom plot shows the distribution of disproportionality among majoritarian and PR systems.*Disproportionality* is a proxy for *de facto* proportionality in the legislature. I use the Gallagher Index of electoral disproportionality, which uses the standard least squares method for comparing the relationship between the parties' votes and their seats in the legislature (Gallagher 1991; Carey and Reynolds 2011; Gandrud 2012). Higher numbers on the Gallagher Index indicate that there is a greater disparity between votes and seats– that elections have produced more disproportional outcomes. This allows for insight to whether election institutions work in the way assumed in my models, as Duverger's law prescribes. The bivariate relationships depicted in the figure suggest that they do.

4.5 Statistical model: Rare events logit

Since my outcome variable is the probability of intrastate armed conflict onset, it is substantively reasonable that the effect of independent variable will be non-linear, and have "diminishing returns as the predicted probability approaches 0 or 1" (Long 1997:39-40). The use of a probit, logit or duration model could be considered. Trivially, these models return
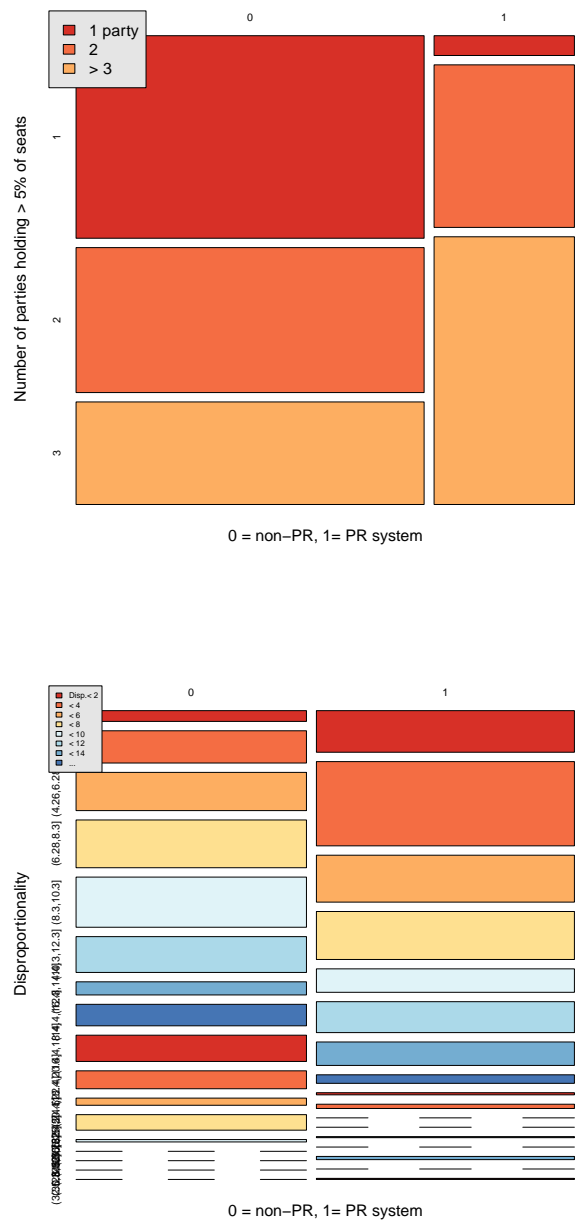
Figure 4.5: Election systems and legislatures. The figure shows number of parties in the legislature (top) and disproportionality score(bottom), for majoritarian and proportional election systems. Data: 1972-2005, all regime types.

very similar results. Employing a logit on binary cross-section-time-series (BCSTS) data, which is in one sense "duration data", is justified since I model time dependency, as discussed in section 4.2.5. Also Beck et al. (1998:1268) side with using the logit link because of its greater familiarity, and it's ability to be extended in a way that meets the structure of my data better.

Intrastate armed conflicts are rare events and I choose to use an extension of the logit link that takes this rarity into account; The rare events logit model, as specified by King and Zeng (2001a), is my main statistical tool. The case for this is that the maximum likelihood estimation (MLE) used in logistic models suffer from small-sample bias. No matter how large the number of observations, there will be very few cases of onsets, leading to bias from MLE (King and Zeng 2001a:145). Maximum-likelihood estimates are calculated by finding the values of the intercept, the coefficients and the variance that maximizes their likelihood, given the values in the observed data.

The ML estimator is consistent, asymptotically efficient and asymptotically normally distributed (Long 1997:26-33), but the bias causes underestimation of event probabilities. King and Zeng (2001a:146) show that for rare events data, $P(Y = 1)$ is underestimated, and hence $P(Y = 0)$ is overestimated . The basic logic behind this is that the density of zeros will have greater certainty than the density of ones, and hence "pull" estimates in one direction: In order to make as few mistakes in prediction as possible, MLE will place the outpoint for which values of an observed variable are associated with onsets closer to the maximum of $P(X|Y = 0)$ than to the minimum value of $P(X|Y = 1)$, resulting in biased coefficient estimates assigned to the variable. These biases are in a predictable direction: estimated event probabilities are too small (King and Zeng 2001b:704). In rare events data these biases in probabilities can be substantively meaningful even with sample sizes "in the thousands" (King and Zeng 2001a).

I use the Zelig package, and the relogit procedure in R (Imai et al. 2007; 2008) to estimate the rare events model estimates using ML. The rare events procedure in R corrects the estimates for this bias, by inserting additional weights into the ML-equation[11].

In chapter 3 I presented the theoretically derived regression models as functions of the variables($\boldsymbol{X}$) and their parameters ($\boldsymbol{\beta}$). King and Zeng (2001a:140) show that the probabilities in a rare events model can be calculated in the same manner as for a logistic model.

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[11]See for example Imai et al. (2007:510) for the equation and the bias term.

Inserting the logit link, the probability of armed conflict, becomes:

$$P(Y_i = 1 \mid \boldsymbol{\beta}) = P(Y_i^* > 0) = \frac{1}{1 + e^{-\boldsymbol{x_i}\boldsymbol{\beta}}} \tag{4.7}$$

4.6   Methodological challenges

One problem that is only partly overcome through the use of the rare events logit is that there is little variation in the outcome variable: only 77 of 6632 observations from 1972 to 2005 are coded as onsets of internal armed conflict. The effect of the electoral system must be estimated from cross-sectional variation in the data, since reform, and therefore variation over time, is rare. As pointed out by Persson and Tabellini (2003:9), the non-random selection on countries produces a risk that I confound any effect of electoral system with fixed country characteristics. The problem is mitigated since the unit of observation is ethnic groups, allowing for, at least some, within-country variation.

The threat of omitted variable bias is always present in statistical analysis (Stock and Watson 2012:224). Since some unobserved factors may be correlated with my independent variables and be determinants of ethnic conflict onset, I will employ alternative specifications of the models, including additional controls. I will also run fixed effects models controlling for country specific effects. The intercept also picks up effects from omitted variables.

Nonspherical errors are likely to occur. Error terms are almost always heteroskedastic, and the error terms for each ethnic group will most likely be autocorrelated. I do not suspect correlations of errors across units to be a great threat. To control for heteroskedasticity and autocorrelation I use Heteroskedasticity- and Autocorrelation-robust (HAC) standard errors in regressions. More specifically I a kernel-based HAC covariance estimator employing the weights given in Lumley and Heagerty (1999), clustering errors on countries.

The largest threat to making valid inference from the data is the problem of endogeneity. The origin of constitutional rules may be endogenous to the performance of institutions (Persson and Tabellini 2003:104-105). Lipset and Rokkan (1967) theorized that the institutions of a country is a reflection of key cleavages within society, as more homogeneous states tend to install majoritarian rules. In other words power sharing arrangements may be endogenous to societal divisions. If a state was experiencing ethnic discrepancies or there was fear that ethnic armed conflicts could occur at the time when the institutional design was created, this could be crucial concerns guiding the decision to implement power sharing

institutions. More specifically: If PR systems have a higher correlation with armed con-
flicts than majoritarian systems it may be caused, not by the system, but by the historical
and cultural traits that made them self-select into proportionality (Persson and Tabellini
2003:114). Since estimation tools allowing for instrumentation in rare events models are not
available, I rely on the rare events procedure and the controls to provide statistical estimates.
I will also test robustness by the use of fixed effects models. These will help reveal whether
country-specific historical traits bias the logit estimates.

Towards the end of the next chapter, I address the concerns raised here. First, I will
present the results from the empirical analysis.

Chapter 5

Results

In this chapter I present the main results from the statistical analysis, according to the order of hypotheses 1 to 4. I will only briefly discuss the substantive result here, as I leave a discussion of the implications for chapter 6. I present several regression model results for each hypothesis. For the models estimated on equally many observations the AIC reports very little variation in fit[1], and I therefore choose to include different specifications, as they are all suited for testing the empirical implications of my theoretical model.

I put emphasis on interpreting the strength and the statistical significance of the interaction terms for the hypothesized relationships. In order to present marginal effects I rely on reporting first differences from simulations and plotting the changes in expected values of intrastate armed conflict onset for different values of the parameters. My theoretical model concerns what effect PR systems have conditioned on salient ethnic cleavages, and not mainly the probability of ethnic intrastate conflict.

For hypothesis 1 I present more alternative regression models in order to illustrate how various model specifications and data affect the coefficient estimates. The models discussed in some depth are reported in tables in the main text. Additional models are presented in table format in Appendix B, or available in the do-file. In section 5.4 I address statistical concerns regarding the models and discuss robustness and model fit.

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[1]Comparing the model's AIC we need to be certain they are derived from equally many observations (Kennedy 2008:101).

5.1   Varying effects of PR systems across group sizes

The first hypothesis concerned how relative group sizes affects the effect of PR systems. To test the hypothesis I first regressed the model on the original dataset, and then ran several regressions on the imputed dataset. First I estimated a regression model consisting of the variables most interesting theoretically, as operationalized in chapter 4, including the control variables, and polynomials for peace year. I then proceeded with a specification less demanding to the data, using only one interaction term. Finally the same models are rerun using the *log of relative size*, to see whether this specification yields stronger estimates.

As visible from table 5.1 hypothesis 1 is supported, but the results vary across model specifications.

The first column (Model 1a) shows the results of the estimated regression model 1 on the original data, using the measures for demographic power balance. Remember that we had to observe a negative β for relative size, and a positive β for the square of group size, to support the hypothesis. The size and the signs of the interaction coefficients in this model suggests that the empirical relationship may correspond to my model, but unfortunately the standard errors are quite large, resulting in a p-value of 0.16, meaning that within normal conceptions of statistical significance, we cannot make any certain conclusions based on the results. Could these disconfirming results be a product of missing data?

Model 1b tells us that this is not the case. We see that even for the imputed data, where we have more observations, and the problem with missingness is curbed, the results are still not statistically significant. Rather the marginal conditional effects are quite similar for the first two regressions. Still, we should not be fooled by the absence of stars. In figure 5.1 I compare the coefficient estimates of Model 1a in table 5.1 to the coefficients from the model regressed on the imputed data. What this plot tells us is that though the estimates cannot be said to be significant within normal conceptions of statistical significance, the coefficient estimates for the conditional effect of PR and demographic power balance are almost separable from zero, suggesting that we can be quite certain that the conditional effect of PR from relative size is negative.

Model 1c is an alternative specification of model 1 where I use the relative size measure. When including an interaction for the square of size, the model did not estimate properly, and this specification is therefore not reported. I then relaxed the assumption of a decreasing

Table 5.1: Hypothesis 1) An increase in relative group size is associated with an increase in probability of intrastate armed conflict onset, with a reducing rate for very large sizes, but under PR systems the risk of conflict only increases for very large sizes.

	Model 1a	Model 1b	Modellc	Model 1d
Intercept	19.340 (32.575)	22.936 (31.638)	18.736 (31.261)	22.093 (32.188)
PR system	0.848 (0.496)*	0.848 (0.480)*	0.915 (0.392)**	0.654 (0.585)
Demographic power	0.855 (1.801)	1.645 (1.783)		
Demographic power sq.	−0.757 (2.153)	−1.619 (2.117)		
Economic inequality sq.	1.303 (0.331)***	1.225 (0.325)***	1.186 (0.319)***	1.303 (0.341)***
GDP per capita (logged)	−0.692 (0.191)***	−0.648 (0.179)***	−0.684 (0.181)***	−0.670 (0.179)***
No. excluded groups	−0.029 (0.018)	−0.023 (0.017)	−0.023 (0.017)	−0.018 (0.020)
Population (logged)	0.142 (0.115)	0.097 (0.112)	0.106 (0.113)	0.087 (0.119)
Banned ethnic parties	0.742 (0.303)**	0.677 (0.292)**	0.711 (0.292)**	0.653 (0.294)**
Democracy	−0.398 (0.348)	−0.223 (0.326)	−0.213 (0.326)	−0.243 (0.326)
Year	−0.010 (0.016)	−0.011 (0.016)	−0.009 (0.015)	−0.011 (0.016)
Peace years	−0.268 (0.065)***	−0.285 (0.063)***	−0.272 (0.062)***	−0.275 (0.063)***
Peace years sq.	0.011 (0.003)***	0.011 (0.003)***	0.011 (0.003)***	0.011 (0.003)***
Peace years cubed	0.000 (0.000)***	0.000 (0.000)***	0.000 (0.000)***	0.000 (0.000)***
PR * Dem. power	−5.674 (4.001)	−4.047 (3.692)		
PR * Dem. power(sq.)	5.286 (4.898)	3.051 (4.684)		
Realtive Size			0.510 (0.754)	
PR * Relative size			−4.586 (2.316)**	
Logged relative size				0.167 (0.237)
Logged realtive size(sq)				−0.019 (0.054)
PR * logged size				0.563 (0.603)
PR* logged size(sq.)				−0.258 (0.166)
AIC	759.532	785.804	777.715	780.942
Log Likelihood	−363.766	−376.902	−374.858	−374.471
Num. obs.	6535	6632	6632	6632

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Coefficient estimates from rare events logit regression.

Standard error in parentheses.

Data covering years 1972-2005. Groups > 500.000.

The imputed models are estimated on the fifth of five imputed datasets.

Figure 5.1: Coefficients plot from Model 1a and Model 1b. The dots mark the best estimate, the thick lines show one standard deviation confidence, and the thin line two standard deviations.
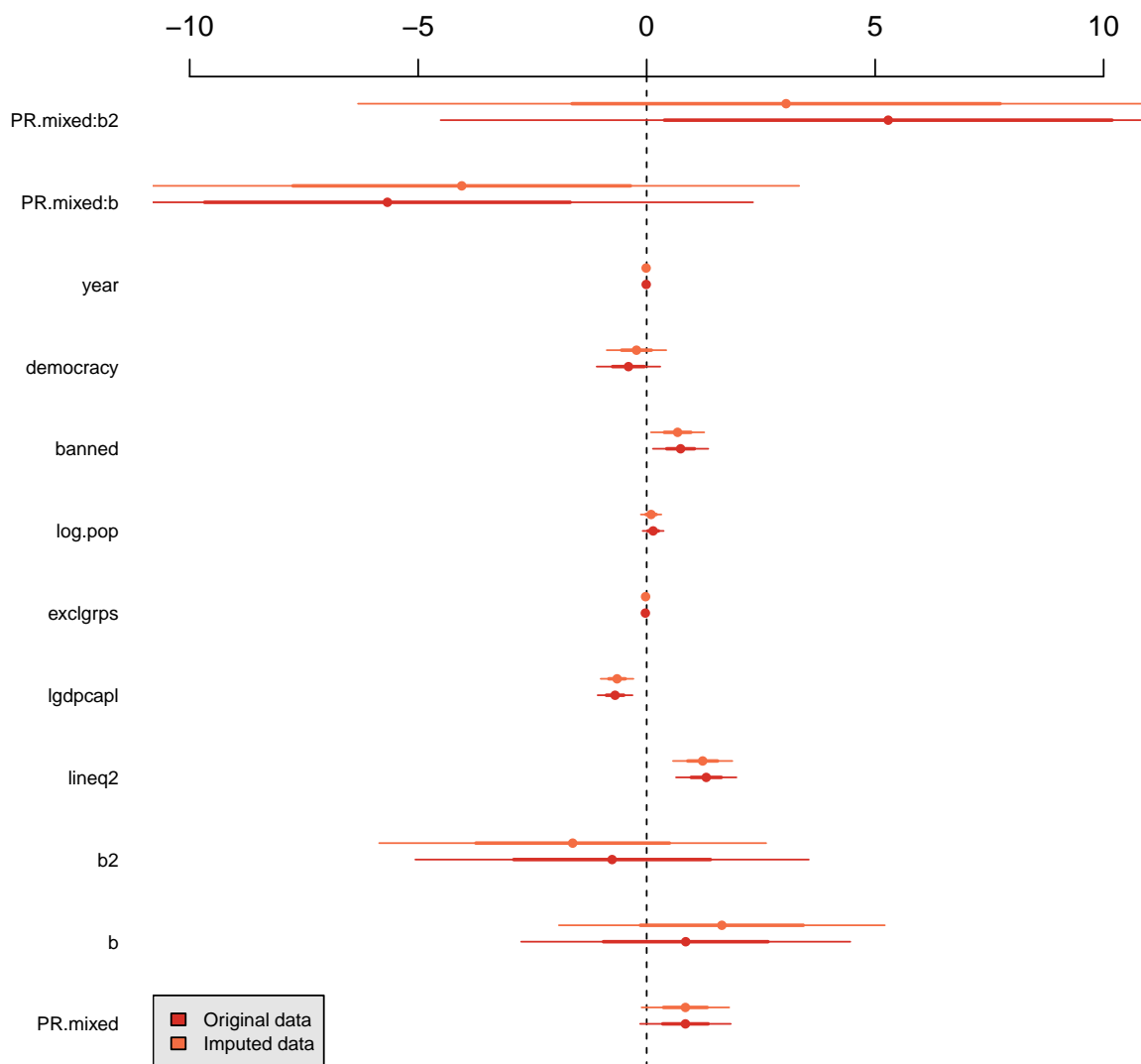
negative conditional effect as group sizes grow large, in order to test if there might be some linear conditional effect of group size. The interaction term now turns significant. In other words: The risk of being involved in armed conflict *does* increase with relative group size under non-PR systems. Under PR-systems, however, size has a negative effect on the risk of conflict onset, although this is a very imprecise estimate. The suggestion of a monotonically decreasing effect of relative sizes in PR systems is rather puzzling, considering the median voter theorem, bargaining theory, and the theoretical model presented.

The fourth column in table 5.1 shows a third model specification on the imputed data, where demographic power balance is replaced by the log of relative group size, as described in section 4.2.4. The coefficients for the interaction terms are not consistent in terms of direction with the other specifications of Model 1, but the estimates fail to reach significance even at the 20% level.

So far, I have not commented on the coefficients of the other independent variables, as these are of a secondary interest in this context. The control variables generally behave as expected. The parameters for state coherence support the notion that small and strong states are the most peaceful. Logged GDP per capita is consistently negative and significant, and inequality has a positive effect. Democracy has the expected negative effect on conflict onset, though not a significant one. Most notable of the independent variables is the coefficient for PR system, which is positive and significant across specifications. However, this term must be interpreted with caution, as it is the effect of PR when a group is of zero size, which is of course empirically impossible.

Another interesting estimate is that of banned parties – it seems that for groups living in states where ethnic or religious parties are banned from electoral contest, the risk of conflict increases. This result stands in contrast to majoritarian conceptions of ethnic parties, and will be discussed in the next chapter.

My main interest lies in the marginal effect of PR systems, depending on the size of the group, which can be calculated[2] as the partial change. For Model 1c, for instance, this is:

$$\frac{\partial Onset}{\partial PR} = \beta_1 + \beta_4 Size \tag{5.1}$$

In order to show the marginal effect, as a better interpretation of the conditional relationship suggested by the coefficients in table 5.1, I estimated expected values of the dependent

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[2]I base this equation on Brambor et al. (2006:73) .

variable, for various values on all independent variables, based on Model 1b and Model 1c. I choose to investigate mainly the results from Model 1b over the more certain estimates from column three, because this model is the one capturing the theoretical expectation more adequately. And though the estimates are uncertain, the estimates can nevertheless give us some idea regarding the conditional effect of PR systems.

One illuminating way to present these results is in terms of the differences in effect on expected values between the presence and absence of a PR systems, holding all other variables at their means[3] as recommended by Long (1997); King et al. (2000).

To compute expected values and present them in the form of first differences and plots of marginal effects, I used the Zelig package in R, which computes quantities of interest through the use of simulation. Simulation is a simple way to compute features of the probability distributions in my data (King 1997:141), so that I can report quantities of interest (such as first differences) *and* the uncertainty surrounding these values. This procedure allows for better understanding of the statistical models presented in table 5.1. Since the vector of β is uncertain, the changes in risk of armed conflict as we move from a majoritarian to a proportional system, is also uncertain (King et al. 2000:349). Zelig picks 1000 random draws from my data, and compute the "Expected value of Y" given specific values of all variables in the model, $E(Y|\boldsymbol{x})$.

Rather than setting all variables at their mean, a more informative approach is to set variables at substantively interesting values[4], and then investigate the change in onset probability between electoral system, dependent on the relative sizes of groups. As discussed in chapter 4 (page 46), internal armed conflicts rarely happen in well developed countries, and I therefore set the value for GDP per capita to both mean and the first quantile of its distribution. Keeping all other control variables at mean values, I calculated first differences based on Model 1b, as visible in table 5.2.

The first differences indicate that for both relatively small and very large groups, the marginal effect of a PR systems is positive, while for those at the considerable sizes they are negative. This supports my proposition of a non-linear conditional relationship. Also

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[3]For all presentations of marginal effects I set the character variables for democracy and banned parties at 1. Using the means of these variables makes little sense substantially. This decision does not affect the presentation of marginal effects by large.

[4]See King et al. (2000:356) for an argument supporting counterfactual estimates as a heuristic for understanding regression output.

E(Y|PR) - E(Y|Majoritarian)	b	logged GDP per capita
0.003	Mean	Mean
0.009	1st Q	Mean
-0.002	3rd Q	Mean
0.005	Mean	1st Q
0.016	1st Q	1st Q
-0.005	3rd Q	1st Q
0.022	Max	1st Q

Table 5.2: First differences Model1a

as relative sizes of groups increase the risk of intrastate armed conflict onset is larger under majoritarian systems, but for the largest groups the risk is higher under proportionalism, in line with my theoretical model. Still, the very small first differences raise the question as to how *consequential* the differences in risk of onset really is between majoritarianism and proportionalism.

Perhaps the insignificance of the estimates differ across the range of values for group size? Figure 5.2 presents the plotted estimates of the effect of demographic power balance as specified in Model 1b for $PR = 0$ and $PR = 1$. GDP is set at 1st quantile, and all the other variables at mean[5]. The plot shows the expected probabilities of intrastate armed conflict onset.

The figure reveals that the marginal effects of proportional elections run in the directions hypothesized in hypothesis 1, with the probability of conflict onset increasing under majoritarian systems, but not so under PR. The clearly negative effect for increases in demographic power under PR systems, is more surprising, but still partly in line with my theoretical model. The estimate has thinner confidence bands around the lower range of values, indicating that the certainty is greater at smaller sizes, but providing little leverage in terms of giving confidence in the estimates for larger sizes.

Since Figure 5.2 is based on the uncertain estimates from Model 1b, I included a figure representing the alternative, and more certain Model 1c in Appendix B (page 114). Plotting Model 1c shows the same tendency as figure 5.2.

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[5]b2 could not be set to vary with b, so I tried a range of values, showing quite similar relationships. For high b2-values, the probability of conflict grew suspiciously high, so I set b2 to the arbitrary and low value 0.1, possibly skewing the plot somewhat.

Figure 5.2: Model 1. The effect of demographic power balance, dependent on election system
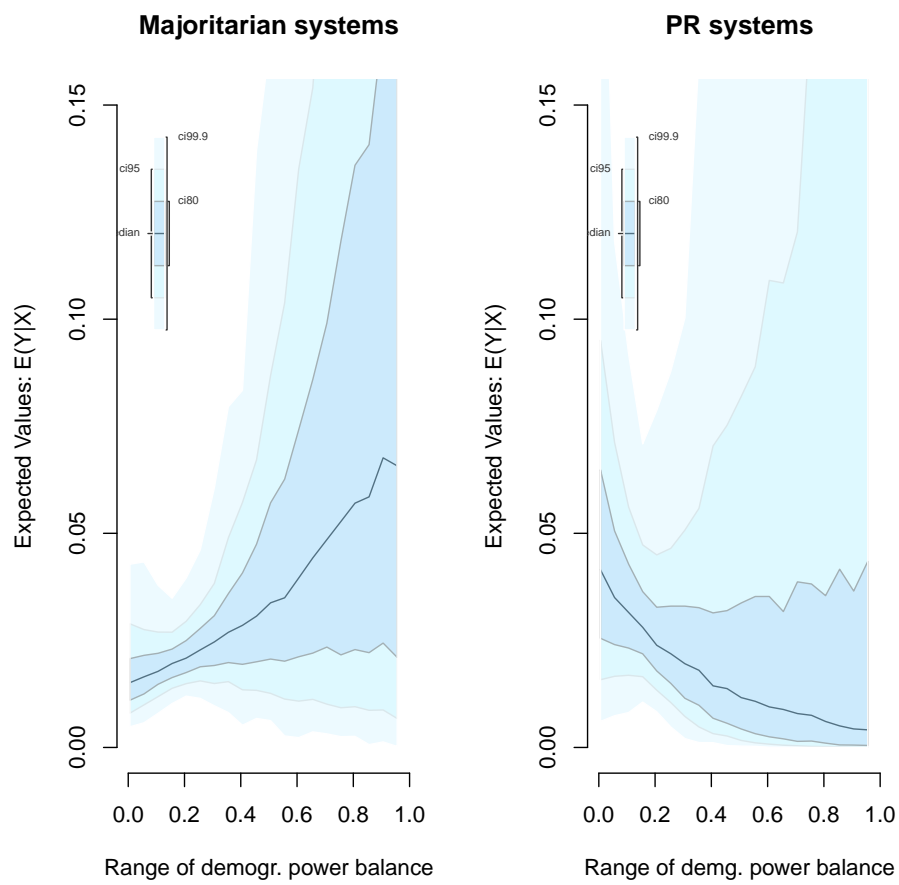
Table 5.3: Hypothesis 2) *The higher the ethnic polarization is within a country, the larger is the risk of rebellion, but this increase is less prominent under PR than under other election systems.*

	Model 2a	Model 2b
Intercept	24.834 (32.565)	23.782 (31.358)
PR system	0.637 (1.300)	0.415 (1.227)
Ethnic Polarization	0.650 (1.051)	0.522 (1.041)
Economic inequality(sq. log)	1.462 (0.323)***	1.356 (0.317)***
GDP per capita (logged)	−0.716 (0.187)***	−0.660 (0.176)***
No. excluded groups	−0.034 (0.017)*	−0.030 (0.017)*
Democracy	−0.379 (0.341)	−0.220 (0.322)
Banned ethnic parties	0.771 (0.298)***	0.725 (0.289)**
Year	−0.013 (0.016)	−0.012 (0.015)
Peace years	−0.265 (0.064)***	−0.271 (0.062)***
Peace years sq.	0.010 (0.003)***	0.010 (0.003)***
Peace years cubed	0.000 (0.000)***	0.000 (0.000)***
Population (logged)	0.138 (0.111)	0.093 (0.110)
PR * Polarization	−0.715 (1.750)	−0.290 (1.660)
AIC	758.932	785.778
Log Likelihood	-365.466	-378.889
Num. obs.	6535	6632

***$p < 0.01$, **$p < 0.05$, *$p < 0.1$
Coefficient estimates from rare events logit regression.
Standard errors in parentheses.
Data covering years 1972-2005. Groups > 500.000.
The imputed models are estimated on the fifth of five imputed datasets.

5.1.1 Polarization and election systems

The results from Model 2 do not provide much leverage in terms of neither supporting nor rejecting Hypothesis 2. The interaction term is negative as hypothesized, indicating that polarization is less damaging to peace under PR systems than under majoritarian election systems. However, the coefficient never reaches significance. This means there is no certain conditional effect of polarization. I refrain from interpreting these results any further here, but will return to them when discussing an alternative specification in the robustness section.

5.2   Inequality challenges peace

Hypothesis 3 is partly supported. The coefficient for the squared logarithm of economic inequality is significantly positive across specifications. The coefficient for degree of negative economic inequality is also positive and significant, meaning that groups poorer than the average wealth for groups in a country, are more at risk of experiencing armed intrastate conflict, all else equal. The effect of being economically privileged is characterized by uncertainty.

Concerning the second and conditional part of the hypothesis, the results contradict my model. We see that for both specifications in table 5.4, the interaction term for PR system and economic inequality is significant and *positive*, while for the hypothesis to be supported we needed to see a negative β here. The interaction terms are quite precise and suggest that inequality has an even greater impact on the risk of conflict under PR systems.

Again, I am interested in the marginal effect of a proportional election system. In table 5.5 the first differences estimated by simulation from counterfactual values are reported. Similar to what I discovered in for Model 1, the first differences are very small, suggesting that the marginal effect of election system is negligible. An interesting deviation here, is the difference for the maximum value of negative inequality, which is very large.

I find it unlikely that a change from a majoritarian to a proportional system could result in such a dramatic change in the probability of intrastate armed conflict, even for very high levels of inequality. Investigating the data more closely, I found that the result may be driven by outliers[6]: The first and second Chechen wars (1994 and 1999). The Chechen in Russia have the highest score on negative inequality of all ethnic groups in the data, above 6. Below them the next value of inequality is approximately 5 (the Karakalpaks in Russia), and there are no additional onsets observed for any group with a negative inequality above 4. Besides this Russia is the country with the highest score on the symmetric inequality measure of all countries in the dataset (see table A.2, page 108). The Chechen in 1994 and 1999 were the only group which experienced such strong economic deprivation, and lived within a PR system. This suggests that any inference to other ethnic groups may be speculative.

I reran Model 3a excluding outliers. This resulted in more imprecise estimates, but the

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[6]In general outliers are quite frequent in my data, but I refrain from excluding them to keep as much variations between groups that experienced onsets as as possible. See Figure B.1 in Appendix B.

Table 5.4: Hypothesis 3) *An increase in economic inequality is associated with an increased risk of rebellion, but this increase in risk has a less steep slope in PR systems.*

	Model 3a	Model 3b
Intercept	22.454 (31.649)	25.425 (31.501)
PR system	−0.614 (0.615)	0.055 (0.324)
Negative economic inequality	0.584 (0.295)**	
Positive economic inequality	0.590 (0.325)*	
Demographic power	1.215 (1.575)	0.962 (1.588)
Demographic power sq.	−1.733 (1.885)	−1.381 (1.914)
GDP per capita (logged)	−0.660 (0.180)***	−0.632 (0.177)***
No. excluded groups	−0.019 (0.017)	−0.020 (0.018)
Democracy	−0.164 (0.332)	−0.173 (0.333)
Banned ethnic parties	0.784 (0.297)***	0.777 (0.296)***
Year	−0.011 (0.016)	−0.013 (0.016)
Peace years	−0.279 (0.063)***	−0.280 (0.063)***
Peace years sq.	0.011 (0.003)***	0.011 (0.003)***
Peace years cubed	0.000 (0.000)***	0.000 (0.000)***
Population (logged)	0.088 (0.113)	0.085 (0.112)
PR * neg. inequality	0.520 (0.314)*	
PR * pos. inequality	0.739 (0.576)	
Economic inequality sq.		0.902 (0.461)*
PR * inequality sq.		0.740 (0.478)
AIC	787.013	784.017
Log Likelihood	-376.506	-377.008
Num. obs.	6632	6632

***$p < 0.01$, **$p < 0.05$, *$p < 0.1$
Model 3. standard errors in parentheses.
Coefficient estimates from rare events logit regression.
Data covering years 1972-2005. Groups > 500.000.
The imputed models are estimated on the fifth of five imputed datasets.

E(Y|PR) - E(Y|Majoritarian)	Negative Inequality	logged GDP per capita
-0.001	Mean	Mean
-0.002	1st Q	Mean
0.000	3rd Q	Mean
-0.002	Mean	1st Q
-0.004	1st Q	1st Q
0.000	3rd Q	1st Q
0.456	Max	1st Q

Table 5.5: First differences Model3a

direction and strength of the interaction terms remained almost unchanged.

To get more leverage in interpreting the results, I will concentrate on more frequent values of economic inequalities. Figure 5.3 shows the probability of conflict for PR and non-PR systems over the range of values of negative inequality up to the 3rd quantile in the variable's univariate distribution.

As visible, the marginal effect of economic inequality varies little across election systems. From the figure we get the impression that the effect may be a little stronger under PR systems than under majoritarian systems of election, with the probability of onset being lower when inequality is zero, and then increasing more rapidly under PR election systems.

This result does not support the second part of hypothesis 3, stating that in PR systems, economic deprivation is less of a destabilizing factor. Rather the results suggest that when controlling for the conditional effect of economic inequality, PR systems are more peaceful, all else equal, but when economic inequality is high, PR systems are at least as vulnerable to ethnic conflicts as majoritarian systems.

Plotting the density (Figure 5.4) of the first differences from Model 3, reveal that it is difficult to distinguish between the two electoral systems, at all levels of negative economic inequality. The plots here show the densities for low and high inequality, and though the overlap is slightly less complete for low inequality, the plots show that the distributions are not significantly distinguishable at conventional levels of statistical significance. It is therefore safe to say that the result from Model 3 undermine the theoretical framework and the models presented. The result will be examined further in the next chapter.

Figure 5.3: Model 3. The effect of negative inequality, dependent on election system
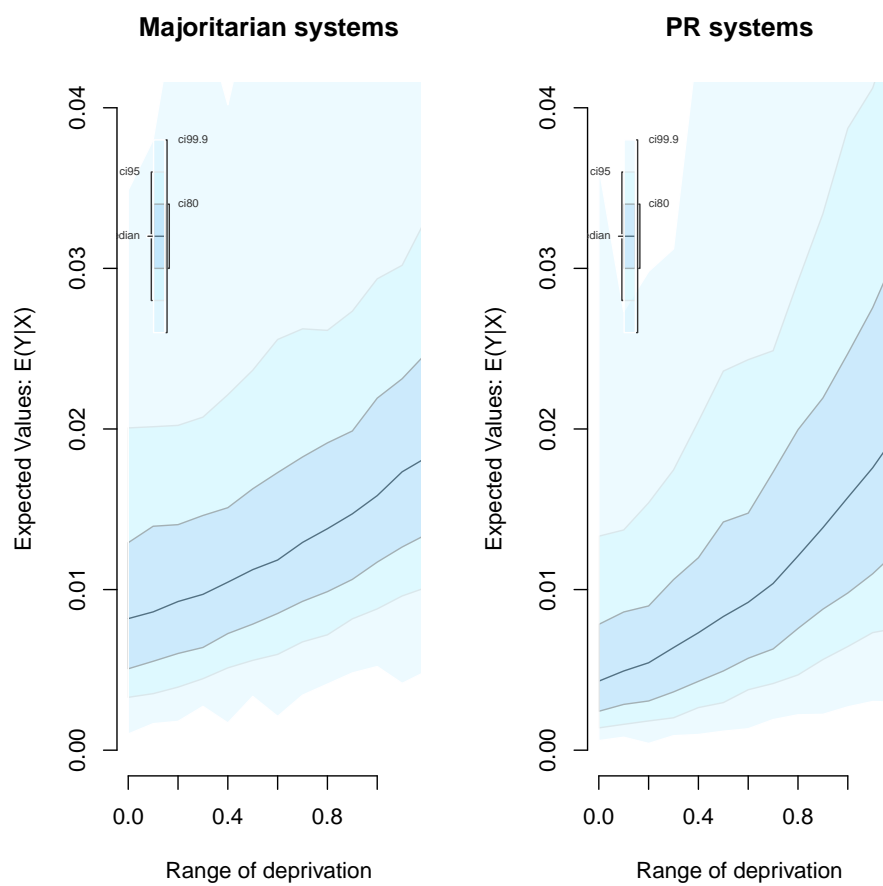
Figure 5.4: Density plots of first differences in Model 3
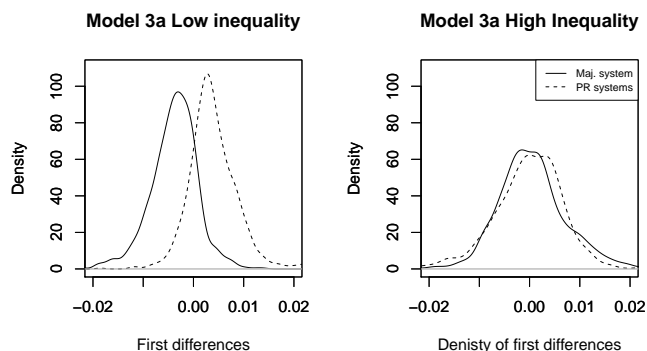
5.3   The combined marginal effects

Hypothesis 4 stated that the there is a compound effect of size, economic inequality and PR system. In order to test the hypothesis, I included a triple interaction in the regression model. The results from this procedure are visible in Table 5.6.

Coefficients of triple interaction terms are very hard to interpret by and of themselves. The table discloses that the regression performed on the imputed data (Model 4b) produces more certain estimates than the model estimated on the original data. Model 4c, where I replaced the demographic balance measures with *Log of relative size*, also reveals a significant interaction.

The coefficient estimate for the interaction terms are very large in models 4a and 4b, leading me to believe that these results are somewhat overdetermined. I tried simplifying the models by reducing the number of controls, but this did not alleviate any potential bias, as the coefficients were consistent in size for smaller model frames[7]. These problems are

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[7] By leaving out all non-significant control variables and the polynomials of peace years from Model 4b, the interaction estimates achieved higher significance, but showed coefficients as high as 17.

Table 5.6: Hypothesis 4) *The risk of intrastate armed conflict increases with higher relative size and negative economic inequality, and the combination of larger sizes and high levels of deprivation is the greatest treat to ethnic peace. However, under PR systems, there is no increase in risk with increases in inequality or size.*

	Model 4a	Model 4b	Model 4c
Intercept	15.372 (32.601)	18.508 (31.740)	25.572 (31.786)
PR system	0.375 (0.733)	0.312 (0.710)	−0.313 (1.103)
Demographic power	−0.383 (2.800)	0.555 (2.694)	
Negative economic inequality	0.057 (0.296)	0.039 (0.291)	0.164 (0.281)
Demographic power sq.	0.661 (3.692)	−0.616 (3.469)	
GDP per capita (logged)	−0.661 (0.190)***	−0.627 (0.178)***	−0.630 (0.175)***
No. excluded groups	−0.002 (0.015)	0.001 (0.015)	0.005 (0.017)
Population (logged)	0.086 (0.115)	0.048 (0.113)	0.035 (0.117)
Banned ethnic parties	0.671 (0.309)**	0.600 (0.295)**	0.630 (0.295)**
Democracy	−0.221 (0.352)	−0.085 (0.330)	−0.067 (0.327)
Year	−0.008 (0.016)	−0.009 (0.016)	−0.012 (0.016)
Peace years	−0.275 (0.066)***	−0.289 (0.063)***	−0.287 (0.063)***
Peace years sq.	0.011 (0.003)***	0.011 (0.003)***	0.011 (0.003)***
Peace years cubed	0.000 (0.000)***	0.000 (0.000)***	0.000 (0.000)***
PR * Dem. power	−0.736 (8.032)	3.288 (7.185)	
PR * Neg. inequality	0.600 (0.364)*	0.617 (0.357)*	0.553 (0.390)
Dem. power * Neg. inequality	1.443 (2.645)	1.144 (2.581)	
PR * Dem. power(sq.)	−7.067 (12.451)	−12.753 (12.201)	
Neg. inequality * Dem. power(sq.)	−1.509 (3.777)	−0.840 (3.679)	
PR * Dem. power * Neg. ineq	−5.946 (6.196)	−8.170 (5.495)	
PR * Dem. power(sq.) * Neg. ineq	12.689 (9.628)	15.853 (8.774)*	
Logged relative size			0.043 (0.283)
Logged realtive size(sq)			0.009 (0.072)
PR * Logged realtive size			1.776 (1.202)
Logged size * Neg. inequality			−0.011 (0.168)
PR* Logged size(sq.)			−0.643 (0.349)*
Neg. inequality * Logged size(sq.)			0.011 (0.057)
PR * Logged size * Neg. ineq.			−0.509 (0.406)
PR * Logged size(sq.) * Neg. inequality			0.198 (0.152)
AIC	765.595	791.158	791.616
Log Likelihood	-361.798	-374.579	-374.808
Num. obs.	6535	6632	6632

***$p < 0.01$, **$p < 0.05$, *$p < 0.1$
Model 4. Coefficient estimates from rare events logit regression.
Data covering years 1972-2005. Groups > 500.000. Monopoly and dominant groups excluded.
The imputed models are estimated on the fifth of five imputed datasets.

discussed further in the robustness section. The more moderate estimate from Model 4c is not significant.

Choosing to put some confidence in the estimates, though the coefficients may be too extreme, figure 5.5 gives a better idea as to what the result mean. Here, I have calculated the marginal effect economic deprivation for three levels of relative sizes of groups, conditioned on election system. As a proxy for *small* groups I set the value of demographic power balance to 0.15. For the *medium* groups this value is set to 0.3, and large groups are those with demographic power at 0.6[8]. The plots depict the simulation of expected values from the estimates in Model 4b.

The left-hand plots show the combined conditional effects of demographic power balance and economic inequality for groups living under majoritarian systems (top) and PR systems (bottom), for small groups. Ignoring the confidence bands for now, we see that the hypothesis is partly supported for small groups; As inequality increases under majoritarianism, so does the probability of armed conflict, while under PR systems, the probability decreases. Surprisingly, it seems that for very low levels of economic inequality, the risk of civil conflict is higher in PR than in majoritarian systems.

The groups of medium size (middle plots) appear to behave similarly to the small groups, and the best estimate suggests that the risk of conflict onset increases with inequality for medium sized groups under majoritarian systems, perfectly in line with hypothesis 1d).

The plots for small and medium sized groups reveal, through their broad confidence bands, the great uncertainty of the estimates. For the last two plots, showing the marginal effects of inequality and election systems for large groups, the results seem rather extreme, but again, there is large uncertainty attached to them. The tendency illuminated is nevertheless in line with hypothesis 4 – I expected that higher levels of inequality for large groups under PR systems should yield a higher probability of intrastate war than the same configuration under a majoritarian system. Still, probabilities above 0.1 is extremely high in the context of intrastate war, and I expect outliers to drive the results for larger groups. I find the estimates from Model 4 to rest on shaky ground methodologically, and I therefore refrain from investigating these results any further.

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[8]These values are theoretically interesting, according to my theoretical model where I hypothesize that the medium sized groups will be more at risk of conflict onset under majoritarian than under PR systems. However, the value of 0.15 which I name "small group" is actually the median *observed* value, and 0.6 is close to the 99th percentile (0.67) of the univariate distribution of *Demographic power balance*.

Figure 5.5: The combined marginal effects of size and inequality
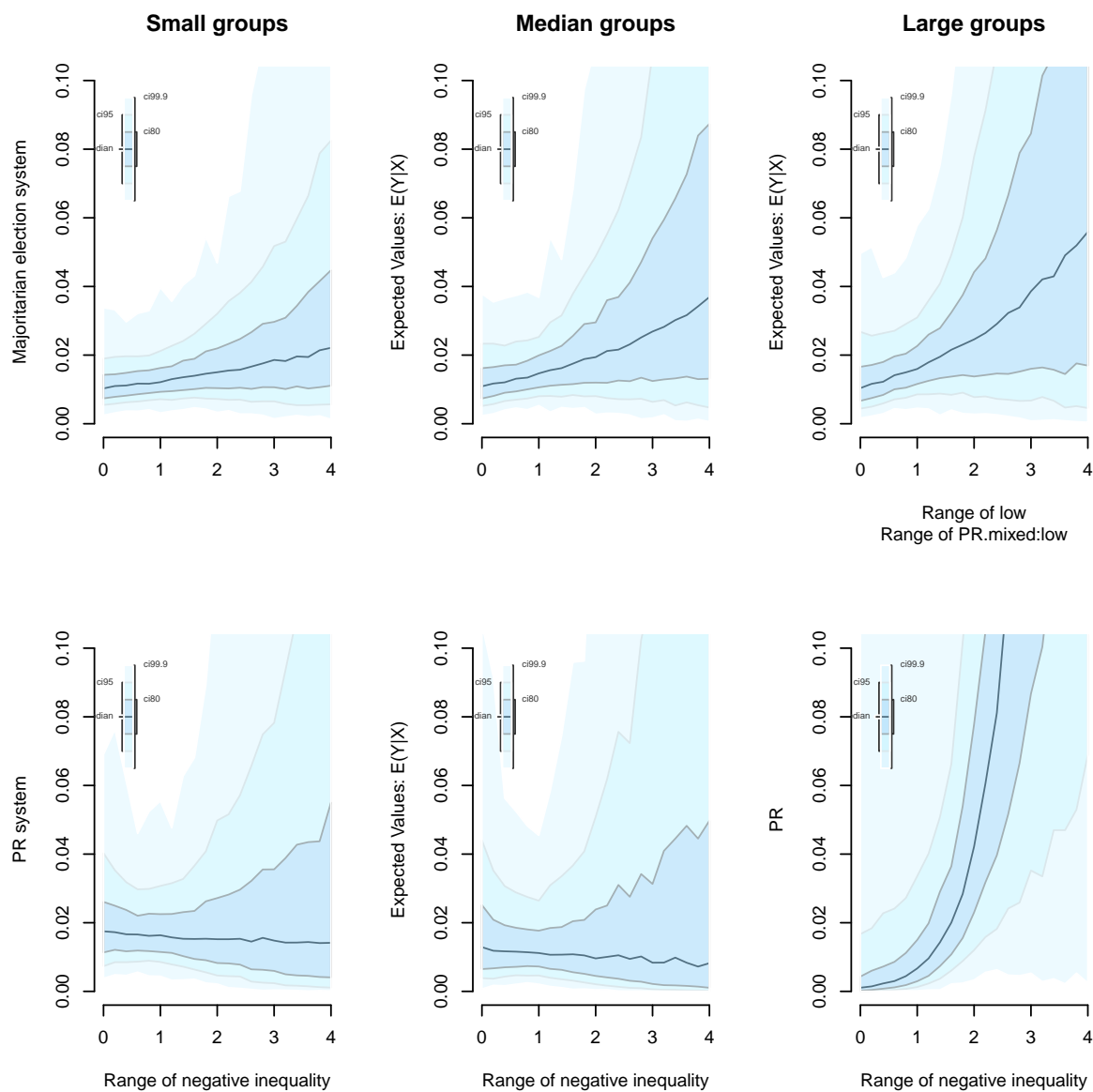
5.4   Robustness and goodness of fit

How well do the rare events models predict the outcome? The Akaike Information Criterion (AIC) is generally high in all my modes, with minor variations. Since the AIC is an estimate of a constant plus the relative distance between the unknown true likelihood function of the data and the fitted likelihood function of my models, a lower AIC is better as this means the models are "closer to the truth" (Kennedy 2008:101). However, since the rare events logit is a choice of less bias over fit (King and Zeng 2001a), the models reported here will have lower log likelihoods than a normal logit, and we should not be worried by the high AIC (or the low log-likelihood).

A simple and more illuminating answer to how well the models fit is figure 5.6. This plot shows how well the models predict. The X axis of the curve shows the share of all onsets that are correctly classified, while the Y axis shows the share of correctly classified non-onsets. Any point on the curved line indicates how the probability of correctly predicting a 1 is traded against the probability of correctly predicting a 0. We see that when sensitivity, the probability of correctly predicting an onset, is very high, specificity, the probability of correctly predicting a non-onset, declines.

Investigating the fit of model 1, the areas under the curve (AUC) calculated using Reimann sums (Weisstein 2012), were approximately 0.66 for Model 1b and 0.64 for 1c, suggesting they both have good predictive power relative to a random guess, and that they predict similarly well. For the remaining models the values are quite similar, with values from approximately 0.62 (Model 3b) to 0.65 (Model 4b).

Omitted variable bias and endogeneity

The effects reported so far may be products of omitted variable bias. There might be hidden, and unobserved, country-fixed or year-specific effects[9]. Since I am interested in the hypothesized relationships and not particularities of countries or year, I control for country effects by employing a fixed effects model. The approach here is to include dummy variables for each cross-section (to create individual "intercepts"), and omit the intercept (Kennedy 2008:282-283). The results from this procedure is visible in table B.2 in Appendix B (page

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[9]There might also be omitted group-specific effects, but estimating a model with group-specific effects entails including 284 extra dummies, leaving very little variation.
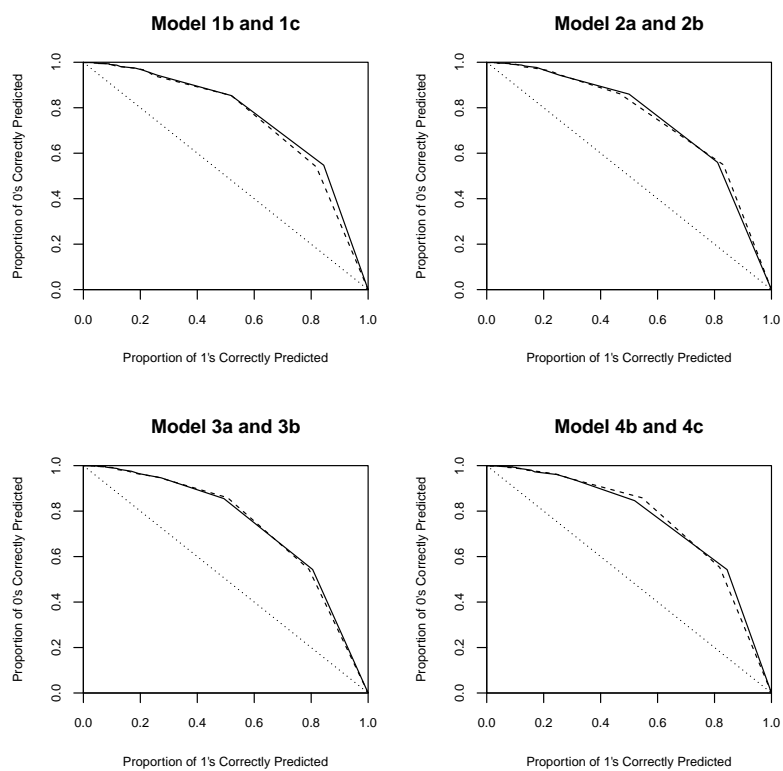
Figure 5.6: ROC curve

The figure shows "Receiver Operator Characteristic" plot. Solid line: First model in headline. Dashed line: Second model in headline

113). The key insight from the fixed effects estimation is that the coefficients of interest are quite similar both in strength, sign and certainty to those estimated using the rare events logit[10]. The interaction term of demographic power balance and PR system in Model 1, dips below the 90% confidence level in the fixed effects model, suggesting that this result is fragile, and that we cannot state with confidence that there is any conditional effect of PR systems dependent on group sizes.

However, the fixed effect model may be too restrictive, for two reasons. First, the model does not adjust for rare events, possibly leading to an underestimation of the probability of intrastate armed conflict onset. The second qualification is that though the fixed effects model allows variation between groups within countries, it "wipes out all explanatory variables that do not vary within a country" (Kennedy 2008:284). This is especially harmful in this context, since electoral institutions are very seldom reformed (Persson and Tabellini 2003:9), and within-country variation will be close to absent for this explanatory variable.

A less restrictive approach is to use a Random effects model. This model assumes country effects to be normally distributed, and they are treated as belonging to the error term, producing a composite error term consisting of both the "country deviations" and the traditional random error (Kennedy 2008:284). Nor in a random effects model is it possible to account for rare events. I nevertheless ran random effects regressions on all models, disclosing quite similar coefficients as the rare events logit model, but greater uncertainty. (See table B.3, page 113.) Taking the underestimation of onsets into consideration, the random effects model to some degree supports the main estimations from the rare events logits, suggesting that there is little bias induced from omitted country specific factors.

My main concern regarding the robustness of the results is, as pointed out in chapter 4, the theorized endogeneity of electoral systems and onset of intrastate armed conflict. There might be an undiscovered and stronger conditional effect of election systems, that could be discovered if the models accounted for the origins of institutions. To see if the estimates presented so far actually bear on this and are biased, an approach to consider is using an instrumental variables approach appropriate for the binary and rare outcome under study[11]. However, since there are very few onsets, and there exists, to my knowledge, no models incorporating an instrumental rare events approach, these concerns must be left unstudied

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[10]Model 4 could not be estimated, as it produced probabilities of zero and 1.

[11]One such approach might be using an instrumental probit, with the instruments described in Persson and Tabellini (2003:129-130). See also Acemoglu (2005) for a discussion on the validity of these instruments.

Table 5.7: Estimation on democracies

	Model 1c	Model 2b	Model 3a
(Intercept)	97.034 (67.835)	101.366 (70.138)	96.043 (68.535)
PR.mixed	0.712 (0.852)	2.946 (2.564)	0.263 (1.906)
size	0.213 (3.203)		
lineq2	0.271 (0.906)	0.479 (0.885)	
lgdpcapl	−0.555 (0.327)*	−0.523 (0.309)*	−0.535 (0.327)
exclgrps	0.334 (0.116)***	0.391 (0.119)***	0.419 (0.128)***
banned	0.847 (0.566)	0.823 (0.560)	0.897 (0.579)
year	−0.047 (0.033)	−0.049 (0.035)	−0.046 (0.034)
pyrs	−0.262 (0.145)*	−0.289 (0.149)*	−0.275 (0.146)*
pyrs2	0.010 (0.007)	0.011 (0.007)	0.010 (0.007)
pyrs3	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)
log.pop	−0.269 (0.192)	−0.286 (0.195)	−0.334 (0.212)
PR.mixed:size	−2.095 (5.495)		
polrqnew		1.476 (2.811)	
PR.mixed:polrqnew		−3.876 (3.769)	
low			0.005 (0.857)
high			0.623 (0.579)
b			1.316 (5.433)
b2			−2.409 (9.932)
PR.mixed:low			0.048 (1.345)
PR.mixed:high			0.139 (1.535)
AIC	200.905	201.843	201.784
Log Likelihood	-87.452	-87.922	-84.892
Num. obs.	2321	2321	2321

***$p < 0.01$, **$p < 0.05$, *$p < 0.1$

Coefficient estimates from rare events logit regression.

Standard errors in parentheses.

Data covering years 1972-2005. Non-democracies excluded. Groups > 500.000.

The imputed models are estimated on the fifth of five imputed datasets.

in this thesis.

Selection bias and multicollinearity

In section 4.2.5 I noted that the effect and the content of political institutions differ across regime type. When I exclude non-democracies from the data, the returned estimates from regressions change by much[12]. For models 1 and 3, as visible in table 5.7 the coefficients change signs or sizes, or their explanatory power is wiped out. However the results from Model 2, investigating the effect of polarization, are somewhat less uncertain than the results

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[12]Regression Model 4 is not reported or discussed, due to the uncertainty of the previous estimate. I show estimates for Model 1c on democracies, as Model 1b reported probabilities of zero and one.

after regressing the Model on all regime types, with confidence intervals not overlapping zero. Figure 5.7 shows the results from simulations for this model, and reveal that though the slope has a steeper increase in majoritarian systems for higher values of polarization, the consequences of high ethnic polarization are quite similar between election systems.

Figure 5.7: Ambiguous effect of polarization
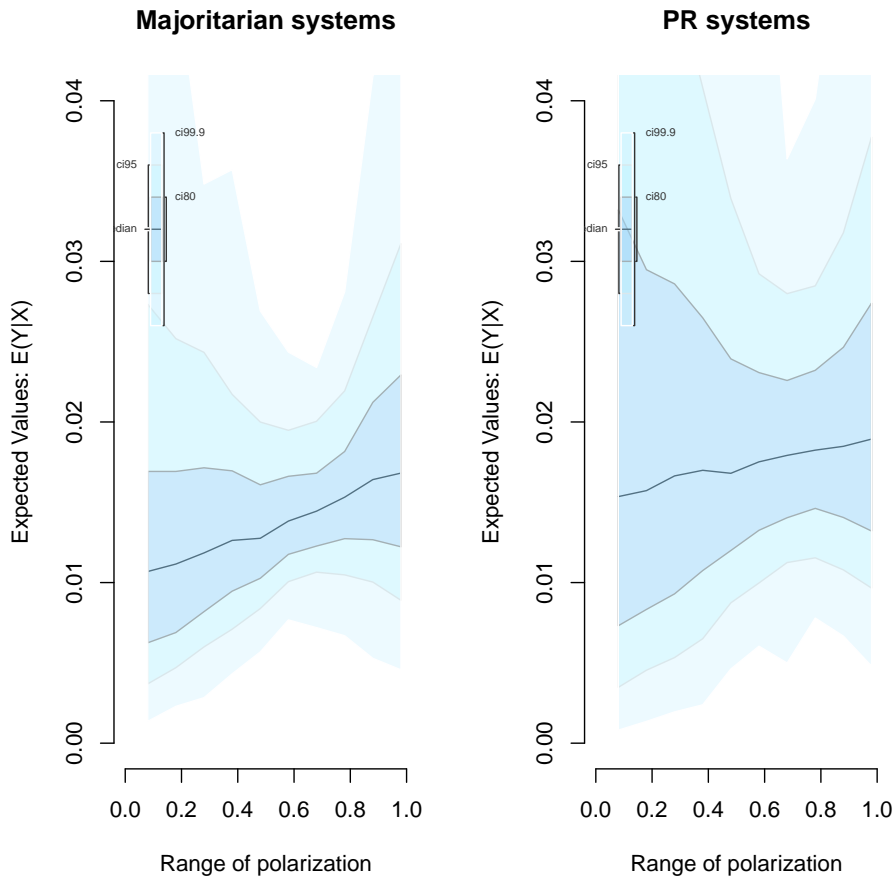
The differences between regressing on the full dataframe and on democracies only might suggest that the workings of election systems are different between autocracies and democracies. On the other hand, both the number of observations, and the number of onsets shrink to a fraction when I exclude the non-democracies. With very few onsets (18) estimates are likely to be biased due to little variation, despite the correction of the rare events procedure,

and hence these results do not pose a great challenge to the robustness of my main findings[13].

I suspect a violation of the assumption that the independent variables are not approximately linearly related, resulting in too large variances of the relogit estimates (Kennedy 2008:192-198). I therefore ran tests for multicollinearity[14]. The square root of the Variance Inflation Factor (VIF) showed that the standard errors are a little higher than they would have been with no correlation between the independent variables. For the PR system variable in Model 1b, for instance, the VIF is only 3.44, but for the interacted terms of demographic power balance and it's square variant, the VIFs are approximately 11.6 and 15.8, suggesting that these estimates have standard deviations about 3 and 4 times higher than if these were not correlated. This is not surprising since constitutive terms will be highly correlated with the interactions. I ran the model using different specifications both omitting and excluding variables, and on different temporal ranges, but the results where similar across specifications[15]. The existing multicollinearity is a result of too little information in the data, and in this sense any inflated standard errors are correct and reflect the inaccuracy of the estimates in my models (Brambor et al. 2006:70).

5.5 Summary of empirical findings

Since the results from the rare events regression models are not all wiped out as a result of frailty, they should be treated with some substantive interest. Before I move into a more theoretically guided discussion, a summary of main findings is in order.

My main proposition was: *The negative effect of proportional electoral systems on the risk of intrastate armed conflict is not uniform across differently composed states and ethnic groups. Rather, the effect is conditional on salient ethnic cleavages.* This proposition is partly supported by the rare events models, showing statistically significant and substantial

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[13]The temporal range of the data may also affect results, both since there were more plurality systems before the end of the cold war, and since more states are non-democracies the further back we go. To test this I specified alternative models with temporal range from 1990-2005, but this resulted in some models with probabilities of 1 and 0, due to too many constrictions on the data, or highly uncertain estimates, probably as a result of the small N, and the small number of onsets. The conditional effect of polarization (Model 2) became significant, but plotting the first differences reveal a nearly complete overlap between PR and non-PR systems. See do-file for details

[14]In order to do this I had to use a normal logit model, for which the estimates where slightly weaker but similar to the rare event logit, as suspected since the logit underestimates the probability of $Y = 1$ when events are rare.

[15]Tables of alternative models are available on request.

conditional effects, though with varying levels of certainty.

Hypothesis 1 proposed that: *An increase in relative group size is associated with an increase in probability of intrastate armed conflict onset, with a reducing rate for very large sizes, but under PR systems the risk of conflict only increases for very large sizes.* We saw that the risk of intrastate armed conflict increased with larger group sizes under majoritarian systems, supporting the first part of the hypothesis. However, under PR systems, the results suggest that the risk *declines* with larger group sizes, with a slower rate for very large sizes.

The wording of Hypothesis 2 was: *An increased risk of rebellion associated with higher ethnic polarization is less prominent under PR than under other election systems.* The sign of the coefficient estimates supports this claim. But, since they are very far from significance, there is great uncertainty attached to these results, and they only undecidedly suggest that higher polarization might be less of a danger under PR systems.

Hypothesis 3 was partly rejected. It stated that *An increase in economic inequality is associated with an increased risk of rebellion, but this increase in risk has a less steep slope in PR systems.* The rare events models suggest the opposite: Increasing levels of inequality is a greater danger under proportional systems. For negative economic inequality, the contrary evidence was statistically significant. The first part of the hypothesis, however, gained full support: An increase in economic inequality is associated with an increased risk of intrastate armed conflict, in all systems.

The claim in Hypothesis 4, of a compound effect of size and inequality, can neither be rejected nor confirmed from the empirical investigation, due to the suspicion that the results are driven by the structure in my data.

Chapter 6

The (minimal) effect of proportional systems

Do proportional election systems contribute in reducing the risk of armed conflict onset in states where ethnic cleavages are salient? The empirical investigation undertaken supports my overall proposition that they *under some circumstances* do. The estimates regarding conditional effects of PR systems on the risk of intrastate armed violence were significant in Model 1 and 3, but the result from Model 3 revealed an unanticipated *direction* of the effect; The result indicated that election systems help preserve peace in the case of relatively larger groups, but in cases of high economic inequality, the estimates suggest that a majoritarian system is more apt.

However, I contend that the *main* lesson, and the overarching answer to my research question is that the *magnitude* of these effects is negligible. This was clear from the values for simulated first differences, and from the model plots. How can this result be understood?

One interpretation of the empirical results is to point to flaws in my models or biases in data and operationalization. This interpretation was already discussed in section 5.4, and I concluded that my design and operationalization are committed in a reasonably robust manner. I therefore leave discussions on the statistical methods and the data behind now, though I will put forth some suggestions for future research towards the end of the chapter.

The second interpretation is to consider the empirical results support for the null hypotheses — as proofs that the presence of a proportional election system does not matter for intrastate peace in divided societies. Perhaps sharing power in the legislature does not

help preserve the peace? This interpretation prompts a discussion of the theoretical and real life implications of the statistical results. In the next section I attend to the task of explaining more substantially what the results indicate. I then move on to discuss theoretical implications, with an emphasis on inherent assumptions in theory on election systems, and in my model.

6.1   Negligible effects

To understand more fully what my results actually mean, the use of some simple counter-factual experiments are helpful. First, I want to return to the problem of salient ethnic cleavages.

From history we have seen the consequences of mismanagement of ethnic divisions. When ethnic cleavages are not dealt with institutionally[1], either because they are believed not be a challenge, or simply ignored, majority rule with no accommodation has sometimes been the institutional option. We have experienced such systems and their effects in the cases of South Africa and Sri Lanka (Coakley 2009). Such experiences from the past paired with the knowledge of an increasingly democratic world, and the growing importance of political formal institutions in less developed and ethnically divided countries, has stimulated research on appropriate representative institutions.

The results from my empirical investigation lead me to believe that which type of election system is used is *not* important in determining how peaceful divided countries will be. The differences in terms of risk of conflict onset between majoritarian and proportional systems are almost zero. Advocates of majoritarianism on the one hand, and proportional election system on the other, lend the election system great importance in divided societies. I contend that these theorists are too optimistic on the behalf of political electoral institutions. I have tested mechanisms derived from the theories of authoritative figures in the institutional literature, and I did so in a benign manner – by contending the effects of election systems depend on the salience of ethnic cleavages. If proportional systems reduce the risk of conflict anywhere, it is where ethnic differences are salient, where there are ethnic conflicts to absorb into politics. My benign test evidences that neither systems is superior and that any such

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[1]Another extra-institutional option for regulating ethnic conflicts (apart from genocide and ethnocide) is boundary change. This latter option falls outside the focus on institutions in this thesis (for reviews, see McGary et al. 2008; Coakley 2009).

reduction in risk of conflict is negligible.

In chapter 2 I brought attention to the first civil war in Cote d'Ivoire. This case is illustrative as to how minimal the effects from Model 1 are. In 2002 rebels (the Mouvement Patriotique de Cote d'Ivoire) stated that they were fighting for the rights of the Muslim majority in the north of Cote d'Ivoire, whom they perceived had been discriminated against by the present government (Langer 2005). The "Northerners" were a group of considerable demographic power, at approximately 0.4 on my scale. They were therefore, according to my model, more at risk for rebellion (due to high π, or probability of winning a war). A majoritarian system was in effect at the outbreak of the civil war. Would the probability of civil war have been any lower, all else equal, if the conflicting groups were living under a PR system? According to my statistical results, and a counterfactual assessment, the reduction in probability of onset when moving from a majoritarian system to a PR system, while holding all other variables at the observed values for Cote d'Ivoire in 2002, is the meagre 0.002 (0.2%). This estimate is not even separable from zero[2] when taking the uncertainty of the estimates into account.

The Northerners in Cote d'Ivoire also experienced some degree of negative economic inequality. First differences simulated from Model 3, reveal that this group's probability of onset would yield a change as low as -0.001 (best estimate) in expected value of onset when moving from a majoritarian to a PR system. This is telling.

Another telling example is counterfactual Sudan. This country experienced a civil war in 1983, a conflict that included fighting between government forces and a plethora of ethnic group affiliations, among these the Beja, Dinka, Nuba and Nuer. The election system was majoritarian, and there were varying levels of economic inequality between groups. The Dinka, for instance, was a medium size group experiencing high inequality, and in a sense the most likely case, where PR system should reduce incentives to pick up arms. I plotted the effect estimated from Model 1b across a range of values for demographic power, corresponding to the observed range of demographic power balance for the warring groups in Sudan at the outbreak of the civil war. Taking into account the uncertainty of the estimates[3], the plots for non-PR and PR respectively (Figure 6.1) reveal that the effect of demographic power is

Figure 6.1: Model 1: Counterfactual Dinka in Sudan
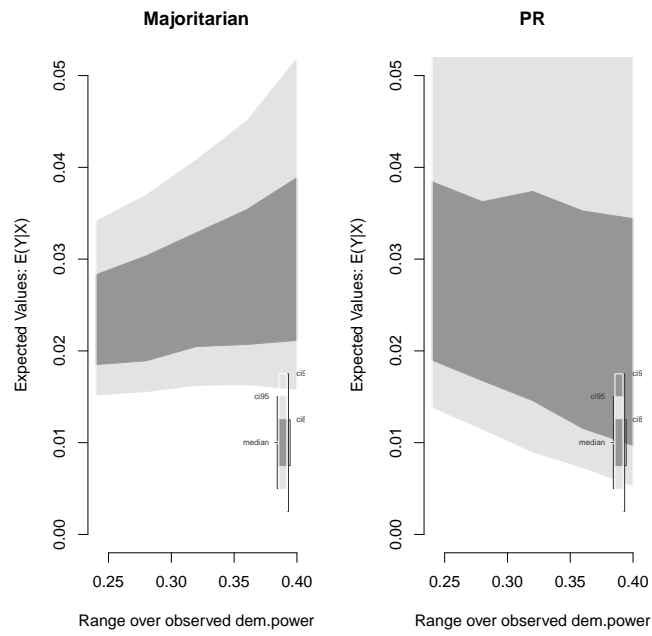
Figure 6.2: Model 3: Counterfactual Dinka in Sudan
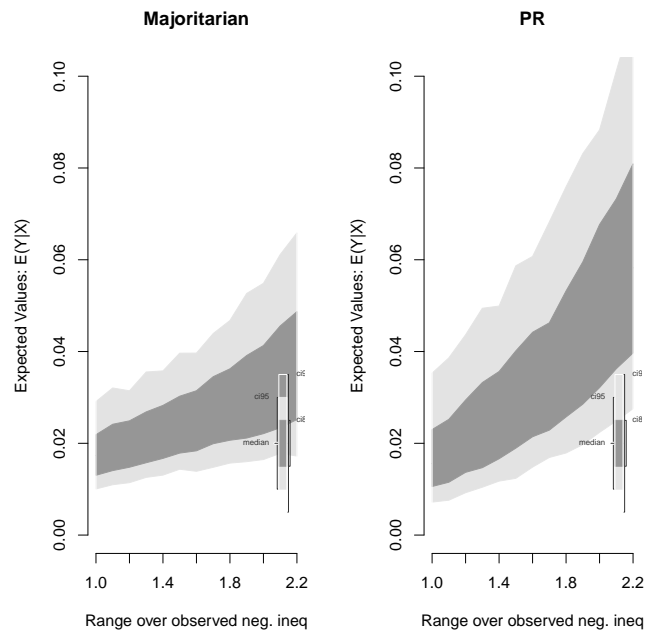
approximately the same between election systems.

Figure 6.2 depicts the effect of negative economic inequality as evident from the result in Model 3a. Here, there seems to be a substantial increase in risk of onset for larger values of inequality, and the slope seems steeper for PR systems. However, the confidence bands reveal that the uncertainty of any such effect is large. In sum, it is safe to say that the type of election system did not matter in this counterfactual case. Similar results fro Model 1 and 3 are apparent for other ethnic groups and their expected values of intrastate armed conflict: The changes in risk of conflict are clearly negligible.

The effect of ethnic parties

An interesting finding on the side of my research question, is the effect of laws against the participation in legislative elections of ethnic or religious parties, a feature not often investigated empirically. Theory suggests that the banning of parties is conducive to peace, since it contributes to cross-cutting party politics (Lipset 1960), and lead to a reduction of inter-ethnic conflict that would otherwise be exacerbated by an ethnicization of national politics or the "public institutional recognition of group identities" that Horowitz (2003) warns against.

My results reveal the opposite. Across all models and all specifications this is one of the more consistent results. The effect of banning ethnic parties is significant and positive, indicating that permissive laws regarding what parties are allowed to participate in the contest for power, reduce ethnic tensions[4].

Contrary to the contention that reducing the ethnic dimension of contest in politics, this result may be interpreted as support for proportional election systems and accommodationist perspectives: When ethnic groups are allowed to voice their ethnic or religious claims within party politics, the danger of ethnic conflict is reduced. For instance, Lemarchand (2007:7) argues that permitting ethnic parties is part of the explanation for a promising outlook for Burundian politics; Here ethnic differences are explicitly recognized and power is shared

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[2]The values at the lower and upper confidence levels (2.5 and 97.5%) are -0.013 and 0.011.

[3]95% confidence is the area in light grey.

[4]My results regarding banning of parties must of course be treated with caution, as they are neither sufficiently theorized or investigated in terms of marginal effects. However, when performing a minimal investigation into the results regarding banned parties to the values for Cote d'Ivoire, the first difference measure 0.029 at the mean, with confidence bands stretching from 0.015 to 0.066. These are still small changes, but intrastate armed conflicts are rare events, and the first differences are substantially higher than those investigating the effects of election systems.

among ethnic parties.

6.2   The discrepancy between theory and findings

A third interpretation of the empirical results is that the uncertain and the non-confirming results is an indication that some assumptions often held in the political science literature are false, and perhaps not as useful as we like to think. For instance: are institutions little more than words on paper? Winding back to the theoretical model, and the assumptions that were illuminated there, I use the theoretical assumptions as staring points for interpreting the results, and eventually summing up an answer to my research question. The assumptions behind my theoretical model are often implicit in theories on election systems and intrastate peace, and addressing them explicitly is a first step to approaching a better understanding of the conflicting and often ambiguous results empirical political science provide to the question of which electoral institutions are better suited for ethnically divided societies.

De facto political power

The first of these assumptions concern the political outcomes from election systems: Does the shape of *de jure* institutions give considerable de facto vestiges? To what degree do proportional election system really contribute to proportionality in the legislature? Do we see less political exclusion in proportional systems of elections? I already discussed this in section 4.4 (page 50), and the bivariate distributions in my data did confirm the assumption that PR systems produce power-sharing in the legislature. Both the frequency of multi-party systems and the proportionality of legislatures are higher for states with PR systems.

What I did not address, is exclusion from the *executive*. Do proportional legislatures produce power sharing in the executive? Or will we find just as high levels of de facto political exclusion from the executive[5] in proportional systems? Figure 6.3 depicts the relationship between electoral systems and executive exclusion, and no distinct pattern stands out between the types. The greater rectangle belongs to the category for excluded group in autocratic majoritarian systems, which supports the notion that majoritarianism is a more exclusive system. But at the same time, plural systems (to the very left) seem to produce relatively little exclusion. There is therefore no clear divide between the two aggregated

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[5]Exclusion is defined as holding not even a junior role in the executive branch (Cederman et al. 2011:484).

election system types in terms of exclusion from the executive.

Of course, the rectangles in the figure are frequencies only and we do not know if these similarities across systems are due to other and omitted factors. Nevertheless, the figure give an indication that also under PR election systems a large number of ethnic groups can be excluded altogether from executive power. This is a qualification to the assumption underlying consociational theory, that PR systems produce broad executive coalitions. The failure to test this assumption may drive inconclusive results regarding the effects of election systems. A viable way forward is investigating into which groups, and why, are excluded form executive power, and whether this exclusion is persistent or erratic.
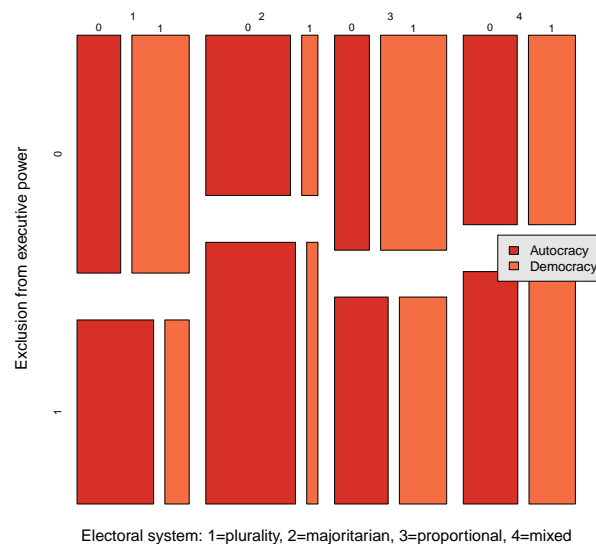
Figure 6.3: Excluded groups by election system and regime type. 1972-2005.

Economic policies and election systems

My empirical investigation provided strong support for the claim that economic inequality increases probability of intrastate armed conflict onset, which was the first part of hypothesis 3. The rather puzzling result is that the negative conditional effect of PR systems and economic inequality is either absent or quite weak. For some levels of inequality PR systems

were suggested to increase the risk of conflict. This calls for an evaluation of the conjecture that proportional systems spend more on broad programs and that this should dampen the frustration of being economically deprived.

Theory presumes PR systems invoke the conviction that economic differences will diminish in the future. The first part of the assumption, regarding the distribution of resources, is theoretically convincing, and supported by empirical work or recent date (Persson and Tabellini 2003; Knutsen 2011). The qualification here regards the second part of the assumption; That proportionality will dampen the frustration over a disparaged economic status quo.

The bivariate distributions of inequality and PR systems supported the notion that there is less economic inequality under PR systems. This however, is no support for the claim that inequality causes less frustration under proportionality. Perhaps the static measure for economic inequality is inadequate in capturing the causal mechanisms proposed? If a deprived group's economic situation does not change over time for the better under PR, than there is no reason to assume they will remain content under the system. The net utility of the electoral institution might diminish.

The often mentioned concern that majoritarian systems have greater accountability, and therefore are more apt to produce economic development in the short term, is one tentative explanation corresponding to the, at first sight, puzzling findings from Model 3. There might be a built-in bias in favour of the status quo in proportional systems. The larger the number of parties with distinct policy positions, the harder the process of passing fundamentally new legislation (Tsebelis 2002). My empirical results from Model 3 shows that larger values of economic inequality is associated with a greater increase in the risk of onset under PR systems than under majoritarianism. If PR systems produce more conservative economic policies, hinging on broad political consensus, then economic deprivation may be more persistent, as the politics of the status quo never challenge the prevailing economic order of a society.

Adding to this, where the promise of redistribution that PR entails is not complied with in practice, frustration will conceivably reach even higher levels than under majoritarian systems where such promises are void.

An alternative explanation, is the tentative answer provided by the results from the combined regression model (Model 4): Economic inequality is a greater risk to peace under PR systems than under majoritarian systems, but only when considered separately from

measures of the sizes of groups. Larger groups have lower opportunity costs associated with rebellion under PR systems than under majoritarian systems. Therefore simplistic statistical models risk failing to reveal any true conditional effect of PR systems. However, until we can provide with data that is sufficient for such data-challenging multifaceted relationships, this is only an ad hoc explanation to the somewhat incognizable statistical results in Model 3 and their relation to the results in Model 4.

Elections as censuses

The third assumption I would like to discuss is the "elections as censuses" proposition and the contention that policy spaces are one-dimensional – that voters in divided societies vote strictly based on group membership, as a consequence of the main conflicts in society being ethnic. The simplifying assumption that seats in parliament are allocated on the basis of the sizes of groups is what underlines the PR-voter theorem after Reynal-Querol (2001) (see equation 3.4 page 27). The assumption is also inherent in theories on election systems in divided societies, and in a wider sense, the accommodationist school of thought on election systems.

If voters care strongly for more than one political dimension, the ethnic make-up of a country will not solely determine the composition of the legislature. The question really comes down to whether or not members of ethnic groups pass their vote based on shared ethnicity, and not based on some other political affiliations and convictions.

The contention that ethnic parties will be a threat to stability is derived from the belief in elections as censuses. If economic issues cross-cut ethnic party affiliations, then we can expect inter-party alliances and coalitions, not the polarized pluralism feared by Horowitz. Of course, the importance of ethnicity is crucial where the state has yet to become a nation. Also, the existence of institutional rules can plausibly be assumed to reduce the number of issue dimensions in policyspace. In this sense, the policy space may be close to uni-dimensional in some cases. However, to hold this a universal assumption is rather coarse, and might explain the results in this thesis and elsewhere.

Further, in cases where there is large intra-group inequality, we can expect the members of ethnic groups to reveal less homogeneous preferences. Especially if ethnic elites are not experiencing horizontal inequalities, then this might significantly reduce the risk of violent group mobilization, also where there are horizontal inequalities between groups; where the

"masses" of the ethnic group perceive they are deprived economically or politically. The elites, those normally considered to hold the resources necessary to mobilize for rebellion, might be better of under the status quo, and lack incentives for mobilization. Some claim that the politicization of ethnicity hinges on political entrepreneurs who play crucial roles in the mobilization of protest (Roeder 1991:202). The incentives of such entrepreneurs do not always align with the incentives of the ethnic masses.

Some even conceive of elites as necessary actors not only for ethnic mobilization, but also for ethnic identity *formation* (Roeder 1991). Others argue that ethnic groups are important in and of themselves, and that ethnicity is a temporally stable marker of group coherence and mobilization. Most people do not have the choice to switch identities, and inequalities among groups can become "a source of unhappiness and resentment, and a cause of social instability" (Stewart and House 2002:8). I have relied on the latter conception of ethnicity in my modelling, and the contention that the experience of political inclusion will dampen frustrations from economic inequalities. If what is crucial for ethnic mobilization and conflict is the salience of *elite* cleavages, then this might explain the minimality of effects uncovered.

Election systems and regime type

If electoral institutions are nothing but words on paper, then the conditional effects discovered in this analysis are spurious. However, such a critique is not a big threat, as political institutions are becoming more important, even in African politics where informal institutions have been resilient to institutional reforms. Posner and Young (2007:126), for example, conclude that "the formal rules of the game are beginning to matter", suggesting that elites are increasingly adhering to formal political institutions. We can expect electoral institutions to play a substantial role, also in states that are not considered democratic in the literature.

Nevertheless, the regime type is of course crucial when discussing the effect of electoral institutions, since these will not have the same consequences in democracies and autocracies. Autocratic political institutions are considered very different from democratic institutions. While democratic institutions are often built on the normative ground of securing accountability or representativity , and providing checks on political leadership, the widespread assumption is that autocratic institutions sometimes have the opposite effects. Elections in authoritarian regimes are perceived as choreographed events, with little real-world impact. In autocracies candidates are instructed and monitored, and outcomes are often determined

through "ballot-box stuffing and manipulation" (Lust-Okar 2006:457).

This view on autocratic institutions is however contested, and case evidence from for instance Jordan, suggest that elections in autocratic regimes can provide an important arena for competition over state resources. To solicit cooperation or avoid rebellion, autocrats use policy concessions and distribution of spoils. While the second option requires little, working out policy concessions requires an institutional setting – such as legislatures (Gandhi and Przeworski 2007:1282). Parliament becomes, among other things, "a basis from which one can call upon ministers and bureaucrats to allocate jobs to constituents" (Lust-Okar 2006:459).

Statistical studies have shown that authoritarian electoral systems help stabilize and hence increase the survival of non-democratic regimes (Gandhi and Przeworski 2007). Specifically, partisan legislatures in autocracies can incorporate potential opposition forces, and by this invest them with a stake in the ruler's survival[6]. The autocratic, communist regime in Poland, for example, when challenged by the force of organized workers, attempted to encapsulate the opposition, by introducing a more inclusive election system. This way electoral institution in autocracies can in fact help secure the power base of the ruler. Proportional measures in autocratic elections can broaden the basis of support for the regime, and lengthen the tenure of an autocrat (Gandhi and Przeworski 2007). At the same time, autocratic proportionality opens up to more inclusive politics. We can therefore speak of proportional election systems in autocracies[7], though the autocratic version differs from democratic proportionalism in key respects.

When I ran regressions on democracies only no considerable effects of election systems were apparent (see table 5.7). This is partly the result of the fact that there are very few intrastate armed onsets in consolidated democracies (even using the procedural measure for democracy as employed here), producing uncertain estimates, but might also indicate that autocratic institutions have different effects from democratic.

The regression result for democracies might also mirror how election systems can have

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[6]Geddes (1999) investigated empirically the differences across types of authoritarian regimes and the risk of regime breakdown. She argues that the reason why single-party regimes often last longer can be traced back to how they respond to economic shocks and to endogenous sources of instability. Through the "allocation of educational opportunities, jobs, and positions in government, single parties can typically claim the acquiescence of many of the "most able, ambitious, and upwardly mobile individuals in society, especially those from peasant and urban marginal backgrounds" (Geddes 1999:134).

[7]McGary et al. (2008) for instance, states that consociations can be both democratic and undemocratic. One instance that can be defined as an undemocratic proportional system is Yugoslavia, where communist elites from each ethnic group controlled the federal governments, but were not elected democratically.

different consequences between young and old democracies. Some claim that majoritarian or plurality systems may be best in terms of promoting effective representation and democratization in developing or emerging democracies. Also democratization is a long-term process that may require different electoral systems at different stages, and PR systems may fit mature democracies better than they fit the young ones (Meisburger 2012:155). One policy-suggestions for the new South Sudanese election systems for example stress that "a government that does not shoulder a reasonable amount of accountability for its performance will leave a lot to be desired" (Gerenge 2012).

6.3   Conclusion

The *de jure* electoral system only make up one part of the institutional setup of a country. Indeed, in assessing this institution alone, and not investigating into the geographical dispersion of power, the judicial and economic institutions, the whole story cannot be told. Also, institutions do not always deliver what they promise, as discussed in the previous section. The assumptions inherent in conflict regulation theory, theories on election systems, and in my model can be questioned on the ground of being too simplistic. This is the caveat of quantitative research on rare phenomenons: Everything cannot be taken into account. In constructing my theoretical model, and discussing its assumptions, I have illuminated some of the unknowns.

Strong claims have been made as to the merits of electoral systems. This thesis provides some leverage in understanding the role of election systems where ethnic cleavages are salient. The results from the particular regression models indicate directions of relationships, and a partial support for my theoretical model. However, directions per se are not very interesting, unless the effects have substantive meaning. The closer investigation of the actual implications presented in this chapter, uncovers the response to my research questions: The marginal effects of election systems are negligible, contrary to the claims of the advocates of both majoritarianism and proportionalism for divided societies. My benign test evidences that neither the majoritarian nor the proportional election system is superior; Any reduction in risk of ethnic armed conflict induced by the election systems is negligible.

My conclusion here indicates that scholars should be cautious in universally recommending proportional systems as an outright remedy for lasting peace. A policy recommendation

that *can* be aired on the basis of my findings is that institutional and economic measures to prevent horizontal economic inequality to rise or take hold should be extant. Inequality is shown to increase the risk of intrastate armed conflict under any system. Horizontal economic inequality is on the rise, and curbing this rise through institutional or policy reforms might be one viable approach worth pursuing. My results therefore indicate that any attempt to assist new democracies in state and institution building must take the distribution of economic resources into account.

I found that a banning of parties increase the risk of onset. This draws up a dichotomy of institutional setups not investigated fully here. Closer inspection into my tentative findings and a more nuanced theoretical discussion of causal mechanisms could yield new insights. My results suggest that accommodationist theories might have explanatory power when it comes to the role of ethnicity in party politics. Is it so that an exclusion of ethnic concerns from the arena of party politics boosts an embrace of more violent ethnic expressions?

My result regarding horizontal economic inequality supports earlier work on horizontal inequality, and suggests that the investigation of institutions and any solution they may offer to remedy economic inequality is important. An interesting avenue of research here is the relationship between election systems and *changes* in economic inequality. Unfortunately, no well-developed data on change in economic horizontal inequality are readily available, to my knowledge. Providing yearly measures for group wealth as an extension of the Ethnic Power Relations data is a challenge worth undertaking for the research community.

This thesis has provided some new insights to the research on ethnic armed conflict. I have unpacked the central theoretical concept *divided societies* and theories on election systems into distinct theoretical parameters, mechanisms and expectations. My empirical investigation evidences that proponents of proportional election systems as peace preserving, are too optimistic, and that neither majoritarian nor proportional election systems seem to influence the probability of intrastate armed conflict by much.

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Appendix A

Additional material

Data and do-file

The dataset (the original datasets, my merged data and the imputed version) and the R-code are available on request. E-mail: heggedal@gmail.com.

Lists of groups in conflict and countries

Table A.1: Armed conflict onsets

Year	Ethnic group	Country
1972	Christian Eritreans	Ethiopia
1972	Moro	Philippines
1973	Kurds	Iraq
1974	Baluchis	Pakistan
1975	Tribal-Buddhists	Bangladesh
1975	Hindus	Bangladesh
1975	East Timorese	Indonesia
1978	Papua	Indonesia
1979	Kurds	Iran
1979	Arabs	Iran
1979	Sunni Arabs	Syria
1980	Indigenous Peoples	Liberia
1980	Basques	Spain
1981	Zulu	South Africa
1981	Xhosa	South Africa
1981	Far North-West Nile (Kakwa-Nubian, Madi, Lugbara, Alur)	Uganda
1982	Manipuri	India
1982	Shi'a Arabs	Iraq
1982	Maronite Christians	Lebanon
1982	Baganda	Uganda
1983	Punjabi-Sikhs (non-SC/ST/OBCs)	India

Table A.1: Armed conflict onsets

Year	Ethnic group	Country
1983	Sri Lankan Tamils	Sri Lanka
1983	Beja	Sudan
1983	Other Southern groups	Sudan
1983	Dinka	Sudan
1983	Nuba	Sudan
1983	Nuer	Sudan
1984	Fulani (and other northern Muslim peoples)	Cameroon
1984	Kurds	Turkey
1986	Ewe (and related groups)	Togo
1987	Shi'a Arabs	Iraq
1987	Basques	Spain
1989	Hazaras	Afghanistan
1989	Afar	Ethiopia
1989	Muslims	India
1989	Assamese (non-SC/ST/OBCs)	India
1989	Achinese	Indonesia
1990	Whites (Tuareg and Arabs)	Mali
1990	Azerbaijanis	Russia
1990	Armenians	Russia
1991	Bakongo	Angola
1991	Muslim Arakanese	Myanmar
1991	Basques	Spain
1991	Kabré (and related groups)	Togo
1992	Uzbeks	Afghanistan
1992	Pashtuns	Afghanistan
1992	Tajiks	Afghanistan
1992	Serbs	Croatia
1992	Naga	India
1992	East Timorese	Indonesia
1992	Transnistrians	Moldova
1993	Croats	Bosnia and Herzegovina
1994	Whites (Tuareg and Arabs)	Mali
1994	Indigenous peoples	Mexico
1994	Chechens	Russia
1994	Langi/Acholi	Uganda
1994	Southerners	Yemen
1996	Uzbeks	Afghanistan
1996	Uzbeks	Afghanistan
1996	Hazaras	Afghanistan
1996	Tajiks	Afghanistan
1996	Hazaras	Afghanistan
1996	Afar	Ethiopia

Table A.1: Armed conflict onsets

Year	Ethnic group	Country
1996	Somali (Ogaden)	Ethiopia
1996	Mons	Myanmar
1996	Ethnic communities (later Adivasi/Janajati)	Nepal
1997	East Timorese	Indonesia
1997	Wa	Myanmar
1997	Tuareg	Niger
1998	Uzbeks	Tajikistan
1998	Albanians	Yugoslavia
1999	Oroma	Ethiopia
1999	Achinese	Indonesia
1999	Chechens	Russia
2002	Northerners (Mande and Voltaic/Gur)	Cote d'Ivoire
2004	Northerners (Mande and Voltaic/Gur)	Cote d'Ivoire
2004	Ijaw	Nigeria

In table A.1 all the ethnic armed conflict onsets in the sample are listed in chronological order from 1972 to 2005. In table A.2 all countries in the data are reported along with key values on independent variables.

Table A.2: List of ethnically divided countries by economic status and number of onsets

Country	lineq2	GDP cap	Onsets
Russia	3.24	10051.07	4
Nigeria	1.46	1102.29	1
Thailand	1.43	4865.99	0
United Kingdom	1.21	18854.68	0
Indonesia	1.15	2700.28	6
Yugoslavia	0.96	2635.55	1
South Africa	0.79	7601.66	2
Sudan	0.58	1096.79	5
Iran	0.47	5827.04	2
Peru	0.36	4444.56	0
Central African Republic	0.34	861.19	0
Vietnam	0.31	1665.82	0
Turkey	0.31	3563.56	1
India	0.25	1772.46	5
Chile	0.22	9846.80	0
Ecuador	0.22	4538.43	0
Cameroon	0.22	2501.56	1
Angola	0.16	1091.17	1
Philippines	0.16	3293.19	1
Zimbabwe	0.15	3205.61	0
Namibia	0.14	5036.76	0
Kyrgyzstan	0.14	3439.17	0
Zambia	0.13	1147.96	0
Croatia	0.13		1
Pakistan	0.10	1989.89	1
Ukraine	0.07	6096.49	0
Canada	0.07	20973.88	0
Kenya	0.06	1247.76	0
Mexico	0.05	6926.04	1
Bangladesh	0.05	1731.81	2
Afghanistan	0.04	1523.40	9
Spain	0.04	15569.46	3
Democratic Republic of the Congo	0.03	1088.52	0
Ethiopia	0.03	631.92	5
Chad	0.03	875.06	0
United States of America	0.03	26028.87	0
Syria	0.02	1812.52	1
Bosnia and Herzegovina	0.02	2694.67	1
Mozambique	0.02	1115.70	0
Kazakhstan	0.02	8242.99	0
Yemen	0.02	1021.30	1
Niger	0.02	843.09	1

Table A.2: List of ethnically divided countries by economic status and number of onsets

Country	lineq2	GDP cap	Onsets
Sri Lanka	0.01	2645.58	1
Lithuania	0.01	9045.74	0
Kuwait	0.01	30715.30	0
Bulgaria	0.01	7266.72	0
Benin	0.01	1166.60	0
Malaysia	0.01	7070.44	0
Bolivia	0.01	2812.51	0
Myanmar	0.01	1084.60	3
Madagascar	0.01	844.45	0
Macedonia	0.01	5016.40	0
Senegal	0.01	1432.89	0
Colombia	0.00	5158.18	0
Belarus	0.00	9774.26	0
Iraq	0.00	2565.06	3
Uganda	0.00	863.81	3
Cote d'Ivoire	0.00	2155.80	2
Brazil	0.00	6786.93	0
Slovakia	0.00	9622.70	0
Switzerland	0.00	25374.39	0
Uzbekistan	0.00	3567.21	0
Laos	0.00	1269.58	0
Togo	0.00	925.46	2
Algeria	0.00	5423.87	0
Ghana	0.00	1260.86	0
Czechoslovakia	0.00	11798.89	0
Nepal	0.00	1291.16	1
Mauritania	0.00	1389.51	0
Belgium	0.00	19322.37	0
Finland	0.00	17837.19	0
Paraguay	0.00	4643.53	0
Cambodia	0.00	566.83	0
Gambia	0.00	904.89	0
Sierra Leone	0.00	783.05	0
Guinea	0.00	2440.19	0
Malawi	0.00	780.38	0
Tajikistan	0.00	2059.21	1
Liberia	0.00	1130.98	1
Moldova	0.00	2653.56	1
Egypt	0.00	3200.16	0
Lebanon	0.00	4043.09	1
Mali	0.00	962.99	2
Romania	0.00	5305.96	0

Table A.2: List of ethnically divided countries by economic status and number of onsets

Country	lineq2	GDP cap	Onsets
Taiwan	0.00	10677.41	0
New Zealand	0.00	17647.19	0
Congo	0.00	2232.29	0
Trinidad and Tobago	0.00	11208.33	0
Guatemala	0.00	3758.78	0
Venezuela	0.00	7010.76	0
Haiti	0.00	2038.76	0
Israel	0.00	16796.48	0
Japan	0.00	14070.29	0
Morocco	0.00	3350.72	0
Netherlands	0.00	22043.74	0

Imputations

Figure A.1 shows the densities of continuous variables after imputations. We see that the densities become more centered from imputations.
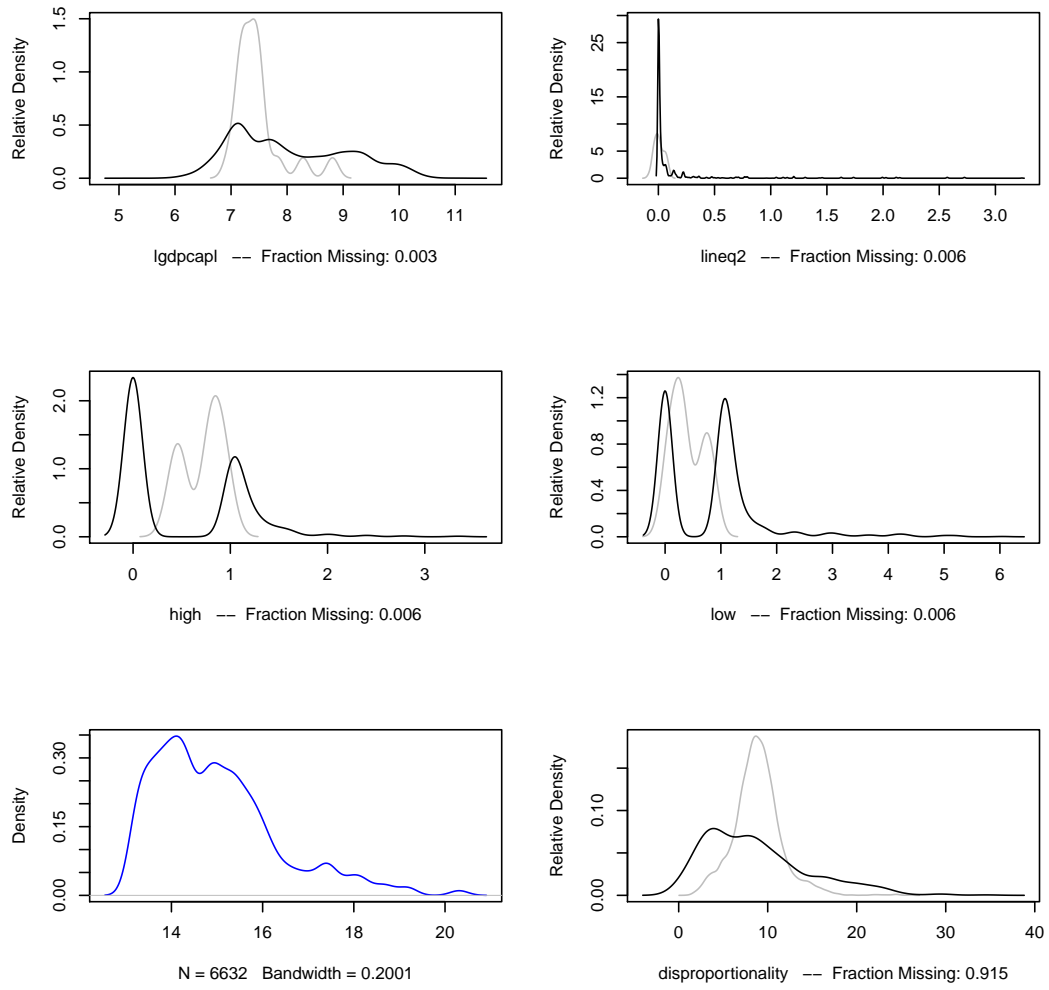
Figure A.1: Densityplot. Original data in black lines, and imputed data grey

Appendix B

Robustness and additional figures

Table B.1: Model 1a across imputed datasets

	Imputation 1	Imputation 2	Imputation 3	Imputation 4	Imputation 5
(Intercept)	25.163 (31.560)	25.070 (31.526)	22.516 (31.589)	24.417 (31.471)	22.936 (31.638)
PR.mixed	0.850 (0.479)*	0.848 (0.479)*	0.848 (0.480)*	0.849 (0.479)*	0.848 (0.480)*
b	1.698 (1.780)	1.690 (1.781)	1.654 (1.784)	1.716 (1.781)	1.645 (1.783)
b2	−1.674 (2.113)	−1.653 (2.116)	−1.629 (2.118)	−1.694 (2.116)	−1.619 (2.117)
lineq2	1.209 (0.324)***	1.214 (0.325)***	1.225 (0.325)***	1.206 (0.324)***	1.225 (0.325)***
lgdpcapl	−0.641 (0.178)***	−0.648 (0.179)***	−0.646 (0.179)***	−0.631 (0.178)***	−0.648 (0.179)***
exclgrps	−0.023 (0.017)	−0.023 (0.017)	−0.023 (0.017)	−0.023 (0.017)	−0.023 (0.017)
democracy	−0.233 (0.326)	−0.231 (0.326)	−0.220 (0.326)	−0.237 (0.325)	−0.223 (0.326)
banned	0.601 (0.289)**	0.603 (0.289)**	0.682 (0.292)**	0.605 (0.288)**	0.677 (0.292)**
year	−0.013 (0.016)	−0.012 (0.016)	−0.011 (0.016)	−0.012 (0.016)	−0.011 (0.016)
pyrs	−0.285 (0.063)***	−0.285 (0.063)***	−0.284 (0.063)***	−0.285 (0.063)***	−0.285 (0.063)***
pyrs2	0.011 (0.003)***	0.011 (0.003)***	0.011 (0.003)***	0.011 (0.003)***	0.011 (0.003)***
pyrs3	0.000 (0.000)***	0.000 (0.000)***	0.000 (0.000)***	0.000 (0.000)***	0.000 (0.000)***
log:pop	0.089 (0.112)	0.090 (0.112)	0.097 (0.112)	0.090 (0.112)	0.097 (0.112)
PR.mixed:b	−4.064 (3.687)	−3.992 (3.689)	−4.044 (3.687)	−4.049 (3.693)	−4.047 (3.692)
PR.mixed:b2	3.064 (4.682)	2.976 (4.686)	3.060 (4.675)	3.030 (4.701)	3.051 (4.684)
AIC	787.456	787.079	785.793	787.726	785.804
BIC	896.250	895.873	894.588	896.520	894.599
Log Likelihood	-377.728	-377.539	-376.897	-377.863	-376.902
Deviance	755.456	755.079	753.793	755.726	753.804
Num. obs.	6632	6632	6632	6632	6632

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Coefficient estimates from rare events logit regression. Standard errors in parentheses.
Models estimated on 5 different datasets produced by multiple imputation
Data covering years 1972-2005. Groups > 500.000.

	Model 1	Model 2	Model 3
PR.mixed	0.32 (0.88)	2.73 (2.77)	−2.28 (1.07)**
b	3.01 (3.33)		1.67 (3.16)
b2	−2.84 (3.79)		−1.74 (3.46)
lineq2	1.69 (0.50)***	1.73 (0.49)***	
lgdpcapl	−0.88 (0.53)*	−1.41 (0.59)**	−0.91 (0.53)*
log.pop	−0.35 (0.19)*	−0.33 (0.16)**	−0.31 (0.20)
banned	0.44 (0.51)	0.18 (0.49)	0.62 (0.52)
democracy	−0.36 (0.56)	−0.53 (0.58)	−0.25 (0.56)
year	0.00 (0.02)	0.00 (0.02)	0.00 (0.02)
pyrs	0.01 (0.01)	0.01 (0.01)	0.01 (0.01)
PR.mixed:b	−9.88 (6.84)		
PR.mixed:b2	10.39 (7.97)		
polrqnew		−1.79 (4.06)	
PR.mixed:polrqnew		−5.52 (4.53)	
low			0.70 (0.36)*
high			0.81 (0.43)*
PR.mixed:low			0.83 (0.35)**
PR.mixed:high			0.79 (0.70)
AIC	819.15	812.85	814.82
BIC	1546.71	1526.81	1549.19
Log Likelihood	-302.57	-301.42	-299.41
Deviance	605.15	602.85	598.82
Num. obs.	6632	6632	6632

$^{***}p < 0.01,\ ^{**}p < 0.05,\ ^{*}p < 0.1$

Table B.2: Fixed effects models

	Model1	Model2	Model3	Model4
(Intercept)	10.29 (25.16)	−11.38 (27.67)	−14.58 (27.81)	−15.42 (27.67)
PR.mixed	1.04 (0.45)	−0.65 (0.60)	0.63 (1.32)	0.08 (0.69)
b	1.36 (1.72)	0.44 (1.57)		−0.60 (2.75)
b2	−1.18 (2.07)	−0.85 (1.89)		0.05 (3.57)
lineq2	1.03 (0.25)		1.09 (0.24)	
lgdpcapl	−0.73 (0.17)	−0.72 (0.18)	−0.75 (0.17)	−0.64 (0.17)
pyrs	−0.02 (0.01)	−0.02 (0.01)	−0.03 (0.01)	−0.02 (0.01)
year	0.00 (0.01)	0.01 (0.01)	0.01 (0.01)	0.01 (0.01)
log.pop	0.04 (0.10)	0.11 (0.11)	0.11 (0.11)	0.08 (0.11)
PR.mixed:b	−4.18 (3.55)			6.96 (7.22)
PR.mixed:b2	2.27 (4.55)			−20.57 (12.32)
low		0.40 (0.25)		0.02 (0.30)
high		0.40 (0.31)		
banned		0.78 (0.30)	0.67 (0.29)	0.66 (0.30)
PR.mixed:low		0.69 (0.30)		0.77 (0.37)
PR.mixed:high		0.86 (0.56)		
polrqnew			1.12 (1.11)	
PR.mixed:polrqnew			−0.34 (1.78)	
b:low				1.14 (2.63)
low:b2				−0.35 (3.74)
PR.mixed:b:low				−10.21 (5.66)
PR.mixed:low:b2				19.49 (9.06)
AIC	800.91	796.59	796.88	800.60
Log Likelihood	-388.46	-384.30	-387.44	-382.30
Num. obs.	6632	6632	6632	6632
Num. groups: country	95	95	95	95
Variance: country.(Intercept)	0.04	0.04	0.04	0.04
Variance: Residual				

Significance stars not reported

Table B.3: Random effects models

Figure B.1: Outliers?
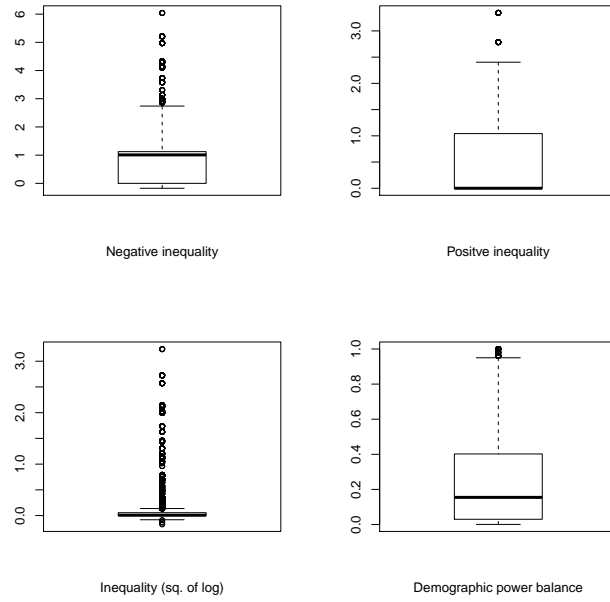
Figure B.2: Model 1c
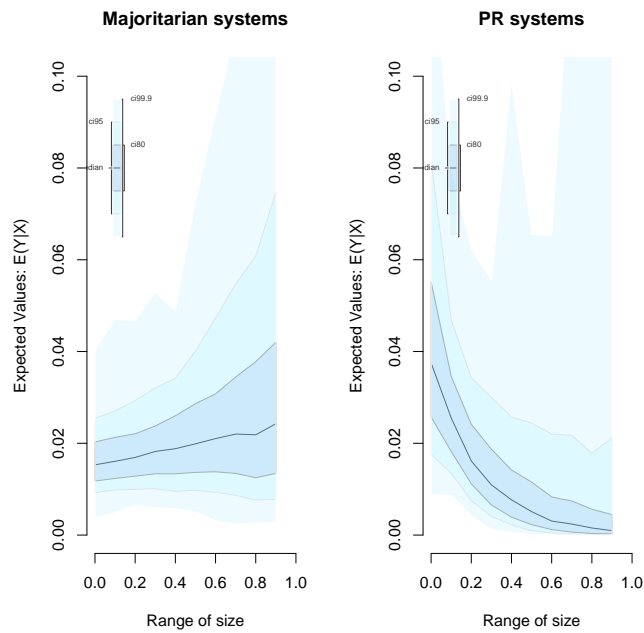
Table B.4: Replication of Cederman et al. (2011) models

	Model 1	Model 2	Model 3	Model 4
(Intercept)	348.840 (83.104)***	427.061 (94.174)***	424.459 (94.556)***	416.822 (93.996)***
lineq2	0.658 (0.203)***	1.707 (0.372)***	1.705 (0.364)***	
b	3.774 (2.218)*	3.472 (2.642)	5.674 (2.775)**	5.900 (2.810)**
b2	−4.926 (3.159)	−5.579 (3.846)	−7.590 (4.063)*	−7.990 (4.153)*
lgdpcapl	−0.468 (0.170)***	−0.857 (0.221)***	−0.883 (0.224)***	−0.907 (0.228)***
exclgrps	−0.012 (0.018)	−0.037 (0.028)	−0.051 (0.029)*	−0.050 (0.029)*
year	−0.175 (0.042)***	−0.213 (0.047)***	−0.212 (0.047)***	−0.208 (0.047)***
pyrs	−0.038 (0.092)	0.114 (0.105)	0.122 (0.105)	0.128 (0.106)
spline1	0.001 (0.001)	0.002 (0.001)*	0.002 (0.001)**	0.003 (0.001)**
spline2	0.000 (0.001)	−0.001 (0.001)	−0.002 (0.001)*	−0.002 (0.001)*
spline3	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)
excluded			1.260 (0.382)***	1.301 (0.391)***
low				1.112 (0.241)***
high				1.066 (0.277)***
AIC	554.656	410.418	399.914	401.282
BIC	629.129	479.567	475.349	483.003
Log Likelihood	-266.328	-194.209	-187.957	-187.641
Deviance	532.656	388.418	375.914	375.282
Num. obs.	6440	3969	3969	3969

***$p < 0.01$, **$p < 0.05$, *$p < 0.1$

Robust, country clustered standard errors in parentheses.
Temporal range: 1991 - 2005.
Model 1 is based on data for all groups, and models 2 - 5 on data on groups > 500.000.

Replication of Cederman et al. (2011)

Table B.4 presents the results from replicating some of Cederman et al.'s (2011) main models. The result are very similar to the results from Cederman et. al's article. The small differences between the coefficient estimates reported here and in their article can be attributed to differences in the matrix inversion routines implemented in R and Stata (Imai et al. 2007:513).