Autonomy, Secession and Conflict: A Strategic Model[*]

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Paper prepared for presentation at the
ENCoRe Conference (Barcelona, October 1-2, 2015)

September 13, 2015

Abstract

Whether granting regional autonomy to specific ethnic groups helps pacifying conflictual plural societies is hotly debated in the literature. In part this has to do with the scarcity of data on groups demanding and profiting from specific autonomy concessions. Based on a dataset covering detailed information on the type of autonomy granted to administrative subunits and data on which ethnic groups profit from these arrangements, we assess whether such institutional arrangements have the desired pacifying effect. To do so we rely on a formal model focusing on the interactions between a government and a group possibly demanding autonomy and/or secession. Based on this model we proceed by employing a strategic estimation of the structural form. This allows us to evaluate in a novel way the interdepencies among demands, concessions and conflict.

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Introduction

Claims to self-governance by territorially concentrated ethnic groups are at the core of the political debates and struggles in many countries, including current-day Iraq, Syria, Nigeria, the United Kingdom, Spain, as well as Ukraine, to name but a few. Faced by the prospects of state disintegration or civil war, the governments of these countries are confronted with the complex question how to counter such demands. In the hope of placating separatists, governments often offer autonomy to disgruntled minorities. However, there is no guarantee that such concessions will have the desired effects. Indeed, states sometimes fall apart despite, or perhaps even because of, wide-ranging decentralization, as illustrated by the former Soviet Union and Yugoslavia.

It is therefore not surprising that scholars have argued both for and against territorial autonomy as a way to prevent and resolve conflict or state dissolution. Currently, this debate is far from resolved (Bakke, 2015). Working towards a clearer picture, we argue that the existing literature has paid insufficient attention to the strategic nature of the interaction between groups and governments, and the implications this bears for empirical analyses. Giving in to demands for self-governance is inherently costly to governments—after all, such concessions surrender some their power,—but not doing so might risk the outbreak of violence. Thus, decisions to offer self-governance will depend directly on how separatists are expected to react. Can the government afford to remain unrelenting and set a precedence, while risking civil war? And what would happen should violence break out? Clearly, governments will attempt to anticipate such consequences.

Similar to the government's expectations about the consequences of territorial accommodation, groups' decisions to put forward demands for self-determination are also likely to underlie strategic rationales. For instance, it can be expected that more influential or powerful groups will make bolder claims. The government, on its turn, might infer from facing such claims that it is likely to face an opponent difficult to vanquish in a conflict, and thus make concessions. In view of such strategic interaction, the consequences of decentralization can hardly be understood in isolation from its generative process, since strategic anticipation reverses the causal arrow and renders demands for self-governance endogenous. To be sure, scholars have viewed regional autonomy and secessionist politics through the lens of strategic interactions for some time (e.g., Hechter, 2000; Walter, 2006*a*, 2006*b*,2009*a*). Yet, few have proposed empirical methods that explicitly take the resulting interdependencies into account.

This strategic interaction is also at the heart of the notorious endogeneity problem when assessing the effect of autonomy specifically, and political institutions more broadly. Keenly aware of

this problem, Sambanis and Milanovic (2014) doubt that a solution can be found at all (though for two previous attempts, see Christin and Hug, 2012; Cederman, Hug, Schädel and Wucherpfennig, 2015). In this paper, we propose an alternative approach to reverse causation and endogeneity that renders explicit the actors' actions and motivations. At the core is a simple game-theoretic model that captures the choices of governments and separatists, including autonomy concessions and full-blown secession. The game makes explicit the sequence of interaction and highlights the logic of strategic anticipation. We then use the theoretical model to derive a coherent estimator to derive our empirical results, relying on Signorino's (1999) "strategic estimation."

In the next section we evaluate the literature on autonomy, secession and conflict to highlight the main arguments and gaps that still persist. Based on this review of the literature, we then introduce an extensive form game that models the interaction between an ethnic group and a central government. In the following two sections we present the data we use to estimate the effect of these two actors' choices as well as our empirical results. In the final section we conclude by summarizing our findings and sketch the future steps we envision in our larger research program on autonomy and secession.

Autonomy, secession and conflict in the literature

We situate our approach in the broader context of the literature on decentralization and conflict. In structuring our own approach, we identify three core research questions, corresponding to particular streams of the literature:

1. Does decentralization contain or spur conflict?

2. What explains governments' reactions to demands for self-governance?

3. What explains the demand for self-governance?

Clearly, the most central (and thus also most hotly debated) question is whether decentralization affects the conflict proneness of ethnic groups in a society. Those who stress the pacific effect of autonomy build directly or indirectly on Tiebout's (1956) classical framing of decentralization as a way to resolve conflicts over public goods provision by taking into account heterogeneous preferences among regions in a country. By improving policy responsiveness to as many people as possible, grievances can be avoided and peaceful avenues for political change provided to potential secessionists (Hechter, 2000; Bakke and Wibbels, 2006). Skeptics retort that decentralization,

especially along ethnic lines, risks deepening already existing cleavages (Kaufmann, 1996; Chapman and Roeder, 2007; Roeder, 2007) while equipping groups with resources that can be used to fuel separatist campaigns, possibly even violently (Snyder, 2000; Roeder and Rothchild, 2005). Whether based on qualitative case studies or quantitative analysis, most of this literature treats the level of decentralization as an exogenously given factor, and thus rarely addresses the question why governments grant autonomy in the first place.[1]

This second core research question is, however, of central importance when evaluating the causal effect of decentralization on conflict, as doing so requires eliminating concerns about endogeneity. Many scholars explicitly or implicitly acknowledge that regional autonomy and federal arrangements are, at least in part, adopted with the aim of placating minorities and pacifying center-periphery relations. Yet, if this is the case, decentralization efforts by governments are endogenous and cannot be assumed to be adopted without considerations about the prospects of violence. Sambanis and Milanovic (2014, 1845) eloquently describe these obstacles blocking sound causal inference:

> This problem of endogeneity arises in some form in every study of the relationship between conflict and autonomy, or decentralization and any other policy outcome because changes in the level of decentralization are likely to reflect the government's expectations about how they will affect the risk of conflict or the policy outcome in question.

Convinced that no viable instrumental variable, which would allow us to solve the endogeneity problem econometrically, can be found for autonomy or any other type of decentralization, Sambanis and Milanovic (2014) limit themselves to articulating correlational claims while deliberately refraining from causal interpretations. Their analysis reveals strong correlations between relative regional income, regional population share, natural resource endowment and regional interpersonal inequality on one side and demand for regional autonomy on the other.[2]

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[1]The broader literature on federalism and decentralization examines why such schemes are introduced in the first place, but is seldomly directly linked to the conflict research (for recent excellent reviews of this literature, see Weingast, 2005; Rodden, 2006; Beramendi, 2007; Bednar, 2011; Beramendi and León, 2015).

[2] Defying the analytical pessimism of Sambanis and Milanovic (2014), Cederman et al. (2015) propose an instrument for autonomy that exploits differences in the ethno-geographically conditioned proclivity to grant territorial autonomy between the French and British colonial empires to assess the risk of territorial civil-war onset. They argue that this strategy allows them to better assess the effect of regional autonomy. While such a research design helps improve causal inference, it does so by black-boxing the strategic interactions themselves, and especially how these factor

Consequently, even if we are only interested in the first core research question on the overall effect of decentralization, the second question examining the origin of such institutions also has to be addressed. This is because governments are very likely to have forward-looking expectations as regards the group's actions. Unfortunately, however, studying governmental responses to territorial claims for self-governance has attracted surprisingly little attention in the conflict literature (Cunningham, 2014, 77).[3] Because the literature on grievances and inequality has been focusing on conflict as an outcome while treating ethnic inclusion and decentralization as exogenous, we know relatively little about what motivates states to grant potential or actual secessionist movements regional autonomy. Given the inherently strategic nature of the second question, it is natural that the best-known work in this area is inspired by game-theoretic reasoning (for a broader review of this literature, see Walter, 2009a). Highlighting the importance of reputation in a bargaining context, Walter (2006a) analyzes the government's decision making when faced with secessionist bids (see also Jenne, Saideman and Lowe, 2007).[4] Considering the risk of state collapse and conflict, governing elites in large multi-ethnic states will be reluctant to make concessions to any of the state's ethnic minorities since such moves may embolden others to follow suit.[5]

More recently, Grigoryan (2015) proposes a game-theoretic model that focuses on how governments respond to "restive ethnic minorities." Extending Fearon's (1998) application of the commitment problem to secessionist conflict, this study attempts to explain why governmental responses to minorities' demands vary from state to state. Arguing that state elites may well prefer to coerce separatist groups the weaker the state is and the more likely the group is to receive support from third parties, such as ethnic kin, this study makes a valuable contribution to theory-building, even though a full exploration of the comparative statics implied by the model is absent, and the empirical evaluation is limited to case studies.

By modeling explicitly the ethnic group's choice to mobilize, Grigoryan (2015) also directly addresses our third core research question on the causes of territorial claims or demands. Compared

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in the consequences of both autonomy and secession. Moreover, by its very nature, this approach is applicable only to former British and French colonies, thus potentially limiting external validity beyond these cases (for a related, though different, attempt see Christin and Hug, 2012).

[3]Needless to say, there is a considerable literature on state repression in the more general sense (for an excellent review of this literature see Davenport, 2007).

[4]Bunce (2004) discusses cooperation and conflict between the center and periphery of multi-ethnic states (for a more extensive treatment, see Bunce, 2003). In her study of India, Lacina (2015 (forthcoming)) offers a more comprehensive discussion of the same relationship.

[5]Walter (2006b, 2009, Chapter 5) also offers an empirical study focusing on the third question, but fails to link it to her work on the second question.

to the second one, the question dealing with what inclines groups to make secessionist claims is relatively well covered in the literature. Because mobilization constitutes a first step toward rebellion, it is not surprising that scholars of civil war and ethnic conflict have produced insights addressing this issue. Classical contributions by Gurr, Harff, Marshall and Scarritt (1993) and Horowitz (1985) highlight grievances and discrimination as possible causes that prompt ethnic groups to mobilize along separatist lines (for an overview, see Cederman, Gleditsch and Buhaug, 2013). Withdrawal of regional autonomy and other types of decentralization measures can also serve as strong triggers for peripheral mobilization (e.g., Hechter, 2000; Jenne, 2006).[6] Besides political marginalization, scholars also highlight economic inequality as a motivation for secessionist campaigns, both for groups that are poorer (Hechter, 1975; Horowitz, 1985; Dower and Weber, 2015) and wealthier (e.g., Gourevitch, 1979; Collier and Hoeffler, 2006; Hale, 2008; Morelli and Rohner, 2015 (forthcoming)) than the country's average. Beyond the grievance-based accounts, there are studies that focus on ethnic groups' opportunities to build support for their separatist bids. Such factors include demographic concentration (e.g., Toft, 2002; Weidmann, 2009), and the group's relative power compared to the incumbent government (e.g., for the case of secessionism, see Sorens, 2012). As is the case with the analyses of decentralization's overall impact on conflict, endogeneity poses difficulties for the studies of the demand for sovereignty as well. Indeed, most scholars treat secessionist motivations as exogenous and generally do not fully capture the strategic logic of state-minority politics.

This survey of the literature reveals that there are several challenges to be confronted. First, answering the question about the consequences of decentralization is largely impossible without addressing the two other questions, since endogeneity makes empirical evaluation of the first question very difficult. Yet, the two remaining questions have rarely been studied in an integrated fashion, and if so, primarily theoretically, as illustrated by the work of Walter (2006*a*, 2006*b*, 2009) and Grigoryan (2015), whose related empirical work presents shortcomings.

Furthermore, the empirical literature tends to conflate explanations of self-determination demands with accounts of armed conflict. Clearly, in agreement with recent work on non-violent conflict (e.g., Chenoweth and Lewis, 2013), studies of separatist politics systematically need to separate the third question about demands from the first one about political violence, since making demands is not the same thing as engaging in violent conflict (Cetinyan, 2002).

Finally, the literature often confuses secessionist demands with less ambitious autonomy claims.

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[6]Relatedly, Lacina's (2015 (forthcoming)) work emphasizes that power struggles within the periphery and their relationship to the central government affect the likelihood of conflict.

While movements may be split as regards to these objectives, both between factions and over time (Cunningham, 2014), these are distinct options, and some movements may strategically express secessionist demands in order to secure autonomy (see Grigoryan, 2015, who, in his model, also fails to make this important distinction). Thus, a complete model of secessionist politics would need to include demands for autonomy and secession as distinct moves.

A strategic model

This section introduces a strategic model of demands for regional autonomy and secession that allows to address the main shortcomings identified by our literature review. The model makes explicit several aspects highlighted by the theoretical discussion above, building directly on the three core research questions. This has several advantages. First, choices by the central government and a potential self-determination movement are theorized to be interdependent, given the structure of our game tree. Consequently, offers of regional autonomy, for instance, are explicitly modeled as governmental reactions to demands by an ethnic group. This allows us to address issues of endogeneity head-on. Second, demands for secession can be met with offers of autonomy, and such offers can accepted or challenged through secession, as suggested by the Scottish independence campaign. To allow for this, our model distinguishes between demands of secession or autonomy, which are frequently conflated in the literature.

Based on these core ideas, we propose a succinct extensive form game modeling the interaction between potential rebels (r) and a central government (c).[7] Figure 1 visualizes the sequence of play. There are nine distinct outcomes, indicated through circled numbers. We assume that potential rebels may either demand autonomy or secession or make no demand and thus accept the *status quo* (the latter ending the game at outcome ④.). These demands may be formulated in violent or non-violent campaigns (Chenoweth and Lewis, 2013) or, for secessionist demands, simply in declarations of independence (Coggins, 2011; Regan and Wallensteen, 2013; Griffiths, 2015 (forthcoming)). If the rebel's demands are met through adequate government concessions, the game ends (outcomes ③ and ⑦). While we assume that at this stage violence is not yet an option, it becomes so after the response by the government. Whenever the government does not fully (or to an acceptable extent) address the demands by r (i.e., *reject* the demands or offer only

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[7]Strictly speaking this representation depicts a stage of a possibly infinitely repeated game. It also bears some resemblance to Hale's (2008) simple games and Grigoryan's (2015) more evolved game.
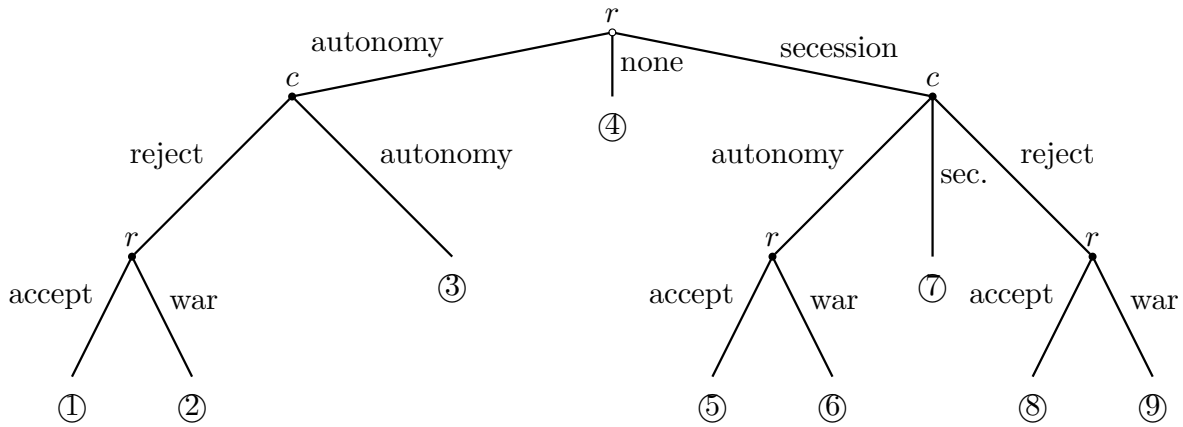
Figure 1: Extensive form game

autonomy as response to a campaign for secession), then r decides whether to escalate the conflict and respond by violence (outcomes ②, ⑥ and ⑨) or simply back down (outcomes ①, ⑤ and ⑧).

At the empirical level, the interactions presented in figure 1 have so far been studied almost exclusively in what might be considered a reduced form empirical model. As Carrubba, Yuen and Zorn (2007) remind us, however, especially if we are to take seriously strategic interaction, such a model would have to specify the comparative statics implications in a particularly careful manner (for related arguments, see Achen, 2002; Schrodt, 2014). A more direct way to assess the effects of the elements of our game, especially with regard to interdependent choices, is to rely on a strategic estimator as proposed by Signorino (1999), drawing on precursor work in the analysis of experimental data by McKelvey and Palfrey (1995, 1998).[8] The underlying idea of this technique is to write down a statistical model that mirrors a particular extensive form game. More specifically, by assuming for this game with complete and perfect information (which normally would lead to deterministic predictions) that actors make small errors when making choices at their respective decision nodes, this generates probabilities associated with each action. By parameterizing the utilities of the various outcomes for each player using empirical data the effect of variables on choice probabilities can be estimated and the latter be calculated. If we assume that the errors made by the actors are independently distributed (Signorino, 1999, describes this as "agent error") according to a type 1 extreme value distribution, the functional form for determining the probabilities corresponds to a logit specification. In addition, thanks to the independence assumption, the probability of each outcome can simply be determined by multiplying the choice probabilities of

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[8]See also the elaborations of this approach by Signorino (2002, 2003), Signorino and Yilmaz (2003), Signorino and Tarar (2006), Whang (2010), and Leemann (2014). An alternative consists of using what Bas, Signorino and Walker (2008) label "statistical backward induction."

each actor leading from the initial node to the particular final node corresponding to an outcome. This distribution of probabilities over final outcomes allows us to specify a likelihood function that can be used in a full information maximum likelihood (FIML) estimation to determine the effects of various variables on the decisions depicted in the game tree by the two actors.

The estimator captures interdependence and strategic anticipation in a way that bears close resemblance to conventional backwards induction. For example, in instances where r moves last (i.e., decides whether to raise arms), in the preceding move the government c will weigh each choice alternative (and the associated utilities that follow) by the (expected) probabilities with which r is likely to react.

Data

Estimating a strategic model of the type depicted in figure 1 requires a considerable amount of *actor-specific* data. In particular, we require data on the trajectories of play, i.e. the various outcomes, along with data for each player's utility associated with these outcomes. Combining two recent datasets makes it possible to generate a database that allows us to estimate with reasonable precision how the various decisions by groups and government interact. To identify the relevant actors, we use as starting point the "Ethnic Power Relations" (EPR) dataset (EPR-ETH, Version 2, see Cederman, Wimmer and Min, 2010) which identifies politically relevant groups worldwide. This includes both groups that could plausibly put forward demands for territorial self-governance ("the rebels"), and information on those holding power (i.e. those that constitute the "central government)". In constructing our sample of potential rebels, we assume that only groups that are territorially relevant and do not control the state as a monopoly or dominate in the executive are affected by the strategic interaction outlined above. Importantly, the EPR data provide a coding for *de facto* autonomy (one part of the government's response) through a recent extension by Cederman et al. (2015), group-specific codings of conflict, along with several other useful group characteristics.

We combine these ethnic group-year data with information from Chenoweth and Lewis's (2013) data on non-violent and violent campaigns in order to determine which groups put forward demands of a given type. This dataset covers not only secessionist demands (akin to declarations of independence) but also demands for autonomy. More specifically, Chenoweth and Lewis (2013) report 64 campaigns with territorial demands in 40 different countries, 39 of which demanded se-

cession and 25 autonomy.[9] Almost all these campaigns, namely 52 can be linked to EPR groups in 33 different countries.[10] Constructed this way, our data cover 424 groups in 114 countries, covering the period 1946-2005, the last year for which Chenoweth and Lewis (2013) provide data.[11]

Dependent variable

Our dependent variable corresponds to the various final nodes of our theoretical model, as illustrated in figure 1 and is constructed from our combined dataset. Within our sample, we consider all ethnic groups that have engaged in a campaign for autonomy (identified through Chenoweth and Lewis (2013)) as having chosen the left part of our game tree. Groups that are granted autonomy during their campaign for autonomy as coded by Cederman et al. (2015) are assigned in the year of the governmental concession to final node ③ in figure 1. If the government chooses not to offer autonomy (per the coding of Cederman et al., 2015) a conflict onset as coded by the UCDP/PRIO civil war dataset (Themnér and Wallensteen, 2011) leads to a group-year being assigned to final node ②.[12] If no conflict occurs after a rejected demand, the group-year is assigned to final node ①.

Campaigns for secession, as coded by Chenoweth and Lewis (2013), lead groups down the right part of the game tree. If such a secessionist demand is accepted according to the data collected

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[9]Seven of the campaigns for autonomy were non-violent, 18 violent, while for secessionist movements the numbers are five, resp. 35.

[10]In her work on secessionism, Coggins (2011) offers the most comprehensive information on declarations of independence. Her data covers 259 such declarations, of which 242 were made after 1945. Of these, 133 cases are linked to groups covered by the EPR groups in 51 countries. It is noteworthy that only about one hundred of these declarations of independence stem from "minorities at risk" (Gurr et al., 1993). Building on and extending Coggins's (2011) dataset, Griffiths (2015 (forthcoming)) reports 269 secessionist demands in the period since 1945 in 58 countries. He complements this data with information on what he considers proto-states, i.e., entities that might declare independence, to assess what explains these latter declarations. It should be noted that less than half of all declarations of independence are made on behalf of the proto-states Griffiths (2015 (forthcoming)) identifies. Regan and Wallensteen (2013) report 230 declarations of independence. 76 can be linked to EPR groups in 42 countries. As these datasets do not cover demands for autonomy (or conflate them with secessionist demands) we refrain from resorting to these alternative data sources.

[11]In table 6 in appendix A we list all countries appearing in our analyses and the number of cases that they contribute to our data.

[12]To simplify, group-years of ongoing conflicts are omitted from the dataset, as conflict onset and continuation are likely to be affected differently by explanatory factors.

by Tir (2005) (as extended in their online appendix by Cederman et al., 2015), a group-year is assigned to final node ⑦ and subsequently drops from the analysis.[13] If the government offers regional autonomy a group that chooses to start a conflict is assigned to final node ⑥, while if it does not, it is assigned to final node ⑤.[14] Finally, if a government does not react to a demand for secession, a conflict onset (Themnér and Wallensteen, 2011) leads us to assign the respective group-year to final node ⑨, while the absence of a conflict leads to final node ⑧.

Independent variables

Formulated as a likelihood function for the outcomes, our proposed strategic estimation approach assumes that particular observable variables are associated with the utilities that rebels and the government obtain from particular outcomes. While many of the theoretical accounts discussed above implicitly make similar assignments, they are not always very transparent on what particular variables are supposed to reflect in terms of underlying theory. Therefore, we propose that the payoffs for both actors are composed of five main elements (table 1). First, where autonomy is granted, it is likely to be considered a benefit for the rebel group, while generating costs for the government. We assume that autonomy is particularly valuable for an ethnic group that profited from such an arrangement in the past, but lost it in the meantime (this factor is also highlighted by Jenne, 2006; Walter, 2006*a*; Walter, 2009*b*; Sorens, 2012). In addition, we assume that granting autonomy is less costly for the government of countries with a federal system (for an implicit argument along these lines, see Lacina, 2014), but more beneficial for the affected rebel group.[15]

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[13]In addition to all secessionist campaigns identified by Chenoweth and Lewis (2013) we also considered ethnic groups from EPR that are coded as separatist autonomy and groups that obtained independence as engaging in a separatist campaign.

[14]As discussed in greater detail below, in our dataset we only have only one instance in which a group, after having been offered autonomy instead of the demanded secession initiates a civil war. Given this sparseness of the data, we omitted this conflict case and assumed that after obtaining autonomy, all secessionist ethnic groups would back down.

[15]In the appendix B we present the results of an additional model that includes the ethnic group's population size as an additional variable for the government's cost of granting autonomy. This follows upon a remark by Walter (2009*b*, 75 in a footnote) arguing that autonomy is likely to be especially costly if the group obtaining it is large. This variable is also at the basis of Cederman et al.'s (2015) identification strategy as it serves in part as instrument for autonomy. As the results in the appendix B show, adding this variable leads to some estimation issues as one of the estimated standard errors increases dramatically. For this reason we report the results from the model without this variable in the main text.

Second, secession is likely to have a similar structure of costs and benefits. Following a series of authors including Collier and Hoeffler (2006), Walter (2009*b*), Sorens (2012), and Morelli and Rohner (2015 (forthcoming)), we assume that natural resources, oil in particular, on the territory settled by a secessionist group, is likely to increase the value of a secession for a group, while being particularly costly to the government.

Third, we acknowledge that war is costly. Thus, if the rebel group chooses to fight, then both government and rebel group will have to shoulder war costs. For the rebel group we assume first that previous wars lower material, military and mobilization costs, for example through militarily trained personnel, stockpiles of arms or emotions stemming from prior campaigns. If the group is also excluded from central executive power, it will have an easier time mobilizing support for a war against an oppressive government, as implicitly argued for secessionist claims by Sorens (2012, 46f) (for a more general argument, see Cederman, Gleditsch and Buhaug, 2013, Chap. 3). For the government we assume, that economic development will reduce the costs of war (for a similar argument about secession, see Sorens, 2012, 44f) and that audience costs make wars in democracies particularly costly.[16]

Fourth, in the event of a conflict, the outcome is rendered as a (costly) lottery over victory, defeat or stalemate. Thus, we also consider the probability of obtaining a favorable outcome through fighting as an important ingredient for the payoffs of both actors. Walter (2009*b*) and Grigoryan (2015) implicitly make similar claims when discussing capabilities of both self-determination groups and governments. Like us, these authors also conjecture that groups with transborder ethnic kin, as well as those with a larger share of the population have better chances to succeed in a war (see also Jenne, 2006). In addition, we consider the economic wealth as an additional factor influencing the likelihood of winning a war.[17] As we assume that these variables affect the likelihood of a rebel group winning in a conflict, by symmetry, these same variables are likely to affect the government's chances of losing.

Finally, both rebels and governments are likely to face reputation costs. We assume that rebel groups that make demands and back down after a rejection by the government face reputation costs. We consider these costs to be especially high where an ethnic group has been excluded from

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[16]Griffiths (2015 (forthcoming)) makes a similar case for the way in which democratic governments deal with secessionist demands.

[17]Interesting to note is that several authors also mention the economic development as a factor influencing the likelihood of demands for autonomy (e.g., Sambanis and Milanovic, 2014) or secession (e.g., Sorens, 2012, 32f), but do not explain through what mechanism this occurs. We are explicit about this and argue that wealthier groups have better chances of winning in a war.

Payoff components	Variables for r	Sign	Variables for c	Sign
autonomy	group previously lost autonomy	+		
	federal system	+	federal system	-
secession	oil in ethnic group's settlement	+	oil in ethnic group's settlement	-
war costs	number of previous wars	-	log of GDP per capita	-
	excluded group	-	democracy (xpolity2)	+
probability r wins war	cross-border ethnic kinship	+	cross-border ethnic kinship	-
	relative population size of group	+	relative population size of group	-
	relative wealth of group	+	relative wealth of group	+
reputation costs	duration group is excluded	+	number of challengers	+
			number of groups w/ autonomy	-

Table 1: Operationalization of payoffs, theoretical expectations

power for a long time.[18] Similarly, offering concessions to rebel groups induces reputation costs for the government, since this demonstrates to other potential challengers that concession can be obtained (Walter, 2006*a*, 2009, 68f). Consequently, we follow her approach and use the number of potential challengers to operationalize reputation costs for the central government. However, we argue that if a government has already granted autonomy to a series of groups, then offering such an arrangement to an additional one is likely to result in much lower reputation costs as compared to a situation where several groups already profit from such arrangements (as a similar argument is implicit in the work on India by Lacina, 2015 (forthcoming)).

In table 1 we summarize these payoff components along with the variables we assign to these components. We use the information depicted in this table to determine the sets of variables that we assume to affect the utilities for each actor and for a given outcome.[19] Most of the variables

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[18]We conceptualize this variable in two different ways for groups demanding secession and autonomy. For the former we count the years since a group has not had access to executive power at the central government. For the latter we also consider being only a junior partner in government as being reflective of exclusion from this executive power. We motivate this difference by the fact that Cederman et al.'s (2015) data on regional autonomy assumes that such concessions are only relevant for excluded groups and those that are junior partners in government. In addition, this different conceptualization also renders the estimation of our model easier.

[19]In this process of assignment, and in the subsequent estimation, we adopt a (possibly) needlessly flexible approach. More specifically, as for instance rebels may gain autonomy after demanding either autonomy or secession, the variables assigned to this outcome should in principle have the same effects (and thus coefficients) at both final nodes. However, we let the coefficients vary across the nodes. In addition, we adopt one simplification, namely that the probability of winning a war does not enter multiplicatively in the calculation of the payoffs. As our model is non-linear with errors assumed to be distributed according to the extreme-value type 1 distribution (and in-

proposed can easily be constructed on the basis of the datasets on which we rely here. We complemented this data, however, with information on federalism from Bednar (2008), the level of democracy from Vreeland's (2008) modified polity measure (Marshall, Gurr, Davenport and Jaggers, 2002), on the presence of oil in ethnic group's settlement as compiled by Hunziker's (2014) based on Lujala, Rød and Thieme (2007), economic indicators as introduced by Cederman, Weidmann and Bormann (2015 (forthcoming)) relying in part on Nordhaus's (2006) data, and ethnic kinship as used by Cederman, Gleditsch, Salehyan and Wucherpfennig (2013).

Empirical analysis

Table 8 presents the results of our estimation of the full model. We report the estimated coefficients in separate columns, each corresponding to utilities that the actors obtain from some of the final nodes.[20] While the estimated coefficients inform us about what variables affect the utilities of each of the two actors assigned to the final nodes, their interpretation is quite involved, given that the utilities assigned to some final nodes are assumed to be zero (these nodes fail to have corresponding columns in table 8). We use final node ④, the status quo, as a natural baseline category for which we assume a utility of zero for both actors.

The first coefficient for the rebels' utilities, to take an illustrative example, inform us that in a federal system the rebels have stronger incentives to fight if their demand for autonomy is rejected. The coefficient for the same variable in the next column indicates that gaining autonomy based on a demand also increases the rebels' utility. But as the rebels at that decision node do not make a move (it is the government that accepts or rejects demands), this coefficient also shows us that in federal systems demands for autonomy, as long as they are accepted or fought for, increase the rebel side's utility compared to the status quo.

Needless to say, to derive the implications of each estimated coefficient for the actions of the two

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dependent at each decision node, implying that we assume agent errors, see Signorino, 1999), this is not too problematic a simplification (see, for instance Berry, Esarey and Demeritt, 2010). In appendix A we present a table 5 that shows how these payoff components are assigned to the various final nodes of our game tree (see figure 1).

[20]It is useful to repeat that the reason why not all final nodes appear in table 8 is that for identification purposes some utilities have to be set to zero. In addition, we assume for simplicity's sake that the reputation costs that a rebel group is likely to bear if it backs down completely, can be factored into the utilities at the other node. We will explain this complication below. And finally, we omitted the sixth final node as only one observation corresponded to this outcome.

	r's utility from					c's utility from				
terminal node	fight, aut. 2	accept aut. 3	accept aut. 5	secession 7	fight sec. 9	fight aut. 2	aut. 3	aut. 5	secession 7	fight sec. 9
	b / s.e. / z	b / s.e. / z	b / s.e. / z	b / s.e. / z	b / s.e. / z	b / s.e. / z	b / s.e. / z	b / s.e. / z	b / s.e. / z	b / s.e. / z
federal	1.71	85.82	9.02			3.31	6.07	-1.21		
	0.62	67.78	4.87			1.70	1.90	0.21		
	2.76	1.27	1.85			1.95	3.20	-5.78		
lost autonomy	0.90	-0.22	41.51							
	0.59	1.65	13.99							
	1.52	-0.13	2.97							
length exclusion (or junior)	-0.01	0.43								
	0.04	0.59								
	-0.15	0.74								
excluded	2.25				3.24					
	1.85				0.80					
	1.22				4.07					
number of conflicts	1.49				0.85					
	0.22				0.08					
	6.81				10.82					
relative size	2.08				0.10	-5.14				-1.16
	1.07				0.33	2.42				0.23
	1.94				0.29	-2.13				-5.13
relative wealth (poorer)	2.88				-0.38	-4.44				0.36
	0.99				0.09	2.14				0.08
	2.89				-4.17	-2.08				4.47
relative wealth (richer)	-0.12				1.43	-7.94				-1.68
	0.17				0.56	3.47				0.35
	-0.68				2.56	-2.29				-4.78
transborder ethnic kin	2.46				-0.08	-5.52				-0.10
	0.63				0.16	2.41				0.12
	3.88				-0.52	-2.29				-0.82
oil				-128.63	1.68				-1.50	-1.41
				93.29	0.29				0.43	0.30
				-1.38	5.85				-3.47	-4.63
length exclusion			0.04	-1.83	0.01					
			0.11	0.68	0.00					
			0.40	-2.67	2.57					
number of challengers						-0.10	0.06	0.01		
						0.08	0.04	0.01		
						-1.17	1.30	1.78		
number of groups with autonomy						0.61	0.52	0.03		
						0.62	0.56	0.02		
						0.99	0.94	1.67		
log GDP per capita$_{t-1}$						0.55				-0.06
						0.24				0.03
						2.25				-2.47
democracy (xpolity2)						-0.28				-0.01
						0.12				0.01
						-2.48				-0.83
constant	-9.75	-117.38	-51.70		-3.63	17.10	-2.55	0.39		6.21
	3.67	81.73	16.86		0.98	7.98	0.79	0.46		0.64
	-2.66	-1.44	-3.07		-3.70	2.14	-3.22	0.84		9.79
n					11293					
llik					-1106.35					

Table 2: Results of FIML estimation

actors is quite complicated and tedious. For ease of interpretation, we visualize a series of average differences in predicted probabilities, as suggested by Gelman and Hill (2007) (see also Hanmer and Kalkan, 2013). In what follows we do not depict all these changes in predicted probabilities, but focus on those that offer the most interesting insights (the complete set of figures can be found in appendix B). We organize our discussion by returning to our three core research questions laid out in the literature review proceeding in reverse order.

What explains the demand for self-governance?

Our empirical model – which starts by a rebel group choosing whether to make a demand and if so, whether to opt for autonomy and secession – provides insights about what increases the likelihood of such demands. Figure 2 depicts the average differences in the predicted probability of rebel group's requesting secession. While the depicted effects are small, we find that a group having lost autonomy in the past is significantly more likely to demand secession than all other groups. This result confirms Walter's (2009*b*, 121) finding that groups that lost autonomy are much more likely to mobilize for self-determination (see also Jenne, 2006). Interesting to note is, however, that contrary to our expectations, this positive effect of lost autonomy on the benefit of obtaining autonomy fails to materialize if a group is engaged for in a campaign for autonomy.[21]

Similarly, groups excluded from executive power are also significantly more likely to be secessionist, echoing Sorens's (2012, 60ff) results.[22] In our perspective being excluded from executive power reduces war costs, thus making secession a more attractive option to the rebels. Oil on the ethnic group's territory does not significantly increase the likelihood of secessionist demands, a finding that contradicts Collier and Hoeffler's (2006) claim.[23]

In figure 3 we depict the effects of the number of past conflicts on the likelihoodd of asking for autonomy (left panel) or secession (right panel). In both panels we find that with a more conflictual past the likelihood that a group makes a demand for autonomy or secession increases. As we consider that the number of past conflicts reduces the rebel's war cost, this result is perfectly in line with our reasoning. As these war costs decrease (i.e., the number of past conflicts increases) rebel groups are much more likely to make demands for self-determination. This effect is quite precisely estimated for secessionist demands, but much less so for groups demanding autonomy.

This result as well as the two previous ones for our third core research question, suggests that

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[21]This result suggests that our flexible estimation approach, i.e., the let coefficients for the same payoff components to vary among final outcomes, is warranted. It suggests as well, however, that our payoff specification is not yet complete and exhaustive.

[22]It should be noted that Sorens (2012, 58) uses as indicator for power the relative population size.

[23]This choice for demanding secession is obviously in competition with asking for autonomy or accepting the status quo. Consequently, the probabilities for these choices are in part mirror images of the ones depicted in figure 2. Because of this, and since almost all of these average differences in predicted probabilities are insignificant, we do not depict them here. The only notable result regarding the demands for decentralization concerns whether a group has lost autonomy in the past, as this significantly decreases the likelihood of accepting the status quo.

r: demanding secession

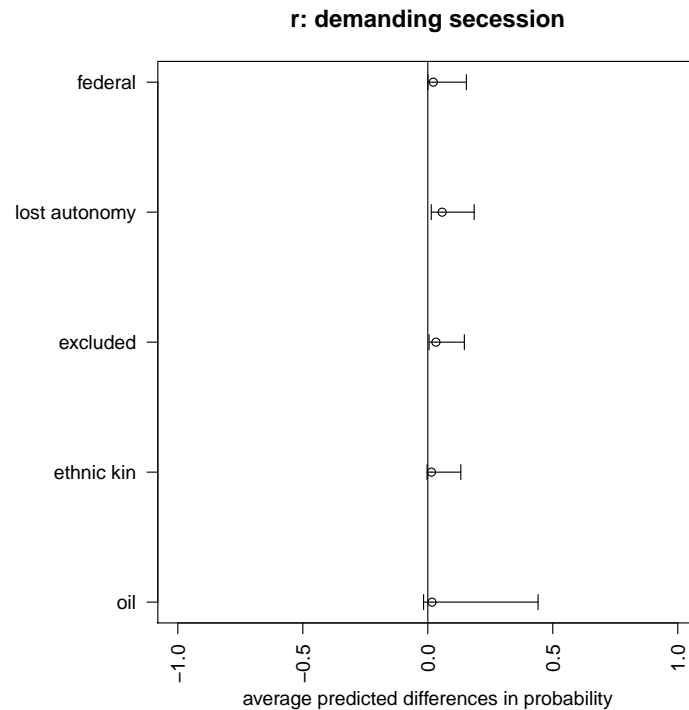average predicted differences in probability

Figure 2: Average differences in predicted probabilities of demands due to binary variables based on model reported in table 2 (and 95 % confidence intervals)

mostly political factor help explaining demands for autonomy and secession. As the figures in appendix B clearly show, none of the economic variables (e.g., oil, relative wealth of the group etc.) contribute significantly to increasing or decreasing the likelihood of self-determination claims. This result presents a considerable challenge to Collier and Hoeffler's (2006) claim that economic factors are behind secessionist movements. Their empirical analysis, however, only looks at the likelihood of secessionist war, which is not the same thing as demands for self-determination. As we will see below, economic variables do play a role, according to our analysis, but not at the stage of demand formulation.[24]

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[24]This also runs counter Sambanis and Milanovic's (2014) emphasis of economic factors in their correlational analysis. As our results seem to suggest, when the strategic interdependencies are taken into account, economic factors explaining the demand for self-determination largely vanishes. Similarly, our empirical finding is not in line with results from Jenne (2006, 22), who finds that economically advantaged groups are much less likely to engage in self-determination movements (see also Walter, 2009*b*; Sorens, 2012).
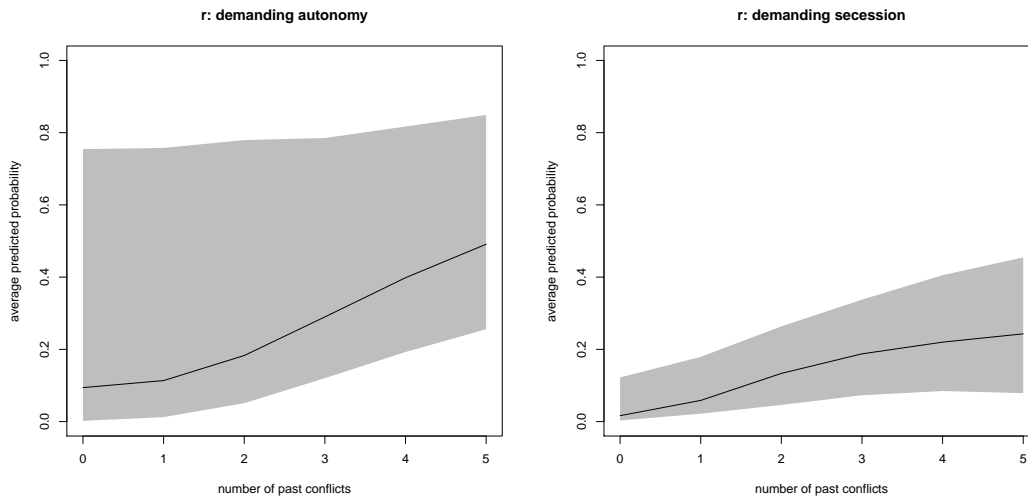
Figure 3: Average differences in predicted probabilities of demands due to number of past conflicts based on model reported in table 2 (and 95 % confidence intervals)

What explains governments' reactions to demands for self-governance?

We now turn to our second research question. Whether groups make particular demands depends in part on the expected reactions by the governments, as our game tree shows. Figure 4 depicts a first set of average differences in predicted probabilities of concessions. In the top two panels in figure 4 we find that offering autonomy is affected differently by our explanatory variables depending on whether it is offered after a campaign for autonomy or one for secession. In the former case our results show that offering autonomy is much more likely in a federal country (i.e., the likelihood of rejecting such a demand decreases), but this effect is absent in secessionist campaigns. This corresponds nicely with our expectations. In a federal country the government's cost associated with conceding autonomy to additional groups is much lower. Consequently central governments are much more likely to respond to such demands. On the other hand, counter to our expectations, offering autonomy to secessionist groups appears, to generate more costs in federal countries. This may have to do with Roeder's (2007) argument that all nation-states find their origin in so-called "segmental states," i.e., territories that have obtained some autonomy. Our finding suggests that central governments appear to be aware of this slippery slope especially when confronted with secessionist movements.

Autonomy concessions are also more likely if a group has transborder ethnic kin, both for groups that demand autonomy and those that launch a secessionist campaign. This result jibes perfectly with our claim that having transborder ethnic kin increases the likelihood for an ethnic

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group to win in a war. If the central government is aware of this fact, all else equal, the latter is better off making concessions to such a group. Interestingly, both Jenne (2006, 22) and Walter (2009*b*, 121) fail to find any effect when assessing whether such kin relationships increase the likelihood of self-determination demands, possibly because their reduced-form analysis does not take account of the strategic interactions between rebels and government.

In the lower two panels of figure 4 we find another notable effect relating to the political power status of the group making a demand. If the group is excluded from central executive power, secessionist demands are likely to be rejected by the government, which obviously also reduces the likelihood of peaceful secession. As the two top panels show, this same variable has no effect on the government's decision to offer autonomy, however. In our payoff scheme we assumed that being excluded from government reduces the war costs for a rebel group. This, however, should make conflict more likely and thus induce the government to make more frequently concessions, contrary to our results.
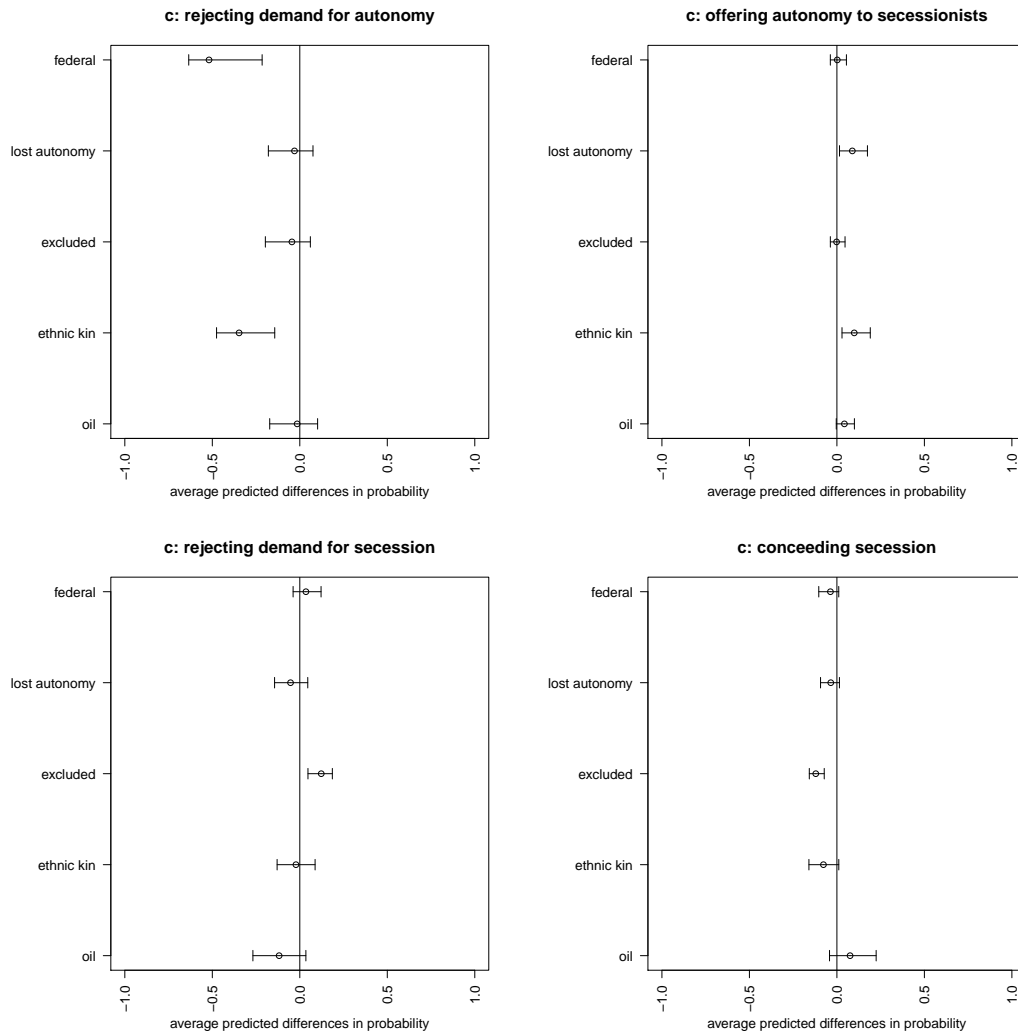
Figure 4: Average differences in predicted probabilities due to binary variables based on model reported in table 2 (and 95 % confidence intervals)
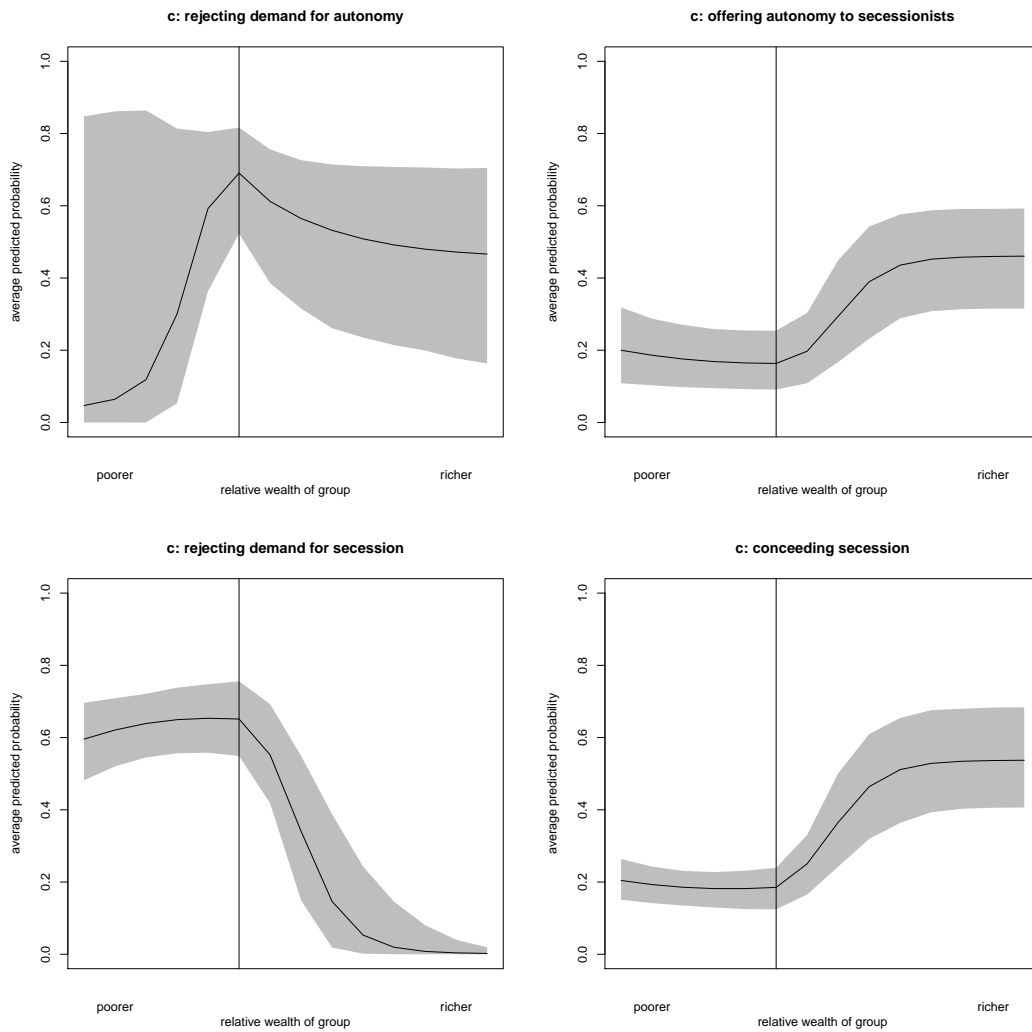
Figure 5: Average differences in predicted probabilities of concessions due to relative economic wealth of group based on model reported in table 2 (and 95 % confidence intervals)

Figure 5 reveals that the relative economic wealth of a group also heavily influences the government's reaction to demands. As the top two panels show, this economic variable has however differential effects on the likelihood of concessions of regional autonomy, depending on the type of demand made by the group. In the left panel it transpires that demands for autonomy by poorer groups are rejected with a rather low probability. Similar demands by groups richer than the national average, however, face a much higher rejection probability by the government. In our interpretation, based on our payoff table, we relate this to the reduced likelihood of such groups winning in a war. If these were true, however, then the opposite relationships should appear in the left panel in the top row if figure 5. It bears noting, however, that the average differences in predicted probabilities are estimated with considerable uncertainty.

A result much more in line with our assumptions appears in the second panel in the top row of figure 5. There we find that governments are much more willing to make a counter-offer of autonomy to rich secessionist groups than to poor ones. We would expect exactly this relationship according to our assumption that richer groups increases the likelihood of a victory in war. Governments, as a consequence, anticipate that rejected demands are likely to lead to a conflict, and thus offer autonomy with a higher probability.

The final two panels in figure 5 demonstrate that the relative economic wealth of ethnic groups strongly affects whether governments reject or concede secession. Demands for secession are rejected with a very high probability if they come from poorer groups, while the same demands by very rich groups are almost always accepted. Again, our argument about war costs and how they relate to the relative economic standing of a group is perfectly in line with this finding. It bears noting, that this result contradicts Walter's (2009*b*, 90f) null finding regarding the effect of economic characteristics of the territory settled by a self-determination movement and the level of accommodation by the government. Again, as the results differ in part between responses to secessionist demands and those for autonomy, the use of the umbrella term of self-determination movements may account for her null result.

Regarding Walter's (2006*a*, 2009*b*) main argument on government responses, namely that the number of potential challengers plays an important role, we find no support for claim. More specifically figure 6 shows that both for secessionist groups and those demanding autonomy, an increasing number of challengers leads a government to be more accomodating. Consequently, our assumption about the number of challengers increasing reputation costs for the government when making concession (following Walter, 2006*a*, 2009*b*) fails to be supported by our results. Needless to say that the average differences in predicted probabilities are estimated with quite

some uncertainty. This is hardly surprising as table 2 indicates that no coefficient related to the number of challengers reaches statistical significance. Thus, our results arequite closely in line with those obtained by Forsberg (2013). In her study of post-conflict arrangements she fails to support for Walter's (2006*a*, 2009*b*) challenger effect.
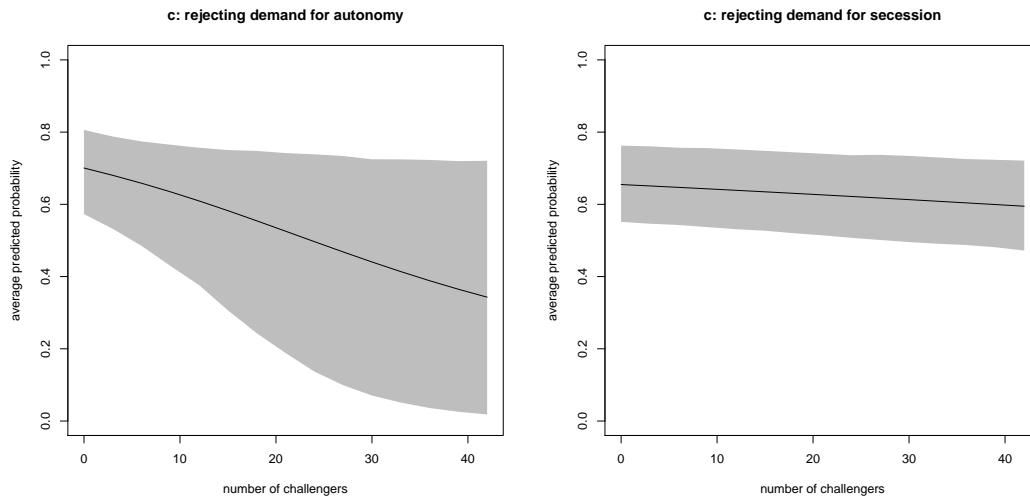

Figure 6: Average differences in predicted probabilities of concessions due to number of challengers based on model reported in table 2 (and 95 % confidence intervals)

Finally, figure 7 informs us that previous conflicts with an ethnic group affect the government's response to demands. The first panel in the top row shows that with an increasing number of previous conflicts the likelihood that a government rejects demands for autonomy increases notably. The second panel in the same row shows that this same effect, despite going in the same direction, is much smaller if autonomy offers can be made to a secessionist group. The lower panels report equally important effects regarding the effect of previous conflicts on the likelihood of the government offering secession. This latter probability increases considerably with a longer conflict history, as the right panel illustrates. The flip-side of this effect is depicted in the lower panel on the left, namely a increasing probability of rejecting a secessionist demand from groups with numerous previous conflicts compared to more peaceful groups. These results are contrary to our expectations. We expected that groups with a more conflictual history would have lower war costs, and these lower costs should induce governments to adopt a more compromising stance. We suspect that the number of past conflicts not only affects the rebel's war costs, but probably also the government's resolve in dealing with a rebellious group.
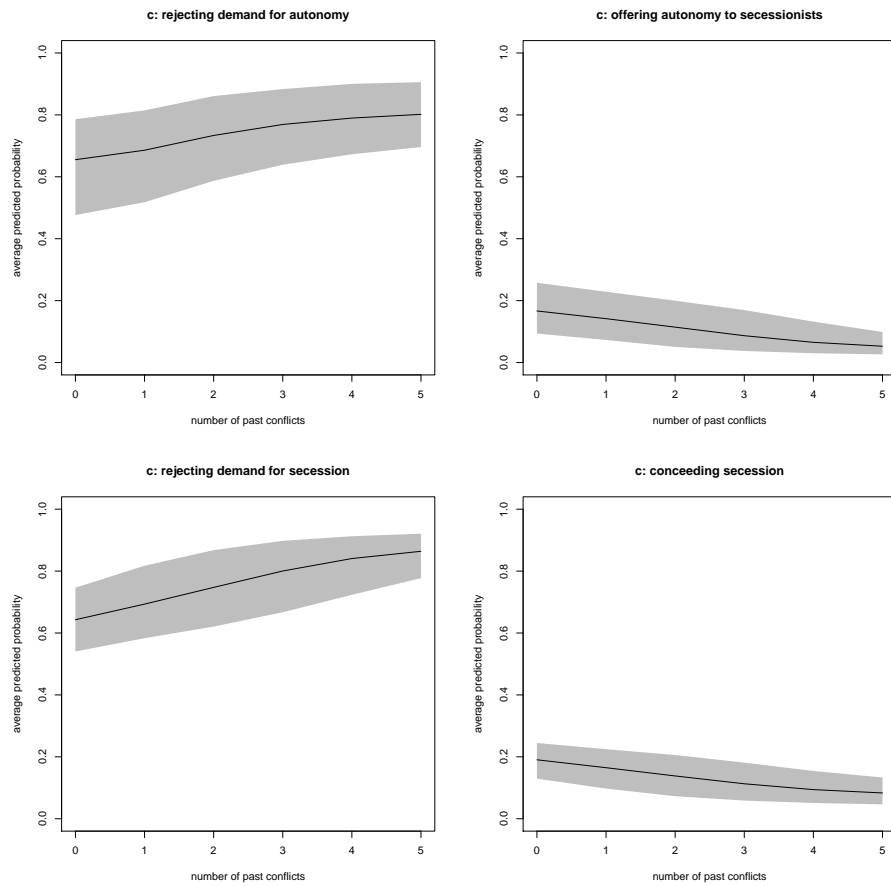
Figure 7: Average differences in predicted probabilities of concessions due to number of past conflicts based on model reported in table 2 (and 95 % confidence intervals)

Does decentralization contain or spur conflict?

Our findings relating to the first core research question are in part limited by the nature of our data. As noted above, we find very few conflicts after governments made autonomy concessions to groups that demand secession or autonomy. Nevertheless, the results show what factors influence the likelihood of conflict over autonomy or secession. The average differences in predicted probabilities depicted in figure 8 identify two factors of this kind. Both excluded groups and those that are settled in oil-producing area are much less likely to back down if their demand for secession is rejected. This latter result allows us to disentangle Collier and Hoeffler's (2006) finding that primary commodity exports lead to more secessionists conflicts. Our findings suggest that if oil is on the secessionist group's territory, the latter will adopt a much less compromising stance when dealing with the government (see also Hunziker, 2014; Asal, Findley, Piazza and Walsh, forthcoming; Morelli and Rohner, 2015 (forthcoming)). This is so, because the cost of a secession is much larger if the seceding territory contains oil deposits.
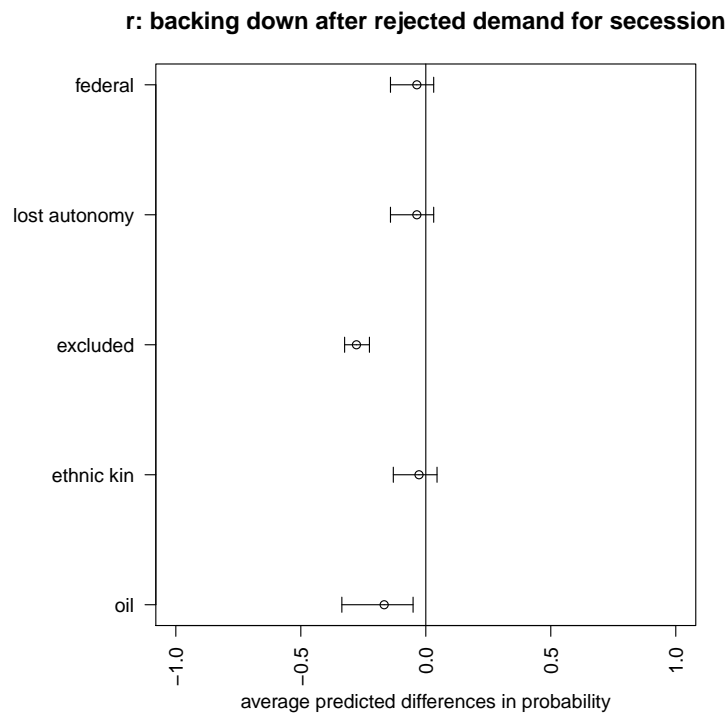

Figure 8: Average differences in predicted probabilities of secessionist conflict due to binary variables based on model reported in table 2 (and 95 % confidence intervals)

Figure 9 shows that the relative economic wealth affects whether a group takes a more or less

conflictual stance. As the left panel illustrates, poorer groups are much less likely to back down after their demand for autonomy has been rejected. Richer groups, on the other hand, are almost certain not to engage in conflict in such a case. This runs counter our argument that economic wealth correlates positively with the chances of winning a war. If this were the case, poorer groups would be more likely to back down. The second panel shows, however, that this clear-cut relationship does not apply to groups making demands for secession. Among these groups, rejected demands lead to conflict with the lowest probability among those that are poorer than the average population. Much poorer groups are almost certain to engage in a conflict (though note the large confidence interval), while the richer groups do not behave very differently from those that are as rich as the national average.
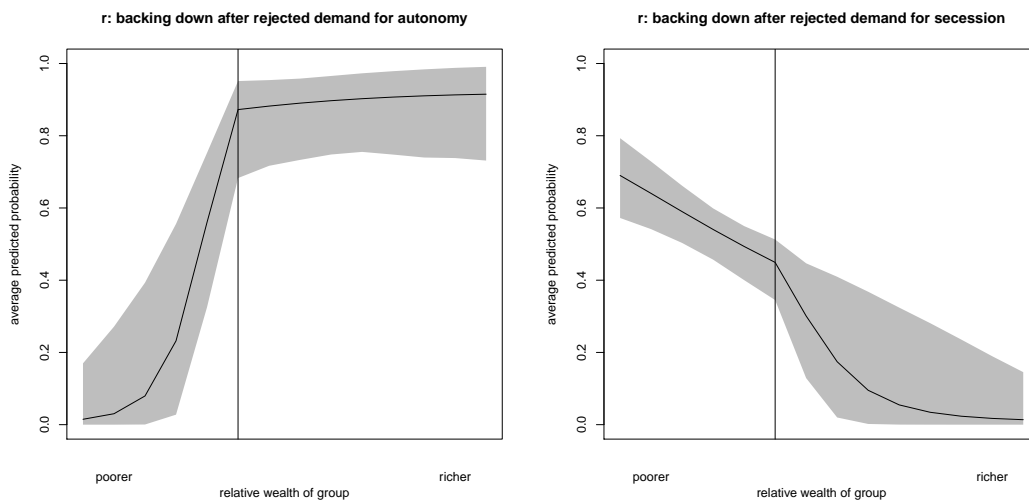

Figure 9: Average differences in predicted probabilities of backing down due to relative economic wealth of group based on model reported in table 2 (and 95 % confidence intervals)

An additional effect can be detected for the relative size of the ethnic group. Figure 10 demonstrates that for both secessionist groups (right panel) and those requesting autonomy (left panel), increasing relative group size decreases the chances of backing down. Thus, relatively large groups are much more prone to engage in conflicts for autonomy or secession. This result is perfectly in line with our expectations. As relatively larger groups are more likely to win in a war (per our assumption), these groups should also be more willing to engage in a violent conflict.

Finally, figure 11 indicates that the number of past conflicts significantly affects whether a self-determination movement backs down when its demand is rejected by the government. The two panels show that the effects are in the same direction for groups with both types of demands. If the latter have a long conflictual history with the government, they are much less likely to back down,
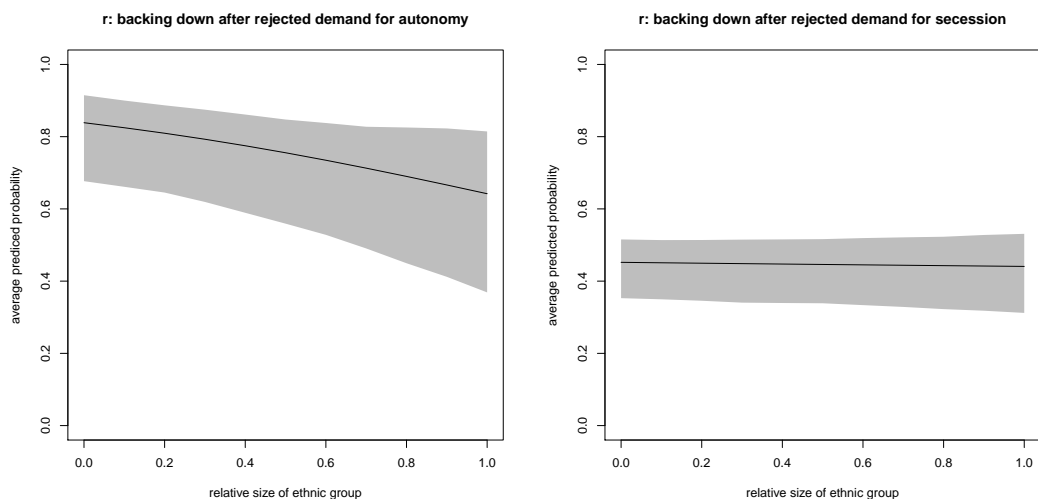
Figure 10: Average differences in predicted probabilities of backing down due to relative size of an ethnic group based on model reported in table 2 (and 95 % confidence intervals)

after their demands have been rejected. As we assumed that a longer history of conflict reduces the costs of war for the rebel group, we expect in both cases a positive relationship with the likelihood of war. As the two panels in figure 11 show, this is exactly what our estimations show.

While these results tell us what makes conflict over secession or autonomy more or less conflictual, they only indirectly answer the core research question of whether decentralization contains or spurs conflict. Unfortunately, because of data limitations, there are few cases that allow us to estimate the net effect of autonomy and secession on conflict. Missing data on our independent variables force us to drop several relevant cases. Yet, two simple cross-tabs on the full sample of cases yield a preliminary indication of the direction of the effect. Tables 3 and 4 depict whether conflict onset becomes more or less likely after granting autonomy, both during campaigns for autonomy and secession. For the former case table 3 clearly shows that when autonomy is granted conflict onset is less likely. In table 4 this difference fails to materialize, suggesting that in secessionist campaigns offering autonomy is not correlated with a reduction in the likelihood of conflict onsets.
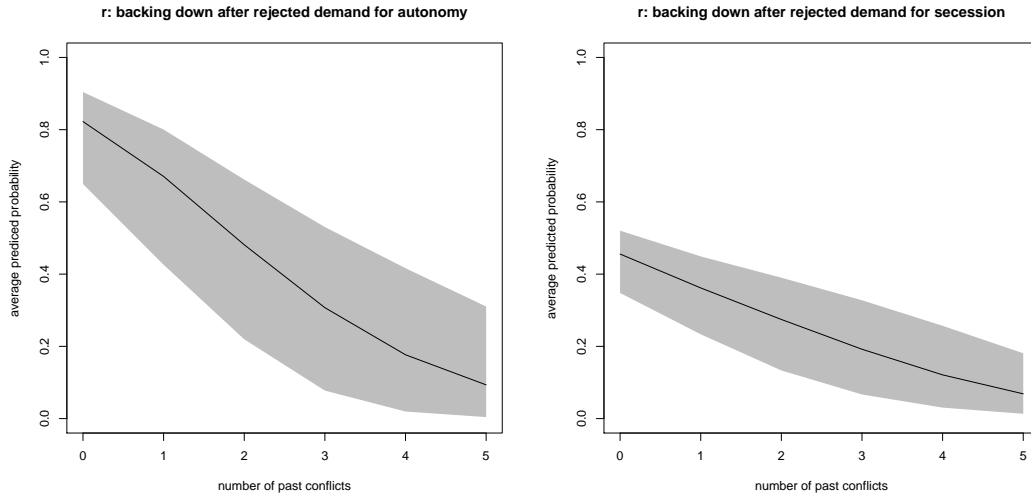
Figure 11: Average differences in predicted probabilities due to number of past conflicts based on model reported in table 2 (and 95 % confidence intervals)

	no autonomy	autonomy
no conflict	48	24
conflict onset	9	2

Table 3: Autonomy and conflict onset during campaigns for autonomy

	no autonomy	autonomy
no conflict	336	12
conflict onset	34	1

Table 4: Autonomy and conflict onset during secessionist campaigns

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Conclusion

Understanding whether, how, and why institutional arrangements can help bring about favorable outcomes such as peace clearly ranks among the top research problems in political science. Yet, evaluating their effects is almost always complicated by the problem of endogeneity. Put simply, if institutions are not assigned randomly as in a laboratory experiment, but are the result of political choices, then we have reason to believe that their origins are causally related to what they are supposed to achieve. Thus, the key question is "how to distinguish effects of institutions from those of the conditions that give rise to them" (Przeworski, 2004, 527).

Using these considerations as our point of departure, we have attempted to increase causal depth by improving our theoretical and empirical understanding of the process that brings about outcomes of self-governance, autonomy and secession for territorially concentrated ethnic groups. By explicitly modeling the interdependencies of a central government and a rebel group in their bargaining over self-determination, and by offering an estimator that directly accounts for this interaction we shed new light on key findings in the literature.

First, with respect to our last core research question, we find all factors that affect the likelihood of self-determination demands are of a political nature. Excluded groups, those having experienced autonomy arrangements but having lost them in the past, and those with a history of conflict are much more likely to demand secession (but not autonomy). All our economic variables, like the group's relative wealth or the presence of oil fail to explain whether self-determination demands are made. These results question strongly the strongly economic claims by, for instance Collier and Hoeffler (2006) that demands for secession have their roots in economic and not political (or identity) issues.

Second, for our second core research question on government responses we fail to find support for Walter's (2006*a*, 2009*b*) claim regarding reputation costs as measured by the number of challengers. We find that a larger number of challengers actually softens a government's stance toward a self-determination movement, but this result is estimated with little precision. Consequently, our results are in line with those obtained hyForsberg (2013). The important finding that the relative economic wealth of a group affects considerably how the government treats its demands is more in line with our assumptions. As relative economic wealth is likely to correlate positively with the probability of a rebel victory in a war, governments can more easily reject demands by poorer groups.

Third, among our main findings regarding conflict we find that oil on the territory of a seces-

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sionist group increases considerably the likelihood that a demand rejected by the government will lead to secessionist war. A similarly strong effect in line with our argument concerns the power status of the group in question. If excluded from central executive power, it will be much more likely on engage in a conflict after a rejected demand for secession because its war costs are more limited compared to weaker groups.

For the central question whether autonomy and secession actually pacify or deteriorate relations between government and rebels, our analysis does not yet produce definitive results due to data limitations. A simple descriptive analysis of our full sample of observations suggests that granting autonomy to a group demanding such an arrangement is associated with a much lower conflict risk. Autonomy offered to a secessionist movement, however, does not appear to reduce the risk of civil war.

These limitations of our analysis suggest a first step to improve our study. We are currently unable to assess in full the consequences of autonomy arrangements and secession because our dataset contains few cases with complete information on all our independent variables for outcomes attained after autonomy concessions. In part this also has to do with the fact that our dataset on campaigns for autonomy and secession codes such campaigns according to quite demanding criteria.[25] Thus expanding our data along these lines will allow us to generate much more precise estimates and cover all decision nodes of our game tree more completely.

Needless to say, the current analysis also calls for additional comparative interpretation that relate it more closely to the existing literature. For instance, unlike Cederman et al. (2015) we have not considered how territorial concessions interact with concessions at the central level of government, but treated the latter as exogenously given. Similarly, we have not at all considered that especially secessionist demands are also related to the geopolitical feasibility of secession. At the domestic level this relates mostly to geographic factors (e.g., Toft, 2002; Weidmann, 2009) and at the international level to the support in the international community, as argued by Coggins (2011). Indeed, more work is required to compare our strategic estimation results more directly with studies relying on reduced form models. Finally, it would desirable to model demands for autonomy and secession, together with the corresponding counter-offers by governments, as competing strategies. Estimating our model in ways that come closer to empirical models used by other authors and actual historical trajectories will allow us to demonstrate more clearly the added value

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[25]Indicative of this is that there are much fewer secessionist campaigns in Chenoweth and Lewis's (2013) data than the declarations of independence in Coggins's (2011) data. It bears noting that the former secessionist cases are not a subset of the cases from the latter dataset.

of our approach.

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Appendix A

In this appendix we offer in table 5 information on how variables are assigned to the utilities attached to the final outcomes in our game tree (figure 1 and list in table 6 the number of cases from each country that contributes to the dataset for the full analysis. For the same set of cases table 7 reports descriptive statistics of all the variables.

endnode	variables$_r$	variables$_c$
1	length_excl_j	0
2	federal, lostaut, excluded, warhist, hastek, b, low1_overlap, high1_overlap	federal , hastek, b, low1_overlap (or nh), high1_overlap (or nh), challengers (=rlvt_groups_count-autgroups_count), autgroups_count, ln_rgdppc_lag.x, xpolity2
3	federal, lostaut	federal, challengers (=rlvt_groups_count-autgroups_count), autgroups_count
4	0	0
5	federal, lostaut	federal, challengers (=rlvt_groups_count-autgroups_count), autgroups_count
(6)	-	-
7	pd_onshore	pd_onshore
8	length_excl	
9	pd_onshore, excluded, warhist, hastek, b, low1_overlap, high1_overlap	pd_onshore, hastek, b, low1_overlap, high1_overlap, ln_rgdppc_lag.x, xpolity2

Legend: length_excl_j (duration group is excluded or junior), length_excl (duration group is excluded), hastek (cross-border ethnic kinship), federal (federal system), lostaut (group previously lost autonomy), excluded (excluded group),warhist (number of previous wars), b (relative population size of group), low1_overlap and high_overlap (relative wealth of poorer, resp. richer group), challengers (number of challengers), rlvt_groups_count (number of politically relevant ethnic groups), autgroups_count (number of groups with autonomy), ln_rgdppc_lag.x (log of GDP per capita), xpolity2 (democracy), pd_onshore (oil in ethnic group's settlement)

Table 5: Payoff variables at endnodes (number from left to right)

country	n
Afghanistan	246
Albania	2
Algeria	23
Angola	98
Argentina	64
Australia	44
Bahrain	54
Belgium	26
Benin	117
Bhutan	3
Bolivia	108
Botswana	151
Brazil	52
Bulgaria	1
Burkina Faso	43
Burundi	55
Cambodia	70
Cameroon	151
Central African Republic	159
Chad	247
Chile	83
China	553
Congo	386
Costa Rica	174
Croatia	20
Cyprus	24
Democratic Republic of the Congo	124
Djibouti	60
Ecuador	118
Eritrea	25
Ethiopia	214
Fiji	25
France	70
Gabon	39
Gambia	57
German Democratic Republic	27
Ghana	259
Greece	23
Guatemala	62
Guinea	148
Guyana	10
Honduras	72
India	257
Indonesia	283
Iran	255
Israel	129
Italy	74
Ivory Coast	139
Japan	81
Kazakhstan	51
Kenya	29
Kuwait	27
Kyrgyzstan	16
Laos	137
Lebanon	200
Lesotho	44
Liberia	224
Libya	51
Lithuania	5
Madagascar	54
Malawi	58
Malaysia	24
Mali	57
Mexico	48
Mongolia	24
Morocco	16
Mozambique	105
Myanmar	75
Namibia	194
Nepal	69
Netherlands	34
New Zealand	74
Nicaragua	64
Niger	29
Nigeria	13
North Korea	24
Paraguay	48
Peru	162
Philippines	85
Poland	25
Portugal	33
Republic of Vietnam	18
Russia	287
Rwanda	67
Saudi Arabia	169
Senegal	67

Sierra Leone	113
Slovenia	20
Somalia	17
South Africa	376
Sri Lanka	7
Sudan	148
Swaziland	12
Syria	48
Taiwan	24
Tajikistan	32
Tanzania	115
Thailand	104
Togo	56
Tunisia	27
Turkey	46
Uganda	234
Ukraine	29
United Arab Emirates	12
United Kingdom	180
Uruguay	64
Uzbekistan	42
Venezuela	76
Vietnam	191
Yemen	38
Yemen Arab Republic	26
Yugoslavia	58
Zambia	245
Zimbabwe	64

Table 6: Countries and cases covered in main analysis

Variable	Minimum	1st Qu.:	Median	Mean	3rd Qu.:	Maximum
outcome	1.000	4.000	4.000	Mean 4.111	4.000	9.000
onset_do_flag	0.000000	0.000000	0.000000	0.003276	0.000000	1.000000
low1_overlap	1.000	1.000	1.019	1.243	1.247	5.935
high1_overlap	1.000	1.000	1.000	1.083	1.070	8.587
hastek	0.0000	0.0000	1.0000	0.5805	1.0000	1.0000
warhist	0.0000	0.0000	0.0000	0.1077	0.0000	5.0000
excluded	0.0000	0.0000	1.0000	0.5717	1.0000	1.0000
b	0.000177	0.054545	0.176471	0.257524	0.405405	1.000000
pd_onshore	0.0000	0.0000	0.0000	0.3356	1.0000	1.0000
lostaut	0.00000	0.00000	0.00000	0.03887	0.00000	1.00000
length_excl	0.00	0.00	59.00	33.17	59.00	60.00
length_excl_j	0.00	59.00	59.00	48.99	59.00	60.00
xpolity2	-6.000	-3.000	-2.000	0.245	5.000	7.000
federal	0.0000	0.0000	0.0000	0.2579	1.0000	1.0000
ln_rgdppc_lag	3.911	6.731	7.300	7.524	8.350	10.482
rlvt_groups_count	1.000	4.000	5.000	8.304	8.000	57.000
egip_groups_count	0.000	1.000	2.000	2.856	3.000	14.000
autgroups_count	0.0000	0.0000	0.0000	0.7008	0.0000	41.0000
challengers	0.000	1.000	2.000	4.747	4.000	48.000
lnasize	0.6408	6.2505	7.1455	7.1528	8.1398	11.9705

Table 7: Descriptive statistics of variables used in main analysis

Appendix B

In this appendix we present the full set of figures (12- 20) that report the average differences in predicted probabilities from which a subset has been presented in the main text to illustrate the main results of our analysis. In table 8 we report the estimation results of our model to which we added the log of the absolute population size as explanatory variable (as discussed in the main text).
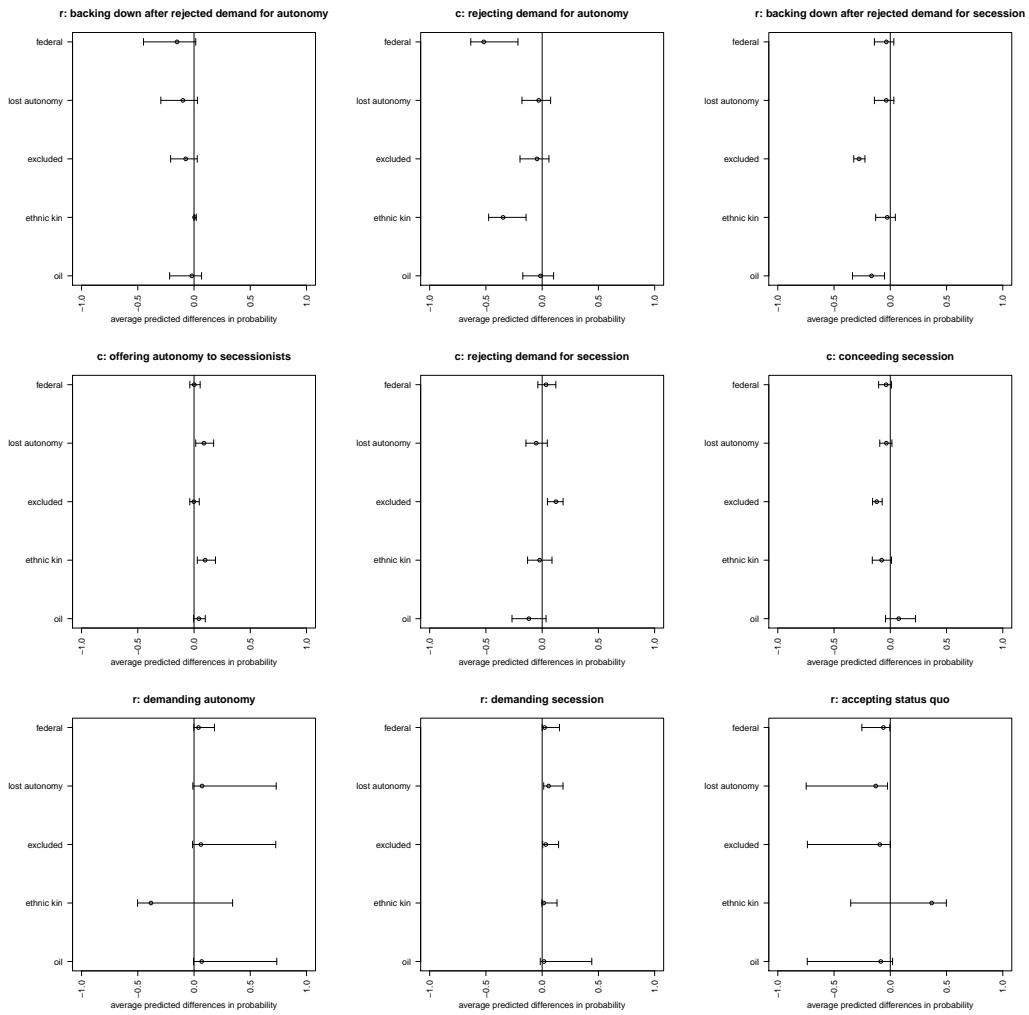

Figure 12: Average differences in predicted probabilities due to binary variables based on model reported in table 2 (and 95 % confidence intervals)
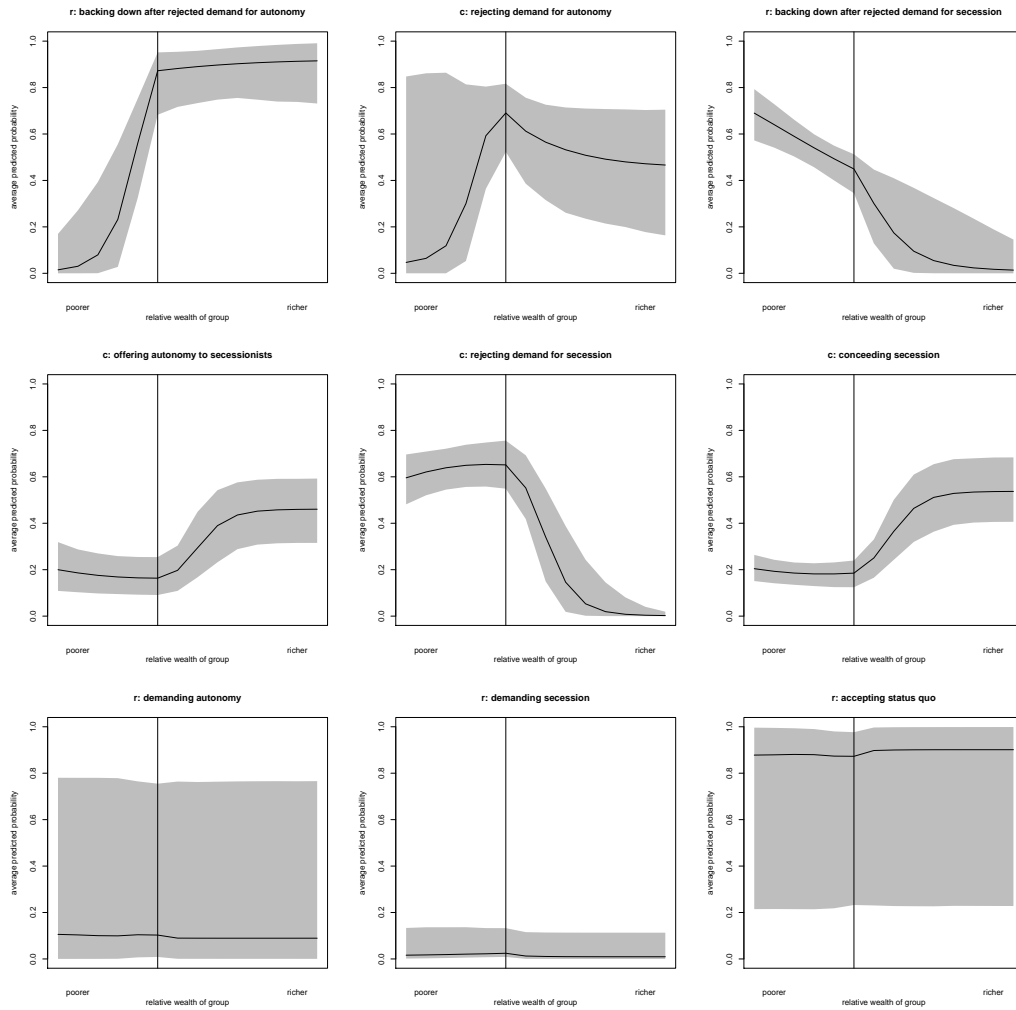
Figure 13: Average differences in predicted probabilities due to relative economic wealth of group based on model reported in table 2 (and 95 % confidence intervals)
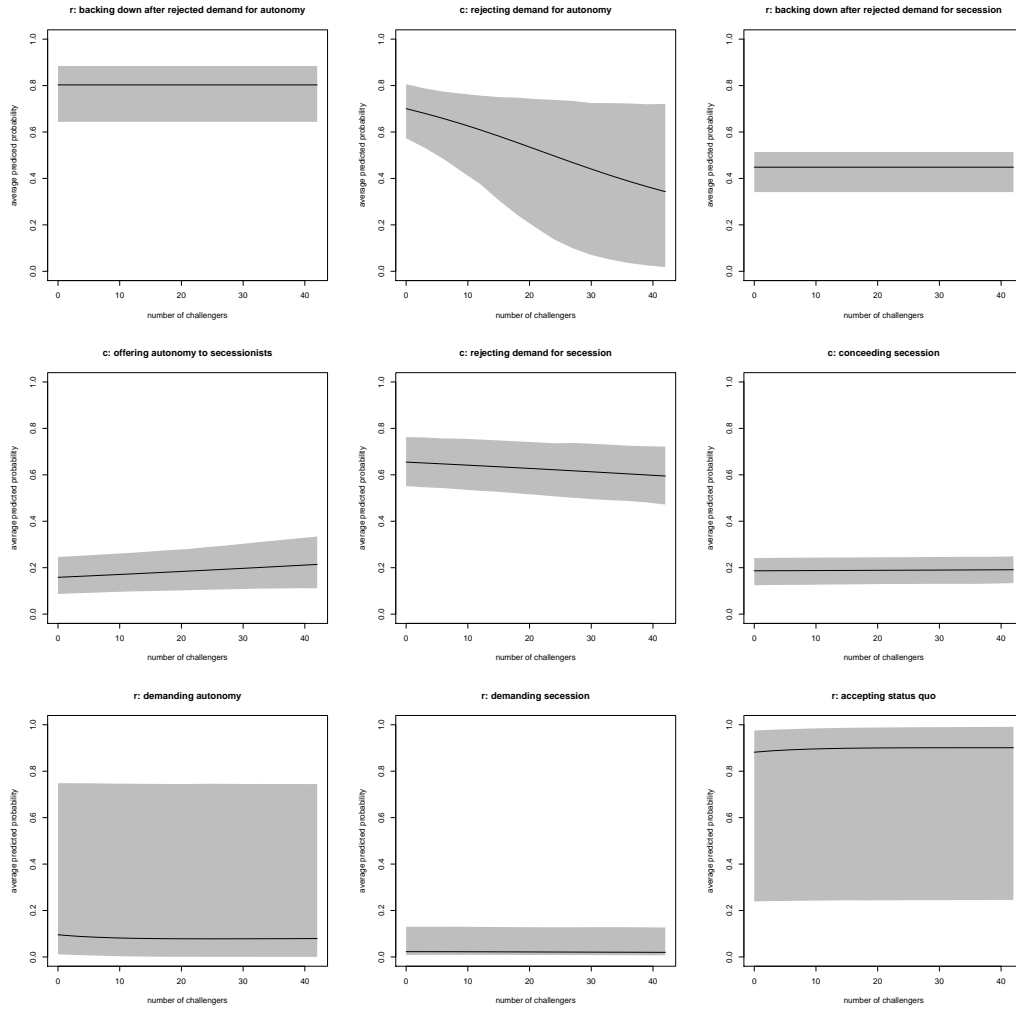
Figure 14: Average differences in predicted probabilities due to number of challengers based on model reported in table 2 (and 95 % confidence intervals)

r: backing down after rejected demand for autonomy

c: rejecting demand for autonomy

r: backing down after rejected demand for secession

c: offering autonomy to secessionists

c: rejecting demand for secession

c: conceeding secession

r: demanding autonomy

r: demanding secession
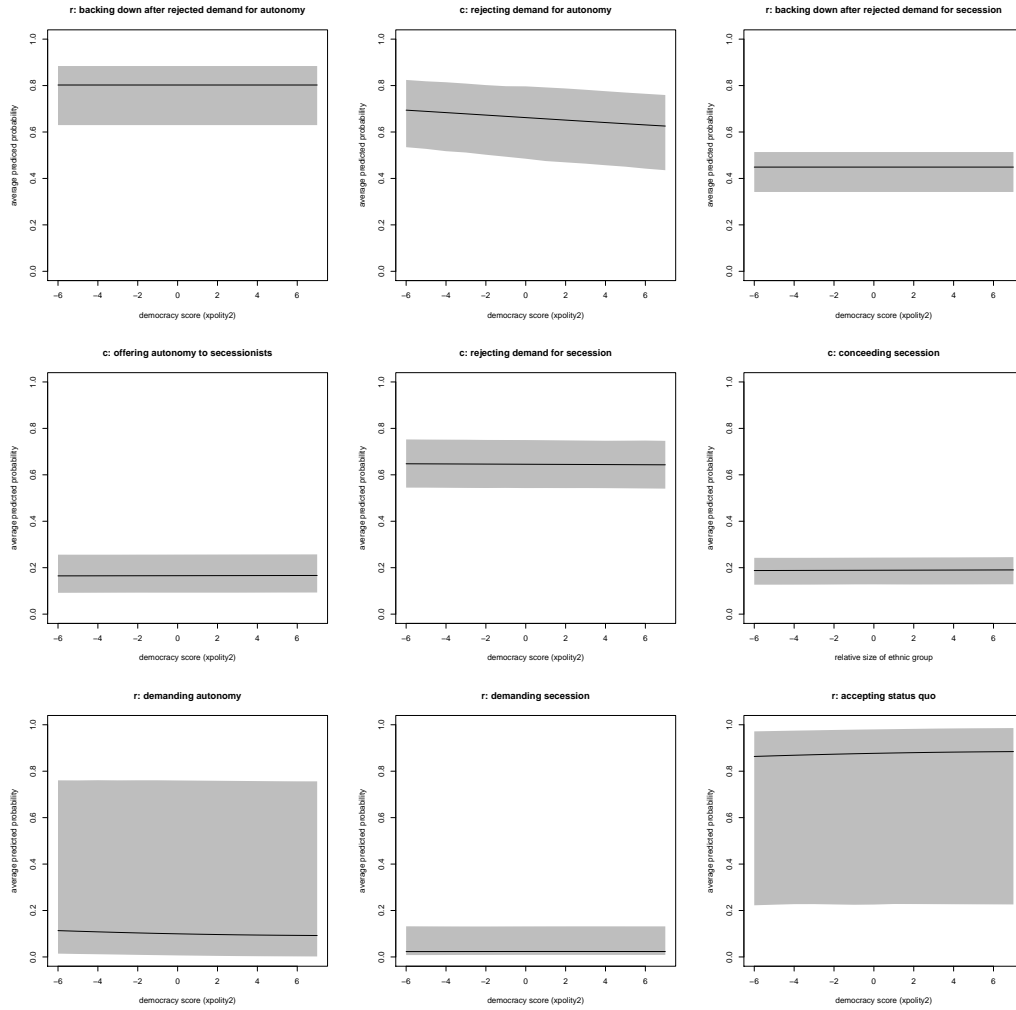
r: accepting status quo

Figure 15: Average differences in predicted probabilities due to the level of democracy (xpolity2) based on model reported in table 2 (and 95 % confidence intervals)

Figure 16: Average differences in predicted probabilities due to relative size of an ethnic group based on model reported in table 2 (and 95 % confidence intervals)

Figure 17: Average differences in predicted probabilities due to log of GDP per capita (lagged) based on model reported in table 2 (and 95 % confidence intervals)
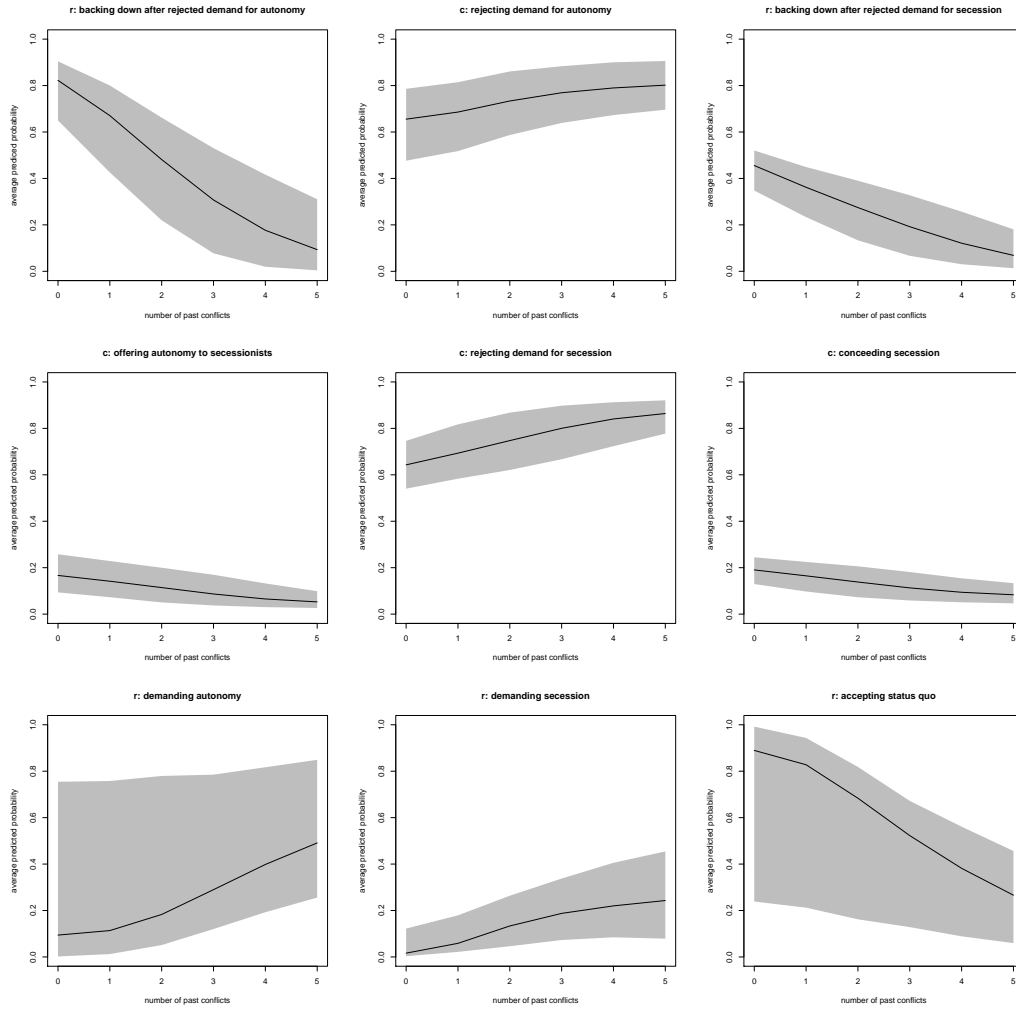
Figure 18: Average differences in predicted probabilities due to number of past conflicts based on model reported in table 2 (and 95 % confidence intervals)

Figure 19: Average differences in predicted probabilities due to length of exclusion based on model reported in table 2 (and 95 % confidence intervals)

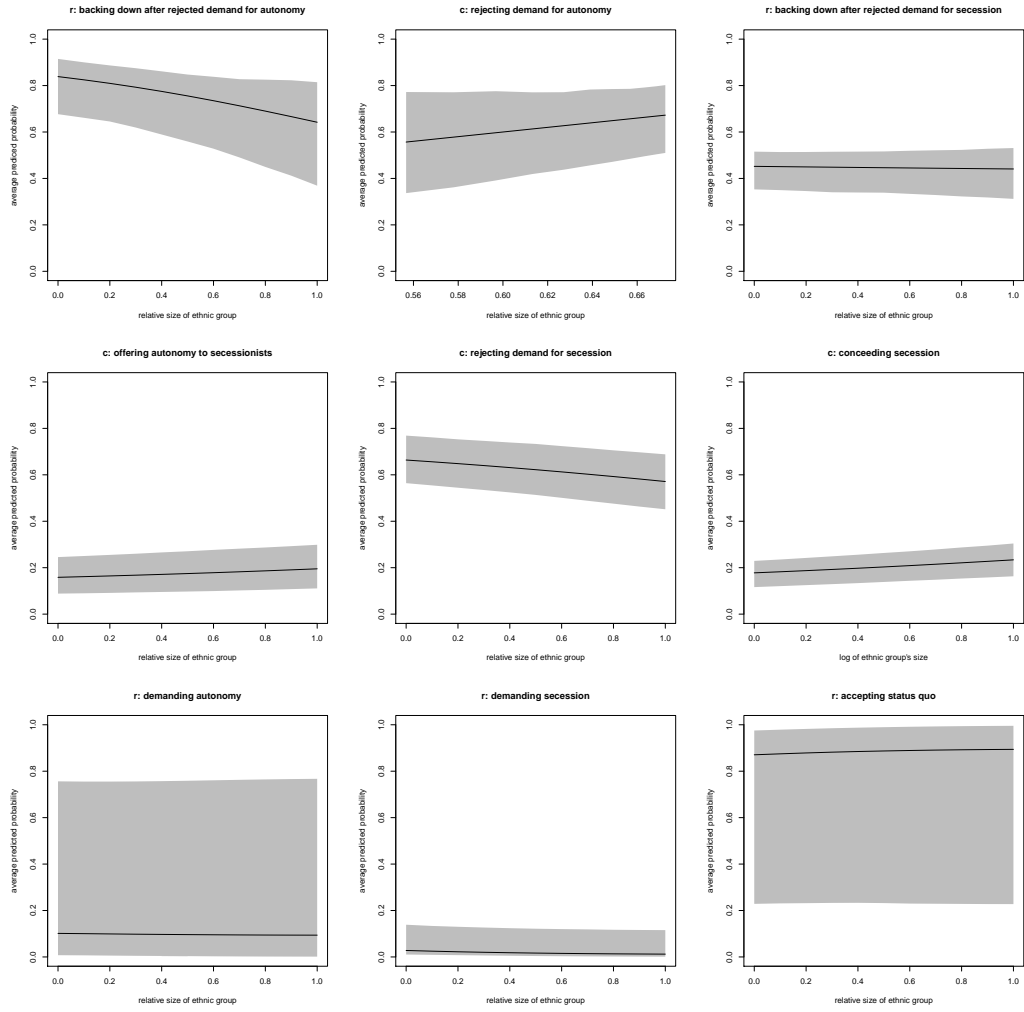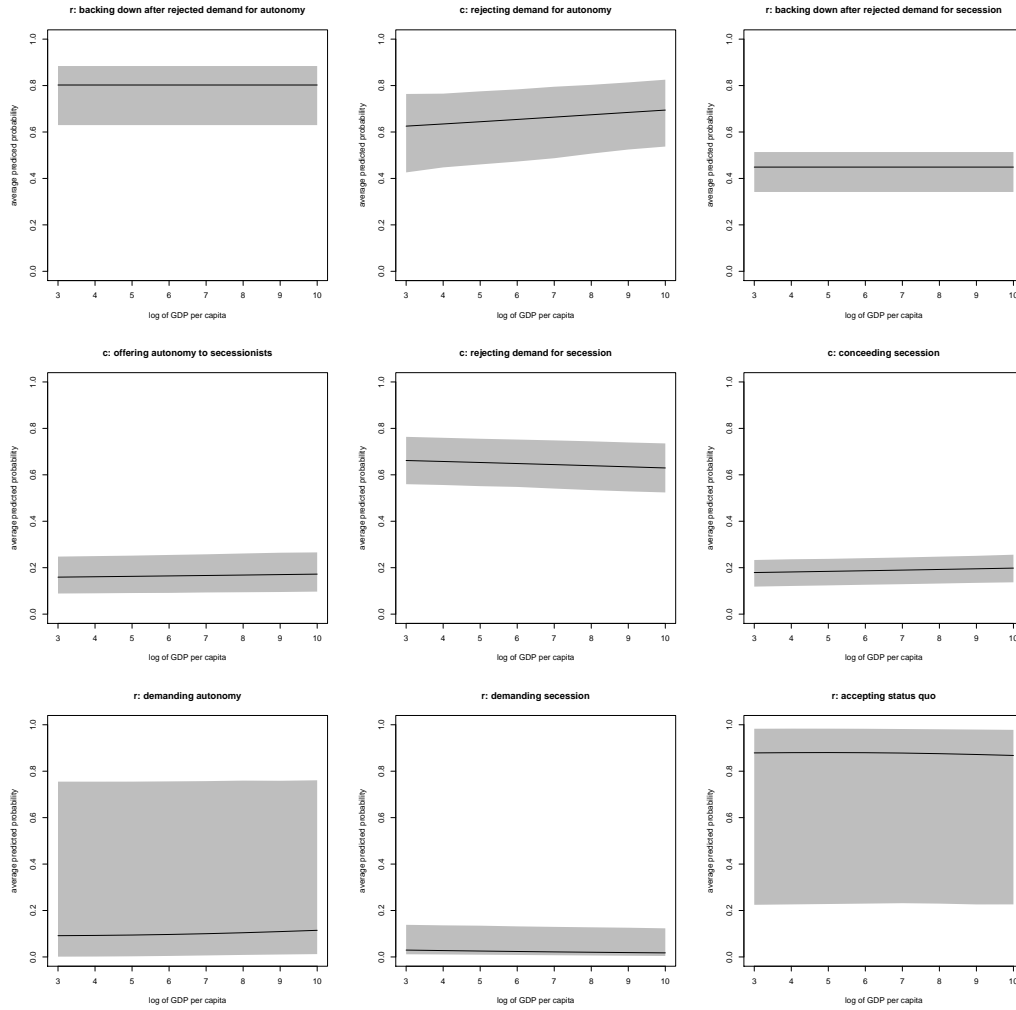Figure 20: Average differences in predicted probabilities due to length of exclusion (junior) based on model reported in table 2 (and 95 % confidence intervals)

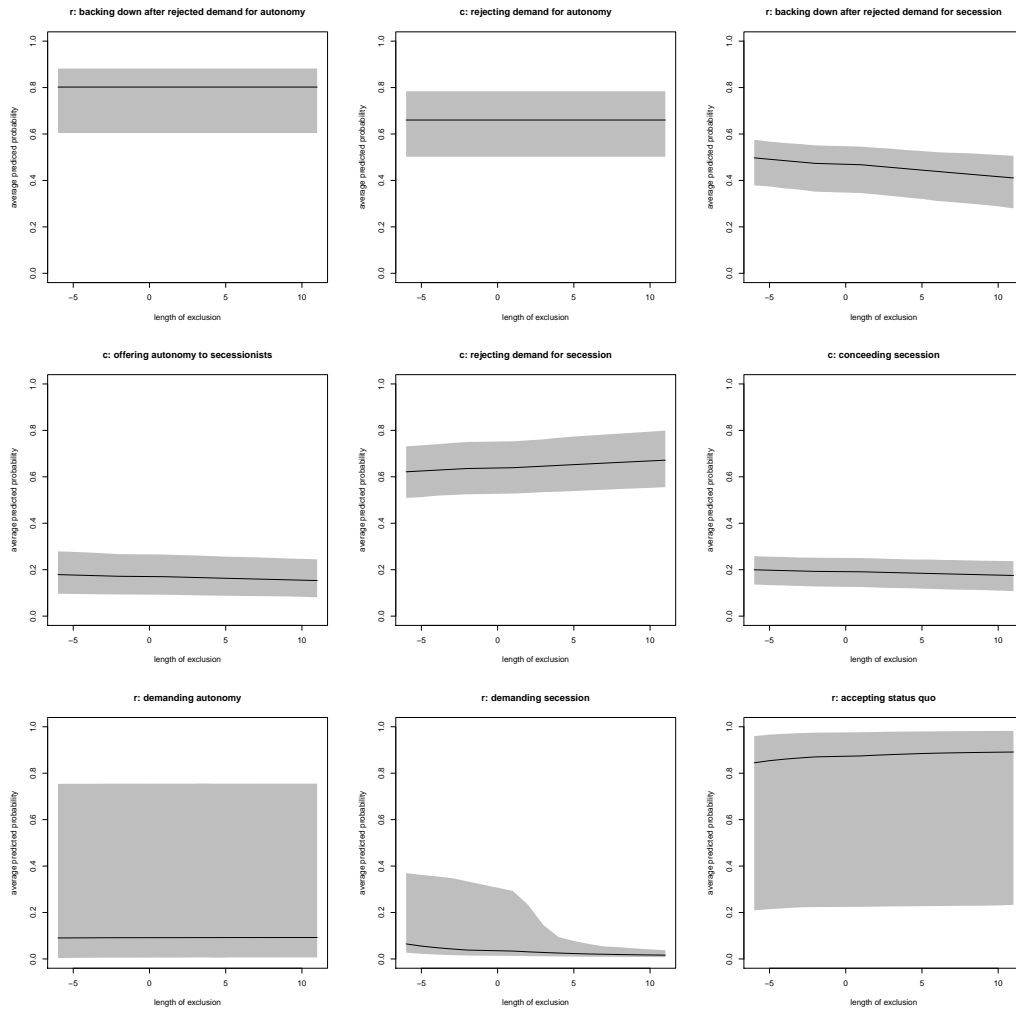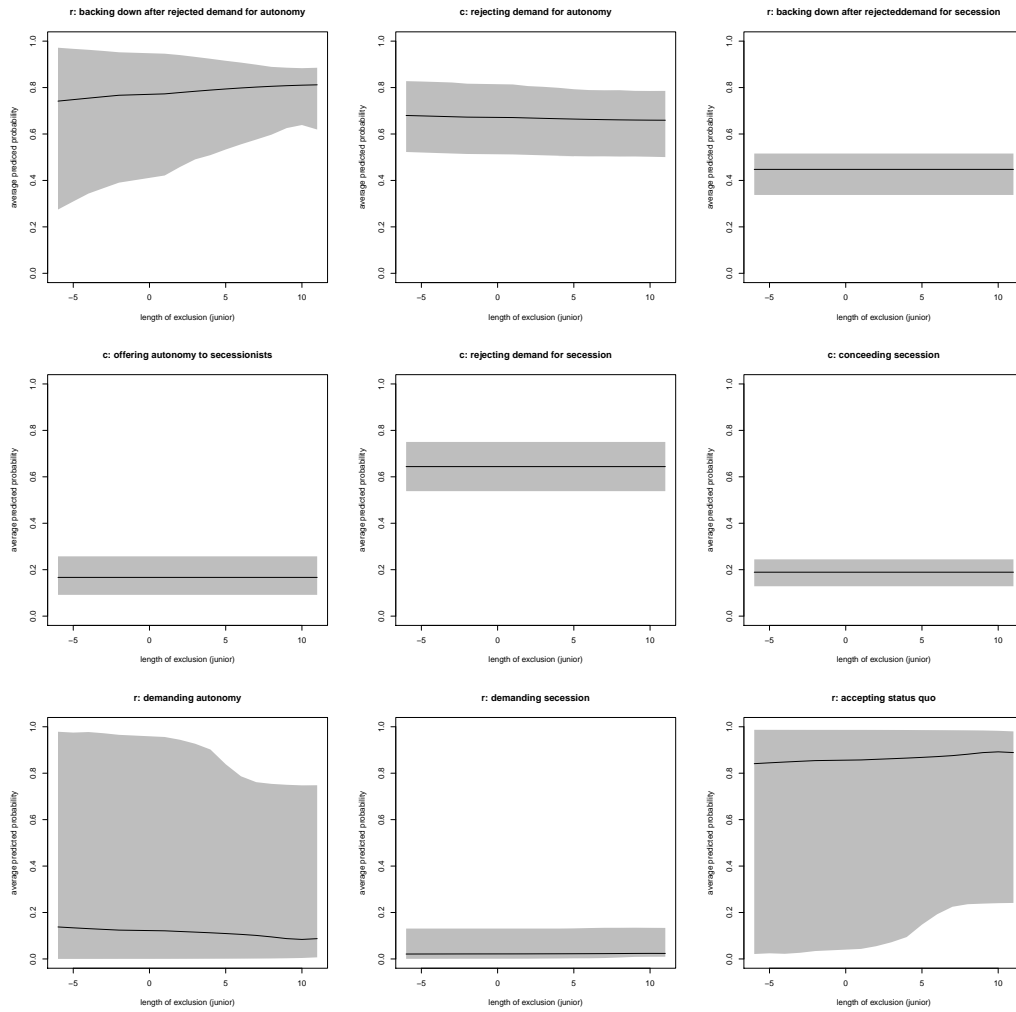|	r's utility from					c's utility from				
	fight, aut.	accept aut.	accept aut.	secession	fight, sec.	fight aut.	aut.	aut.	secession	fight sec.
final node	2	3	5	7	9	2	3	5	7	9
	b	b	b	b	b	b	b	b	b	b
	s.e.	s.e.	s.e.	s.e.	s.e.	s.e.	s.e.	s.e.	s.e.	s.e.
	z	z	z	z	z	z	z	z	z	z
federal	5.93	42.16	-1.31		1.38	3.57	-1.19			
	0.93	33.87	3.50		0.82	1.06	0.25			
	6.36	1.25	-0.38		1.68	3.36	-4.67			
lost autonmy	-0.87	0.43	24.13							
	0.68	1.29	8.58							
	-1.28	0.34	2.81							
length exclusion (including junior)	-0.03	0.73								
	0.04	1.26								
	-0.65	0.58								
excluded	3.92				19.24					
	1.19				1048.58					
	3.29				0.02					
number of conflicts	3.36				0.77					
	0.49				0.08					
	6.92				9.24					
relative group size	12.88				-0.01	-11.02				-0.80
	2.76				0.34	3.71				0.26
	4.67				-0.03	-2.97				-3.09
relative wealth (poorer)	-4.49				-0.37	10.20				0.40
	0.87				0.09	2.76				0.09
	-5.14				-4.23	3.69				4.39
relative wealth (richer)	-0.13				1.35	-8.65				-1.91
	0.15				0.54	3.04				0.37
	-0.86				2.50	-2.85				-5.15
transborder ethnic kin	-2.87				-0.21	4.25				0.03
	0.96				0.14	1.35				0.11
	-2.98				-1.47	3.16				0.29
oil				-117.77	1.39				-0.98	-1.19
				98.80	0.24				0.36	0.33
				-1.19	5.89				-2.68	-3.57
length exclusion			0.07	-3.56	0.01					
			0.05	1.55	0.00					
			1.40	-2.29	2.26					
number of challengers						-0.43	0.04	0.03		
						0.14	0.03	0.01		
						-3.15	1.07	2.77		
number of groups with autonomy						0.33	0.30	-0.76		
						0.41	0.35	0.20		
						0.80	0.86	-3.79		
log absolute size						-2.12	-0.14	0.04		
						0.49	0.07	0.05		
						-4.28	-1.97	0.79		
log GDP per capita$_{t-1}$						2.19				-0.06
						0.62				0.03
						3.50				-2.42
democracy (xpolity2)						-0.65				0.00
						0.20				0.01
						-3.28				0.41
constant	-3.08	-91.52	-30.01		-19.23	-3.67	-0.94	1.50		6.96
	2.75	89.52	9.78		1048.58	5.85	1.03	0.70		0.69
	-1.12	-1.02	-3.07		-0.02	-0.63	-0.92	2.14		10.03
n					11293					
llik					-1084.40					

Table 8: Results of FIML estimation of full model