Ethnic winning coalitions and the political economy of aid*

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Abstract

Selectorate theory provides an elegant and encompassing theoretical framework that makes predictions for several important puzzles in research on democracies and autocracies. Yet several critics lament shortcomings in the measurement of its key concepts: the size of the selectorate S and the winning coalition W. We suggest an alternative that exploits information on the power status and population shares of ethnic groups around the world. Specifically, we identify the size of the selectorate as the sum of groups' population shares that do not suffer from political discrimination, and the size of the winning coalition as the cumulative population share of those ethnic groups represented in a state's executive. Our proposal improves on existing work by providing a continuous operationalization of W and S and by not yielding observations, in which the size of W exceeds the size of S. We illustrate the usefulness by retesting and extending the claim that regimes with smaller winning coalitions receive higher levels of aid.

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1 Introduction

In various research areas the selectorate theory as articulated most fully in "The logic of political survival" (Bueno de Mesquita, Smith, Siverson and Morrow, 2003) has allowed for many new insights and offered solid theoretical underpinnings for many existing claims. Its elegant setup relies on the relative importance of the population in charge of selecting the leader of a country, the selectorate S, and the population supporting the winner, namely the winning coalition W, and as a consequence permits parsimonious characterizations of political regimes. Thus, this theoretical approach has inspired a large set of research projects and contributions relying on the concepts proposed in this theory.

However, Bueno de Mesquita, Smith, Siverson and Morrow's (2003) theoretical approach and especially their empirical strategy have attracted criticism. On a conceptual level some authors question whether in authoritarian regimes the notions of selectorate and winning coalitions even follow from institutional rules (e.g., Gallagher and Hanson, 2015). Clarke and Stone (2008) raise issues that undermine the empirical tests of selectorate theory such as the close link between the chosen indicators and a frequently used measure of democracy (for a more general critique of the indicators see Kennedy, 2009).

While even Bueno de Mesquita, Smith, Siverson and Morrow (2003, 133) admit to the crudeness of their operationalization of the two key concepts, no viable alternatives have been forthcoming so far. In this paper, we propose a possibly more accurate way to determine the size of the selectorate and the winning coalitions by drawing on the power-status of ethnic groups as recorded in the Ethnic Power Relations (EPR) dataset (Cederman, Wimmer and Min, 2010; Vogt, Bormann, Rüegger, Cederman, Hunziker and Girardin, 2015). As these measures directly refer to population shares, they can serve as basis for continuous measures of regime types, as suggested at the conceptual level by Bueno de Mesquita, Smith, Siverson and Morrow (2003, 72). Admittedly, our exclusive focus on ethnic groups and their access to power presupposes that ethnicity is an important structuring factor in politics in general and in crucial policy areas in particular. Justifying this assumption below, we point to two key advantages of our alternative measures of W and S: First, they seamlessly connect democracies and autocracies also at the theoretical level. Second, our measurements do not yield observations, in which the size of the winning coalition exceeds the one of the selectorate.

We illustrate the usefulness of our indicators by replicating analyses that apply

selectorate theory to allocation decisions of foreign aid (Bueno de Mesquita, Smith, Siverson and Morrow, 2003; Bueno de Mesquita and Smith, 2009), an area in which the selectorate theory has been applied with increasing frequency (see also Bueno de Mesquita and Smith, 2007; Bueno de Mesquita and Smith, 2016 (forthcoming)) and in which ethnicity plays also a significant role (see for instance Brown, Stewart and Langer, 2010; Briggs, 2012; Briggs, 2014; Jablonski, 2014; Dreher, Fuchs, Parks, Strange and Tierney, 2015). Our replications demonstrate that our proposed measures provide a valid alternative to existing measures.

In the next section we briefly review the main building blocks of the selectorate theory and discuss both theoretical applications and empirical challenges. In section three, we propose alternative measures for both the selectorate S and the winning coalition W based on information on ethnic groups' access to political power. We then apply these measures to replicate a series of existing studies that assess how selectorate theory contributes to explaining foreign aid allocation decisions. We conclude in section five by highlighting the advantages and limitations of our new conceptualization of the size of selectorates and winning coalitions.

2 The selectorate theory and its empirical challenges

Selectorate theory provides an elegant way to compare political regimes across the full spectrum from autocracies to full-fledged democracies. Thus, Gallagher and Hanson (2015, 368) argue that the "[selectorate] theory's most elegant innovation is to create a logic of accountability that links the policy outputs of rulers in all types of polities to the sizes of their winning coalitions..."

The fundamental assumption behind selectorate theory holds that national leaders aim to remain in power by distributing public and private goods to their supporters. The mix between private and public goods depends on the population shares of the selectorate S and the winning coalition W. Bueno de Mesquita, Smith, Siverson and Morrow (2003, 42) describe the selectorate as the subset of the population ". . . whose endowments include the qualities or characteristics institutionally required to choose the government's leadership and necessary for gaining access to private benefits doled out by the government's leadership." They define the winning coalition ". . . as a subset of the selectorate of sufficient size such that the subset's support endows the leadership with political power over the remainder of the selectorate as well as over

the disenfranchised members of the society" Bueno de Mesquita, Smith, Siverson and Morrow (2003, 55).

Thus, selectorate theory predicts that leaders with small winning coalitions W will focus on providing private goods to their limited number of supporters, while those faced with a large W will provide public goods. This basic logic is used by Bueno de Mesquita, Smith, Siverson and Morrow (2003) to explain a whole host of political outcomes, from peace and war (see also Bueno de Mesquita and Siverson, 1995), to public goods provision, leader survival, foreign aid etc. Gallagher and Hanson (2015, 368) quote from these authors' website, that they consider it as a "power tool for explaining politics."

While the simplicity of the argument and the encompassing nature of its implications explain the attractiveness of this theory,[1] several scholars have criticized the operationalization of the crucial elements of W and S.[2] While Bueno de Mesquita, Smith, Siverson and Morrow (2003, 72) emphasize that ". . . W and S . . . are conceptually continuous variables . . ." (see also Bueno de Mesquita and Smith, 2007, 255), all their empirical applications effectively rely on ordered categorical variables (e.g. Bueno de Mesquita, Smith, Siverson and Morrow, 2003; Bueno de Mesquita and Smith, 2007, 2009a, 2009b, 2016 (forthcoming)). Specifically, Bueno de Mesquita and Smith (2009, 323) define their five-point measure of the winning coalition W as:

> "W is normalized to vary between 0 and 1, with 1 representing the most democratic countries and 0 the most autocratic. The estimate of winning coalition size relies on the Polity data [...] components REGTYPE (regime type), XRCOMP (the competitiveness of executive recruitment), XROPEN (the openness of executive recruitment), and PARCOMP (competitiveness of participation). One point is added to the index of W for each of the following conditions: if the REGTYPE is nonmilitary, if XRCOMP is greater than or equal to 2 (meaning the chief executive is not chosen by heredity or in rigged, unopposed elections), if XROPEN is greater than 2, and if PARCOMP equals 5 (indicating the presence of a competitive party system)."

In their seminal book Bueno de Mesquita, Smith, Siverson and Morrow (2003,

[1] The various contributions by Bueno de Mesquita, Smith, Siverson and Morrow (2003) are highly cited in the literature.

[2] There have also been theoretical critiques, some of which are nicely reviewed and presented by Gallagher and Hanson (2015).

134f) describe their measure of S as follows:

> "We use a[nother] POLITY variable, Legislative Selection (LEGSELEC), as an initial indicator of S . . . We divide LEGSELEC by its maximum value of 2 so that it varies between 0 and 1 . . ."

Table 1 summarizes these operationalizations of S and W, which, as these authors admit, are crude ways to measure the central concepts and fail to produce continuous measures. Figure 1 depicts the relationship between S and W for the observations covered in Bueno de Mesquita, Smith, Siverson and Morrow (2003).[3] First, it illustrates the non-continuous distribution of the values for S and W. Second, it reveals another problematic feature of the relationship between S and W. By construction, the winning coalition should always be a subset of the selectorate. Empirically, this means that all observations should fall below the diagonal depicted in Figure 1, which would imply that $W < S$. As the graph shows, however, this condition fails to hold in a considerable number of cases (1,513 out of 12,459). As long as we focus on W or S separately these cases constitute a lesser problem. However,many empirical applications in Bueno de Mesquita, Smith, Siverson and Morrow (2003) also rely on the so-called loyalty norm measured by W/S. Here the observations above the diagonal become more problematic because this fraction should have an upper limit of 1.[4] Moreover, in some instances S equals zero, and as a consequence Bueno de Mesquita, Smith, Siverson and Morrow (2003, 135) adjust the ratio W/S on an ad-hoc basis. Gallagher and Hanson (2015, 376) understandably criticize the lack of theoretical justification for this procedure.[5]

[3] The data used is the replication dataset `bdm2s2_nation_year_data.dta` obtained at `http://www.nyu.edu/gsas/dept/politics/data/bdm2s2/Logic.htm` (accessed August 8, 2016).

[4] One might consider using a rescaling of W, so that in figure 1 no observations above the diagonal would appear. But just mentally considering squeezing the observations for which S=0 so that they all come under the diagonal shows the futility of this exercise: by squeezing these observations, all others would have to be squeezed as well, leading W to be zero for all observations.

[5] Among the observations depicted in figure 1 the revised formula for W/S generates for approximately 2,000 observations (out of 12,459) values larger than 1.

Concept	Definition	Criteria	Bueno de Mesquita, Smith, Siverson & Morrow (2003)		Ethnic Power Relations	
			Measure[i]	Criteria ok?	Measure	Criteria ok?
Selectorate S	% of population *potentially* relevant for selecting the leader	Continuous variable; $S \in [0, 1]$	$LEGSELEC/2$	No, non-continuous variable	$S = 1-$ population share belonging to a discriminated ethnic group	Yes
Winning coalition W	% of population selecting the leader	Continuous variable; $W \in [0, S]$	One point is added to a cumulative index for each of the following conditions that is fulfilled: (i) REGTYPE is nonmilitary; (ii) XRCOMP $\geqslant 2$; (iii) XROPEN $\geqslant 2$; and (iv) PARCOMP $= 5$. The resulting sum is then divided by 4.	No, non-continuous variable; sometimes $W \notin [0, S]$	$W =$ population share of ethnic groups included in executive	Yes
Loyalty norm W/S		Continuous variable; $W/S \in [0, 1]$		No, non-continuous variable; sometimes $W > S$; sometimes W/S is undefined	W/S	Yes

Notes: LEGSELEC refers to legislative selection and comes from the Banks data (according to Bueno de Mesquita and Smith (2009) LEGSELEC is from the Polity IV dataset.); REGTYPE refers to regime type from Banks data (according to Bueno de Mesquita and Smith (2009) REGTYPE is from the Polity IV dataset); XRCOMP refers to the competitiveness of executive recruitment (Polity IV dataset); PARCOMP refers to the competitiveness of participation (Polity IV dataset).

Table 1: Overview table

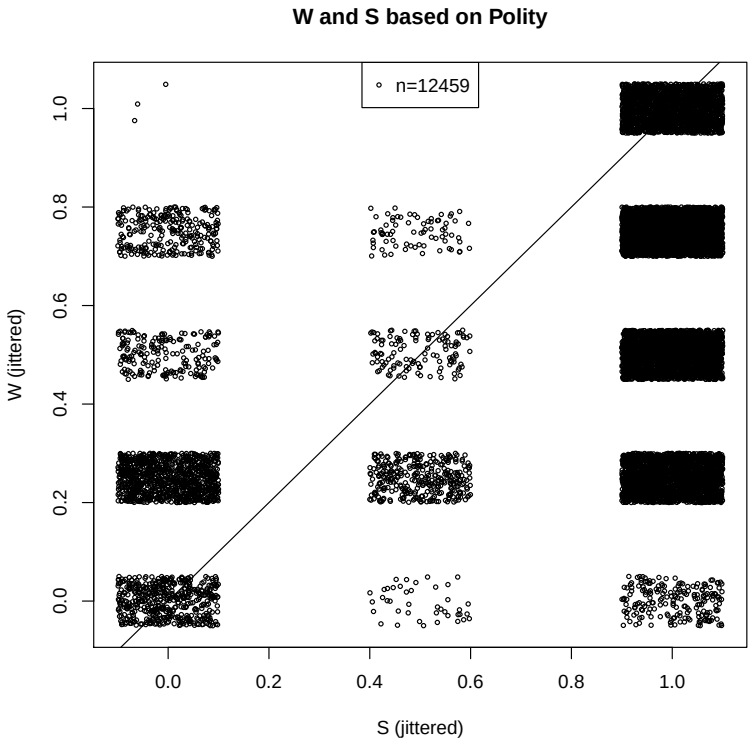

Figure 1: W and S based on POLITY (- 2000, all POLITY countries)

Beyond these inherent issues of measurement validity, several authors have criticized the empirical tests in the work of Bueno de Mesquita, Smith, Siverson and Morrow (2003). Raising both conceptual and empirical concerns, Clarke and Stone (2008) criticize the way in which these authors deal with measures of the winning coalition and the Polity IV index of democracy. Since Bueno de Mesquita, Smith, Siverson and Morrow (2003) argue that both the size of the winning coalition W and the degree of democracy in a country affect the provision of public goods, they wish to account for this latter confounding factor. Relying on components of the Polity IV scale as a source for the measures for W and S on the one hand and using all components for their measure of democracy on the other, proves to be problematic (Clarke and Stone, 2008). More specifically, Bueno de Mesquita, Smith, Siverson and Morrow (2003, 137) consider democracy to be endogenous to public good provision and therefore regress democracy on W to use the residuals from this regression as a proxy for democracy. This amounts to ensuring that W picks up all the shared effects of

democracy on the dependent variable, as the residuals, by definition, are orthogonal to W. Clarke and Stone (2008) show, however, that this fix induces omitted variable bias. Correcting the problem yields much weaker support for implications derived from the selectorate theory.

Clarke and Stone (2008) offer a possible solution and propose an alternative measure for W in democracies, namely the size of the governing coalition as measured by Powell (2000). Using this measure in conjunction with the Polity Democracy measure (Marshall, Gurr, Davenport and Jaggers, 2002), fails to produce support for the selectorate theory. Although Morrow, Bueno de Mesquita, Siverson and Smith (2008) acknowledge the econometric problems in their original analysis (Bueno de Mesquita, Smith, Siverson and Morrow, 2003, chapters 4 and 5), they hold that Clarke and Stone's (2008) solution is inadequate.[6] In response, Morrow, Bueno de Mesquita, Siverson and Smith (2008) pursue an alternative empirical strategy by operationalizing democracy only through the Polity IV component that is not used in the operationalization of W, namely the constraints on the executive.

While re-partitioning the Polity IV index into W and a democracy residual solves the direct econometric concerns, it fails to address the deeper conceptual concerns. In fact, the new strategy simply repeats the earlier approach of rededicating a measure of democracy as an indicator for winning coalition size. Gallagher and Hanson (2015, 376, footnote 7) express this concern by stating that "[t]he more fundamental problem is that W does not represent winning coalition size to begin with." There are two more straightforward ways to address the issue that regime type and the size of the winning coalitions both rely on Polity IV and influence public good provision: To propose alternative measures for W and S that do not rely on components of the Polity indicator (Gallagher and Hanson, 2015) or to replace the measure for democracy by an alternative, for instance the one presented by Alvarez, Cheibub, Limongi and Przeworski (1996) (see also Cheibub, Gandhi and Vreeland, 2010).

While Clarke and Stone's (2008) critique mostly targets the application of the selectorate theory in democracies, Gallagher and Hanson (2015) raise related concerns regarding the applicability of this theory in autocracies. Leaving aside further conceptual concerns, we will focus on the issues that deal with the use of Polity components

[6]Morrow, Bueno de Mesquita, Siverson and Smith (2008, 396) also reject Clarke and Stone's (2008) use of the size of the governing coalition as measure of W, presumably on the grounds that the latter is a behavioral measure and not an institutional one (though see below; information provided by Randall Stone in a personal communication, September 13, 2016).

to measure W and S in autocracies. Specifically, Bueno de Mesquita, Smith, Siverson and Morrow (2003) emphasize the institutional basis of their operationalization of S and W as a key advantage of their approach. However, Gallagher and Hanson (2015, 374) argue that in authoritarian regimes leadership changes usually depend less on formal institutions but follow more complex coalitional configurations. This critique reflects research that sees authoritarian institutions as an outcome rather than a determinant of elite coalition building and violent struggle (Slater, 2010; Pepinsky, 2014). Therefore, the measures for W and S proposed by Bueno de Mesquita, Smith, Siverson and Morrow (2003) have to be questioned in the context of authoritarian regimes, as "... authoritarian politics . . . often do not have any institutionalized structure for leadership selection or transition." (Gallagher and Hanson, 2015, 368). In China and Russia, for example, "the selectorate is not well defined even in these highly institutionalized authoritarian systems" (Gallagher and Hanson, 2015, 371).[7]

3 Winning coalitions, the selectorate and ethnic power relations

In response to the various criticisms leveled at selectorate theory, we propose alternative measures of S and W that (i) span democratic and autocratic regimes with a continuous measure, and (ii) do not produce observations in which the winning coalition size exceeds the size of the selectorate. Our proposal draws on information on ethnic groups' leaders access to executive power and the population share of their groups. We are cognizant that basing measures of S and W on information on ethnic groups assumes that politics centers around ethnic divisions, and that ethnicity means the same across different contexts. We argue that ethnicity indeed constitutes a globally relevant cleavage in the time period that we study due to the ubiquity of the territorial state since the end of colonialism, and its close link to nationalism exported by Western states to their former colonies. Nationalism is most famously defined by Gellner (1983, 1) as the ideology that holds that "the political and national unit should be congruent." Nationalism thus often divides individuals living in the same state along ethnic lines. While different definitions of nationhood exist, the most common one is based on membership in ethnic groups (Mann, 2005). Hechter (2000, 62) explains the

[7]More conceptual issues regarding the use of the selectorate theory to study authoritarian regimes are raised by Kennedy (2009) and Marcum and Brown (2016) (see also Gallagher and Hanson, 2013).

reason for the special role of ethnicity: "[C]ultural uniformity helps to facilitate, and to legitimize, direct rule."

Given this macro-historical configuration, it is not surprising that an increasing amount of research not only shows how ethnicity structures domestic power relations since 1946 but also how ethnically exclusive regimes drive civil war (Gurr, 2000; Wimmer, 2002; Cederman, Wimmer and Min, 2010; Cederman, Gleditsch and Buhaug, 2013). Once violent conflict erupts, ethnic power relations affect the duration of conflict (Wucherpfennig, Metternich, Cederman and Gleditsch, 2012), the selection of the targets of violence (Fjelde and Hultman, 2014) and the intensity of conflict (Heger and Salehyan, 2007).

At least partially, the link between ethnic exclusiveness and civil war stems from the large distributional repercussions associated with ethnic diversity and differential access to power. Specifically, the visibility of ethnic differences enables elites to form coalitions that exclude members of some ethnic groups while giving preferential treatment to others (Bates, 1974; van der Veen and Laitin, 2012). Although Kasara (2007) argues that national leaders find it easier to tax their co-ethnics due to informational advantages, most studies would argue that ethnic groups benefit when their elites hold government power (Burgess, Jedwab, Miguel, Morjaria and Padro i Miquel, 2015; Morelli and Rohner, 2015; Alesina, Michalopoulos and Papaioannou, 2016). A recent study by Weidmann, Benitez-Baleato, Hunziker, Glatz and Dimitropoulos (2016) illustrates the interplay of political inequalities and the provision of public goods by showing that internet traffic is much lower in geographic areas populated by ethnic groups excluded from power.[8]

Relatedly, several recent studies show that coalitions among ethnic groups in power follow a logic of survival akin to Bueno de Mesquita, Smith, Siverson and Morrow's (2003) argument in both democracies and autocracies (for a detailed study, see Bormann, 2014). Focusing on dictatorships, Beiser and Metternich (2016) show that the coalitions of ethnic groups forming in autocracies balance off the threat of a coup from the inside and challenges from the outside (for similar and related arguments, see Roessler, 2011; Roessler and Ohls, 2015). We thus argue that the EPR data prove especially useful for studying power relations in autocracies but also capture elite competition in democracies. This satisfies our first demand on better measures of W and S.

[8]Other researchers report similar findings with regard to electricity (e.g., Baskaran, Uppal and Min, 2015; Min, 2015; Kroth, Larcinese and Wehner, 2016).

Many of the studies discussed above rely on information from the EPR dataset (Vogt, Bormann, Rüegger, Cederman, Hunziker and Girardin, 2015).[9] This dataset codes politically relevant ethnic groups between 1946 and 2013 in all states with a population in excess of 500'000. The EPR data consider linguistic, religious, racial, and caste differences, but not clan cleavages, for all groups, whose leaders advance political claims on their behalf in the national arena, or for groups discriminated politically by the state. In addition, the data provide information on groups' population share and their leaders' access to executive power as shown in Table 2.

	Power Status	Group-Years	Share
Included	Monopoly	2,303	0.053
	Dominant	3,522	0.063
	Senior Partner	3,522	0.096
	Junior Partner	6,997	0.190
Excluded	Powerless	15,634	0.425
	Self-excluded	592	0.016
	Discriminated	5,822	0.158

Table 2: Categories and distribution of power access in the EPR dataset, 1946–2013

Whereas the monopoly and dominant categories characterize monoethnic governments, senior and junior partners mark power-sharing regimes. To qualify for an inclusion coding, groups need to have effective and not just token representation in the highest national executive body. The latter comprises communist central committees, military juntas, or royal courts in dictatorships, and presidential and parliamentary cabinets in democracies. Groups excluded from the national executive fall into one of three categories: Powerless groups, which lack influence in the executive, self-excluded groups that declared independence from the central government, and discriminated groups, which face "active, intentional and targeted political discrimination by the state" such as the denial of voting or even citizenship rights (Vogt, Bormann, Rüegger, Cederman, Hunziker and Girardin, 2015, 1331). Combining information on groups' power status and their relative size, we propose novel measures for S and W along the following lines:[10]

[9] EPR, Luc Girardin, Philipp Hunziker, Lars-Erik Cederman, Nils-Christian Bormann, and Manuel Vogt. 2015. $GROW^{up}$ - Geographical Research On War, Unified Platform. ETH Zurich. `http://growup.ethz.ch/` (accessed August 8, 2016) (Vogt, Bormann, Rüegger, Cederman, Hunziker and Girardin, 2015).

[10] As the EPR-data only provides information on the power status of ethnic groups that are politically relevant, for countries with no notable ethnic divides no such information is available. For these coun-

$$
\begin{aligned}
S &= 1 - \text{population share belonging to a discriminated ethnic group} \\
W &= \text{population share of ethnic groups included in executive}
\end{aligned}
$$

EPR's explicit focus on executive power and the link of political power to distributional outcomes justifies our measure of the winning coalition W.[11] Operationalizing the selectorate proves a greater challenge. Vogt, Bormann, Rüegger, Cederman, Hunziker and Girardin (2015, 1331) define powerless groups as "simply not represented in the executive." As such they may theoretically influence the composition of the winning coalition. In contrast, EPR codes discriminated groups exactly because the state actively excludes them from this power. Therefore members of discriminated groups should not be included in the selectorate. Self-excluded groups fall somewhere in-between these two categories but, as Table 2 indicates, they are so rare that assigning them to the selectorate hardly matters. In the following results we do not count them towards the selectorate. By proceeding in this way our measures of S and W are continuous and span the whole spectrum from autocracies to democracies per our first criterion.[12]

We combine the EPR data and the data from Bueno de Mesquita and Smith (2009) and focus on the observations included in both datasets. For the time period 1960-1999 and the countries with a population in excess of 500'000, Figure 2 thus re-produces Figure 1 for the proposed measures S and W as well their original measures. Excluding cases not captured in the EPR data does not fundamentally alter the distribution of W and S and there remains to be more than five percent of all observations that fall above the diagonal. In contrast, the EPR-based measures of W and S in the second panel satisfy the condition that $W < S$ by construction and our second demand on new measures ($S > 0$)

Comparing the two graphs suggests that the two sets of measures are related.[13] In most country-years, the selectorate includes the full population ($S = 1$), most of which

tries, to ensure consistency, we assume that both S and W are equal to one. In the empirical analysis that follow we systematically also offer results based on analyses that exclude these observations.

[11] Heger and Salehyan (2007), for instance, assume that for study on Africa the winning coalition W corresponds to the population size of the head's of state ethnic group.

[12] The correlations between Polity IV on one hand and S and S_{EPR} on the other are .35 and .33 respectively. They thus do not give any cause for concern in terms of collinearity as they might do with Bueno de Mesquita, Smith, Siverson and Morrow's (2003) measure of W which correlates strongly with the Polity IV scale (.82).

[13] The correlations, while significant, are not particularly strong with 0.087 for S and 0.174 for W.

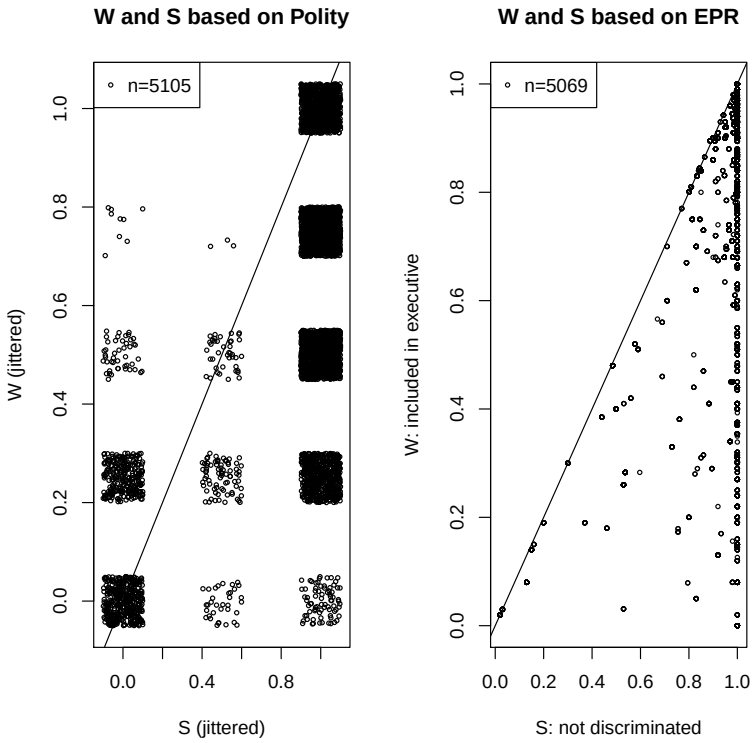

Figure 2: W and S based on Polity and EPR (1960-1999, population 500'000)

is also part of the winning coalition (high values of W). Yet the EPR measures counts far fewer cases with a tiny selectorate and a small winning coalition. It is possible that the EPR-based measures overestimate winning coalition and selectorate size or that the original measures underestimated them (see Heger and Salehyan, 2007).

4 Ethnic winning coalitions and aid

While we have argued that our measures of the selectorate and the winning coalition are conceptually more convincing than the ones of Bueno de Mesquita, Smith, Siverson and Morrow (2003), we are cognizant that we cannot prove that our measures are empirically better. In what follows we employ our measures in replications of analyses focusing on foreign aid allocation and provide at least suggestive evidence that our measures are preferrable. This area of research has seen recently a series of applications of the selectorate theory (Bueno de Mesquita, Smith, Siver-

son and Morrow, 2003; Bueno de Mesquita and Smith, 2007; Bueno de Mesquita and Smith, 2009; Bueno de Mesquita and Smith, 2016 (forthcoming)). In addition, several recent studies in this area also emphasize the role ethnicity (for instance of the head of state of the recipient) play in aid allocations (see for instance Brown, Stewart and Langer, 2010; Dreher, Fuchs, Parks, Strange and Tierney, 2015; Briggs, 2012; Briggs, 2014; Jablonski, 2014). Thus, we use two studies (Bueno de Mesquita, Smith, Siverson and Morrow, 2003; Bueno de Mesquita and Smith, 2009) and show how replacing the original measures for S and W with our proposed measures affect the results found. In addition, by analyzing the fit of the empirical models and the residuals, we hope to demonstrate that our measures are preferrable to the original ones.

While the first study (Bueno de Mesquita, Smith, Siverson and Morrow, 2003) we replicate only offers a brief analysis of donor decisions, the more recent publication by Bueno de Mesquita and Smith (2009) pursued an extension of the selectorate theory in the realm of foreign aid. Regarding donor decisions, as studied in Bueno de Mesquita, Smith, Siverson and Morrow (2003), the basic argument is that donors give aid to "buy" policy concessions from recipients. As such policy concessions are assumed to be cheaper for leaders with small Ws, the authors argue that larger Ws reduce the likelihood of receiving aid.[14] Smaller Ws should also lead to receiving higher amounts, while the so-called loyalty norm (W/S) should increase the received aid.

To empirically assess these hypotheses, Bueno de Mesquita, Smith, Siverson and Morrow (2003, 480) propose an analysis of the recipients of US aid. More specifically they estimate a Heckman selection model in which the selection equation addresses the issue to whom the US gives aid, and the outcome relates to the amount of aid given. Table 3 reports our results.[15] Model 1 corresponds to the original results from the book, while Model 2 depicts those obtained with the help of the replication dataset. Both models yield a negative estimated effect of W on the likely recipients of aids, which aligns with the theoretical expectations. Similarly, the coefficient for recipient's W exhibits the expected negative effect on the amount of aid received. Finally, the coefficient for the loyalty measure is positive as expected. Model 3 estimates the same model on the subset of cases for which EPR-data is available (i.e., recipient countries with populations of 500'000 and more) and that are also covered by the original analysis,[16] and the results remain quite similar. Only the coefficient for W in the selection

[14] A similar, less developed, argument is presented for S.

[15] We thank Alastair Smith for his help in reproducing these results.

[16] Of the 196 observations we lose by doing so all but fourteen stem from countries with population

equation becomes much smaller and fails to reach statistical significance. Model 4 relies again on the EPR-based measures for S and W but includes all observations for which this information is available. The results generally correspond to the original ones except for a positive but insignificant coefficient for W in the selection equation. In the next column (Model 5) we report the results of an estimation that uses exactly the same observations as those used for Model 3. Comparing these two models suggests that for these cases using our measures for S and W we obtain in each of these two selection equations a significant coefficient for W although with opposite signs. In the outcome equation, however, with our measures, we fail to find a statistically significant effect for the effective S and its coefficient (as in Model 4) has turned positive. As these two models are identical in terms of observations used etc. and only differ with respect to the measures used for S and W the comparison of the log-likelihood gives us some indication of the relative fit of the two models. As the two values suggest, using our measures for S and W leads to a higher value of the log-likelihood, which suggests a better fit.[17] Finally, in the last column we report the results of a model that only retains observations from countries in which there are politically relevant ethnic groups. Here we fail to find again a significant effect for W in the selection equation, but the effect of the effective S in the outcome equation becomes again statistically significant.[18]

sizes smaller than half a million. The fourteen other cases correspond to nine from Germany, four from Namibia and one from the Comoros Islands.

[17] As the degrees of freedom are identical across the two models information criterion (which we do not report here) would lead to the same conclusion.

[18] These subtle differences due to different sample specifications might also be linked to the fact that the identification restriction of the Heckman-model relies on the fact that S is sufficiently different from the efficient S, as the former is excluded from the outcome equation. In addition, some other specification issues might also have an impact on the instability of the results.

	Original	Replication		Replication EPR		
			(Adjusted n)	All countries	(Adjusted n)	Relevant countries
	$Model1$	$Model2$	$Model3$	$Model4$	$Model5$	$Model6$
			Selection			
W	-1.087^*	-1.214^*	-0.420	1.007	1.442^*	0.712
	(0.422)	(0.406)	(0.415)	(0.520)	(0.524)	(0.582)
S	-1.533^*	-1.274^*	-2.140^*	-3.192^*	-3.688^*	-2.621^*
	(0.564)	(0.511)	(0.559)	(0.688)	(0.697)	(0.733)
Ln(GDP)	-2.188^*	-1.967^*	-2.036^*	-2.104^*	-2.057^*	-2.134^*
	(0.149)	(0.124)	(0.132)	(0.124)	(0.126)	(0.130)
GovDebt	0.016^*	0.016^*	0.019^*	0.015^*	0.015^*	0.014^*
	(0.002)	(0.003)	(0.002)	(0.002)	(0.002)	(0.002)
(Intercept)	21.948^*	19.706^*	20.216^*	20.879^*	21.201^*	20.185^*
	(1.419)	(1.200)	(1.268)	(1.177)	(1.196)	(1.223)
			Outcome			
W	-269.082^*	-228.419^*	-353.663^*	-201.520^*	-201.070^*	-171.965^*
	(90.604)	(124.000)	(18.211)	(25.100)	(25.248)	(27.147)
Effective S	-38.071^*	-46.321^*	-42.237^*	137.252	136.583	207.126^*
	(11.023)	$15.080)$	(13.250)	(71.220)	(71.672)	(78.375)
Ln(GDP)	15.804^*	26.537^*	27.147^*	22.982^*	23.005^*	23.724^*
	(1.853)	(2.483)	(2.308)	(2.239)	(2.300)	(2.537)
GovDebt	0.382^*	0.664^*	0.695^*	0.594^*	0.595^*	0.666^*
	(0.039)	(0.054)	(0.048)	(0.046)	(0.047)	(0.053)
W/S	243.808^*	210.417	319.873^*	324.287	322.824	365.773
	(94.773)	(129.696)	(117.588)	(54.704)	(55.169)	(60.831)
(Intercept)	-60.965^*	-138.563^*	-146.131^*	-279.674^*	-278.916^*	-359.067^*
	(14.843)	(20.076)	(18.210)	(69.736)	(70.124)	(76.747)
N censored	420	424	360	360	360	305
N uncensored	1225	1222	1089	1105	1089	903
N	1645	1646	1449	1465	1449	1208
Llik	-7109.28	-7491.148	-6520.318	-6561.113	-6462.898	-5391.542

Notes: Standard errors in parentheses. * indicates significance at $p < 0.05$.
Censored observations are those country-years that do not receive any US aid. Models 2 and 3 replicate Bueno de Mesquita, Smith, Siverson and Morrow (2003). The dependent variable of the selection equation is one in country-years with positive US aid flows and zero otherwise. The dependent variable of the outcome equation is logged bilateral US aid. The unit of analysis is the recipient-year level.

Table 3: Heckman model of aid

As noted above a comparison between the log-likelihoods of models 3 and 5 suggest that our measures improve the fit of the model to the data, compared to the original measures of S and W. As we discussed above, we consider as one of the main problems of the original measures that their relative values do not match the theoretically expected values, which becomes especially transparent when these measures suggest that the winning coalition W is larger than the selectorate S. In such situations the loyalty norm W/S would take values larger than one, which incidentally is also undefined for values of S equal to zero. For this reason Bueno de Mesquita, Smith, Siverson and Morrow (2003) propose an alternative formula that leads to a defined value for the loyalty norm even if S is equal to zero. Nevertheless, we would suspect that especially cases in which W is larger than S (or either of these two variables is equal to 0) are those that might be most problematic. To assess this we report in table 4 the results of simple regressions using as dependent variable the absolute values of the residuals from the outcome equation of model 2 from table 4. The first model uses as single explanatory variable a dichotomous indicator for all cases in which W exceeds S for the original measures. As the results clearly show, the observations for which this is the case have significantly larger absolute values for the residuals than those for which this condition does not hold. In the second model we add two indicators for cases in which either S or W is equal to zero. In this model we find that the residuals for observations where W is zero are on average much smaller, while for the two other dichotomous indicators we find positive and large, though statistically non-significant coefficients. In the next two columns we report on two similar models which are based, however, on model 5 from table 4, i.e. a model that uses our measures for S and W. We would expect that in this case the (in part) problematic values of the original measures for S and W should not (or less) affect the absolute size of the residuals. This, however, is not the case. We find for these two models quite similar patterns, namely that having W smaller than S yields higher absolute values for the residuals, and that when taking into account whether S and/or W is zero, the latter has a negative effect on the absolute value of the residuals.

Thus, contrary to our presumption the residuals do not appear to be larger when the original measures for W and S yield problematic values. Table 4 shows, however, that on average the residuals for the models with our measures are substantially smaller (see estimates for the intercepts). This underlines the finding based on a comparison of the log-likelihoods from table 3. That the proposed new measures for S

	Replication		Replication EPR	
	(1)	(2)	(3)	(4)
$S < W$	49.41*	31.42	49.11*	31.06
	(8.22)	(18.33)	(7.01)	(16.93)
$W = 0$		−37.40*		−31.61*
		(14.66)		(12.91)
$S = 0$		17.03		16.65
		(17.00)		(15.41)
(Intercept)	54.54*	56.13*	43.58*	44.98*
	(2.14)	(2.20)	(1.89)	(1.95)
N	1222	1222	1089	1089
Resid. sd	72.31	72.09	60.04	59.86

Notes: Standard errors in parentheses.

* indicates significance at $p < 0.05$

The dependent variables of columns 1 and 2 and of columns 3 and 4 are the absolute value of the residuals from the outcome equation in columns 2 and 5 of table 4 respectively.

Table 4: Residuals and values of S and W

and W yield these improved results might be linked to Brown, Stewart and Langer's (2010) argument regarding the importance of horizontal inequalities (i.e., inequalities among ethnic groups) for foreign aid and the fact that horizontal inequalities are often associated with ethnic power-sharing.

In a more recent article Bueno de Mesquita and Smith (2009) develop their argument regarding the "political economy of aid" (for reviews of this literature, see Wright and Winters, 2010; Fuchs, Dreher and Nunnenkamp, 2014) and provide more detailed analyses of bilateral aid flows. Drawing on their argument that foreign aid is used to extract policy concessions from recipient countries (Bueno de Mesquita and Smith, 2007), their theoretical model implies that rich countries with large W will give more aid, and that while initially increasing W leads to more aid for a recipient, the relationship subsequently reverses until no more aid is given (Bueno de Mesquita and Smith, 2009, 321). The empirical results for W reported in this article are mixed at best (table 5, model 1). The W of the donors A has a significantly negative effect on (logged) aid amounts, which the authors attribute to the fact that in their OECD sample almost all countries are democracies and thus have a W of 1. Regarding the effect for the W of the recipients B the relationship appears to be curvilinear but not in the direction predicted by the theory. More precisely for small values of the recipients' W the effect on aid received is negative. As W increases, aid increases at an accelerat-

ing rate. When replicating this model with the data made available by the authors we obtain more or less the same results (table 5, model 2).

	Original	Replication		Replication EPR		
	$Model1$	$Model2$	$Model3$	$Model4$	$Model5$	$Model6$
Donor coalition: W_A	-8.243^*	-8.275^*	-8.397^*	3.033	2.809	2.321
	(0.749)	(0.749)	(0.750)	(1.852)	(1.856)	(2.000)
Donor resources: R_A	0.803^*	0.799^*	0.833^*	0.909^*	0.903^*	0.962^*
	(0.009)	(0.009)	(0.009)	(0.010)	(0.009)	(0.012)
Lagged recipient coalition W_B	-0.260	-0.276	-0.266	-203.959^*	-202.987^*	-160.730^*
	(0.159)	(0.159)	(0.160)	(7.169)	(7.029)	(9.245)
Lagged recipient coalition W_B^2	0.599^*	0.681^*	0.648^*	110.275^*	109.935^*	86.404^*
	(0.179)	(0.179)	(0.180)	(3.734)	(3.655)	(4.890)
Lagged recipient wealth$_B$	4.247^*	3.869^*	4.148^*	3.992^*	4.120^*	4.696^*
	(0.429)	(0.425)	(0.429)	(0.424)	(0.416)	(0.514)
Lagged recipient wealth$_B^2$	-0.305^*	-0.281^*	-0.299^*	-0.289^*	-0.298^*	-0.329^*
	(0.027)	(0.027)	(0.027)	(0.027)	(0.026)	(0.032)
Recipient Gov.share$_B$	1.748^*	1.533^*	1.533^*	1.041^*	1.064^*	0.798
	(0.274)	(0.272)	(0.274)	(0.269)	(0.263)	(0.603)
Gov.share$_B^2$	-0.553^*	-0.470	-0.474	-0.217	-0.273	0.643
	(0.241)	(0.241)	(0.242)	(0.239)	(0.237)	(0.883)
Ln(recipient population$_B$)	1.526^*	1.798^*	1.740^*	1.520^*	1.392^*	1.820^*
	(0.088)	(0.077)	(0.078)	(0.077)	(0.075)	(0.096)
Ln(recipient population$_B^2$)	-0.077^*	-0.075^*	-0.067^*	-0.049^*	-0.045^*	-0.126^*
	(0.014)	(0.014)	(0.014)	(0.014)	(0.014)	(0.017)
Ln(distance)	-0.827^*	-0.827^*	-0.832^*	-0.908^*	-0.887^*	-0.802^*
	(0.022)	(0.022)	(0.022)	(0.022)	(0.022)	(0.025)
Colony	2.609^*	2.618^*	2.598^*	2.744^*	2.746^*	2.813^*
	(0.043)	(0.043)	(0.043)	(0.043)	(0.042)	(0.049)
US[19]	0.696^*	0.717^*	0.618^*	-4.474^*	-4.435^*	-3.732^*
	(0.045)	(0.045)	(0.046)	(0.199)	(0.194)	(0.238)
N	39919	39919	39338	39338	40892	25915
R^2	0.375	0.479	0.482	0.493	0.489	0.540
Resid. sd		1.846	1.846	1.827	1.831	1.791

Notes: Standard errors in parentheses. * indicates significance at $p < 0.05$

The dependent variable is logged bilateral aid amounts. Replication based on Bueno de Mesquita and Smith (2009). Unit of analysis is the donor-recipient-year.

Table 5: Explaining Gross Aid

In the remaining models in table 5 we replicate Bueno de Mesquita and Smith's (2009, 328 (model 2)), first by focusing on those countries that can be covered with EPR-data (model 3). As the results show, this has no substantive effect on the results, even though it slightly reduces the number of observations. For model 4 we replace again the original measure for W with the one relying on information from the EPR data. This has as a consequence that the donor's W no longer has a statistically significant effect on aid, although the coefficient now is positive as expected by Bueno de Mesquita and Smith (2009). Regarding the effect of the recipient's W we find again a curvilinear effect as in the original model, but its marginal effect is always negative for all values of W.[20] This also applies to the next model (5 in table (5), for which we used all the observations available from the EPR-dataset. As for the results obtained when only focusing on countries in which there are politically relevant ethnic groups (model 6 in table 5) these do hardly differ from those obtained for model 4. Thus, the differences between the results obtained from models using the original measure for W and those obtained with our measure appear not to be sensitive to different sample specifications.

Again, as for the previous replication, the question arises whether the results obtained based on our proposed measure are more valid than those obtained with the original measure. As neither S nor the loyalty norm W/S appear among the independent variables in Bueno de Mesquita and Smith's (2009, 328 (model 2)) model, analyzing the residuals as a function of the relative values of these variables is hardly useful. Nevertheless, table 5 provides one piece of information in favor of our proposed measure, namely the R^2 values for models 3 and 4. As these values are obtained exactly on the same samples (as R^2 are sample-specific) the higher values obtained in model 4 suggests that our proposed measure for W provides a better fit to the data.

5 Discussion and Conclusion

The measures used by Bueno de Mesquita, Smith, Siverson and Morrow (2003) for their central concepts of selectorate and winning coalition have been criticized by multiple scholars. In this paper, we proposed alternative measurements of W and S which fulfill two conditions: (i) they span both democracies and dictatorships, and (ii) they avoid unrealistic cases in which $W > S$. We believe that our measure succeeds on

[20] It is worth noting, as discussed above, that this corresponds to the effect that Bueno de Mesquita, Smith, Siverson and Morrow (2003, 483f) expected in their earlier work.

both counts. Although no objectively valid way exists that would decide which measure is more suited, our empirical tests of predictions on foreign aid allocation derived from the selectorate theory demonstrate the usefulness of our indicators. In both replications, when focusing on the observations for which both proposed measures can be derived, our measures lead to a better fit of the model to the data.

Nevertheless some caveats remain. First, our measures presume that ethnic divisions and processes of exclusion and discrimination underlie political processes. Our measure will perform less well where non-ethnic cleavages predominate. Second, our actor-centered measure of W and S does not comply with Bueno de Mesquita, Smith, Siverson and Morrow's (2003) demand for institution-based measures. Nevertheless, Bormann, Cederman, Gates, Graham, Hug, Strøm and Wucherpfennig (2014) demonstrate that EPR-based measures of ethnic coalitions follow institutional incentives as measured in new data on power-sharing institutions compiled by Strøm, Gates, Graham and Strand (2015 (forthcoming)). Yet, even these new institutional data do not directly measure specific democratic or authoritarian characteristics and still remain to capture non-institutional aspects of authoritarian politics as highlighted by Gallagher and Hanson (2015).

Finally, while we obtain similar findings for some analyses as Bueno de Mesquita, Smith, Siverson and Morrow (2003) and Bueno de Mesquita and Smith (2009), we do not reproduce all their findings. Some of our results are more in line with the theoretical predictions, while others contradict them. We believe that the empirical measures of the size of the selectorate and the winning coalitions introduced in this paper improve on earlier efforts.

Appendix

In table 6 we list the countries covered in the analysis underlying table 3 in the main text.

country	n original	n replication
ALBANIA	4	4
ALGERIA	5	5
ARGENTINA	4	4
AUSTRALIA	26	26
AUSTRIA	5	5
BAHAMAS	26	0
BAHRAIN	18	9
BANGLADESH	1	1
BARBADOS	20	0
BELARUS	7	7
BELGIUM	29	29
BHUTAN	11	11
BOLIVIA	6	6
BOTSWANA	20	20
BRAZIL	7	7
BULGARIA	1	1
BURKNA FASO	4	4
BURUNDI	9	9
CAMEROON	13	13
CANADA	27	27
CEYLON	1	1
CHAD	4	4
CHILE	13	13
COLOMBIA	6	6
COMORO IS	1	0
CONGO	5	5
CONGO DR	1	1
CONGO REP	2	2
COSTA RICA	13	13
COTE D'IVOR	5	5
CYPRUS	8	8
CZECH REP	7	7
DENMARK	8	8
DOMIN REP	2	2
EGYPT	2	2
EL SALVADOR	3	3
ESTONIA	4	4
ETH'PIA PDR	6	6
ETHIOPIA	6	6
FIJI	21	21
FINLAND	28	28
GAMBIA	10	10
GEORGIA	3	3
GERMANY	9	0
GHANA	17	17
GREECE	19	19
GUATEMALA	1	1
GUYANA	16	16
HAITI	4	4
HUNGARY	16	16
ICELAND	27	0
INDIA	26	26
INDONESIA	28	28
IRELAND	3	3
ISRAEL	28	28
ITALY	13	13
IVORY COAST	1	1
JAMAICA	6	6
JAPAN	4	4
JORDAN	25	25
KAZAKHSTAN	3	3
KENYA	7	7
KOREA REP	28	28
KYRGYZSTAN	1	1
LATVIA	6	6
LEBANON	6	6
LESOTHO	9	9
LITHUANIA	2	2
LITHUATIA	1	1
LUXEMBOURG	25	0
MADAGASCAR	8	8
MALAGASYR	4	4
MALAWI	14	14
MALAYSIA	15	15
MALDIVE IS	14	0
MALI	4	4
MALTA	26	0

MAURITIUS	28	28
MEXICO	26	26
MOLDOVA	5	5
MONGOLIA	7	7
MOROCCO	25	25
NAMIBIA	4	0
NAURU	1	0
NEPAL	19	19
NETHERLANDS	12	12
NEW ZEALAND	29	29
NICARAGUA	10	10
NIGERIA	5	5
NORWAY	28	28
OMAN	25	25
PAKISTAN	25	25
PANAMA	7	7
PAPUA NEW G	25	25
PARAGUAY	11	11
PERU	6	6
PHILIPPINES	28	28
POLAND	6	6
PORTUGAL	6	6
RHODESIA	4	4
ROMANIA	1	1
RUSSIAN FED	2	2
RWANDA	9	9
SENEGAL	10	10
SEYCHELLES	4	0
SIERRA LEO	23	23
SINGAPORE	29	29
SLOVAK REP	4	4
SLOVENIA	7	7
SO AFRICA	12	12
SOLOMON IS	7	0
SPAIN	26	26
SRI LANKA	28	28
ST VINCENT	14	0
SURINAME	6	0
SWAZILAND	12	11
SWEDEN	12	12
SWITZERLAND	23	23
TAJIKISTAN	1	1
THAILAND	29	29
TOGO	5	5
TRINIDAD	3	3
TUNISIA	29	29
TURKEY	27	27
UGANDA	1	1
UK	28	28
URUGUAY	23	23
US	28	28
VANUATU	12	0
VENEZUELA	17	17
WESTN SAMOA	1	0
ZAIRE	25	25
ZAMBIA	10	10
ZIMBABWE	18	18
total	1646	1439

Table 6: Countries covered in analysis on Who get's aid . . . ?

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