Probing PR: Does proportional representation induce ethnic power sharing?*

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Paper prepared for presentation at the EPSA 2022 Annual Conference (June 23 - 25, 2022)

First version: February 2021, this version: June 13, 2022

^{*}An earlier version of this paper was presented at the ISA Annual Convention (March 30th - April 2nd, 2022). Helpful comments by the discussant Carl Müller-Crépon and panel participants, as well as those by Nenad Stojanovic are gratefully acknowledged.

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Abstract

Recent work on power sharing and civil conflicts in ethnically divided societies emphasizes the crucial distinction between mandates and their implementation. Formal power-sharing rules reduce the risk of armed conflict, but power-sharing practices mediate this effect. Political scientists frequently categorize proportional electoral (PR) rules as part of the broader class of power-sharing institutions, which should induce power-sharing practices, and in turn reduce the likelihood of intrastate armed conflict. Empirical evidence for this claim is indirect at best. Using mediation analysis, we assess whether PR rules alone, or their combination with other power-sharing institutions engender elite power sharing, and reduce the risk of internal conflict. Using different datasets, we find no evidence for a positive effect of PR on power-sharing practices, and only weak evidence that PR reduces intrastate conflict through other mechanisms. Recommendations of PR to ethnically divided societies or post-conflict environments should be reconsidered.

1 Introduction

The adoption of the Sustainable Development Goals by the United Nations, especially SDG 16, renewed attention to institutions that foster inclusive and cooperative behavior in deeply divided societies. Formal rules that improve the chances of power sharing between political leaders in government have gained special attention in the scholarly literature and policy circles. These debates inform institutional choices aimed at avoiding or resolving armed internal conflict from Lebanon to South Africa, from Indonesia to Colombia, and from Liberia to Bosnia (Reynolds, 2002; Roeder and Rothchild, 2005; Hartzell and Hoddie, 2007)

Yet whether or not power-sharing institutions exert a pacifying effect in divided societies frequently depends on underlying conceptual decisions (see Bormann et al., 2019; Cederman, Hug and Wucherpfennig, 2022 (forthcoming, chapter 2). While some scholars rely on the four behavorial elements that Arend Lijphart (1969, 1977) introduced in his theory of consociationalism, the scope of what constitutes power sharing has notably broadened since. Electoral rules and more precisely proportional representation (PR) take a central place in this broader understanding of power sharing. Lijphart first suggested PR rules in the mid-1980s as part of the proportionality principle (with only some cursory references in Lijphart, 1977, 40) he had earlier recommended for bureaucratic and military recruitment (Lijphart, 1985). Others see in PR an essential element of *liberal* power sharing, which encourages elite cooperation in government rather than guaranteeing it (e.g., McCulloch, 2014). Yet whether or not PR actually induces power-sharing behavior remains a theoretically and empirically disputed question (Lijphart, 2002; Horowitz, 2002).

In this article, we provide a novel test of the link between PR and the likelihood of intrastate conflict. In contrast to existing work which investigates a direct link between PR rules and ethnic conflict onset, we test the mechanism by which PR affects intrastate ethnic conflict through power-sharing behavior in the central government.² We conceptualize power-sharing practices as the inclusion of representatives from at least two ethnic groups in a state's central government.³ Our minimalist understanding of ethnic power sharing differs from Lijphart's maximalist notion of the grand coalition that includes all relevant ethnic groups in a country.

¹According to Lijphart, the four consociational elements in ethnically divided societies are the grand coalition, the minority veto, proportionality in military and bureaucracy appointments, and autonomy for ethnic groups in cultural matters.

²Our investigation of intrastate conflicts between organizations that represent distinct ethnic groups follows Lijphart's and other scholars' focus "severely divided", i.e., ethnically divided societies. We adopt a broad understanding of ethnicity that build's on Weber's famous definition of a "putative believe in common ancestry" along linguistic, religious, or phenotypical markers (Weber, 1978). For stylistic, we sometimes refer only to armed conflict or conflict onset but always mean ethnic armed conflict.

³We emphasize that these power-sharing practices may be the consequence of formal institutions that have been correctly implemented. They may also result, however, from informal institutions or result from other factors. The focus in our research note is, however, on the link between formal institutions and observable practices of power sharing.

We compare the effect of PR rules to executive power-sharing institutions that guarantee governmental representation of specific ethnic groups. The pre-determined inclusion of representatives from distinct ethnic communities in key governmental positions in Lebanon and Bosnia are the most well-known examples of such formal institutions, but many peace agreements contain similar provisions (Hartzell and Hoddie, 2007; Mattes and Savun, 2009; Johnson, 2021). Specifically, we define executive power-sharing institutions as the guarantee of ministerial positions to representatives of different ethnic groups or the right of group representatives to veto government decisions.⁴

To study the mechanism that connects PR and executive power-sharing institutions to the onset of intrastate conflict via practices, we rely on mediation analysis. Our results at both the country- and the group-level confirm that executive power-sharing institutions strengthen power-sharing practices, and thereby reduce the likelihood of conflict onset. In contrast, PR electoral rules have a null or negative effect on power-sharing behavior by leaders, which in turn has a negative effect on the likelihood of conflict onset. We thus find a positive mediated effect of PR on conflict risk, the opposite of what is suggested by most proponents of PR. However, we also discover that PR has a negative direct effect on conflict onset. Put differently, PR reduces conflict risk but not through increased inclusion in the central government. Our results thus question the argument by proponents of liberal power sharing that PR induces power-sharing behavior.

2 Executive Power Sharing, PR, and Peace

Investigating which institutions stabilize post-conflict states and ethnically divided societies, political scientists have identified four major institutional provisions in peace agreements: (1) guarantees of political representation in executive and legislative bodies, (2) economic resource sharing, (3) territorial self-rule, and (4) military integration of former fighters (e.g., Sisk, 1996; Roeder and Rothchild, 2005; Hartzell and Hoddie, 2007). Among these, political power sharing takes on central importance in overcoming the severe lack of trust between former combatants in post-conflict societies (Walter, 2002; Mattes and Savun, 2009).

Unfortunately, little agreement exists over the exact institutions that constitute political power sharing. Whereas some scholars focus on guaranteed government inclusion for political antagonists (Walter, 2002; Jarstad and Nilsson, 2008; Johnson, 2021), others conceptualize power sharing as varying bundles of guaranteed government inclusion, proportionality in bureaucratic appointments, and PR electoral rules (Hartzell and Hoddie, 2003; Mukherjee, 2006; Mattes and Savun, 2009). Unsurprisingly, this literature faces charges of conceptual stretching (Andeweg, 2000; Binningsbø, 2013).

⁴We do not consider rules that prescribe proportionality group representation in the bureaucracy or military, or segmental autonomy in the form of autonomous self-rule (cf. Lijphart, 1969).

Some scholars distinguish between "liberal" and "corporate" approaches to power sharing (O'Leary, 2005; McGarry and O'Leary, 2007; McCulloch, 2014; Juon, 2020). PR belongs to the family of liberal institutions that allow political elites to "self-determine" cooperation in the government. In contrast, corporate institutions "predetermine" or guarantee political representation of political rivals (Lijphart, 1995). Both studies on post-conflict stability and the literature on liberal and corporate power-sharing institutions bundle various institutions into broader categories. If individual components of the broader categories have countervailing effects on conflict risk, empirical investigations might fail to identify both pacifying and conflict-intensifying institutional effects. Consciously avoiding this aggregation of multiple institutions into one measure, we study the most prominent individual elements of liberal and corporate power sharing: executive power-sharing institutions that guarantee ministerial positions or permit politicians to veto government positions for one, and PR electoral rules for another.

Existing scholarly work has already studied PR electoral rules in isolation, albeit with inconclusive, if not contradictory conclusions (see Cohen, 1997; Reynal-Querol, 2002; Saideman et al., 2002; Cammett and Malesky, 2012). Some scholars argue that this lack of agreement results from complex conditional effects of PR on conflict risk that depend on states' social structures (Selway and Templeman, 2012; Wilson, 2020). We point to another issue: most existing research on the effects of PR, as well as post-conflict power sharing, does not fully recognize the underlying theoretical mechanism. Both executive power-sharing institutions and PR rules influence the risk of intrastate conflict onset through *power-sharing practices*. We define these practices as de facto inclusion of at least two politically rival or ethnically distinct elites into the central government of a state.

We know of only one test that links inclusive or executive power-sharing institutions to power-sharing practices, and intrastate conflict risk (Bormann et al., 2019). To our knowledge no study traces the entire mechanism from PR via power-sharing practices to conflict onset. Pospieszna and Schneider (2013) consider PR as an institution that may encourage an actual power-sharing "arrangement" (see Reilly, 2005) or practice in post-conflict settings, but reject this hypothesis due to a lack of evidence, while Bormann (2019) investigates the effect of PR on ethnic coalitions around the globe without conclusive results. Neither of these studies investigates a direct link of practices to conflict risk.

Our contribution is then two-fold: First, we improve on existing work that bundles various power-sharing institutions by distinguishing between executive power-sharing

⁵Cammett and Malesky (2012, 988) distinguish between "soft" (liberal) and "hard guarantees" (corporate) of power sharing (for similar distinctions, see Rothchild and Roeder, 2005; Gates and Strøm, 2022).

⁶Others have investigated the effect of PR on democratization (see Reilly, 2005).

⁷Lijphart (2002) himself argued that PR would increase the chances of coalition government by avoiding the disproportional allocation of seats to parties under winner-take-all plurality electoral rules, and by giving parliamentary representation to minority parties.

guarantees and proportional representation. Second, we empirically trace the mechanism from these institutions via power-sharing practices to conflict risk.

3 Data and Methods

To study the mechanism that links PR and executive power-sharing institutions to intrastate conflict onset via power-sharing practices, we run mediation analysis at the country and group-level. Although our measure of electoral systems occurs at the country-level, all other variables also exist at the group-level. We leverage this information when estimating models at the group-level. To measure the different variables, we combine four different data sources.

Our first *explanatory variable*, a binary indicator of proportional electoral rules, derives from an updated version of Bormann & Golder's (2013) "Democratic Electoral Systems" dataset. The updated version covers all democratic, lower-house elections between 1945 and 2020. Bormann and Golder (2013) code proportional representation when a state employs "a quota or divisor system in multi-member districts." We fill in country-years between elections with the electoral rule used in the last election, drop all non-democratic country-years, and use majoritarian or mixed electoral systems as a baseline in our models. 9

Our second explanatory variable, a dichotomous indicator of executive power-sharing institutions, captures the presence of one out of three mandates in constitutions and peace agreements: (1) a grand coalition, (2) reserved seats in the executive, or (3) mutual vetos. The information derives from Strøm et al.'s (2017) indicator of inclusive power-sharing institutions and is available for the time period 1974 to 2009. Based on forthcoming work by AUTHOR, we additionally measure executive institutions directed at specific groups.

To operationalise our *mediator*, power-sharing practices, we draw on the Ethnic Power Relations (EPR) dataset (Wimmer, Cederman and Min, 2009; Vogt et al., 2015). The data capture the share of politically relevant ethnic groups that are part of the executive body of a state as of January 1st of a given calendar year.¹¹ At the group-level, we use a simple indicator of group inclusion in the central government. We

⁸The newest version of the dataset codes an election as democratic if it occurs in a country-year considered democratic by one of five major democracy databases: Polity V, Freedom House, V-Dem, Cheibub et al.'s (2010) Democracy and Dictatorship, or Boix et al.'s (2013) democracy measure.

⁹Although electoral rules should be less effective in authoritarian regimes, we test the of our results with the help of Wig and Regan's (2015) data on electoral rules in democratic and autocratic elections.

¹⁰As this restricted timeframe may affect our results regarding the effect of PR, we also estimated models covering the time period 1947 to 2017 with only PR as treatment. As Table 13 in the Appendix shows, our substantive conclusions regarding the mediated effects of PR through power-sharing practices remain unaffected.

¹¹The January 1st rule assures that power-sharing practices always precede our outcome, intrastate conflict onset. Groups are politically relevant if a political organization claims to act on their behalf at the national level.

record power-sharing practices only if the government includes at least two groups, and drop all country-years with only one politically relevant group.

Finally, we measure our *outcome variable* with a binary indicator of intrastate ethnic armed conflict. We draw on the UCDP Armed Conflict Database to identify the onset of armed conflicts with at least 25 battle-deaths in a calendar year (Gleditsch et al., 2002; Pettersson and Öberg, 2020). We retain only conflict onsets, when an armed organization claims to act on behalf of and recruits from a given ethnic group (Vogt et al., 2015). In our country-year analysis, we keep observations with ongoing conflict in our sample, as additional ethnic conflicts may start during an ongoing war. In our group-year analysis, we drop years with ongoing conflict, as the same group cannot fight the government again in that period.¹²

To estimate the *direct* and *indirect* treatment effects of PR rules and executive power-sharing institutions via power-sharing practices on ethnic conflict onset, we rely on mediation analysis for multiple treatments (Hayes and Preacher, 2014; Hayes, 2017), and adapt it to a Bayesian framework.¹³ We then estimate three regression models: The first model, our mediator equation, links our treatments—PR, executive power-sharing institutions and the combination of both— to our mediator, power-sharing practices. The second and third model are different versions of the outcome equation. One links both the treatments and the mediator to our outcome, conflict onset. The other only links the treatments to the outcome, but drops the mediator.

We determine the two treatment effects from the posterior samples of the coefficients for our three regressions by applying a procedure that Muthén, Muthén and Asparouhov (2017) call "counterfactually-defined causal effects." To obtain the direct treatment effect, we draw distributions from the posterior samples of our outcome model that omits the mediator (equation 3) to obtain the average predicted probability for situations when each of the treatments is equal to one while all others are set to 0. Comparing these distributions to the one obtained for the control group (all treatment variables set to zero) gives us the relative "counterfactually-defined causal [direct] effects" (Muthén, Muthén and Asparouhov, 2017) for each treatment.

We repeat this procedure for the posterior samples from the mediator equation and the outcome equation that includes the mediator as a predictor. Comparing the posterior distributions when a treatment variable is set to 1 compared to the distribution when all treatments are set to 0, we obtain treatment effects for our institutional measures on power-sharing practices. Finally, we use these predicted differences from the mediator equation to assess by how much the probability of conflict changes in our outcome equation, i.e., the indirect or mediated treatment effect of power-sharing institutions.

The procedure is straightforward for the country-level analysis because our mediator is continuous, and we obtain meaningful predictions for the share of included

¹²Our appendix contains a table with the countries and time periods in our sample.

¹³Stan code upon which we build is provided by Solomon Kurz at https://bookdown.org/content/b472c7b3-ede5-40f0-9677-75c3704c7e5c/).

groups.¹⁴ At the group-level, however, our mediator of power-sharing practices is dichotomous, and we obtain probabilities rather than observable values of the mediator. We therefore use a binomial distribution to generate predicted probabilities for the the mediator, which we then plug into the outcome equation to assess by how much the predicted probabilities of conflict onset change. Relying on the binomial distribution introduces additional uncertainty into our results. To obtain more reliable effects, we run the final step five times and average the results.¹⁵

4 Analysis

In the following, we evaluate the mechanisms that link PR and corporate power-sharing institutions to ethnic conflict onset via practices at the country-level first, and the group-level second. To compare our analysis to previous research, we adapt the model from Bormann et al.'s (2019) mediation analysis. We directly describe the estimated mediated and total (direct and indirect) treatment effects using graphs. Our appendix contains the underlying regression models.

4.1 Country level

In Figure 1 we depict the relative mediated and total effects of our three treatments.¹⁶ The relative average mediated effects of executive power-sharing institutions are on average slightly negative. Although the 95% credible intervals comprise some positive values, the results suggest a conflict-dampening effect of executive power-sharing guarantees via practices. Combining PR and executive power-sharing institutions yields largely similar results. In contrast, the relative mediated effect of PR alone

¹⁴We estimate this mediator equation as a linear regression. Given the upper and lower bounds of our mediator, we report results from fractional regression (Papke and Wooldridge, 1996) in Tables 9, 10, 11, and 12 in our appendix. The results suggest that our findings do not hinge on the linearity assumption.

¹⁵Note that these effects are only causal if no confounding is present, respectively that the "sequential ignorability assumption" (Imai, Keele and Tingley, 2010) holds. Preliminary sensitivity analysis, following those carried out by Bormann et al. (2019), suggest that the direction of the mediated effect of executive power-sharing institutions is robust, as long as these institutions are more likely to be introduced in cases where conflict is likely. The opposite is the case for PR.

 $^{^{16}}$ In the appendix we report summaries of the posterior distributions of our coefficients that we use to produce the graphs reported in the main text in Tables 1, 2, 3 and 4. All models were estimated with the brms package which uses stan to generate posterior samples. In each estimation, we used four chains and assessed convergence with Gelman's (1992) \hat{R} diagnostic, which suggested convergence to the true posterior distribution in all cases. We also estimated the mediated and total effects employing other approaches. For the country-level analysis (as the mediator is continuous) we relied on the PROCESS-package proposed by Hayes (2017). For all analyses we also relied on the mediation-package proposed by Imai, Keele and Tingley (2010), which allowed us, however, only to estimate conditional (holding other treatments constant) mediated effects and the approach proposed by VanderWeele (2015) (which caused, however, problems of quasi-complete separation). In all cases the substantive conclusions remained unaffected.

is almost precisely zero. Although our mediator, power-sharing practices exerts a negative effect of the risk of ethnic armed conflict, PR rules have a negative association with our mediator. Put differently, PR electoral rules decrease power-sharing practices, and thus minimize the pacifying effect of power-sharing (see Table 1 in our appendix).

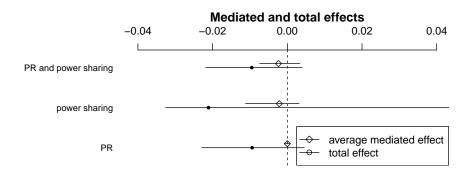


Figure 1: Mediated and total effect of PR and power sharing, democracies 1974-2009

Additionally, Figure 1 displays the total effects of both PR and executive power-sharing institutions (solid circle). On average, all three treatment effects are negative, with credible intervals comprising mostly negative values. In other words, next to the mediated effect that runs through power-sharing practices, both executive power-sharing guarantees and PR rules exert a direct pacifying effect on conflict onset. Combining the insights from the mediated and the direct effects, we conclude that PR might decrease the risk of conflict onset, but not through the mechanisms expected by proponents of liberal power sharing, namely through power-sharing practices.

Figure 2 depicts the same effects as Figure?? but draws on on a larger sample of cases that also comprises non-democracies (Wig, Hegre and Regan, 2015). Again we find a small but negative mediated effect for executive power-sharing institutions on conflict onset, while effect of PR is once again 0. As before, the relative mediated effect for PR and executive power sharing combined is also negative and falls somewhere between the individual treatments.

In this larger sample we find more evidence that PR reduces the chances of conflict onset through other mechanisms, as its total effect is largely negative. The total effect of executive power-sharing institutions is on average slightly positive, but the credible interval is quite wide. Table 2 in the appendix shows that PR does not strengthen power-sharing practices, whereas executive power-sharing institutions do. In turn, the latter decrease the conflict risk through power-sharing practices.

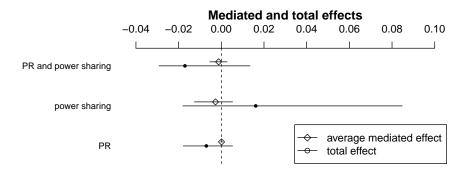


Figure 2: Mediated and total effect of PR and power sharing, all countries 1974-2009

4.2 Group level

Although electoral systems generally operate at the country-level, executive power-sharing institutions might favor specific ethnic groups. Moreover, both armed conflicts and power-sharing practices constitute group-level phenomena. Therefore, we move to disaggregated analysis at the group-year level. This shift in the resolution of our analysis has two consequences. First, estimating models with group-years decreases the uncertainty for the estimated effects of PR because we use the same country-year observation multiple times. The second, the group-level coding of executive power-sharing institutions conservative and biases our results against finding a credible effect. We only coded executive power-sharing institutions at the group-level if the formal rules either made an explicit reference to any particular group or a region in which one group predominantly resided. We do not capture less formal applications of country-wide power-sharing rules that benefit certain groups. These cases end up in our control condition of no power-sharing institutions. Thus, these groups are less likely to be involved in ethnic armed conflict, and make it harder to identify a pacifying effect of power-sharing institutions.

Using the sample restricted to democracies, Figure 3 depicts total(solid circles) and mediated (diamonds) effects of PR and executive power-sharing guarantees. ¹⁸ It provides the clearest evidence so far that executive power-sharing institutions decrease the risk of ethnic conflict onset through power-sharing practices. In contrast, PR exerts a positive effect on conflict risk via ethnic inclusion. Once more, PR fails to have a positive effect on power-sharing practices, which do decrease the likelihood of conflict onset. Combining both institutions reveals a positive effect on conflict with wide credible intervals.

¹⁷Principally, we could address this issue by estimating the mediator model with random effects at the country-year level. For simplicity's sake, and because it might bias our results against finding a credible effect for PR, we refrain from doing so.

¹⁸We report the underlying regression models in Table 3 in the appendix.

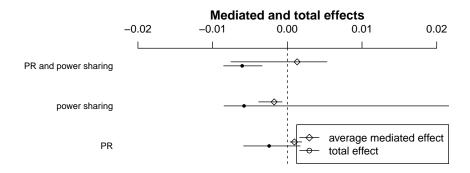


Figure 3: Mediated and total effects of PR and power sharing, democracies 1974-2009

Regarding the total effects of our three treatments, we find that all of them decrease conflict risk. However, only the treatment effect combining PR and executive guarantees has credible intervals that fully exclude zero. Once again, we find reduces conflict risk on average, but it does not do so through power-sharing practices.¹⁹

Finally, Figure 4 depicts the relative mediated and total effects for the larger sample that also comprises non-democracies (see Table 4). Our conclusions for PR do not change. The suggested mechanism running from institutions through practices to conflict onset does not hold. To the contrary, PR once again decreases the likelihood that ethnic group leaders participate in government institutions, which in turn reduces conflict risk. In contrast, executive power-sharing institutions have the expected negative mediated effect, even if combined with PR. The total effects, of the latter are also on average negative, as they are for PR. Finally, the total effect of executive power-sharing institutions is slightly positive, on average, but comes with a large credible interval.

5 Conclusion

In this research note, we demonstrated that PR fails to have a negative mediated effect through power-sharing practices on conflict. Thus, the prevailing theoretical mechanism that links PR to reduced conflict through power-sharing practices is null and void. The reason for this is that PR does not have the purported positive effect on power-sharing practices. Quite to the contrary, we even find some indication that PR might decrease the likelihood of power-sharing practices, and would thus be a counter-productive institutional intervention in ethnically divided or post-conflict societies. In contrast, formal guarantees of executive power-sharing are associated with a higher chance of power-sharing practices, and a reduced risk of armed conflict.

¹⁹Note that the uncertainty for the effects of PR are likely to be underestimated as we consider PR as a group-level predictor.

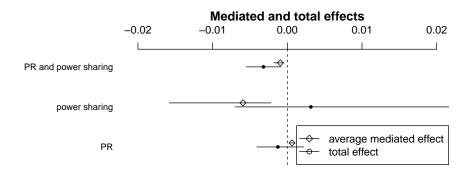


Figure 4: Mediated and total effects of PR and power sharing, all countries 1974-2009

We do find some evidence that PR is associated with a reduced risk of ethnic armed conflict onset, though not through power-sharing practices. At this point we can only speculate what underlies this negative relationship between PR and conflict risk. Power-sharing practices in the legislature offer one explanation. While currently untestable due to a lack of data on legislative power sharing, it is odd that such practices should reverse in a country's executive body. Another explanation for the generally pacifying effect of PR could be selection bias. PR might be used in countries that are generally less likely to experience conflict.²⁰ Until proponents of PR present a convincing theoretical mechanism between PR and peace, and empirical evidence that supports this mechanism, the electoral rule should not be advocated as an institutional solution to ethnic intrastate conflicts.

²⁰Müller-Rommel (2008) criticized Lijphart's work on the effects of consensus and majoritarian democracies along the same lines.

Appendix

Posterior distributions

In Tables 1 and 2 we report summaries of the posterior distributions underlying the estimation of the relative total and mediated effects at the country level depicted in the Figures 1 and 2 of the main text.

·	Mediator: share of groups in power sharing	Outcome: ethi	nic conflict onset
Intercept	0.05	-4.19*	-4.11*
	[-0.18; 0.29]	[-7.09; -1.42]	[-6.97; -1.44]
PR	-0.00	-0.28	-0.28
	[-0.04; 0.03]	[-0.69; 0.12]	[-0.71; 0.12]
power sharing	0.33*	-3.58	-3.60
	[0.23; 0.43]	[-11.06; 0.73]	[-10.84; 0.64]
PR and power sharing	0.39*	-3.93	-3.99*
	[0.31; 0.46]	[-11.04; 0.00]	[-10.96; -0.13]
log(GDP pc)t-1	0.04*	-0.22	-0.21
	[0.00; 0.08]	[-0.65; 0.19]	[-0.62; 0.21]
log(population)t-1	-0.02	0.40*	0.39*
	[-0.05; 0.01]	[0.11; 0.73]	[0.09; 0.69]
previous wars	0.01	0.05	0.05
_	[-0.00; 0.02]	[-0.00; 0.10]	[-0.00; 0.10]
peace years	0.11*	-0.17	-0.23
	[0.05; 0.18]	[-0.84; 0.49]	[-0.88; 0.42]
peace years ²	-0.43^{*}	0.97	1.16
	[-0.70; -0.16]	[-2.27; 4.40]	[-2.15; 4.57]
peace years ³	0.51*	-2.05	-2.26
F)	[0.21; 0.80]	[-7.17; 2.32]	[-7.32; 2.22]
former british colony	0.40*	0.34	0.21
	[0.36; 0.45]	[-0.20; 0.89]	[-0.24; 0.65]
former french colony	0.76*	0.65	0.42
	[0.68; 0.84]	[-0.19; 1.56]	[-0.33; 1.12]
share groups in power sharing	. , 1	-0.31	/ 1
The second secon		[-0.99; 0.35]	
N	1780	1780	1780

^{*} Null hypothesis value outside 95% credible interval.

Table 1: Country-level mediator and outcome models, democracies 1974-2009 (mean and credible intervals of posterior distributions)

In Tables 3 and 4 we report the same summaries underlying the estimation of the relative total and mediated effects at the group level depicted in the Figures 3 and 4 of the main text.

	Mediator: share of groups in power sharing	Outcome: ethn	ic conflict onset
Intercept	0.46*	-2.73*	-2.80*
	[0.27; 0.64]	[-4.39; -1.04]	[-4.44; -1.14]
PR	-0.03*	-0.16	-0.15
	[-0.05; -0.00]	[-0.42; 0.09]	[-0.41; 0.10]
power sharing	0.36^{*}	0.26	0.23
	[0.28; 0.43]	[-0.49; 0.90]	[-0.47; 0.83]
PR and power sharing	0.29*	-0.53	-0.52
	[0.23; 0.36]	[-1.57; 0.24]	
log(GDP pc)t-1	0.03*	-0.35*	-0.34*
	[0.00; 0.06]	[-0.58; -0.11]	[-0.57; -0.11]
log(population)t-1	-0.06*	0.28*	0.29*
	[-0.08; -0.04]	[0.08; 0.48]	[0.08; 0.49]
previous wars	0.01*	0.07^*	0.07^*
	[0.00; 0.01]	[0.04; 0.11]	[0.04; 0.11]
peace years	0.13*	-0.23	-0.25
	[0.08; 0.18]	[-0.69; 0.22]	[-0.69; 0.18]
peace years ²	-0.58*	0.89	0.98
•	[-0.80; -0.37]	[-1.41; 3.36]	[-1.21; 3.36]
peace years ³	0.68*	-1.43	-1.54
	[0.43; 0.93]	[-4.95; 1.74]	[-4.94; 1.45]
former british colony	0.31*	-0.17	-0.21
, i	[0.27; 0.34]	[-0.48; 0.13]	[-0.51; 0.08]
former french colony	0.38*	0.09	0.06
•	[0.34; 0.41]	[-0.24; 0.40]	[-0.24; 0.36]
share groups in power sharing	. , ,	-0.12	. , ,
		[-0.45; 0.22]	
N	3324	3324	3324

Null hypothesis value outside 95% credible interval.

Table 2: Country-level mediator and outcome models, all countries 1974-2009 (mean and credible intervals of posterior distributions)

	Mediator: power-sharing status	Outcome: c	onflict onset
Intercept	0.44*	-0.23	-0.72
	[0.04; 0.84]	[-1.86; 1.34]	[-2.34; 0.81]
PR	-0.48*	-0.25	-0.21
	[-0.56; -0.40]	[-0.60; 0.08]	[-0.55; 0.13]
power sharing	5.12*	-3.37	-3.56
	[1.28; 12.48]	[-10.58; 1.09]	[-10.98; 0.75]
PR and power sharing	0.84*	-4.10*	-4.19*
	[0.50; 1.20]	[-11.35; -0.17]	[-11.05; -0.40]
downgraded	-0.43*	0.06	0.24
	[-0.77; -0.09]	[-1.10; 0.97]	[-0.87; 1.09]
power balance	8.55*	2.10*	1.09
_	[8.05; 9.03]	[0.06; 4.20]	[-0.82; 3.13]
power balace ²	-8.52*	-3.67^*	-2.72*
	[-9.01; -8.02]	[-7.32; -0.79]	[-6.29; -0.01]
number of excluded groups	-0.13*	-0.01	-0.00
	[-0.15; -0.11]	[-0.03; 0.01]	[-0.02; 0.02]
federal	1.02*	0.45*	0.32*
	[0.94; 1.10]	[0.15; 0.76]	[0.04; 0.60]
log(GDP pc)t-1	-0.30*	-0.26*	-0.19*
	[-0.33; -0.27]	[-0.39; -0.13]	[-0.32; -0.07]
log(population)t-1	0.36*	0.77	0.72
	[0.02; 0.70]	[-0.60; 2.25]	[-0.60; 2.20]
peace years	0.69*	-1.05*	-1.08*
	[0.49; 0.90]	[-1.66; -0.48]	[-1.69; -0.48]
peace years ²	-1.95*	3.37*	3.44*
	[-2.70; -1.22]	[0.97; 5.97]	[0.87; 6.03]
peace years ³	1.78*	-3.52*	-3.61*
•	[1.05; 2.54]	[-6.53; -0.78]	[-6.69; -0.70]
group in power sharing		-0.56*	. , ,
		[-0.90; -0.22]	
N	8270	7976	7976

Table 3: Group-level mediator and outcome models, democracies 1974-2009 (mean and credible intervals of posterior distributions)

	Mediator: power-sharing status		onflict onset
Intercept	-0.43*	-0.59	6.03
	[-0.67; -0.19]	[-1.30; 0.14]	[-1.43; 26.41]
PR	-0.38*	-0.12	0.55
	[-0.44; -0.32]	[-0.31; 0.07]	[-0.25; 2.43]
power sharing	5.85*	0.44	-0.31
	[2.69; 12.27]	[-0.48; 1.13]	[-1.57; 0.74]
PR and power sharing	0.72*	-4.09*	-3.42*
	[0.46; 0.99]	[-11.36; -0.17]	[-11.26; -0.48]
downgraded	-0.48*	0.49	0.86^{*}
	[-0.73; -0.23]	[-0.03; 0.95]	[0.13; 1.73]
power balance	6.98*	1.90*	0.96*
_	[6.69; 7.28]	[0.94; 2.88]	[0.31; 2.01]
power balace ²	-7.50*	-2.30*	-1.72*
	[-7.81; -7.19]	[-3.44; -1.24]	[-2.54; -0.58]
number of excluded groups	-0.18*	0.01*	0.11*
	[-0.19; -0.17]	[0.00; 0.02]	[0.01; 0.41]
federal	0.62*	0.35*	0.86*
	[0.57; 0.68]	[0.17; 0.53]	[0.11; 2.64]
log(GDP pc)t-1	-0.13^*	-0.14*	-1.24*
	[-0.15; -0.11]	[-0.21; -0.06]	[-4.59; -0.06]
log(population)t-1	0.38*	-0.11	0.08
	[0.21; 0.56]	[-0.65; 0.46]	[-0.60; 0.66]
peace years	0.62*	-0.85*	-1.36*
	[0.50; 0.74]	[-1.19; -0.49]	[-2.82; -0.57]
peace years ²	-1.96*	2.15*	2.14*
	[-2.41; -1.51]	[0.76; 3.49]	[1.00; 3.46]
peace years ³	1.91*	-1.70*	-1.59*
	[1.44; 2.38]	[-3.16; -0.20]	[-3.12; -0.43]
group in power sharing	-	-0.53*	•
		[-0.75; -0.32]	
N	16947	16262	16262

Null hypothesis value outside 95% credible interval.

Table 4: Group-level mediator and outcome models, all countries 1974-2009 (mean and credible intervals of posterior distributions)

Data

Table 5 reports the descriptive statistics of the variables used in the country-level analysis, while Table 6 reports those for the group-level data. Tables 8 and ?? list the countries covered in the analyses of democracies, respectively all countries (for the period 1974-2009).

Statistic	N	Mean	St. Dev.	Min	Pctl(25)	Pctl(75)	Max
democracy	4,743	0.571	0.495	0.000	0.000	1.000	1.000
conflict onset	6,451	0.024	0.153	0.000	0.000	0.000	1.000
peace years	6,451	14.928	15.746	0.000	2.000	24.000	63.000
previous wars	6,451	1.199	2.238	0.000	0.000	2.000	22.000
log(GDP pc)t-1	6,322	3.487	0.544	2.043	3.029	3.898	5.049
log(population)t-1	6,322	7.012	0.653	5.353	6.579	7.414	9.120
former british colony	6,451	0.188	0.391	0.000	0.000	0.000	1.000
former french colony	6,451	0.168	0.374	0.000	0.000	0.000	1.000
share of groups in power sharing	6,451	0.287	0.375	0.010	0.010	0.625	0.990
power sharing	3,941	0.066	0.249	0.000	0.000	0.000	1.000
PR	4,711	0.361	0.480	0.000	0.000	1.000	1.000

Table 5: Descriptive statistics of country-level data

Statistic	N	Mean	St. Dev.	Min	Pctl(25)	Pctl(75)	Max
number of excluded groups	24,997	9.844	15.779	0	2	7	55
log(population)t-1	24,997	0.907	0.142	0.220	0.882	0.995	1.017
downgraded group	24,997	0.008	0.089	0	0	0	1
conflict onset	23,957	0.007	0.082	0.000	0.000	0.000	1.000
log(GDP pc)t-1	24,782	8.038	1.248	4.764	6.991	9.073	11.164
federal	24,997	0.320	0.466	0	0	1	1
peace years	24,997	3.381	1.727	0.000	2.100	4.700	6.300
power balance	23,254	0.242	0.326	0.000	0.014	0.372	1.000
power balance ²	23,254	0.165	0.317	0.000	0.0002	0.138	1.000
power-sharing status	24,997	0.244	0.430	0	0	0	1
power sharing	24,997	0.019	0.136	0	0	0	1
peace years ²	24,997	1.442	1.108	0.000	0.441	2.209	3.969
peace years ³	24,997	0.671	0.669	0.000	0.093	1.038	2.500
PR	18,317	0.301	0.459	0.000	0.000	1.000	1.000

Table 6: Descriptive statistics of group-level data

Table 7: Countries and time period covered in analyses of democracies

	country	min.	max
1	Albania	1992	2009
2	Argentina	1975	2009
3	Armenia	1995	2008
4	Australia	1975	2009
5	Austria	1975	2009
6	Bangladesh	1991	2009
7	Belgium	1975	2009
8	Benin	1991	2009
9	Bhutan	2008	2009
10	Bolivia	1979	2009
11	Bosnia and Herzegovina	1996	2009
12	Botswana	1975	2009
13	Brazil	1985	2009
14	Bulgaria	1991	2009
15	Burundi	1993	2009
16	Canada	1975	2009
17	Central African Republic	1993	2002
18	Chile	1993	2009
19	Colombia	1975	2009
20	Congo	1992	1996
21	Costa Rica	1975	2009
22	Croatia	1992	2009
23	Czechoslovakia	1990	1992
24	Ecuador	1979	2009
25	El Salvador	1985	2009
26	Estonia	1992	2009
27	Finland	1975	2009

28	France	1975	2009
29	Gambia	1975	1993
30	Georgia	2004	2009
31	Ghana	1979	2009
32	Greece	1975	2009
33	Guatemala	1975	2009
34	Guinea-Bissau	1994	2009
35	Guyana	1992	2009
36	Honduras	1985	2009
37	Hungary	1990	2009
38	India	1975	2009
39	Indonesia	1999	2009
40	Israel	1975	2009
41	Italy	1975	2009
42	Japan	1975	2009
43	Kenya	1998	2009
44	Kyrgyzstan	2007	2008
45	Latvia	1993	2009
46	Lebanon	1975	1975
47	Liberia	2006	2009
48	Lithuania	1992	2009
49	Macedonia	1994	2009
50	Madagascar	1993	2001
51	Malawi	1994	2009
52	Mali	1992	2009
53	Mauritania	2007	2007
54	Mexico	2000	2009
55	Moldova	1994	2009
56	Mongolia	1992	2009
57	Montenegro	2007	2009
58	Mozambique	1994	2003
59	Nepal	1991	2001
60	New Zealand	1975	2009
61	Nicaragua	1984	2009
62	Niger	1993	2008
63	Nigeria	1979	2008
64	Pakistan	1988	2009
65	Panama	1989	2009
66	Paraguay	1989	2009
67	Peru	1980	2009
68	Philippines	1987	2009
69	Poland	1991	2009
70	Romania	1990	2009
71	Russia	1993	2000
72	Senegal	2001	2009
73	Sierra Leone	1996	2009
74	Slovakia	1994	2009
75	Slovenia	1992	2009
76	South Africa	1994	2009
77	Spain	1977	2009
78	Sri Lanka	1975	2009
79 80	Switzerland Taiwan	1975 1998	2009 2009
81 82	Thailand	1975 1975	2008 2009
82	Trinidad and Tobago	1975	2009
83 84	Turkey	1975	1984
84 85	Uganda Ukraine	1980	2009
85 86	United Kingdom	1994	2009
87	United Kingdom United States of America	1975	2009
88	Uruguay	2006	2009
89	Venezuela	1975	2009
07	VCHCZUCIA	1713	2008

Table 8: Countries and time period covered in analyses of democracies

	country	min.	max
1	Afghanistan	1978	2009
2	Albania	1990	2009
3	Algeria	1977	2009
4	Angola	1993	2009
5	Argentina	1975	2009
6	Armenia	1995	2009
7	Australia	1975	2009
8	Austria	1975	2009
9	Azerbaijan	1996	2009
10	Bahrain	2006	2009
11	Bangladesh	1975	2009
12	Belarus	1995	2009
13	Belgium	1975	2009
14	Benin	1978	2009
15	Bhutan	1991	2009
16	Bolivia	1975	2009
17	Bosnia and Herzegovina	1993	2009
18	Botswana	1975	2009
19	Brazil	1978	2009

17

20	Bulgaria	1975	2009
21	Burundi	1982	2009
22	Cambodia	1975	2009
23	Cameroon	1975	2009
24	Canada	1975	2009
25	Central African Republic	1993	2009
26 27	Chad Chile	1990	2009
28	Colombia	1975 1975	2009 2008
29		1975	2008
30	Congo Costa Rica	1975	2009
31	Croatia	1993	2009
32	Czechoslovakia	1975	1992
33	Democratic Republic of the Congo	1975	2009
34	Djibouti	1993	2009
35	Ecuador	1979	2008
36	Egypt	1975	2009
37	El Salvador	1975	2009
38	Estonia	1992	2009
39	Ethiopia	1995	2009
40	Fiji	1975	2005
41	Finland	1975	2009
42	France	1975	2009
43	Gabon	1975	2009
44	Gambia	1975	1993
45	Georgia	1992	2009
46	Ghana	1979	2009
47	Greece	1975	2009
48	Guatemala	1975	2009
49	Guinea	1991	2009
50	Guinea-Bissau	1992	2009
51	Guyana	1975	2009
52	Honduras	1975	2009
53	Hungary	1975	2009
54	India	1975	2009
55	Indonesia	1975	2009
56	Iran	1975	2009
57	Iraq	1975	2009
58	Israel	1975	2009
59	Italy	1975	2006
60	Ivory Coast	1975	2009
61	Japan	1975	2009
62	Jordan	1975	2009
63 64	Kazakhstan	1992 1975	2009 2009
65	Kenya Kuwait	1975	2009
66	Kyrgyzstan	1992	2009
67	Laos	1992	2009
68	Latvia	1993	2009
69	Lebanon	1975	2009
70	Liberia	1975	1985
71	Lithuania	1992	2009
72	Macedonia	1994	2009
73	Madagascar	1993	2001
74	Malawi	1993	2009
75	Malaysia	1975	2009
76	Mali	1980	2009
77	Mauritania	1975	2009
78	Mexico	1975	2009
79	Moldova	1992	2009
80	Mongolia	1975	2009
81	Montenegro	2007	2009
82	Morocco	1975	2009
83	Mozambique	1991	2009
84	Myanmar	1975	1988
85	Namibia	1991	2009
86	Nepal	1991	2009
87 88	New Zealand	1975 1975	2009 2009
89	Nicaragua Niger	1973	2009
90	Nigeria	1979	2009
91	Pakistan	1986	2009
92	Panama	1979	2009
93	Paraguay	1975	2009
94	Peru	1979	2009
95	Philippines	1975	2009
96	Poland	1975	2009
97	Romania	1975	2009
98	Russia	1993	2009
99	Rwanda	1979	2009
100	Senegal	1975	2009
101	Sierra Leone	1996	2009
102	Slovakia	1994	2009
103	Slovenia	1993	2009
104	South Africa	1975	2009
105	Spain	1979	2009
106	Sri Lanka	1975	2009
107	Sudan	1986	1991

108	Switzerland	1975	2009
109	Syria	1975	2009
110	Taiwan	1975	2009
111	Tajikistan	1992	2009
112	Tanzania	1978	2009
113	Thailand	1975	2009
114	Togo	1980	2009
115	Trinidad and Tobago	1977	2009
116	Turkey	1975	2009
117	Turkmenistan	1992	2009
118	Uganda	1980	2009
119	Ukraine	1992	2009
120	United Kingdom	1975	2009
121	United States of America	1975	2009
122	Uruguay	2006	2009
123	Uzbekistan	1992	2009
124	Venezuela	1975	2009
125	Vietnam	1977	2009
126	Yemen	1991	2009
127	Zambia	1975	2009
128	Zimbabwe	1981	2009

Mediator models of country-level analysis with fractional regressions

Tables 9 and 10 report the results of linear and fractional regression models of our mediator models at the country level for democracies and all countries for which we have information on the electoral systems. Tables 11 and 12 report the same information for the period 1947-2017.

Table 9: Linear and fractional regression model for mediator model of country-level analysis (1974-2009, democracies)

	Depende	ent variable:
	share groups	in power sharing
	(1)	(2)
constant	0.059	1.177
	(0.111)	(0.570)
PR	-0.041	-0.390
	(0.016)	(0.093)
power sharing	0.289	1.261
	(0.056)	(0.236)
PR and power sharing	0.329	1.226
	(0.041)	(0.140)
log(GDP pc)t-1	0.094	-0.119
	(0.018)	(0.100)
log(population)t-1	-0.042	-0.318
	(0.012)	(0.063)
previous wars	0.010	0.057
	(0.004)	(0.017)
peace years	0.165	0.710
	(0.029)	(0.160)
peace years ²	-0.643	-2.221
_	(0.127)	(0.710)
peace years ³	0.683	2.087
	(0.146)	(0.824)
former british colony	0.292	0.882
	(0.022)	(0.114)
former french colony	0.730	
	(0.043)	
Observations	2,450	2,450
R^2	0.199	0.199
Adjusted R ²	0.195	0.195
Residual Std. Error (df = 2438)	0.349	0.349
F Statistic (df = 11; 2438)	55.017	55.017

Table 10: Linear and fractional regression model for mediator model of country-level analysis (1974-2009, all countries)

	Dependent variable: share groups in power sharing	
	(1)	(2)
constant	0.056	-2.590
	(0.105)	(0.651)
PR	-0.042	-0.230
	(0.015)	(0.094)
power sharing	0.277	1.219
	(0.053)	(0.238)
PR and power sharing	0.328	1.579
	(0.039)	(0.150)
log(GDP pc)t-1	0.101	0.581
	(0.017)	(0.110)
log(population)t-1	-0.046	-0.226
	(0.012)	(0.069)
previous wars	0.010	0.060
	(0.004)	(0.017)
peace years	0.162	0.986
	(0.028)	(0.161)
peace years ²	-0.614	-3.678
	(0.121)	(0.715)
peace years ³	0.646	3.831
	(0.141)	(0.827)
former british colony	0.280	1.458
,	(0.021)	(0.120)
former french colony	0.688	3,370
	(0.039)	(0.205)
Observations	2,653	2,653
R^2	0.197	0.197
Adjusted R ²	0.194	0.194
Residual Std. Error (df = 2641)	0.344	0.344
F Statistic (df = 11; 2641)	58.985	58.985
Note:	·	NA

Table 11: Linear and fractional regression model for mediator model of country-level analysis (1947-2017, all democratic countries)

nare groups (1) 0.649 0.044) 0.051 0.0011) -0.025 0.004) -0.013 0.003)	(2) 0.626 (0.211) 0.222 (0.041) -0.106 (0.021)
0.649 0.044) 0.051 0.011) -0.025 0.004) -0.013	0.626 (0.211) 0.222 (0.041) -0.106
0.044) 0.051 0.011) -0.025 0.004) -0.013	(0.211) 0.222 (0.041) -0.106
0.051 0.011) -0.025 0.004) -0.013	0.222 (0.041) -0.106
0.011) -0.025 0.004) -0.013	(0.041) -0.106
-0.025 0.004) -0.013	-0.106
0.004) -0.013	
-0.013	(0.021)
	(0.021)
0.003)	-0.053
	(0.012)
0.016	0.067
0.002)	(0.009)
0.035	0.151
0.015)	(0.060)
-0.080	-0.339
0.058)	(0.235)
0.057	0.243
0.061)	(0.240)
0.207	0.856
0.012)	(0.045)
0.470	2.400
0.019)	(0.136)
2,603	2,603
0.307	0.307
0.305	0.305
0.505	0.207
	127.787
	0.305 0.207 127.787

Table 12: Linear and fractional regression model for mediator model of country-level analysis (1947-2017, all countries)

	Depende	ent variable:
	share groups in power sharin	
	(1)	(2)
constant	0.607	0.464
	(0.036)	(0.161)
PR	0.022	0.094
	(0.008)	(0.029)
log(GDP pc)t-1	-0.004	-0.015
	(0.003)	(0.015)
log(population)t-1	-0.030	-0.126
	(0.002)	(0.011)
previous wars	0.016	0.068
	(0.002)	(0.010)
peace years	0.087	0.371
	(0.012)	(0.048)
peace years ²	-0.287	-1.234
	(0.048)	(0.196)
peace years ³	0.260	1.118
	(0.052)	(0.204)
former british colony	0.196	0.809
	(0.008)	(0.034)
former french colony	0.319	1.350
	(0.010)	(0.051)
Observations	4,887	4,887
R^2	0.263	0.263
Adjusted R ²	0.262	0.262
Residual Std. Error (df = 4877)	0.224	0.224
F Statistic (df = 9; 4877)	193.791	193.791

Country level analyses of PR

As our analyses presented in the main text are constrained by the availability of information on power-sharing institutions by Strøm et al. (2017) and on electoral systems by Bormann and Golder (2022), our time-frame and the countries covered is limited. Here we expand our analysis to cover the 1947-2017 time-period, implying that we can only analyze the mediating effect of PR, focusing first on democracies, and second broadening the scope to all countries for which we have information on the electoral rule from Wig, Hegre and Regan (2015) and Bormann and Golder (2022).

	Mediator: share of groups in power sharing	Outcome: ethn	ic conflict onset
Intercept	0.65*	-1.25	-1.14
	[0.56; 0.73]	[-3.09; 0.68]	[-2.92; 0.66]
PR	0.05*	-0.94*	-0.92*
	[0.03; 0.07]	[-1.50; -0.45]	[-1.45; -0.44]
log(GDP pc)t-1	-0.02*	-0.22*	-0.23*
	[-0.03; -0.02]	[-0.41; -0.05]	
log(population)t-1	-0.01*	0.11*	0.11*
	[-0.02; -0.01]	[0.00; 0.22]	[0.00; 0.22]
previous wars	0.02^*	0.07^*	0.07^*
	[0.01; 0.02]	[0.02; 0.11]	[0.02; 0.11]
peace years	0.04^{*}	-0.10	-0.12
	[0.01; 0.07]	[-0.74; 0.51]	[-0.75; 0.52]
peace years ²	-0.08	0.93	1.03
	[-0.20; 0.03]	[-2.30; 4.31]	[-2.19; 4.41]
peace years ³	0.06	-2.47	-2.59
	[-0.06; 0.18]	[-7.67; 2.09]	[-7.78; 1.95]
former british colony	0.21*	-0.28	-0.25
Ť	[0.19; 0.23]	[-0.74; 0.16]	[-0.68; 0.20]
former french colony	0.47*	-0.07	0.02
•	[0.43; 0.51]	[-0.77; 0.60]	[-0.56; 0.58]
share groups in power sharing		0.18	-
		[-0.58; 0.90]	
N	2603	2603	2603

Null hypothesis value outside 95% credible interval.

Table 13: Mediator and outcome models for PR 1947-2017 (democracies)

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