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High minority power facilitates democratization across ethnic fault lines

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Abstract

The historical record knows only few instances of democracies waging war against each other. Therefore, democratization is considered key in achieving global peace. However, efforts to achieve sustained democratic governance often fail—Afghanistan being a recent example. Democratization appears particularly challenging where grievances between ethnic groups can spill over into democratic institutions and obstruct the negotiation of mutually beneficial compromises. So far, research on democratization vis-à-vis preexisting ethnic conflict has relied on correlational evidence and historical case studies, making it hard to establish causality. Here, we complement previous work with an economic lab-in-the-field experiment modeling a situation in which unequal groups with ongoing ethnic tensions can solve a joint allocation problem either democratically or aggressively. We find that, as theoretically predicted, minority groups are much more likely to opt for inefficient aggression, but also that equipping minorities with high power under the democratic allocation procedure substantially reduces this problem. Removing ethnic hostility subtly shifts participants' beliefs but does not reduce aggressive behavior. Thus, our results demonstrate that well-designed democratic institutions can achieve efficient, peaceful outcomes even when intergroup hostility is prevalent. However, we also see that their success vitally depends on their inclusivity towards the interests of minority groups.

Keywords: democratization, ethnicity, intergroup conflict, warfare, peace-making, minority power

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Introduction

Assume that a country, call it 'Exampland', is inhabited by two ethnic groups, the 'Ma' and the 'Mi'. The Ma account for 60% of the population and the Mi for 40%. Decisions in Exampland are made by the president who is elected into office by plain majority rule voting. Elections are free and fair, so Exampland can be considered a full democracy in this regard. Nonetheless, Exampland faces a problem: a presidential candidate can win a majority by promising Ma-favoring policies and get reelected by implementing them and promising further such policies (Burgess et al. 2015; Houle et al. 2019; McGauvran and Stewart 2021). In such a democracy, the Mi are structurally disadvantaged and possibly tyrannized by the Ma (Toqueville 1835). Thus, when forced to choose between this type of democracy and violent ways of providing public goods for their group, the Mi might well opt for aggression, e.g., trying to install a Mi-favoring leader or solving the resource-allocation problem in other non-democratic ways. In fact, as Fig. 1 illustrates, at the macro level successful democratization is negatively correlated with ethnic fractionalization. That is, the more ethnic divisions a country has, the harder it seems to establish democratic forms of governance (Reynal-Querol 2003; Esteban et al. 2012a,b; Houle 2015; Shoup 2018; Panzano 2023; Leipziger 2024).

Such obstacles to democratization are well known in political economy and international relations (Fearon 1995; Fearon and Laitin 1996; Acemoglu and Robinson 2006; Acemoglu et al. 2008; Besley and Persson 2010, 2011; Laurent-Lucchetti et al. 2024). So far, however, research on this question has relied on analyses of historical data and detailed case studies, making it hard to establish causality (Beissinger 2008; Blattman and Miguel 2010; Harkness 2016; Ryvkin and Semykina 2017; Vogt 2019; Rohner and Thoenig 2021; Uzonyi et al. 2021). Here, we complement these approaches by adding clean, causal evidence from an economic lab-in-the-field experiment which models the structural problem faced by countries like 'Exampland'. Beyond this, we use the flexibility of our method to, *ceteris paribus*, investigate the general stability of alternative democratic decisions rules besides simple majority-rule voting and to test for possible effects of removing ethnic tensions between the involved groups, both being impossible with other methods.

Experimental design

We conducted our preregistered experiment in the Southern Nations, Nationalities, and Peoples Region (SNNPR) of Ethiopia in fall 2019 (Glowacki et al. 2019). At that time, strong ethnic tensions existed between the Sidama, who formed the largest ethnic fraction in the SNNPR, and other major ethnicities in the region (Tronvoll et al. 2020). At the time of data collection, the Sidama were forcefully striving for political independence from the SNNPR which was met with strong resistance by other ethnic groups. We recruited N=240 male participants, 120 Sidama and 120 Wolayta. The Wolayta formed the second largest ethnic group in the SNNPR prior to Sidama independence which was achieved in June 2020. For additional background and procedural details see Section "Methods", theoretical benchmark predictions

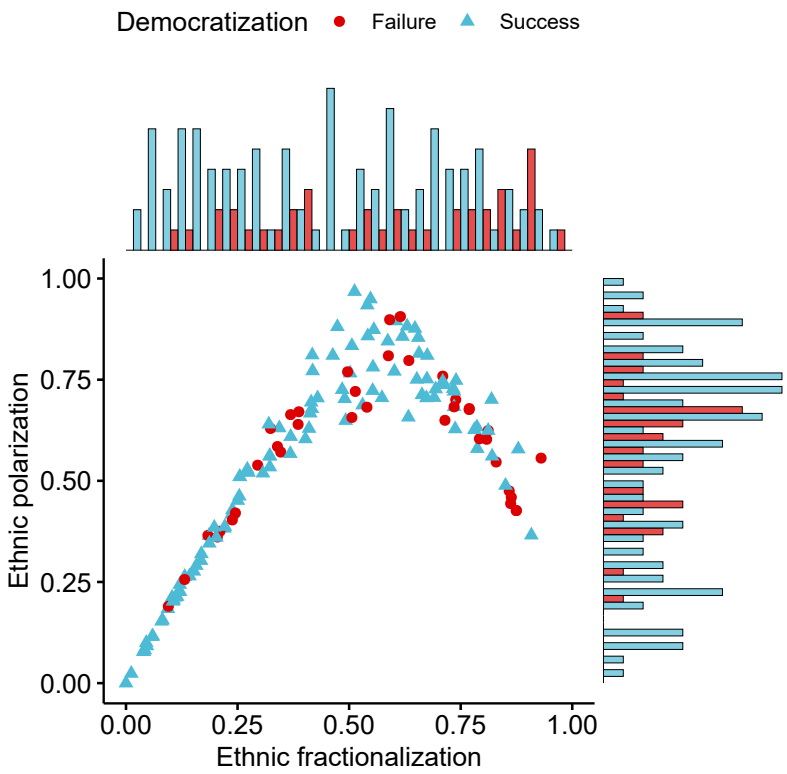

Figure 1: *Ethnic fractionalization and polarization from Alesina et al. (2003) for N=143 countries, grouped by occurrence of at least one successful episode of democratization in the time between 1900 and 2018 in the V-DEM data from Wilson et al. (2020), coded as 'Success' vs. other outcome ('Failure'), censored episodes are excluded. Mean polarization: 0.585 vs. 0.539 for Failure vs. Success,* $t = 1.247$, $P = 0.215$; *mean fractionalization: 0.558 vs. 0.409 for Failure vs. Success,* $t = 3.089$, $P = 0.003$. *See Section "Statistical analyses" for details.*

are included with the Supplementary information.

For our experiment, we randomly formed 'societies' of five players subdivided into a majority group of three and a minority group of two players, with each group being ethnically homogeneous. The experimental task for these pairs of unequal groups was to divide an amount of 540 Ethiopian Birr (ETB) among the five players. They could do so either via a given democratic procedure for collective decision-making or via an aggressive, destructive option. (Note that although we will label the destructive option 'conflict' and the democratic procedures 'peace' here, all experimental instructions were presented in neutral language.)

Always comparing against the fixed 'BASELINE' condition, we experimentally manipulated two aspects of the interaction: (*i*) the minority group's power under the democratic decision-making regime (conditions 'PROP-REP' and 'VETO') and (*ii*) the intensity of ethnic tensions between the two groups (condition 'ALL-INGROUP'). In all conditions, participants were fully and truthfully informed *ex ante* about the ethnic background of their own and the other group as well as the entire sequence and consequences of the decisions they would potentially be making. Comprehension of these instructions was thoroughly checked.

In Stage 1 of our BASELINE condition, the groups simultaneously decided whether to commit to

Table 1: *The five allocations of 540 ETB which participants could choose from under the democratic decision-making procedures, as group totals and broken down per capita. In the experiment, neutral labels 'A'-'E' were used for the allocations and the money amounts where additionally shown using bills and coins of the local currency. 'Blue' was consistently used as the color marker and label for the own group and 'green' for the other group. For easier comparison, the last column shows the expected payoffs if conflict is triggered.*

Allocation	**'none'**	**'less'**	**'equal'**	**'more'**	**'all'**	*Conflict payoff*
Own group	**0**	**138**	**324**	**402**	**540**	**135**
if majority	3×0	3×46	3×108	3×134	3×180	3×45
if minority	2×0	2×69	2×108	2×201	2×270	2×67.5
Other group	**540**	**402**	**216**	**138**	**0**	**135**
if minority	2×270	2×201	2×108	2×69	2×0	2×67.5
if majority	3×180	3×134	3×108	3×46	3×0	3×45

the democratic regime ('peace') or not ('conflict'). If at least one of the groups opted for conflict, half of the 540 ETB were retained by the experimenter as to represent the cost of conflict including resource investments and possible destruction. The remaining 270 ETB were randomly allocated to one of the groups with 50:50 chance, where they were then split equally among the members of the winning group. The other group received nothing, and the interaction ended. Hence, the *expected* conflict payoff for a member of the minority (majority) was 67.5 ETB (45 ETB) and did not depend on any decisions by the other group. This option is clearly inefficient from a collective perspective, as 270 ETB are simply 'destroyed'. Nonetheless, the positive expected conflict payoff might still appear attractive to participants compared to what they may have expected under the democratic allocation procedure, which might be a disproportionally small resource share or even no payoff at all.

If none of the groups chose conflict in Stage 1, the interaction moved to Stage 2 where an election determined which group would be entitled to decide over the allocation of the full 540 ETB. Every player had one vote and the simple majority of votes determined which group won the election. Subsequently, in Stage 3, the winning group chose the allocation to be implemented and the interaction ended. To reduce the complexity of the experimental task, groups could only choose from five predetermined allocations, as shown in Tab. 1. The experimental conditions differed from BASELINE only in a single aspect each.

In ALL-INGROUP we removed ethnic tensions from the interaction by matching a minority and majority group of the same ethnicity. Thus, between-group tensions based on ethnic divisions are ruled out in this condition. This manipulation leaves the monetary incentives unchanged and thus does not change the game theoretic benchmark predictions. However, it might reduce conflict rates via other channels, e.g., higher expected generosity or reduced expected aggression from members of the ethnic ingroup and consequently higher trust in the democratic mechanism (Doğan et al. 2018; Böhm et al. 2020).

In PROP-REP, we structurally increased the minority group's power by changing the voting rule in Stage 2. Here, not the plain majority would win, but instead one of the five individual votes cast by

Table 2: *Overview of experimental conditions, predictions, and key descriptive results*

	BASELINE	ALL-INGROUP	PROP-REP	VETO
Ethnic tensions	Yes	No	Yes	Yes
Voting rule	Majoritarian	Majoritarian	'Random dictator'	Majoritarian
Minority power	Low	Low	Intermediate	High
Stage 1	Peace/conflict	Peace/conflict	Peace/conflict	Voting
Stage 2	Voting	Voting	Voting	Allocation
Stage 3	Allocation	Allocation	Allocation	Peace/conflict
Pred. majority	Peace	Peace	Peace	take 'more'
Pred. minority	Conflict	Conflict	Peace	Peace
Obs. confl. rate	69.3%	78.7%	72.0%	36.7%
Avg. payoff	71.9 ETB	67.1 ETB	70.9 ETB	89.4 ETB

players would be randomly chosen to determine the winning group. This voting mechanism, sometimes called 'random dictator', captures some key features of voting power in democratic regimes with proportional representation of societal fractions (Feddersen et al. 2009; Morton and Ou 2015; Tyran and Wagner 2019). Assuming risk-neutrality and perfectly self-interested decision-making by all players, this manipulation increases the minority group's expected payoff from 0 ETB in BASELINE to 216 ETB in PROP-REP. From an *ex ante* perspective, this is just as good as the 'equal' allocation and could thus suffice to make the minority choose 'peace'.

In VETO, instead, we stuck with majority rule voting, but changed the sequence of decision stages, thus maximizing minority power (Mueller and Rohner 2018; Eisenstadt and Maboudi 2019; Juon and Bochsler 2022). Here, the election was held first and the winning group was entitled to choose an allocation. However, before implementation, the group that lost the election was informed of the allocation chosen by the winner and could decide whether to either accept it 'peacefully' or to choose the conflict option instead. This manipulation effectively equips the outvoted group with veto power over the allocation by the elected decision-maker. Perfectly self-interested decision-makers would choose allocation 'more' here, which leaves the other group with a payoff just above their expected conflict payoff so that conflict is avoided. Tab. 2 provides a summary of the experimental design, benchmark predictions, and key descriptive results.

Results

Fig. 2A shows the proportions of conflict choices in all conditions except VETO broken down by group size (minority vs. majority). In all three conditions, minority groups chose conflict much more often than majority groups (all pairwise tests of proportions P's < 0.001, OR's > 7.8), resulting in conflict incidence rates of 69% and larger, see Tab. 2. There are no statistically significant differences in conflict choices between the three conditions when comparing decisions by groups of same size. These findings are very much in line with the benchmark predictions, except for choices by minority groups in PROP-REP.

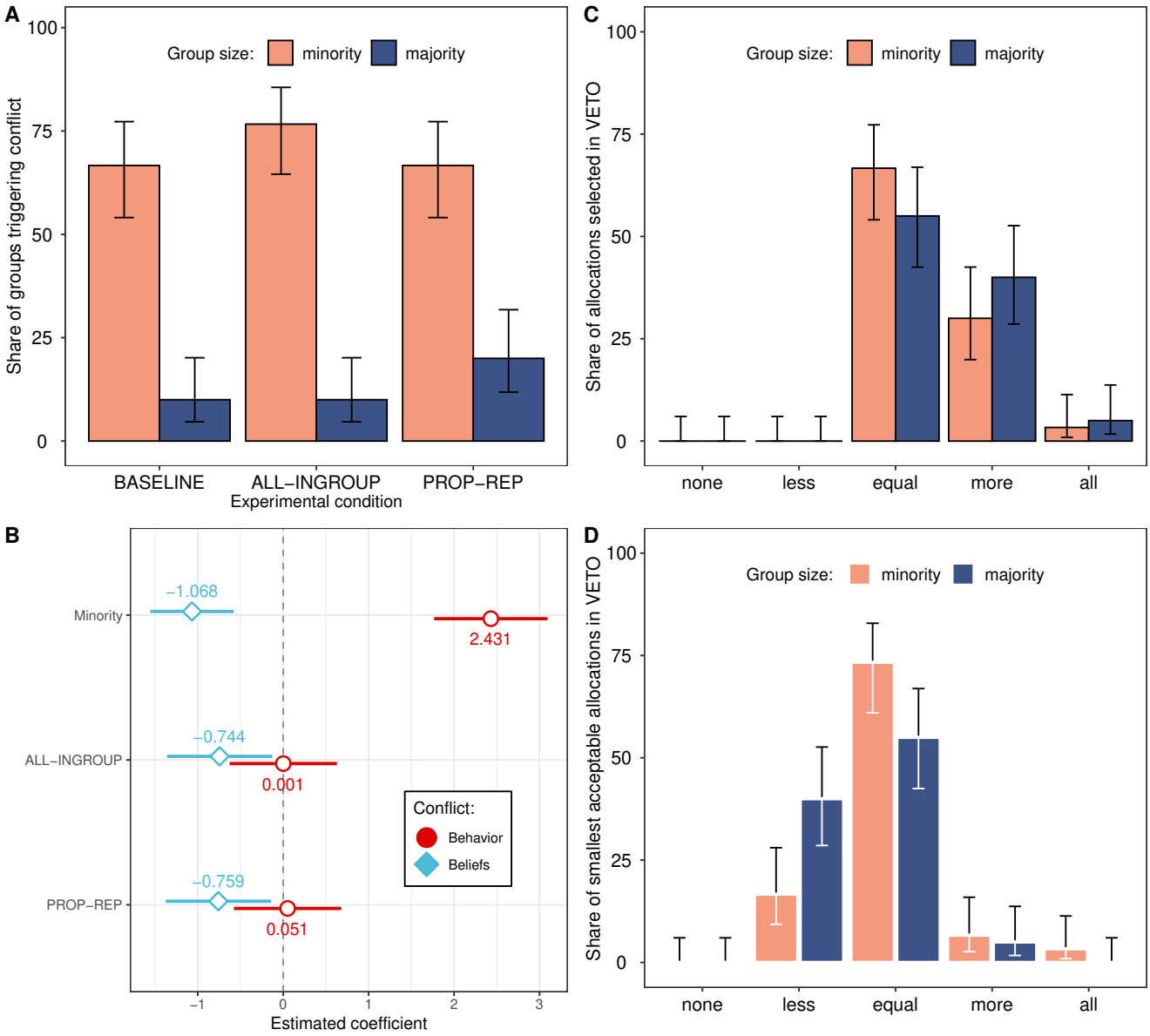

Figure 2: ***Panel A****: Group decisions in Stage 1 ('peace' vs. 'conflict') in conditions BASELINE, ALL-INGROUP, and PROP-REP, broken down by group size (minority/majority).* ***Panel B****: Estimated coefficients with 95% confidence intervals for effects of minority group membership (relative to majority) and conditions ALL-INGROUP and PROP-REP (relative to BASELINE) on individual choice of conflict ('Behavior') and individual belief that other group will trigger conflict ('Beliefs'), based on a logistic regression model including additional controls; see Section "Statistical analyses" for details.* ***Panels C&D****: Allocations and minimum acceptable resource share for the five possible allocations (to the own group) in condition VETO, group-level decisions. Error bars in panels A, C, and D indicate Wilson's 95% confidence intervals for single proportions.*

Here, our manipulation of the voting rule from 'winner-take-all' to 'random dictator' did not have the predicted effect of appeasing minorities (also see Section "Discussion").

Fig. 2C&D show allocations and acceptance decisions in VETO. Here, majorities, i.e., the most likely winners of the election, chose more generous allocations than theoretically required: the most frequent choice (55%) was the 'equal' split of the 540 ETB among all players. The second most frequent allocation (40%) was to take 'more', in line with the benchmark prediction. Allocations 'none' and 'less' were never chosen and 'all' was very rarely taken.

In turn, most groups' smallest acceptable allocation was 'less' (17% for minorities vs. 40% for majorities), following the theory prediction, or the 'equal' split (73% for minorities vs. 55% for majorities); only few groups chose 'more' or even 'all' for themselves as the minimum acceptable offer. The higher-than-predicted average demand by minorities, i.e., the most likely losers of the election, explains why conflict emerges in VETO despite rather generous offers by majorities. Nonetheless, our manipulation of assigning effective veto power to minorities substantially reduced conflict incidence rates. Relative to the other three conditions, the rate of inefficient conflict in VETO was roughly halved which also reflects in notably larger average payoffs for participants in this condition, see Tab. 2.

In addition to studying participants' behavior, we asked them to guess what the respective other group would decide in several phases of the interaction. Our experimental manipulations had statistically significant effects on these beliefs exactly in line with the benchmark predictions: participants in majority groups expected minorities to choose conflict more often, and beliefs that the respective other group would choose conflict were lower in ALL-INGROUP and PROP-REP relative to BASELINE. Fig. 2B summarizes these results.

Discussion

Our results clearly establish a causal effect of being in a minority position on the reluctance to commit to peaceful, democratic procedures of collective decision-making when these procedures do not guarantee a sufficient influence on outcomes for the minority. This finding seems predominantly driven by the structural disadvantages that minorities face under some democratic regimes. Removing preexisting ethnic tensions between minority and majority did not alleviate this problem in our setting. With all due interpretative caution, this result corroborates theories conceiving of ethnic divisions as being instrumentalized opportunistically by malicious leaders and weakens those building on ideas of eternal 'primordial hatreds' between ethnic groups (Fearon and Laitin 2000, 2003; Esteban and Ray 2011; Esteban et al. 2012b; Ray and Esteban 2017).

Moreover, our results suggest that subtle procedural adjustments, such as changing the aggregation rule for votes, may have only insufficient impact, even if these favor the minority. In our PROP-REP condition, for example, the adjusted voting procedure increased minorities' *expected* payoffs *ex ante*, but did not remove the majority's advantage in the democratic allocation mechanism and still was predicted to result in very imbalanced eventual allocations *ex post*; this may explain its failure to reduce conflict.

However, our VETO condition also demonstrates that inclusionary collective decision-making procedures which leave the minority with more direct *ex post* control over the outcome implemented by the majority can facilitate democratic compromising and substantially reduce inefficient conflict even when ethnic tensions are high. Despite recent setbacks on the global stage, this renewed proof of concept can maybe encourage future democratization efforts.

Methods

This section summarizes our experimental procedures and provides additional background information on the field setting. A concise overview of related literature, our game theoretical model with derivation of hypotheses, and additional empirical analyses are available as Supplementary Information.

Field setting

During the summer and fall of 2019 ethnic tensions erupted between the Sidama and Wolayta, two major ethnic groups in the Southern Nations, Nationalities, and People's Region (SNNPR) of Ethiopia (Tronvoll et al. 2020). At the time, the SNNPR was the most ethnically diverse of Ethiopia's nine regional states consisting of over fifty ethnic groups. The Sidama were the largest ethnic group in the SNNPR, vastly outnumbering the Wolayta, the region's second largest ethnic group (Ethiopian Statistical Service 2007). The capital of SNNPR was the city of Hawassa, which contained a majority of Sidama residents but also included a substantial percentage of Wolayta residents.

The Ethiopian constitution guarantees the right for states to be organized based on ethnic identity (Federal Democratic Republic of Ethiopia n.d.). In 2018 Sidama representatives requested of the federal Ethiopian government to formally be recognized as an Ethiopian Region. If the Sidama region were approved, the SNNPR capital, Hawassa, a diverse multi-ethnic city would eventually become the seat of power for the Sidama zone. Instead of being part of the multi-ethnic SNNPR, the new Sidama zone would be the seat of power for the Sidama ethnicity.

The Ethiopian constitution required a referendum to be held within one year of the request, which would have been in July 2019 but it was delayed until November 2019. While many Sidama were in favor of recognition of statehood, most Wolayta and others living within what would be the new Sidama region feared for loss of political power. More generally there were fears throughout the region that recognition of a Sidama state would lead to collapse of the SNNPR with many of the smaller ethnic groups subsequently requesting recognition of statehood.

During the time between the request for statehood and the referendum numerous ethnic riots broke out in Hawassa and across the region. Although the cumulative number of dead are unknown, it includes at least dozens if not hundreds of victims and large amounts of property destroyed (BBC 2019; Gebreselassie 2019). The referendum was approved by an overwhelming majority of 98% though many Wolayta and other minority ethnic groups were reported to boycott it or failed to register to vote, in part reportedly because of intimidation (Awasa Guardian 2019). The successful creation of a Sidama

zone did usher in the collapse of the SNNPR. The Wolayta applied to leave the SNNPR, and other ethnic groups have followed leading to the creation of several new and smaller Ethiopian states as a result.

Experimental procedures

This study was conducted in October of 2019, approximately one month before the referendum when ethnic tensions between the Wolayta and Sidama were extremely high.

Recruitment Sidama participants were recruited by word of mouth from the town of Hawassa, by then the capital city of SNNPR. Wolayta participants were recruited by word of mouth from the town of Jinka, a larger market town south-east of Hawassa. We exclusively recruited male participants in order to avoid gender effects when our participants interacted within groups and had to make joint decisions. Traditionally, Ethiopia is a patriarchal country in which women are often excluded from democratic decision-making processes.

Sample size and repeated measures Our aim was to recruit 60 participants per condition in sessions with 12 or 18 participants at a time. This allows for forming 6 groups of 2 and 4 groups of 3 (9 groups of 2 and 6 groups of 3) within sessions. In each session we collected decisions of the groups based on a 'strategy method', that is, for all possible choices the other group in their 'society' could have made. These decisions were then matched with a randomly selected group from another session (same treatment condition) to determine the outcome of the game. For instance, we matched the decisions of a three-person group of a session with Sidama participants to the decisions of a two-player group of a session with Wolayta participants; the two groups did not meet in person.

Conditions needed to have multiples of 30 subjects in order for the matching of minority and majority groups to work out. Therefore, our sample size is a compromise between maximizing statistical power and logistical feasibility.

To increase the number of observations, each session included two independent rounds of the game described in the main text and more formally in Section "Theoretical model and predictions" with random re-matching of the groups between the rounds, ensuring that no two participants would interact more than once within a session. Thus, each participant was part of a group A (with $n_A = 3$ members) in one round and part of a group B (with $n_B = 2$ members) in the other round. The rules of the second round were only announced after completion of the first round. We also control for repeated measures in our advanced statistical analyses, see Section "Statistical analyses".

Power analysis Our central variable of interest is the individual binary choice for or against conflict, requiring a comparison of proportions between conditions, e.g., using Fisher's exact test. We calculate with condition sample sizes of $N = 60$, i.e., conservatively not combining choices made as part of round 1 with those made as part of round 2. Conventional power requirements ($1 - \beta = 0.8$) of Fisher's exact test are met at $\alpha \leq 0.05$ for differences in proportions of about 25% and larger. That is, for effects with Cohen's $h \geq 0.5$, approximately, i.e., medium to large effects.

Data collection and payment After confirming that study participants were either Sidama or Wolayta depending on the condition, they were invited to participate in the study. All participants received a show-up fee of 100 Ethiopian Birr, corresponding to approximately 3.40 USD at the time of the experiment. Participants were given information sheets on which to record their responses and divided into appropriately sized groups for the particular study condition. Groups were seated around a table separated from other groups. The instructions of the study were explained, and the procedures demonstrated by the experimenter and a research assistant. After a comprehension check to ensure participant understanding, study participants had to make both individual and group decisions.

Participants first made individual decisions for all variables of interest—i.e., preferred allocation, voting decision, and whether to trigger conflict, or, in VETO, which allocations to veto/accept—and stated their individual beliefs about opponent group behavior. Discussions among participants were not allowed at this stage. Once individual decisions were completed, participants entered a group discussion phase in which they had to choose one of the individual decisions as their group's final decision. For making these group decisions free discussion among their members was allowed and encouraged. Group decisions and individual decisions turned out to be very closely aligned. We therefore use individual decisions in our detailed analyses, as this approach has higher statistical power; see Section "Statistical analyses".

After the first round, study participants were re-seated with new group members and completed the second round. Post-experimental payments based on condition and participant responses were made via phone credit after all data were collected.

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Declarations

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- **Conflict of interests:** The authors declare no conflict of interest.
- **Ethics:** Ethics approval was obtained from the joint Ethics Committee of the Faculty of Economics and Business Administration of Goethe University Frankfurt and the Gutenberg School of Management & Economics of the Faculty of Law, Management and Economics of Johannes Gutenberg University Mainz (approval letters Sept. 24, 2019, and Oct. 16, 2019). All research was carried

out in accordance with required guidelines and regulations and all study participants provided informed consent.

- **Preregistration:** The preregistration of this study is available via https://doi.org/10.1257/rct.4847-1.0
- **Author contributions:** The authors consider their contributions equal and are listed in alphabetical order.

Supplementary information

This article has the following accompanying supplementary materials.

Overview of related literature

At a general level, our study relates to a literature in political science and economics that has studied reasons for why players reject (Pareto superior) peaceful resource distributions and end up fighting. Explanations for the emergence of such conflicts are incomplete information (Brito and Intriligator 1985; Powell 1987, 1988; Morrow 1989; Fearon 1995; Mesquita et al. 1997; Slantchev 2010), problems of time consistency and commitment (Garfinkel and Skaperdas 2000; Powell 2006), agency problems (Hess and Orphanides 1995; Jackson and Morelli 2007), problems of multiple equilibria (Slantchev 2003; Konrad and Leininger 2011), arguments of evolutionary stability (Konrad and Morath 2016), and restrictions on how a prize can be shared, for instance, with respect to specific territorial claims (Hensel and Mitchell 2005; Hassner 2006). While sometimes being criticized in the context of war between states, prize sharing restrictions may be relevant for political leadership especially in countries with weak checks and balances. An extensive discussion in political science is devoted to the impact of the regime type on (inter-state) war, based on the observation that democratic states wage war against each other less often than authoritarian regimes (Ray 1998; Hess and Orphanides 2001). For underlying theoretical considerations of 'democratic peace' see, for instance, De Mesquita et al. (1999); Gartzke (2007) discusses problems of causality. Jackson and Morelli (2011) provide an overview of the 'rational choice' explanations as well as some further explanations including ideology and revenge. Blattman and Miguel (2010) survey a large body of work that focuses on civil war.

Seminal contributions that study determinants of successful democratization and political violence more generally include Acemoglu and Robinson (2001, 2006) and Besley and Persson (2010, 2011). One focal topic within this broad literature are the effects that ethnic divisions and ethnic inequality have on voting decisions (Houle et al. 2019; McGauvran and Stewart 2021), democratization (Houle 2015; Panzano 2023; Laurent-Lucchetti et al. 2024; Leipziger 2024), and the outbreak of civil war (Fearon and Laitin 1996, 2000, 2003; Esteban and Ray 2008a; Esteban et al. 2012a). Using data from Northern Ireland, for example, Mueller and Rohner (2018) show that power sharing in local governments by the two main religious groups reduces the likelihood of conflict. Our study builds on a similar idea but investigates different mechanisms to ensure significant minority power and establishes causality using experimental methods.

The onset of conflict has also been linked to patterns of ethnic composition by correlating indexes of fractionalization and polarization with the likelihood of conflict (Reynal-Querol 2003; Montalvo and

Reynal-Querol 2005; Esteban and Ray 2008b; Shoup 2018). For instance, Montalvo and Reynal-Querol (2005) find a significant effect of polarization (but statistically insignificant effects of fractionalization) on the emergence of conflict. Esteban et al. (2012b) and Ray and Esteban (2017) provide overviews of theoretical and empirical work on ethnic conflict.

Methodologically more closely related to our work are lab-in-the-field studies conducted in contexts with prevalent intergroup tensions. Doğan et al. (2018), for example, studied the effects of within-group spoils sharing rules on offensive vs. defensive strategy choice in between-group contests by groups with and without real-world hostility. More common are studies that elicit participants' (pro- and anti-) social preferences and behavior in simpler allocation games played with recipients from ingroup and varying outgroups (Doğan et al. 2022; Werner and Lambsdorff 2020; Bauer et al. 2016, 2018; Schaub 2017; Restrepo-Plaza and Fatas 2022; Böhm et al. 2021). Lane (2016) provides a meta-analysis investigating the question which types of group membership differences between players are likely to trigger discriminating behavior.

Besides these broader connections to the extensive literature on (ethnic) conflict and discrimination, our paper adds more narrowly to a literature that analyzes inter-group conflict as well as reasons for conflict and the success of conflict resolution mechanisms in the controlled conditions of an experiment. For surveys of experimental work on conflict and contests see Dechenaux et al. (2015) and Sheremeta (2018), the latter focusing on contests between groups. With respect to inter-group conflict, most attention has been given to determinants of the level of group efforts in the conflict, that is, conflict intensity. For instance, a number of studies investigate the consequences of group heterogeneity; other recent papers study the role of within-group decision-making rules, including voting, for conflict effort (Sheremeta 2011; Bhattacharya 2016; Fallucchi et al. 2021; Eckel et al. 2022; Kölle 2022; Brandts et al. 2023; Chaudoin et al. 2024). However, rather than looking at how government structures within groups impact conflict between groups, we focus on overarching institutions that govern between-group resource sharing.

The (few) existing experimental studies on the onset and resolution of conflict almost exclusively analyze conflict between individuals and in the environment of the laboratory. McBride and Skaperdas (2014) consider commitment problems when conflict changes future interactions. Kimbrough and Sheremeta (2013, 2014) study the role of side payments for conflict resolution. Lacomba et al. (2014), Smith et al. (2014), and Miettinen and Vanberg (2023) analyze ex post choices of conflict after arming decisions have already been made. In this area, the two papers that are most closely related to our study are Kimbrough et al. (2014) and Herbst et al. (2017), both with a focus on conflict asymmetries and their effect on rejections of peaceful resource allocations and bargaining failure, respectively. To the best of our knowledge, the only laboratory experiment that investigates the onset of conflict between groups is by Ke et al. (2023) who focus on behavioral factors that may make players more aggressive when they would enter the conflict as part of a group. We contribute to this literature by comparing different mechanisms for conflict resolution that vary the power of the minority and by bringing the setting to the field. We know of no other lab-in-the-field study investigating the impact of ethnic hostilities on the acceptance of democratic institutions as a means to allocate resources and to avoid destructive conflict.

Finally, our study connects to an experimental literature on voting mechanisms. For instance, Höchtl et al. (2012) and Agranov and Palfrey (2015) consider the impact of voting rules on income redistribution in a stable democratic regime. Morton and Rietz (2007) compare minority representation under plurality rule to run-off elections; Casella et al. (2008) use storable votes as a mechanism to strengthen the political influence of the minority. Herrera et al. (2014), Kartal (2015), and Casella et al. (2023) relate different voting rules to political power through their impact on voter turnout. Llavador and Oxoby (2016) survey a broad set of laboratory experiments on political economy questions. We add to this literature by looking at income allocations and effective power in a framework where political institutions are endogenous and overthrown when conflict is triggered.

Theoretical model and predictions

Basic setup

Two groups A and B with $n_A = 3$ and $n_B = 2$ members, respectively, must decide how to divide a given amount V of money: through a voting mechanism or through inefficient conflict which dissipates part of the resources. In stage 1 of the game, the groups $G \in \{A, B\}$ independently and simultaneously make a choice $z_G \in \{0, 1\}$ where $z_G = 0$ means that group G opts for the voting mechanism and $z_G = 1$ means that group G opts for conflict. If $z_A = z_B = 0$, then V is allocated in the 'voting subgame' whereas if $z_G = 1$ for at least one group, the groups enter into the 'conflict subgame'. The choice of z_G is made jointly by all members $g \in G$.

Conflict subgame If at least one group chooses conflict, a share $\gamma = 1/2$ of the prize V is lost and the remaining share $(1 - \gamma) V$ is allocated to either group $G \in \{A, B\}$ with probability $p_G = 1/2$. Within the group that wins the conflict, the prize is split equally so that each member g of the winning group G gets a payoff equal to $(1 - \gamma) V / n_G$. All members of the losing group get zero payoff. This ends the game.

The choice of the parameters for win probabilities (p_G) and rent dissipation (γ) reflects the equilibrium outcome of a standard Tullock contest between two groups that maximize their respective group payoff and split the prize and effort costs equally within each group. With linear effort cost functions $c(e) = e$ and a monetary prize V, equilibrium efforts are independent of the group size and equal to $V/4$ for each group. Hence, the rent dissipated is $\gamma V = V/2$, the probability of winning is $1/2$ for each group, and the expected conflict payoff is $(1/2) \cdot (1 - \gamma) V / n_G$ for group members $g \in G$.

Assuming that efforts are chosen cooperatively within each group, the equilibrium payoffs are the same for both groups, but the members of the smaller group receive a higher expected per capita conflict payoff. This theory result and the corresponding parameter choice in the experiment follow the standard logic of group contests about a prize of private-good nature which has to be split within the winning group.[1]

[1] If the group members choose their efforts non-cooperatively the equilibrium win probability and expected group payoffs

Voting subgame If neither of the groups chooses conflict, the game enters into the voting subgame where the individuals elect one group to determine the allocation of V. This subgame proceeds in two stages. First, each group member $g \in G$ casts a vote $v_g \in \{A, B\}$ for one of the groups. These decisions are made simultaneously and independently.

The second stage is the allocation stage. Here, the group $\mathcal{G} \in \{A, B\}$ that has received a majority of the votes (more than 50%) decides on a split characterized by a resource share $s_{\mathcal{G}} \in [0, 1]$ for the own group, that is, allocates an amount $s_{\mathcal{G}} V$ to the own group and an amount $(1 - s_{\mathcal{G}})\, V$ to the other group. This second decision is made jointly by all members $g \in \mathcal{G}$.

Payoffs in the voting subgame are $s_{\mathcal{G}} V / n_{\mathcal{G}}$ for each member of group $\mathcal{G}$ that chose the allocation and $(1 - s_{\mathcal{G}})\, V / n_{\tilde{\mathcal{G}}}$ for each member of group $\tilde{\mathcal{G}} \neq \mathcal{G}$ that lost the election. This ends the game.

Equilibrium prediction Solving the game by backward induction, since the split in the voting subgame is determined after the choice on conflict has been made, the winning group's proposal should allocate zero to the other group. Anticipating this, each individual should vote for her own group and the majority group A should win. Thus, in stage 1, the minority group B (with $n_B < n_A$) should choose conflict and the majority group A should choose the voting subgame in equilibrium.[2]

Experimental conditions

BASELINE Our baseline condition follows the rules of the game described in Section "Basic setup", with two procedural differences. First, the group members have to reveal individually preferred choices on conflict (z_g) and peaceful resource allocations (s_g) before the aggregation of preferences within each group takes place. Second, the choices are made based on a 'strategy method' where all necessary choices are collected independently for both groups A and B and are matched only afterwards. The members of groups A and B are recruited from two different ethnic groups and this is common knowledge.

In step 1 of the BASELINE treatment, each participant g is asked to make three choices: (i) a choice $z_g \in \{0, 1\}$ on the preferred allocation mechanism (voting or conflict); (ii) a vote $v_g \in \{A, B\}$ in case the game enters into the voting subgame; and (iii) an allocation proposal s_g for the own group's resource share in case that, in the voting subgame, g's group wins the election. (Due to the use of the strategy method, the order of these choices does not matter. In the experiment we elicit these choices in reverse order to facilitate participants' understanding of subgame perfection in the sense that the choice of z_g should reflect the expectations of the split proposals.)

would be higher for the smaller group B since the players do not internalize the positive externality of their effort on the other group members' payoff by assumption. Due to the free-riding, the equilibrium rent dissipation would be only $V/(n_A + n_B) < V/2$ in this case: free-riding makes the conflict option relatively more attractive. On the one hand, the experiment removes any strategic interaction but exogenously sets the conflict parameters to $(\gamma, p_G) = (1/2, 1/2)$, implicitly assuming effort coordination within each group. On the other hand, we also abstract from possible complementarities of efforts within each group which would countervail the strategic disadvantage of the larger group.

[2] To be precise, if group B chooses conflict, group A is indifferent and may opt for conflict as well since B's choice already determines the outcome. A similar comment applies to the voting choice where non-pivotal players may cast an arbitrary vote; in theory, any outcome of the voting game–even a victory of the minority–can be supported as an equilibrium outcome. Our predictions ignore such equilibria as they can be eliminated by appropriate equilibrium refinements or very mild behavioral considerations.

The allocation proposal s_g is chosen from the set

$$\left\{0, 0.25, \frac{n_G}{n_A + n_B}, 0.75, 1\right\}.$$

In addition to choosing the own preferred allocation, each participant is asked to indicate which allocation proposal they expect the other group to select. This elicitation of beliefs is not incentivized for reasons of tractability.

We only allow for five possible split proposals in order to simplify decision-making for the participants. Apart from the high-inequality proposals, $s_g \in \{0, 1\}$, which reflect the equilibrium outcomes in the respective subgames, and a proposal that implements perfect payoff equality at the individual level, $s_g = n_G/(n_A + n_B)$, we include two 'intermediate' proposals with lower inequality, $s_g \in \{0.25, 0.75\}$. These are determined based on the disadvantaged group's expected conflict payoff.[3] To be precise, for the experiment we chose values marginally above 0.25 and marginally below 0.75 in order to avoid a possible indifference of participants choosing solely based on expected monetary payoffs.

In step 2 of BASELINE, the relevant individual decisions are aggregated to the group level. More precisely, the members $g \in G$ must jointly select z_G and s_G from the individual conflict choices $\{z_g\}_{g \in G}$ and individual allocation proposals $\{s_g\}_{g \in G}$, respectively. Requiring that the groups must select one of the individual choices from step 1 gives the participants an incentive to state their preferences truthfully in step 1. The decision on z_G reflects stage 1 above and the allocation proposals are chosen—as part of the strategy method—for the case where the game enters into the voting subgame and the own group wins the majority.

In addition to their own decisions, we elicit the following beliefs of the participants: about the conflict choice of the other group; about which group would win the vote; and about the resource allocation chosen by the other group.

ALL-INGROUP The first experimental manipulation, condition ALL-INGROUP, concerns the impact of ethnic hostilities on the willingness to resolve the distributional conflict by means of majority voting. The only change of the setup relates to the ethnic background of the two groups: in the ALL-INGROUP condition, the members of groups A and B are from the same ethnicity; this is known to the subjects. None of the theoretical predictions from BASELINE is affected by this manipulation.

PROP-REP The second experimental manipulation, condition PROP-REP, explicitly restricts the decision-making power of the majority by changing the voting rule. Instead of a simple majority rule, we ensure that each individual has an identical impact on the allocation, independent of their group membership (majority or minority). To implement this, we keep the exact same choices as in

[3] Based on standard theory considerations, there is no particular reason for this specific proposal to be relevant in BASELINE; here, we could have included any proposal with intermediate inequality. Nonetheless, the specific proposals we chose may reflect a salient fairness norm under which the majority allocates to the minority what the latter could have gained under conflict. Similarly, these allocations are appealing if participants' choices are affected by a heuristic that takes into account dynamic aspects such as an *ex post* rejection possibility of the minority which, hence, would need to be offered at least its outside option. This *ex post* rejection possibility is then also explicitly included in the treatment condition VETO.

BASELINE but change the mechanism that determines the allocation proposal that is implemented: instead of counting all votes, we randomly select one of the $n_A + n_B$ votes and let this vote $v_{\tilde{g}} \in \{A, B\}$ decide on the group whose preferred allocation (s_G) is then implemented. Thus, each vote has the same probability of being decisive. This yields an expected payoff of $\frac{n_G}{n_A+n_B}V$ in the voting subgame if all participants act fully selfishly. Hence, the benchmark prediction changes in that minority groups should now opt against conflict, the latter resulting in a payoff of $V/4 < 2V/5$ for their group.

VETO The third manipulation picks up on the idea that conflict can be used as a threat by the minority to ensure a more equitable resource allocation despite the majority's formal decision-making power. In the BASELINE version of the game with majoritarian system, the majority can appropriate all resources since the decisions on conflict vs. democratic allocation are made *ex ante* and are binding, that is, conflict cannot be chosen *conditional* on the allocation selected by the majority. In turn, conflict emerges because the majority cannot credibly commit to implementing an equitable allocation once the democratic allocation mechanism has been accepted. The VETO condition, instead, allows the choice of the preferred allocation mechanism ($z_g \in \{0, 1\}$) to be made conditional on the proposed allocation $s_{\mathcal{G}}$ by a simple change of the timing of the game.

In step 1 of VETO, each participant $g \in G$ is asked to make three sets of choices: (i) a voting decision $v_g \in \{A, B\}$ on which group should choose the peaceful allocation; (ii) a proposal s_g for the allocation in case g's group obtains the majority; and (iii) a choice $z_g\,(1 - s_{\mathcal{G}}) \in \{0, 1\}$ on the preferred allocation mechanism (conflict or voting) for each of the five possible resource shares $1 - s_{\mathcal{G}}$ that could have been assigned to g's group by the winning group $\mathcal{G}$ at the allocation stage. The conflict choice z_g in response to the resource share $s_G = 1 - s_{\mathcal{G}}$ obtained from the other group is, hence, made using a strategy method and reveals the minimum acceptable resource share for the own group.

In step 2, the relevant individual decisions are aggregated to the group level: the members $g \in G$ must jointly select s_G and z_G from the individual allocation proposals $\{s_g\}_{g\in G}$ and implicit individual conflict choices $\{z_g\}_{g\in G}$, respectively. The stage 1 votes v_g determine the group $\mathcal{G}$ whose preferred allocation $s_{\mathcal{G}}$ is selected; the conflict choice $z_G\,(1 - s_{\mathcal{G}})$ of the group $G \neq \mathcal{G}$ that lost the vote decides whether the chosen allocation is implemented or if the payoff is decided in the conflict subgame.

Benchmark predictions

Ethnic hostility Under the majoritarian systems of BASELINE and ALL-INGROUP where the allocation is decided by majority rule, the minority power under the democratic mechanism is minimized in that the majority can appropriate all resources. Hence, following the standard theory with players who maximize monetary payoffs under complete information, group A (with more members) should choose $z_A = 0$ (voting) and group B should choose $z_B = 1$ (conflict) in the conditions BASELINE and ALL-INGROUP.

Prediction 1. With payoff-maximizing players, the treatment variation ALL-INGROUP on the origin of the out-group should not matter.

Potential deviations. If the players have distributional preferences that exhibit in-group altruism

towards members of the same ethnicity, the minority's choice may change, resulting in a treatment effect on the conflict choice. Concretely, what matters are the minority group B's beliefs over the possible allocations chosen by the majority in the voting subgame. If group B believes that a winning group A chooses the low-inequality allocation $s_A = 1 - \frac{(1-\gamma)}{2}$ (or even the equal split) with high likelihood due to, for instance, altruistic preferences, the optimal choice becomes $z_B = 0$ (voting).[4] The individual beliefs may be correct but may also stem from a projection of own altruism on the other group's preferences in line with a theory of social projection. We provide exploratory analyses testing the plausibility of these causes of behavioral deviations from Prediction 1 in Section "Statistical analyses".

Power sharing via balanced individual voting power The second experimental manipulation is designed such that the theory prediction for payoff-maximizing players fundamentally changes: in the PROP-REP treatment, both groups $G = A, B$ should choose $z_G = 0$, that is, no conflict. Anticipating that each group would claim the entire resources if winning at the voting stage, the expected continuation payoffs in the voting game are $3V/5$ and $2V/5$ for group A and B, respectively; both are higher than the expected conflict payoff of $V/4$. Hence, whereas the standard theory predicts conflict with probability one in BASELINE, it predicts conflict with probability zero in PROP-REP.

Prediction 2. With payoff-maximizing players, neither minority nor majority group members in PROP-REP should opt for conflict.

Potential deviations. In the PROP-REP treatment, conflict may be attractive for a minority group that exhibits strong outgroup spite. This follows from the fact that in the conflict subgame the individual expected payoff of a member of group B is higher than the individual expected payoff of a member of group A, in contrast to the voting subgame where all individuals get the same expected payoff (based on fully selfish allocation choices). Another potential reason for deviations from Prediction 2 are preferences for procedures that are not only fair *ex ante*, like the 'random dictator' mechanism we implement in this condition, but also lead to equitable outcomes *ex post*. However, given the limited set of variables we can collect, we are unable to explore further which of these possible explanations, if any, is more plausible in our context.

Maximum minority power via veto rights Adding the possibility of a choice of conflict conditional on the majority's allocation proposal captures another conflict-based mechanism to resolve distributional conflict. Anticipating that the minority would reject all proposals that leave them with a lower payoff than their outside option, i.e., their expected conflict payoff, the majority should claim a share $s_A = 1 - (1 - \gamma)/2$ for themselves.[5] In turn, the minority should accept this proposal so that conflict occurs with probability zero.

[4] Holding the beliefs constant, altruism on the side of group B would make group B more willing to accept unequal splits and choose the voting subgame where no rents are dissipated. Hence, the beliefs must assign sufficiently high probability–but not necessarily probability one–to shares $s_A \leq 1 - (1 - \gamma)/2$.

[5] To deal with the minority's indifference between acceptance and conflict, the theory breaks ties in favor of acceptance in this case in order to avoid non-existence of equilibrium in a continuous strategy space. The corresponding proposal s_A in the experiment was set marginally lower so that acceptance is strictly preferred by the minority.

Prediction 3. With payoff-maximizing players, the majority group should propose the allocation that ensures that the minority group has no incentive to trigger conflict.

Intuitively, the threat of conflict in the VETO treatment works as a strong form of veto power of the minority in case of too unequal allocations. However, instead of changing the political institutions and formal checks-and-balances, the predicted prevalence of democratic outcomes relies on the majority's attempt to appease the minority by offering them a sufficiently large share of the resources. Put differently, whereas the PROP-REP treatment can be interpreted as 'inclusive' political institutions which may reduce civil conflict, the 'inclusiveness' of the political institutions arises endogenously in the VETO treatment. The *ex post* conflict option in VETO can also be understood in the spirit of a repeated interaction where current appropriation activities of the majority cause political instability in the medium run.

Potential deviations. With spiteful preferences, which could be induced by ethnic tensions, the minority may still be unsatisfied with a proposal that leaves them with their conflict payoff (outside option) only. Reluctance on the side of the majority to accommodate higher demands of the minority may still yield conflict as an outcome, at least with some probability.

Statistical analyses

This section presents full statistical analyses of our data, detailing the results reported in the main text and providing robustness checks where appropriate. Calculations were carried out in R (version 4.2.2). Across the models reported below, 'individual controls' always refers to participants' age (in years), education level (none / high school / university), number of children, frequency of contact with other ethnic group ('never or rarely' / 'a couple of times per year' / 'a couple of times per month' / 'a couple of times per week'), and prior experience of conflict with the other ethnic group ('yes' / 'no').

Historical data on democratization

We obtained the data on episodes of democratization ('EPLIB') from Wilson et al. (2020). EPLIB covers the time between 1900 and 2018 and 153 countries. In the EPLIB dataset, transitions from low to higher levels of democracy, measured using V-DEM indicators (Coppedge et al. 2019), are classified into several types of episodes of democratization: 'Censored', 'Failed liberalization', 'Preempted transition', 'Stabilized electoral autocracy', and 'Success'. We excluded censored episodes and then counted the number of episodes classified as 'Success' per country. If that number was larger than 0, we coded 'Democratization' in that country as 'Success' for our analysis and as 'Failure' otherwise. We then merged data on ethnic fractionalization and polarization from Alesina et al. (2003) to the aggregated EPLIB data, leaving us with $N = 143$ countries for which data from both sources was available. Ethnic polarization was computed from the raw data underlying Alesina et al. (ibid.) using the 'RQ' specification suggested by Montalvo and Reynal-Querol (2005). Combining these two data sources yields the correlational evidence shown in Fig. 1 in the Introduction.

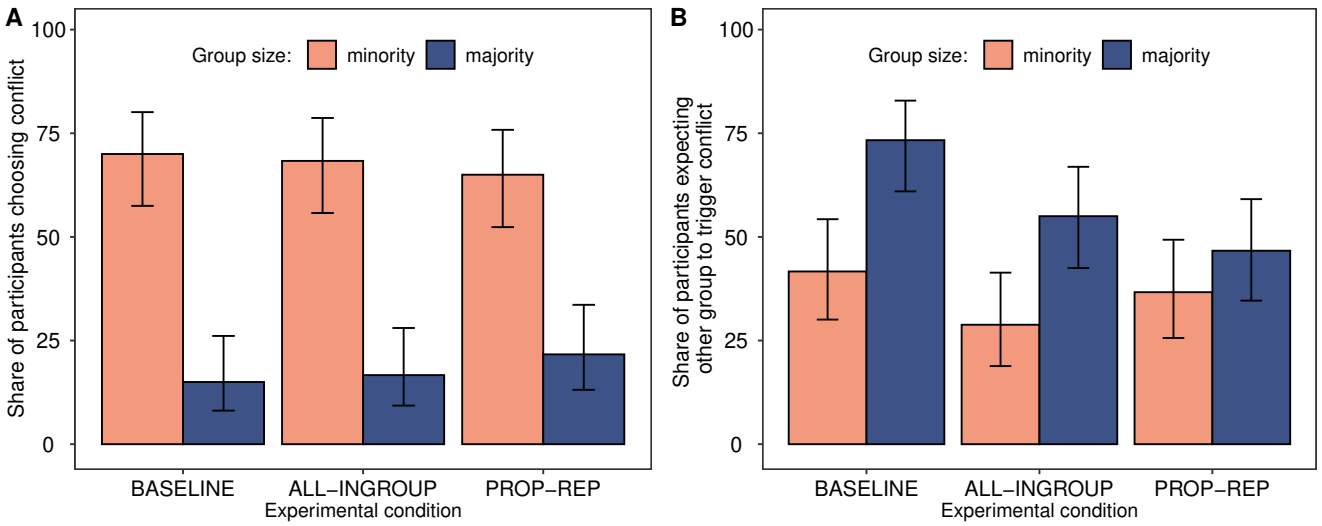

Figure S1: ***Panel A:*** *Share of participants choosing conflict across conditions broken down by group size (minority/majority), individual choices.* ***Panel B:*** *Share of participants expecting other group to trigger conflict across conditions broken down by group size (minority/majority). Both panels: error bars indicate Wilson's 95% confidence intervals for single proportions.*

Choices of and expectations about conflict vs. peace

Fig. S1 shows individual-level conflict choices and beliefs about whether the opponent group would trigger conflict. Estimations (1)-(6) in Table S1 present results from logistic regressions of individual conflict choice and beliefs on experimental condition and further explanatory variables—controlling for repeated measures via participant random effects (package `lme4`, version 1.1-34). Data from conditions BASELINE, ALL-INGROUP, and PROP-REP is included. In VETO participants made their conflict decisions conditional on allocation proposals; thus, these choices are not comparable straightforwardly with those of the other three conditions. We also do not include beliefs in any models explaining beliefs, as the direction of causality is unclear in these cases.

Behavior Main results are as follows. First, members of minority groups choose conflict with significantly higher probability across the three treatment conditions. Second, there is no significant main effect of condition, and also no robust interaction effects of condition with group size (minority/majority) are observed. Interestingly, though, model (3) suggests that majority participants in PROP-REP are somewhat more likely to choose conflict, which is in line with their increased risk of obtaining no positive payoff under the democratic regime that gives equal power to each vote. Moreover, model (3) strongly indicates that players who believe that the other group chooses conflict are more likely to choose conflict as well—in line with our considerations regarding (expected) non-pivotality in Section "Basic setup".

Beliefs Estimations (4)-(6) in Table S1 present results from random-effects logistic regressions of individual beliefs about whether the opponent group would trigger conflict (yes/no) on mostly the same set of independent variables as models (1)-(3). We observe a strong and consistent minority effect

Table S1: *Conflict: Random-effects logistic regressions of individual conflict choice (1 = conflict / 0 = peace; estimations (1)-(3)) and beliefs about the other group triggering conflict (1 = yes / 0 = no; estimations (4)-(6)) on experimental condition and further explanatory variables—controlling for repeated measures via participant random effects (package* `lme4`*, version 1.1-34). Data from conditions BASELINE, ALL-INGROUP, and PROP-REP is included. Decisions and beliefs in VETO were elicited conditional on allocation proposals and are thus not comparable straightforwardly to the other conditions.*

	Dependent variable:					
	Trigger conflict			Expect conflict		
	(1)	(2)	(3)	(4)	(5)	(6)
Minority	2.431***	2.765***	3.283***	−1.068***	−1.552***	−1.478***
	(0.339)	(0.531)	(0.561)	(0.249)	(0.440)	(0.441)
ALL-INGROUP	0.001	0.133	0.516	−0.744*	−0.928*	−0.800
	(0.320)	(0.519)	(0.551)	(0.314)	(0.442)	(0.450)
ALL-INGROUP		−0.215	−0.366		0.294	0.273
× Minority		(0.656)	(0.704)		(0.590)	(0.600)
PROP-REP	0.051	0.476	1.232*	−0.759*	−1.317**	−1.217**
	(0.320)	(0.498)	(0.537)	(0.314)	(0.450)	(0.466)
PROP-REP		−0.718	−1.028		1.084	0.953
× Minority		(0.638)	(0.692)		(0.588)	(0.601)
First round	0.771**	0.777**	1.078***	−0.836***	−0.857***	−0.879***
	(0.265)	(0.267)	(0.299)	(0.244)	(0.248)	(0.254)
Exp. win elect.			−0.505			
			(0.328)			
Exp. allocation			−0.403			
			(0.919)			
Exp. conflict			1.652***			
			(0.348)			
Ind. controls			✓			✓
Constant	−2.035***	−2.242***	−4.774**	1.313***	1.589***	1.601
	(0.362)	(0.450)	(1.778)	(0.301)	(0.375)	(1.500)
Observations	360	360	331	359	359	337
Log Likelihood	−192.835	−192.150	−158.126	−227.984	−226.105	−210.165
Akaike Inf. Crit.	397.670	400.300	348.252	467.968	468.209	446.330
Bayesian Inf. Crit.	420.987	431.389	409.086	491.268	499.276	495.991
Note:						*p<0.05; **p<0.01; ***p<0.001

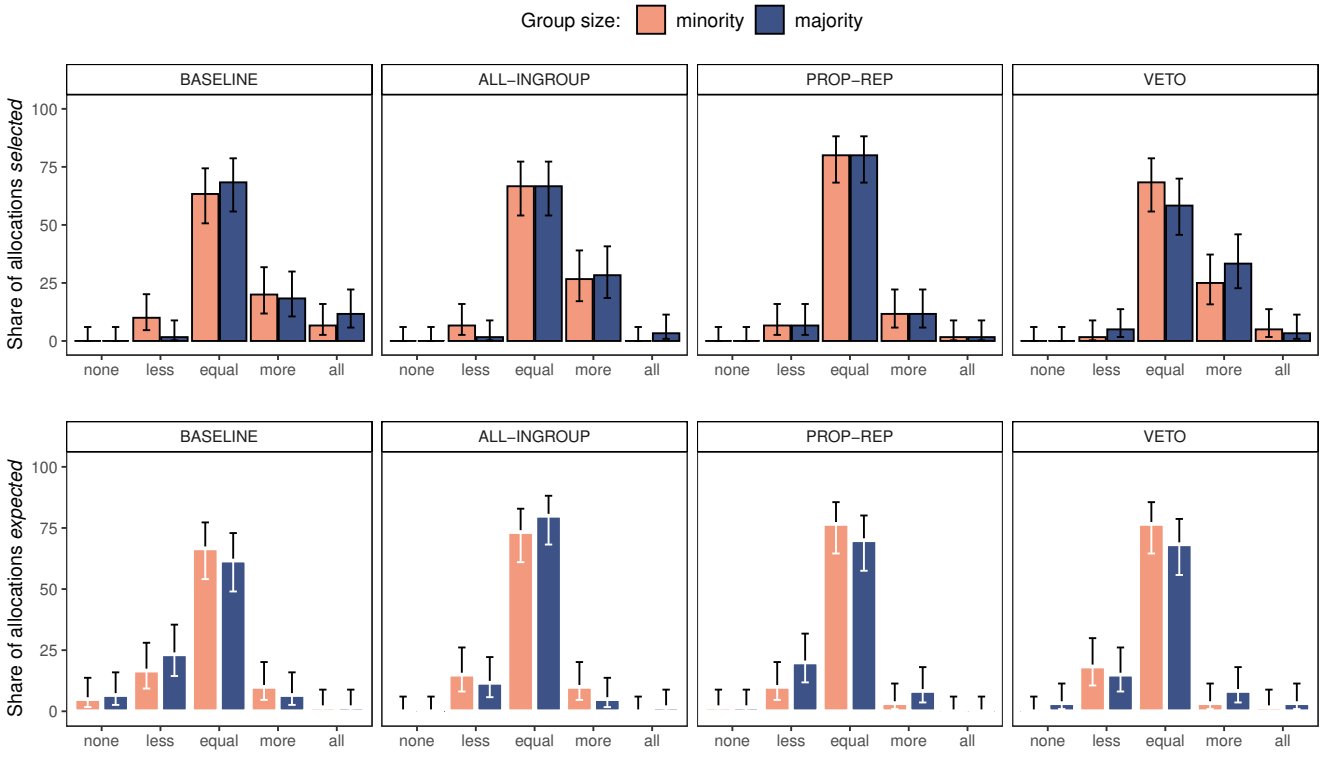

Figure S2: *Individual selection of preferred allocations, upper row, and expectations about allocations selected by respective other group, lower row, across conditions broken down by group size (minority/majority). Error bars indicate Wilson's 95% confidence intervals for single proportions.*

indicating that minorities understood that majorities would be much less inclined to trigger conflict, and vice-versa. Moreover, conditions ALL-INGROUP (in models 4 and 5; $P = 0.076$ in model 6) and PROP-REP (all models) show effects on beliefs which match our suspected reasons for behavioral deviations from benchmark preditions: members of majority groups seem to have expected less aggressive minority behavior from members of the same ethnic group (ALL-INGROUP) and when voting power was more balanced (PROP-REP). Observing these treatment effects on the beliefs of majority groups is in line with the idea that the treatment effects are predicted to affect only the minority group's conflict decision.

Selected and expected allocations

Estimations (1)-(6) in Table S2 present results from random-effects regressions of individual allocation choice and beliefs about allocation choice by the other group on experimental condition and further explanatory variables—controlling for repeated measures via participant random effects (package `lme4`, version 1.1-34). Data from all conditions is included. For ease for interpretation, dependent variables are coded as: 0 = 'none', 0.25 = 'less', 0.4 or 0.6 = 'equal', 0.75 = 'more', 1 = 'all', and represent the respective share of the resource value which is (expected to be) allocated to the own group, also see Table 1. To simplify the interpretation of the estimated coefficients, the results shown are based on linear models; ordered logit models yield qualitatively the same conclusions. Figure S2 shows the distributions of the

Table S2: *Allocations: Random-effects linear regressions of individual allocation choice (estimations (1)-(3)) and beliefs about the amount received from the other group (estimations (4)-(6)) on experimental condition and further explanatory variables—controlling for repeated measures via participant random effects (package* `lme4`*, version 1.1-34). Data from all conditions is included. Coding of the independent variable is according to the group-level resource share: 0 = 'none', 0.25 = 'less', 0.4 (minorities) or 0.6 (majorities) = 'equal', 0.75 = 'more', 1 = 'all'.*

	Dependent variable:					
	Allocation chosen			Allocation expected		
	(1)	(2)	(3)	(4)	(5)	(6)
Minority	−0.158***	−0.173***	−0.157***	−0.140***	−0.095***	−0.093***
	(0.011)	(0.022)	(0.024)	(0.013)	(0.025)	(0.026)
ALL-INGROUP	−0.015	−0.018	−0.007	0.045	0.078**	0.083**
	(0.023)	(0.028)	(0.029)	(0.023)	(0.029)	(0.030)
ALL-INGROUP		0.007	−0.010		−0.067	−0.075*
× Minority		(0.031)	(0.032)		(0.036)	(0.037)
PROP-REP	−0.061**	−0.067*	−0.069*	0.013	0.038	0.035
	(0.023)	(0.028)	(0.029)	(0.023)	(0.029)	(0.030)
PROP-REP		0.013	0.023		−0.050	−0.052
× Minority		(0.031)	(0.033)		(0.036)	(0.038)
VETO	−0.001	−0.022	−0.017	0.026	0.058*	0.068*
	(0.023)	(0.028)	(0.029)	(0.023)	(0.029)	(0.030)
VETO		0.042	0.034		−0.063	−0.066
× Minority		(0.031)	(0.032)		(0.036)	(0.037)
First round	0.033**	0.033**	0.038**	0.007	0.007	0.001
	(0.011)	(0.011)	(0.012)	(0.013)	(0.013)	(0.013)
Exp. allocation			−0.062			
			(0.047)			
Exp. win elect.			0.021			
			(0.016)			
Ind. controls			✓			✓
Constant	0.644***	0.652***	0.689***	0.514***	0.492***	0.499***
	(0.018)	(0.021)	(0.102)	(0.018)	(0.021)	(0.095)
Observations	480	480	445	472	472	445
Log Likelihood	221.428	214.516	177.885	188.227	182.900	154.525
Akaike Inf. Crit.	−426.856	−407.032	−319.771	−360.454	−343.799	−277.050
Bayesian Inf. Crit.	−393.466	−361.120	−246.006	−327.199	−298.072	−211.481
Note:						*p<0.05; **p<0.01; ***p<0.001

underlying data broken down by condition and group size (minority/majority).

We observe only little variance in chosen and expected allocations. Most participants chose 'equal' or 'more' and expected to receive 'less' or 'equal', as indicated by the estimated intercepts somewhat larger than 0.5 in models (1)-(3) and around 0.5 in models (4)-(6). A difference which, *per se*, shows that behavior and expectations were quite well aligned. (Note that the highly significant negative effect of 'Minority' across models is obtained because choosing 'equal' results in a lower group-level share s_G for minorities than for majorities. Looking at per-capita shares, this negative 'Minority' effect disappears.)

Allocations selected For allocation choice, we observe an effect of condition PROP-REP. Here, models (1)-(3) indicate that majority participants were (even) more generous relative to BASELINE: the average amount allocated to the own group decreases by $6.1\% - 6.9\%$. For ALL-INGROUP we observe no significant effect. The fact that the allocations chosen with highest frequency are 'equal' and 'more' already in BASELINE may also explain why there is no further treatment effect of VETO where fully selfish allocations ('all') are predicted to be driven out by the minority's veto power.

Allocations expected For allocation expectations, we observe a partial effect of condition ALL-INGROUP. Here, models (5) and (6) indicate that participants of majority groups expected more generous allocations from the opponent group relative to BASELINE; a finding which is in line with our suspected behavioral deviations from benchmark prediction 1 on ethnic hostility. For minority groups' expectations, however, we find no such effect.

Voting decisions and expectations

To conclude the discussion of the experimental data, we analyze individual voting decisions. The voting choices in the experiment are mostly in line with the theory prediction in that a vast majority of subjects voted for the own group. This holds in particular for members of the majority group who, on average, vote for their own group in 86% of their voting decisions; compare Fig. S3. For members of the minority group, this percentage decreases to 67.50% on average, which is a significant difference (Fisher's exact test, $P < 0.001$). This lower probability in minority groups can be explained by the fact that their votes are not pivotal if everyone in the majority group votes for the own group. Looking at the belief about who wins the election confirms that members of minority groups are indeed much less likely to expect their own group to win: 25.8% in minorities vs. 75.8% in majorities (Fisher's exact test, $P < 0.001$).

Estimations (1)-(6) in Table S3 present results from random-effects logistic regressions of individual voting choice and beliefs on experimental condition and further explanatory variables—controlling for repeated measures via participant random effects (package `lme4`, version 1.1-34).

The estimations largely confirm the aggregate results just discussed. Noteworthy effects of conditions are that majority groups in PROP-REP and VETO show slightly reduced rates of voting for their own group. Moreover, participants in VETO also expected their group to be less likely to win the election. The findings for VETO are in line with the idea that the voting procedure could be less relevant to participants here, because they might anticipate the final allocation decision to represent a compromise

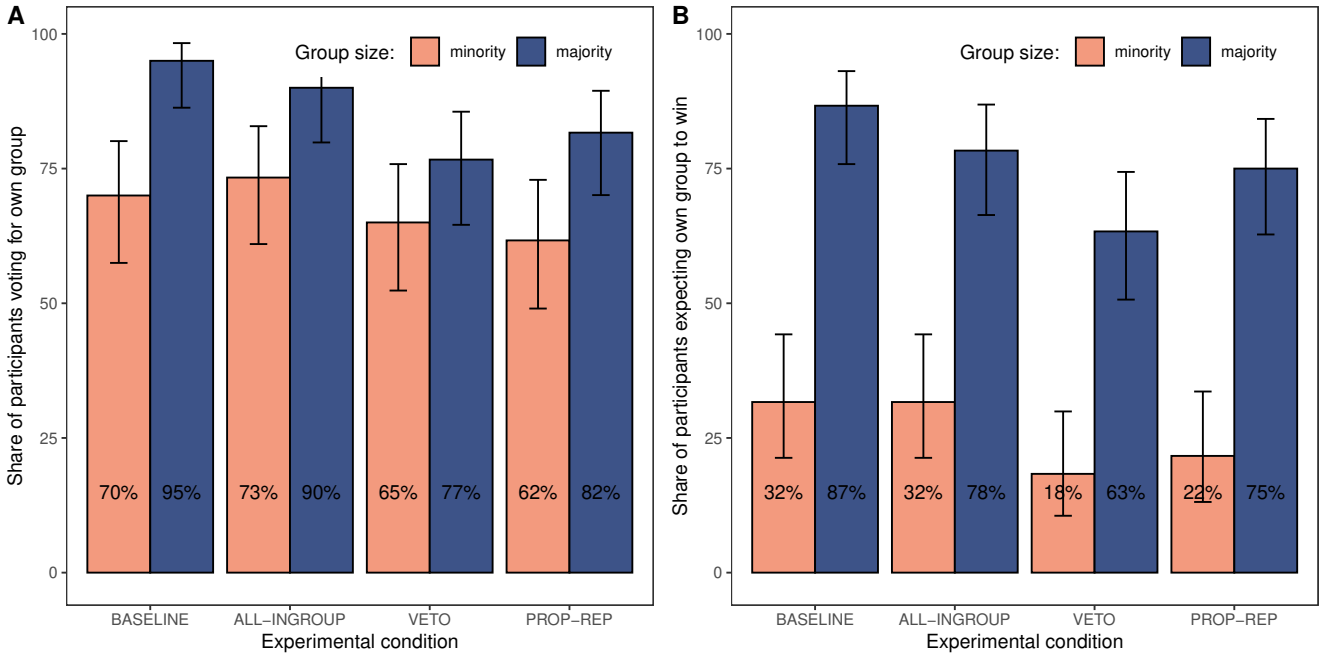

Figure S3: ***Panel A:*** *Individual voting decisions across conditions broken down by group size (minority/majority).* ***Panel B:*** *Individual expectations about whether the own group would win the election across conditions broken down by group size (minority/majority). Error bars indicate Wilson's 95% confidence intervals for single proportions.*

between both groups anyway. Similarly, the slightly lower probability that members of the majority group in PROP-REP vote for their own group could reflect an understanding that, with the 'random dictator' rule, own behavior in the voting procedure has less of an impact on the likelihood that the own (majority) group wins.

Table S3: *Voting: Random-effects logistic regressions of individual voting choice (1 = own group / 0 = other group; estimations (1)-(3)) and beliefs about the own group winning the election (1 = yes / 0 = no; estimations (4)-(6)) on experimental condition and further explanatory variables—controlling for repeated measures via participant random effects (package* `lme4`*, version 1.1-34). Data from all conditions is included.*

	Dependent variable:					
	Voted for own group			Expected win election		
	(1)	(2)	(3)	(4)	(5)	(6)
Minority	-1.132^{***}	-2.167^{**}	-0.925	-2.434^{***}	-2.825^{***}	-2.768^{***}
	(0.245)	(0.670)	(0.774)	(0.303)	(0.532)	(0.529)
ALL-INGROUP	-0.061	-0.770	-0.461	-0.242	-0.613	-0.718
	(0.357)	(0.743)	(0.887)	(0.326)	(0.514)	(0.523)
ALL-INGROUP		0.948	0.792		0.614	0.508
× Minority		(0.850)	(1.009)		(0.649)	(0.663)
PROP-REP	-0.685^{*}	-1.495^{*}	-1.389	-0.622	-0.807	-0.902
	(0.340)	(0.693)	(0.826)	(0.329)	(0.505)	(0.519)
PROP-REP		1.102	1.337		0.263	0.439
× Minority		(0.795)	(0.945)		(0.657)	(0.670)
VETO	-0.730^{*}	-1.810^{**}	-0.982	-1.065^{**}	-1.404^{**}	-1.495^{**}
	(0.339)	(0.681)	(0.829)	(0.340)	(0.495)	(0.503)
VETO		1.569^{*}	1.143		0.628	0.651
× Minority		(0.787)	(0.940)		(0.655)	(0.662)
First round	0.718^{**}	0.722^{**}	1.334^{***}	-0.487^{*}	-0.489^{*}	-0.525^{*}
	(0.233)	(0.235)	(0.309)	(0.225)	(0.226)	(0.231)
Exp. win elect.			3.372^{***}			
			(0.485)			
Exp. allocation			-0.580			
			(0.971)			
Ind. controls			✓			✓
Constant	1.939^{***}	2.710^{***}	0.109	1.989^{***}	2.236^{***}	6.015^{***}
	(0.342)	(0.623)	(1.908)	(0.335)	(0.444)	(1.414)
Observations	480	480	445	480	480	452
Log Likelihood	-240.074	-237.804	-167.174	-261.002	-260.348	-241.449
Akaike Inf. Crit.	494.148	495.609	368.347	536.005	540.696	512.898
Bayesian Inf. Crit.	523.365	537.347	438.015	565.221	582.434	574.603

Note: *p<0.05; **p<0.01; ***p<0.001

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Luke Glowacki, Florian Morath and Hannes Rusch

High minority power facilitates democratization across ethnic fault lines

Abstract
The historical record knows only few instances of democracies waging war against each other. Therefore, democratization is considered key in achieving global peace. However, efforts to achieve sustained democratic governance often fail — Afghanistan being a recent example. Democratization appears particularly challenging where grievances between ethnic groups can spill over into democratic institutions and obstruct the negotiation of mutually beneficial compromises. So far, research on democratization vis-à-vis preexisting ethnic conflict has relied on correlational evidence and historical case studies, making it hard to establish causality. Here, we complement previous work with an economic lab-in-the-field experiment modeling a situation in which unequal groups with ongoing ethnic tensions can solve a joint allocation problem either democratically or aggressively. We find that, as theoretically predicted, minority groups are much more likely to opt for inefficient aggression, but also that equipping minorities with high power under the democratic allocation procedure substantially reduces this problem. Removing ethnic hostility subtly shifts participants' beliefs but does not reduce aggressive behavior. Thus, our results demonstrate that well-designed democratic institutions can achieve efficient, peaceful outcomes even when intergroup hostility is prevalent. However, we also see that their success vitally depends on their inclusivity towards the interests of minority groups.

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