The Sound of Silence
Turnout Neutrality and the Choice of Groups

Niels Boissonnet & Nathanaël Colin-Jaeger*

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Abstract

Abstainers are silent, and every voting rule must say what becomes of their share of the decision. Democracies promise one person, one vote, but they count one voter, one vote. Counting only the ballots is not neutral: it gives the same outcome as counting every abstainer like the average voter, so that a group that votes less weighs less. We study the alternative default, which hands each abstainer's share to the voters of her own group, so that each group weighs its share of the population whatever its turnout. With a blank ballot that means "let all voters decide", the two rules agree on what every ballot means and differ only on what silence means: one voter, one vote is the case in which every non-voter casts a blank ballot. The group default is also as far as a correction can go: when groups are united against each other, no rule that counts ballots equally when everyone votes, rewards nobody for staying home and ignores abstention spread evenly over all groups does more for the groups that vote less. We argue that the default is owed when turnout gaps are produced by the costs of voting and by a circle of neglect and abstention, and that, besides territory, only age meets the conditions for applying it today. In German federal elections, where turnout is high, it would have changed no party's share by more than a quarter of a point; in British general elections, where the age gap in turnout is large, it would have moved one to two points from the Conservatives to Labour.

Keywords— One person, one vote; turnout; abstention; participation; political equality; weighted voting; age.

*Niels Boissonnet is a post-doctoral researcher at Bielefeld University, Germany, Center for Mathematical Economics; Nathanaël Colin-Jaeger is a post-doctoral researcher at the American University of Paris, Center for Critical Democracy Studies.

1 Introduction

Abstainers are silent, and every voting rule can be read as an interpretation of their silence. What they would have chosen, had they sufficient reasons to vote, is not observed. Yet a rule implicitly says what becomes of their share of the decision. The principle of one voter, one vote, which we distinguish from the democratic promise of one person, one vote,[1] seems to be an exception, since it ignores abstention. But disregarding is an interpretation. Counting only the ballots gives the same outcome as counting every abstainer like the average voter (Observation 1). One voter, one vote thus proceeds as if abstainers would have voted like those who did, and spreads their shares over all voters, whatever their group. It departs from one person, one vote whenever some groups vote less than others: their weight then falls with their turnout, although each of their members is one person like any other. Is this departure a wrong? It depends on their reasons to abstain, however pluralistic and imperfeclty observed they may be. A turnout gap can be regarded as innocent when it reflects how much citizens care; it is not when voting costs the members of a group more, or when parties neglect them because they abstain.

The groups that vote less ~~are not a random draw, that~~ is a fact. The young vote less than their elders, the poor less than the rich, and the less educated less than graduates, partly because voting costs them more and parties court them less (Lijphart, 1997; Verba *et al.*, 1995). Handing their abstainers' shares to all voters then lets the very conditions that keep them home also reduce the weight of their interests.

In this paper, we argue that these turnout gaps are largely driven by reasons for which citizens are not to blame, and for which institutions are, and we study a voting rule that neutralizes their effect. The rule interprets the silence of abstainers by assuming that, had they voted, the abstainers of a group would have voted like the voters of their group. Each group then weighs exactly its share of the population, whatever its turnout: a ballot cast in a group that votes half as much as the electorate counts twice. We call the rule *turnout-neutral*. It is one person, one vote between groups and one voter, one vote within them: among the voters of a group, every ballot counts the same.

The rule is not new: Machin (2015) suggested it for age groups in a short blog post, and the generational districts discussed in Japan give the same seat shares under proportional representation (Oguro, 2016). Nor is it radical. Seats are apportioned to districts by population rather than by ballots cast, so a ballot cast in a low-turnout district already weighs more in the composition of the legislature; students of American elections call such districts "cheap seats"

[1] Both phrases come from the same US Supreme Court case, Gray v. Sanders (1963). Justice Douglas wrote that political equality "can mean only one thing—one person, one vote" (p. 381). Justice Stewart, concurring, stated the rule for a single constituency as "one voter, one vote" (p. 382). In the cases that followed, one person, one vote came to govern apportionment: each district receives seats in proportion to its population, voters or not (Reynolds v. Sims, 1964; Evenwel v. Abbott, 2016).

(Campbell, 1996).[2] But the rule has come without an analysis of what it does, without an argument, and without an account of the groups it should apply to. This paper provides all three.

~~We begin with what the rule does.~~ Our main claim is that choosing between one voter, one vote and the turnout-neutral rule is choosing what silence means by default, not choosing between equal and unequal votes. To see this, add to the ballot a blank option that means "let all voters decide". Citizens can then vote, leave their share to the voters of their group by staying home, or leave it to all voters by casting a blank ballot. One voter, one vote is the case in which every citizen who does not vote casts a blank ballot. The two rules then read every ballot in the same way, and differ only in what they make of silence (Proposition 3).

Two critics will object, from opposite sides. The first will find the rule too timid: if the groups that vote less are neglected, why not let their voters speak for every abstainer, or give them more than their share? Our answer is that the rule goes as far as a correction can go. Say that a rule rewards abstention if a citizen can ever help the option she supports by staying home rather than voting for it. Consider every rule that counts all ballots the same when everyone votes, never rewards abstention, and is not affected when every group abstains at the same rate. Suppose that each group votes as a block, some groups for one option and the others for another. Then none of these rules does better for the groups that vote less than the turnout-neutral rule (Theorem 1). Under majority rule, the point is plain: groups that vote less than the others win only if they make up a majority of the population, and under the turnout-neutral rule they win whenever they do. A rule that went further would let some citizens gain by staying home, or would favour some group even when every group votes at the same rate. When groups are divided, the theorem says nothing, and the rule follows from the assumption that those who stay home would have voted like the voters of their group (Section 4.2). The second critic will find the rule too bold. Even if turnout gaps are largely driven by reasons for which citizens are not to blame, some citizens stay home because they do not care, or because they trust others to decide. Why give their share to their group? The blank ballot is our answer: a citizen who would rather leave her share to all voters can say so. The legislature cannot push the correction further, and each citizen can take her own share out of it.

We then argue that, for some groups, the reasons for abstaining (Section 3) justify a cor-

[2] If each group formed a district electing representatives in proportion to its population, by proportional representation, each party would win the share of seats that the turnout-neutral count gives it; the rule obtains this without splitting representatives by group. Statisticians call the operation post-stratification (Little, 1993). Like apportionment, the rule corrects turnout, not numbers. A more numerous group still weighs more, because it has more members, each holding one share. A group that votes more does not hold more shares; it only uses more of them, and under one voter, one vote it also collects the unused shares of the others. The rule stops this collection and changes nobody's share. The precedent supports the mechanism, not our reasons for choosing groups: districts are justified because each elects representatives who serve all its residents (Evenwel v. Abbott, 2016). Our shares count those entitled to vote, not the total population; on this dispute in apportionment law, see Garza v. County of Los Angeles (1990) and Evenwel v. Abbott (2016).

rection. Some of are costs: registering, moving often, knowing where and how to vote. Others come from a vicious circle: parties neglect those who abstain, and citizens abstain because they are neglected. When this circle operates, the groups that vote more dominate the groups that vote less, even if no voter care less. One may reply that those who vote care more about the outcome. Within a group, this is plausible, since its members face similar costs. Between groups, a turnout gap mixes how much citizens care with how much voting costs them, and the rule removes only the gap between groups. In a simple model in which citizens weigh the costs of voting, the outcome of the rule no longer depends on these costs, while the outcome of one voter, one vote does (Proposition 7).

The choice of groups carries the rest of the argument. We state the conditions a characteristic must meet and examine the candidates (Section 6). Age passes. The gap is large and partly due to neglect, age is recorded for every citizen and cannot be changed, and since everyone passes through every age, the correction creates no lasting hierarchy among citizens. Income and education pass the moral test, but they are not recorded on electoral registers. Race, religion and origin fail, because a state that sorted ballots along these lines would not treat its citizens as equals. Finally, we measure what the rule would change. In the German federal elections of 2017, 2021 and 2025, where turnout is high, it would have changed no party's share by more than a quarter of a point, and in 2025 it would have given the most weight to the oldest voters (Section 7). In Britain, where the young vote much less than their elders, it would have taken one to two points from the Conservatives in each general election since 2017, but it would not have reversed the vote to leave the European Union (Section 7.2). The rule does not favour the young, or any group, as such. It corrects whichever group votes less.

Related literature. Machin (2015) also noted that, under the rule, no age group could weigh more than its size. Moyn (2025, 2026) proposes to let young voters vote for the non-voting members of their generation, without a formula, and Oguro (2016) discusses generational districts.[3] Other proposals to weight votes by age rest on the idea that those more affected by a decision, or who will live longer with it, should have more say (Van Parijs, 1998; Goodin, 2007; Arandjelović, 2023; Gosseries, 2022; Angell, 2025); the turnout-neutral rule weights nobody by how much they are affected. Poama & Volacu (2023) ask whether equal opportunity for political influence justifies reducing the weight of older voters, and conclude that age-weighted voting is hard to apply and gives unreliable results across political contexts; the turnout-neutral rule weights nobody by age, and its weights are recomputed at every election from observed turnout. The closest work is Häggrot & Destri (2025), who propose to give a share of legislative seats to non-voters drawn by lot. Their proposal and ours answer the same question—what should

[3]The proposal is usually credited to Ihori & Doi (1998); see also Ihori (2016, ch. 8). Takeuchi (2011) proposed a variant that allocates seats in proportion to remaining life expectancy, which Ishida & Oguro (2018) study in a model of successive generations.

non-votes do?—in opposite ways: they give non-voters a voice of their own; we hand each non-voter's voice to the voters of her group. Foley (2015) gives a third answer: every voter should act on behalf of the whole community. On the meaning of one person, one vote, Fishkin (2012) argues that the doctrine cannot rest on the weight of individual votes, and is better read as protecting the political power of groups of citizens; our argument extends this reading to groups that are not defined by territory. Theories of group representation ask which groups deserve guaranteed seats (Young, 1990; Phillips, 1995; Williams, 1998; Mansbridge, 1999); our question is narrower: between which groups should a count be neutral? The rule can be seen as a vote in two stages: each group splits its share among the options, and the shares are then added with fixed weights. Work on such two-stage votes asks which weights groups of unequal size should receive (Barberà & Jackson, 2006; Koriyama *et al.*, 2013); we take population weights as given and ask what becomes of the shares of those who do not vote. Economic models of voting treat turnout as a sign of how much citizens care (Campbell, 1999; Börgers, 2004; Krishna & Morgan, 2012); Section 3.2 explains why this defence of one voter, one vote fails between groups whose costs differ. Our formal results draw on the axiomatic theory of voting (Young, 1975; Myerson, 1995). With two options, never rewarding abstention is the property that social choice theorists call participation, whose failure is known as the no-show paradox (Fishburn & Brams, 1983; Moulin, 1988); here it limits how far a rule may favour the groups that vote less.

2 Shares, counts and silence

2.1 Equal shares

We take for granted what (Christiano, 2008) calls equal say: political equality requires that collective decisions and their institutional expression advance the interests of all citizens equally, in a way that all can see.[4] Our question is how institutions should interpret the share of a citizen who does not use it.

A *characteristic* partitions the eligible population into groups $i \in \mathcal{G} = \{1, \dots, G\}$, with $G \geq 2$: age groups, income brackets, levels of education, districts. Let $g_i > 0$ be the share of group i in the eligible population, so that $\sum_i g_i = 1$. Citizens choose among a finite set P of $m \geq 2$ options: candidates, party lists, or the answers to a referendum. A *profile* $\mathbf{v} = (v_p^i)$ records the fraction $v_p^i \geq 0$ of group i who vote for p. The turnout of group i is $t_i = \sum_p v_p^i$, assumed positive,[5] and $\sigma_p^i = v_p^i / t_i$ is the share of p among its voters. Overall turnout is $T = \sum_i g_i t_i$.

[4] This is also what Dworkin (2000, ch. 4) calls equality of impact, and the equal political power that relational egalitarians defend (Kolodny, 2014; Viehoff, 2014).

[5] If an entire group abstains, the turnout-neutral count below is not defined. The natural convention is to ignore that group and rescale the shares of the others.

An election turns the shares of citizens into a score for each option. A *count* x assigns to each profile a vector of scores $x(\mathbf{v}) \in \mathbb{R}_+^P$, where $x_p(\mathbf{v})$ is the share of the electorate credited to option p. Every count we consider credits a citizen who votes for p to p. The *ballot count* does only that, $x_p^B(\mathbf{v}) = \sum_i g_i v_p^i$, and its scores sum to T: the shares of abstainers are credited to nobody. This is where a count meets silence. It does not observe what abstainers would have chosen, yet it must say what becomes of their shares: they are either left out, or credited to the options according to some view of how abstainers would have voted had they been forced to vote. Leaving them out, we shall see, is itself such a view. Call an *intepretation of abstention* a map μ that assigns to each profile and group i a distribution $\mu^i(\mathbf{v})$ over the options, and call

$$x_p^\mu(\mathbf{v}) = \sum_i g_i \left(v_p^i + (1 - t_i)\, \mu_p^i(\mathbf{v}) \right)$$

the *completed count*. Its scores sum to one: every citizen counts once, whether or not she votes. Conversely, every count that credits each abstainer to some option is a completed count for some interpretation of abstention. To choose such a count is to choose an interpretation of abstention.[6]

Two interpretations of abstention will occupy us. The first counts every abstainer like the average voter, $\mu^i = \mathrm{PL}$, where $\mathrm{PL}_p = \sum_i g_i v_p^i / T$ is the share of p among the ballots. The completed count is then PL itself: adding the abstainers' shares in proportion to the ballots changes no proportion. It is the interpretation of abstention behind one voter, one vote (Observation 1 below): it spreads the voice of every abstainer over all voters, whatever their group, as if she would have voted like those who did. The second interpretation hands the voice of every abstainer to the voters of her own group, as if she would have voted like them: $\mu^i = \sigma^i$.

Definition 1 (The turnout-neutral count)**.** For every profile $\mathbf{v}$ and option p, $\mathrm{TN}_p(\mathbf{v}) = \sum_{i \in \mathcal{G}} g_i\, \sigma_p^i(\mathbf{v})$.

The count computes each option's share among the voters of each group, then averages these shares with population weights. Both counts have the form

$$x_p(\mathbf{v}) = \sum_j \omega_j\, \sigma_p^j(\mathbf{v}), \qquad \omega_j = \begin{cases} g_j t_j / T & \text{under one voter, one vote,} \\ g_j & \text{under the turnout-neutral count.} \end{cases}$$

We call ω_j the *weight* of group j: the share of the count decided by how its voters vote.[7] Under one voter, one vote, a group weighs its share of the ballots cast; under the turnout-neutral count,

[6] Survey statisticians face the same choice when respondents fail to answer. Filling a missing answer with the answers of respondents in the same cell is called hot-deck imputation (Andridge & Little, 2010); with groups as cells, it is what the turnout-neutral count does.

[7] A group's weight is its share of the count. It is not its voting power in the sense of Penrose (1946) and Banzhaf (1965), which measures how often a voter is decisive.

its share of the population. Equivalently, the turnout-neutral count multiplies each ballot cast in group i by $w_i = T/t_i$, which exceeds one when the group votes less than the electorate as a whole.

Consider a referendum on a climate bill in a country with as many young citizens as seniors. Seventy percent of young voters support the bill, against 35 percent of senior voters. But only 40 percent of the young vote, against 80 percent of seniors. For every hundred young citizens and hundred seniors, the bill thus gets 28 votes from each group, 56 of the 120 ballots cast: it fails with 46.7 percent. Under the turnout-neutral count, it passes with 52.5 percent, the average of 70 and 35, and a young voter's ballot counts 1.5 times, a senior's 0.75 times (Table 1). The weights are computed after the election from observed turnout, and they all equal one when every group votes at the same rate.

	Population share g_i	Turnout t_i	Share of ballots $g_i t_i / T$	Support for the bill σ^i_{yes}	Weight of a ballot w_i
Young	50%	40%	33.3%	70%	1.50
Seniors	50%	80%	66.7%	35%	0.75
All	100%	60%	100%	$\text{PL}_{\text{yes}} = 46.7\%$,	$\text{TN}_{\text{yes}} = 52.5\%$

Table 1: The climate bill. Under one voter, one vote, seniors cast two thirds of the ballots although they are half of the population, and the bill fails. Under the turnout-neutral count, each age group weighs its population share, and the bill passes.

Neither interpretation of silence is written in the principle of political equality. Both are defaults, and a default must be justified by what it does to the interests of the citizen whose share it assigns. Each default names the voters who speak for non-voters: one voter, one vote names all voters; the turnout-neutral count names the voters of the abstainer's group.

From scores to outcomes. An *aggregator* $\mathcal{A}$ turns a vector of scores into an outcome: a set of winners, a distribution of seats, or the passage or rejection of a bill. A *voting rule* assigns an outcome to each profile, and the rules we study are of the form $F = \mathcal{A} \circ x$: the count interprets the silence of those who do not vote, the aggregator turns shares into outcomes. Whatever the aggregator, one voter, one vote is $\mathcal{A} \circ x^B$ and the turnout-neutral rule is $\mathcal{A} \circ \text{TN}$; with the plurality aggregator, they are the rules F^{PL} and F^{TN} that elect the options maximizing PL_p and TN_p. An aggregator is *scale invariant* if $\mathcal{A}(kx) = \mathcal{A}(x)$ for $k > 0$: plurality, proportional representation and qualified majorities are; a turnout quorum is not.[8]

[8] A turnout quorum gives abstention a meaning of its own: in a referendum that requires half of the electorate to vote, staying home counts against the proposal. Under the turnout-neutral count, whose scores always sum to one, such a quorum is always met.

Observation 1. *Under every scale-invariant aggregator,* $\mathcal{A} \circ x^B = \mathcal{A} \circ \mathrm{PL}$*: disregarding abstention gives the same outcome as counting every abstainer like the average voter.*

Indeed $x^B = T\,\mathrm{PL}$, and scale invariance removes the factor T. This is the precise sense in which disregarding is an answer. One voter, one vote does not leave abstainers out of the decision: it proceeds as if they would have voted like those who did, and the voters of every group speak for the abstainers of every group, in proportion to their numbers. Only a rule that looks at turnout itself, such as a quorum, gives silence a meaning of its own. Under plurality, the same outcome also obtains if every abstainer flips a coin, since adding the same score to every option never changes their order; Appendix E shows that this second reading holds for aggregators that look only at the order of the scores (Proposition 13), but not under proportional representation or a qualified majority. Under either reading, one voter, one vote makes an assumption about the silent, just as the turnout-neutral count does.

3 The case for neutralizing turnout

3.1 Two kinds of abstention

Two cases must be distinguished. In the first, the abstainer has chosen not to vote in the way one chooses to delegate. She trusts the judgment of others, she has no strong view, or she thinks the decision does not concern her. Her reason for abstening is her own, and institutions cannot be blamed tfor it. Moreover, her share should then go where she would have wanted it to go. One voter, one vote assumes that this is to the electorate at large; the turnout-neutral count assumes that it is to those who share her situation. Neither assumption is obviously right, and the blank ballot of Section 5 lets her say which she prefers. In the second case, the abstainer has not chosen in any meaningful sense. She stays home because voting is costly for people in her situation, or because nothing on offer speaks to her concerns, or because she has come to believe that politics is not for people like her. Her abstention is a product of circumstances she shares with the members of her group. To hand her share to the electorate at large is then to let the very conditions that keep her from voting also reduce the weight of her interests. To leave it with her group is to keep her interests in the count, as represented by those who share her situation and did vote.[9]

The argument therefore depends on the second case being real: turnout gaps between groups must be, at least in part, produced by circumstances rather than by choice, and insitution may be blamed for it.

[9]Representation by those who share one's situation is descriptive representation, one form of what Pitkin (1967) calls "standing for". Mansbridge (1999) argues that it is valuable under certain conditions; condition (A) of Section 6.1 states ours.

3.2 Between and within groups

The alternative view deserves to be taken seriously. In the economic theory of costly voting, citizens vote when their stake in the outcome exceeds their cost of voting, so that turnout carries information about intensity of preference (Campbell, 1999; Börgers, 2004; Krishna & Morgan, 2012). On this view, the shares of abstainers should go to voters, because voters care more, and counting a group that votes less at its population share would overweight indifference.

This defence of one voter, one vote is sound within a group and unsound between groups. Within a group, citizens face similar costs, and differences in turnout plausibly track differences in intensity. Between groups, costs differ systematically. Registration, information, time and the sense that one's vote counts are unevenly distributed, along the same lines as turnout: the young, the poor and the less educated face higher costs and lower benefits of voting for reasons that have nothing to do with how much they care (Wolfinger & Rosenstone, 1980; Verba *et al.*, 1995; Blais *et al.*, 2019; Hill, 2020). A turnout gap between groups therefore confounds intensity with cost. The turnout-neutral count removes exactly the between-group component and keeps the within-group one. Among the young, those who care more still vote more, and it is their ballots that decide how the young's shares are cast. What the count refuses is that the young, as a group, be counted as caring less because voting is harder for them. It thereby also discards any genuine difference in intensity between groups. But one voter, one vote cannot read that difference either, since costs and intensity are confounded: it attributes the whole gap to intensity, whereas the count attributes none of it.[10]

What the count removes can be written down. Let $\mathrm{Cov}_g(t, \sigma_p) = \sum_i g_i(t_i - T)(\sigma_p^i - \mathrm{TN}_p)$ be the population-weighted covariance, across groups, between turnout and support for p.

Proposition 1 (Where the count bites)**.** *For every profile and option p,*

$$\mathrm{TN}_p - \mathrm{PL}_p = -\,\mathrm{Cov}_g(t, \sigma_p)/T.$$

The two counts differ only when a turnout gap meets a preference gap: when the groups that vote less also want something else. In the example, the covariance is -0.035 and overall turnout 0.6, so the count adds 5.8 points to the bill. A characteristic along which groups vote at the same rate, or want the same things, can be included at no cost to outcomes.

Costs are only half of the story. The other half is a vicious circle between neglect and abstention (Lijphart, 1997). Parties have weak incentives to court habitual abstainers: mobilizing them is expensive, and it may require positions that regular voters dislike (Häggrot & Destri, 2025). When turnout changes, policy follows: compulsory voting in Australia increased

[10] One voter, one vote does not weight the ballots that are cast by intensity either: a voter who is indifferent counts as much as one who is passionate. It is odd to defend the rule by appeal to an intensity signal that it ignores everywhere else.

pension spending (Fowler, 2013), compulsory voting in a Swiss canton increased support for leftist policies (Bechtel *et al.*, 2016), and preregistration in U.S. states raised youth turnout and shifted spending toward higher education (Bertocchi *et al.*, 2020). Neglect, in turn, breeds alienation, and alienated citizens vote less even after controlling for demographics (Finifter, 1970; Teixeira, 1992); non-voters are far more likely to agree that "no one represents people like me" (CEVIPOF, 2022). Abstention invites neglect, neglect breeds alienation, alienation produces abstention. The young illustrate both halves. Their turnout gap is among the most robust in political science (Wolfinger & Rosenstone, 1980; Smets, 2010). They move often, must register anew, and know the procedures less well (Hill, 2020; Sasso & Judd, 2022); they endorse the duty to vote less, which the literature increasingly attributes to the perception that they are poorly represented rather than to indifference (Kiisel *et al.*, 2015; Goerres, 2009); and they remain politically active outside elections (Amnå & Ekman, 2014). On any of these explanations, their abstention is more circumstance than choice.

3.3 Domination

What is wrong with letting such gaps translate into weight? No voter need do anything wrong: a senior who votes for lower education spending wrongs nobody. The wrong lies in the institutions. A group M exploits a group N structurally when the rules of the game let M regularly turn collective decisions to its advantage at N's expense, while N lacks the capacity to defend its interests (Wollner, 2019; Vrousalis, 2013). A voting rule is implicated when it lets turnout gaps produced by circumstances translate into gaps in weight. One may object that voters often vote for what they see as the common good rather than their interests (Brennan & Hill, 2014, p. 41), and Foley (2015) turns this into a norm: voters should act on behalf of the whole community. If they did, one voter, one vote would serve abstainers well. The objection fails for two reasons. First, conceptions of the common good depend on one's situation, so that even a voter who acts on behalf of all sees the common good from where she stands. Second, even a group that does not exploit another dominates it if it *could*: the weaker group depends on the goodwill of the stronger, in violation of non-domination (Pettit, 1997). This domination is exercised through institutions rather than by a master (Gädeke, 2020), and the rule is at fault for allowing it, whatever voters do.

Appendix C makes the mechanism precise with three simple models. In a model of competition between two parties, the weight parties give a group under one voter, one vote is the product of its size, its turnout and its share of voters who can be swayed, and the turnout-neutral rule removes turnout from this product and nothing else (Proposition 5). When turnout responds to policy, one voter, one vote can lock a society into lasting low turnout and neglect, which the rule prevents (Proposition 6). And when citizens decide whether to vote by weighing its costs, the outcome of the rule no longer depends on these costs, while the outcome of one

voter, one vote does (Proposition 7).

4 How far should a correction go?

The turnout-neutral rule gives each group exactly its population share. Two critics will find this arbitrary, from opposite sides. The first holds that the rule does too little: if the young are neglected because they abstain, why not let the group that votes least speak for all abstainers, or give the young more than their share? The second holds that it does too much: some citizens stay home because they do not care, and their share need not go to their group. This section answers the first critic, and Section 5 the second.

4.1 Contests between groups

To favour a group is to let it get its way when it disagrees with others. The cleanest disagreements are those in which every group is united. Consider two options, p and q, and a set of groups S whose voters all vote for q, while the voters of every other group vote for p. We call this the *contest between S and the rest* at turnouts $t = (t_1, \ldots, t_G) \in (0,1]^G$: formally, the profile in which $v_q^i = t_i$ for $i \in S$ and $v_p^j = t_j$ for $j \notin S$. In a contest, only the size of each group and its turnout can matter. How a rule settles contests therefore says how it treats groups as such, apart from how it treats a group's minority, to which Section 4.2 turns.

At a profile in which every ballot goes to p or q, we consider rules whose outcome concerns only p and q, as do all rules $\mathcal{A} \circ x$ with the usual aggregators. The outcome can then be summarized by a number $R \in [0,1]$, the extent to which q prevails over p: 1 if q wins, 0 if p wins, $\frac{1}{2}$ in a tie, and q's share of the seats under proportional representation. Let $\mathcal{V}_{pq}$ be the set of profiles in which every ballot goes to p or q, that is, $v_r^i = 0$ for every group i and every option $r \notin \{p, q\}$. For $\mathbf{v} \in \mathcal{V}_{pq}$, write $R_F(\mathbf{v})$ for the outcome of rule F at $\mathbf{v}$, and $R_F(S,t)$ for its outcome in the contest between S and the rest. We take the aggregator to be *monotone*: R does not fall when the score of q rises and that of p falls. Plurality, proportional representation and qualified majorities are monotone. In the climate example, suppose that every young voter backed the bill and every senior voter opposed it. Under one voter, one vote, the bill would get a third of the ballots and fail. Under the turnout-neutral rule, it would get half of the count, whatever the turnouts, since the young are half of the population.

We compare rules that agree when everyone votes. Call $\mathbf{u}$ a *full-turnout profile* if $t_i(\mathbf{u}) = 1$ for every group i. At such a profile, the ballot count credits every citizen to her choice, and $\mathcal{A}(x^B(\mathbf{u}))$ is the outcome that everyone's votes produce.

Definition 2 (Full-Turnout Equality)**.** A voting rule F satisfies Full-Turnout Equality if $F(\mathbf{u}) = \mathcal{A}(x^B(\mathbf{u}))$ for every full-turnout profile $\mathbf{u}$: when everyone votes, every ballot counts the

same.

The first critic proposes rules of this kind. Under the *least-voting-group rule*, all abstainers are counted like the voters of the group that votes least. In the example, this gives the young 60 percent of the count, and they would win the contest. Under the *smallest-group rule*, all abstainers are counted like the voters of the smallest group, whatever its turnout. Two requirements separate these rules from the turnout-neutral rule.

Axiom 1 (No Reward for Abstention)**.** Let p and q be two options, $\mathbf{v} \in \mathcal{V}_{pq}$ a profile, i a group and $\varepsilon > 0$ with $\varepsilon < t_i(\mathbf{v})$.

(i) If $\varepsilon \leq v_p^i$ and $\mathbf{v}'$ is obtained from $\mathbf{v}$ by replacing v_p^i with $v_p^i - \varepsilon$, then $R_F(\mathbf{v}') \geq R_F(\mathbf{v})$.

(ii) If $\varepsilon \leq v_q^i$ and $\mathbf{v}'$ is obtained from $\mathbf{v}$ by replacing v_q^i with $v_q^i - \varepsilon$, then $R_F(\mathbf{v}') \leq R_F(\mathbf{v})$.

In words: if some voters of a group who vote for p stay home instead, the outcome does not move toward p, and likewise for q. A ballot never hurts the option it is cast for, so a citizen never helps her side by staying home. The condition $\varepsilon < t_i(\mathbf{v})$ keeps some voters in the group, so that its turnout stays positive. With two options, this is the participation property of social choice theory (Moulin, 1988), whose failure is the no-show paradox (Fishburn & Brams, 1983). One voter, one vote satisfies the axiom, and so does the turnout-neutral rule (Proposition 8). The least-voting-group rule violates it. In the contest between the young and the seniors, suppose that seniors' turnout fell from 80 to 35 percent, just below that of the young. Seniors would then capture every abstainer and weigh 80 percent instead of 40, and they would win a contest they were losing. Their side would gain by staying home. A rule that rewards abstention gives a group a reason to vote less, and it makes the outcome depend on turnout in the way the whole argument objects to, only in the other direction.

Axiom 2 (Uniform Abstention)**.** For every full-turnout profile $\mathbf{u}$ in which every ballot goes to p or q, and every $c \in (0, 1]$, $F(c\,\mathbf{u}) = F(\mathbf{u})$.

In words: abstention spread evenly over all groups changes nothing. This is the one case in which one voter, one vote and the turnout-neutral rule agree whatever the voters want, and both satisfy the axiom (one voter, one vote under every scale-invariant aggregator). It is the part of the correction that nobody disputes. The smallest-group rule violates it, since it favours the smallest group even at equal turnout.

How much does a rule favour the groups that vote less? We answer in terms of outcomes. Call a change of turnouts from t to t' a *move against* a set of groups S if no group in S votes more and no group outside S votes less. By No Reward for Abstention, a set of groups never does better in its contest with the rest after a move against it: the move removes ballots for q in S, which cannot raise R, and adds ballots for p outside S, which cannot raise R

either, since removing them cannot lower it. Falling behind never pays. To compare rules, we compare levels. Say that F *favours the groups that vote less at least as much as* F' if $R_F(S,t) \geq R_{F'}(S,t)$ in every contest in which every group of S votes no more than every group outside S. A comparison of levels cannot by itself tell voting less apart from the other reasons a rule may favour a group—the smallest-group rule favours the smallest group whether it votes less or more—which is why it requires Uniform Abstention.

Theorem 1. *Let $\mathcal{A}$ be a monotone aggregator. The turnout-neutral rule $\mathcal{A} \circ \mathrm{TN}$ satisfies Full-Turnout Equality, No Reward for Abstention and Uniform Abstention. If a voting rule F satisfies these three conditions, the turnout-neutral rule favours the groups that vote less at least as much as F: $R_F(S,t) \leq R_{\mathrm{TN}}(S,t)$ in every contest in which $\max_{i\in S} t_i \leq \min_{j\notin S} t_j$.*

The proof is in Appendix A. Its idea is simple. Compare the contest at turnouts t with the contest in which every group votes at a common rate between the turnouts of S and those of the rest. Moving from the second to the first is a move against S, so S does no better at t; and at a common rate, Uniform Abstention and Full-Turnout Equality give the outcome that full turnout would produce, which is the outcome of the turnout-neutral rule.

Among rules that reward nobody for staying home and ignore abstention spread evenly, none gives the groups that vote less a better outcome against the rest. Under the turnout-neutral rule, moreover, falling behind never costs either, since $\mathrm{TN}_q = \sum_{i\in S} g_i$ in every contest. It is the only rule satisfying Full-Turnout Equality and No Reward for Abstention that has this property in contests.[11] Beyond its three conditions, the theorem places no restriction on the form of the rule. The rule need not be built from a count, and the theorem makes no assumption about how abstainers would have voted. With the plurality aggregator, it takes a simple form.

Corollary 1. *Let $\mathcal{A}$ be majority rule: of the two options, the one with the higher score wins. Consider the contest between S and the rest at turnouts t, and say that S wins if q wins. Suppose that the groups in S vote no more than the groups outside S: $\max_{i\in S} t_i \leq \min_{j\notin S} t_j$.*

(a) Under any rule that satisfies Full-Turnout Equality, No Reward for Abstention and Uniform Abstention, S wins only if $\sum_{i\in S} g_i > \frac{1}{2}$.

(b) Under the turnout-neutral rule, S wins if and only if $\sum_{i\in S} g_i > \frac{1}{2}$.

(c) Under one voter, one vote, S wins if and only if $\sum_{i\in S} g_i t_i > \sum_{j\notin S} g_j t_j$.

In words: groups that vote less than the others win only if they make up more than half of the population (a). Under the turnout-neutral rule, this is also sufficient (b). Under one voter,

[11] Let F satisfy both conditions, and suppose that no set of groups ever does worse in its contest after a move against it. By No Reward for Abstention, it never does better either. Let t^S agree with t in S and equal 1 outside S. The change from t to t^S and the change from full turnout to t^S are both moves against S, so that $R_F(S,t) = R_F(S,t^S) = R_F(S,\mathbf{1})$, which is $R_{\mathrm{TN}}(S,t)$ by Full-Turnout Equality.

one vote, what matters instead is whether their voters outnumber the voters of the other groups (c). Part (b) holds because, in a contest, the turnout-neutral score of q is $\sum_{i\in S} g_i$; part (a) then follows from Theorem 1, and part (c) from the fact that the ballot count gives q the score $\sum_{i\in S} g_i t_i$ and p the score $\sum_{j\notin S} g_j t_j$. Under the turnout-neutral rule, what decides a contest between groups is how many people they contain, not how many of them vote.

Counts make the theorem quantitative. Under a quota rule, q wins if its share of the count exceeds a threshold ν, and in a contest the share of q is the weight of S. A group's weight is thus the threshold that separates the quotas under which it wins against the rest from those under which it loses, and applying Theorem 1 to every quota turns statements about outcomes into statements about weights. Appendix B does this for every count that credits the abstainers' shares like the votes of some group, in proportions that depend on turnouts. Under the two axioms, a set of groups that vote less than all others never weighs more than its population share, and weight per member never covaries negatively with turnout (Proposition 4 and Corollary 2). In the example, the covariance between turnout and weight per member is 0.067 under one voter, one vote, zero under the turnout-neutral count, and -0.040 under the least-voting-group count, which rewards abstention.

4.2 Within groups

Theorem 1 concerns contests, in which each group is united, and says nothing about a divided group. Consider the *block count*, which keeps each group at its population share but hands all of a group's abstainers to the option most of its voters chose, as the electoral college hands a state's votes to its plurality winner. In contests, it meets the three conditions of Theorem 1 and gives the same outcome as the turnout-neutral rule, since each group's abstainers go where all its voters go. But it favours the majority within each group at the expense of its minority: in the climate example, the young supporters of the bill would control 44 percent of the count instead of 35, and the young opponents 6 percent instead of 15. If those who stay home are kept away by circumstances they share with their group, they would have voted like the voters of their group, not all like its majority. What should count, then, is a group's mix of views, not how many of its members turn out to express it. Write $\mathbf{v}^{i,\lambda}$ for the profile obtained from $\mathbf{v}$ by multiplying the votes of group i by λ.

Definition 3 (Turnout Neutrality)**.** A voting rule F satisfies Turnout Neutrality if $F(\mathbf{v}^{i,\lambda}) = F(\mathbf{v})$ for every profile $\mathbf{v}$, group i and $\lambda > 0$ such that $\lambda t_i(\mathbf{v}) \leq 1$: a group's weight does not depend on how many of its members vote.

Proposition 2. *Let $\mathcal{A}$ be an aggregator. A voting rule satisfies Full-Turnout Equality and Turnout Neutrality if and only if it is the turnout-neutral rule $\mathcal{A} \circ \mathrm{TN}$.*

The proposition is close to a definition, and we claim no more for it (the proof is in Appendix A). Its use is to state plainly what the rule assumes: that those who stay home would have voted like the voters of their group. One voter, one vote satisfies Full-Turnout Equality but not Turnout Neutrality: if a fifth of the young voters in the example stayed home at random, the bill's share would fall from 46.7 to 45.0 percent although nobody changed her mind. The block count fails Turnout Neutrality too, since the more a group abstains, the larger the share its majority controls. Proposals that weight ballots by stake, lifetime or merit fail Full-Turnout Equality (Table 6 in Appendix F).[12]

5 What should silence mean?

The second critic holds that the rule does too much. Even if turnout gaps are largely driven by reasons for which citizens are not to blame, some citizens stay home out of indifference, and they may not want their share to go to their group. Léa, 24, does not feel competent to judge the climate bill and stays home. Under one voter, one vote, she leaves the decision to all those who vote; in the example, two thirds of them are seniors. Under the turnout-neutral rule, she leaves it to the voters of her own age group. Neither rule asks Léa what she means; each interprets her silence by default.[13] A blank ballot can let her choose.[14]

A profile $(\mathbf{v}, \mathbf{b})$ now also records the fraction b_i of group i who cast a blank ballot, so that $a_i = t_i + b_i \leq 1$ is the fraction who come to the polls. The ballot count is still $x_p^B = \sum_i g_i v_p^i$: like abstention, a blank ballot is credited to no option. A blank ballot counts as a vote for a special option, "let all voters decide": the share of a group that goes to blank ballots is spread over all voters, in proportion to the scores of the options. Citizens can thus vote, delegate to their group by staying home, or delegate to everyone by casting a blank ballot. Formally, call $(\mathbf{u}, \mathbf{c})$ a *full-attendance profile* if $a_i = 1$ for every i, and let $\tau \odot (\mathbf{u}, \mathbf{c})$ be the profile in which a fraction τ_i of each group comes to the polls and splits between the options and the blank ballot like the whole group.

Axiom 3 (Representative Attendance)**.** For every full-attendance profile $(\mathbf{u}, \mathbf{c})$ and every $\tau \in (0,1]^G$, $F(\tau \odot (\mathbf{u}, \mathbf{c})) = \mathcal{A}(x^B(\mathbf{u}))$.

[12] In social choice, a rule whose outcome depends only on the proportions of ballots of each kind is called homogeneous (Smith, 1973); Turnout Neutrality asks for homogeneity within each group.

[13] Abstaining to leave the decision to better-informed voters can be rational: this is the logic of the swing voter's curse (Feddersen & Pesendorfer, 1996). Delegation is also the vocabulary of proxy voting and liquid democracy (Blum & Zuber, 2016).

[14] We call it a blank ballot because current rules already treat a blank ballot this way: like abstention, it is set aside, which leaves the citizen's share to all voters. But blank ballots are often cast in protest (Cohen, 2024). Under the turnout-neutral rule, a protest ballot that hands one's share to all voters would strengthen the groups that vote most. Ballots should therefore say what a blank ballot does, and a separate protest option, if one is wanted, should leave the share with the citizen's group, as abstention does.

In words: if those who stay home would have done what those of their group who come to the polls did, the outcome is the one full attendance would have produced, with blank ballots set aside.

Proposition 3. *Let $\mathcal{A}$ be an aggregator, and F a voting rule on profiles with blank ballots. Let $y_p(\mathbf{v}, \mathbf{b}) = \sum_i g_i v_p^i/(t_i + b_i)$.*

(a) F satisfies Representative Attendance if and only if $F = \mathcal{A} \circ y$.

(b) At every profile in which every citizen who does not vote casts a blank ballot, $y = x^B$, so that $\mathcal{A} \circ y$ coincides with one voter, one vote.

Under a scale-invariant aggregator, the rule elects according to $\mathrm{TN}_p^b = \sum_i \gamma_i \sigma_p^i / \sum_i \gamma_i$, with $\gamma_i = g_i t_i/(t_i + b_i)$, and it reduces to the turnout-neutral rule when nobody casts a blank ballot.[15] Once silence is distinguished from a blank ballot, the two rules agree on what a vote means and on what a blank ballot means. They disagree only on silence: under one voter, one vote, a citizen who stays home is counted as if she had cast a blank ballot; under the turnout-neutral rule, as if she had delegated to her group. The choice between them is not a choice between equal and unequal votes. It is the choice of a default.

The law fills the gaps of contracts with default rules, which apply unless the parties say otherwise, and the usual benchmark is the default most parties would have chosen (Ayres & Gertner, 1989). By condition (A) of Section 6.1, the voters of a citizen's own group share her situation and her interests on the issues at stake; when (A) holds, they speak for her better than the electorate at large. There is a second reason, which comes from the menu itself. A citizen who wants her share to go to everyone can now say so, so the silent include all those for whom the trip to the polls was too costly, whatever they would have chosen there. A default binds most heavily those who cannot opt out of it, and it should be set with them in mind.[16]

Why then not correct partly? A partial correction would treat a fixed fraction λ of each group's silent citizens as if they had cast a blank ballot, which gives group i a weight proportional to $g_i t_i/(t_i + \lambda(1 - t_i))$. Such a rule attributes the same intention to a fixed fraction of every group's silent citizens, although none of them has expressed it. The blank ballot lets each citizen make this choice herself, provided the ballot says what a blank ballot does. Among rules that weight each group by a function of its turnout, the full correction is also the only one that satisfies Turnout Neutrality (Corollary 3).

The two answers now fit together. Theorem 1 says that the legislature cannot push the correction beyond the population share without rewarding abstention or favouring a group for

[15] Like any other ballot, a blank ballot speaks for its share of its group's abstainers. In the example, if one young citizen in ten cast a blank ballot instead of abstaining, the weight of the young would fall from 50 to about 44 percent and the bill would get 50.6 percent.

[16] The rules that say how one may opt out of a default are what Ayres (2012) calls altering rules.

something other than its turnout. The blank ballot lets each citizen take her own share out of the correction. The legislature sets the largest correction it can, and only citizens can reduce it, each for herself. The menu has a cost: a blank ballot requires the same trip to the polls as any other ballot, so a citizen who faces high costs and wants her share to go to everyone cannot say so. But under one voter, one vote, a citizen who wants her share to stay with her group cannot say so at all: no ballot means "count me with my age group". The rule with blank ballots enlarges the menu; it does not shrink it.

6 Which groups?

6.1 Conditions on the characteristic

The argument so far justifies neutralizing a turnout gap between groups defined by *some* characteristic. It does not say which. Since the rule can be defined for any partition of the electorate, the choice of characteristic carries the rest of the normative weight, and it is where most objections to the rule properly belong. We propose seven conditions. The first three say when there is something to correct; the next four say when correcting it is feasible and compatible with political equality.

A characteristic is an admissible basis for turnout neutralization when:

(A) *Shared interests.* Its groups share interests on some issues of public decision, and these interests conflict across groups. Otherwise the voters of a group do not represent its abstainers better than the electorate does.[17]

(B) *Turnout gap.* Its groups differ consistently in turnout. Otherwise there is nothing to correct, and by Proposition 1 the rule does nothing.

(C) *Institutional origin.* The gap is produced, at least in part, by the costs of voting or by the circle of neglect and abstention, rather than by differences in how much the groups care.

(D) *Observability.* The characteristic is recorded for every citizen, for reasons independent of voting.

(E) *Fixity.* Citizens cannot change it cheaply to gain weight, and the boundaries of the groups are fixed in advance by a criterion with independent meaning, not drawn after looking at how people vote.

[17] Young (2000) distinguishes interests, opinions and social perspectives, and grounds the representation of groups in perspectives. Our condition concerns interests, because the interpretation of abstention asks whether a group's voters choose as its abstainers would.

(F) *Equal standing.* Counting ballots by this characteristic does not express or entrench a demeaning hierarchy among citizens, and does not revive an official classification once used to dominate.[18]

(G) *Size.* The groups are large enough for the secrecy of the ballot to be preserved when ballots are counted by group.

Conditions (A)–(C) restate the argument of Section 3 for a given characteristic. They distinguish choice from circumstance, but the rule does not ask any citizen why she abstains: it sets a default for a group and lets each member opt out, and so avoids the intrusive judgments of responsibility for which luck egalitarianism has been criticized (Anderson, 1999). Conditions (D)–(G) answer objections that the argument alone cannot. Condition (F) is relational: it asks what an official classification expresses about the standing of citizens. Theories of group representation ask which groups deserve guaranteed seats (Williams, 1998); counting ballots by group asks instead what it means for the state to sort ballots along a given line.

6.2 The candidates

Table 2 summarizes our verdicts; Appendix F argues each one in detail.

Characteristic	(A) Shared	(B) Gap	(C) Instit.	(D) Recorded	(E) Fixed	(F) Standing	(G) Size	Verdict
Territory	✓	✓	∼	✓	∼	✓	✓	Already practised
Age	✓	✓	✓	✓	✓	✓	✓	Justified
Income, wealth	✓	✓	✓	∼	∼	∼	✓	Normatively strong; not yet feasible
Education	∼	✓	✓	∼	∼	∼	✓	Normatively strong; not yet feasible
Gender	∼	∼	∼	✓	✓	∼	✓	Little to correct
Race, ethnicity	✓	∼	✓	×	×	×	∼	Excluded by (D)–(F)
Religion	∼	∼	∼	×	×	×	∼	Excluded by (D)–(F)
Immigrant origin	∼	✓	∼	∼	✓	×	∼	Excluded by (F)
Disability	∼	✓	✓	∼	∼	∼	∼	Direct remedies first
Occupation	✓	∼	∼	∼	×	∼	∼	Excluded by (E)

Table 2: Candidate characteristics against the conditions of Section 6.1. ✓: satisfied; ∼: partly or contestably; ×: not satisfied. Entries are our judgments for established democracies today and are meant to be argued with.

[18] Equal standing is the central idea of relational egalitarianism (Anderson, 1999; Kolodny, 2023). On what laws and classifications express, see Anderson & Pildes (2000); on when a classification wrongs by demeaning, see Hellman (2008).

Territory satisfies every condition, two of them only in part, and the correction is already in place through apportionment by population. Its difficulties are instructive: they lie in drawing the groups, and gerrymandering is the classic failure of (E).

Age satisfies all seven. Age groups share interests on education, housing, pensions, climate and debt, and these interests conflict (A). The turnout gap is among the most robust known (B), and it is partly produced by costs and by neglect (C). Part of it reflects the life cycle rather than costs or neglect, and the rule corrects that part too. But the rule only changes what silence means: a young citizen who abstains out of indifference leaves her share to the young who vote rather than to everyone, which wrongs no one, and she can cast a blank ballot if she disagrees (Appendix H). The gap is not always monotone: turnout also falls among the oldest (Bhatti & Hansen, 2012), and in Germany in 2025 the rule would have up-weighted the oldest most (Section 7). Date of birth is recorded on the electoral register for reasons that have nothing to do with the rule (D), nobody can change her age, and age groups are defined by thresholds fixed in advance (E). Marking ballots by age expresses no hierarchy: the German electoral statistics have marked ballots by birth-year group for decades, under legal safeguards for the secrecy of the ballot (Wahlstatistikgesetz, 1999) (F). With five or six age groups, cells are large (G). Two further features strengthen the case. Everyone passes through every age group, so the correction creates no permanent class of citizens whose ballots weigh more (Daniels, 1988).[19] And the harms of neglecting the young are among the hardest to repair. This is not the argument that those more affected should have more say: it gives nobody extra weight and does not change the form of the correction. It only says why the age gap matters: decisions on education, climate and debt fall on those who are young when they are taken, and opportunities denied at one stage of life may never return (Bidadanure, 2021).

Income and education pass the normative conditions. Their turnout gaps are large, and they are produced by resources and neglect at least as clearly as the age gap (Verba *et al.*, 1995; Schlozman *et al.*, 2012); in the United States, policy responds to the preferences of the affluent and barely to those of the poor (Bartels, 2008; Gilens, 2012). They fail the institutional conditions today. Neither is recorded on electoral registers; income fluctuates and is measured per household, and both can be gamed at the margin (D), (E). Marking ballots by class or diploma would make an official category at the polling station of what tax brackets and diplomas keep out of the voting booth, and the precedent of Mill's plural voting, in the opposite direction, is not reassuring (F).

[19] The point holds only in part, since the rule's weights change from one election to the next. The same symmetry might seem to excuse one voter, one vote, since today's young will vote more when they are old. McKerlie (2013) argues that inequality between age groups at a given time matters even when complete lives are equal; the rule meets his concern, since at every election it gives each age group its share of the electorate.

The others. Gender largely fails (B): in most established democracies, women now vote at about the same rate as men (Kostelka *et al.*, 2019), and in Germany a count by sex would have changed no party's share by more than 0.03 points (Appendix G). Race, ethnicity, religion and origin can satisfy (A)–(C), since minorities often vote less partly because of past and present suppression (Fraga, 2018). They fail (D)–(F). Registers by race have been the instruments of disenfranchisement, and a state that counted ballots by race, even to the minority's advantage, would revive a classification whose history is one of domination. The wrongs these groups suffer at the polls call for the enforcement of voting rights and the removal of obstacles, not for a correction that needs the classification that made suppression possible.

Verdict. Age is the only characteristic besides territory that passes every condition today. This is not a claim that the class gap matters less than the age gap. It is a claim about what can be done now, with the records democracies keep and the classifications they can be trusted with. Where a characteristic passes (A)–(C) but fails (D)–(G), the right conclusion is not to weight ballots but to ask whether the institutions that would make it feasible are worth having. The conditions are not a licence to multiply corrections; they are a test that most candidates fail.

6.3 Why a counting rule?

Changing how votes are counted should perhaps be a last resort. Lowering the costs of voting—automatic registration, preregistration of young citizens, postal voting—targets a cause of the gap, and it works (Bertocchi *et al.*, 2020). It complements the rule rather than replacing it: it addresses costs but not responsiveness, and the rule switches itself off as it succeeds, since its weights return to one when turnout gaps close. Compulsory voting abolishes silence, and with it turnout gaps, at the cost of coercion (Lacroix, 2007; Umbers, 2020); it also abolishes the delegation that abstention allows, which the rule keeps while changing its default. Quotas and reserved seats guarantee a group's presence among representatives (Phillips, 1995; Williams, 1998), but not that its interests weigh more, and they narrow the range of democratic outcomes. Non-voter sortition (Häggrot & Destri, 2025) represents non-voters as a whole; the rule corrects the distribution of turnout across groups, and the two could be combined. Appendix F discusses these alternatives further.

7 How much would it matter?

7.1 Germany

How large are the rule's effects in real elections? Germany offers a clean test, because it already collects the data the rule needs. In a sample of polling and postal districts, ballots carry a mark for sex and one of six birth-year groups, and the official statistics publish, for each group, the number of eligible voters, the number of voters and the second votes cast for each party (Wahlstatistikgesetz, 1999; Die Bundeswahlleiterin, 2025b). We combine the eligible population by age group, which gives g_i, with the second votes by age group, which give σ_p^i, and compute the turnout-neutral score $\sum_i g_i \sigma_p^i$ for the Bundestag elections of 2017, 2021 and 2025.[20]

Table 3 reports the results for 2025. Three findings stand out. First, the effects are small. No party's share changes by more than 0.21 points in 2025, or by more than 0.09 points in 2017 and 2021. Turnout is high in Germany and the gaps between age groups are moderate, so by Proposition 1 the rule has little to correct. In 2025 it would have moved three seats: two from the AfD to the CDU and one from the Greens to the SPD. Second, the rule does not up-weight the young as such. In 2025 the ballots that would have weighed most are those of citizens aged 70 and over, whose turnout falls with age, as it does elsewhere (Bhatti & Hansen, 2012); in 2017 and 2021, the youngest group was the most up-weighted. Third, the partisan direction changes from one election to the next: in 2017 and 2021, the rule would have helped the Greens and the FDP; in 2025, the CDU and the SPD. The choice of groups matters too. With two age groups instead of six, the CDU's gain in 2025 falls from 0.18 to 0.04 points, because the oldest, who vote less, are merged with the middle-aged, who vote more (Table 7). These are static counterfactuals, which apply the rule to the ballots cast under one voter, one vote; where turnout gaps are large, voters' responses to what their ballots are worth would matter more (Proposition 7).

7.2 Britain

Germany is a hard case for the rule: turnout is high and the gaps between age groups are moderate. Britain is the opposite. Turnout is lower, and the age gap is large: in 2024, an estimated 37 percent of resident adults aged 18 to 24 voted, against 73 percent of those aged

[20] Data: federal rows of the files `btwYY_rws_bw2.csv` and `btwYY_rws_bst2.csv` of the representative electoral statistics (Der Bundeswahlleiter, 2018, 2022; Die Bundeswahlleiterin, 2025b). The published vote totals are calibrated to the official result, so one voter, one vote is the official result. The turnout-neutral score uses only the eligible population, from the register, and the vote shares within groups, so it does not depend on how turnout by age is estimated (Die Bundeswahlleiterin, 2025a). Seats are allocated by the Sainte-Laguë method among the 630 seats of the Bundestag, with the 5 percent threshold; applied to the official result, this reproduces the official allocation. Appendix G gives further results. Code and data are available from the authors.

A. Age groups					
Age	Eligible share g_i (%)	Share of valid votes (%)	Turnout (ballots, %)	Turnout (register, %)	Weight of a ballot
18–24	6.91	6.81	81.2	78.5	1.01
25–34	12.36	12.48	83.1	81.1	0.99
35–44	14.77	15.08	84.1	82.9	0.98
45–59	23.36	24.20	85.4	85.0	0.96
60–69	19.07	19.52	84.4	85.5	0.98
70+	23.52	21.91	77.2	79.3	1.07
All	100	100	82.5	82.5	
B. Parties (second votes)					
Party	One voter, one vote (%)	Turnout-neutral (%)	Difference (points)	Seats (official)	Seats (turnout-neutral)
CDU	22.55	22.73	+0.18	164	166
CSU	5.97	6.00	+0.03	44	44
AfD	20.80	20.59	−0.21	152	150
SPD	16.41	16.58	+0.16	120	121
Greens	11.61	11.52	−0.09	85	84
Die Linke	8.77	8.75	−0.02	64	64
BSW	4.98	4.96	−0.02	0	0
FDP	4.33	4.34	+0.01	0	0

Table 3: The Bundestag election of 2025 under the turnout-neutral rule, with six age groups. The weight of a ballot is the eligible share divided by the share of valid votes. The SSW, exempt from the threshold, keeps its seat. Source: own computations from the representative electoral statistics.

65 and over (Ipsos, 2024). No official statistics record ballots by age in Britain, so the vote shares within age groups come from survey estimates: Ipsos's aggregates of its pre-election polls, weighted to the actual result by region and to the population profile of Great Britain (Ipsos MORI, 2016, 2017, 2019; Ipsos, 2024). The shares g_i are those of the adult resident population of Great Britain in the year of the vote (Office for National Statistics, 2025), and the turnout-neutral score $\sum_i g_i \sigma_p^i$ is compared with the official result (UK Parliament, 2024).

Table 4 reports the results. The effects are about ten times larger than in Germany. In each of the three general elections, the rule would have taken between one and two points from the Conservatives and given most of them to Labour; in 2024 it would also have given about half a point to the Greens. Unlike in Germany, the direction is stable. In Britain the age gap in turnout meets a large and lasting age gap in party choice: in 2024, Labour led the Conservatives by more than thirty points among voters under 35, and trailed them by twenty among voters aged 65 and over. By Proposition 1, this is exactly where the rule bites. It would not have changed the outcome of the 2016 referendum on leaving the European Union: Remain would have gained about one point, and still lost.

A. Weight of a ballot

Age	18–24	25–34	35–44	45–54	55–64	65+
2017	1.17	1.15	1.13	0.96	0.89	0.89
2019	1.31	1.12	1.14	0.98	0.93	0.83
2024	1.50	1.35	1.15	1.01	0.86	0.76

B. Vote shares

Vote	Option	Official result (%)	Turnout-neutral (%)	Difference (points)	Difference within the survey (points)
2016 referendum	Remain	48.1	49.3	+1.2	+1.6 to +2.0
2017 election	Conservative	43.4	42.2	−1.2	−1.5
	Labour	41.0	42.3	+1.3	+1.4
	Liberal Democrat	7.6	7.6	0.0	+0.1
2019 election	Conservative	44.7	42.9	−1.8	−2.1
	Labour	32.9	34.6	+1.7	+2.0
	Liberal Democrat	11.8	11.6	−0.2	0.0
2024 election	Labour	34.6	35.5	+0.9	+1.9
	Conservative	24.4	23.2	−1.2	−3.0
	Reform UK	14.7	14.5	−0.2	−0.4
	Liberal Democrat	12.6	12.7	+0.1	+0.1
	Green	6.9	7.4	+0.5	+1.1

Table 4: Britain under the turnout-neutral rule, with six age groups (seven in 2016, with 65–74 and 75+). Panel A: population share divided by share of ballots, using Ipsos's estimates of turnout among resident adults. Panel B: official results in Great Britain for general elections (Green includes the Scottish Greens) and in the United Kingdom for the referendum. "Difference within the survey" is $\mathrm{TN}_p - \mathrm{PL}_p$ computed from the survey's own turnout estimates (Proposition 1); for 2016, the range covers Ipsos's raw and BES-adjusted turnout estimates. Sources: Ipsos and Ipsos MORI estimates; ONS mid-year population estimates; UK Parliament election results. Own computations.

Two caveats apply. First, survey estimates are less precise than the German statistics. Vote shares within age groups are published rounded to the nearest point, which bounds the resulting error on each score at half a point, and the comparison with the official result mixes the effect of the rule with the survey's own errors. The last column of Table 4 therefore also reports the difference implied by Proposition 1 within the survey. The two columns agree closely except in 2024, where the survey's turnout estimates fit the official result least well; the effect on the Conservatives then lies between one and three points. Second, the resident population includes adults who may not vote, notably citizens of other EU countries, who are disproportionately young, so that it overstates the weight the young would receive. For the referendum, weighting each group by its registered population instead, which errs in the other direction, lowers Remain's turnout-neutral share from 49.3 to about 48.4 percent. Seats cannot

be computed, since constituency results by age do not exist. Like the German figures, these are static counterfactuals.

8 Objections

The rule amplifies an unrepresentative few. The voters of a low-turnout group are not a random sample of it: young voters are more educated and more politicized than young abstainers, and the rule weights their ballots up. The right comparison is with one voter, one vote, which also interprets their silence: it counts every abstainer like the average voter (Observation 1). Let μ_p^i be the proportion of group i's abstainers who would choose p if they voted, and x_p^* the score of p under full turnout, had abstainers been forced to vote. Then

$$x_p^* - \mathrm{TN}_p = \sum_i g_i(1-t_i)(\mu_p^i - \sigma_p^i), \qquad x_p^* - \mathrm{PL}_p = (x_p^* - \mathrm{TN}_p) + (\mathrm{TN}_p - \mathrm{PL}_p)$$

(Proposition 10). The error of the rule comes from selection within groups: abstainers differ from the voters of their own group. One voter, one vote makes the same error and adds a second one: abstainers differ from the electorate as a whole. It is closer to the full-turnout outcome only when the two errors happen to offset each other. The concern about selection is a concern about any rule that counts only those who vote; condition (A) is the requirement that the within-group interpretation of abstention be the better one.[21] The same decomposition answers the worry that up-weighting young voters raises the weight of graduates: under the rule, graduates are over-represented by exactly the selection within age groups, and under one voter, one vote by the same amount plus a term of either sign (Proposition 11 and Appendix H). Selection also depends on the rule: if supporters organize within groups, the rule's equilibrium voters are an exact sample of their group (Remark 1).

The rule has foreseeable partisan effects. In most democracies the young vote less and lean differently from their elders, so the rule's partisan effect can be predicted, and a rule adopted with foreseeable partisan effects lacks the impartiality of a choice made behind a veil. This objection applies to the status quo with the same force. By Proposition 1, the effect on option p of moving from one voter, one vote to the rule is $-\mathrm{Cov}_g(t, \sigma_p)/T$, which is also the exact amount by which turnout gaps tilt one voter, one vote toward p. Whoever objects that the rule would help one party observes, in the same breath, that the current rule helps another by the same amount. An impartiality objection therefore needs a baseline, and the natural one

[21] Political scientists who ask what full turnout would produce impute the preferences of abstainers from those of voters with similar characteristics (Citrin *et al.*, 2003; Bernhagen & Marsh, 2007; Bol & Giani, 2021); they often find modest effects (Highton & Wolfinger, 2001). By Proposition 1, when full turnout would change little, so does the rule.

is the outcome under full turnout, which empirical work on the effects of turnout already uses (Citrin *et al.*, 2003; Bol & Giani, 2021). The rule is closer to it whenever abstainers resemble the voters of their group more than the electorate. Moreover, the direction of the effect need not be fixed. In Germany it changed from one election to the next; in Britain it did not, because age and party choice are closely tied there (Section 7.2). Where the direction is predictable, a rule can be adopted with a delay of several elections, so that those who adopt it cannot know whom it will help.

Unequal weights deny equal standing. Christiano (2008) and Gosseries (2022) argue that weighting votes by age fails to treat older citizens as equals. The rule does not weight anyone by age, or by any personal attribute. It weights groups by population, and a ballot's weight depends on how many members of its group vote, not on who its author is. Each citizen keeps one ballot, and when everyone votes, every ballot counts the same. The rule is symmetric: in Germany in 2025, the ballots of those aged 70 and over would have weighed most. What the rule refuses is that a group's share of the decision depend on how many of its members show up, which is the refusal that underlies the apportionment of seats by population. Condition (F) is where the objection keeps its force: for characteristics whose official marking would itself express a hierarchy, it is decisive, and we have excluded them.

The rule has costs of its own. Table 5 lists standard properties of voting rules. The turnout-neutral rule gives up four that one voter, one vote satisfies. Two identical ballots cast in different groups may weigh differently. With three options or more, a voter can be better off abstaining than voting for her preferred option, since under the rule abstention is a fractional ballot distributed like one's group (Proposition 8); but a ballot for an option never hurts that option. Votes for a third option can change the ranking of two others, since a group's weight is shared among the options its voters choose. And the rule fails reinforcement: an option can win in every district and lose nationally (Section 9). In exchange, it satisfies Turnout Neutrality, caps every group's weight at its population share, and never lets a ballot hurt the option it is cast for. One further cost: while suppressing the turnout of a whole group no longer pays, keeping a few opponents of a low-turnout group away from the polls pays more, because each of their ballots weighs more (Proposition 9). The rule makes the protection of access to the polls more important.

9 Implementation

Counting ballots by group. The rule requires the number of ballots for each option in each group. Germany's representative electoral statistics show how this can be done without

Property	One voter, one vote	Turnout-neutral rule	See
Anonymity across all ballots	✓	×	Section 2
Anonymity within groups	✓	✓	Section 2
Neutrality between options	✓	✓	
No Reward for Abstention: a ballot for p never hurts p	✓	✓	Proposition 8(a)
Participation with three options or more	✓	×	Proposition 8(b)
Votes for r do not change the ranking of p and q	✓	×	Proposition 8(b)
Reinforcement across districts	✓	×	Section 9
Full-Turnout Equality	✓	✓	Proposition 2
Turnout Neutrality	×	✓	Proposition 2
No group weighs more than its population share	×	✓	Section 2

Table 5: Properties of one voter, one vote and of the turnout-neutral rule, with the plurality aggregator. ✓: satisfied; ×: violated.

compromising secrecy (Wahlstatistikgesetz, 1999): in a sample of polling districts, ballots carry a printed mark for sex and birth-year group, and the marked ballots are sent, sealed, to the statistical offices, which count them by group separately from the registers. Under the rule, all ballots would carry the mark, and the count by group would become part of the official result, computed only at a level where cells are large.

Groups and level of aggregation. The partition must be fixed by law in advance, and how fine it is matters: merging groups reintroduces, within each cell, the turnout bias that the rule removes between cells (Corollary 4). The finest partition compatible with the secrecy of the ballot is best, and boundaries should be set mechanically—the age bands of the official statistics, say—since the cut can decide an election (Proposition 12). The shares g_i should be those of the eligible population, from the register where registration is automatic and from census estimates elsewhere; otherwise registration gaps would carry over into the weights. With national groups, the rule fails reinforcement across districts;[22] applying it within districts restores consistency. Under proportional representation, the rule applies to party totals before seats are allocated, and thresholds apply to turnout-neutral shares; in two-round systems, weights are recomputed at each round. If 20 percent of a group vote and 80 percent of another do, a ballot of the first counts four times as much as one of the second. Blank ballots let citizens who do not wish to

[22]Take two districts of equal size, each with two equally large groups. In district A, 90 percent of group 1 vote, 20 percent of them for p, and 10 percent of group 2 vote, 90 percent for p; district B is the mirror image. District by district, p gets 55 percent. With national groups, p's share among the voters of each group is 0.27, and p gets 27 percent.

be represented by their group's voters say so; a floor on turnout in the computation of weights is a cruder safeguard, which gives up Turnout Neutrality below the floor (Corollary 3).

Legal status. In most democracies, the rule would require a constitutional amendment. In the United States, Gray v. Sanders (1963, p. 379) requires that all who participate in an election within a constituency have an equal vote, and Foley (2025) concludes, against Moyn (2025), that weighting the votes of the young is unconstitutional; we agree as a matter of current doctrine. In Germany, Article 38 of the Basic Law requires that every vote have the same counting value (Bundesverfassungsgericht, 2012b). Yet the reasons behind the doctrine are less hostile to the rule than its letter. The wrong Reynolds v. Sims (1964) condemns is that the weight of a citizen's vote depends on where she lives, and its remedy, apportionment by population, already makes the weight of a ballot depend on the turnout of its district. The German Constitutional Court anchors electoral equality in those entitled to vote (Bundesverfassungsgericht, 2012a), as our shares g_i are, and describes the democratic principle as each citizen's equal share in the exercise of public authority (Bundesverfassungsgericht, 2009). Whether counting only ballots is the best way to honour that principle is the question of this paper. Generational districts, which produce the same seat shares under proportional representation while every ballot keeps the same counting value within its district, are a more conservative route (Oguro, 2016).

10 Final remarks

Abstainers are silent, and every voting rule can be read as an interpretation of their silence. One voter, one vote disregards it, which amounts to counting every abstainer like the average voter. The turnout-neutral rule counts her instead like the voters of her own group. With a blank ballot that leaves one's share to all voters, the two rules read every ballot in the same way and differ only in what they make of silence: the choice between them is the choice of a default. We have shown that the group default goes as far as a correction can go: when groups vote as blocks, no rule that counts ballots equally when everyone votes, rewards nobody for staying home and favours no group when all vote at the same rate does more for the groups that vote less. Under the rule, each group weighs its share of the population, and within each group every ballot counts the same. We have argued that this default is owed when turnout gaps are driven by the costs of voting and by neglect rather than by how much citizens care, and that, besides territory, only age meets the conditions for applying it today.

The main open question is empirical. In Germany, where turnout is high, the rule would have changed little; in Britain, where the age gap in turnout is large, it would have moved one to two points between the main parties. How citizens and parties would respond to the rule is something a model can suggest but only experience can tell. Democracies in which the young,

the poor and the less educated vote less will have to decide whether these groups' shares of collective decisions should depend on how many of them show up. We have argued that, for the characteristics that can be counted without wronging anyone, they should not. Between such groups, one person, one vote should not be read as one voter, one vote.

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A Proofs

Proof of Theorem 1. At a full-turnout profile $\mathbf{u}$, $\sigma^i = u^i$ for every group, so that $\mathrm{TN} = x^B$: the turnout-neutral rule satisfies Full-Turnout Equality. Multiplying all turnouts by c leaves every σ^i unchanged, hence Uniform Abstention. Removing ballots for p from group i lowers σ^i_p and raises σ^i_q, so it lowers TN_p and raises TN_q; since $\mathcal{A}$ is monotone, R does not fall, and likewise for q. This is No Reward for Abstention.

Now let F satisfy the three conditions, and take c with $\max_{i\in S} t_i \le c \le \min_{j\notin S} t_j$. The change from the contest in which every group votes at rate c to the contest at turnouts t is

a move against S, so that $R_F(S,t) \leq R_F(S,c\mathbf{1})$. By Uniform Abstention and Full-Turnout Equality, $R_F(S,c\mathbf{1}) = R_F(S,\mathbf{1}) = R_{\mathrm{TN}}(S,\mathbf{1})$. Finally, in a contest $\mathrm{TN}_q = \sum_{i\in S} g_i$ whatever the turnouts, so that $R_{\mathrm{TN}}(S,\mathbf{1}) = R_{\mathrm{TN}}(S,t)$. □

Proof of Proposition 2. The turnout-neutral rule satisfies Full-Turnout Equality (proof of Theorem 1), and Turnout Neutrality because multiplying the votes of group i by λ leaves σ^i unchanged. Conversely, let F satisfy both properties, let $\mathbf{v}$ be a profile, and let $\mathbf{u}$ be the full-turnout profile with $u_p^i = \sigma_p^i(\mathbf{v})$. Multiplying the votes of each group i in turn by $1/t_i(\mathbf{v})$ leads from $\mathbf{v}$ to $\mathbf{u}$, so that Turnout Neutrality gives $F(\mathbf{v}) = F(\mathbf{u})$, and Full-Turnout Equality gives $F(\mathbf{u}) = \mathcal{A}(x^B(\mathbf{u})) = \mathcal{A}(\mathrm{TN}(\mathbf{v}))$, since $x_p^B(\mathbf{u}) = \sum_i g_i\sigma_p^i(\mathbf{v}) = \mathrm{TN}_p(\mathbf{v})$. □

Proof of Proposition 1. Since $\sum_i g_i t_i \sigma_p^i = T\,\mathrm{PL}_p$, $\sum_i g_i\sigma_p^i = \mathrm{TN}_p$, $\sum_i g_i t_i = T$ and $\sum_i g_i = 1$,

$$\mathrm{Cov}_g(t,\sigma_p) = \sum_i g_i t_i \sigma_p^i - \mathrm{TN}_p \sum_i g_i t_i - T\sum_i g_i\sigma_p^i + T\,\mathrm{TN}_p = T\,\mathrm{PL}_p - T\,\mathrm{TN}_p.$$

With two groups, $\mathrm{Cov}_g(t,\sigma_p) = g_1 g_2 (t_1 - t_2)(\sigma_p^1 - \sigma_p^2)$, as for any covariance over two points with weights g_1 and $g_2 = 1 - g_1$. □

Proof of Proposition 3. Write $a_i = t_i + b_i$. (a) The rule $\mathcal{A}\circ y$ satisfies Representative Attendance: at $\tau \odot (\mathbf{u},\mathbf{c})$, group i votes $\tau_i u_p^i$ for p and has attendance $a_i = \tau_i$, so that $y_p = \sum_i g_i u_p^i = x_p^B(\mathbf{u})$. Conversely, let F satisfy the axiom and let $(\mathbf{v},\mathbf{b})$ be a profile. With $\tau_i = a_i$, $u_p^i = v_p^i/a_i$ and $c_i = b_i/a_i$, $(\mathbf{u},\mathbf{c})$ is a full-attendance profile and $(\mathbf{v},\mathbf{b}) = \tau\odot(\mathbf{u},\mathbf{c})$. Hence $F(\mathbf{v},\mathbf{b}) = \mathcal{A}(x^B(\mathbf{u})) = \mathcal{A}(y(\mathbf{v},\mathbf{b}))$. Since $g_i v_p^i/a_i = g_i(t_i/a_i)\sigma_p^i = \gamma_i\sigma_p^i$, $y_p = \sum_i \gamma_i\sigma_p^i$ and $\mathrm{TN}^b = y/\sum_i\gamma_i$; with the plurality aggregator, F therefore elects the options maximizing TN_p^b. (b) If $b_i = 1 - t_i$ for all i, then $a_i = 1$ and $y = x^B$. □

Online appendix

B Weights

This appendix makes Theorem 1 quantitative. The counts of Section 2.1 credit the shares of abstainers like the votes of some group. Consider all counts that do this in proportions depending only on turnouts: a fraction $\eta_j(t)$ of the abstainers' shares is counted like the voters of group j, with $\eta(t) = (\eta_1, \ldots, \eta_G)$ a probability vector. The score of p is then

$$x_p(\mathbf{v}) = \sum_j g_j v_p^j + (1-T) \sum_j \eta_j(t)\, \sigma_p^j = \sum_j \omega_j(t)\, \sigma_p^j, \qquad \omega_j(t) = g_j t_j + (1-T)\, \eta_j(t),$$

and the weights $\omega_j(t)$ sum to one. One voter, one vote has $\eta_j = g_j t_j / T$, the turnout-neutral count $\eta_j = g_j(1-t_j)/(1-T)$, and the partial corrections of Section 5, indexed by λ, go from the first ($\lambda = 1$) to the second ($\lambda = 0$). The least-voting-group count gives all of $1-T$ to the group that votes least, and the smallest-group count to the smallest group.

In the contest between S and the rest, the score of q is the weight of S, $\omega_S(t) = \sum_{i \in S} \omega_i(t)$. Let $\mathcal{A}_\nu$, for $\nu \in (0,1)$, be the *quota aggregator* under which q wins if $x_q > \nu(x_p + x_q)$, p wins if $x_q < \nu(x_p + x_q)$, and the two tie otherwise: $\nu = \frac{1}{2}$ is majority rule, $\nu = \frac{2}{3}$ a two-thirds majority. Under $\mathcal{A}_\nu \circ x$, the set S wins its contest if and only if $\omega_S(t) > \nu$. The weight of S is thus the threshold that separates the quotas under which it wins against the rest from those under which it loses, and applying Theorem 1 to every quota turns statements about outcomes into statements about weights. Every rule $\mathcal{A}_\nu \circ x$ satisfies Full-Turnout Equality, since $\omega = g$ at full turnout. It satisfies No Reward for Abstention for every quota exactly when, at every profile in which every ballot goes to p or q, a ballot for an option never lowers its score; we then say that the count satisfies No Reward for Abstention. It satisfies Uniform Abstention for every quota exactly when $\omega(c\mathbf{1}) = g$ for every c, and we then say that the count does. The partial corrections satisfy both.[23]

Proposition 4. *Consider the counts $x_p = \sum_j \omega_j(t)\sigma_p^j$ above that satisfy No Reward for Abstention.*

(a) A set of groups never gains weight by falling behind: $\omega_S(t') \leq \omega_S(t)$ for every set S and every move against S from t to t'. The weight per ballot of group i, $\omega_i/(g_i t_i)$, is nonincreasing in t_i when other turnouts are fixed.

[23] Uniform Abstention is immediate, and No Reward for Abstention is shown at the end of this appendix. One might also let a share of the abstainers' votes be spread evenly over the options, as under the coin flip of Appendix E. Under the two axioms this share vanishes, so that enlarging the class to allow it changes nothing: by No Reward for Abstention, applied at a profile where every group votes unanimously for the same option, the evenly spread share cannot fall when a group votes less; lowering every turnout to the lowest one therefore cannot lower it; and at equal turnout, by Uniform Abstention, it is zero.

(b) *The turnout-neutral count is the only one under which no set of groups ever loses weight by falling behind.*

(c) *If the count also satisfies Uniform Abstention, a set of groups that vote no more than any group outside it never weighs more than its population share:* $\omega_S(t) \leq \sum_{i \in S} g_i$ *whenever* $\max_{i \in S} t_i \leq \min_{j \notin S} t_j$.

Except for the claim on ballots, which follows directly from No Reward for Abstention, the proposition follows from Theorem 1: if, say, $\omega_S(t)$ exceeded $\sum_{i \in S} g_i$ in (c), a quota between the two would let S win a contest under $\mathcal{A}_\nu \circ x$ that it loses under the turnout-neutral rule. The proof is at the end of this appendix. The simplest case is that of a single group whose own turnout falls, others fixed: if the turnout of the young fell from 40 to 30 percent in the example, they would lose 6.1 points of weight under one voter, one vote, 5.0 under the partial correction with $\lambda = \frac{1}{2}$, and none under the turnout-neutral count. Part (c) turns losses into levels. Its content is clearest when the groups are ordered by turnout, $t_1 \leq \cdots \leq t_G$; write $\Omega_k = \sum_{i \leq k} \omega_i$ and $\Gamma_k = \sum_{i \leq k} g_i$ for the weight and the population share of the k groups that vote least.

Corollary 2. *Under No Reward for Abstention and Uniform Abstention,* $\Omega_k \leq \Gamma_k$ *for every* k*; for every nonincreasing function* φ*,* $\sum_i \varphi(t_i)\, \omega_i \leq \sum_i \varphi(t_i)\, g_i$*; and the covariance between turnout and weight per member is nonnegative,*

$$\sum_i g_i\, (t_i - T) \Big(\frac{\omega_i}{g_i} - 1 \Big) \;\geq\; 0.$$

The turnout-neutral count attains equality throughout.

Weight, spread across turnout levels, never sits further toward low turnout than population does. Among counts that satisfy the two axioms, every measure $\sum_i \varphi(t_i)\, \omega_i$ that values a group's weight more the less the group votes is maximized by the turnout-neutral count, and none makes weight per member covary negatively with turnout. In the example, the covariance is 0.067 under one voter, one vote, 0.043 under the partial correction with $\lambda = \frac{1}{2}$, zero under the turnout-neutral count, and -0.040 under the least-voting-group count, which rewards abstention.[24]

Proof of Proposition 4. Fix a count in the class that satisfies No Reward for Abstention. For every quota $\nu \in (0, 1)$, the rule $\mathcal{A}_\nu \circ x$ then satisfies No Reward for Abstention: at a profile in which every ballot goes to p or q, $x_p + x_q = 1$, so removing ballots for p does not lower x_q

[24] Distance measures, such as the distance between the weights and the population shares, count any response of weights to turnout as a fault, in either direction. They too are built from losses of weight, taken over all changes of turnout and all sets of groups, and the turnout-neutral count is the one count under which no set of groups ever loses weight, whatever happens to turnout; so it minimizes them without any axiom. A general theorem on measures built from losses adds nothing to what precedes.

and the outcome does not move toward p, and likewise for q. (Conversely, if removing ballots for p lowered x_q, a quota between the two values of x_q would turn a win for q into a loss.) The rule also satisfies Full-Turnout Equality, since $\omega = g$ when $T = 1$. In the contest between S and the rest, $x_q = \omega_S(t)$, so its outcome $R_\nu(S,t)$ is 1, $\frac{1}{2}$ or 0 according as $\omega_S(t)$ is above, at or below ν; under the turnout-neutral rule, according as $\sum_{i\in S} g_i$ is.

(a) If $\omega_S(t') > \omega_S(t)$ for a move against S from t to t', a quota ν strictly between the two gives $R_\nu(S,t') = 1 > 0 = R_\nu(S,t)$: S would do better after a move against it, which No Reward for Abstention excludes (Section 4.1). For the weight per ballot, take $t'_i < t_i$, let group i give p the votes $v_p^i = t_i - t'_i$ and q the rest, and let every other group vote unanimously for p. Then $x_p = \omega_i(t)(1 - t'_i/t_i) + 1 - \omega_i(t) = 1 - \omega_i(t)\, t'_i/t_i$. When the voters of p in group i all stay home, its turnout becomes t'_i, none of its voters back p, and $x_p = 1 - \omega_i(t'_i, t_{-i})$. No Reward for Abstention gives $\omega_i(t)/t_i \le \omega_i(t'_i, t_{-i})/t'_i$.

(b) Under the turnout-neutral count, $\omega = g$ does not depend on t. Conversely, suppose that no set of groups ever loses weight by falling behind. By (a), no set ever gains weight either, so that ω_S is unchanged by every move against S. Let t^S agree with t in S and equal 1 outside S. The changes from t to t^S and from full turnout to t^S are both moves against S, so that $\omega_S(t) = \omega_S(t^S) = \omega_S(\mathbf{1}) = \sum_{i\in S} g_i$, since $\omega = g$ at full turnout. Taking $S = \{i\}$ gives $\omega = g$.

(c) The rule $\mathcal{A}_\nu \circ x$ satisfies Uniform Abstention, since $\omega(c\mathbf{1}) = g$. If $\omega_S(t) > \sum_{i\in S} g_i$, a quota between the two gives $R_\nu(S,t) = 1 > 0 = R_{\mathrm{TN}}(S,t)$, which Theorem 1 excludes. □

Partial corrections satisfy No Reward for Abstention. For $\lambda \in [0,1]$, the partial correction of Section 5 gives group j the weight $\omega_j = h_j/H$, with $h_j = g_j t_j/D_j$, $D_j = \lambda + (1-\lambda)t_j$ and $H = \sum_j h_j$. Since $t_j \le D_j \le 1$, $H \le 1 \le 1/D_j$, so $\omega_j \ge g_j t_j$ and the count is in the class; at equal turnout, $\omega = g$. Its score is $x_p = N/H$, with $N = \sum_j g_j v_p^j/D_j \le H$. Raising v_p^i raises t_i by the same amount, so that

$$\frac{\partial N}{\partial v_p^i} = g_i \frac{\lambda + (1-\lambda)(t_i - v_p^i)}{D_i^2} \;\ge\; g_i \frac{\lambda}{D_i^2} = \frac{\partial H}{\partial v_p^i}.$$

Hence $\partial x_p/\partial v_p^i = \big(H\,\partial N/\partial v_p^i - N\,\partial H/\partial v_p^i\big)/H^2 \ge (H-N)\, g_i\lambda/(D_i^2 H^2) \ge 0$, at every profile and for any number of options. □

Proof of Corollary 2. The first claim is Proposition 4(c) with $S = \{1,\dots,k\}$. For the second, since $\Omega_G = \Gamma_G = 1$, summation by parts gives

$$\sum_i \varphi(t_i)(\omega_i - g_i) = \sum_{k=1}^{G-1} \big(\varphi(t_k) - \varphi(t_{k+1})\big)(\Omega_k - \Gamma_k) \;\le\; 0,$$

because $\varphi(t_k) \geq \varphi(t_{k+1})$ and $\Omega_k \leq \Gamma_k$. For the third, $\sum_i(\omega_i - g_i) = 0$, so the covariance equals $\sum_i t_i(\omega_i - g_i)$; take $\varphi(t) = -t$. Under the turnout-neutral count $\omega = g$. □

C Political weights, neglect and endogenous turnout

These models draw on probabilistic voting (Lindbeck & Weibull, 1987; Persson & Tabellini, 2000) and on rule-utilitarian models of turnout (Harsanyi, 1980; Feddersen & Sandroni, 2006), in the group version of Coate & Conlin (2004). Turnout under proportional power sharing has been compared with turnout under winner-take-all (Herrera *et al.*, 2014; Kartal, 2015; Faravelli & Sanchez-Pages, 2015; Cox *et al.*, 2016), and Hizen *et al.* (2025) study, in the laboratory, turnout when groups have fixed weights shared out by vote shares, as under the turnout-neutral rule. To our knowledge, no result shows how fixing a group's weight changes the effect of voting costs on turnout and outcomes; Proposition 7 provides one. Empirical work shows that changes in turnout move outcomes and policy (Fowler, 2013; Bechtel *et al.*, 2016; Hansford & Gomez, 2010; Bertocchi *et al.*, 2020).

C.1 Political weights

How would parties respond to the rule? We use the probabilistic voting model (Lindbeck & Weibull, 1987; Persson & Tabellini, 2000). Two office-motivated parties A and B choose platforms q_A, q_B in a compact convex set Q. A voter j of group i chooses A if $u_i(q_A) - u_i(q_B) > \xi_{ij} + \delta$, where u_i is the policy utility of group i, ξ_{ij} her individual bias toward B, and δ an aggregate popularity shock realized after platforms are chosen.

Assumption 1. (i) Each u_i is continuous and strictly concave. (ii) Within group i, the biases ξ_{ij} are uniform on $[-1/(2\psi_i), 1/(2\psi_i)]$, among voters and abstainers alike. (iii) δ is uniform on $[-1/(2h), 1/(2h)]$. (iv) $|u_i(q) - u_i(q')| + 1/(2h) \leq 1/(2\psi_i)$ for all i and $q, q' \in Q$.

The parameter ψ_i is the density of swing voters in group i. Part (ii) says that abstainers are not ideologically different from the voters of their group; it is the case in which the turnout-neutral interpretation of abstention (Section 2) is exact.

Proposition 5 (Political weights)**.** *Under Assumption 1, the game has a unique Nash equilibrium, in which both parties propose*

$$q^{\mathrm{PL}} = \arg\max_{q \in Q} \sum_i g_i\, t_i\, \psi_i\, u_i(q) \qquad \textit{under one voter, one vote,}$$

$$q^{\mathrm{TN}} = \arg\max_{q \in Q} \sum_i g_i\, \psi_i\, u_i(q) \qquad \textit{under the turnout-neutral rule.}$$

Under one voter, one vote, a group's political weight is the product of its size, its turnout and its share of swing voters. The rule removes turnout from this product and nothing else. With one-dimensional quadratic utilities, $u_i(q) = -(q-\theta_i)^2$, both equilibria are weighted means of the ideal points θ_i, and $q^{\mathrm{PL}} - q^{\mathrm{TN}} = \mathrm{Cov}_\pi(t,\theta)/\sum_i \pi_i t_i$ with weights $\pi_i \propto g_i\psi_i$: one voter, one vote biases policy toward high-turnout groups by exactly the covariance between turnout and ideal points. In the example, if the young want 60 percent of public investment devoted to long-horizon goods and seniors 20 percent, both parties propose 33 percent under one voter, one vote and 40 percent under the rule. The rule leaves the density of swing voters in place: parties still cater to groups with many voters who can be swayed.

C.2 The neglect trap

We now let turnout respond to policy, as the vicious circle of Section 3.2 requires. Take two groups, Y and O, with shares g_Y and $g_O = 1 - g_Y$, a policy $q \in [0,1]$ with $u_Y(q) = -(1-q)^2$ and $u_O(q) = -q^2$, and equal swing densities. At each election $\tau = 0, 1, 2, \ldots$, parties propose the equilibrium policy of Proposition 5 given current turnout. The turnout of O is constant at t_O; the turnout of Y responds to the last policy, $t_{Y,\tau+1} = h(q_\tau)$, with h continuous and strictly increasing. The equilibrium policy is $q^{\mathrm{PL}}(t_Y) = g_Y t_Y/(g_Y t_Y + g_O t_O)$ under one voter, one vote and $q^{\mathrm{TN}} = g_Y$ under the rule.

Proposition 6 (The neglect trap)**.** *(i) Under the turnout-neutral rule, the policy is g_Y at every election and the turnout of Y is $h(g_Y)$ from the second election on. (ii) Under one voter, one vote, the policy converges monotonically to a steady state q^*; at every steady state, $q^* < g_Y$ if and only if $h(q^*) < t_O$, and in that case the turnout of Y is lower, and the policy further from its ideal, than under the rule. (iii) Under one voter, one vote, there can be several stable steady states.*

Figure 1 illustrates (iii). With $g_Y = 0.4$, $t_O = 0.8$ and an S-shaped response of turnout, one voter, one vote has two stable steady states: one in which Y votes at 20 percent and the policy is 0.14, and one in which it votes at 73 percent and the policy is 0.38. Which one a society reaches depends on where it starts. Under the rule, the policy is 0.40 whatever happens to turnout, and turnout settles at 74 percent. The rule breaks the circle at the link that runs from turnout to policy.

C.3 Endogenous turnout

In the neglect trap, turnout responds to policy. It also responds to what a ballot is worth, and the rule changes what a ballot is worth, so it changes who votes. Under the rule, a ballot cast in group i is worth T/t_i ordinary ballots: it is worth more where few of the group vote. A

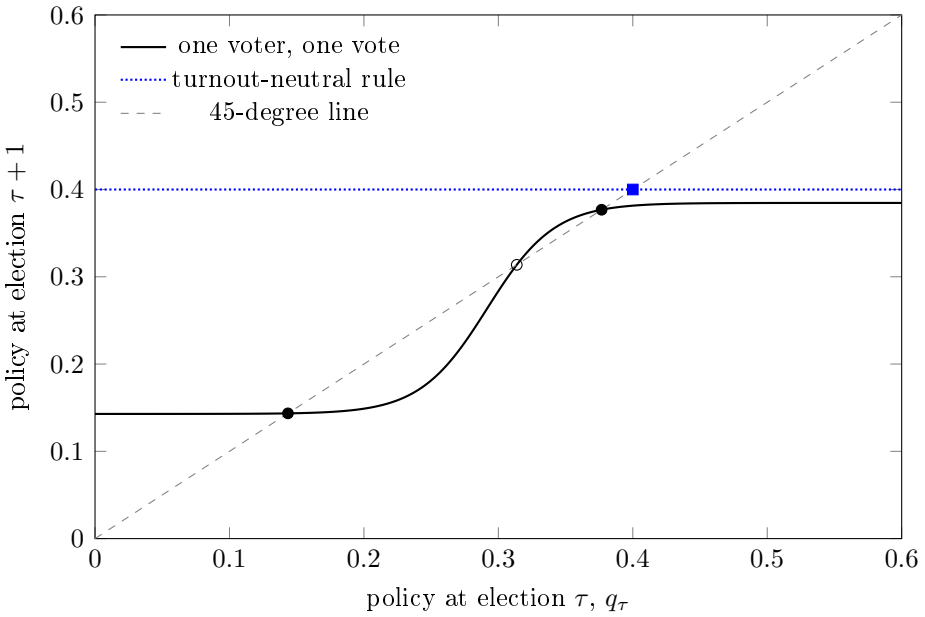


Figure 1: The neglect trap. Under one voter, one vote, the policy chosen at one election determines the low-turnout group's turnout at the next, hence the next policy (solid curve). Filled dots are stable steady states, the hollow dot an unstable one. Under the turnout-neutral rule, the policy is $g_Y = 0.4$ whatever turnout (dotted line). Parameters: $g_Y = 0.4$, $t_O = 0.8$, $h(q) = 0.2 + 0.55/(1 + e^{-40(q-0.3)})$.

high-cost group still votes less, but each of its ballots matters more. Does this offset the effect of costs, and what happens to the outcome?

We answer with the rule-utilitarian model of turnout (Harsanyi, 1980; Feddersen & Sandroni, 2006), in the group version of Coate & Conlin (2004).[25] In this model, citizens do not ask whether their own vote will be decisive. They follow the rule of conduct that, if followed by everyone on their side, would serve their side best. There are two options, A and B, and in group i a share α_i of the members prefer A; write $m_{iA} = g_i\alpha_i$, $m_{iB} = g_i(1-\alpha_i)$ and $M_s = \sum_i m_{is}$. Voting is costly, and costs are where institutions enter: registration, the distance to the polls, the information needed to vote.

Assumption 2. (i) In group i, voting costs are distributed so that a turnout rate τ is achieved by the members whose cost is below $\bar{c}_i\tau^\beta$, for some $\beta > 0$ and cost scale $\bar{c}_i > 0$; with $\beta = 1$, costs are uniform on $[0, \bar{c}_i]$. Costs are independent of preferences within groups. (ii) The supporters

[25] In Harsanyi (1980)'s rule utilitarianism, and in Feddersen & Sandroni (2006), citizens follow the rule that would maximize the welfare of all. In the group version of Coate & Conlin (2004), they maximize the payoff of their side. The group here is the set of an option's supporters, not an age group.

of option s choose turnout rates $(\tau_{is})_i$ in all groups to maximize

$$W\, M_s\, S_s \;-\; \sum_i m_{is}\, C_i(\tau_{is}), \qquad C_i(\tau) = \bar{c}_i\, \frac{\tau^{1+\beta}}{1+\beta},$$

where S_s is the score of s under the rule in force, $W > 0$ is the value of one unit of score to each supporter, and $C_i(\tau)$ is the average cost per member of turning out a fraction τ of them.

The payoff is linear in the score. This fits proportional representation, where seats follow scores, and also a winner-take-all election whose margin is hit by a uniform aggregate shock, as in Assumption 1, where the probability of winning is linear in the expected score. Turnout in group i is $t_i = \alpha_i \tau_{iA} + (1-\alpha_i)\tau_{iB}$, and the share of A among its voters is $\sigma_i = \alpha_i \tau_{iA}/t_i$. We call an equilibrium interior if all turnout rates lie in $(0,1)$, which holds when W is small relative to the cost scales. Write $a_\beta = \sum_i g_i \alpha_i \bar{c}_i^{-1/\beta}$ and $b_\beta = \sum_i g_i (1-\alpha_i) \bar{c}_i^{-1/\beta}$.

Proposition 7 (Endogenous turnout)**.** *Under Assumption 2, consider an interior equilibrium.*

(a) Under the turnout-neutral rule, the share of A among the voters of group i is

$$\sigma_i = \frac{\alpha_i r_i}{\alpha_i r_i + 1 - \alpha_i}, \qquad r_i = \left(\frac{M_A(1-\alpha_i)}{M_B\, \alpha_i} \right)^{\frac{1}{1+\beta}}.$$

It depends neither on the cost scales $(\bar{c}_j)$ nor on turnout in other groups. Hence the outcome $\sum_i g_i \sigma_i$ does not depend on the cost scales.

(b) Under one voter, one vote, the share S of A among the ballots satisfies

$$\frac{S}{1-S} = \left(\frac{M_A}{M_B} \right)^{\frac{1}{1+\beta}} \left(\frac{a_\beta}{b_\beta} \right)^{\frac{\beta}{1+\beta}}.$$

It equals the full-turnout outcome M_A when $a_\beta/b_\beta = M_A/M_B$, for instance when all groups face the same costs, and it exceeds M_A when A's supporters are concentrated in low-cost groups ($a_\beta/b_\beta > M_A/M_B$).

(c) If groups i and j have the same composition ($\alpha_i = \alpha_j$), then $t_i/t_j = (\bar{c}_j/\bar{c}_i)^{1/\beta}$ under one voter, one vote and $t_i/t_j = (\bar{c}_j/\bar{c}_i)^{1/(1+\beta)}$ under the turnout-neutral rule.

(d) If all groups have the same composition, both rules yield the outcome M_A. Overall turnout is lower under the turnout-neutral rule, strictly so unless all cost scales are equal, and there is a threshold c^* such that group i votes more under the rule than under one voter, one vote if and only if $\bar{c}_i > c^*$.

Part (a) is Turnout Neutrality with turnout made endogenous. Making voting costlier for a whole group changes how many of its members vote, but not the composition of its voters, so it no longer changes the outcome. Under one voter, one vote, by part (b), the side whose supporters live in low-cost groups gains. Part (c) says that, with uniform costs ($\beta = 1$), the rule halves the elasticity of a group's turnout with respect to its costs. A group that faces higher costs still votes less, but the gap shrinks, because each of its ballots is worth more. Part (d) says that the rule does not raise turnout overall: low-cost groups vote less, because each of their ballots is worth less, and high-cost groups vote more. Under the rule, the groups no longer compete with each other for weight; within each group, the two sides compete for the group's fixed weight.

The proof is at the end of this appendix. Its key step is that, under the rule, raising the turnout of A's supporters in group i raises A's score in proportion to $(1 - \sigma_i)/t_i$, against $(1-S)/T$ under one voter, one vote. The first-order conditions of the two sides therefore involve only group i, and their ratio pins down the composition of its voters independently of costs.

To see the size of these effects, return to the climate bill and suppose that its turnout gaps are entirely due to costs. With $\beta = 1$, the model reproduces Table 1 under one voter, one vote when the bill's supporters are 67.3 percent of the young and 32.2 percent of seniors, so that the bill would get 49.8 percent under full turnout. Under the turnout-neutral rule, once both camps adjust their turnout, the bill gets 49.8 percent as well, within 0.01 points of the full-turnout outcome. Turnout among the young rises from 40 to 47 percent, among seniors it falls from 80 to 68 percent, and overall turnout falls from 60 to 57 percent. The static figure of Table 1, 52.5 percent, overstates the effect of the rule. Under one voter, one vote, the bill's supporters, disadvantaged by the low turnout of the young, partly compensate by turning out at higher rates within every group; the static calculation keeps this compensation while removing its cause. In this calibration the rule does not pass the bill. It removes the effect of costs on the outcome, which is what our argument asks of it.

Two variants show which conclusions depend on the model. First, suppose that the supporters of an option organize within each group—the young supporters of A, say—rather than across the electorate. Then, under the rule, both sides of every group turn out at the same rate, the voters of each group are an exact sample of it, and the rule yields the full-turnout outcome (Remark 1 in Appendix D). Under one voter, one vote they do not. Second, suppose that citizens vote to raise the weight of their age group rather than the score of an option, as in group-based models of turnout (Uhlaner, 1989; Shachar & Nalebuff, 1999). Under one voter, one vote, a group's political weight rises with its turnout (Proposition 5); under the rule it is fixed, so this motive disappears. The model thus makes the trade-off precise. The rule strengthens partisan reasons to vote where turnout is low, and it removes age-group reasons to vote everywhere. Which effect dominates depends on how citizens are mobilized. The evidence

that party leaders organize much of the mobilization (Shachar & Nalebuff, 1999) suggests the first, but the question is empirical.

The two models of this section capture different channels. In the neglect trap, turnout responds to policy; in Proposition 7, to what a ballot is worth. Neither settles how real citizens would respond to the rule. Our case does not depend on it: the rule is designed to neutralize the effect of turnout gaps on weight, not to close them.

C.4 Proofs

Proof of Proposition 5. Let $\rho_i = g_i t_i$ under one voter, one vote and $\rho_i = g_i$ under the turnout-neutral rule; both rules give A the score $\sum_i \rho_i \sigma_A^i / \sum_i \rho_i$. Write $\Delta_i = u_i(q_A) - u_i(q_B)$. By Assumption 1(ii) and (iv), the share of A among the voters of group i is $\sigma_A^i = 1/2 + \psi_i(\Delta_i - \delta) \in [0,1]$. Hence A wins if and only if $\sum_i \rho_i \psi_i (\Delta_i - \delta) > 0$, that is, if and only if

$$\delta < D(q_A, q_B) = \frac{W(q_A) - W(q_B)}{\sum_i \rho_i \psi_i}, \qquad W(q) = \sum_i \rho_i \psi_i u_i(q).$$

By (iii), A's probability of winning is $\pi(q_A, q_B) = \min\{1, \max\{0, 1/2 + hD(q_A, q_B)\}\}$, nondecreasing in $W(q_A)$ and nonincreasing in $W(q_B)$; B wins with probability $1 - \pi$. By (i), W is continuous and strictly concave on the compact convex set Q and has a unique maximizer q^R. Choosing q^R is a weakly dominant strategy for each party, so (q^R, q^R) is a Nash equilibrium, in which each party wins with probability $1/2$. Conversely, in any Nash equilibrium each party can guarantee $1/2$ by choosing q^R, so each wins with probability exactly $1/2$. If $q_A \neq q^R$, then $W(q_A) < W(q^R)$, and B could deviate to q^R and win with probability $1 - \max\{0, 1/2 - h(W(q^R) - W(q_A))/\sum_i \rho_i \psi_i\} > 1/2$, a contradiction. Hence $q_A = q^R$, and symmetrically $q_B = q^R$. For the quadratic case, the maximizer of $\sum_i \rho_i \psi_i u_i$ over an interval containing all θ_i is the weighted mean $\sum_i \rho_i \psi_i \theta_i / \sum_i \rho_i \psi_i$; with $\pi_i = g_i \psi_i / \sum_j g_j \psi_j$, this gives $q^{\mathrm{TN}} = \sum_i \pi_i \theta_i$ and $q^{\mathrm{PL}} = \sum_i \pi_i t_i \theta_i / \sum_i \pi_i t_i$, whence $q^{\mathrm{PL}} - q^{\mathrm{TN}} = \mathrm{Cov}_\pi(t, \theta) / \sum_i \pi_i t_i$. □

Proof of Proposition 6. (i) follows from $q^{\mathrm{TN}} = g_Y$, which does not depend on turnout. (ii) The map $f(q) = q^{\mathrm{PL}}(h(q))$ is continuous and strictly increasing on $[0,1]$, with values in $[0,1]$. Hence the sequence $q_{\tau+1} = f(q_\tau)$ is monotone: if $q_1 \geq q_0$ then $q_2 = f(q_1) \geq f(q_0) = q_1$, and so on, and similarly if $q_1 \leq q_0$. Being bounded, it converges, and by continuity its limit q^* satisfies $q^* = f(q^*)$. At a steady state, with $t_Y^* = h(q^*)$,

$$q^* < g_Y \iff g_Y t_Y^* < g_Y(g_Y t_Y^* + g_O t_O) \iff t_Y^*(1 - g_Y) < g_O t_O \iff t_Y^* < t_O.$$

In that case, since h is strictly increasing, $t_Y^* = h(q^*) < h(g_Y)$, and q^* is further from 1, the ideal of Y, than g_Y. (iii) In the example of Figure 1, $f(q) - q$ changes sign three times on $[0,1]$,

at $q \approx 0.144$, 0.314 and 0.377. At the first and last, f crosses the diagonal from above, so these steady states are stable; at the middle one it crosses from below. □

Proof of Proposition 7. *Preliminaries.* Write τ_{iA}, τ_{iB} for the turnout rates, $t_i = \alpha_i \tau_{iA} + (1-\alpha_i)\tau_{iB}$, $\sigma_i = \alpha_i \tau_{iA}/t_i$, and $T = \sum_i g_i t_i$. Under one voter, one vote, $S_A = X/(X+Y)$ with $X = \sum_i m_{iA}\tau_{iA}$ and $Y = \sum_i m_{iB}\tau_{iB}$; under the turnout-neutral rule, $S_A = \sum_i g_i \alpha_i \tau_{iA}/(\alpha_i \tau_{iA} + (1-\alpha_i)\tau_{iB})$. In both cases S_A is concave in $(\tau_{iA})_i$ given $(\tau_{iB})_i$, since $x \mapsto x/(x+y)$ is concave and X is linear; symmetrically for $S_B = 1 - S_A$. Since each C_i is strictly convex, each side's objective is strictly concave in its own turnout rates, and an interior equilibrium is characterized by the first-order conditions

$$W\, M_s \frac{\partial S_s}{\partial \tau_{is}} = m_{is}\, \bar{c}_i\, \tau_{is}^{\beta} \qquad \text{for all } i \text{ and } s \in \{A, B\}.$$

The derivatives are $\partial S_A/\partial \tau_{iA} = m_{iA}(1-S_A)/T$ and $\partial S_B/\partial \tau_{iB} = m_{iB} S_A/T$ under one voter, one vote, and $\partial S_A/\partial \tau_{iA} = m_{iA}(1-\sigma_i)/t_i$ and $\partial S_B/\partial \tau_{iB} = m_{iB}\sigma_i/t_i$ under the turnout-neutral rule.

(a) Under the turnout-neutral rule, the first-order conditions are $\bar{c}_i \tau_{iA}^{\beta} = W M_A (1-\sigma_i)/t_i$ and $\bar{c}_i \tau_{iB}^{\beta} = W M_B \sigma_i / t_i$. Dividing the first by the second and using $(1-\sigma_i)/\sigma_i = (1-\alpha_i)\tau_{iB}/(\alpha_i \tau_{iA})$ gives $(\tau_{iA}/\tau_{iB})^{1+\beta} = M_A(1-\alpha_i)/(M_B \alpha_i)$, so that $\tau_{iA}/\tau_{iB} = r_i$ and $\sigma_i = \alpha_i r_i/(\alpha_i r_i + 1 - \alpha_i)$, which involves neither the cost scales nor other groups.

(b) Under one voter, one vote, the first-order conditions are $\bar{c}_i \tau_{iA}^{\beta} = \kappa_A$ and $\bar{c}_i \tau_{iB}^{\beta} = \kappa_B$, with $\kappa_A = W M_A (1-S)/T$ and $\kappa_B = W M_B S/T$ common to all groups. Hence $\tau_{iA} = (\kappa_A/\bar{c}_i)^{1/\beta}$, $\tau_{iB} = (\kappa_B/\bar{c}_i)^{1/\beta}$, and

$$\frac{S}{1-S} = \frac{\kappa_A^{1/\beta} a_\beta}{\kappa_B^{1/\beta} b_\beta} = \left(\frac{M_A}{M_B} \cdot \frac{1-S}{S}\right)^{1/\beta} \frac{a_\beta}{b_\beta}.$$

Solving for $S/(1-S)$ gives the formula. It equals M_A/M_B if and only if $a_\beta/b_\beta = M_A/M_B$, which holds when all $\bar{c}_i$ are equal, and it exceeds M_A/M_B if and only if $a_\beta/b_\beta > M_A/M_B$.

(c) Under one voter, one vote, by (b), $t_i = \bar{c}_i^{-1/\beta}(\alpha_i \kappa_A^{1/\beta} + (1-\alpha_i)\kappa_B^{1/\beta})$, so that $t_i/t_j = (\bar{c}_j/\bar{c}_i)^{1/\beta}$ when $\alpha_i = \alpha_j$. Under the turnout-neutral rule, by (a), $r_i = r_j = r$ and $\sigma_i = \sigma_j = \sigma$ when $\alpha_i = \alpha_j = \alpha$. Then $t_i = k\tau_{iA}$ with $k = \alpha + (1-\alpha)/r$, and the first-order condition for A becomes $\bar{c}_i k\, \tau_{iA}^{1+\beta} = W M_A (1-\sigma)$, whose right-hand side is the same for i and j. Hence $\tau_{iA} \propto \bar{c}_i^{-1/(1+\beta)}$, and so is t_i.

(d) Let $\alpha_i = \alpha$ for all i, so that $M_A = \alpha$, and let $K = W\alpha(1-\alpha)$. Under the turnout-neutral rule, $r_i = 1$ by (a), so $\sigma_i = \alpha$, the outcome is α, and the first-order condition reads $\bar{c}_i t_i^{1+\beta} = K$, so that $t_i = (K/\bar{c}_i)^{1/(1+\beta)}$. Under one voter, one vote, $a_\beta/b_\beta = \alpha/(1-\alpha)$, so $S = \alpha$ by (b), $\kappa_A = \kappa_B = K/T$, and $t_i = (K/(T\bar{c}_i))^{1/\beta}$. Let $y_i = \bar{c}_i^{-1/(1+\beta)}$ and $p = (1+\beta)/\beta > 1$, and write $\mathcal{M}_p(y) = (\sum_i g_i y_i^p)^{1/p}$ for the power mean of order p. Summing $g_i t_i$ gives $T^p = K^{1/\beta} \sum_i g_i y_i^p$ under one

voter, one vote, so $T^{\mathrm{PL}} = K^{1/(1+\beta)}\mathcal{M}_p(y)$, while $T^{\mathrm{TN}} = K^{1/(1+\beta)}\sum_i g_i y_i = K^{1/(1+\beta)}\mathcal{M}_1(y)$. By the power-mean inequality, $\mathcal{M}_1(y) \le \mathcal{M}_p(y)$, with equality if and only if all y_i are equal. Finally, $t_i^{\mathrm{PL}} = K^{1/(1+\beta)}\mathcal{M}_p(y)^{-1/\beta} y_i^p$ and $t_i^{\mathrm{TN}} = K^{1/(1+\beta)} y_i$, so $t_i^{\mathrm{TN}} > t_i^{\mathrm{PL}}$ if and only if $y_i^{p-1} < \mathcal{M}_p(y)^{1/\beta}$, that is, since $p - 1 = 1/\beta$, if and only if $y_i < \mathcal{M}_p(y)$, or $\bar{c}_i > c^* = \mathcal{M}_p(y)^{-(1+\beta)}$. □

D Further properties of the rule

Weights that depend on turnout. A natural way to design a correction is to weight each ballot by a function of its group's turnout. Only one function works. Let $\phi : (0,1] \to (0,\infty)$ and $F^\phi(\mathbf{v}) = \arg\max_p \sum_i g_i \phi(t_i) v_p^i$.

Corollary 3. *F^ϕ satisfies Turnout Neutrality if and only if there is $k > 0$ such that $\phi(t) = k/t$ for all $t \in (0,1]$. In that case $F^\phi = F^{\mathrm{TN}}$.*

Proof. If $\phi(t) = k/t$, then $\sum_i g_i \phi(t_i) v_p^i = k\,\mathrm{TN}_p$ and $F^\phi = F^{\mathrm{TN}}$. Conversely, suppose F^ϕ satisfies Turnout Neutrality and let $c(t) = t\phi(t) > 0$, so that $\sum_i g_i \phi(t_i) v_p^i = \sum_i g_i c(t_i) \sigma_p^i$. Suppose by contradiction that $c(t) \neq c(t')$ for some $t, t' \in (0,1]$. Take options p, q and groups $1, 2$. In the profiles below, all other options receive no votes, and every other group votes at full turnout, half for p and half for q, adding the same amount to both scores. Group 2 votes at full turnout and group 1 at turnout t. Let $d = g_1 c(t)$ and $e = g_2 c(1)$. If $d \le e$, let group 1 vote only for p and group 2 vote for p in proportion $(1 - d/e)/2$ and for q otherwise. If $d > e$, let group 2 vote only for q and group 1 vote for p in proportion $(1 + e/d)/2$ and for q otherwise. In both cases the scores of p and q are equal, so $F^\phi(\mathbf{v}) = \{p, q\}$. Now multiply the votes of group 1 by $\lambda = t'/t$, bringing its turnout to $t' \le 1$ without changing σ^1. The difference between the scores becomes $g_1(c(t') - c(t))(\sigma_p^1 - \sigma_q^1) \neq 0$, since $\sigma_p^1 - \sigma_q^1 > 0$ in both cases. Hence F^ϕ now elects a single option, contradicting Turnout Neutrality. So c is constant, equal to some $k > 0$, and $\phi(t) = k/t$. □

Under the blank-ballot interpretation of Section 5, the partial corrections that keep a clear meaning are those with $\phi(t) = 1/(t + \lambda(1-t))$ for some $\lambda \in [0,1]$: they treat a fixed fraction λ of every group's non-voters as casting a blank ballot. By Corollary 3, only $\lambda = 0$ satisfies Turnout Neutrality.

Participation. Consider citizens who abstain at a profile $\mathbf{v}$ and make up a fraction $\varepsilon > 0$ of group i, and let $\mathbf{v}^{+p}$ be the profile in which they vote for p instead.

Proposition 8 (Participation). *(a) $\mathrm{TN}_p(\mathbf{v}^{+p}) \ge \mathrm{TN}_p(\mathbf{v})$ and $\mathrm{TN}_q(\mathbf{v}^{+p}) \le \mathrm{TN}_q(\mathbf{v})$ for every $q \neq p$; hence if p wins when they abstain, it still wins when they vote for p, and with two options no group of voters is better off abstaining than voting for its preferred option. (b) With*

three options or more, a group of voters can be better off abstaining than voting for its preferred option.

Proof. (a) Write $t = t_i(\mathbf{v})$. Only the shares of group i change: σ_p^i becomes $(v_p^i+\varepsilon)/(t+\varepsilon) \geq v_p^i/t$, since $v_p^i \leq t$, and σ_q^i becomes $v_q^i/(t+\varepsilon) \leq v_q^i/t$. (b) Take two groups of equal size. Forty percent of group 1 vote, all for a centre-left party q; sixty percent of group 2 vote, 2 percent of them for q and 98 percent for a right-wing party r. Then $\mathrm{TN}_q = 0.51$ and $\mathrm{TN}_r = 0.49$. If 2 percent of group 1, who abstained, vote for a green party p that they prefer to q, and q to r, the share of q among group 1's voters falls to 0.4/0.42, TN_q falls to 0.486, and r wins with 0.49. Had they abstained, q would have won. □

Under one voter, one vote, voting for p cannot change the ranking of the other options. Under the rule, abstaining is a fractional ballot distributed like one's group, and a voter who prefers this mix to her own ballot may choose it. By (a), the mix never gives her something no ballot could: if an option wins when she abstains, it also wins if she votes for it. The example in (b) also shows that votes for a third option p can change the ranking of q and r (Table 5).

Mobilization, persuasion and suppression. Suppose there are two options A and B, and consider a group i and a small fraction ε of its members. Mobilization turns ε abstainers into A voters; persuasion turns ε B voters into A voters; selective suppression keeps ε B voters away from the polls. We compare their marginal effects, as $\varepsilon \to 0$, on the margin that decides the election: A's score minus B's under the rule, and A's share of the ballots minus B's under one voter, one vote, evaluated at a tie.

Proposition 9. *(a) Under one voter, one vote, mobilization is worth half as much as persuasion in every group; under the rule, it is worth $1-\sigma_A^i$ times as much. (b) Persuading voters of group i moves the margin T/t_i times as much under the rule as under one voter, one vote. (c) Under the rule, a change in a group's turnout that leaves the composition of its voters unchanged has no effect; under one voter, one vote, a proportional fall in the turnout of group i raises A's share if and only if $\sigma_A^i < \mathrm{PL}_A$. (d) Selective suppression in group i moves the margin $2\sigma_A^i\, T/t_i$ times as much under the rule as under one voter, one vote.*

Proof. Write $t = t_i$, $V_A = \sum_j g_j v_A^j$, $V_B = \sum_j g_j v_B^j$, so $V_A + V_B = T$; at a tie $V_A = V_B$. Under the rule, group i contributes $g_i(v_A^i - v_B^i)/t$ to the margin, and the other groups' contributions are unaffected. (a) Under one voter, one vote, mobilization changes the margin by $g_i\varepsilon/(T+g_i\varepsilon)$ at a tie and persuasion by $2g_i\varepsilon/T$; the ratio tends to 1/2. Under the rule, mobilization changes group i's contribution by $g_i\varepsilon(t - v_A^i + v_B^i)/(t(t+\varepsilon)) = 2g_i\varepsilon\sigma_B^i/(t+\varepsilon)$, since $t - v_A^i + v_B^i = 2v_B^i$ with two options, and persuasion by $2g_i\varepsilon/t$; the ratio tends to $\sigma_B^i = 1 - \sigma_A^i$. (b) Persuasion leaves the number of ballots unchanged; it changes the margin by $2g_i\varepsilon/T$ under one voter,

one vote and by $2g_i\varepsilon/t$ under the rule. (c) The first claim is Turnout Neutrality; for the second, $\partial \mathrm{PL}_A/\partial t_i = g_i(\sigma_A^i - \mathrm{PL}_A)/T$ when v^i is scaled proportionally. (d) Under one voter, one vote, at a tie, removing ε B voters changes the margin by $g_i\varepsilon/(T - g_i\varepsilon)$; under the rule, by $g_i\varepsilon(t + v_A^i - v_B^i)/(t(t-\varepsilon)) = 2g_i\varepsilon\sigma_A^i/(t-\varepsilon)$. The ratio tends to $2\sigma_A^i T/t$. □

By (a), the rule makes it less attractive to rally a base that already dominates its group, and more attractive to mobilize where a party trails; this is the force behind Proposition 7. By (b), persuading voters of low-turnout groups pays more. By (c), discouraging a whole group from voting no longer pays, unless it also changes the composition of its voters. By (d), keeping a few opponents of a low-turnout group away from the polls pays more: in the example, removing a few young opponents of the bill is worth about twice as much under the rule as under one voter, one vote (the factor is 2.1 at a tie and 2.25 at the profile of Table 1).

Imputation errors. Let μ_p^i be the proportion of group i's abstainers who would choose p if they voted, and $x_p^* = \sum_i g_i(t_i\sigma_p^i + (1-t_i)\mu_p^i)$ the score of p under full turnout: the completed count of Section 2.1 with abstainers credited as they would actually have voted.

Proposition 10. *$x_p^* - \mathrm{TN}_p = \sum_i g_i(1-t_i)(\mu_p^i - \sigma_p^i)$ and $x_p^* - \mathrm{PL}_p = \sum_i g_i(1-t_i)(\mu_p^i - \mathrm{PL}_p) = (x_p^* - \mathrm{TN}_p) + (\mathrm{TN}_p - \mathrm{PL}_p)$.*

Proof. Since $\sum_i g_i t_i \sigma_p^i = T\,\mathrm{PL}_p$, $x_p^* - \mathrm{TN}_p = \sum_i g_i t_i \sigma_p^i + \sum_i g_i(1-t_i)\mu_p^i - \sum_i g_i\sigma_p^i = \sum_i g_i(1-t_i)(\mu_p^i - \sigma_p^i)$, and $x_p^* - \mathrm{PL}_p = T\,\mathrm{PL}_p + \sum_i g_i(1-t_i)\mu_p^i - \mathrm{PL}_p = \sum_i g_i(1-t_i)(\mu_p^i - \mathrm{PL}_p)$, using $\sum_i g_i(1-t_i) = 1 - T$. The last equality is an identity. □

A second characteristic. Let a second characteristic, such as holding a degree, be shared by a fraction e_i^P of the members of group i and by a fraction e_i^V of its voters. Its weight in the count is $E^{\mathrm{TN}} = \sum_i g_i e_i^V$ under the rule and $E^{\mathrm{PL}} = \sum_i g_i t_i e_i^V/T$ under one voter, one vote, and its share of the eligible population is $E^* = \sum_i g_i e_i^P$. Write $\mathrm{Cov}_g(t, e^V) = \sum_i g_i(t_i - T)(e_i^V - E^{\mathrm{TN}})$.

Proposition 11. *$E^{\mathrm{TN}} - E^* = \sum_i g_i(e_i^V - e_i^P)$ and $E^{\mathrm{PL}} - E^* = (E^{\mathrm{TN}} - E^*) + \mathrm{Cov}_g(t, e^V)/T$.*

Proof. The first equality is the definition. For the second, apply Proposition 1 with e_i^V in place of σ_p^i: $E^{\mathrm{TN}} - E^{\mathrm{PL}} = -\mathrm{Cov}_g(t, e^V)/T$. □

Merging groups.

Proposition 12. *If groups i and j are merged into one, with $\alpha = g_i/(g_i + g_j)$, the turnout-neutral score of option p changes by $(g_i + g_j)\,\alpha(1-\alpha)(t_i - t_j)(\sigma_p^i - \sigma_p^j)/(\alpha t_i + (1-\alpha)t_j)$.*

Proof. Write $g = g_i + g_j$ and $\beta = 1-\alpha$. Before merging, the two groups contribute $g(\alpha\sigma_p^i + \beta\sigma_p^j)$. After merging, the share of p among the merged group's voters is $(\alpha t_i\sigma_p^i + \beta t_j\sigma_p^j)/(\alpha t_i + \beta t_j)$, and the group contributes g times this share. The difference is $g\,\alpha\beta(t_i - t_j)(\sigma_p^i - \sigma_p^j)/(\alpha t_i + \beta t_j)$, since $\alpha t_i\sigma_p^i + \beta t_j\sigma_p^j - (\alpha\sigma_p^i + \beta\sigma_p^j)(\alpha t_i + \beta t_j) = \alpha\beta(t_i - t_j)(\sigma_p^i - \sigma_p^j)$. □

Corollary 4. *Let the groups be merged into cells C, with $g_C = \sum_{i\in C} g_i$, within-cell weights g_i/g_C, mean turnout $\bar{t}_C = \sum_{i\in C}(g_i/g_C)t_i$, and within-cell covariance $\mathrm{Cov}_C(t, \sigma_p)$. The turnout-neutral score of p computed on the cells exceeds the score computed on the groups by*

$$\sum_C \frac{g_C\ \mathrm{Cov}_C(t, \sigma_p)}{\bar{t}_C}.$$

Proof. Within a cell, the merged share of p among voters is $\sum_{i\in C} g_i t_i \sigma_p^i/(g_C\bar{t}_C)$, and the cell contributes g_C times it, against $\sum_{i\in C} g_i\sigma_p^i$ before merging. The difference is $g_C\big(\sum_{i\in C}(g_i/g_C)t_i\sigma_p^i - \bar{t}_C\bar{\sigma}_C\big)/\bar{t}_C = g_C\,\mathrm{Cov}_C(t, \sigma_p)/\bar{t}_C$, where $\bar{\sigma}_C = \sum_{i\in C}(g_i/g_C)\sigma_p^i$. Summing over cells gives the result. □

Supporters organized within groups.

Remark 1. Modify Assumption 2(ii) so that the supporters of s in group i form their own team, maximizing $m_{is}\big(W\,S_s - C_i(\tau_{is})\big)$. Under the turnout-neutral rule, every interior equilibrium has $\tau_{iA} = \tau_{iB}$ and $\sigma_i = \alpha_i$ in every group, so the outcome is the full-turnout outcome $\sum_i g_i\alpha_i$.

Proof. The first-order conditions are $Wm_{iA}(1-\sigma_i)/t_i = \bar{c}_i\tau_{iA}^{\beta}$ and $Wm_{iB}\sigma_i/t_i = \bar{c}_i\tau_{iB}^{\beta}$. Dividing and using $m_{iA}(1-\sigma_i)/(m_{iB}\sigma_i) = \tau_{iB}/\tau_{iA}$ gives $(\tau_{iA}/\tau_{iB})^{1+\beta} = 1$. □

E One voter, one vote as a coin flip

An aggregator is *ordinal* if $\mathcal{A}(x) = \mathcal{A}(x')$ whenever x and x' rank the options in the same way, that is, whenever $x_p \geq x_q$ if and only if $x'_p \geq x'_q$ for all options p and q. Plurality is ordinal, and so is ranking the options by score. Proportional representation is not, since seats follow the size of the scores, and neither is any threshold: a qualified majority, a minimum share for winning seats, or the absolute majority needed to win the first round of a two-round election.

A coin flip, $\mu^i = \bar{s}$ with $\bar{s} = (1/m, \ldots, 1/m)$, fits a citizen who does not care which option wins. It gives the count $x^{\bar{s}} = x^B + (1-T)\,\bar{s}$, which adds the same score to every option. Write Δ for the set of share vectors, $s \in \mathbb{R}_+^P$ with $\sum_p s_p = 1$.

Proposition 13 (Coin flips)**.** *Let $\mathcal{A}$ be a scale-invariant aggregator.*

(a) If $\mathcal{A}$ is ordinal, then $\mathcal{A} \circ x^{\bar{s}} = \mathcal{A} \circ x^B$ at every profile.

(b) Suppose that $\mathcal{A}$ ranks the options, and that its ranking of any two options p and q depends only on their scores x_p and x_q. Then $\mathcal{A} \circ x^{\bar{s}} = \mathcal{A} \circ x^B$ at every profile if and only if $\mathcal{A}$ is ordinal.

Under proportional representation, coin flips pull every party toward an equal share of the seats. In a referendum, the independence assumed in (b) holds trivially, so the two readings agree exactly when the outcome depends only on which side has more votes. A qualified majority separates them: under a two-thirds rule, a bill backed by 70 percent of voters at 60 percent turnout passes under one voter, one vote, but gets $0.6 \times 0.7 + 0.4 \times 0.5 = 62$ percent once abstainers flip coins, and fails.[26] One voter, one vote thus treats the silent as indifferent, where the aggregator is ordinal, or as average voters; the turnout-neutral count treats them as voters of their own group.

Proof. We first show that $\mathcal{A} \circ x^{\bar{s}} = \mathcal{A} \circ x^B$ at every profile if and only if $\mathcal{A}(Ts + (1-T)\bar{s}) = \mathcal{A}(s)$ for every $s \in \Delta$ and $T \in (0, 1]$. At a profile $\mathbf{v}$ with turnout T and ballot shares $s = \mathrm{PL}(\mathbf{v})$, $x^B(\mathbf{v}) = Ts$ and $x^{\bar{s}}(\mathbf{v}) = Ts + (1-T)\bar{s}$, and scale invariance gives $\mathcal{A}(x^B(\mathbf{v})) = \mathcal{A}(s)$. If the condition holds, then $\mathcal{A}(x^{\bar{s}}(\mathbf{v})) = \mathcal{A}(s) = \mathcal{A}(x^B(\mathbf{v}))$. Conversely, given $s \in \Delta$ and $T \in (0, 1]$, let every group vote at turnout T with ballot shares s, that is, $v_p^i = Ts_p$ for all i and p. Then overall turnout is T, $x^B = Ts$ and $x^{\bar{s}} = Ts + (1-T)\bar{s}$, so that $\mathcal{A}(s) = \mathcal{A}(Ts) = \mathcal{A}(Ts + (1-T)\bar{s})$.

(a) For $T > 0$, $(Ts + (1-T)\bar{s})_p - (Ts + (1-T)\bar{s})_q = T(s_p - s_q)$, so s and $Ts + (1-T)\bar{s}$ rank the options in the same way, and the condition holds.

(b) By (a), every ordinal aggregator satisfies the condition. Conversely, suppose that $\mathcal{A}$ satisfies it, and fix two options p and q. By assumption, the way $\mathcal{A}$ ranks p and q depends only on (x_p, x_q), and by scale invariance, only on this pair up to a common positive factor: on $r = x_p/(x_p + x_q)$ when $x_p + x_q > 0$. Take $r \in (\frac{1}{2}, 1]$ and the share vector s with $s_p = r$, $s_q = 1 - r$ and $s_o = 0$ for every other option o. The vector $Ts + (1-T)\bar{s}$ gives p and q the ratio

$$r(T) = \frac{Tr + (1-T)/m}{T + 2(1-T)/m},$$

which is continuous in $T \in (0, 1]$, equals r at $T = 1$ and tends to $\frac{1}{2}$ as $T \to 0$. Every $r' \in (\frac{1}{2}, r]$ is therefore equal to $r(T)$ for some T, and the condition implies that $\mathcal{A}$ ranks p and q in the same way at ratios r' and r. Since r is arbitrary, $\mathcal{A}$ ranks p and q in the same way whenever

[26] The independence assumed in (b) concerns the aggregator, which sees only scores; it should not be confused with the property of Table 5 that votes for a third option do not change the ranking of two others, which concerns the whole rule. Without that independence, agreement with coin flips does not require ordinality. Consider an aggregator that declares an outright winner when her lead over the runner-up is at least twice the runner-up's lead over the third, and calls a runoff otherwise. Adding the same score to every option, or rescaling all scores, leaves the ratio of the two leads unchanged, so the aggregator gives the same outcome under coin flips as under one voter, one vote. Yet it declares an outright winner at $(0.6, 0.25, 0.15)$ and calls a runoff at $(0.4, 0.35, 0.25)$, although both rank the options in the same way.

$x_p > x_q$; likewise whenever $x_p < x_q$. When $x_p = x_q = 0$, which requires at least three options, the condition with any $T < 1$ brings the pair to ratio $\frac{1}{2}$, so $\mathcal{A}$ ranks p and q as it does whenever $x_p = x_q > 0$. Hence the ranking of every pair depends only on the order of their scores, and $\mathcal{A}$ is ordinal. □

F Candidate characteristics and alternatives

This appendix argues the verdicts of Table 2 and discusses the alternatives to a counting rule. Table 6 compares the main proposals against Full-Turnout Equality and Turnout Neutrality.

Proposal	What it adjusts	Equal ballots when everyone votes	Group's weight independent of its turnout
One voter, one vote	Nothing	Yes	No
Plural voting (Mill, 1861)	Weight of a ballot, by education	No	No
Life-expectancy weighting (Van Parijs, 1998; Arandjelović, 2023)	Weight of a ballot, by remaining lifetime	No	No
Proportionality to stakes (Brighouse & Fleurbaey, 2010)	Weight of a ballot, by how much one is affected	No	No
Compulsory voting (Lijphart, 1997)	Turnout itself	Yes	Not applicable
Reserved seats, quotas (Williams, 1998; Mansbridge, 1999)	Who is elected	Yes	No
Non-voter sortition (Häggrot & Destri, 2025)	Seats allotted by lot to non-voters	Yes	No
Apportionment by population	Seats per district	Yes*	Yes*
Turnout-neutral rule (Machin, 2015)	Weight of a ballot, by its group's turnout	Yes	Yes

Table 6: Alternatives to one voter, one vote, against Full-Turnout Equality and Turnout Neutrality. *With proportional allocation of seats within districts.

Besides conditions (A)–(G), two further features strengthen a case without being necessary.

(H) *Lifetime symmetry.* Every citizen passes through every group. The correction then favours no person over another across a life, and creates no permanent class of up-weighted citizens.[27]

[27] This is why we speak of age groups, the citizens of a given age at a given election, rather than of generations or birth cohorts, the citizens born in a given period. Condition (H) holds for age groups, not for cohorts (Daniels, 1988; Bidadanure, 2021).

(I) *Irreversibility.* The harm of neglecting the group falls at a stage from which it cannot be repaired later.

Territory. Residence satisfies every condition, two of them only in part, and the correction is already in place in legislative elections through apportionment by population. Interests are shared within regions and conflict across them (A); turnout differs across districts (B), partly for reasons of access and partly because campaigns neglect safe districts (C); residence is recorded on the register (D); it can be changed, but at a cost that no one would bear for voting weight, and the boundaries are set in advance—though their manipulation, gerrymandering, is the classic failure of (E); no one takes marking ballots by district as demeaning (F); districts are large (G). As Section 2 noted, territory is a precedent for the mechanism rather than for our argument: districts are justified by the representation of places, and condition (C) holds for them only in part. Whether territory is the right basis for constituencies at all is itself contested (Rehfeld, 2005). The case is still instructive. It shows that turnout neutrality is not an exotic principle, and it shows where the difficulties lie: in drawing the groups.

Age. Age satisfies (A)–(G) and both of (H) and (I). Age groups share interests on education, housing, pensions, climate and debt, and these interests conflict (A). The turnout gap is among the most robust known (B), and it is partly produced by costs and by neglect (C), as Section 3.2 argued. It is not always monotone: turnout also falls among the oldest (Bhatti & Hansen, 2012), and in Germany in 2025 the rule would have up-weighted the oldest most (Section 7). Date of birth is recorded for every citizen on the electoral register, for reasons that have nothing to do with the rule (D). Nobody can change her age, and age groups are defined by thresholds that have independent meaning and are fixed in advance (E). Marking ballots by age group expresses no hierarchy: age is not a stigmatized identity, and the German electoral statistics have marked ballots by birth-year group for decades, under legal safeguards for the secrecy of the ballot (Wahlstatistikgesetz, 1999) (F). With five or six age groups, cells are large (G). Everyone passes through every age group (H): the correction treats all cohorts alike and creates no permanent class of citizens whose ballots weigh more.[28] And the harms of neglecting the young are among the hardest to repair (I). Age is, with territory, the characteristic for which the case is complete.

[28] Daniels (1983, 1988) makes the point for health care, in what is known as the prudential lifespan account: since everyone passes through every age, treating age groups differently need not treat persons unequally, because "the age criterion operates within a life and not between lives" (Daniels, 1983, p. 500). The point holds only in part for us, since the rule's weights change from one election to the next and cohorts meet different weights at the same age. The same symmetry might seem to excuse one voter, one vote, since today's young will vote more when they are old. McKerlie (2013) argues that inequality between age groups at a given time matters even when complete lives are equal. On his view the excuse fails, and the rule meets his concern, since at every election it gives each age group a weight equal to its share of the electorate.

Income and wealth. The normative case is at least as strong as for age. The poor and the rich have conflicting interests on redistribution, taxation, housing and labour law (A). The turnout gap by income is large and persistent (Lijphart, 1997; Verba *et al.*, 1995); in the United States, the affluent vote at rates far above the poor, and policy responds to the preferences of the affluent and barely to those of the poor (Bartels, 2008; Gilens, 2012) (B). The resource model of participation explains the gap by time, money and civic skills, and the sense that politics responds to others explains the rest (C) (Verba *et al.*, 1995; Schlozman *et al.*, 2012). The institutional conditions are where the case fails today. Income is not recorded on electoral registers; tax records exist, but income is measured per household or per year, it fluctuates, and much of it escapes the administration (D). Income brackets have thresholds that can be gamed by timing or declaration, and that would have to be redrawn as prices change (E). Marking ballots by income bracket would make class an official category at the polling station. Tax brackets are official categories too, but they do not follow citizens into the voting booth; whether this expressive cost is acceptable is, we think, open (F). Wealth fares worse than income on every count. Our verdict is conditional: income satisfies (A)–(C), meets (D) and (E) only in part under current institutions, and raises a question under (F). A democracy that wished to neutralize the class gap would first have to decide whether it wants to record class on the electoral register at all.

Education. Education is the strongest single predictor of turnout (Wolfinger & Rosenstone, 1980), so (B) is amply met. Its groups share interests less obviously than income groups: education shapes preferences, especially on cultural issues, but the interests at stake are largely those of class, for which education is a proxy (A). The gap has institutional sources: civic skills acquired at school lower the costs of voting, and the less educated are the group most alienated from a political class composed almost entirely of graduates (Verba *et al.*, 1995; Bovens & Wille, 2017) (C). On (D), diplomas are certified by the state but not recorded on registers; a register of highest qualification is conceivable but does not exist. On (E), education can be understated, which would be the direction of gain, so that certification rather than declaration would be required. On (F), the precedent is Mill's plural voting, in the opposite direction, and it is not reassuring: ranking citizens by diploma on the ballot institutionalizes an educational hierarchy, even when the weights run against the educated. Education thus resembles income: a strong normative case, an institutional case that is not yet made, and an expressive cost to weigh.

Gender. Gender largely fails (B). In national elections in most established democracies, women now vote at about the same rate as men (Kostelka *et al.*, 2019). In the German federal elections of 2017–2025, a turnout-neutral count by sex would have changed no party's share by

more than 0.03 points (Appendix G). A gap persists in lower-stakes contests, such as European and regional elections, and it tracks a gender gap in political interest rather than in the costs of voting. Whether this residual gap is institutional in the sense of (C) is unclear: differences in political interest may reflect gendered socialization, but not the costs or the neglect our argument targets. Where there is no gap, the rule does nothing (Proposition 1), so including gender would be harmless but pointless, and it would raise an expressive question under (F), since legal sex is recorded but a binary classification of ballots is contested. In democracies where women do vote much less, the gap often reflects norms and intimidation, and the remedy lies elsewhere.

Race, ethnicity, religion and origin. These characteristics can satisfy (A)–(C): in several countries, minorities share interests, vote less, and vote less partly because of past and present suppression (Fraga, 2018). They fail (D)–(F). Many democracies do not record race or religion and some forbid it: France's Constitutional Council has held that studies of diversity and discrimination may not be based on ethnic origin or race (Conseil constitutionnel, 2007). Where race is self-identified, it can be changed at will (E). Above all, the official sorting of ballots by race or religion is incompatible with equal standing (F). Registers by race have been the instruments of disenfranchisement, and a state that counted ballots by race, even to the minority's advantage, would revive a classification whose history is one of domination. The same holds for naturalized citizens and citizens of immigrant origin, who do vote less: a mark on the ballot would stamp them as a separate class of citizens. The wrongs these groups suffer at the polls are real, but they call for the enforcement of voting rights and the removal of obstacles, which target suppression directly, not for a correction that needs the very classification that made suppression possible.

Disability, occupation, parenthood. Citizens with disabilities vote less, because of lower resources, limited mobility, social isolation and inaccessible polling places, and because parties contact them less (Schur & Kruse, 2000): (B) and (C) hold. But much of the gap is a cost gap for which direct remedies, accessible polling places and postal voting, are available and owed independently, and the boundary of the group is fuzzy and only partly recorded (D), (G). Occupation defines shared interests (A) and is recorded by social security, but it can be changed and declared strategically (E), and the corporatist tradition of representation by occupation, of which the vocational panels of the Irish Senate are a surviving example, carries a history of its own (F). Parenthood is the basis of Demeny voting (Demeny, 1986), which asks a different question, the representation of children, and changes the number of shares rather than the fate of unused ones.

Combinations. Several characteristics can be combined by taking the cells of their cross-partition, such as age within districts. The rule's logic extends without change, and when the rule is applied district by district, age within districts is what one gets. But each combination multiplies the cells, which shrinks them (G) and increases the number of weights the public must trust. Corollary 4 shows that merging groups changes the outcome only when they differ both in turnout and in preferences, so that a coarse partition loses little when the merged groups are alike. We would not recommend more than two characteristics.

Alternatives to a counting rule. Support for one voter, one vote can rest on the belief that changing how votes are counted should be a last resort. We consider the alternatives.

The first is to lower the costs of voting: automatic registration, preregistration of young citizens, postal and online voting, more polling stations. These measures target a cause of the gap, and they work (Goodman & Stokes, 2020; Bertocchi *et al.*, 2020). We support them; they are complements to the rule, not substitutes. They address costs but not responsiveness, and the vicious circle runs through responsiveness. Moreover, the rule switches itself off as they succeed: when turnout gaps close, its weights return to one.

The second is compulsory voting (Lacroix, 2007; Brennan & Hill, 2014; Umbers, 2020). It removes turnout gaps by removing abstention, at the cost of coercion. Coercion can be justified only if voting is a duty, and Volacu (2020) argues that such a duty would have to be a duty to vote *well*, which is hard to define and costly to enforce. Some citizens may better fulfil their civic duty by leaving the decision to others, which is what abstention allows. Compulsory voting abolishes this delegation; the turnout-neutral rule keeps it and changes its default.

The third is to guarantee the group's presence among representatives: quotas or reserved seats (Phillips, 1995; Williams, 1998; Mycock & Tonge, 2012; Bidadanure, 2021). Presence may help a group identify with its representatives. But it does not guarantee that the group's interests weigh more if party elites control the agenda, and it narrows the range of democratic outcomes, which should *prima facie* be avoided. The counting rule leaves open what the electorate can decide.

The fourth is to give non-voters seats of their own, allotted by lot among them (Häggrot & Destri, 2025). This gives non-voters a voice without asking them to vote, and it gives every party a reason to court them, since non-voting now costs every party seats. The turnout-neutral rule is less radical: it changes how ballots are counted, not who sits in the legislature, and it represents an abstainer by voters who chose to vote rather than by citizens who did not. The two proposals also aim at different targets. Sortition represents non-voters as a whole; the turnout-neutral rule corrects the distribution of turnout across groups. They could be combined.

The fifth is to entrench the group's interests constitutionally (Christiano, 2008). Funda-

mental rights protect against severe threats, not against the ordinary disadvantage of being neglected, and regulating the institutions that shape the political supply tightly enough to remove neglect would undermine their democratic role. Redistribution, finally, is insufficient and unstable: power does not run through wealth alone, and a group that keeps greater influence can undo redistributive policies.

A last worry is epistemic. Influence asymmetries are hard to identify, and overweighting a group that seemed to lack influence at one election may create new asymmetries at the next. Fixed weights are vulnerable to this objection. The turnout-neutral rule mitigates it: its weights are recomputed at every election from observed turnout, and they equal one when turnout gaps vanish. The rule tracks turnout, not influence itself; but turnout is both a symptom and a cause of unequal influence, and it is observable.

G German federal elections: further results

The representative statistics estimate turnout by age in two ways: the turnout file applies a common rate of returned postal ballots to every age group, while the vote file counts marked ballots (Die Bundeswahlleiterin, 2025a). They disagree by almost three points for the youngest group in 2025 (Table 3); the turnout-neutral score does not depend on either. A second release of the 2025 vote statistics, which splits ballots by type of district, gives differences from the official result within 0.04 points of ours. In 2017 and 2021 the youngest group was the most up-weighted (weights 1.12 and 1.08), followed by the 25–34 in 2017 and by the oldest in 2021. Table 7 reports the differences for all three elections and for other partitions in 2025.

	Six age groups			2025, other partitions			
Party	2017	2021	2025	3 age groups	2 age groups	Age × sex	Sex only
CDU	−0.05	0.00	+0.18	+0.10	+0.04	+0.19	0.00
CSU	0.00	−0.01	+0.03	+0.02	+0.01	+0.03	0.00
SPD	−0.05	−0.08	+0.16	+0.11	+0.03	+0.17	+0.01
AfD	−0.09	−0.09	−0.21	−0.12	−0.01	−0.20	−0.02
Greens	+0.05	+0.05	−0.09	−0.05	−0.01	−0.09	+0.01
FDP	+0.03	+0.06	+0.01	0.00	0.00	+0.01	0.00
Die Linke	0.00	+0.02	−0.02	−0.03	−0.03	−0.05	+0.01
BSW	–	–	−0.02	−0.01	0.00	−0.02	0.00

Table 7: Turnout-neutral score minus official second-vote share, in percentage points. Three age groups: 18–34, 35–59, 60+. Two age groups: 18–44, 45+. Age × sex: twelve cells.

Two further results bear on the choice of groups. Merging age groups removes much of the correction: with two groups (18–44 and 45 and over), the CDU's gain in 2025 falls from 0.18 to 0.04 points, because the oldest, who vote less, are merged with the middle-aged, who vote more.

Adding sex to age changes almost nothing, and a turnout-neutral count by sex alone changes no party's share by more than 0.03 points: there is no gap to correct. Both observations illustrate Proposition 1.

These are static counterfactuals: they apply the rule to the ballots cast under one voter, one vote. Proposition 7 suggests caution in reading them, since voters respond to what their ballots are worth. In Germany, where the effects are small, the caution matters little. It would matter more where turnout gaps are large, and calibrations for such democracies are the natural next step.

H Objections: further replies

The rule raises the weight of graduates. Young voters are more educated than young abstainers, and in most democracies the young are more educated than their elders. Up-weighting young voters may then raise the weight of graduates in the count, and deepen the education gap that Section 6 takes seriously. The objection uses our own concerns against us, and it deserves an answer. Let e_i^P be the share of graduates among the members of group i and e_i^V their share among its voters. Graduates make up $E^* = \sum_i g_i e_i^P$ of the eligible population and $E^{\mathrm{TN}} = \sum_i g_i e_i^V$ of the turnout-neutral count. Proposition 11 in Appendix D shows that

$$E^{\mathrm{TN}} - E^* = \sum_i g_i (e_i^V - e_i^P), \qquad E^{\mathrm{PL}} - E^* = (E^{\mathrm{TN}} - E^*) + \frac{\mathrm{Cov}_g(t, e^V)}{T}.$$

Under the rule, graduates are over-represented by exactly the selection within age groups: the rule neither creates it nor corrects it. Under one voter, one vote they are over-represented by the same amount plus a second term, which is negative when the groups that vote less have more graduates among their voters. So when the rule raises the weight of graduates relative to one voter, one vote, it is because one voter, one vote makes two errors that partly offset: it under-weights the young, and with them some graduates. Silencing the young is no remedy for the diploma gap. The remedy is a count neutral between education groups, which Section 6 found not yet feasible, or direct measures that lower the costs of voting for the less educated (Gallego, 2010). The sign of the effect, finally, depends on which groups vote less. In Germany in 2025, the most up-weighted group is the oldest, among whom graduates are rarest, so the rule would probably have lowered their weight.

Partisan effects: a further remark. Under one voter, one vote, parties can act on turnout gaps through registration rules, the location of polling stations and the timing of elections; under the rule, measures that change a whole group's turnout no longer pay (Proposition 9).

Not every turnout gap is unjust. The rule corrects every gap along the chosen characteristic, whatever its cause, while condition (C) only licenses gaps of institutional origin. Part of the age gap reflects the life cycle, and part of the class gap may reflect genuine indifference. Three replies. First, condition (C) requires that the gap be *partly* institutional, and the evidence of Section 3.2 shows that it is, for age, income and education alike. Second, the rule only changes the default meaning of silence. A citizen who abstains out of indifference leaves her share to her group rather than to everyone, which is hard to call a wrong to anyone, and she can cast a blank ballot if she disagrees; Section 5 argued that the full correction is the right default once this option exists. Third, by Proposition 1, where the groups do not differ in what they want, the rule changes nothing. A partial correction fixed by the legislature attributes an unexpressed intention to a fixed fraction of every group's silent citizens; the blank ballot makes the realized correction partial by the choice of each citizen (Section 5).

Why not correct everything? If age, why not class, and then education, and then every line along which turnout differs? Conditions (D)–(G) are the answer. They are not met by every characteristic, and they are not met today by most. The rule is not a licence to multiply corrections; it is a test that most candidates fail. Where a characteristic passes (A)–(C) but fails (D)–(G), as income and education do, the right conclusion is not to weight ballots but to ask whether the institutions that would make it feasible are worth having.