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An Election Method to Improve Policy Representation of a Parliament

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Abstract Since voters are often swayed more by the charisma, personal image and communication skills of the individual candidates standing for election than by the parties' political manifestos, they may cast votes that are actually in opposition to their policy preferences. Such a type of behavior, known as 'irrational voting', results in the election of representatives who do not correspond exactly to the voters' own views. The example of the 2013 German Bundestag shows that the method used to elect it results in inadequate policy representation. The analysis of these elections (see, Tangian, 2016) led to an alternative method which is discussed in this paper. In the alternative method the voters' policy preferences are taken into account explicitly by means of embedded referenda, testing the matching of the candidates' policy profiles with that of the electorate. Then the parties are indexed, not with respect to the percentage of votes received but with respect to their representativeness indices of popularity (the average percentage of the population represented) and universality (frequency in representing a majority), as introduced in the previous paper mentioned. The method is then hypothetically applied to redistribute the Bundestag seats among the party factions, producing a considerable gain in the representativeness of the Bundestag.

This article and an article entitled "Policy representation of a parliament: The case of the German Bundestag 2013 elections (DOI:10.1007/s10726-016-9507-5)" discuss the same parliament elections. In DOI:10.1007/s10726-016-9507-5, the actual election method is analyzed and in DOI:10.1007/s10726-016-9508-4, an alternative method is proposed.

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Finally, we discuss mixed election procedures combining the elements of traditional voting schemes with the proposed method.

Keywords Policy representation · Representative democracy · Direct democracy · Elections · Coalitions · Theory of voting

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1 Introduction: Concepts of Representation and the Implementation Thereof

The idea of political representation dates back to (Hobbes 1651, *Leviathan*, Ch 16). However, according to (Pitkin 1967, pp. 14–37), his treatment of the subject is monarchical-tendentious, inconsistent and merely of historical interest. Rather, the modern concepts of political representation are attributed to the American and French Revolutions of the late eighteenth century. All of them are based on the delegation of powers with interaction between the electorate and the elected, differing chiefly in how strictly the delegates are bound by the electorate's preferences.

The etymology of the word 'represent' is 're-' (back, again—recall) plus 'present'. Among its meanings, one finds 'to portray' and 'to correspond to in essence' Merriam-Webster (2016). According to these meanings, an assembly should be a condensed reflection of the society for which it speaks, proportionally representing its most important groups. In the United States of America, this approach was defended by the Anti-Federalists, particularly by John Adams (1735–1826), one of its key Founding Fathers, its first vice-president and second president:

> The principal difficulty lies, and the greatest care should be employed, in constituting this representative assembly. It should be in miniature an exact portrait of the people at large. It should think, feel, reason, and act like them. That it may be the interest of this assembly to do strict justice at all times, it should be an equal representation, or, in other words, equal interests among the people should have equal interests in it.
> (Adams 1776, *Thoughts on Government*, p. 195)

In France, the same viewpoint was shared by Honoré Gabriel Riqueti, comte de Mirabeau (1749–1791), a statesman, moderate revolutionary and promoter of a British-like constitutional monarchy. On January 30, 1789, before the new convocation of the Estates General, Mirabeau said:

> The Estates are to the nation as a reduced map is to its physical extent: whether in whole or in part, the copy must always have the same proportions as the original.
> (Mirabeau 1789, *Discours prononcés à la tribune nationale*, p. 7)

This type of representation, called by (Pitkin 1967, p. 60) 'descriptive', suggests that the delegates naturally make the same choices and vote on propositions in the same way as their electors would do, because they resemble their fellow countrymen and belong to the same constituencies. An assembly, however, should be sufficiently large to reflect the diversity of social groups in their true proportion. For instance, in the U.S. Constitution ratification debate, the Anti-Federalists doubted that a relatively small national assembly proposed by the Federalists could adequately mirror a large and heterogeneous population of numerous states.

The descriptive approach finds its extreme expression in the ‘mandate theory’. Under its provisions, the function of representatives as transmitters of the will of their constituencies is enhanced by binding instructions to the elected, or imperative mandates. The final effect is similar to that of descriptive representation except that representation of the constituency’s will is legally secured (Manin 1997, p. 111).

The American Federalists had a different view of representation. They considered representatives as the people’s trustees, possessing high civil virtue and competence, who make decisions independently and serve the country using their advanced political skills. Representatives of this type are empowered agents of the people, similar to lawyers, who proceed on behalf of their clients, or like bankers, who make investments for their depositors. According to Alexander Hamilton (1755–1804), one of the Founding Fathers and the first United States Secretary of the Treasury, and James Madison (1751–1836), Father of the Constitution and the fourth president of the USA, such delegates would not betray the electorate because of their approbated high reputation, their self-respect, their own vanity, the frequency of election, and their subordination to the laws they would adopt for everyone—including themselves:

> In the first place, as they will have been distinguished by the preference of their fellow-citizens, we are to presume that in general they will be somewhat distinguished also by those qualities which entitle them to it . . .
>
> In the second place, they will enter into the public service under circumstances which cannot fail to produce a temporary affection at least to their constituents. There is in every breast a sensibility to marks of honor, of favor, of esteem, and of confidence, which, apart from all considerations of interest, is some pledge for grateful and benevolent returns. . . .
>
> In the third place, those ties which bind the representative to his constituents are strengthened by motives of a more selfish nature. His pride and vanity attach him to a form of government which favors his pretensions and gives him a share in its honors and distinctions. . . .
>
> All these securities, however, would be found very insufficient without the restraint of frequent elections. Hence, in the fourth place, the House of Representatives is so constituted as to support in the members an habitual recollection of their dependence on the people. . . .
>
> I will add, as a fifth circumstance in the situation of the House of Representatives, restraining them from oppressive measures, that they can make no law which will not have its full operation on themselves and their friends, as well as on the great mass of the society.
> (Hamilton and Madison 1788, *Federalist Papers*, 57)

For this type of independent representative, the requirements of belonging, likeness or resemblance are irrelevant, and the assembly can be relatively small. Therefore, for a large country with heterogeneous populations, the ‘agent’ conception of representation is more suitable than the descriptive one, which requires large representative bodies. However, as with the scruples of lawyers and bankers, the principled conscientiousness of the people's agents can be always called into question; at any rate, the assembly risks becoming a 'club' of politicians for its own sake, and one should take it with a grain of salt. Nevertheless, the Federalist elitist approach prevailed over the Anti-Federalist 'likeness' (descriptive) approach.

In revolutionary France, the same elitist view of politics was promoted by the conceptualist of representative government, abbot Emmanuel Joseph Sieyès (1748–1836). In January 1789, Sieyès published his famous anticlerical and anti-aristocratic pamphlet, *Que'est-ce que le Tiers-État? (What Is the Third Estate?)*, in which he answers one of central questions, 'What is necessary that a nation should subsist and prosper?', with 'Individual effort and public functions' (Sieyès 1789). The interaction between the people, embodying the 'individual effort', and the government charged with the 'public functions' is viewed from the standpoint of the efficient division of labor. Since people in 'commercial societies' are primarily occupied in production and trade, it is unreasonable to burden them with time-consuming 'public functions' that could be much better performed by elected professionals. 'The common interest,' writes Sieyès later in 1789, 'the improvement of the state of society itself cries out for us to make Government a *special profession*' (Manin 1997, p. 3).

The conception of representation shapes the implementation of representative government. Distinguishing between the descriptive and agent conceptions is important because they imply different electoral systems and different methods of allocating parliament seats:

> These two senses of *represent* are both in general use. However, not only are they not the same, they can be inconsistent. There is no reason why legislators elected by a system that somehow maps the people in Mirabeau's sense should individually regard themselves as agents, still less that they should in aggregate and, conversely, no reason why legislators who are agents of the people should be a microcosm of them . . . The first leads obviously to proportional representation (PR) and to multimember districts (since exploring PR soon reveals that Adams's and Mirabeau's ideals cannot be achieved in a system of single-member districts). The second leads to majoritarianism: an individual legislator is a true agent of the voters if and only if he or she represents a majority of them and a legislature is representative in aggregate if it is accepted by a majority of all the electors. (McLean and Urken 1995, *Classics of Social Choice*, pp. 43–44)

Sometimes the two major concepts of representation are mixed. For instance, the seats in the European Parliament are distributed according to the principle of degressive proportionality, i.e. the larger the state, the more citizens are represented by each parliament member (as of 2014, Germany with its 80.9 million inhabitants has 96 seats, i.e. one seat per 843,000 inhabitants, whereas Malta with 0.4 million inhabitants has 6 seats, i.e. one seat per 70,000 inhabitants) (European Parliament 2016). This rule is a compromise between the descriptive (proportional) and the agent conceptions of representation ('one country, one vote', as used in many international organizations).

Regardless of these differences in understanding representation, it is always assumed that the people govern themselves through elected representatives. The most restrictive 'mandate' conception supposes that the will of the electorate is represented one-to-one in the assembly, whereas the most relaxed agent conception suggests that a certain independence of competent representatives would serve the public interest even better. However, in all cases, the will of the people is intermediated, which raises a number of questions about the relation of representative government to democracy. These doubts were expressed as early as the mid-eighteenth century by Jean-Jacques Rousseau (1712–1778):

> The people of England regards itself as free; but it is grossly mistaken; it is free only during the election of members of parliament. As soon as they are elected, slavery overtakes it, and it is nothing. The use it makes of the short moments of liberty it enjoys shows indeed that it deserves to lose them.
>
> The idea of representation is modern; it comes to us from feudal government, from that iniquitous and absurd system which degrades humanity and dishonors the name of man. In ancient republics and even in monarchies, the people never had representatives; the word itself was unknown. It is very singular that in Rome, where the tribunes were so sacrosanct, it was never even imagined that they could usurp the functions of the people, and that in the midst of so great a multitude they never attempted to pass on their own authority a single plebiscitum. We can, however, form an idea of the difficulties caused sometimes by the people being so numerous, from what happened in the time of the Gracchi, when some of the citizens had to cast their votes from the roofs of buildings.
> (Rousseau 1762, *Social Contract*, Book III, 15)

Thus, each concept of representation has both advantages and disadvantages; each requires a particular implementation and a particular electoral system. The question is in fact about *how well* the public interest is represented. Indeed, the higher the quality of the representation, the higher the people's impact on policy making and, consequently, the 'more democracy'. However, two and half centuries after Rousseau, the question remains open how, exactly, political representation is related to government by the people, or democracy:

> Which of these two types of indirectness—or indeed what other type—best represents the role of political representatives and the power the people have over them? The modern view of representative democracy as indirect government by the people tells us nothing here. In reality, the information provided by the usual distinction between direct and representative democracy is meager. The uncertainty and poverty of our modern terminology, like the contrast that it presents with the perception of the eighteenth century, show that we do not know either what makes representative government resemble democracy or what distinguishes it therefrom. Representative institutions may be more enigmatic than their place in our familiar environment would lead us to believe.
> (Manin 1997, *Principles of Representative Government*, p. 5)

This theoretical difficulty has practical consequences. The divergence between the people and the government has been illustrated in the previous paper, 'Policy representation of a parliament: The case of the German Bundestag 2013 elections' (Tangian

2016). The deficit of policy representation revealed there results in the 2013 Bundestag's independence of public opinion, which can be hardly accepted as normal. Although both major concepts of representation leave politicians some room for free decisions, they nevertheless do not allow neglect of the electorate will.

To enhance the quality of political intermediation, the notion of *policy representation* has been introduced; for references see Introduction to (Tangian 2016). This notion complements the descriptive and agent conceptions in the following way: the descriptive conception is focused on the question *'Who is represented?'*, the agent conception on *'Who are representatives?'*; but both disregard the question *'What is represented?'*—the subject of policy representation. It is not surprising that the latter is missing from the debates of the eighteenth century, when the idea of representation was coined. The acute questions of that time were voting rights, property qualifications, gender restrictions, assembly composition, etc., that is, who should vote (who is represented), and eligibility conditions for public offices, that is, who can be elected and to which offices (who are representatives). The uneducated common folk had no policy preferences on most policy issues (with a few exceptions for voting rights, equality before the law or taxation); the communication possibilities were limited, and politicians seldom, if ever, made their positions on every issue public. Since political decisions were entrusted to elected representatives, government by the people was not on the agenda; furthermore, the Founding Fathers of the United States were explicitly against democracy (Manin 1997, Ch. 3). Correspondingly, neither the American Constitution nor any Amendment to it ever refer to democracy; democracy is completely missing in the French post-revolutionary constitutions (Tangian 2014, p. 192). As (Held 2006, p. 1) notes, 'a general commitment to democracy is a very recent phenomenon'.

Now the situation is different. The voting rights and eligibility for offices are no longer disputed, because all restrictions for citizens are removed. The population has become more advanced politically, mass media make information available, and politicians' programs are publicly discussed. Policy representation is becoming more important as bridging representative government with government by the people. Nevertheless, candidates' policy preferences and party manifestos are often overlooked, resulting in 'irrational voting' as reviewed in Introduction to (Tangian 2016). Factually, the question *'What is represented?'* is still insufficiently elucidated, and voting for candidates by name bears a part of responsibility for that.

The analysis from (Tangian 2016) is visualized in Fig. 1, in which the German parties are ordered by decreasing number of votes received in the 2013 federal election. Here, the irregular broken curve (in black) of the mean index of policy representation (as computed in Tangian 2016) exhibits no statistically significant dependence on the number of electoral votes received by a party. Furthermore, there is a slight opposite trend: the fewer the votes, the higher the representativeness. In other words, a party's electoral success does not depend on its capacity for policy representation.

At the same time, Fig. 1 demonstrates a very high and statistically very significant correlation between the number of party members and the votes received. As highlighted at the top of the figure, the correlation between the party size and votes received is as high as 0.9835 with P value <0.00005. The causality in this strong dependence is likely two-way. On the one hand, large parties with proven leadership qualities enjoy

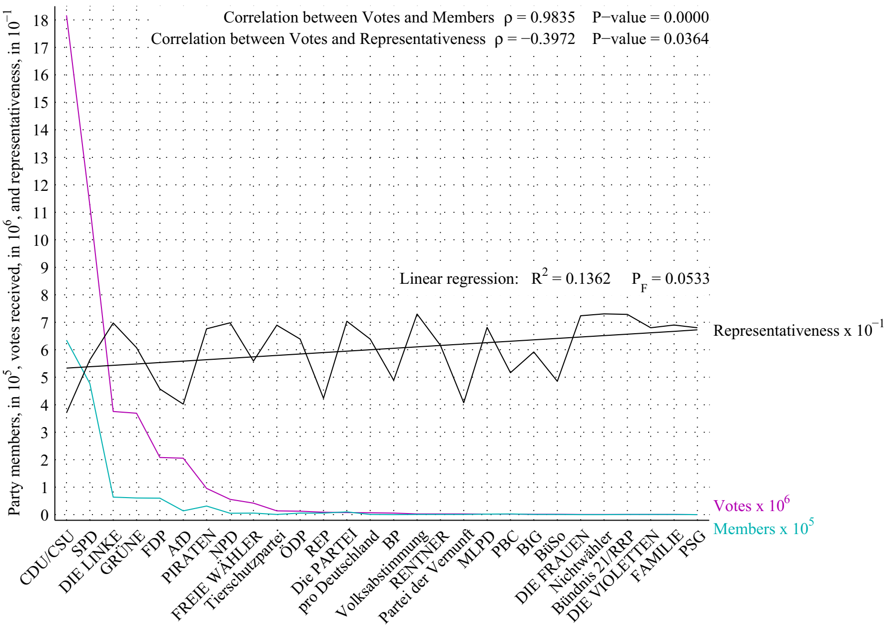

Fig. 1 Party sizes, votes received, and mean representativeness indices of German parties in the 2013 federal election

established reputations, have large networks, raise considerable funds for electoral campaigns and are constantly presenting themselves in the media. On the other hand, the electoral success itself attracts members by political inclusion, participation in policy making and by enhancing personal influence and career prospects. All of these relate rather to the near-party circles than to the whole of citizenry, and large parties that win elections are not necessarily highly representative. This is generally inherent in one-party systems, and, as shown in Tangian (2016), it is also true for Germany.

It looks that election methods based on voting for candidates by name are designed for the two major concepts of representation—descriptive and 'agent'—but not for the concept of policy representation. These election methods divert the voters' attention away from specific policies, focusing on personalities and political labels. Regarding policy representation, this can result in the election of 'wrong' parties and in 'wrong' coalition formation. Since the two major types of representation are backed up by their own election methods, it would be natural to enhance the third type of representation, policy representation, with a dedicated voting procedure.

Taking into account the results of Tangian (2016), the given paper develops an alternative voting procedure. The goal is to redirect the electorate's attention away from candidates as personalities and from parties as abstract ideological symbols toward their specific abilities to speak on behalf of the public and represent public opinion on various policy issues. In other words, the question '*Whom* are we electing?' is to be replaced by '*What* are we electing?' For this purpose, electoral ballots are proposed to include questions about the voter's position on key issues in candidate manifestos (Introduce a nationwide minimum wage? Yes/No; Introduce a speed limit on German motorways? Yes/No; etc.). The procedure envisages evaluating the candidates by the degree to which their policy preferences match with that of the electorate. The degree of conformity can be measured, for instance, using the representativeness indices of popularity (the average percentage of the population represented) and universality (frequency in representing a majority) introduced in Tangian (2016). In contrast to habitual voting, here the candidates receive no votes. Rather, the embedded referendum on a sample of issues serves as a direct-democracy test of the candidates.

Section 2, 'Alternative election architectures', explains that the order of operations in voting can lead to different election outcomes with different policy representation effects.

Section 3, 'Adding the third vote to German ballots' proposes a scenario of German electoral reform. For illustration, the method is used to hypothetically redistribute seats in the German Bundestag, resulting in a considerable gain in its representativeness.

Section 4, 'Discussion', is devoted to several aspects of implementation of the election procedure proposed: selection of questions, dealing with unrealistic electoral pledges, combinations with traditional voting methods and some others.

Section 5, 'Conclusions', recapitulates the main statements of the paper.

2 Alternative Election Architectures

Before continuing, we comment on *election architecture*, drawing an analogy to 'software architecture' in computer science to characterize the order of operations. Let us illustrate alternative architectures and their impact on the election outcome with an example, which idea goes back to Ostrogorski's paradox (Nurmi 1999, pp. 70–73) and (Gehrlein and Lepelley 2011, pp. 123–124).

Suppose that the editor of an academic journal must accept or reject a paper evaluated by three reviewers with regard to three equally important criteria: (1) new findings, (2) awareness of literature, and (3) presentation and style. The positive and negative opinions of the reviewers are shown in Table 1. The table displays two *architectures* for the evaluation procedure. The first architecture has the order of operations $\downarrow\downarrow\rightarrow$. It assumes that opinions are first aggregated individually by each reviewer, resulting in votes either for (+) or against (−) acceptance of the article. Then these votes are accounted to make the final decision. Under this architecture, the paper is rejected by two out of three votes. The second architecture has the order of operations $\rightrightarrows\ \downarrow$. It assumes that a collective opinion is made for each criterion, and then these partial opinions are aggregated to make the final decision. Under this architecture, the paper is accepted.

In fact, what we have just considered is equally applicable to appointing a candidate to an office, or choosing between two candidates labeled '+' and '−'. The two architectures have very different background philosophies. The first architecture with the order of operations $\downarrow\downarrow\ \rightarrow$ reflects the liberal philosophy of *individual determination* based on individualism in opinions and on understanding the public good as the sum of the good of every individual, in the spirit of John Locke (1632–1704):

> Every man has a "property" in his own "person." This nobody has any right to but himself…

Table 1 Two architectures of editorial decisions based on three reviews

Criterion	Reviewers 1	2	3		Majority vote		Collective opinion
New findings	+	+	−			→	+
Awareness of literature	+	−	+			→	+
Presentation and style	+	−	−			→	−
	↓	↓	↓				↓
Reviewer's vote	+	−	−	→	−		+

> The public good, i.e. the good of every particular member of that society.
> (Locke 1689, *Second Treatise of Government*, Chapter 5, 26, and *First Treatise of Government*, Chapter 9, 92)

This philosophy deals with the aggregation of what Rousseau (1712–1778) and Condorcet (1743–1794) called individual wills. Electors choose their favorite candidates themselves, according to their own criteria and without being asked why they cast votes for this or that candidate.

The second architecture with the order of operations $\rightrightarrows \downarrow$ reflects the philosophy of *public determination*. It explicitly articulates the public interest, formulating socially important questions and asking for the electors' opinions on them. The society is considered a single body that has a political profile regarding these issues, resembling the Rousseauvian *general will*:

> Each of us puts his person and all his power in common under the supreme direction of the general will, and, in our corporate capacity, we receive each member as an indivisible part of the whole. At once, in place of the individual personality of each contracting party, this act of association creates a moral and collective body, composed of as many members as the assembly contains votes, and receiving from this act its unity, its common identity, its life and its will. This public person, so formed by the union of all other persons, formerly took the name of *city*, and now takes that of *Republic* or *body politic*…
>
> There is often a great deal of difference between the will of all and the general will; the latter considers only the common interest, while the former takes private interest into account, and is no more than a sum of particular wills…
> (Rousseau (1762), *Of Social Contract*, Book I, 6 and Book II, 3)

The public political profile is used to find the most socially adequate candidate by matching his/her profile to that of the electorate. This architecture enhances the civic aspect of election and reduces the partiality of electors' opinions. It is often used for evaluating new products, project proposals, scientific contributions, etc., when each referee estimates every quality separately.

This approach is in line with recent business practices. Trying to enhance objectivity in recruitment procedures, some corporations, e.g. l'Oréal, Accor and AXA, evaluate job candidates considering exclusively job-related matters and using anonymous questionnaires without names, photos or any personal information; for an international survey see (Krause et al. 2010, pp. 8–21). This practice is becoming more widespread, and Germany is even shaping it into legal guidelines (Antidiskriminierungsstelle des Bundes 2010).

3 Adding the Third Vote to German Ballots

Traditionally, elections are based on voting for candidates by name, that is, they use the architecture of individual determination (the first one). In this section it is shown that the architecture of public determination (the second one) can be used as well. The aims are: (a) to redirect the voters' attention from candidate (party) images to their manifestos and policy proposals, and (b) to enhance policy representation by matching the candidate's policy profiles with that of the electorate. To be specific, we hypothetically apply the architecture of public determination to the German election procedure.

Recall that the German Bundestag is elected via two votes, the first *(Erststimme)* for a person and the second *(Zweitstimme)* for a party. The first 299 Bundestag members are therefore direct mandate holders, representing 299 local constituencies. They are elected through the first vote by simple plurality within the constituency. The second vote is used (1) to determine the eligible Bundestag party factions (those who have at least 5 % of the second national votes or at least three direct mandates) and (2) to make their size (including the party members already elected by the first vote) proportional to the second vote. For this purpose, the next 299 Bundestag seats are distributed among the eligible parties. If the proportion to votes is not accurate enough due to discrepancies between the number of directly elected persons through the first vote and the percentage of seats finally allowed to the party through the second vote, some extra seats, called 'overhang mandates', are added (Überhangmandat 2012). The 2013 Bundestag has 631 seats, including 598 basic and 33 extra seats (Bundeswahlleiter 2013). Obviously, the second vote is decisive, because it determines the size of the party factions.

Let us imagine that the ballots are complemented by a third vote *(Drittstimme)* asking for the elector's political profile, as in the voting advice applications, along the lines of the policy issues declared in the party manifestos (Introduce nationwide minimum wage? Yes/No; Introduce a general speed limit on highways? Yes/No; etc.). The first vote, as before, is cast by name for the Bundestag member from the local constituency. The second vote—for a party—is used only to filter out unpopular and untrustworthy parties who receive fewer than 5 % of the votes. Thus, the second vote retains only its first filtering function, and its second function—distribution of the Bundestag seats among eligible parties—is conveyed to the third vote.

The third vote is used to determine the political profile of the electorate, similar to the way the collective opinion is formed in Table 1. Then the parties are allocated Bundestag seats in proportion to the degree to which their political profiles (as declared in their manifestos) match with the political profile of the electorate. The degree of matching can be measured, for instance, by the indices introduced in Tangian (2016). In a sense, the third vote performs a kind of 'direct democracy test'—a competitive public examination of the parties, who are evaluated through the election procedure.

Table 2 Indices of the four eligible parties, of the Bundestag before coalition formation, and of the Bundestag with its seats redistributed proportionally to the parties' mean indices

	Bundestag seats (%)	Bundestag seats, adjusted (%)	Popularity unweighted (%)	Universality unweighted (%)
CDU/CSU	49.3/ 1	16.5/ 4	40/ 4	34/ 4
SPD	30.5/ 2	25.2/ 3	56/ 3	57/ 3
DIE LINKE	10.2/ 3	31.2/ 1	64/ 1	76/ 1
GRÜNE	10.0/ 4	27.1/ 2	58/ 2	63/ 2
Bundestag	100	–	51	50
Bundestag, adjusted	–	100	57	61
Absolute max	100	100	73	100

To illustrate the election method proposed, we consider the German public profile based on 36 polls of public opinion on 36 policy issues and the political profiles of the four parties eligible for the Bundestag seats considered in Tangian (2016). Table 2 shows the parties' unweighted indices of policy representation and the actual size of the Bundestag factions, as well as their size adjusted proportionally to the parties' mean indices of unweighted popularity and universality. For instance,

$$\begin{aligned}\text{Adjusted seats of CDU/CSU} &= \left(\frac{\overbrace{40}^{\substack{\text{Unweighted}\\ \text{popularity}\\ \text{of CDU/CSU}}}}{\underbrace{64+58+56+40}_{\substack{\text{Unweighted}\\ \text{popularity indices of}\\ \text{the four eligible parties}}}} + \frac{\overbrace{34}^{\substack{\text{Unweighted}\\ \text{universality}\\ \text{of CDU/CSU}}}}{\underbrace{76+63+57+34}_{\substack{\text{Unweighted}\\ \text{universality indices of}\\ \text{the four eligible parties}}}} \right)\\ &\times \frac{100\%}{2}\\ &\approx 16.5\% \ .\end{aligned}$$

The bottom section of the table displays the policy representation indices of the Bundestag before coalition formation, those for a Bundestag adjusted to better represent the policy preferences of the electorate, and, for reference, the maximum attainable indices if majorities in the society were represented on all the policy issues. The indices of the adjusted Bundestag surpass 50 %, meaning that it is no longer independent of public opinion although not completely bound by it—exactly as assumed in the modern concept of representation.

Given makeup of the seats in the adjusted Bundestag, the coalition indices of popularity and universality can be computed as in Section 3 of Tangian (2016). The results are displayed in Table 3 and illustrated in Fig. 2, which is the same as Fig. 3 in Tangian (2016) but complemented with the new minimal eligible coalitions distinguished by

Table 3 Indices of minimal eligible coalitions for the current Bundestag and for the adjusted Bundestag with redistributed seats (R) (computed for unweighted questions and the impact of member weights on the coalition decisions $p = 0.50$)

Coalitions	Bundestag seats	Unanimity	Popularity		Universality	
			Expectation	Standard deviation	Expectation	Standard deviation
	%/Rank	%/Rank	%/Rank	%/Rank	%/Rank	%/Rank
1 CDU/CSU–SPD	79.8 / 1	66.7 / 2	46.5 / 2	±2.9 / 3	45.0 / 2	±5.8 / 3
2 CDU/CSU–DIE LINKE	59.5 / 2	33.3 / 4	43.0 / 4	±2.0 / 1	40.1 / 4	±4.2 / 1
3 CDU/CSU–GRÜNE	59.3 / 3	45.7 / 3	44.1 / 3	±2.5 / 2	42.1 / 3	±4.9 / 2
4 SPD–DIE LINKE–GRÜNE	50.7 / 4	77.1 / 1	54.4 / 1	±3.4 / 4	56.8 / 1	±6.4 / 4
Coalitions for redistributed seats						
1R SPD–DIE LINKE	56.3 / 2	80.0 / 3	56.2 / 1	±3.5 / 1	61.5 / 1	±6.5 / 1
2R SPD–GRÜNE	52.3 / 3	85.7 / 2	54.3 / 3	±3.5 / 2	57.3 / 3	±6.8 / 2
3R DIE LINKE–GRÜNE	58.3 / 1	94.1 / 1	55.3 / 2	±3.7 / 3	60.4 / 2	±7.1 / 3

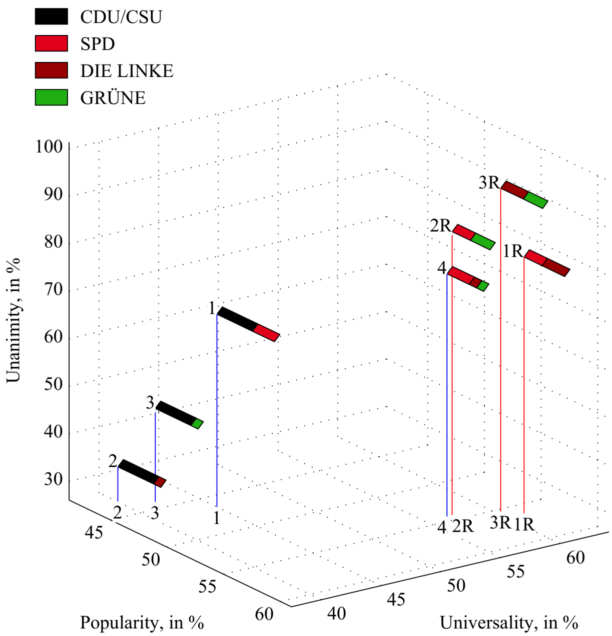

Fig. 2 Indices of minimal eligible coalitions for the Bundestag and for the adjusted Bundestag with redistributed seats (R) (computed for unweighted questions and the impact of member weights on the coalition decisions $p = 0.50$)

red flagstaffs. After adjustment, all minimal eligible coalitions are more unanimous and more representative than the actual ones (with blue flagstaffs). The most representative among the adjusted coalitions is SPD–DIE LINKE, the next best is DIE LINKE–GRÜNE, which is most unanimous and, consequently, most probable.

The redistribution of the Bundestag seats is made without explicitly taking into account numerous direct mandates. Due to the party-identifiable first vote, there is a strong correlation between the party seats resulting from the first vote for persons and those stemming from the second vote for parties, which implies rather small adjustments of Bundestag factions with overhang mandates. This is not to be expected with a third vote that bears no explicit party identification. For instance, our application restricts CDU/CSU to only 16.5 % of the Bundestag seats, whereas the union received 45.3 % of the first votes (Bundeswahlleiter 2014, p. 36). As one can see, this disproportion is of a quantitative rather than a qualitative nature. The same can occur under the current election method, when a party's poor results in the second vote must be combined with its numerous direct mandates; so there is no contradiction with the logic of the existing rule.

However, to avoid a large number of overhang mandates, the members of redundant factions (with redundant direct mandates) can be restricted to discounted (fractional) parliament votes. In our application, the union CDU/CSU would not receive any additional Bundestag seats other than its direct mandates that constitute $45.3/2 = 22.65\,\%$ in the total of the $299 + 299$ Bundestag seats. Then each direct mandate holder would have only $16.5/22.65 \approx 0.72$ of the regular vote.

4 Discussion

Of course, the above hypothetical application to the German Bundestag is just an illustration, and the method proposed is no more than a prototype, a reform scenario which is by no means ready for immediate use. By and large, it is suggested to couple elections with referenda that reveal the public opinion on a number of policy issues.

Elections are often combined with referenda in Switzerland, Canada, the United States and some other countries, where it is done to avoid multiple campaigns for the convenience of the population. Our proposal to use referenda with elections goes further: not only to let the electorate vote on particular actions of the authorities, but to form these authorities with respect to public opinion and general political context. When representatives are tested with referenda, the electorate gains more control over policy making.

Since the proposed election method is based on imbedded referenda, the questions and their wording are of prime importance. To avoid manipulation of electoral outcomes by posing questions favorable for one candidate and unfavorable for others, the questions can be drawn up by the parties themselves. This can be done implicitly, within the party manifestos, or explicitly, by announcing a list of program policy issues. The questions formulated by one party can be shared with all other parties giving them an opportunity to make their positions comparable. Finally, competing parties can negotiate on the questions in order to prevent misinterpretations.

The focus on policies rather than on personal charisma or party ideologies makes elections less emotional, more objective and more *rational*. The current German system with its two votes tends to overcome the electors' subjectivity, and the method described follows this logic of increasing the impartiality of votes. The first vote allows electors to choose their preferred politicians by name, but the partiality of the vote for a person is counteracted by rearranging the Bundestag factions according to the more conceptual and less personified vote for a party. In our procedure, the third vote is linked neither to candidates nor to parties. It allows the electorate to objectively test them with a few questions in the same way as a committee examines students. As explained previously, the political profiles of the candidates (parties) are backed up by a certain worldview, making the answers to different questions strongly interdependent. Therefore, a few questions can provide a reliable basis for specifying the political profiles of both candidates and electors. Thus, the third vote continues the logic of the German two-vote system: the first vote is for a person, the second vote is for a party, and the proposed third vote is for a party policy profile, so that the considerations become progressively more conceptual and less personal.

The focus on policies also hinders strategic voting. Indeed, to cast the third vote more or less rationally, that is, to select preferred policy issues question-by-question, it suffices to rely on common sense and awareness of the current news and policy debates. In contrast to that, to strategically favor a candidate or party by means of the third vote and simultaneously decrease the chances of their competitors, one requires much more knowledge—about the state of political affairs and, additionally, about the detailed candidate profiles with regard to all the policy issues. Therefore, under the method proposed, most of the people would probably not be driven by prejudice and/or calculated intent to influence an election—if only for lack of knowledge.

It is unlikely that all the electorate's preferences could be equally satisfied, particularly due to financial constraints. The politically experienced parties are more realistic in formulating their positions, giving priorities to certain issues. In a sense, they propose feasible programs, from which a solution should be found, whereas the electorate's policy profile serves as a (unattainable) target to match with consistent party programs. This is the problem considered within a new branch of social choice theory called 'judgment aggregation'.

To discourage a party from making unrealistic electoral pledges, its index based on the third vote can be discounted if the party did not keep its word as given in the previous campaign. A party can also take a prudent 'neutral' position on most of the issues if it fears repelling electors with (too) definitive statements. Indefinite positions either mean that a party is not ready to represent the public on a broad range of issues or that it is intentionally concealing its plans. When information is lacking, matching the electorate's and the party's profiles with a few issues results in a low statistical confidence in the party index. In such cases the party index can be discounted as well.

The proposed election method can be combined with the existing one. Voting flexibility is already inherent in the German system—electors may vote for a person without voting for a party, and vice versa. In case of a missing third vote, the second vote can be given the 'full weight' by attributing to the ballot a virtual third vote corresponding to the profile of the party indicated in the second vote. This way voters can also enhance their identification with particular parties. To express trust in creditable parties, as opposed to their non-liable competitors who freely over-promise, the second and third votes can be counted in a weighted combination.

To account for the degree of individual preferences, voters may be granted the right to prioritize questions; this information can be included in the calculation of the party indices. The degree of public preference can be measured by the imbalance of public opinion on every question—the greater the imbalance, the stronger the public preference; an imbalance of zero means indifference.

There are plenty of other options which we do not discuss here. In any case, the proposed scheme requires detailed elaboration and approbation, first in small communities.

5 Conclusions

To enhance the policy representation of a parliament, the electorate's policy profile is revealed by using ballots that include dichotomous (Yes/No) questions on a number of policy issues. The issues can either be announced by the candidate parties or taken from their manifestos. Then the eligible parties are indexed according to the closeness of their policy profiles to that of the electorate, and the parliament seats are distributed among them in proportion to the indices. A hypothetical application of this method to the 2013 German Bundestag considerably strengthens its policy representation.

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