

Preface

The essays in this volume were presented by academic experts in voting theory from seven countries, as well as by two voting practitioners, at an international workshop on “Assessing Alternative Voting Procedures”, held on 30 July – 2 August 2010 at Chateau du Baffy, Normandy, France. It received generous financial support from the Leverhulme Trust (Grant # F/07 004M).

The main purpose of the workshop was to explore both the theoretical and actual vulnerability to various voting paradoxes or pathologies of voting procedures designed to elect a single candidate. The following five relatively recent election-related events served as background to the workshop deliberations:

- The phenomenon displayed (again) in the 2000 US presidential elections, where George W. Bush was elected by the Electoral College although Albert Gore received more popular votes.
- The decision by the German Federal Constitutional Court on 3 July 2008 mandating the Bundestag to amend by June 2011 the procedure by which it is elected so as to avert, or significantly decrease, the impact of non-monotonicity afflicting it.
- Several mayoral elections conducted in the US (e.g., in Burlington, VT., in March 2009) displaying the non-monotonicity paradox.
- The release by the British Academy on 10 March 2010 of a report summarizing the properties of parliamentary voting procedures currently used in the world but without mentioning the voting paradoxes (pathologies) to which they are vulnerable.¹
- The decision of the UK parliament in May 2010 to conduct a referendum in May 2011 as to whether the UK should elect its parliament by the Alternative Vote procedure instead of the current Plurality procedure (aka “First Past the Post”).

¹ Hix, S., Johnston, R., & McLean, I. (2010). *Choosing an electoral system: A research report prepared for the British Academy*. London: British Academy Policy Centre. ISBN 978-085672-588-3.

As outlined below, these events are explored in some of the chapters in this volume.

The volume is divided into three parts containing a total of 13 chapters.

The first part (comprising Chaps. 1–2) contains brief introductory remarks on electoral procedures of representative assemblies and decision-making rules within them. It classifies the types of representative assemblies and the manner in which they are elected, and thereafter explores possible decision rules that could be instituted within them so as to make them truly representative.

Chapter 1 formulates two main political dichotomies, each offering two alternatives. This gives rise to a fourfold political classification of voting procedures. The first main dichotomy distinguishes between legislatures based on *proportional representation*, and those based on *district representation*. The second main dichotomy distinguishes between elections employing a *deterministic voting procedure* and those using lottery. Following this fourfold classification the chapter proceeds to explore what social-choice theory has to offer in each of these four classes.

Chapter 2 argues that regardless of how a representative assembly is elected, it cannot truly be representative if (permanent) minorities in it are unable to affect decisions due to a majoritarian decision rule. This chapter briefly examines some alternative decision rules that would increase the actual voting power of minority groups.

The second part of the volume (Chaps. 3–9) surveys paradoxes afflicting single-winner voting procedures, as well as assessing the theoretical and empirical frequencies of some of these paradoxes.

Chapter 3 contains a comprehensive review and illustration of the main paradoxes that may afflict each of 18 single-winner voting procedures. It argues that in order to better assess the probability of occurrence of every paradox to which a given voting procedure is vulnerable, one must first determine what are the necessary and/or sufficient condition(s) for this paradox to occur under the given procedure. As this has so far not been achieved with respect to most paradoxes/procedures, perhaps a more reasonable way for selecting a voting procedure would be to limit the choice of a voting procedure only to those procedures that are not vulnerable to what the author considers as especially serious pathologies.

Chapters 4 and 5 investigate the probability of occurrence – in two particular settings – of the general phenomenon variously known as *majority-deficit*, or *election inversion*, or *referendum paradox*, that can occur in any two-tier electoral system, whereby the candidate (or party) that receives the largest number of votes in the entire electorate is either not elected or does not receive the largest number of parliamentary seats.

Chapter 4 investigates this phenomenon in the context of US presidential elections where it last occurred in the 2000 US presidential election. This chapter identifies the sources of election inversions by the US Electoral College, establishes logical bounds on the phenomenon, and estimates the frequency and magnitude of inversions on the basis of historical state-by-state US presidential election data.

Chapter 5 investigates this phenomenon in the context of French local (cantonal) elections. Despite the fact that the cantons are of unequal population size, each

of them is represented by one representative in the region's assembly (called *conseil general*) who is elected by the plurality-with-runoff procedure. The authors' objective is to find how many representatives should be allocated to each canton as a function of its population size so as to minimize the frequency of the referendum paradox. They find that the optimal number should be very close to being proportional to the square root of each canton's population. Thus this is probably the first experimental study to support what has long been advocated in the theoretical literature on voting power and known as the "square root rule".

Chapter 6 outlines five alternative proposals to avert, or significantly decrease, the non-monotonicity of the election procedure of the German Bundestag, whereby every voter casts two votes – one for a preferred constituency representative and the other for a preferred party list. The interplay of these two votes with the Federal structure of Germany has led to instances of non-monotonicity: a vote for a party list reduced the number of seats it received in the Bundestag. At the time of writing it is not yet known which, if any of these or other proposals currently being contemplated, will be adopted by the Bundestag and sanctioned by the German Federal Constitutional Court.

The last three chapters of Part II (Chaps. 7–9) present and defend alternative methods for assessing the probabilities of various voting paradoxes.

Chapter 7 defends computer simulations designed to estimate the probability of voting paradoxes in three-candidate single-winner elections based on the models known in the literature as the Dual Culture Condition, the Impartial Culture Condition, and the Impartial Anonymous Culture Condition. Although admittedly these models do not reflect realistic scenarios, it is argued that they still add very significantly to research on the probability of occurrence of various voting paradoxes; in particular, they suggest that most extreme voting paradoxes should be expected to be rare events.

The same authors continue to investigate in Chap. 8 which of five single-winner voting procedures (Plurality, Negative Plurality, Borda, Alternative Vote, and Coombs' procedure) is more likely to maintain the social preference ordering when there are three candidates, a Condorcet Winner exists, and various degrees of group coherence in voters' preferences are introduced.

In contrast to Chaps. 7 and 8, Chap. 9 argues that any evaluation of the probability of various voting phenomena – e.g., that the social preference ordering contains a cycle, or the likelihood that a Condorcet Winner is elected when s/he exists, or that voters vote strategically rather than sincerely – needs to be based on a statistical model that describes how voters behave in actual elections. This chapter uses two sets of data, one from actual elections and the other from survey of voters, to evaluate 12 statistical models that make different assumptions regarding voters' behavior in three-candidate single-winner elections (and hence reach different conclusions) regarding voters' behavior in three-candidate single-winner elections.

The final part of the volume comprises four chapters (Chaps. 10–13). It discusses considerations other than susceptibility to paradoxes in selecting a voting procedure.

In Chap. 10 it is argued that the paradoxes afflicting single-winner voting procedures may not be the best criterion, and that selection should be based on additional criteria. Moreover, it is argued that the determination of who of the competing candidates ought to be elected should not necessarily be based on the voters' (ordinal) rankings of the candidates because voters are often capable of a much more refined expression of their preference ordering among the candidates.

Chapter 11 is an advocacy essay, supporting the replacement of the current plurality procedure by which the UK elects its members of parliament with the Alternative Vote (AV) procedure. Although it has been decided in the 5 May 2011 referendum in the UK to keep the plurality procedure for electing the UK parliament, this chapter should be of interest not only to activist proponents or opponents of AV, but also to electoral-system scholars because of its balanced and nuanced analysis of the AV procedure.

Since all the other chapters in this volume are concerned with single-winner electoral procedures, we thought it is appropriate – at least for the purpose of charting directions for possible future research – to include in this volume also one chapter which addresses multi-winner electoral procedures, e.g., procedures for electing teams or fixed-size committees. Chapter 12 describes various multi-winner procedures and proposes several properties that may be used for assessing the desirability of such procedures. It is concluded that Approval balloting is the most natural approach to multi-winner elections.

At the end of the workshop it was agreed among its 22 participants to hold a vote as to the best single-winner procedure for electing a mayor for a city or town. Each of the participants listed in his or her ballot one or more of 18 proposed single-winner procedures that s/he approved, and it was agreed that the winner would be the procedure which received the most approval votes. The last chapter in this volume (Chap. 13) describes and analyzes this election. It also contains explanations supplied by some of the participants as to why they voted the way they did. As far as we know, this is the first time that voting theorists hold a vote on voting procedures. The decision to hold the vote was spontaneous. Consequently, no one had much time to think things over, discuss them with others, or calculate. Arguably, this detracts from the significance of the result; but perhaps it adds to its significance, in that the opportunity for strategic manipulation was diminished. In either case, it seems likely that if the experiment is ever repeated, the circumstances will be different; or that knowledge of this experiment may mean that future ballots will be more carefully considered. Thus, this vote may be unique in that it may have been the first and last “naïve” vote on voting rules by voting theorists.

Of course, some assertions made in some essays included in this volume are controversial. But this is to be expected from voting theorists and practitioners, who are engaged in the highly important and sensitive issue of how to aggregate individual preferences into a binding social decision. Perhaps one of the merits of this volume is that it brings these controversies to the attention of a wider public.

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Electoral Systems

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