Chapter 1
Voting Rules in Context

Abstract All societies have rules. Some are explicitly based on them, but in general rules take on many forms. They can strict and formal or ambiguous and informal or something between these extremes. Many rules have a clear-cut motivation. Some pertain to coordination such as the traffic rules. Some have the aim of avoiding collectively irrational or harmful outcomes. The rules prohibiting cartel formation are examples of these. This book deals with the problems of choosing rules. More specifically, our focus is on rules of collective decision making. We study the most common collective decision making rules singling out the advantages and disadvantages using well-defined criteria.

1.1 Introduction

Rules are a pervasive feature in all societies from the primitive hunter-gatherer groupings through medieval city-states to modern industrial and post-industrial societies. Their role is easily recognizable in modern systems with formally regulated ways of rule production and application, but also informal rules constitute an important aspect of living in a community of humans. Rules are often closely related to norms: both map social situations into action patterns. The Ten Commandments of the Holy Bible can be seen both as norms and as rules. Indeed, as a verb 'rule' is basically synonymous with issuing a norm, e.g 'the judge ruled that the defendant be imprisoned for 2 years'. Some rules, however, do not seem to be related to norms, at least not directly. For example, 'people tend to get angry when provoked' seems to refer to rule that expresses what often or almost always happens without stating that this should be the case. Norms typically deal with what ought to be done or ought to be left undone, while rules can have a purely factual meaning.

Rules are basically predictive devices. If you are living in England, you can predict that the vehicles drive on the left-hand side on roads if the traffic is moving in two opposite directions. Similarly, every community of individuals develops rules and/or norms to regulate interactions between its members. Some rules are pretty flexible, e.g. rules concerning how to greet one's fellow group members (although in military units the flexibility is almost nonexistent), while others contain precise instructions,

A. T. de Almeida et al., *Systems, Procedures and Voting Rules in Context*,
Advances in Group Decision and Negotiation 9,
https://doi.org/10.1007/978-3-030-30955-8_1

such as forms to be filled when applying for a passport. Some rules do not presuppose the existence of a social context. Thus, the rules of rational choice may be applied in settings that can be characterized as games against nature: an individual is making a choice between alternatives using only individual preference information (e.g. in deciding on whether to lie on one's left or right side when trying to get to sleep).

In groups or communities the fact that there are rules implies that one can to an extent predict how people behave in certain types of situations. Rules are often used in coordinating activities, e.g. in setting up meeting times and places. These rules are sometimes called coordination norms in contradistinction to another major class of social rules: the Prisoner's Dilemma norms (Ullman-Margalit 1977). These aim at reaching the cooperative, collectively rational outcomes rather than the individually rational, non-cooperative ones in situations representable as Prisoner's Dilemma games (Rapoport and Chammah 1965; Nurmi 1980).[1] The classic two-person Prisoner's Dilemma payoff matrix is presented in Table 1.1. Here one player's choices are represented as rows and the other's as columns. Both can choose either to cooperate (C) or to defect from cooperation (D). Situations describable as Prisoner's Dilemmas are typically situations involving collective good provision, such as building a bridge, a road or maintaining public safety. The individually best outcome (payoff 4) is obtained when the player defects (D), while the other player cooperates (C). The cooperator then gets his/her worst outcome (1). If both players cooperate the outcome brings the next to highest payoff (3) to both, while if both defect the outcome is next to worst (2) to both. So, there are incentives to cooperate, but if the other player cooperates, it is profitable to defect. This is a typical mixed motive game. Another somewhat less extensively studied game is Chicken (Table 1.2). It is less dramatic than Prisoner's Dilemma, since in Chicken the players do not have dominant choices because C is better than D if the other player chooses D, but D is better than C if the other player chooses C. In Prisoner's Dilemma, on the other hand, D is the dominant choice for both players. Yet, by so choosing they end up with the only Pareto sub-optimal outcome 2, 2.

Now, some Prisoner's Dilemma norms aim at making the cooperative choices more likely, but interestingly there are also rules that aim at exactly the opposite, viz. to guarantee that the actors involved in a Prisoner's Dilemma do not collude, but resort to their individually rational strategies. These kinds of rules are often encountered in arrangements that inhibit the emergence of price-fixing cartels or market sharing collusion of enterprises.

The underlying assumption in these norms is that rules together with principles guiding the behavior of actors determine the social states that prevail under those norms. Some of these may be deemed desirable, others less so. Institutional design deals precisely with these kinds of settings and asks which rules would - either always or often enough - lead to desirable outcomes in equilibrium. In other words, institutional design aims at establishing arrangements that result in desirable outcomes so

[1] Due to its assumed plausibility as a model of many kinds of social interactions, Prisoner's Dilemma has generated a truly voluminous literature. Much of it is of experimental nature and seeks explanations for the common deviations from individual benefit-maximization.

Table 1.1 Prisoner's Dilemma

	C	D
C	3, 3	1, 4
D	4, 1	2, 2

Table 1.2 Chicken game

	C	D
C	3, 3	2, 4
D	4, 2	1, 1

that the actors do not have second thoughts about their own strategies. When these kinds of arrangement are found, one can predict that the desired outcomes are likely to emerge barring changes in the principles of behavior.

In this book the focus is on principles of choosing the rules of choice. More specifically we focus on rules that are used in making collectively binding decisions. These decisions are often needed to guarantee the provision of collective or public goods. These goods are by definition ones where the decentralized market mechanism fails to secure optimal provision. Typically, the decentralized supply is grossly sub-optimal as no individual actor has an incentive to contribute to the provision. Given the obvious sub-optimality, the coordination problem emerges. It is, in fact, in the nature of Prisoner's Dilemma. Since the decentralized mechanism is likely to fail, various kinds of non-market rules have evolved. A prominent one among those is voting whereby the alternatives to be voted upon are levels of the public good provision. For voting to succeed in solving the public goods provision problem, the actors have to commit themselves to the resulting voting outcomes. Our focus will be on reasons for actors to agree to such a commitment.

Voting is often used in contexts that are related to public goods in somewhat indirect way, e.g. in parliamentary legislation. The results are then pieces of collectively binding legislation. While public goods provide a standard context for the application of voting rules, many a voting takes place in settings where either private goods, policies, norms or candidates form the sets from which the choice is to be made. Often the act of voting is preceded by some kind of bargaining. If this fails, voting is often deemed the last resort.

Voting may take place in public or private contexts and the methods of voting are often quite similar. That is, while the alternative sets may vary, the voting systems do not necessarily reflect this. E.g. one-person-one-vote rule is commonly applied in both public and private settings. One would, however, expect that the criteria

imposed on the voting rules could vary in different settings. This expectation forms the rationale of this work. We consider the duplicate choice of the choice rule problem from the angle of the contextual requirements rather than universally applicable standards of performance. This will hopefully open a novel angle to the problem of rule selection.

The plan of the book is the following. The first part deals with some of the classic treatises in the field. We first discuss the rule choice problem as a cost minimization one: each individual supports the collective decision rule that minimizes the expected costs ensuing from its application. We then turn to the majority rule for it is often considered as the most obvious rule to adopt and, perhaps because of this, it is also widely used. It is also often regarded as the rule that defines democratic governance. This chapter is very much in line with the traditional cost-benefit analysis of public and private decision making. As such it provides a kind of bench-mark for the approach advocated in this book. After this brief discussion we turn to a more general discussion on why so many voting systems exist, i.e what is their primary motivation and what properties they have. The bulk of what follows next focuses on applying the social choice theory to voting procedures. We introduce and evaluate a number of voting systems using the standard social choice desiderata as benchmarks. We also discuss the relevance of strategic behaviour in various voting contexts. Thereafter we introduce a framework for facilitating the choice of a voting rule in business contexts. An important role is played by multiple criterion decision making/aiding (MCDM/A) tools and the standard procedure evaluations, but our aim is to provide a methodology for their systematic application in business contexts. The book presents four applications in different contexts of the framework for choosing rules, such as environmental policy and technological choice. The book is concluded with a comparative assessment of the procedures in various contexts, i.e. a discussion on the advantages and disadvantages of classes of rules. Our contention is that while all voting procedures are vulnerable to some major flaws, there are circumstances that de-emphasize some flaws in the sense of making them less likely to materialize. Hence, one should pay due attention to the contextual factors when making the choice of a procedure.

1.2 Topics for Further Reflection

Consider the following questions from the view point of the organization you are interested in. Elaborate the advantages and disadvantages related to the ways things are arranged in the organization with respect to these questions.

1. What kinds of decisions are made by individuals in the organization?
2. What is the role of bargaining within the organization?
3. Which decisions are normally made by groups?
4. Are there explicit decision rules for group decisions?
5. Do the rules – if they exist – envisage secret balloting or roll-call type of voting where the identity of voters is disclosed?

1.3 Suggestions for Reading

The books of Ullman-Margalit (1977) and Elster (1992) are relatively non-technical introductions and overviews on the emergence and functions of norms. Somewhat more restricted in scope and slightly more technical in presentation is Axelrod's (1984) text on evolution of cooperative strategies in repeated Prisoner's Dilemma games. Voting is intimately linked to democratic theory. The foundations of the modern theory of voting were laid by Black (1958). Comprehensive overviews are provided by Straffin (1980), Riker (1982) and Dummett (1984). One of the writers of the present treatise gave his first contributions in Nurmi (1983, 1987).

References

Axelrod, R. (1984). *The evolution of cooperation*. New York: Basic Books.
Black, D. (1958). *Theory of committees and elections*. Cambridge: Cambridge University Press.
Dummett, M. (1984). *Voting procedures*. Oxford: Oxford University Press.
Elster, J. (1992). *Local justice*. New York: Russell Sage Foundation.
Nurmi, H. (1980). Ways out of the Prisoner's Dilemma. *Quality & Quantity*, *14*, 743–765.
Nurmi, H. (1983). Voting procedures: A summary analysis. *British Journal of Political Science*, *13*, 181–208.
Nurmi, H. (1987). *Comparing voting systems*. Dordrecht: D. Reidel.
Rapoport, A., & Chammah, A. M. (1965). *Prisoner's Dilemma*. Ann Arbor: Michigan University Press.
Riker, W. H. (1982). *Liberalism against populism*. San Francisco: W. H. Freeman.
Straffin, P. D. (1980). *Topics in the theory of voting*. Boston: Birkhäuser.
Ullman-Margalit, E. (1977). *The emergence of norms*. Oxford: Oxford University Press.