EXPERIMENTAL POLITICAL SCIENCE:  
THE CASE OF THE VOTING RULES


More than 180 years ago, in his essay On the Definition of Political Economy; and on the Method of Investigation Proper to It, J. St. Mill developed the view that in moral sciences the only certain or scientific mode of investigation is the a priori method, or that of “abstract speculation”. The focus of his approach was political economy. But it is significant that some of his examples concerned topics that we now include in the domain of political science. The following quotation concentrates his main argument:

There is a property common to almost all the moral sciences, and by which they are distinguished from many of the physical; this is, that it is seldom in our power to make experiments in them. In chemistry and natural philosophy, we can not only observe what happens under all the combinations of circumstances which nature brings together, but we may also try an indefinite number of new combinations. This we can seldom do in ethical, and scarcely ever in political science. We cannot try forms of government and systems of national policy on a diminutive scale in our laboratories, shaping our experiments as we think they may most conduce to the advancement of knowledge. We therefore study nature under circumstances of great disadvantage in these sciences; being confined to the limited number of experiments which take place (if we may so speak) of their own accord, without any preparation or management of ours; in circumstances, moreover, of great complexity, and never perfectly known to us; and with the far greater part of the processes concealed from our observation. (Mill: 1874, p. 103)
For Mill, experiments in political science are not an appropriate means of arriving at truth. However, Mill attaches them another important role: experiments help verify truth, and reducing as much as possible the “uncertainty before alluded to as arising from the complexity of every particular case, and from the difficulty (not to say impossibility) of our being assured *a priori* that we have taken into account all the material circumstances”.

Mill’s insight is significant in at least two respects. First, he pointed to a relevant feature of political science. Experiments are difficult to imagine and conduct, and many times scholars are confined to the so-called natural experiments as faced, e.g., in real world elections. Secondly, Mill treated along the same lines economics and political science.

The plan of my paper is this. In the next section I shall discuss some of the views expressed by economists, concerning the role of experiments. I shall focus on the view developed by Vernon Smith on the significance and role of the experimental research in economics. One of the reasons for this choice is that Smith gives institutions a core role in theory construction as well as in experimental settings. As one can immediately guess, voting rules can be easily identified with an institution – a rule or a collection of rules on how the electorate’s votes can be transformed into a group decision. I shall then turn to political science; based on the lessons of the experimental economics, I shall discuss the issue in what sense political science, and specifically the study of the voting rules, can add something relevant to our understanding of the relation between theory and experiments. The focus will be on a small list of voting rules: the plurality rule, the approval rule and the Borda rule. Experiments performed with these rules will be discussed. The main thesis of this paper is that there is much to gain in the experimental approaches by taking into account the study of the voting rules by means of the social choice techniques. Social choice theorists showed that voting rules, plurality, approval and Borda rules included, can be characterized by appealing to sets of properties they uniquely satisfy. A voting rule can then be identified with such a set of properties. Therefore, it is tempting to study not only how voters behave when confronted with situations in which a certain voting rule works, but also their attitudes towards such properties. Fortunately, in many cases experiments have been conducted that throw light on this issue. For example, one such property some voting rules have is that of anonymity. Roughly, it states that all voters should be treated as equals. Then a large collection of experiments concerning the topic of voters’ attitudes toward equality and fairness becomes

---

1 For a general discussion on the role of experiments in social sciences, see Gonzalez (2007).
relevant for the study of voting rules. The paper concludes that we have much to win by connecting such different strands of experimental research.

It is usually argued that for the majority of economists, experimental ones included, economics is viewed as a hypothetico-deductive science, in which conclusions are deduced from provisional hypotheses, rather than self-evident axioms or known laws. These conclusions are then tested against evidence from the real world (Hausman: 1992). So, it is commonly presupposed that economic knowledge is encoded in a body of theory and that the function of empirical research is to test preexisting theories\(^2\). Unsurprisingly, under these assumptions, methodological reflections of the economists focused mainly on traditional issues like the validity of the Popperian falsificationism, or the Lakatosian research programmes\(^3\).

However, other issues in methodological discussions concern directly experiments, not their relevance for an economic theory. I shall give two examples in this sense. First, a crucial feature of the laboratory experiments is that they are performed in controlled conditions. The data collected in this way are to be compared with economic data and economic behavior as they naturally occur. But to have this aim it is necessary to assess the relevance of these lab data to economic theories. This gives rise to what is often called the problem of “external validity” (Guala: 2005): how can we infer from the special circumstances created in the laboratory to the phenomena that take place “in the wild”?\(^4\)

Secondly, an increasingly influential view is that experiments can be shown to play a much more complex role than theory testing (no matter how widely this issue is

---

\(^2\) The issue is usually conceptualized by appealing to the standard distinction between deduction and induction. Testing is deductive. Experimental research concerns the inductive tasks of generating and explaining the anomalous effects. For a more detailed approach in this sense, see e.g. D. Mayo (2008).

\(^3\) The following remarks are on these lines: „The principal contribution of Popper’s falsificationist methodology is, I believe, the influential attempt to develop a formal logic of skeptical inquiry. That the attempt has failed, in the sense that it has produced no defensible codified set of procedures that yield a science of scientific method (happily it would appear that all such attempts will fail), should not detract from the disciplinary value of the falsificationist perspective in approaching scientific questions. Its value to the experimentalist is to force him to ask “How can I design an experiment with the property that the set of potentially observable outcomes can be partitioned into those that are consistent with one (or a given) theory and those that are consistent with other theory(ies) (or inconsistent with the given theory)?”” (Smith: 1985, p. 265n)

\(^4\) Let me give a rather anecdotical example in this sense. Since subjects in most experiments are students, one may wonder, do college students behave like real people? Of course, you can never be sure. But there is little evidence that they do not (Roth: 1988). Ball and Cech (1996) find little evidence of subject pool effects between different populations. Konow (2003) surveys the issue in experiments concerning the issue of fairness and finds that the results point in the same direction.
conceptualized) if we take into account the scientific practice, i.e. what economists really do. According to V. Smith, there are at least seven reasons for a researcher to devise and conduct experiments (Smith: 1994). She may want to: (i) test a theory, or discriminate between theories; (ii) explore the causes of a theory's failure; (iii) establish empirical regularities as a basis for new theory (in the laboratory, especially with computerization, institutions with complex trading rules are as easier to study); (iv) compare environments; (v) compare institutions (using identical environments, but varying the market rules of exchange, has been the means by which the comparative properties of institutions has been established); (vi) evaluate policy proposals; (vii) treat the laboratory as a testing ground for institutional design, for examining the performance properties of new institutions.

V. Smith received the Nobel prize in 2002 for his contribution in experimental economics. He acknowledges that to accept that experiments have such roles is at odds with the standard, received view on way that economics is commonly researched, taught, and practiced (Smith: 2008). On this view economics is conceived as an a priori science consisting in logically correct, internally consistent theories and models, while experiments can only be used to “test” alternative model specifications. It is then counterintuitive for people trained in this tradition to understand key features of the experimentalist economists’ methodology. When confronted with economists working in this paradigm, the experimental researcher essentially sees himself as a kind of an anthropologist on Mars: he and the traditional economist live in different ways of thinking, have different two world views.

Smith (2008, pp. 293 – 294) gives a telling example. A large number of experiments were done on public goods. If experiments are viewed as means of testing theories, then the question naturally arises, how control can be achieved over the efficient allocation as the benchmark used in the comparisons of various public goods incentive mechanisms. For the experimentalist researches the answer is obvious: each subject is given a payoff function in monetary rewards defined jointly over variable units of a public (common outcome) good, and variable units of a private good. Given this experimental setting, the researcher knows the social optimum and can use the experimental data to compare the performance of alternative public good incentive mechanisms. This procedure is, however, incomprehensible for the

---

5 V. Smith (1994, p. 129) boldly puts this idea: „If you look at what experimental economists do, not what they say, you get the right picture of science learning”.

6 As we shall immediately see, Smith’s account heavily relies on his conception on the structure of an economic theory – see especially the place he attaches to the environment and institutions in a microeconomic theory.

7 Smith also derives a more general conclusion from this circumstance: „the roots of our discipline require a complete reexamination … Above all, we need to develop a body of knowledge which clarifies the difference between what we have created (theory as hypothesis) and what we have discovered (hypothesis that, to date, is or is not falsified by observation)” (Smith: 1982, p. 952).
deductivist economist. From his point of view, allocation mechanisms require agents to have complete information, but not mechanism designers. So, in order to judge the efficacy of these mechanisms we had no criteria, other than internal theoretical properties such as incentive compatibility. Then, if the experimenter is assumed to have sufficient information to know what constitutes the socially optimal allocation, then he does not need a mechanism: he could just impose the optimal allocation. But the experimentalist came accustomed to think in a quite different manner: „The whole idea of laboratory experiments was to evaluate mechanisms in an environment where the Pareto optimal outcome was known by the experimental designer but not by the agents so that performance comparisons could be made” (p. 294).

As an institutionalist theorist, V. Smith is aware of the fact that experimentalist economists have been largely influenced by institution-specific theory that began to develop about 1960. The lesson they learned is that institutions matter: agent incentives in the choice of messages (like bids) are affected by the institutional rules that convert messages into outcomes. Institutions are a core element of a theory and, as we shall immediately see, of an experimental setting. A theory can then be institution-free not in the sense that it does not assume an institutional environment, but in that it can be shown that the allocations it predicts are the same for all members of some class of institutions (Smith: 1989, p. 157).

Let us take as an example a special class of economic theories: microeconomic theories. Smith distinguishes three ingredients of these theories: the environment, the institution and the behavior of the actors (Smith: 1989). The first two ingredients help define the micro-economic system to be studied. The third concern the way in which agents choose messages. All three components allow for an assessment of the system performance (Smith: 1982).

The environment can be specified by describing the agents’ characteristics: first, the number of the economic agents; secondly, the list of the commodities or goods among which they are to choose; third, relevant characteristics of the economic agents, such as the agent's utility or preference function, the endowment of agents with resources (technology and knowledge), and the production or cost functions. Hence, a microeconomic environment is

---

8 As he writes, “it would appear that after 200 years, we know and understand very little. Incredibly, it is only in the last 20 of these 200 years that we have seriously awakened to the hypothesis that property right institutions might be important to the functioning of the pricing system!” (Smith: 1982, p. 952)

9 As Bottom et al. (2008) write, „Experiments are uniquely suited for examining institutional effects”. The experimental strategy is to hold preferences constant and randomly assign subjects to treatments distinguished only by variations in institutional rules. The obvious interpretation is that the resulting differences in behavior are to be ascribed to the institutional differences. Significantly, the degree of confidence reached would be impossible in natural political settings.
specified by a set of initial circumstances that cannot be altered by the agents or the institutions within which they interact. This final aspect is especially important. In an experimental setting, the environment should include some circumstances that cannot be altered by the agents because they are control variables fixed by the experiment.

Institutions, in D. North’s famous phrase, define the rules of the game under which agents may communicate and exchange or transform commodities or goods for the purpose of modifying initial endowments in accordance with their private tastes and knowledge. The institution specifies first, a language: the set of messages that can be sent by each of the agents. A message might be a bid, an offer, or an acceptance. Secondly, it specifies the rules: a) allocation rules – which is the resulting commodity or goods allocation to each agent as a function of the messages sent by all agents; a subclass of these rules include the imputation rules, which specify the payment to be made by each agent as a function of the messages sent by all agents; b) adjustment process rules. In general, these rules consist of a starting rule specifying the time or conditions under which the exchange of messages shall begin, a transition rule (or rules) governing the sequencing and exchange of messages, and a stopping rule under which the exchange of messages is terminated.

The third ingredient of the theory is the behavior of the actors. First, theories introduce assumptions about agent behavior, e.g. that agents maximize utility, or expected utility, that common information yields common expectations, that agents make choices as if they are risk averse, that expectations adjust using Bayes rule, that transactions costs (the cost of thinking, deciding, acting) are negligible, etc. The theoretical scheme is this: agents choose messages, and institutions determine the outcomes – the allocations – via the rules that carry messages into allocations. The scheme can be used to explain or to make predictions: about messages, for example the bid(s) that an agent will submit at a sealed bid auction, the price that will be posted by an oligopolist, the reservation price below which a price searching agent will buy, and so on.

The system performance is to be evaluated against some well specified independent criteria. Is an allocation mechanism better than an alternative one? Smith (1982) observes that two elements are crucial at this stage. First, it is necessary to point to the outcomes that are to be compared. Secondly, the criteria of assessment have to be clearly determined. One traditional criterion is Pareto optimality. A standard welfare theorem takes the following form: if the utility functions of the agents satisfy certain conditions, then the rules specified in the institution in conjunction with the maximizing behavior of agents yield a choice of messages which constitute Pareto optimal outcomes.
When comparing outcomes we presuppose that they are observable and measurable. However, not all the components of a microeconomic system are observable. The obvious case is that of preference orderings (and, in general, utility functions). Preferences are, first of all, private. Secondly, in general they are not entirely revealed, or required to be revealed, in practice. For example, in the case of the voting rules, a voter is asked to reveal only a small part of her preferences. Plurality rule requires the voters to reveal the top alternative, but not the other components of their preference relations. The Borda rule often requires more, but not necessarily all the preferences.10 Two other components of a microeconomic system are also unobservable: resource endowments (knowledge and human capital endowments), and message behavior. Willingness to vote in a mass election can at best be inferred from agents’ point actions; sometimes even specific messages cannot be known. In many mass elections we may know allocations of seats to various parties, but not all votes cast by the voters. „Individual skills, knowledge, and willingness to work and buy are not publicly observable — only their consequences are observable” (Smith: 1982, p. 924n). However, other elements that compose a microeconomic system are observable (in principle) in the field. The agents, the physical commodities, goods and resources, the language of the institution, and also the outcomes are observable.

Now let us move to experiments. The crucial point is that Smith regards the structure of the experiment as a replica of the theory (Smith: 1994). Experiments also have three ingredients: an environment, an institution, and the observed behavior of the agents. The characteristic of the experiments is control. “Control is the essence of experimental methodology, and in experimental exchange studies it is important that one be able to state that, as between two experiments, individual values (e.g., demand or supply) either do or do not differ in a specified way” (Smith, 1976, p. 275). Control infuses the first two ingredients of the experiment.11 The environment is controlled using monetary rewards to induce the desired specific value/cost configuration.12 The institution is defined by the experimental instructions which describe the messages and procedures of the market, which are most often computer controlled.13

---

10 This is the case when, e.g., the top alternative is attached three points, the second two points, the third one point, and all the other alternatives no point.

11 According to Boumans and Morgan (2001) control may concern issues like the environment in which the experiment takes place, the communication between subjects, the limits on the range of input behaviour allowed, the variation of output responses, etc.

12 As we shall immediately see, a nonsatiation condition is here assumed.

13 Smith acknowledges, however, that full control is an illusion. “I want simply to note here that there are similar illusions that control is a panacea for ensuring the quality of the information we gather in experiments” (Smith: 2008, p. 295)
One of the most important consequences Smith derives from the fact that the theory’s structure is replicated by experiments, in which relevant variables are controlled, is that experimental laboratory microeconomies are real live economic systems14 (Smith: 1982). Experimental worlds are not fictional, but real economic worlds. As Plott (1991, p. 902) writes, „the logic is as follows. General theories must apply to simple special cases. The laboratory technology can be used to create simple (but real) economies. These simple economies can then be used to test and evaluate the predictive capability of the general theories when they are applied to the special cases. In this way, a joining of the general theories with data is accomplished”.

For R. Sugden, these model worlds are credible worlds: they are not characterized by the fact that they are abstractions from reality, or simplifications of the reality. They are credible, in the sense that they can be real, or that they describe a parallel reality. “Theoretical models in economics often are descriptions of self-contained and imaginary worlds. These worlds have not been formed merely by abstracting key features from the real world; in important respects, they have been constructed by their authors. The … gap between model world and real world can be filled by inductive inference. On this account, models are not internally consistent sets of uninterpreted theorems; but neither are they simplified or abstracted or exaggerated descriptions of the real world. They describe credible counterfactual worlds. This credibility gives us some warrant for making inductive inferences from model to real world” (Sugden: 2000). As a result, they can be objects of interest in their own right.

---

14 V. Smith paid a special attention to the general conditions sufficient for a valid controlled microeconomic experiment (see Smith: 1982). He calls these conditions precepts. The following four conditions are sufficient to rigorously test hypotheses derived from theories, i.e. for the standard view of the role of experiments.

**Nonsatiation**: Given a costless choice between two alternatives, identical (i.e., equivalent) except that the first yields more of a reward medium than the second, individuals will always chose the first over the second.

**Saliency**: Individuals are guaranteed the right to claim a reward which is increasing (decreasing) in the goods (bads) outcomes of an experiment.

**Dominance**: The reward structure dominates any subjective costs (or values) associated with participation in the activities of an experiment.

**Privacy**: Each subject in an experiment is given information only on his/her own payoff alternatives.

But, if we want to know if the laboratory results can be extended to other environments, particularly those of the field, we need a fifth precept that would allow for the trasferability of these results:

**Parallelism**: Propositions about the behavior of individuals and the performance of institutions that have been tested in laboratory microeconomies apply also to nonlaboratory microeconomies where similar ceteris paribus conditions hold.

As Smith notes, what parallelism hypothesizes in microeconomy is that if institutions make a difference, it is because the rules make a difference, and if the rules make a difference, it is because incentives make a difference. It then follows that parallelism is not a metaphysical hypothesis. It is rather the subject of experimental research: „Which kinds of behavior exhibit parallelism and which do not can only be determined empirically by comparison studies”. 

---
Sugden (2005; 2008) has recently developed the theory of so-called exhibits. Exhibits are replicable experimental designs that reliably produce interesting results\(^{15}\). Schelling’s (1960) focal points are examples of such exhibits. Let an experimental design be such that each of two isolated subjects has to choose from the same set of options with the object of choosing the same option as the other. For example, you and me want to meet together, and we can do this either in the campus or in downtown. We meet if we both go in the same place, and fail to meet if we go to different places. Schelling argued that people are remarkably successful at coordinating their choices, even when the set of options is extremely large (Schelling 1960). The games Schelling uses to present the idea of a focal point are simple problems of coordination and bargaining individuals face in the real world. In this sense these games are not concern simplifications, abstracted situations, but they are well-specified games to be played by real individuals. When facing such coordination situations, individuals solve them by finding focal points. The significance of the concept of focal point for game theory is that it can be used to show how players select different equilibria. The experiment that leads to finding a focal point does not appear so much as a test of the theory, but as positive evidence of a particular regularity in behavior, namely, cooperation among players. Moreover, as Sugden notes, the understanding of focal points is still grounded in experimental rather than theoretical models.

II

I shall use the framework developed by Smith to sketch a picture of the way in which voting rules can be studied under laboratory conditions. For our purposes, the environment can be defined by a set of players, called the voters, and sets of policies offered by competing parties. The voters are endowed with votes. Usually, each voter is supposed to have exactly one vote\(^{16}\). The voters can offer they vote in a mass election to one of the competing parties. Since the number of the parties as well as they position concerning an electoral agenda are not variables that depend upon the behavior of the agents, they are also taken as circumstances that cannot be altered by the agents. Finally, the agents are supposed to have preferences over the competing sets of policies, which translate into preferences over competing parties.

\(^{15}\) As D. Mayo (2008) notes, the investigations of exhibits concern the inductive tasks of generating and explaining the anomalous effects observed. So, experimental economists are prepared to accept the burden of methodological critiques about the external validity of their hypotheses and move away from the received defensive standpoint.

\(^{16}\) However, there are cases in which voters may cast more votes. Approval voting is a simple example. In real world parliamentary elections, voters may also be attached more than one vote, e.g. in Germany.
The institution is the voting rule. Given the messages (votes) received from the voters, the voting rule allocates seats to the parties in the Parliament. Of course, indirectly the rule determines if the policies preferred by an actor will be among those promoted by the winning party. Various assumptions concerning the behavior of the voters have been proposed. Most general are those that voters are rational – they are endowed with a complete and transitive preference relation – and that they have common knowledge of the voting situation. Others are more specific; the voters are supposed: to have single picked preferences (Black); to vote for the most preferred party most likely to win (Duverger); to vote for the party closest to their ideal point (Downs), etc.

Quite often the role of the voting rules is presented by reference to the so-called fundamental equation of politics: as Plott (1991) phrased it, the outcomes are function of the preferences and the voting rule. We can keep the institution constant and let preferences change; or we can keep preferences constant and see which the outcomes are under different voting rules. For experimental research, it is provoking to see what happens when players are presented with different rules of the game, how their behavior is affected.

One of the most celebrated pieces of work in political science is due to Maurice Duverger. By comparing electoral systems he concluded (Duverger: 1951) that the plurality system, or the simple majority single ballot system, tends to favor a two-party pattern, while proportional representation creates conditions favorable to foster multiparty development. To account for these differences, Duverger relied on a distinction between mechanical and psychological effects. The mechanical effect corresponds to the transformation of votes into seats. So it expresses the working of the institution. The psychological effect can be viewed as the anticipation of the mechanical system: voters are aware that there is a threshold of representation and they decide not to support parties that are likely to be excluded because of the mechanical effect. Suppose that there are three parties. Under the plurality rule the voters realize that their votes are wasted if they give them to the third party. So they decide to transfer their votes to the party which in their order of preference is on a higher position. Their “natural tendency” is to choose the less evil and to prevent the greater evil. When the simple majority single ballot system is in place, the result is then that a polarization effect works: the institution is detrimental to the new party or the less favored of the existing parties. So, the theory predicts that under an institutional setting, actors curb their messages, i.e. the

---

17 The former thesis is known as Duverger’s law, and the later as Duverger’s hypothesis.
way they vote, in a specific way. Duverger’s psychological effects are paradigmatic instances of such changes in the agents’ behavior induced by institutions like voting rules.

Since the time of Duverger, the psychological effect is generally explained as an instance of strategic voting (Cox: 1997). Theorists developed sophisticated, but appealing models of individual voting based on the idea that individuals are rational and vote strategically. Many of these models yield consequences that are compatible with Duverger’s and are used to study electoral systems (Taagepera: 2007). This formal analysis was successful in explaining the actual behavior of the individual voters, and even in sketching predictions concerning their behavior in new situations. In the past decades the view, earlier associated with political scientists like W.H. Riker18, that strategic voting has a high explanatory capacity, got a larger support. Researchers argued that sophisticated voting raises to a significant proportion of the votes in general elections in countries like Great Britain or Germany (Alvarez et. al: 2006; Herermann, Pappi: 2008).

However, the methodology of formal analysis is subject to at least two types of critics (Laslier: 2010; Blais et al.: 2010). First, one may wonder about the validity of its assumptions. The (more or less) rational voter hypothesis was subject to numerous criticisms. Some of them focused on limitations of the individuals’ capacities to behave rationally: are ordinary people able to produce complete and/or coherent preference relations, or utility functions? Are they able to devise strategic voting procedures? Are they able to acquire and process the information required for a rational choice among the alternatives19? In sum, does strategic voting occurs in real world elections in a relevant proportion? Others questioned the whole methodology behind the rational voter hypothesis (Green, Shapiro: 1994).

Secondly, there is an epistemological problem of the empirical testing. On the one hand, we need to clearly define the consequences of the actors’ behavior. But in many situations this cannot be well-defined. Usually the approaches associated with game theory look for the existence of Nash equilibria. The trouble is that many games have more than one Nash equilibrium (see again Schelling: 1960), and there seems to be no way to predict which equilibrium will be reached (and also how the individuals behave at a particular equilibrium). Laslier (2010) observes that this difficulty goes to the heart of our conception of democracy: for in the case of elections it comes to the idea that the outcome of voting cannot be predicted.

18 „The evidence renders it undeniable that a large amount of sophisticated voting occurs – mostly to the disadvantage of the third parties nationwide – so the force of Duverger’s psychological factor must be considerable” (Riker: 1982, p. 764)

19 Of course, one may argue that a good choice needs not a very large amount of information; see Lupia (1994); Lupia, McCubbins (1998).
from individual opinions. On the other hand, to test the existence of rational strategic behavior of the individuals we need to measure voters’ preferences among the various candidates as well as their beliefs on how other voters will behave in the election and also on how their own vote will affect the outcome of the election. Beliefs cannot be directly observed, so we need to use instead proxies for the relevant beliefs.

A similar difficulty is faced when we try to determine the voters’ preferences. Just like beliefs, preferences are not observable; only choices are revealed. When the institution is the plurality rule, the voters are asked to express only their top preference. But if a psychological effect is appealed to, then we are also required to consider at least which is the second and which is the third alternative in the individuals’ preferences. Duverger’s argument is that under the plurality rule the voter does not vote for her first preference; rather she votes for the second one, in order that her third option would have smaller chances to be elected. But empirically we are again presented with (at most) one chosen alternative for each individual voter. We have no way to find out the entire preference order of the individuals. So when studying the real world behavior of the individual voters, how can we conclude that their vote was the expression of a psychological effect or not?

One way to overcome these difficulties is to radically change the strategy of research, and adopt an experimental setting. Remind Smith’s remarks on public goods experiments. Analogously, the basic principle of the experiments “is to observe individual behavior in situations where the experimenter can control individual preferences. The classical way to induce and control preferences is to use money, that is to pay the subjects more or less, depending on what they do and, in group experiments, what the other subjects do” (Laslier: 2010, 339). Under an experimental setting, beliefs are also controlled, by letting subjects know relevant information about the others’ situation (and also, if applicable, about the way the other subjects behaved in previous rounds). Since the experimental situation is simple, it is reasonable to assume (see again Smith’s precepts of nonsatiation and saliency) that subjects will behave in a rational way.

To see how preferences are controlled, consider the following example (Blais et al.: 2007). A group formed of 21 students is to vote among five candidates, A, B, C, D and E. Candidates are located at five distinct places on a left-right axis that goes from 0 to 20, as in the figure below:
In the same time, the 21 subjects are (randomly) allocated a position on the same political, left-right axis. Preferences are construed by defining the payoffs subjects receive when one of the five candidates is elected. The incentive for a subject is that the elected candidate be as close as possible to her position. Precisely, the subjects are informed that they will be paid 20 Euros minus the distance between the elected candidate’s position and their own allocated position. For example, the subject located on position 5 will get 16 euros if candidate A is elected, 19 euros if candidate B is elected, 15 euros if candidate C is elected, etc. So her preference order is: B > A > C > D > E.

A voting rule can be defined simply by pointing to the move the voter is allowed to take in a given situation. There are extremely many voting rules discussed in the literature. Three examples are the plurality rule, the Borda rule and the approval rule. They can be formulated as below:

**Plurality Rule:** You may vote exactly one candidate. To do this, place a check next to the candidate for whom you are voting. Or you may abstain, i.e. do nothing.

**Borda Rule:** You must give two votes to one candidate and one vote to one of the other candidates. To do this, write “2” next to the candidate to whom you are giving two votes and write “1” next to the candidate to whom you are giving one vote\(^{20}\). Or you may abstain, i.e. do nothing.

**Approval Rule:** You may cast exactly one vote for as many candidates as you wish. To do this, place a place a check next to each candidate for whom you are voting. Or you may abstain, i.e. do nothing.

Most laboratory experiments use such simple statements of the voting rules. As Laslier observes, „these rules are so simple that, in the laboratory, one does not have to explain how ballots are counted: people naturally understand that votes are added“ (Laslier: 2010, p. 346). So the fact that people can take into account the possibility to vote strategically is quite straightforward.

In the remainder of this paper some epistemological issues on experiments on voting rules will be discussed. First, I shall distinguish laboratory experiments from other experimental research, which differ from them by the degree of control. Secondly, I shall discuss some of the results reached by laboratory experiments. I shall narrow my analysis to

\(^{20}\) Obviously, this the simplest form of the Borda rule.
only one voting rule, the approval rule. This rule has a very interesting history: although it is sometimes claimed that it was used as earlier as the 13th century, it was proposed as such by two scholars: S.J. Brams and P.C. Fishburn (see, e.g., Brams, Fishburn: 2005). Therefore, its study has much more in common with standard approaches, which consist in a move from theory to practice. Finally, I shall come back to the idea of a voting rule, and – based on results from social choice theory – argue that actually it has a much more complex structure. Therefore, the possibility opens that experimental research on institutions like voting rules be performed in quite new directions.

Experiments in political science concerning voting rules have a long history (Bositis, Steinel: 1987). However, it is only in the past two decades that their use in political arguments has boomed. One best known field researcher is Elinor Ostrom, a political scientist who recently (in 2009) received a Nobel prize for economics. “Given my reputation as an avid field researcher, colleagues often ask why I ‘bother’ with conducting experiments. They ask questions such as ‘Why would you pay any attention to outcomes in an experiment?’ and ‘What more can you possibly learn about institutions and resource governance from laboratory experiments that you have not already learned in the field?’” (Ostrom: 2006, p. 149). She advances two reasons. The first is very general: we should learn more from multiple research methods applied to the same question than from a single method. For the scientific community, confidence is higher when the results of more methods are corroborated. Secondly, in a field research „one of the frustrating aspects is that so many variables are involved that one is never certain that one has isolated the specific variable (or limited set of variables) that causes an outcome” (Ostrom: 1999, p. 507). Therefore, the possibility to control is a main rationale for the use of lab experiments. However, control in the lab is often criticized for factoring out the wider political context: the real behavior of the voters in a real election, as well as their strategic information and beliefs are largely distorted in the lab.

But control in the lab is criticized from the opposite side, for being too loose: since they leave too much for individual freedom in choosing, lab experiments remain too complex.

---

21 Among them, jury decisions are particularly relevant in the present context. For example, Buckout et al. (1977) studied, among the factors which affect jury decisions, jury size and the decision rules used to reach an outcome. They found that the decision rule used (unanimity or majority) had no significant effect on the verdicts reached.

22 See for example the field experiments on French presidential elections in Baujard, Igersheim (2010).

23 One of the main conclusions Ostrom derives from studying lab experiments on the actors’ behavior in commons-dilemma situations is that individuals initially rely on a battery of heuristics in response to complexity; while without communication and agreements on joint strategies, these heuristics lead to overuse, individuals are still willing to discuss ways to increase their own and others’ payoffs over a sequence of rounds (Ostrom: 1999, p. 507).
This complexity is not subject to mathematical models, but „open”, in the sense that it not within the control of the researcher. Moreover, if the experimental setting is expanded to include more constraints and variables, then the experiments itself become hard to manage; on the other hand, conducting a theoretical analysis of a more complicated mathematical model would be very difficult. The alternative approach that has been proposed is to implement a computer simulation. The principal advantage of a computer simulation is that it can be arbitrarily complex. Since the famous tournament experiments of R. Axelrod, nearly thirty years ago, this approach was extensively used to observe comparative advantages of voting rules. As Roth writes, “While the computer simulations … were conducted with an element of experimental flavour that is missing from conventional computer simulations (in that tournament entries were solicited from others), experiments with human subjects introduce a certain amount of open-ended complexity in the form of human behaviour, that is absent from a tournament in which individuals are represented by short (or even moderately long) computer programs” (Roth: 1988, p. 1001).

For example, McCabe-Dansted and Slinko (2006) studied comparatively 26 rules. Since most of these rules have never been applied in real world group choices, it is infeasible to compare them empirically. Therefore, the authors had to artificially generate the data. They fixed three parameters: the size of the group, the number of alternatives, and a parameter of group homogeneity. The group was formed of 85 agents who could choose among five alternatives (this number is sufficiently large to discriminate among the rules). Out of the immense number of possible profiles of this group, a subclass is chosen. The authors used in simulations sets of about one million profiles. For example, if profiles are randomly chosen, and no dependency between agents is assumed, their collection is called impartial. Given the set of profiles, it is possible to construct a matrix of dissimilarities between the rules based on frequency data. Computer simulations show that departing from the impartial assumption brings about considerable changes in the results obtained under different rules, and thus offers a new means of comparing voting rules, and see similarities between them.

The example of the experiments performed in laboratory conditions on the behavior of subjects under approval voting may be instructive. Theoretically, one of the advantages of this voting rule is that, compared to other methods, it tends to favor consensual outcomes, or compromise among competing groups. The experiment I shall describe below is consistent with this prediction. However, experiments with approval voting touch another issue. We

24 For a randomly generated set of profiles using the same parameter of homogeneity the estimated dissimilarity between rules can be defined by appeal to the frequency that rules fail to pick the same winning alternative.
noticed that sometimes, especially when there are more Nash equilibria, theory cannot predict uniquely the results. When, as Duverger conjectured, subjects have incentives to behave strategically, they respond to the belief about what the others do. When the rule is approval voting, we meet a special combination of circumstances. Under other voting rules, to vote strategically is to vote differently from the sincere voting. But voting strategically under approval voting does not contradict voter’s sincerity. For if a voter is to vote strategically, she needs not refrain from voting her preferred candidate: she only needs to add another candidate on her list; a strategic vote for a candidate that is not a first best does not preclude the voter from also giving a vote for other candidates.

Baron et al. (2005) studied a society split into two groups, A and B, of equal size. There are three alternatives a, b and c. The payoffs are given in the table below.

<table>
<thead>
<tr>
<th>Voter type</th>
<th>Alternative a</th>
<th>Alternative b</th>
<th>Alternative c</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>10</td>
<td>0</td>
<td>6</td>
</tr>
<tr>
<td>B</td>
<td>2</td>
<td>12</td>
<td>8</td>
</tr>
</tbody>
</table>

Clearly, alternative a favors the members of the group A and is detrimental to the members of the group B. The members of the group B prefer most alternative b, which is obviously only the third choice for the members of the group A. Alternative c is not as good as each group’s favorite alternative, but all the voters may accept it as a rather good choice. The problem is that the social optimum (alternative c) is the first choice of no group. If rational, the members of each group defend the group’s preferred alternative rather than the general interest (“parochialism”).

In the laboratory experiment, subjects first voted under the plurality rule: they had exactly one option. It turned out that 45% voted for the alternative a, 2% voted for b, and 54% voted for the consensus c. So the selfish alternatives got on average \((45 + 2)/2 = 23.5%\), and the consensus alternative c got 54%, and so was chosen. Secondly, the subjects were asked to vote under the approval rule. They made the following choices: \{a\} – 19%; \{b\} – 0%; \{c\} – 15%; \{a, b\} + 10%, \{a, c\} – 48%; \{b, c\} – 8%. So, the approval scores are: 77% for a, 18% for b and 71% for c (the selfish alternatives got on average \((77 + 18)/2 = 47.5\%\)). Experiments

\footnote{When voters behave strategically, more equilibria are possible. See for example the experiments on a split majority described in Laslier (2010).}
showed that the consensus alternative $c$ is chosen under both rules, but the support for it is much higher with the approval voting\textsuperscript{26}.

III

In this final section I first argue that the voting rules are much more complex than it is usually assumed. In this sense, arguments from social choice will be briefly discussed. Then I suggest that experimental research on voting rule may largely benefit from connections with some quite different experimental research.

In most experiments on voting rules, they are assumed to be stated in a simple and easy to understand way, as we saw with the plurality rule, the approval or the Borda rule. There are of course some more complicated rules. Consider for example the Hare rule (also known as Single Transferable Vote or Alternative Vote). By this rule, if one alternative’s plurality score is greater than $n/2$ ($n$ is the number of voters), then that alternative is the Hare’s winner; otherwise, eliminate the alternative with the lowest plurality score; continue until one alternative remains. (The plurality score of an alternative is the number of votes for it.) The Hare rule is only a bit more complicated than the first three rules, but there are ones much more difficult to understand and to compute. However, all the rules are defined by reference to the aggregation mechanism they use. The votes are aggregated in different ways, and sometimes the result are different (sometimes they are not). So it looks that voting rule are very simple institutions, especially as we compare with other more political institutions, like the presidential system or federalism. But it is precisely this characteristic that accounts for the prominent role they played in experimental research.

However, some of the most interesting results on voting rules consist in the proof of so-called characterization results. May’s (1952) characterization of the majority rule is perhaps best-known in this respect. He defined condition a voting rule may or may not satisfy. For example, a voting rule may treat all the members of the electorate as equal; others do not. For example, by the Chairperson tie rule if the vote of the members of a group go for an alternative, then it is chosen; but if there is tie, then the vote of the chairperson is decisive. Obviously, the chairperson is attached a special position by this rule. We can then form different collections of such properties of the voting rules. The properties included in such a

\textsuperscript{26} There is also a more general conclusion: as Laslier states it, a relatively large share of the population might be ready to approve a collectively optimal option next to their selfish preferred one, if they are given the opportunity to do so.
collection can be satisfied by more rules, by no rule, or by exactly one rule. The second and the third case gained a special interest in the social choice literature. K. Arrow’s celebrated impossibility theorem states that some reasonable such properties cannot be simultaneously satisfied by any rule. May (1952) proved that, if only two alternatives are considered, we can define four simple such properties which are satisfied by exactly one rule – the simple majority rule. Since then, many voting rules have received such characterizations, or axiomatizations. In many cases, one and the same rule received alternative characterizations. For example, Goodin and List (2006) generalized the classic result of May (1952) to the plurality rule and showed that an aggregation procedure satisfies universal domain, anonymity, neutrality, and positive responsiveness if and only if it is plurality rule. Fishburn (1978) proved that the approval rule is the only aggregation rule that jointly satisfies consistency, disjoint equality and neutrality. Young (1974) proved that Borda rule is the only rule which simultaneously satisfies the properties of neutrality, cancellation, faithfulness, and consistency.

The properties referred to in the above mentioned theorems can be defined rigorously in the frame of social choice. More intuitively, their content can be explained as follows. A rule satisfies universal domain if it accepts all logically possible profiles of votes as admissible input. Neutrality basically says that the names of candidates should not play any role in determining winning candidates. Analogously, anonymity requires that the identity of individual voters does not affect the outcome. By positive responsiveness, if one or more voters change their votes in favor of an option that is winning or tied and no other voters change theirs, then that option is uniquely winning after the change. Consistency requires that the combination of two groups yields the choices the separate groups held in common. Cancellation says that any one voter can cancel out the preferences of any other individual voter with diametrically opposed preferences, more specifically, it stipulates that if all the candidates get the same number of votes from participating voters, then every candidate is a winning candidate. (Note the similarity between this condition and anonymity.) Faithfulness requires that when there is only one individual in the group, the choice set consists only of the top preference of that individual. (A choice set is a list of alternatives that are ranked at least as high by the rule as all the other alternatives.) Finally, disjoint equality requires that, if an electorate has two voters who cast two disjoint ballots, then every candidate approved by either of the two voters is a winning candidate.

So, a voting rule can be identified with a collection of more abstract rules that define the voting situation. In this sense, voting rules are complex institutions, including different
clusters of rules. Some of them are agenda rules: who are the candidates for choice, how are they nominated, etc. Others are allocation rules (Smith: 1982): who are the members of the electorate, how many votes they have, what is their relative position, etc.; still others are domain rules: which are the allowed preference profiles, how are they related, etc.

For example, simple majority rule and absolute majority rule differ in respect to the agenda rules that constrain the voters who act under each of them. Indeed, the simple majority voting requires the individuals to behave by treating all the candidates in an election as equal. But in an absolute majority voting the electorate is allowed to weight higher the incumbent president, if he is among the candidates, or to favor the present law and make it harder the adoption of an alternative regulation. Voting rules differ very much with respect to the allocation rules they contain. Under the plurality voting, each voter is attached exactly one vote, while under the approval rule each voter can give one vote to as many candidates as she wants. But under both voting rules voters are treated in a fair way: no one is assumed to have a privileged position. However, some voting rules, weighted majority rule among them, require that voters be treated unequally. This means that they include rules that define the ways in which individuals are not equal in the voting procedure. Domain rules help characterize voting procedures as complex institutions. They specify the way in which a collection of profiles is generated. As already mentioned, computer simulations have been used to investigate different “cultures”, i.e. generations of collections of profiles. Different rules behave differently on such domains (Laslier: 2010a).

Now, the idea is that to experimentally investigate a voting rule turns to be quite complicated. The experimenter may try to see how subjects behave when faced with different agenda, position or domain rules, etc. Given a domain, which agenda rule is preferred by the subjects? How do people react to rules expressed by a neutrality condition? For example, how do actors behave in situations in which candidates are treated asymmetrically? A large collection of experiments concerning the topic of fairness becomes relevant when allocation rules are taken into account. How favorable are the subjects to fairness rules like anonymity or weaker alternatives to it? Or, when we domain rules are investigated, how much do subjects agree with an impartial culture or with a distributive one?

So, the theoretical results on the axiomatizations of the voting rules may open the experimental research to a new class of approaches.

---

27 Konow (2003) is a good survey of such experiments. Meanwhile, their number increased exponentially.

28 An impartial culture allows of profiles in which individuals are free to choose their preferences as they wish; in a distributive culture individuals are in a complete antagonism: given a divisible good, they wish to get a share as much as possible of it, and do not care about the others’ shares.
References


