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Experiments in Political Science: The Case of the Voting Rules

Nearly two centuries ago, in his essay *On the Definition of Political Economy; and on the Method of Investigation Proper to It*, John Stuart 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 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. … 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.[1]

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".[2]

Mill's view is still critical for understanding the role of experiments in political science.[3] I shall start by discussing some of the views expressed by economists concerning the role of experiments in moral sciences. The view developed by Vernon Smith is specifically relevant is this context. A main reason is that Smith gives institutions a core role in theory construction as well as in experimental settings. Voting rules, i.e. rules to transform the electorate's votes into a group

1 John Stuart Mill (1874). *Essays on Some Unsettled Questions of Political Economy*, Second Edition, Batoche Books, Kitchener, 2000, p. 103.

2 John Stuart Mill (1874). *Essays on Some Unsettled Questions of Political Economy*, p. 107.

3 For a general discussion on the role of experiments in social sciences, see Wenceslao J. Gonzalez, "The Role of Experiments in the Social Sciences: the Case of Economics", in: Theo Kuipers (ed.), *Handbook of the Philosophy of Science: General Philosophy of Science — Focal Issues*, Amsterdam: Elsevier 2007, pp. 275-301.

In Weber, M., Dieks, D., Gonzalez,
W.J., Hartman, S., Stadler, F., and Stoltzner, M. (eds),
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decision, are clear examples of institutions. Experiments performed with these rules will be discussed. The main argument 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 can be characterized by appealing to sets of properties they uniquely satisfy. 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. 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 relevant for the experimental study of voting rules.

1.

Vernon Smith received the Nobel Prize in 2002 for his contribution in experimental economics. According to him, there are at least seven reasons for a researcher to devise and conduct experiments.[4] 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.

Smith acknowledges that to accept that experiments have such roles is at odds with the standard, received view on the way economics is commonly researched, taught, and practiced.[5] 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.[6]

4 Cf. Vernon L. Smith, "Economics in the Laboratory", *The Journal of Economic Perspectives*, 8, 1, 1994, pp. 113-131.

5 Cf. Vernon L. Smith, *Rationality in Economics. Constructivist and Ecological Forms*, Cambridge University Press: Cambridge, 2008.

6 From the point of view of a deductivist economist, allocation mechanisms require agents to have complete information, but not mechanism designers. But the experi-

In Weber, M., Dieks, D., Gonzalez,
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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.[7] 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 *behaviour* of the actors.[8] 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.[9]

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 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 mes-

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mentalist thinks 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", Vernon L. Smith, *Rationality in Economics. Constructivist and Ecological Forms*, Cambridge University Press: Cambridge, 2008, p. 294.

7 As Bottom et al. write, "Experiments are uniquely suited for examining institutional effects". William P. Bottom, Ronald A. King and Larry Handlin, "Miller, G. J., Institutional Modifications of Majority Rule", in: Vernon L. Smith, Charles R. Plott (eds.), *Handbook of Experimental Economics Results*, North-Holland, Amsterdam 2008, p. 857. 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.

8 Cf. Vernon L. Smith, "Theory, Experiment and Economics", *The Journal of Economic Perspectives*, 3, 1, 1989, pp. 151-169.

9 Cf. Vernon L. Smith, "Microeconomic Systems as an Experimental Science", in: *American Economic Review*, 72, 1982, pp. 923-55.

In Weber, M., Dieks, D., Gonzalez,
W.J., Hartman, S., Stadler, F., and Stoltzner, M. (eds),
Probabilities, Laws and Structures, Springer, Dordrecht, 2012.

sages 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 behaviour of the actors. First, theories introduce assumptions about agent behaviour, 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: 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.

Now let us move to experiments. The crucial point is that Smith regards the structure of the experiment as a replica of the theory.[10] Experiments also have three ingredients: an environment, an institution, and the observed behaviour 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".[11] Control infuses the first two ingredients of the experiment. 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 Cf. Vernon L. Smith, "Economics in the Laboratory", *The Journal of Economic Perspectives*, 8, 1, 1994, pp. 113-131.

11 Vernon L. Smith, "Experimental Economics: Induced Value Theory", in: *The American Economic Review*, 66, 2, 1976, p. 275.

12 A "nonsatiation" condition is here assumed (cf. Vernon L. Smith, "Microeconomic Systems as an Experimental Science", *op. cit.*): 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.

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", Vernon L. Smith, *Rationality in Economics. Constructivist and Ecological Forms*, *op. cit.*, p. 295.

In Weber, M., Dieks, D., Gonzalez,
W.J., Hartman, S., Stadler, F., and Stoltzner, M. (eds),
Probabilities, Laws and Structures, Springer, Dordrecht, 2012.

2.

I shall use the framework developed by V. 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. 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 behaviour 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.

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 behaviour 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 phrased it, the outcomes are function of the preferences and the voting rule.[14] We can keep the institution constant and let preferences change; or we can keep preferences constant and see which outcomes are reached 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 behaviour is affected.

One of the most celebrated pieces of work in political science is due to Maurice Duverger. By comparing electoral systems he concluded that the plurality system, or the simple majority single ballot system, tends to favour a two-party pattern, while proportional representation creates conditions favourable to foster multiparty development.[15] 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

14 Cf. Charles R. Plott, "Will Economics Become an Experimental Science?", in: *Southern Economic Journal*, 57, 1991, pp. 901-919.

15 Cf. Maurice Duverger, *Les partis politiques*, Armand Colin: Paris 1951.

In Weber, M., Dieks, D., Gonzalez,
W.J., Hartman, S., Stadler, F., and Stoltzner, M. (eds),
Probabilities, Laws and Structures, Springer, Dordrecht, 2012.

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 favoured of the existing parties. So, the theory predicts that under an institutional setting, actors curb their messages, i.e. the way they vote, in a specific way. Duverger's psychological effects are paradigmatic instances of such changes in the agents' behaviour induced by institutions like voting rules.

Since the time of Duverger, the psychological effect is generally explained as an instance of strategic voting.[16] Theorists developed sophisticated, but appealing models of individual voting based on the idea that individuals are rational and vote strategically. In the past decades the view, earlier associated with political scientists like W. H. Riker, that strategic voting has a high explanatory capacity, got a large support.[17]

However, the methodology of formal analysis is subject to at least two types of critics.[18] 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 alternatives? In sum, does strategic voting occurs in real world elections in a relevant proportion? Others questioned the whole methodology behind the rational voter hypothesis.[19]

Secondly, there is an epistemological problem of the empirical testing. On the one hand, we need to clearly define the consequences of the actors' behaviour. 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

16 Cf. Gary W. Cox, *Making Votes Count: Strategic Coordination in the World's Electoral Systems*, Cambridge University Press: Cambridge 1997.

17 "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", William H. Riker, "The Two-Party System and Duverger's Law: An Essay on the History of Political Science", in: *American Political Science Review*, 76, 1982, p. 764.

18 Cf. Jean-François Laslier and M. Remzi Sanver (eds.), *Handbook on Approval Voting*, Springer-Verlag: Berlin, Heidelberg 2010; Cf. André Blais, Jean-François Laslier, Annie Laurent, Nicolas Sauger, and Karine Van der Straeten, "One Round versus Two Round Elections: An Experimental Study", in: *French Politics*, 5, 2007, pp. 278-286.

19 Cf. Donald P. Green and Ian Shapiro, *Pathologies of Rational Choice Theory: A Critique of Applications in Political Science*, New Haven: Yale University Press 1994.

In Weber, M., Dieks, D., Gonzalez, W.J., Hartman, S., Stadler, F., and Stoltzner, M. (eds), Probabilities, Laws and Structures, Springer, Dordrecht, 2012.

many games have more than one Nash equilibrium, and there seems to be no way to predict which equilibrium will be reached (and also how the individuals behave at a particular equilibrium).[20] Laslier 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 from individual opinions.[21] On the other hand, to test the existence of rational strategic behaviour 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. 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 alternative ranks second and third 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.[22] So when studying the real world behaviour 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. The basic principle of the experiments[23] "is to observe individual behaviour 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".[24] 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 that subjects will behave in a rational way.

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20 Cf. Thomas Schelling, *The Strategy of Conflict*, Harvard University Press: Cambridge, MA 1960.

21 Cf. Jean-François Laslier and M. Remzi Sanver (eds.), *Handbook on Approval Voting*, *Op. Cit.*.

22 The Borda rule requires that the voters reveal more than their top alternative, but not necessarily all the preferences.

23 See also Vernon L. Smith, *Rationality in Economics. Constructivist and Ecological Forms*, *op. cit.*, pp. 293-294, on public goods experiments.

24 Jean-François Laslier, "Laboratory Experiments on Approval Voting", in: Jean-François Laslier and M. Remzi Sanver (eds.), *Handbook on Approval Voting*, *op. cit.*, p. 339.

In Weber, M., Dieks, D., Gonzalez,
W.J., Hartman, S., Stadler, F., and Stoltzner, M. (eds),
Probabilities, Laws and Structures, Springer, Dordrecht, 2012.

A voting rule can be described 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. Under the plurality rule, individuals are required to pick up exactly one candidate. Under the approval rule, they may cast one vote for as many candidates as they wish. In its simplest form, the Borda rules requires that individuals give two votes to one candidate and one vote to one of the other candidates. 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".[25] So the fact that people can take into account the possibility to vote strategically is quite straightforward.

Experiments in political science concerning voting rules have a long history.[26] However, it is only in the past two decades that their use in political research 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?".[27]

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". Therefore, the possibility to control is a main rationale for the use of lab experiments.[28] However, control in the lab is often criticized for factoring out the wider political

25 Jean-François Laslier, "Laboratory Experiments on Approval Voting", *op. cit.*, p. 346.

26 Cf. David A. Bositis and Douglas Steinel, "A Synoptic History and Typology of Experimental Research in Political Science", in: *Political Behavior*, 9, 1987, pp. 263-284.

27 Elinor Ostrom, "The Value-Added of Laboratory Experiments for the Study of Institutions and Common-Pool Resources", in: *Journal of Economic Behavior & Organization*, 61, 2006, p. 149.

28 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, cf. Elinor Ostrom, "Coping with the Tragedy of the Commons", in: *Annual Review of Political Science*, 2, 1999, p. 507.

In Weber, M., Dieks, D., Gonzalez, W.J., Hartman, S., Stadler, F., and Stoltzner, M. (eds), Probabilities, Laws and Structures, Springer, Dordrecht, 2012.

context: the real behaviour 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 can be criticized from the opposite side, for being too loose: since they leave too much for individual freedom in choosing, lab experiments remain too complex. 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.

For example, McCabe-Dansted and Slinko studied comparatively 26 rules.[29] 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 impartiality 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.[30]

3.

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 theory will be briefly discussed. Then I suggest that experimental research on voting rule may largely benefit from connections with some quite different experimental research.

29 Cf. John C. McCabe-Dansted and Arkadii Slinko, "Exploratory Analysis of Similarities between Social Choice Rules", in: *Group Decision and Negotiation*, 15, 2006, pp. 77-107.

30 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.

In Weber, M., Dieks, D., Gonzalez, W.J., Hartman, S., Stadler, F., and Stoltzner, M. (eds), Probabilities, Laws and Structures, Springer, Dordrecht, 2012.

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 results are different (while sometimes they are not). So it looks that voting rules are very simple institutions, especially as we compare them with other political institutions, like the presidential system or federalism. 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. The proof goes as follows. First, properties a voting rule may or may not satisfy are defined. For example, a voting rule may treat all the members of the electorate as equal; others do not. Majority rule paradigmatically treats all the voters on the same par. But consider the Chairperson tie rule. According to it, if the votes 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. Secondly, we can then form different collections of such properties of the voting rules. The properties included in such a collection can be satisfied by more rules, by no rule, of 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 reasonable such properties cannot be simultaneously satisfied by any rule.[31] May proved that the simple majority rule is the only aggregation procedure that jointly satisfies four such properties:[32] universal domain, anonymity, neutrality, and positive responsiveness.[33] Fishburn and Young gave similar characteriza-

31 Cf. Keneth Joseph Arrow, *Social Choice and Individual Values*, New York: Wiley 1951.

32 Cf. Kenneth O. May, "A Set of Independent, Necessary and Sufficient Conditions for Simple Majoritary Decision", in: *Econometrica*, 20, 1952, pp. 680-684.

33 The properties referred to in the above mentioned theorems can be defined rigorously in the frame of social choice theory. 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 favour of an option that is winning or tied and no other voters change theirs, then that option is uniquely winning after the change.

In Weber, M., Dieks, D., Gonzalez,
W.J., Hartman, S., Stadler, F., and Stoltzner, M. (eds),
Probabilities, Laws and Structures, Springer, Dordrecht, 2012.

tions of the approval voting, respectively of the Borda rule.[34] Goodin and List generalized the classic result of May to the plurality rule.[35]

So, a voting rule can be identified with a collection of more abstract rules or properties 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:[36] 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 favour 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.[37]

Now, the idea is that to experimentally investigate a voting rule turns to be quite complicated. It does not simply consist in a simple statement one can easily agree or disagree with. 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 cases in which the neutrality condition is questioned? For example, how do actors behave in situations in which candidates are treated asymmetrically? A large collection

34 Cf. Peter C. Fishburn, "Axioms for Approval Voting: Direct Proof", in: *Journal of Economic Theory*, 19, 1978, pp. 180-185; and H. Peyton Young, "An Axiomatization of Borda's Rule", in: *Journal of Economic Theory*, 9, 1974, pp. 43-52.

35 Cf. Robert E. Goodin and Christian List, "A Conditional Defense of Plurality Rule: Generalizing May's Theorem in a Restricted Informational Environment", in: *American Journal of Political Science*, 50, 4, 2006, pp. 940-949.

36 Cf. Vernon L. Smith, "Microeconomic Systems as an Experimental Science", *op. cit.*

37 Cf. Jean-François Laslier, "*In Silico* Voting Experiments", in: Jean-François Laslier and M. Remzi Sanver (eds.), *Handbook on Approval Voting*, *op. cit.*, pp. 311-335.

In Weber, M., Dieks, D., Gonzalez,
W.J., Hartman, S., Stadler, F., and Stoltzner, M. (eds),
Probabilities, Laws and Structures, Springer, Dordrecht, 2012.

of experiments concerning the topic of fairness becomes relevant when allocation rules are taken into account.[38] How favourable are the subjects to fairness properties like anonymity or weaker alternatives to it? Or, when domain rules are investigated, how much do subjects agree with an impartial culture or with a distributive one?[39]

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

References

Kenneth Joseph Arrow, *Social Choice and Individual Values*, New York: Wiley 1951.

André Blais, Jean-François Laslier, Annie Laurent, Nicolas Sauger, and Karine Van der Straeten, "One Round versus Two Round Elections: An Experimental Study", in: *French Politics*, 5, 2007, pp. 278-286.

David A. Bositis and Douglas Steinel, "A Synoptic History and Typology of Experimental Research in Political Science", in: *Political Behavior*, 9, 1987, pp. 263-284.

William P. Bottom, Ronald A. King and Larry Handlin, "Miller, G. J., Institutional Modifications of Majority Rule", in: Vernon L. Smith, Charles R. Plott (eds.), *Handbook of Experimental Economics Results*, North-Holland, Amsterdam 2008, pp. 857-871.

Gary W. Cox, *Making Votes Count: Strategic Coordination in the World's Electoral Systems*, Cambridge University Press: Cambridge 1997.

Maurice Duverger, *Les partis politiques*, Armand Colin: Paris 1951.

Peter C. Fishburn, "Axioms for Approval Voting: Direct Proof", in: *Journal of Economic Theory*, 19, 1978, pp. 180-185.

Wenceslao J. Gonzalez, "The Role of Experiments in the Social Sciences: the Case of Economics", in: Theo Kuipers (ed.), *Handbook of the Philosophy of Science: General Philosophy of Science - Focal Issues*, Amsterdam: Elsevier 2007, pp. 275-301.

38 Cf. James Konow, "Which Is the Fairest One of All? A Positive Analysis of Justice Theories", in: *Journal of Economic Literature*, 41, 4, 2003, pp. 1188-1239.

39 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.

In Weber, M., Dieks, D., Gonzalez, W.J., Hartman, S., Stadler, F., and Stoltzner, M. (eds), Probabilities, Laws and Structures, Springer, Dordrecht, 2012.

Robert E. Goodin and Christian List, "A Conditional Defense of Plurality Rule: Generalizing May's Theorem in a Restricted Informational Environment", in: *American Journal of Political Science*, 50, 4, 2006, pp. 940-949.

Donald P. Green and Ian Shapiro, *Pathologies of Rational Choice Theory: A Critique of Applications in Political Science*, New Haven: Yale University Press 1994.

James Konow, "Which Is the Fairest One of All? A Positive Analysis of Justice Theories", in: *Journal of Economic Literature*, 41, 4, 2003, pp. 1188-1239.

Jean-François Laslier and M. Remzi Sanver (eds.), *Handbook on Approval Voting*, Springer-Verlag: Berlin, Heidelberg 2010.

Jean-François Laslier, "*In Silico* Voting Experiments", in: Jean-François Laslier and M. Remzi Sanver (eds.), *Handbook on Approval Voting*, Springer-Verlag: Berlin, Heidelberg 2010, pp. 311-335.

Jean-François Laslier, "Laboratory Experiments on Approval Voting", in: Jean-François Laslier and M. Remzi Sanver (eds.), *Handbook on Approval Voting*, Springer-Verlag: Berlin, Heidelberg 2010, pp. 339-356.

Kenneth O. May, "A Set of Independent, Necessary and Sufficient Conditions for Simple Majoritary Decision", in: *Econometrica*, 20, 1952, pp. 680-684.

John C. McCabe-Dansted and Arkadii Slinko, "Exploratory Analysis of Similarities between Social Choice Rules", in: *Group Decision and Negotiation*, 15, 2006, pp. 77-107.

John Stuart Mill, (1874). *Essays on Some Unsettled Questions of Political Economy*, Second Edition, Batoche Books, Kitchener, 2000. (Second Edition London, Longmans, Green, Reader, And Dyer.)

Elinor Ostrom, "Coping with the Tragedy of the Commons", in: *Annual Review of Political Science*, 2, 1999, pp. 493-535.

Elinor Ostrom, "The Value-Added of Laboratory Experiments for the Study of Institutions and Common-Pool Resources", in: *Journal of Economic Behavior & Organization*, 61, 2006, pp. 149-163.

Charles R. Plott, "Will Economics Become an Experimental Science?", in: *Southern Economic Journal*, 57, 1991, pp. 901-919.

William H. Riker, "The Two-Party System and Duverger's Law: An Essay on the History of Political Science", in: *American Political Science Review*, 76, 1982, pp. 753-766.

Thomas Schelling, *The Strategy of Conflict*, Harvard University Press: Cambridge, MA 1960.

In Weber, M., Dieks, D., Gonzalez,
W.J., Hartman, S., Stadler, F., and Stoltzner, M. (eds),
Probabilities, Laws and Structures, Springer, Dordrecht, 2012.

Vernon L. Smith, "Experimental Economics: Induced Value Theory", in: *The American Economic Review*, 66, 2, 1976, pp. 274-279.

Vernon L. Smith, "Microeconomic Systems as an Experimental Science", in: *American Economic Review*, 72, 1982, pp. 923-55.

Vernon L. Smith, "Experimental Economics: Reply", in: *The American Economic Review*, 75, 1, 1985, pp. 265-272.

Vernon L. Smith, "Theory, Experiment and Economics", *The Journal of Economic Perspectives*, 3, 1, 1989, pp. 151-169.

Vernon L. Smith, "Economics in the Laboratory", *The Journal of Economic Perspectives*, 8, 1, 1994, pp. 113-131.Vernon L. Smith, *Rationality in Economics. Constructivist and Ecological Forms*, Cambridge University Press, Cambridge 2008.

H. Peyton Young, "An Axiomatization of Borda's Rule", in: *Journal of Economic Theory*, 9, 1974, pp. 43-52.

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