



Whose opinion counts? Implementation by sortition [☆]

Rene Saran ^{a,*}, Norovsambuu Tumennasan ^b

^a Social Sciences Division, Yale-NUS College, 282 York Street, New Haven, CT 06511, USA

^b Department of Economics and Business, Aarhus University, Fuglesangs Allé 4, Aarhus V 8210, Denmark

ARTICLE INFO

Article history:

Received 27 November 2011

Available online 10 December 2012

JEL classification:

C72

D78

Keywords:

Nash implementation

Sortition

p -Implementation

Direct democracy

Oligarchic democracy

Random sampling

ABSTRACT

Sortition is the process of selecting decision makers or senators by a lottery. We introduce sortition in implementation theory by augmenting a mechanism with a *kleroterion* or lottery machine p that selects the senators. An outcome is implemented after consulting only the opinions of the senators. We call the corresponding notion of implementation as “ p -implementation”, and provide necessary and sufficient conditions for p -implementation. Our main result is that in “economic” environments, every Nash implementable social choice rule (SCR) is also p -implementable if p selects every quartet of players with positive probability and always selects at least three senators. We apply this result to two *kleroteria*: “oligarchic democracy” and “random sampling”. In economic environments, every Nash implementable SCR can be implemented by oligarchic democracy of three oligarchs. In economic environments, every Nash implementable SCR can be implemented by randomly selecting four senators.

© 2012 Elsevier Inc. All rights reserved.

1. Introduction

The central question in implementation theory is how to design a mechanism that structures the interaction among individuals in a way such that the outcome of this interaction is socially optimal.¹ In this theory, a mechanism is conceived of as a communication scheme in which all individuals send messages to a social planner who then maps these messages to outcomes according to a pre-specified rule. This communication scheme thus takes the form of direct democracy: the collective of individuals’ messages determines the outcome that is implemented. Since it consults every individual, direct democracy is both time consuming and expensive, especially in large societies, and perhaps this explains why it is rarely used.²

Sortition is an alternative procedure for making decisions. It is the process of selecting decision makers by a lottery. Sortition was the hallmark of ancient Athenian democracy with several public officials and priests elected by the drawing of lots (Headlam, 1891). Dow (1939) describes how Athenians selected judges using two *kleroteria* or lottery machines for each of the ten tribes. In Renaissance Venice, patricians were selected by lot to enter the Great Council (Finlay, 1980). A more

[☆] An earlier version of this paper was circulated as “Whose Opinion Counts? Political Processes and the Implementation Problem”.

* Corresponding author. Fax: +1 203 432 7804.

E-mail addresses: rene.saran@yale-nus.edu.sg (R. Saran), ntumennasan@econ.au.dk (N. Tumennasan).

¹ See Maskin and Sjöström (2002) and Serrano (2004) for surveys of implementation theory.

² We do not explicitly model costs of consulting each player. One possibility is to assume that there is a fixed cost of consulting each player. We briefly discuss the implication of our results under this assumption in the conclusion. We must also point out that we do not consider the issue of communication and processing burdens imposed on, respectively, the individuals and planner due to large size of the message space (see, for e.g., Saijo, 1988, and McKelvey, 1989, who tackle this issue in the context of Nash implementation).

modern example of sortition is the random selection of prospective jurors in the USA. An opinion poll can also be viewed as sortition if decisions are made on the basis of sampled opinions.

Compared to direct democracy, sortition has the obvious advantage that the planner eventually consults only a subset of the individuals. Nevertheless, a potential disadvantage could be that sortition cannot implement some socially optimal outcomes that are attainable under direct democracy. On the other hand, if there is a sortition scheme that can implement every outcome which can be implemented by direct democracy, then it is clearly better to replace direct democracy by this sortition scheme. But does such a sortition scheme exist? We study this question by introducing sortition in implementation theory under complete information.

We allow for sortition by augmenting a mechanism with a kleroterion to select a senate (i.e., a subset of the individuals).³ Precisely, a mechanism has three components: a message space for each individual, a kleroterion p , and a set of outcome functions, one for each possible senate, that map messages of the selected senators to alternatives. In the mechanism, all individuals simultaneously announce their messages. We interpret these messages as “pre-election promises” that are binding – or simply, think of them as letters written to the planner.⁴ The kleroterion p then selects a senate. Subsequently, messages of the senators are transmitted to the planner whereas messages of other individuals are ignored. Finally, the planner implements an alternative based on the messages of the senators and the outcome function of the corresponding senate. We say that a social choice rule (SCR) is p -implementable if there exists a mechanism which uses the kleroterion p and the set of Nash equilibrium outcomes of the mechanism coincides with the SCR in each state. Thus, the set of p -implementable SCRs delineates what is attainable using kleroterion p .

We identify a “ p -monotonicity” condition that is necessary for p -implementation. In environments with at least three individuals and no unanimously most preferred alternative, we show that p -monotonicity is also sufficient for p -implementation if p is such that (a) it selects every quartet of individuals with a positive probability, and (b) always selects at least three senators. Thus for any such kleroteria, p -monotonicity characterizes the set of p -implementable SCRs in a large class of environments.

These results generalize the necessary and sufficient conditions that are known for Nash implementation.⁵ Nash implementation is equivalent to p_D -implementation, where by p_D we mean direct democracy (i.e., the kleroterion that always selects all individuals). In his seminal contribution, Maskin (1999) showed that any Nash implementable SCR must be Maskin monotonic. Our p_D -monotonicity condition implies Maskin monotonicity. Maskin (1999) further proved that when there are at least three individuals, Maskin monotonicity and no-veto power are sufficient for Nash implementation. It follows that in “economic” environments with at least three individuals, Maskin monotonicity characterizes the set of Nash implementable SCRs. For general environments with at least three individuals, Moore and Repullo (1990) provided Condition μ that characterizes the set of Nash implementable SCRs. The class of kleroteria identified in our sufficiency result includes p_D as a special case. Hence, p_D -monotonicity is equivalent to Condition μ when there are at least three individuals and no unanimously most preferred alternative.

We next apply our sufficiency result to answer our motivating question: are there kleroteria that select a subset of individuals and yet implement every Nash implementable SCR? Our main result is that in economic environments with at least three individuals, any Nash implementable SCR is p -implementable if p satisfies the conditions in our sufficiency result, i.e., (a) it selects every quartet of individuals with a positive probability, and (b) always selects at least three senators. This is because in these circumstances, Maskin monotonicity implies p -monotonicity. We provide two examples of such kleroteria: oligarchic democracy and random sampling.

In an oligarchic democracy, either a strict subset of individuals – the “oligarchs” – are selected as senators or there is a referendum in which everyone is a senator. As a corollary of our main result, we show that in economic environments with at least four individuals, any Nash implementable SCR can also be implemented by oligarchic democracy in which any three individuals are designated as oligarchs even though the probability of referendum is arbitrarily close to zero.

In random sampling, the senate is formed by a randomly selected sample of individuals. As a corollary of our main result, we show that in economic environments with at least five individuals, any Nash implementable SCR can also be implemented by randomly selecting four senators. In fact, four is the minimal sample size that guarantees this result: we present an SCR that is Nash implementable in an economic environment but not implementable by random sampling when the sample size is smaller than four.

Bochet (2007) and Benoît and Ok (2008) studied Nash implementation when the planner uses random mechanisms. In a random mechanism, the planner consults everyone and can implement arbitrary lotteries. In our setup, the planner consults a subset of the individuals, which is determined by the realization of the kleroterion, and can only implement pure alternatives “ex-post” (i.e., after the selection of the senate). However, lotteries can be generated in the mechanism due to stochastic selection of the senate. Still, these lotteries are not arbitrary; their “structure” is defined by the kleroterion (also see Footnote 18 for further comparison between theirs and our work).

³ Alternatively, one can consider processes in which a senate is selected endogenously through voting. This is an interesting area of research that we hope to pursue in future.

⁴ We can alter the mechanism such that an individual announces a message only after she is selected as a senator and still maintain our results (see Remark 2.6).

⁵ See Maskin (1999), Moore and Repullo (1990), Sjöström (1991), Danilov (1992) and Yamato (1992).

Download English Version:

<https://daneshyari.com/en/article/5071959>

Download Persian Version:

<https://daneshyari.com/article/5071959>

[Daneshyari.com](https://daneshyari.com)