Arrovian social choice and decentralizability: An integrated approach

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Abstract

Numerous models of collective decision-making aim to aggregate various types of inputs submitted by individuals (e.g., Arrovian social choice) or to allocate resources among a group of agents based on their characteristics (e.g., claims problems; surplus or cost sharing). We propose a general model that subsumes a wide range of aggregation and resource allocation problems as special cases. Examples include preference aggregation, voting (deterministic or probabilistic), approval voting, claims problems, income redistribution, classification, group identification, probability aggregation, etc. Our focus is on three axioms that have been central to the two strands of literature without connection to each other; in the one strand on aggregation problems is independence of irrelevant alternatives (Arrow, 1951) and in the other strand on resource allocation problems are reallocation-proofness and decentralizability (Moulin, 1985, 1987). We show that these three axioms in our general model are equivalent and characterize the family of rules satisfying them: they are represented by the sum of two factors, the first is constant and the second is the aggregation of functions that are additive with regard to an input variable of the model. We, then, apply our characterization result to the examples above and obtain several existing theorems including the impossibility theorem by Arrow (1951) and the main results by Moulin (1985, 1987).

References

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