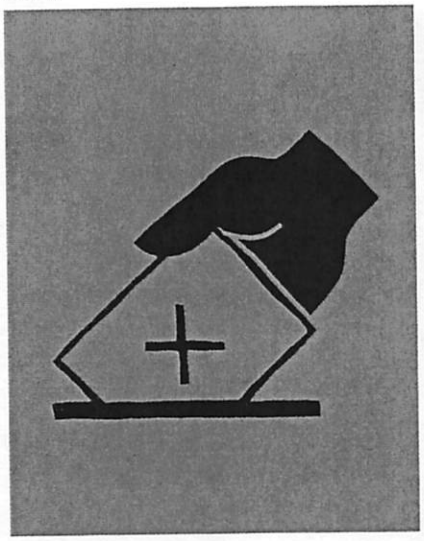


THERE IS NO PERFECT VOTING SYSTEM

SOCIAL CHOICE THEORY

IN CONTEXT

FOCUS
Welfare economics

KEY THINKER
Kenneth Arrow (1921–)

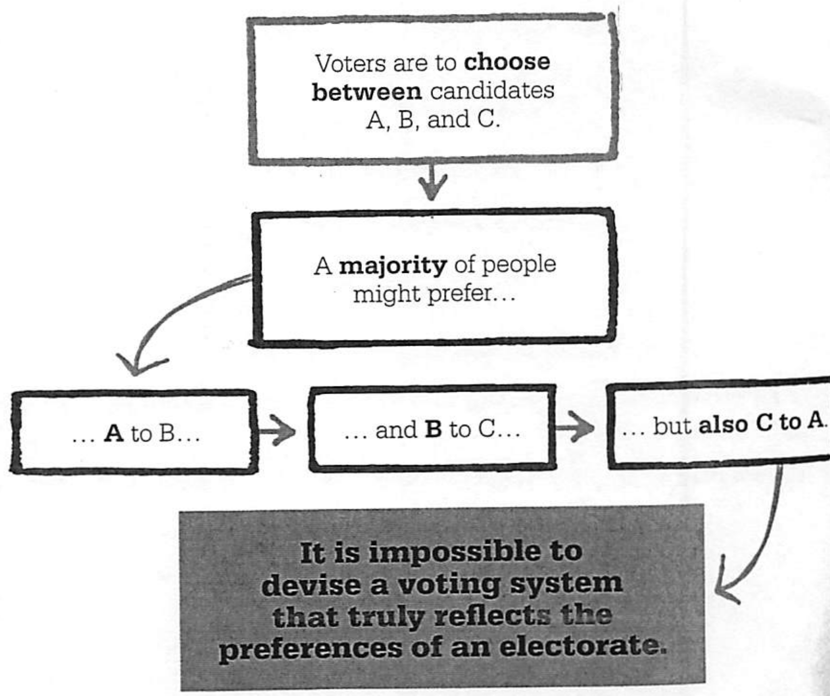
BEFORE
1770 French mathematician Jean-Charles de Borda devises a preferential voting system.

1780s English philosopher and social reformer Jeremy Bentham proposes a system of utilitarianism—aiming for the greatest happiness of the greatest number.

1785 Nicolas de Condorcet publishes *Essay on the Application of Analysis to the Probability of Majority Decisions*, in which he sets out the original voting paradox.

AFTER
1998 Indian economist Amartya Sen is awarded the Nobel Prize for his work on welfare economics and social choice theory.

At a first glance, the mathematics of voting may seem to have little to do with economics. However, in the area of welfare economics, and in social choice theory in particular, it plays a crucial role. Social choice theory was developed by US economist Kenneth Arrow in the 1950s. He saw that in order to evaluate the economic well-being of a society, the values of its individual members have to be taken into account. In the interests of making collective decisions that determine the welfare and social state of a society, there must be a system for individuals to express their preferences, and for these to be combined. The collective



See also: Efficiency and fairness 130–31 ▪ Markets and social outcomes 210–13 ▪ The social market economy 222–23

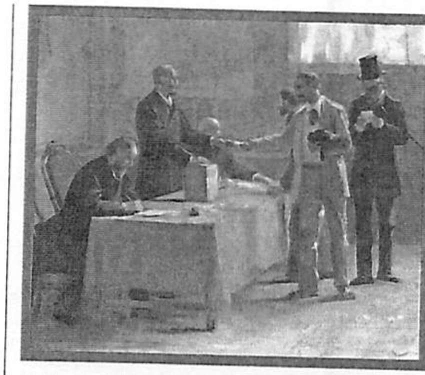
> In a capitalist democracy there are essentially two methods by which social choices can be made: voting… and the market mechanism.
> **Kenneth Arrow**

decision-making process is dependent on a fair and efficient system of voting. However, in *Social Choice and Individual Values* (1951), Arrow demonstrated that there is a paradox at work.

Voting paradox

The so-called voting paradox was first described almost 200 years earlier by the French political thinker and mathematician Nicolas de Condorcet (1743–94). He found that it is possible for a majority of voters to prefer A over B, and B over C, and yet at the same time express a preference for C over A. For example, if one-third of voters rank the choices A-B-C, another third B-C-A, and the remaining third C-A-B, then a majority clearly favor A over B, and B over C. Intuitively, we would expect that C is at the bottom of the list of options. But a majority also prefer C over A. Making a fair collective decision in such cases is clearly problematic.

Arrow showed that a voting system that truly reflects the preferences of the electorate is not just problematic, but impossible. He proposed a set of fairness criteria that need to be satisfied by an ideal voting system. He then demonstrated that it was not possible for any one system to satisfy all these conditions. In fact, when a majority of reasonable assumptions are met, there is a counterintuitive outcome. One of the criteria for fairness was that there should be no "dictator"—no individual who determines the collective decision. Yet paradoxically, when all the other conditions are adhered to, just such a dictator emerges.



The right to vote at the ballot box, shown here in 19th-century France, is entrenched in Western civilization and almost universal, but the truly perfect voting system is elusive.

What are social welfare functions?

There are various methods of assessing the well-being of a society. The 19th-century utilitarians thought that peoples' individual levels of utility, or happiness, could be added up, rather like incomes, to measure overall welfare. Later economists developed "social welfare functions" in an attempt to do the same, but these didn't necessarily involve the measurement of utility. Kenneth Arrow and others formulated these functions as a means of turning individual preferences into rankings of possible social states (their economic position in society). There is an ethical dimension to social welfare thinking. A simple form of utilitarianism emphasizes the maximization of total happiness less its distribution. Another, proposed by US philosopher John Rawls (1921–2002), maximizes the well-being of the least well-off person in society.

The well-being of many

Arrow's paradox (also known as the general possibility theorem) is a cornerstone of modern social choice theory, and Arrow's fairness criteria have formed the basis for devising fair methods of voting that take into account the preferences of individuals.

Social choice theory has now become a major field of study in welfare economics, evaluating the effects of economic policies. This field, which began as the development of abstract theorems, has been applied to concrete economic situations in which governments and planners have to continuously weigh the well-being of many. Much of this has profound implications for the fundamental economic problems of the allocation of resources and the distribution of wealth. ■