



Social Choice Theory

Social choice theory is an economic theory that considers whether a society can be ordered in a way that reflects individual preferences. The theory was developed by economist Kenneth Arrow and published in his book *Social Choice and Individual Values* in 1951.

- Social choice theory is concerned with finding an optimal method that aggregates individual preferences, judgments, votes, and decisions for good rule
- Kenneth Arrow is generally credited for social choice theory but the groundwork was laid by Nicolas de Condorcet in the 18th century.
- Arrow's book specifies five conditions that a society's choices must meet to reflect individual choices.
- They are universality, responsiveness, independence of irrelevant alternatives, non-imposition, and non-dictatorship.

Frenchman Nicolas de Condorcet laid the groundwork for social choice theory in a 1785 essay. The essay included the jury theorem. In the theorem, each member of a jury has an equal and independent chance of making the correct judgment on whether a defendant is guilty.

Condorcet showed that the majority of jurors are more likely to be correct than each individual juror, thereby making the case for collective decision-making. Condorcet's paradox builds upon his previous theorem and proposes that majority preferences can be irrational. Thus, Condorcet showed that while collective decision-making is preferable to individual decisions, there are still problems associated with it.

In the 20th century, Arrow broadened the theory of social choice beyond the investigation of the properties of majority rule. Arrow's generalization of the theory of social choice asks whether it is possible to find a rule that aggregates individual preferences, judgments, votes, and decisions in a way that satisfies minimal criteria for what should be considered a good rule.

Arrow's social choice theory considers all sorts of individual choices, not just political choices, and all sorts of possible rules for reaching collective decisions beyond a simple majority voting rule.

Arrow's Five Conditions

Ordering society in a way that reflects these many and varied individual preferences is difficult. Arrow specified five conditions that a society's choices must meet in order to fully reflect the choices of its individuals. They are:

- **Universality:** The decision rule must yield a complete ranking of all preferences and do so consistently under identical conditions.
- **Responsiveness:** An increase in an individual preference for an alternative must also either increase or at least not change, but never decrease, the overall social preference for that alternative.



- **Independence of Irrelevant Alternatives:** The inclusion or exclusion of certain alternatives must not alter the rank order of other alternatives with respect to one another.
- **Non-imposition:** The set of aggregated social preferences must be a product of one or more combinations of individual preferences.
- **Non-dictatorship:** The rule must actually reflect the preferences of multiple parties, and not simply of a single individual

Using these conditions, Arrow developed his Impossibility Theorem. Arrow's Impossibility Theorem states that it is impossible to order society in a way that reflects individual preferences without violating one of the five conditions.

Therefore, selecting a social choice rule will always involve sacrificing or compromising among Arrow's five axiomatic conditions.

Another notable contributor to social choice theory is Jean Charles de Bourda, a contemporary of Condorcet, who developed an alternative voting system known as Borda Count. Other contributors to the theory include Charles Dodgson (better known as Lewis Carroll) and Indian economist Amartya Sen.

Example of Social Choice Theory

To consider a political example, under a dictatorship, decisions about social choices and the ordering of society are made by a single individual. Meanwhile, in an open democratic society, each individual has an opinion about how society should best be ordered. Both of these systems violate Arrow's Impossibility Theorem and are thus flawed methods for reaching social decisions that reflect the preferences of society.

A dictatorship obviously violates the non-dictatorship condition. A majoritarian democracy, on the other hand, violates the conditions of independence of irrelevant alternatives. This is because in majority voting, cycling (an endless loop of alternatives with no preferred solution) of preferences is possible, which makes the order and selection of alternatives presented a deciding factor in which alternative will be preferred.

For example, consider three voters voting for three alternatives:

- Voter 1 prefers option A over option B and option B over option C
- Voter 2 prefers option B over option C and option C over option A
- Voter 3 prefers option C over option A and option A over option B

All voters prefer A over B, B over C, and C over A, and a majority of voters will always vote against each of the possible options. Only if one of the options is excluded can a majority vote reach a decision in this situation, which means that the social rank order is dependent on the presence (or rather absence) of an irrelevant alternative.

In practice what this means is that in democracy, the outcome of majority voting may often be a function of the allowable alternatives that voters are permitted to consider and not a reflection of the voters' true preferences.



1. **Condorcet Paradox:** A situation where collective preferences are cyclical, even if individual preferences are not. For example, a group might prefer A over B, B over C, and yet C over A, leading to no clear winner.
2. **Majority Rule:** A common voting system where the option with the most votes wins. However, it can be subject to strategic manipulation or fail to represent minority preferences adequately.
3. **Borda Count:** A voting system where individuals rank options, and points are assigned based on the rankings. The option with the highest total points is chosen. While it avoids some issues of majority rule, it can be vulnerable to manipulation by changing rankings of irrelevant alternatives.
4. **Single-Peaked Preferences:** In some cases, individual preferences are "single-peaked," meaning each individual has one most-preferred option and their preferences decrease as they move further from this option. With single-peaked preferences, majority rule can lead to a socially desirable outcome.
5. **Gibbard-Satterthwaite Theorem:** Similar to Arrow's theorem, this theorem states that in any voting system that seeks to select a single winner from three or more alternatives, there is always a possibility for strategic voting, where individuals may misrepresent their true preferences to achieve a more favorable outcome.

Applications of Social Choice Theory:

1. **Voting Systems:** Social choice theory helps in designing fair and effective electoral systems, ensuring that voting procedures reflect collective preferences as accurately as possible.
2. **Public Policy:** Governments use social choice principles to aggregate the preferences of their citizens when making decisions about policies that affect public welfare, such as healthcare, taxation, and public services.
3. **Welfare Economics:** Social choice theory plays a significant role in determining how resources should be distributed in a society to maximize social welfare. It helps to design systems for fair resource allocation.
4. **Group Decision-Making:** Organizations, companies, or committees often use social choice mechanisms when making decisions that involve multiple stakeholders with differing preferences.