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Topic: Arrow's Impossibility Theorem

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Arrow's Theory of Social Choice

Bergson and Samuelson made a significant contribution to welfare economics by introducing the concept of "explicit value judgements" in the form of social welfare function. But they did not deal with the problem that how the value judgement can be obtained and what the value judgement could be for constructing a social welfare. It was the problem which remain untouched by the Bergson and Samuelson social welfare function. But it was explored by Prof. Arrow's path breaking work "Social Choice and Individual Values". Arrow constructs a social ordering. Arrow proved a general theorem according to which it is impossible to construct a social order which will in some way reflect the individual ordering of all the members of the society.

• Arrow's Theorem on Democratic Group Discussion

* Reasons for Arrow's Model :

→ Unlike Bergson, under Arrow's criterion how can we get the value judgement or what these value judgement could be for constructing the social welfare function.

→ The main contention of Arrow is that it is very

difficult to set a rational democratic procedure for the aggregation of individual preferences into a social preference for making a social choice.

Therefore, Arrow has proved the general theorem. According to which it is impossible to construct a social ordering which in some way reflects the individual ordering of all the members of the society.

→ Individual ordering of alternative social state does not depend exclusively upon the commodity consumed but also on the various types of collective such as municipal services, Parks, sanitation, erection of statues of famous men.

■ Arrow's Condition of Social Choice :

Arrow was the first welfare economist who attempted to lay down reasonable necessary condition for achieving the social ordering which reflects the desire or the ordering of all the individual of the society.

In his path breaking work "Social Choice and individual values" demonstrated the concept of "social states and values".

Prof. Arrow has laid down certain necessary condition which social choice must satisfied in order to reflect individual ordering. In fact these condition reflects the value

Judgement of Arrow himself.

The following are the five conditions which must be met for an acceptable social welfare function:-

- i). Transitivity or convexity (collective rationality).
- ii). Responsiveness to individual preferences
- iii). The condition of non-imposition
- iv). The condition of non-dictatorship
- v). Independence of irrelevant alternatives.

1). Transitivity and convexity :- If alternative A is socially preferred to alternative B and B is preferred to C then, C will not be socially preferred to A. If alternative C is found to be socially preferred to A, then the condition of transitivity would be violated and the choice would be inconsistent.

By convexity we mean that the various alternatives must be related to each other by preference or by indifference. Thus two alternatives are said to be related or connected if for any pair of alternatives A and B, either A is preferred to B or B is preferred to A or there is indifference between the two.

2). Responsiveness to individual preferences :- The social choice must change in the same direction as the choice of individual constituting the society.

Ex:- If A is preferred to B on the basis of a set of individual orderings. If change occurs in the ordering of individuals so that some individuals prefer alternative A more strongly than before and no one's preference for it declines, then A must remain socially preferred to B.

3). The condition of Non-Imposition: The third criterion is of "non-imposition". This states that social choices must not be imposed independently of individual preferences.

For instance, if no individual in the society prefers alternative B to A or anyone or few prefers alternative A to B that society must prefer A to B.

4). The condition of non-dictatorship:

Social choice must not be dictated by anyone individual in the society or the community.

The condition implies that the social choice must be determined by voting by all individual rather than dictatorial one of the imposition of his will by an individual.

ex:- Alternative A must not be socially preferable just because one individual revealed it.

5). Independence of Irrelevant Alternatives: Social ranking of any two alternative is determined exclusively by individual ranking of these two

alternatives alone and should not be affected at all by individual preference w.r.t other alternative. In other words, a most preferred alternative out of the given set of available alternative must be independent of other alternatives which are not available.

example: Suppose there are three alternatives A, B and C. If A is preferred over B and B over C and later C is not available then B can not be preferred over alternative A.

The above five conditions of Arrow reflects his own value judgement and they seem reasonable set of conclusion for making choice in the free democratic society.

Arrow demonstrate that it is not possible to satisfy all these five conditions for obtaining a transitive social choice of individual preference for each of individual preferences without violating at least one condition.

This is why social choice is inconsistent or undemocratic because no voting system allows these five conditions to be satisfied. This has come to be known as "Arrow Impossibility Theorem".



Criticisms:

Arrow's general impossibility theorem has been criticised by Samuelson, Little and other welfare

economist. A/c to Little, Arrow's negative conclusion has more relevance in welfare economics. His Impossibility Theorem relates to decision making process and not a social welfare function. Baumol shows that "Arrow's requirements are preposterous that he seen at first view and that are inconsistent or undemocratic." Social choice making is not the only alternative.

The Arrow's theorem is based on the assumption of a "majority voting pattern" which does not take into consideration the possibility of the voting system that requires unanimity.

* According to Amartya Sen "for making a decision regarding social choice to democratic mechanism for information to make a rational choice for maximising social welfare."