**NTU SSS Economics HE2001**  
**Tutorial 10 (Social Choice)**

1) One procedure for aggregating preferences is to use the **plurality rule** is as follows.

Suppose that there are alternatives.

Given the alternatives, pick the alternative that is the top choice of the largest number of individuals and place it at the top of the social preference ordering. Ties are broken randomly. Then, remove that alternative from every individual’s preference ordering, keeping the same order for the remaining alternatives.[[1]](#footnote-1)

Given the alternatives remaining, pick the alternative that is the top choice of the largest number of individuals and place it at the next highest position of the social preference ordering. Ties are broken randomly. Then, remove that alternative from every individual’s preference ordering, keeping the same order for the remaining alternatives.

Repeat the process until there are no remaining alternatives.

(a) Will the plurality rule social decision mechanism always result in a complete and transitive social preference ordering? Explain.

(b) Does the plurality rule satisfy the pareto condition? Explain.

(c) Consider the case of 3 alternatives and a society with 9 individuals with the following preference list:

4 individuals have

3 individuals have

2 individuals have

What is the social ranking according to the plurality rule?

(d) Now, suppose we swap the middle 3 individuals’ preferences over B and C such that the preference list becomes:

4 individuals have

3 individuals have

2 individuals have

What is the social ranking according to the plurality rule?

(e) Does the plurality rule social decision mechanism satisfy the requirement of independence of irrelevant alternatives? Hint: use parts c) and d).

2) In the lecture, we discussed one possible method of aggregating individual preferences: the Borda count, also known as rank-order voting.

Suppose that there are a finite number of alternatives to choose from and that every individual has complete, reflexive, and transitive preferences. For the time being, let us also suppose that individuals are never indifferent between any two different alternatives but always prefer one to the other.

1. Will the Borda Count social decision mechanism always result in a complete and transitive social preference ordering? Explain.
2. Does the Borda Count social decision mechanism defined in this way satisfy the pareto condition? Explain.

(c) Suppose that there are two voters and three candidates, , , and . Suppose that Voter 1 ranks the candidates: first, second, and third. Suppose that Voter 2 ranks the candidates: first, second, and third. What is the Borda count for , and ?

(d) Now suppose that it is discovered that candidate once lifted a beagle by the ears. Voter 1, who has rather large ears himself, is appalled and changes his ranking to first, second, third. Voter 2, who picks up his own children by the ears, is favorably impressed and changes his ranking to first, second, third. What is the Borda count for and ?

(e) Does the Borda Count social decision mechanism satisfy independence of irrelevant alternatives? Hint: use parts d) and e).

(f) Do you think that with Borda Voting, voters always have an incentive to truthfully report their full preference rankings? (Hint: provide an example where a voter changes his reported ranking and benefits from it)

3) Norton and Ralph have a utility possibility frontier that is given by the following equation, (where R and N signify Ralph and Norton respectively).

(a) If we set Norton’s utility to zero, what is the highest possible utility Ralph can achieve? If we set Ralph’s utility to zero, what is the best Norton can do?

(b) Plot the utility possibility frontier on a graph.

(c) Derive an equation for the slope of the above utility possibility curve.

(d) Suppose that a social planner has a utilitarian social welfare function. What is the utility of Ralph and Norton in his ideal allocation?

(e) Both Ralph and Norton believe that the ideal allocation is given by maximizing an appropriate social welfare function. Ralph thinks that is the best distribution of welfare, and presents the maximization solution to a weighted-sum-of-the-utilities social welfare function that confirms this observation. What was Ralph’s social welfare function?   
(*Hint: What is the slope of Ralph’s social welfare function?*)

(f) Norton, on the other hand, believes that is the best distribution. What is the social welfare function Norton presents?

4)  Suppose the utility possibility frontier for two individuals is given by .

1. Plot the utility possibility frontier.
2. In order to maximize a “Nietzschean social welfare function,” , what values of would one set? Draw a few isowelfare lines and the social optimal point.
3. If instead we use a Rawlsian criterion, , what values of would maximize the social welfare function? Draw a few isowelfare lines and the social optimal point.
4. Suppose that social welfare is given by , what values of would maximize the social welfare function? Draw a few isowelfare lines and the social optimal point.

**Sample questions**

1) In order to combat environmental change, the government of Fruitland decides to implement a new environmental policy. There are three choices of policies: and , and consumers have to vote on which policy to implement. Amongst the population of 1000, there are three *types* of preference rankings: “Young”, “Middle Aged” and “Old” as illustrated below.

|  |  |  |  |
| --- | --- | --- | --- |
| ***Rank*** | ***Young*** | ***Middle Aged*** | ***Old*** |
| *1* | *Z* | *X* | *Y* |
| *2* | *Y* | *Z* | *X* |
| *3* | *X* | *Y* | *Z* |

There are 300 young consumers, 300 middle aged consumers and 400 old consumers.

Recall Borda voting as discussed in the lecture let us call this *standard* Borda voting.   
In contrast, consider *modified* Borda voting where all rules remain the same, except that the number of points of middle-aged consumers is multiplied by 1.5, while the number of points of young consumers is multiplied by 2.

1. In general, how do you think the modified Borda voting rule will influence the social preference ranking, compared to standard Borda voting? Explain. **(5 marks)**
2. Does the *modified* Borda voting social decision mechanism satisfy the Pareto condition? Explain. **(6 marks)**
3. What will be the policy choice if the government uses i) a standard Borda voting rule, ii) a modified Borda voting rule. **(6 marks)**
4. Discuss why the modified Borda voting rule as above might be more “reasonable” than the standard Borda voting rule in the above scenario. **(6 marks)**

2) While there are many different pareto efficient allocations, a social planner believes that the ideal allocation for Ivy and Joseph is given by maximizing an appropriate social welfare function.

Suppose that the utility possibility frontier of the exchange economy can be expressed as .

1. Explain what the utility possibility frontier is and illustrate it in a graph. **(4 marks)**
2. Suppose that the social planner is *utilitarian*, how much utility will Ivy and Joseph get in the social planner’s ideal allocation? Illustrate this on your graph.  **(6 marks)**
3. Suppose that instead, the social planner has a *weighted-utilitarian* social welfare function. He thinks that the ideal allocation gives . What is the social planner’s social welfare function? Illustrate this on your graph. **(6 marks)**
4. Will every point on the utility possibility frontier be achievable as a competitive equilibrium? Discuss. **(6 marks)**

1. For example, if , and we are removing alternative , then the new preference ordering is . [↑](#footnote-ref-1)