

Week 9 Summary: Social preferences and choice.

02.229 - Decision Theory and Practice, 2019 Jan-April

Yustynn Panicker

April 8, 2019

Contents

1	Goal of Social Choice Theory	1
2	Descriptive Issues	1
3	Why not just use utility for SWF?	1
4	Terminology	1
5	Arrow's Impossibility Theorem	2
5.1	Implication	2
6	Sen's Construction of Liberalism as Incompatible With Pareto	2
6.1	Sen's Minimal Condition of Liberalism	2
6.2	Nozick's Criticism	2
7	Harsanyi's Utilitarian Theorems	2
7.1	General	2
7.2	Issues/Limitations	2

1 Goal of Social Choice Theory

- Analyze collective decision problems

The real goal here is to find a proper reduce function (known in the field as a **Social Welfare Function**, or SWF).
that takes as input a set of individual preference orderings G and outputs a **social preference ordering** S

Term	Meaning
SWF	Social Welfare Function
G	set of individual preference orderings
S	social preference ordering

$$SWF : G \mapsto S$$

2 Descriptive Issues

- Cyclical preferences (known as the **voting paradox**)

3 Why not just use utility for SWF?

- Interpersonal utility comparisons are an intractable problem

4 Terminology

Term	Meaning	Remarks
Decisiveness (Gilboa calls this unanimity)	Decisive if everyone in the group has the same preference ordering	Can be decisive w.r.t some social state pair (e.g. (a,b)) or decisive overall
Non-dictatorship	No single individual of a group of people can make the group	Libertarianism seems inescapably to have dictators then
Ordering (property)	For any combination of individual preference orderings, the social preference ordering must be complete, asymmetric and transitive	
Asymmetric preference relation	Effectively, it means a strict preference relation (no indifference)	
Independence of irrelevant alternatives (property)	Pairwise preference relations are robust to changes in the set of alternatives	This can be seen as a more general statement of the problem of irrelevant alternatives in minimax regret
Pareto	The group of all individuals in society is decisive	Unclear on what society means, but I'm guessing any arbitrary group of >1 person is fine

5 Arrow's Impossibility Theorem

5.1 Implication

No SWF exists such that it meets the following conditions:

- Non-dictatorship
- Ordering
- Independence of Irrelevant Alternatives
- Pareto

6 Sen's Construction of Liberalism as Incompatible With Pareto

6.1 Sen's Minimal Condition of Liberalism

It's a very, very low bar.

Essentially, it's liberal iff $\exists \geq 1$ preference relation pair where a single individual's preference determines the entire group's preference for that relation pair

Obviously, this cannot then be pareto.

6.2 Nozick's Criticism

- Liberalism is not a SWF, but a constraint on the feasible set of alternatives

7 Harsanyi's Utilitarian Theorems

7.1 General

His overall idea is that rational individuals can represent the utility of a social state on an interval scale. (recall that an interval scale is one in which $a - b$ holds meaning, but a/b does not)

7.2 Issues/Limitations

Mostly lie on his ethical premise that *equal treatment of all individuals* is desirable.

Problems are:

1. Accurate interpersonal comparisons of utility is intractable
2. It's normative, does not stem from descriptive premises

Personally, I don't think these problems are big deals. You can't run away from the need for some sort of ethical axiom, and you don't need a perfect comparison function for utility. I'd expect you to be more right than you are now if you implement this system, even if your comparison function isn't perfect. You don't need to chase perfection - just chase improvement.