Exam in Microeconomics for Phd.
NYU Economics

Lecturer: Ariel Rubisntein
Date: October 20th, 2022
Time: 09:00 - 12:00
Instructions: You are required to answer all three questions. It is an open-book exam and you can use any written source that you wish. Obviously, you are forbidden from communicating with anyone during the exam.

Question 1. Let X be a grand set of alternatives. A decision maker has an arsenal of justifications Λ which he can use to justify his choice. Each element in Λ is a weak preference relation over X and at least one of the members of Λ is a strict preference relation. A choice a from $A \subseteq X$ is Λ-justifiable if $a \in A$ is the *unique* best element in A according to some preference relation in Λ. Define $C_\Lambda(A)$ to be the set of Λ-justifiable alternatives in A.

(i) Is C_Λ always rationalizable? Suggest (and prove) one interesting property that C_Λ satisfies regardless of what Λ is and another that it does not satisfy for some Λ.

(ii) Given a choice correspondence C, is there necessarily a set of justifications Λ such that $C = C_\Lambda$?

Now consider a choice function C built on potential justifications ordered by priority $\geq_1, \ldots, \geq_K$. Assume that the lowest priority justification, $\geq_K$, is a strict ordering. The function C selects from A the alternative which is justified by the highest priority justification.

(iii) Is this choice function necessarily rationalizable?

Question 2. In this question, you are asked to rewrite a "consumer chapter" for a world in which the consumer faces a set X of K indivisible objects and chooses a subset of X. Given a budget w and a price vector $p = (p_k)_{k \in K}$, the consumer can purchase any subset with a total cost of not more than w. Assume that the consumer has a strict preference $\succsim$ on the set Y of subsets of X with the monotonicity property that "adding an item cannot hurt".

a. Formulate the consumer problem.

b. Prove that the demand for good k is non-increasing in p_k.

c. Is it true that all goods are always normal (that is, their demand is non-decreasing in w)? d. How would you derive demand from the indirect preference defined over the space of all (p,w)?

e. Assume now that the price vector is such that the prices of any two subsets of goods are distinct. Prove the following duality proposition: y^* is an optimal subset given p and w which is equal to the cost of y^* if and only if y^* is the cheapest set given p which is at least as good as y^*. Explain why the proposition may be incorrect without the assumption (*) that the costs of all subsets are distinct.

Question 3. A society has $n \geq 3$ individuals. Let X be a set of social alternatives. For any profile of strict preference relations on X, we wish to attach a "representative" preference relation that is one of the profile's preferences. We use a distance function d over the set of preference relations and define $F(\succsim^1, \ldots, \succsim^n)$ to be the set of preference relations in the profile that minimize the average distance from all preferences in the profile.
(a) Can this correspondence be thought of as a choice correspondence (from sets of preference relations)? (yes/no and a one sentence explanation.)

(b) Characterize the correspondence F for the case in which d assigns the value 1 to any two distinct preference relations and 0 otherwise.

(c) Characterize F for the case in which $X = [0, 1]$, each preference relation has a single peak and the distance between two preference relations is defined as the distance between their peaks.

(d) Assume that X is finite, all preferences are strict and the (Kemeny) measure distance between any two preferences is the number of pairs for which the two preferences differ. A Social Welfare Function is derived by breaking ties according to some pre-specified order over the orderings. Does this SWF satisfy: (i) the Pareto property; (ii) the IIA property?