

Final Exam

Spring 2020 - ECO 501 - Microeconomics II

Please email your solution as a single .pdf file to pradeep.dubey@stonybrook.edu (with cc to claviamayol.marc@stonybrook.edu) by 11:59pm EST, May 7th, 2020. You can either type your solution or scan it (make sure your handwriting is readable).

You are expected to complete the exam on your own. Do not discuss it with your classmates and do not use any online resources beyond the materials posted on our Blackboard page. Your academic integrity is at stake.

Question 1.

Consider 4 types of used cars: bad (B), average (A), good (G) and excellent (E) in the proportion 5 : 3 : 3 : 2 among the finitely many sellers. There is a perfectly competitive sector of (infinitely many) buyers. The valuation of the used cars are as follows:

Quality	Seller	Buyer
B	150	170
A	200	250
G	240	280
E	300	310

As usual, sellers know the quality of the car and buyers don't.

- (a) Find all equilibria.
- (b) Suppose the proportions are 5 : 3 : 3 : x . What is the minimum value of x for all cars to be sold in the market?
- (c) Suppose the proportions are 5 : 3 : y : 2. What is the minimum value of y for qualities B, A and G but not E to be sold in the market?

Question 2.

Suppose the productivity of a type 1 worker is $\frac{5}{2}e$ and the productivity of a type 2 worker is $\frac{11}{4}e$, where e is the education level. The utility of wage w and education e to a worker of type 1 is $u_1(w, e) = 5\sqrt{w} - 3e$. The utility of wage w and education e to a worker of type 2 is $u_2(w, e) = 5\sqrt{w} - 2.9e$.

- (a) If the fraction of low-ability ($t = 1$) workers is $\frac{1}{2}$, find the Rothschild-Stiglitz equilibrium.

(b) What's the minimum fraction of low-ability workers such that the Rothschild-Stiglitz equilibrium exists?

Question 3.

Recently, a friend of ours mentioned that he had gone to insure his car and he had been offered several different policies. He could choose between an expensive contract with full insurance or a significantly cheaper contract with a voluntary excess of \$500 (a voluntary excess clause means that the company will pay all losses from accidents over and above the first \$500). Our friend argued that insurance companies offer contracts with excess clauses since that way they make the drivers who suffer many accidents pay \$500 each time. Do you agree or disagree with this argument? [Whether the answer is affirmative or not, you should argue in terms of an adverse selection situation (the insurance company cannot observe whether or not the driver is reckless).]

Question 4.

Suppose the set of alternatives is $A = \{x, y, z, t\}$. Consider the social choice function specified as follows: any pair of alternatives except for the pair x, y are ranked by simple majority voting (a tie in the vote means indifference). As for x, y the rule for comparing them is as follows: if an even number of individuals prefer x to y , then society will prefer x to y ; if an odd number of individuals prefer x to y , then society will prefer y to x . Consider the following preference profiles:

Profile 1				Profile 2				Profile 3		
1	2	3	4	1	2	3	4	1	2	3
x	z	y	t	x	z	t	y	x	z	t
y	t	x	x	y	x	y	x	y	x	x
t	x	t	y	z	y	x	t	z	y	y
z	y	z	z	t	t	z	z	t	t	z

(a) For each of the profiles, find the social preference.

(b) Using only the preference profiles provided above, determine if any of the axioms of transitivity, unanimity and independence of irrelevant alternatives is being violated and explain why or why not.

Question 5.

Consider a simple majority game with $n + 1$ players. There is one large player with n votes and n small players with 1 vote each.

(a) Compute the Core and the Shapley value.

(b) Explain what happens when the number of players becomes very large, i.e., $n \rightarrow \infty$.

Question 6.

Consider a game involving a glove market. Players 1 and 2 each have a left-hand glove and player 3 has a right-hand glove. The worth of a coalition is the amount that it will get for the gloves in its possession.

Every pair of gloves (left and right) can be sold in the market for one dollar. A single glove cannot be sold in the market.

- (a) Describe the game in coalition function form and compute the Core and the Shapley Value of the game.
- (b) Compute the Core and the Shapley Value of the game when there are five players. Players 1,2 and 3 each have a right glove and players 4 and 5 each have a left glove. As before, every pair of gloves is worth one dollar?
- (c) Can you do the case with $2n + 1$ players where $n + 1$ players each have a left glove and n players each have a right glove?