

Topics you need to know for IKT 313 Midterm Exam

9 November 2020-14:30-16:30

- 1) Exchange good economies (2 private goods), Edgeworth box, types of utility functions, Pareto optimality, Contract curve, core allocation, competitive equilibrium, first and second welfare theorem of economics
- 2) What is a public good? What are the main differences between public, private, common and club goods? Free-rider problem, Positive externalities and negative externalities
- 3) How to add demand functions with public and private goods?
- 4) Finding Pareto optimal allocations with public good economies. Samuelson's condition at an interior solution for 1 private good and 1 public good economy.

Proposition: If all individuals have continuously differentiable, quasi-concave utility functions $U(X_i, Y)$ which are strictly increasing in X_i and if the set of possible allocations consists of all

$(X_1, X_2, \dots, X_n, Y)$ such that $\sum_{i \in N} X_i + cY = W$, then $(X_1^*, X_2^*, \dots, X_n^*, Y^*)$ constitutes an interior

Pareto optimal allocation if the feasibility condition holds, i.e., $\sum_{i \in N} X_i^* + cY^* = W$ and

$$\sum_{i \in N} \frac{\partial U_i / \partial Y}{\partial U_i / \partial X_i} = c$$

- 5) **Bonus:** 2 private goods and 1 public good questions. I will solve one problem on a video today.
- 6) Relationship between maximization of summation of utilities and Pareto optimality.

- 7) Kolm triangle, transformation of utility functions onto this triangle and finding Pareto optimal allocations.
- 8) Public good provision problems: Why is there under-provision of public goods? Finding Nash Equilibrium with public goods.
- 9) Numeric Problems with Lindahl taxes and Pigouvian taxes. Where do we use these taxes? Why are they important?

Additional Question 1: Let the utilities of consumers one and two, who consume one private good (X) and one public good (Y) be $U_1(X_1, Y) = X_1 Y$ and $U_2(X_2, Y) = X_2 (Y)^2$, respectively. Let the budget constraint be $X_1 + X_2 + Y = 10$. Find the Pareto optimal allocation levels of the goods.

Bonus Question: Let the utilities of consumers one and two, who consume two private goods (X and Z) and one public good (Y) be $U_1(X_1, Z_1, Y) = X_1 Z_1 Y$ and $U_2(X_2, Z_2, Y) = X_2 Z_2 (Y)^2$, respectively. Let the budget constraint be $X_1 + X_2 + Z_1 + Z_2 + Y = 10$. Find the Pareto optimal allocation levels of the goods when $Y = 4$.