

New Economic School
Microeconomics 3
Problem set #4
Due Week 5

The problems below refer to the material in MWG Chapters 3-4.

1. There are two goods in the economy, x and y ; the prices are p and q , respectively. There are two consumers $i = 1, 2$ with wealth w_i . Each consumer has a Cobb-Douglas utility function $u_i = \sqrt{x_i y_i}$. The social welfare function is $W = u_1 + u_2 + \sqrt{u_1 u_2}$.
 - (a) Derive individual Marshallian (uncompensated) and Hicksian (compensated) demand function for individual consumers. Compute Slutsky matrices. Do individual demands satisfy the uncompensated law of demand?
 - (b) Derive aggregate demand. Does it satisfy uncompensated demand law? The Weak Axiom? If a (positive) representative consumer exists, describe her utility function.
 - (c) Solve the social planner's problem. Describe a (normative) representative consumer.

2. There are two consumers with indirect utility functions $v_1(p, w_1)$ and $v_2(p, w_2)$. Answer the questions below, provide a proof for positive answers and counterexamples for negative ones.
 - (a) Does the aggregate demand exist? If it does, is it generated by the indirect utility function $v(p, w) = v_1(p, w_1) + v_2(p, w_2)$.
 - (b) Answer (a) for $v_i = f(p)w_i$, $i = 1, 2$.

3. There are two goods in the economy, x and y ; the prices are p and q , respectively. There are two consumers $i = 1, 2$ with wealth w_i . Each consumer has an indirect utility function $v_i = w_i \frac{p+q}{pq}$.
 - (a) Does the aggregate demand satisfy the Weak Axiom?
 - (b) Compute the aggregate demand. Derive the representative consumer's utility function.
 - (c) Find the social welfare function such that the solution to the social planner's maximization problem is the same as (b).