

Microeconomics for Management - Yossi Spiegel

Problem set 2

Problem 1

Bob consumes only two goods, 1 and 2. The prices of the two goods are p_1 and p_2 and Bob's income is I . The consumer's utility function is $U(x_1, x_2) = x_1 x_2$.

- (a) Solve Bob's maximization problem and compute his demands for the two goods.
- (b) Show each of the two demand functions in three different graphs: one that shows it as a function of the good's price (p_1 for good 1 and p_2 for good 2), one that shows it as a function of income, and one that shows it as a function of the price of other good (p_2 for good 1 and p_1 for good 2). When you draw the graphs, put the quantity on the horizontal axis and the prices or income on the vertical axis (although this seems to be the "wrong" way of doing it, this is the common way to illustrate demand functions graphically).
- (c) Show how Bob's demand curve for good 1 (the demand for good 1 as a function of p_1) shifts when p_2 increases and how it shifts when I increases.
- (d) Compute the price elasticity of demand, the income elasticity of demand, and the cross-price elasticity of demand (the latter is defined as $\epsilon_{ij} \equiv (\Delta x_i / x_i) / (\Delta p_j / p_j)$, that is, the percentage change in the demand for good i when the price of good j increases by 1%).
- (e) Are the two goods normal, inferior, or neutral? Explain your answer.
- (f) Are the two goods complements or substitutes? Explain your answer.

Problem 2

Repeat your answer assuming that Bob's utility function is $U(x_1, x_2) = \alpha \ln(x_1) + x_2$, where $\alpha > 0$. For simplicity assume that I is large enough to ensure that Bob demands positive quantities of both goods (explain what happens if I is not sufficiently large).

Problem 3

Repeat your answer assuming that Bob's utility function is $U(x_1, x_2) = \text{Max}\{x_1/\alpha, x_2/\beta\}$, where $\alpha > 0$ and $\beta > 0$. (Hint: in this case you cannot solve the problem using calculus since the utility function is not differentiable. To solve Bob's problem, draw his indifference curves in the (x_1, x_2) space and use this graph to find Bob's optimal bundle).

Problem 4

The following problem asks you to think about the meaning of price and income elasticities. You are advised to read Ch. 2 and Braeutigam and Besanko before answering this question (though similar discussion appears in many other textbooks as well).

- (a) Why is it that the price and income elasticities of demand are typically greater in the long-run than in the short-run?
- (b) It was found that in the U.S. in 1990, the price elasticity of Mazda 323 whose price was around \$5,000 was 6.358, the price elasticity of Nissan Maxima whose price was around \$13,700 was 4.845 and the price elasticity of BMW 735i whose price was around \$37,500 was 3.515. Explain the meaning of these findings and what might be the reason for these findings.
- (c) Do you expect the price elasticity of running shoes to be higher or lower than the price elasticity of Nike running shoes? Explain your answer.