

THE UNIVERSITY OF CHICAGO
DEPARTMENT OF ECONOMICS
Elements of Economic Analysis I
Econ 200 (05)
SPRING 2001
PROBLEM SET 1

This problem set is due at the **beginning** of Lecture 5.

1. John faces the following budget constraint:

$$p_1x_1 + p_2x_2 = m$$

Assume that the price of good 1 doubles, the price of good 2 becomes 8 times larger, and income becomes 4 time larger.

- Draw the original budget constraint.
- Write and graph the new budget constraint.
- Draw the two budget constraints on the same graph.
- Is John better or worse off with the new budget constraint? Explain.

2. Suppose Mary has preferences over the amount of leisure she consumes and the amount of income she has. She has a maximum of 24 hours to allocate between working time and leisure time. Assume she can work as many hours as she wants at \$10 an hour, and that she has no other source of income.

- Write and draw her budget constraint.
- Write and draw her budget constraint if she faced a 25% tax on her wage earnings.
- Draw her budget constraint if she faced a 25% tax only on her wage earnings above \$100.
- Draw her budget constraint if she faced a labor market regulation which only allows her to work a maximum of 10 hours per day.

3. Graph a typical indifference curve for the following functions. Calculate the marginal rate of substitution for each using the total differential approach that we discussed in class. Are the indifference curves convex? Explain why or why not.

- $U = 4X + 2Y$
- $U = \sqrt{XY}$
- $U = \sqrt{X^2 + Y^2}$
- $U = X^{1/3}Y^{2/3}$
- $U = \ln X + \ln Y$

4. Imagine that consumers have preferences over beer and pizza. Assume that consumers differ according to their preferences over beer and pizza, so some consumers are beer lovers and some are pizza lovers. Suppose that Illinois and Indiana have different state sales taxes on beer, so the price a consumer pays for beer is different in the two states. Let s be the number of slices of pizza, b be the number of six-packs of beer, $M^A = 700$ be the money income of residents of Illinois, $P_s^A = 2$ be the price of a slice of pizza in Illinois, $P_b^A = 7$ be the price of a six-pack of beer in Illinois, $P_s^B = 2$ be the price of pizza in Indiana, $P_b^B = 5$ be the price of a six-pack in Indiana, and $c = 100$ be the cost of going from Illinois to Indiana and back.

(a) Write and draw the budget constraint for the case of a consumer who spends all his income in Illinois.

(b) Write and draw the budget constraint for the case of a consumer who spends all his income in Indiana.

(c) Draw the two budget constraints in the same graph.

(d) Determine, according to their preferences, which consumers will decide to stay in Illinois and which consumers will decide go to Indiana to spend their income. Make sure you make reference to the marginal rate of substitution between beer and pizza.