Econ 110: Introduction to Economic Theory

5th Class **1/31/11**

start on consumer theory; first of four lectures on this topic
we start with modeling individual consumer psychology and work back up to the market demand curve
this material (through next Mon.) will be covered on the first problem set, along with the baseline concepts material from last week's lectures

basic assumptions about human psychology in order to create a baseline model
this doesn't mean that we necessarily believe all people act this way all the time, but it allows us to set up a standard of comparison to measure actual behavior against; it also allows to us to make predictions about observable actions which we can then test for consistency against the baseline model (or a well-specified alternative)

first assumption: people try to maximize their well-being subject to the constraints they operate under
constraints may be as simple as time, or available funds
one problem that people have to solve in order to maximize their well-being is how much to work for pay out of the available amount of time they have (in, say, a week); we call this the labor supply problem and they solve it conditional on the wage they can earn
straightforward extensions of this problem include adding nonwage benefits, including working conditions, and solving it conditional on family constraints (the dual career problem); also allowing for multiple alternative uses of time including nonmarket production, leisure, and sleep

second assumption: well-being is generated through consumption of goods and services
straightforward extensions of this definition include tradeoffs between current and future consumption and tradeoffs between sure things and unknown or risky outcomes; less straightforward extensions include getting well-being through altruistic acts, i.e., from increasing the well-being of others
however this means we can represent total consumption by income because dollars can be transformed into various goods and services

we represent well-being as a function of the consumption of goods and services, called the utility function:

total utility U = U(Income)

Discuss measuring utils. Note there is a fundamental question of whether it is either possible or valid to make interpersonal utility comparisons (people operate on different feeling scales)

alternatively we can represent the utility function more fundamentally as generated by the actual consumption of amounts of various goods (e.g., X and Y, where X would be the number of apples and Y the number of oranges):

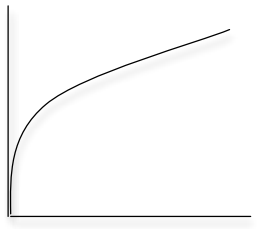
total utility U=U(X,Y,....)

For the purposes of this class we'll just consider two goods at a time and the tradeoffs between them
Two goods are useful for a number of comparisons (consumption today and consumption tomorrow, one good and the income spent on all other goods, etc.)

Can any function serve for a utility function? Yes, but we generally prefer to limit the set of possible functional forms, which is the same as making assumptions about human psychology

Hence we posit the third assumption, which is <u>positive but</u> <u>diminishing marginal utility</u>
(so more is preferred to less, but at a declining rate)

Let's see that for our two representations above



<u>marginal utility</u> MU = $\frac{dU}{dI} > 0$ but $\frac{d^2U}{dI^2} < 0$

marginal utility from consuming X = $MU_X = \frac{dU}{dX} > 0$ and

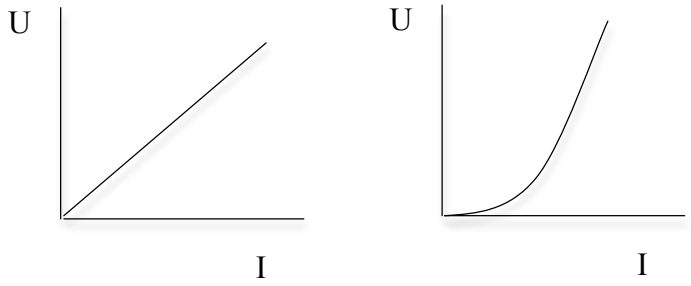
marginal utility from consuming Y = $MU_Y = \frac{dU}{dY} > 0$;

but $\frac{d^2U}{dX^2} < 0$ and $\frac{d^2U}{dY^2} < 0$

Thus only functions with a positive first derivative and a negative second derivative can be used to represent well-behaved utility functions

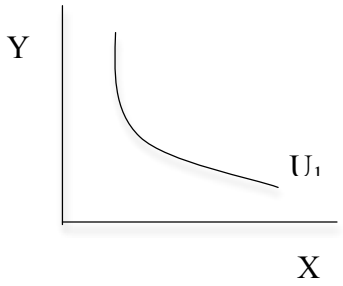
e.g. $U = \sqrt{I} = (I)^{\frac{1}{2}}$; then $\frac{dU}{dI} = \frac{1}{2}(I)^{-\frac{1}{2}}$ and $\frac{d^2U}{dI^2} = -\frac{1}{4}(I)^{-\frac{3}{2}}$

We can contrast this to various alternative, non-well-behaved cases.

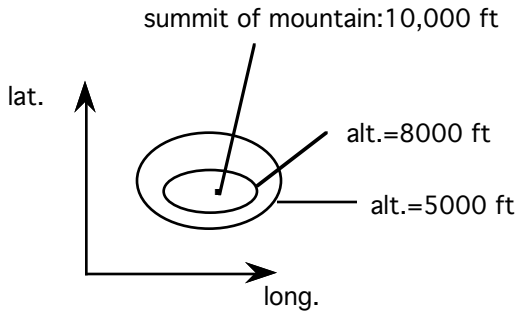


In order to flesh out the idea of well-behaved and non-well-behaved cases further, let's first define and discuss one more related concept, the <u>indifference curve</u>

This shows all the combinations of amounts of X and Y that generate the same amount of utility



discuss the mathematical interpretation of a level set (slices from a 3-D function; analogy to topographical maps)



Fourth assumption: consistency; preferences are somewhat stable; reflexive; full orderings possible (have an opinion about all possible choices); transitive (hence indifference curves can't cross); can argue that this set of assumptions adds up to rationality

Why did I draw the indifference curve as convex? Fifth assumption: averages are preferred to extremes, so that people prefer balanced bundles of goods over extreme ones

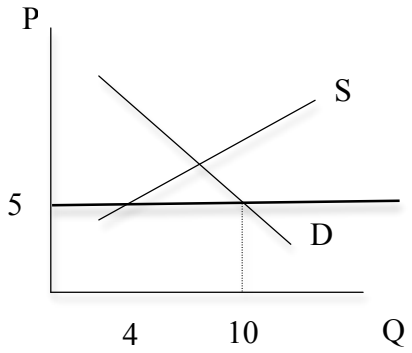
now back to idea of non-well-behaved cases. They will generate indifference curves that don't look like the well-behaved one I just drew. Consider these for the practice problems and we'll start back here next time.

Professor Joyce Jacobsen

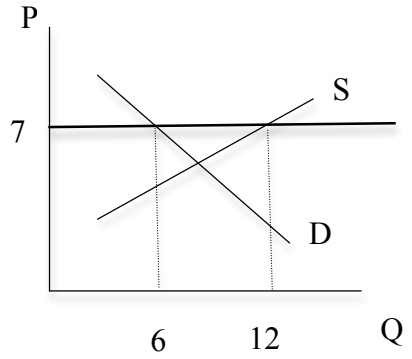
Economics 110-01
Spring Semester 2010-11

Answers to Practice Problems from 1/28/11

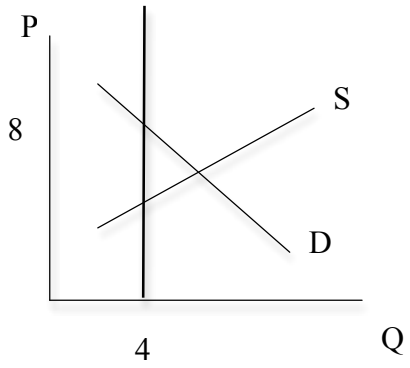
I. 1) 5; 10; 4



2) 7; 6; 12

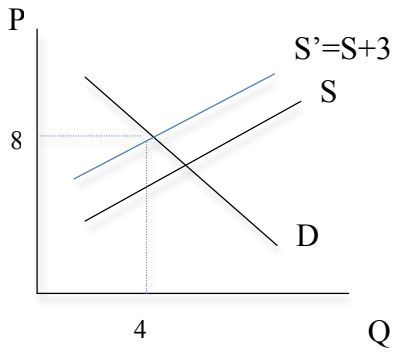


3) 8; 4; 4

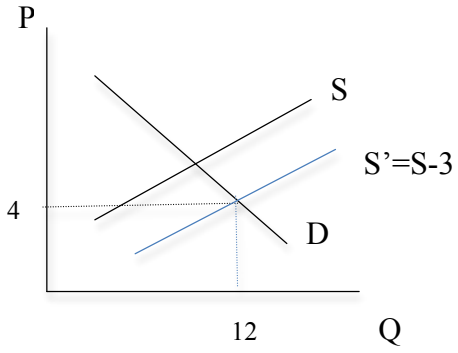


4) In each case, the market is at the original equilibrium (6, 8, 8) because the constraint is not binding.

II. 1) $P = P_D = 8$, Q = 4, tax revenue = 3*4 = 12



2) $P = P_D = 4$, Q = 12, total subsidy = 3*12 = 36



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Practice Problems 1/31/11

I. Consider the following utility function:

$$U = X + \sqrt{Y}$$

1) What is the formula/function for MU_X? And for MU_Y?

2) If I consume 2 units of X and 4 units of Y, what is my total utility U? What is my marginal utility with respect to X? What is my marginal utility with respect to Y?

3) In what sense is this not a well-behaved utility function?

4) Give two pairs of numbers for X and Y that both make U = 12. Sketch the indifference curve that contains both of these points.

II. Sketch the following cases:

1) A couple of indifference curves between nickels and dimes.

2) A couple of indifference curves between left shoes and right shoes for a person with two feet.

3) A couple of indifference curves between left shoes and right shoes for a person with only a right foot.

4) A couple of indifference curves between mushroom and pepperoni as pizza toppings for a person who doesn't really like mushrooms but likes pepperoni