ECON 301 Discussion #1
Sections 310, 318, 316, 312, 315

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1/24/2014

Agenda:

1. Advice for the term.

2. A brief review of calculus.

3. A couple of questions on the first two lectures.

Advice for the term:

- Don't get behind.

- Use the textbook (Varian) in conjunction with the lecture notes.

- Participate in discussion sections.

- Come to office hours with questions.

- Use the course website (http://www.ssc.wisc.edu/~mweretka/home/teaching) and the section website (http://www.shaneauerbach.com/teaching/14s301).

Brief review of calculus: There are several key functional forms that we will be asked to differentiate this term. These can all be done with a few very simpe rules (and notation).

- Rules for Differentiating:

  - The Rule: Pre-multiply by the power, then reduce the power by one! Remember that $x^0 = 1$ and that that $x^{-2} = 1/x^2$.

  - The Chain Rule: Differentiate the outer function leaving the inner function as is, then multiply it by the derivative of the inner function. You've got your derivative. Think of differentiating $f(x) = (x^2)^2$ two different ways.

  - The Product Rule The derivative of $f(x) \cdot g(x) = f'(x) \cdot g(x) + f(x) \cdot g'(x)$

- Functions of interest:

  - Polynomials, eg. $f(x) = 3x^2 - 4x + 1$, $\frac{df(x)}{dx} = f'(x) = 6x - 4$

  - Cobb-Douglas, eg. $f(x, y) = 3x^{1/3}y^{2/3}$, $\frac{\partial f(x,y)}{\partial x} = x^{-2/3}y^{2/3}$

  - Logarithmic, eg. $f(x) = 2\log(x)$, $\frac{df(x)}{dx} = \frac{2}{x}$

Some Questions on Material from L1 and L2...

TA Information

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Course website: http://www.ssc.wisc.edu/~mweretka/home/teaching

Consumer Theory

Economics is a theory of choice: it studies how individuals make choices under various constraints. The simplest consumer choice model involves **preferences** and **budget constraints**.

The **Budget Constraint** for two goods is: $\boxed{P_1 X_1 + P_2 X_2 \leq m}$
The consumer's affordable consumption bundles are those that don't cost any more than m.

The **Budget Set** is the set of all affordable consumption bundles at current prices and income under the budget constraint.

Budget Line: a line that shows the consumption bundles available to a consumer who spends all of his or her income. The budget line of a given income (m), and the prices P_1 and P_2 of good X_1 and good X_2 can be expressed as:

$$m = P_1 X_1 + P_2 X_2 \Rightarrow X_2 = \frac{m}{P_2} - \frac{P_1}{P_2} X_1$$

Food Stamp for $2 X_1$

BL: $X_2 = \frac{m}{P_2} - \frac{P_1}{P_2} X_1$

$(2, \frac{m}{P_2})$
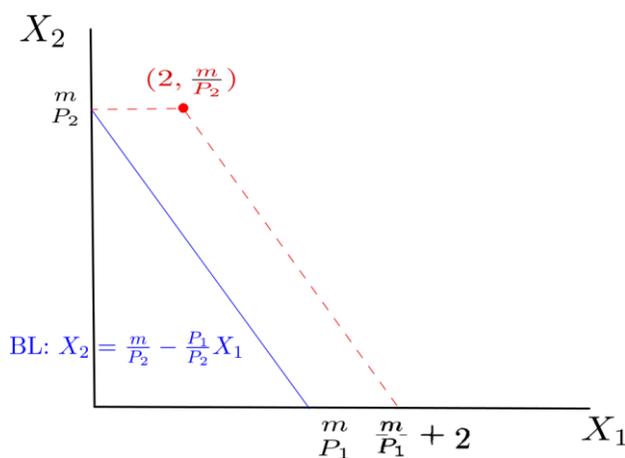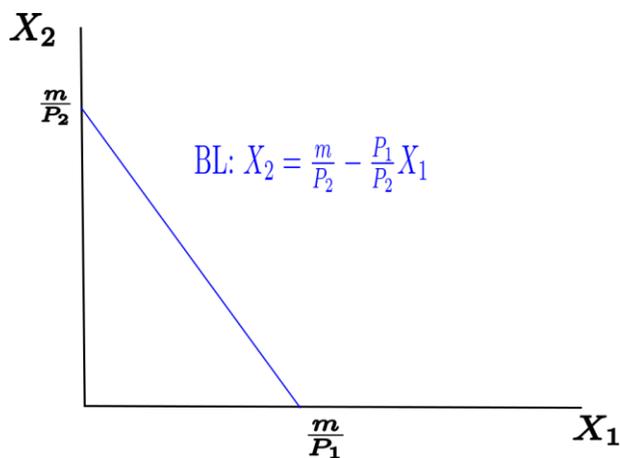
Example 1:

Bryan has just received a $1,000 paycheck. His two favorite goods are video games and movie tickets. Video games are $50 each and Movie tickets are $10 each.

1. Write down the equation for Bryan's budget constraint.
2. Find Bryan's real income in terms of movie tickets and real income in terms of video games.
3. Graph Bryan's budget constraint with video games on the X-axis and movie tickets on the Y-axis. Show the budget set on your graph.
4. What is the slope of Bryan's budget constraint? What are the intercepts?
5. What happens to the budget line if the price of video games doubles?
6. What happens to the budget line if the prices of both goods double?
7. What happens to the budget line if Bryan's paycheck was $500 instead? Use the original prices for video games and movies.
8. What is the difference between the scenarios in 6 and 7?
9. A non-profit organization promoting the development of alternative movie theaters provides Bryan with a grant of $200 that can only be spent on movie tickets (Bryan doesn't care what kind of movies he sees). How does it affect the budget line?
10. The government imposes ad valorem sales on video games at the rate of 50%. How is the budget set affected by this change? What is the relative price of video games in terms of movie tickets before and after the tax introduction?

Preferences

Preferences are a consumer's ranking among different consumption bundles. "Well-behaved" or typical preferences are **monotonic** (more is better) and **convex** (averages are preferred to extremes).

An **Indifference Curve** graphically describes all consumption bundles that the consumer is indifferent between.

The **Marginal Rate of Substitution (MRS)** is the slope of a given indifference curve.

Example 2:

There are two kinds of toppings available for pizza: mushrooms (M) and salami (S). Putting mushrooms on the horizontal axis and salami on the vertical axis, illustrate the following preferences by plotting indifference curves. Check the sign of the MRS. Are preferences (strictly) monotonic? Are preferences (strictly) convex?

1. Utility from pizza can be described as $U = \sqrt{MS}$.
2. You only like pizza if it has both mushrooms and salami, mixed in proportion 2:1.
3. You are indifferent between having mushrooms or salami on your pizza. What is the marginal rate of substitution?
4. You like salami and you don't care whether there are mushrooms on your pizza. What is the marginal rate of substitution?

Budget Constraint + Preferences = Optimal Choice

Your budget constraint is an expression of what you can afford. Your preferences, as represented by indifference curves, tell the observer which items you prefer. Together, an observer can use these two items (what you can afford and what you prefer) to find the optimal choice for each consumer. This is called constrained maximization because the objective is to maximize utility through the consumption of goods, subject to the constraint that you cannot necessarily afford as much as you would like to possess. The following exercises bring these two ideas together to show you how economists attempt to logically explain consumer behavior.

Practice Exercises

1) Macy consumes two goods X and Y. The price of X is $4 and price of Y is $5. Macy's income is $100. What is the absolute value of Macy's MRS between X and Y at her optimal consumption bundle? (Assume good Y is plotted on the vertical axis.)
   a. 20
   b. 25
   c. 4/5
   d. 5/4

2) Suppose Sonny loves ham sandwiches as long as they are made with exactly one slice of ham and two slices of bread. Suppose that the price of one slice of ham is $2 and the price of a slice of bread is $1. If Sonny has exactly $20 to spend on bread and ham, how much money should he spend on bread to maximize his consumption of sandwiches?
   a. $5
   b. $10
   c. $20
   d. $15

3) Maude spends all of her income on books and DVDs. She thinks that books and DVDs are perfect substitutes: one book is just as good as one DVD. Suppose that books cost $4 each and DVDs cost $5 each. Maude has an income of $120. How should she spend her income to maximize her utility?
   a. Maude should buy 30 books.
   b. Maude should buy 24 DVDs.
   c. Maude should buy 15 books and 12 DVDs.
   d. Maude should buy 20 books and 8 DVDs.

4) Maude spends all of her income on books and DVDs. She thinks that books and DVDs are perfect substitutes: **three** books are just as good as **two** DVDs. Suppose that books cost $4 each and DVDs cost $5 each. Maude has an income of $120. How should she spend her income to maximize her utility?
   a. Maude should buy 30 books.
   b. Maude should buy 24 DVDs.
   c. Maude should buy 15 books and 12 DVDs.
   d. Maude should buy 20 books and 8 DVDs.