Econ 301: Intermediate Microeconomics Spring 2014

Discussion Section #3 Handout February 7th

Concepts Review

A. Normal vs. Inferior

- A good is called **normal** if an increase in income leads to a rise in demand.
- A good is called **inferior** if an increase in income leads to a reduction in demand.

B. Ordinary vs. Giffen

- A good is called **Giffen** if a decrease in its price leads to a reduction in demand.
- A good is called **ordinary** if a decrease in its price leads to a rise in demand.

C. Gross Complements & Substitutes

- Good 1 is a **gross substitute** for good 2 if the demand for good 1 rises as the price of good 2 goes up: $\frac{\Delta x_1}{\Delta p_2} > 0$
- Good 1 is a **gross complement** for good 2 if the demand for good 1 falls as the price of good 2 goes up: $\frac{\Delta x_1}{\Delta p_2} < 0$

Practice Problems

Answer the questions below for each of the following preferences:

a. $U(x, y) = \min(4x, y)$
b. $U(x, y) = x + 4y$
c. $U(x, y) = xy^2$
d. $U(x, y) = 2\ln x + y$

For each question, complete the required calculations AND give an economic interpretation of your results. In each case, set $p_1 = 2$, $p_2 = 1$, $m = 12$.

1. Suggest an example of goods that would fit the described preferences.
2. Derive the demand for each good; try using applicable shortcuts instead of solving the complete problem.
3. Derive and plot the income offer curve and the Engel curve for good x. Determine whether x is a normal or an inferior good.
4. Derive and plot the price offer curve for good x.
5. Plot a demand curve for good x. Determine whether x is a Giffen or an ordinary good.
6. Determine whether the two goods are gross complements, gross substitutes or neither.

3 Four types of preferences: a summary of the main formulae

	Type of preferences:			
	Cobb-Douglas	Perfect complements	Perfect substitutes	Quasilinear
Utility function	$u(x_1,x_2) = x_1^a x_2^b$, or			$u(x_1,x_2) = v(x_1) + x_2$
	$u(x_1,x_2) = a\ln x_1 + b\ln x_2$	$u(x_1,x_2) = \min\{ax_1, bx_2\}$	$u(x_1,x_2) = ax_1 + bx_2$	E.g.: $u(x_1,x_2) = \ln(x_1) + x_2$
Demand functions	$x_1 = \frac{a}{a+b}\frac{m}{p_1}$	$x_1 = b\frac{m}{p_1 b + p_2 a}$	1) $x_1 = m/p_1$ if $a/b > p_1/p_2$	1) $x_1 = \frac{p_2}{p_1}, x_2 = \frac{m}{p_2} - 1$ if $m > p_2$
	$x_2 = \frac{b}{a+b}\frac{m}{p_2}$	$x_2 = a\frac{m}{p_1 b + p_2 a}$	2) x_1 = any number between	2) $x_1 = \frac{m}{p_1}, x_2 = 0$ if $m \leq p_2$
			0 and m/p_1 if $a/b = p_1/p_2$	
			3) $x_1 = 0$ if $a/b < p_1/p_2$	
Interpretation	Spend an income share	Pick the highest	Only buy the good that	Demand for good 1
	$\frac{a}{a+b}$ on good 1,	affordable bundle	gives higher utility	doesn't depend on income
	$\frac{b}{a+b}$ on good 2	on the optimal	per dollar spent	in interior solution;
		proportion line		consume only good 1
				in corner solution
Income offer curve	A ray from the origin,	Optimal proportion	Horizontal axis if $\frac{a}{b} > \frac{p_1}{p_2}$	Vertical line at $x_1 = \frac{p_2}{p_1}$
	$x_2 = \frac{bp_1}{ap_2}x_1$	line	Vertical axis if $\frac{a}{b} < \frac{p_1}{p_2}$	and $x_2 = 0$ if $x < \frac{p_2}{p_1}$
Engel curve	A ray from the origin,	A ray from the origin,	1) $m = x_1 p_1$ if $\frac{a}{b} > \frac{p_1}{p_2}$	A line of 2 segments:
	$m = \frac{x_1 p_1 (a+b)}{a}$	$m = \frac{x_1(p_1 b + p_2 a)}{b}$	2) $x_1 = 0$ if $\frac{a}{b} < \frac{p_1}{p_2}$	$m = x_1 p_1$ if $m \leq p_2$
				$x_1 = \frac{p_2}{p_1}$ if $m > p_2$
Price offer curve	A horizontal line	Optimal proportion	1) $x_2 = \frac{m}{p_2} - \frac{a}{b}x_1$ if $x_1 \leq \frac{bm}{ap_2}$	A horizontal line
	$x_2 = \frac{b}{a+b}\frac{m}{p_2}$	line	2) $x_2 = 0$ if $x_1 > \frac{bm}{ap_2}$	