Intermediate Micro HW 2

June 8, 2016

DUE DATE: June 13, 2016 at start of class

1 Leontief & Substitution

An individual has Leontief preferences over goods x_1 and x_2. He starts with income y and the two goods have respective prices p_1 and p_2.

The price of good x_2 increases to $p_2^{'}$. Decompose this individual's change in demand into income and substitution effects.

2 CES Demand

Another commonly used class of utility functions is CES utility, which stands for **constant elasticity of substitution**. In general they take the form:

$$u(x_1, x_2) = (\theta x_1^{\rho} + (1-\theta)x_2^{\rho})^{\frac{1}{\rho}}$$

If we take $\theta = \frac{1}{2}$, these are equivalent to

$$u(x_1, x_2) = (x_1^{\rho} + x_2^{\rho})^{\frac{1}{\rho}}$$

1. Derive the demand for CES utility with $\theta = \frac{1}{2}$, i.e., find $x_1(p_1, p_2, y)$ and $x_2(p_1, p_2, y)$.
2. Decompose a change in the price of good 1 from p_1 to $p_1^{'}$ into substitution and income effects.

3 Home Production

Bunter consumes two goods in quantities x_1 and x_2. Good 2 is a composite consumption good, and has price 1 per unit. Consumption ofx_2 units of good 2 requires tx_2 units of time, so that t is the time cost per unit of good x_2. For example, time must be spent preparing food in order to consume it. Think of x_1 as *leisure* time that is not spent working and not spent fulflling the time-cost of consuming x_2. Bunter has a total of time T available, and earns w per unit of

time spent working. All of time T is consumed either in x_1, working, or fulfilling the time cost of consuming x_2. Bunter's utility function is $u(x_1, x_2) = x_1 x_2^3$.

1. Solve Bunter's utility maximization problem to find his demand functions for goods 1 and 2.

2. Suppose t decreases. For example, new technologies maydecrease food preparation time. What is the effect on the consumptionof good 2? What is the effect on the amount of time this person spendsworking? Be precise.

3. Suppose the wage w increases. What is the effect onthe amount of time this person spends working, and on the amount ofleisure time, x_1 she consumes?