Microeconomics
Part I, Paper 1
Consumer and Producer Theory; Rational Choice
Michaelmas Term 2016

Supervision set 2

(To be completed after Lecture 10)

Suggested reading:

Varian, *Intermediate Microceonomics*, Chapters 6, 8, 9, 10, 14

1. Let $u(x, y) = (x - 1)(y + 1)$ represent a consumer's preferences for goods x and y for bundles with $x \geq 1$.

   (a) Compute the demand function, that is, express x^* and y^* as functions of prices p_x, p_y and income m.

   (b) Explore price effects, and conclude whether these goods are normal or inferior, whether they are ordinary or Giffen, whether one is a substitute for the other, or whether one is a complement for the other.

2. Ann has income m_0 and can consume two goods: apricots A and cabbage C. The prices of the two goods are p_0^A and p_0^C, respectively. Assume that apricots are a normal good and cabbages are an inferior good.

   (a) Putting cabbage on the horizontal axis, draw an indifference curve diagram for Ann. Draw her budget constraint and mark the consumption levels of A and C that Ann will choose.

   (b) Suppose Ann's income falls to $m_1 < m_0$, while the prices of the two goods remain unchanged. Show the new combination of A and C that Ann will consume.

   (c) Would your answer to (ii) change if C were a normal good?

   (d) Consider an increase in the price of apricots to $p_1^A > p_0^A$. Will the quantity of A that Ann buys rise or fall? What happens to the quantity of C if C is normal? And if C is inferior?

   (e) Now suppose the price of apricots stays at p_0^A but that the price of cabbage rises to $p_1^C > p_0^C$. How will the quantities of A and C change? Consider both the case where C is normal and where it is inferior.

3. Homer faces a time constraint: there are only 24 hours in his day. He can allocate his time between fishing and working in an office. Fishing brings him nothing but pleasure. Office work brings him no pleasure but allows him to earn money to finance his consumption of a consumption good C Suppose that Homer earns an hourly wage w when he is working, and that the price of the consumption good is p.

   (a) Use a diagram to plot Homer's budget constraint, with hours of fishing on the horizontal axis.

   (b) Suppose that Homer's hourly wage increases. Is he better off? Will he spend less time fishing? Will he consume more of C? Discuss.

4. Tony knows that he has two years to live. He will receive an income of £15,000 this year and income of £30,000 next year. He intends to plan his consumption so that he leaves no assets and no debt.

(a) If he can borrow or save as much as he wishes at an annual interest rate of 20%, what is the maximum he can spend this year? What is the maximum he can spend next year?

(b) Use a diagram to plot his budget constraint, with this year's consumption on the horizontal axis and next year's consumption on the vertical axis.

(c) What is the maximum he can spend this year if $r = 50\%$? What is the maximum that he can spend next year? Show the budget line corresponding to a 50% interest rate on the same diagram as in part (b). Why do the budget lines cross?

(d) Suppose that Tony is borrowing in the first year. Will he borrow more if the interest rate falls from 50% to 20%? What happens to consumption in each period? Identify all of the effects of this change.

5. (2011 Tripos) A consumer lives for 3 years ($t = 1, 2, 3$) and earns 100 pounds at the start of each year. The interest rate is $i = 0.05$. Her utility is given by

$$U(c_1, c_2, c_3) = (c_1)^{1/3}(c_2)^{2/3}$$

where c_t is consumption in period t.

(a) What is the present value of her lifetime income?

(b) How much will she choose to consume in period 3, and why?

(c) Find the optimal values of c_1 and c_2.

(d) Suppose that the interest rate rises to $i = 0.10$. Find the new optimal values of c_1 and c_2. Explain why your results have changed.

(e) How do your answers to (c) and (d) change if utility were instead given by $U(c_1, c_2, c_3) = (c_1)^{2/3}(c_2)^{1/3}$?