Economics 101A
(Lecture 8, Revised)

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Outline

1. Income changes

2. Price Changes

3. Expenditure minimization

1 Income changes

- Income increases from M to to $M' > M$.

- Budget line $(p_1x_1 + p_2x_2 = M)$ shifts out:

$$x_2 = \frac{M'}{p_2} - x_1\frac{p_1}{p_2}$$

- New optimum?

- Engel curve: $x_i^*(M)$: demand for good i as function of income M holding fixed prices p_1, p_2

- Does x_i^* increase with M?

  – Yes. Good i is *normal*

  – No. Good i is *inferior*

2 Price changes

- Price of good i increases from p_i to to $p'_i > p_i$

- For example, decrease in price of good 2, $p'_2 < p_2$

- Budget line tilts:

$$x_2 = \frac{M}{p'_2} - x_1 \frac{p_1}{p'_2}$$

- New optimum?

- Demand curve: $x_i^*(p_i)$: demand for good i as function of own price holding fixed p_j and M

- Odd convention of economists: plot price p_i on vertical axis and quantity x_i on horizontal axis. Better get used to it!

- Does x_i^* decrease with p_i?
  - Yes. Most cases
  - No. Good i is *Giffen*
  - Ex.: Potatoes in Ireland
  - Do not confuse with Veblen effect for luxury goods or informational asimmetries: these effects are real, but not included in current model [REVISED]

3 Expenditure minimization

- Nicholson, Ch. 4, pp. 105–108.

- Solve problem **EMIN** (minimize expenditure):

$$\begin{array}{l} \min p_1 x_1 + p_2 x_2 \\ s.t.\ u(x_1, x_2) \geq \bar{u} \end{array}$$

- Choose bundle that attains utility $\bar{u}$ with minimal expenditure

- Ex.: You are choosing combination CDs/restaurant to make a friend happy

- If utility u strictly increasing in x_i, can maximize s.t. equality

- Denote by $h_i(p_1, p_2, \bar{u})$ solution to EMIN problem

- $h_i(p_1, p_2, \bar{u})$ is *Hicksian or compensated demand*

- Graphically:
  - Fix indifference curve at level $\bar{u}$
  - Consider budget sets with different M
  - Pick budget set which is tangent to indifference curve

- Optimum coincides with optimum of Utility Maximization!

- Formally:

$$h_i(p_1, p_2, \bar{u}) = x_i^*(p_1, p_2, e(p_1, p_2, \bar{u}))$$

- Expenditure function is expenditure at optimum

- $e(p_1, p_2, \bar{u}) = p_1 h_1(p_1, p_2, \bar{u}) + p_2 h_2\,(p_1, p_2, \bar{u})$

- $h_i(p_i)$ is *Hicksian or compensated demand* function

- Is h_i always decreasing in p_i? Yes!

- Graphical proof: moving along a convex indifference curve

- (For non-convex indifferent curves, still true)

- Now: go back to case where p_2 increases to $p_2' > p_2$

- What is $\partial x_2^* / \partial p_2$? Decompose effect:

  1. Substitution effect of an increase in p_i

     – $\partial h_2^* / \partial p_2$, that is change in EMIN point as p_2 descreases

     – Moving along an indifference curve

     – Certainly $\partial h_2^* / \partial p_2 < 0$

2. Income effect of an increase in p_i

   – $\partial x_2^*/\partial M$, increase in consumption of good 2 due to increased income

– * Shift out a budget line

  * $\partial x_2^*/\partial M > 0$ for normal goods, $\partial x_2^*/\partial M < 0$ for inferior goods