Intermediate Microeconomics. Lecture 7 Income effect

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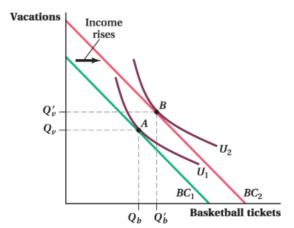
Summer 2021



- Normal and Inferior Goods
- 2 Income Elasticities
- 3 The Income Expansion Path
- 4 The Engel Curve

Response to an Increase in Income

Normal and Inferior Goods



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Figure: Consumer's Response to an Increase in Income

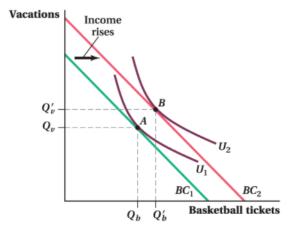


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Normal and Inferior Goods

- Economists call a good for which consumption rises when income rises a **normal good**
- For a normal good, the income effect is positive
- A good for which consumption decreases when income rises is an **inferior good**

Normal and Inferior Goods



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Figure: Consumer's Response to an Increase in Income When One Good Is Inferior

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Income Elasticities and Types of Goods

 Income elasticity measures the percentage change in the quantity consumed of a good in response to a given percentage change in income

$$E_I^D = \frac{\Delta Q}{\Delta I} \cdot \frac{I}{Q}$$

- The first ratio in the income elasticity definition is the income effect shown in the equation above $\frac{\Delta Q}{\Delta I}$
 - For normal goods: $\frac{\Delta Q}{\Delta I} > 0$
 - For inferior goods: $\frac{\Delta Q}{\Delta I} < 0$
- Necessity goods: $0 \le E_I^D \le 1$
- Luxury goods: $E_I^D \ge 1$



Example

Annika spends all of her income on golf and pancakes. Golf fee is \$10 per round. Pancake mix is \$2 per box. When Annika's income is \$100 per week, she buys 5 boxes of pancake mix and 9 rounds of golf. When Annika's income rises to \$120 per week, she buys 10 boxes of pancake mix and 10 rounds of golf. Determine whether each of the following statements is true or false

- Golf is a normal good, and pancake mix is an inferior good.
 FALSE
- Golf is a luxury good. **FALSE**

$$E_I^D = \frac{\Delta Q}{\Delta I} \cdot \frac{I}{Q} = \frac{1}{20} \cdot \frac{100}{9} = \frac{5}{9} < 1$$



Example

• Pancakes are a luxury good. TRUE

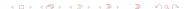
$$E_I^D = \frac{\Delta Q}{\Delta I} \cdot \frac{I}{Q} = \frac{5}{20} \cdot \frac{100}{5} = 5 > 1$$

The Income Expansion Path

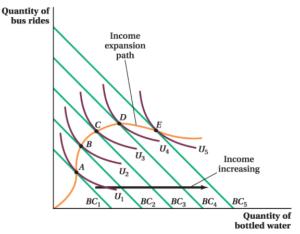
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The Income Expansion Path

- Imagine repeating the analysis in the previous section for every possible income level, starting with 0
 - For a given set of prices and a particular set of preferences, find the utility-maximizing bundle for every possible budget constraint
 - Each constraint corresponds to a different income level
- If we draw a line connecting all the optimal bundles it would trace out the income expansion path



The Income Expansion Path



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Figure: Income Expansion Path



The Income Expansion Path

- The income expansion path is a curve that connects a consumer's optimal bundles at each income level
- This curve always starts at the origin because when income is zero, the consumption of both goods must also be zero
- When both goods are normal goods, the income expansion path will be positively sloped because consumption of both goods rises when income does
- Remember that whether a given good is normal or inferior can depend on the consumer's income level



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The Engel Curve

A better way to see how the quantity consumed of one good varies with income is to take the information conveyed by the income expansion path and plot it on a graph with income on the vertical axis and the quantity of the good in question on the horizontal axis

The Engel Curve

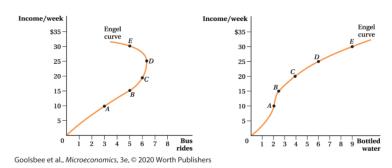


Figure: Engel Curves Show How Consumption Varies with Income

The Engel Curve

- Engel curves show the relationship between the quantity of a good consumed and a consumer's income
- If the Engel curve has a positive slope, the good is a normal good at that income level
- If the Engel curve has a negative slope, the good is an inferior good at that income

Consider the utility function for perfect substitutes: $u(x_1, x_2) = ax_1 + bx_2$. Previously we found that the demand function for good 1 will be

$$x_1 = \begin{cases} \frac{m}{p_1} & \frac{p_1}{p_2} < \frac{a}{b} \\ \in [0, \frac{m}{p_1}] & \frac{p_1}{p_2} = \frac{a}{b} \\ 0 & \frac{p_1}{p_2} > \frac{a}{b} \end{cases}$$

- Let us suppose we are in the case where $\frac{p_1}{p_2} < \frac{a}{b}$
- In this case the Engel curve will be a straight line with a slope of p_1 : $m = p_1x_1$



Example: Perfect Substitutes

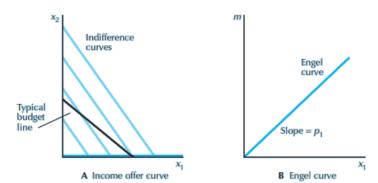


Figure: Perfect substitutes (Source: Varian, Intermediate Microeconomics 8e, 2010)



Example: Perfect Complements

Consider the utility function for perfect substitutes: $u(x_1,x_2)=min\{ax_1,bx_2\}$. Previously we found that the demand function for good 1 will be

$$x_1 = \frac{m}{p_1 + \frac{a}{b}p_2}$$

so the Engel curve is a straight line with a slope of $(p_1 + \frac{a}{b}p_2)$

$$m = (p_1 + \frac{a}{b}p_2)x_1$$

Example: Perfect Complements

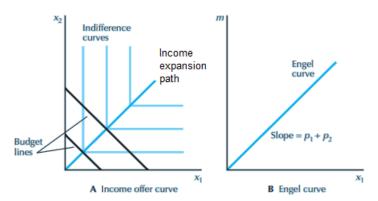


Figure: Perfect Complements (Source: Varian, Intermediate Microeconomics 8e, 2010)

Example: Cobb-Douglas Preferences

Consider now the utility function for Cobb-Douglas preferences: $u(x_1, x_2) = x_1^a x_2^{1-a}$, the Cobb-Douglas demand for good 1 has the form

$$x_1 = \frac{am}{p_1}$$

The Engel curve for good 1 will be a straight line with a slope of $\frac{p_1}{a}$

$$m = \frac{p_1}{a} x_1$$

Example: Cobb-Douglas Preferences

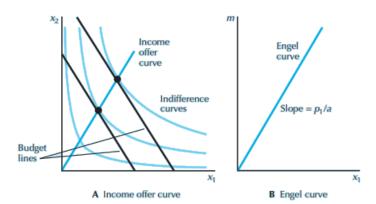


Figure: Cobb-Douglas Preferences (Source: Varian, Intermediate Microeconomics 8e, 2010)

