1 Inferior Engle Curves

If demand is inferior, the engle curve bends backwards.

2 Slutsky Decomposition

2.1 Two Effects

When a price changes, there are two ways that demand changes.

Substitution Effect: You substitute into buying more of the now relatively less expensive goods.

Income Effect: When price goes up, your income becomes relative less valueable and demand for a good may change depending on whether it is normal or inferior.

2.2 Law of Demand

If the price of a good goes up, the demand will always decrease (or stay the same) due to the substitution effect.

For price increase, the substitution effect **is always negative**.

2.3 Three Possibilities

Ordinary/Normal

Ordinary/Inferior

Giffen/Inferior

A giffen good has to be inferior.

2.4 Slutsky Decomposition - Intuition

After a price change demand will change. **Total Effect.**

Goal: Decompose the total effect into the income effect and substitution effect.

Orginal Bundle:$(15, 15)$

Price of good 1 increases:

New Bundle (After price change): $(10, 20)$

Total Effect on x_1: -5 (New Bundle - Old Bundle)

How much of this is due to substituion?

Imagine we give the consumer enough extra money to buy they bundle they were buying before but at the new prices. We ask "what would they buy" with the extra income but the new prices.

They might choose for example: $(12.5, 17.5)$

They were originally demanding 15 and now 12.5. This change -2.5 cant be due to the income effect. We gave them enough money to buy what they were buying before. The difference **has to be due to subtitution**.

2.5 Slutsky Decomposition - In Action

$u(x_1, x_2) = x_1 x_2$

$x_1^* = \frac{\frac{1}{2}m}{p_1}, x_2^* = \frac{\frac{1}{2}m}{p_2}$

$p_1 = 1, p_2 = 2, m = 60$

Suppose p_1 increases to $p_1 = 2$.

Orginal Bundle (before the price change):

$$\left(\frac{\frac{1}{2}60}{1}, \frac{\frac{1}{2}60}{2}\right) = (30, 15)$$

New Bundle (after the price change):

$$\left(\frac{\frac{1}{2}60}{2}, \frac{\frac{1}{2}60}{2}\right) = (15, 15)$$

Total Effect: $15 - 30 = -15$ (The price increase leads to a total effect of a 15 unit decrease in demand.)

How much of this is due to the substitution effect?

Compensated Income: $\tilde{m}$ Income to afford the old bundle at the new prices. The cost of the bundle at the new prices.

$$(30, 15)$$

New prices $p_1 = 2, p_2 = 2$.

$$\tilde{m} = (2 * 30) + (2 * 15) = 90$$

What would the buy with $p_1 = 2, p_2 = 2, \tilde{m} = 90$.

$x_1^* = \frac{\frac{1}{2}m}{p_1}, x_2^* = \frac{\frac{1}{2}m}{p_2}$

$$\left(\frac{\frac{1}{2}90}{2}, \frac{\frac{1}{2}90}{2}\right) = (22.5, 22.5)$$

How much is due to subsitution. Old bundle $(30, 15)$ thought experiment $(22.5, 22.5)$.

The decrease from 30 to 22.5 can't be due to the income effect.

$$SE = 22.5 - 30 = -7.5$$

$$TE = IE + SE$$

$$-15 = IE - 7.5$$

$$-7.5 = IE$$

2.6 Slutsky Decomposition - In Action

$min\,\{x_1, x_2\}$

$x_1^* = \frac{m}{p_1+p_2}, x_2^* = \frac{m}{p_1+p_2}$

$p_1 = 1, p_2 = 2, m = 60.$

The price of p_1 changes to $p_1 = 2$

Old Bundle (before price change)

$$\left(\frac{60}{3}, \frac{60}{3}\right) = (20, 20)$$

Old Bundle (before price change)

$$\left(\frac{60}{4}, \frac{60}{4}\right) = (15, 15)$$

Total Effect: -5.

How much money does the consumer need to buy $(20, 20)$ at the new prices?

$$\tilde{m} = (2 * 20) + (2 * 20) = 80$$

What would they buy at the new prices but with **compensated income?**

$$p_1 = 2, p_2 = 2, m = 80?$$

$$\left(\frac{80}{4}, \frac{80}{4}\right) = (20, 20)$$

Old bundle $(20, 20)$ thought experiment $(20, 20)$.

$$SE = 0$$

$$TE = -5$$

$$TE = IE + SE$$

$$IE = -5$$