1 Chapter 8

Slutsky Decomposition

1.1 Two Effects

Income effect. When the price of something goes up, your income is effectly worth less. You might change your consumption based on that.

Substitution effect. When the price of something goes up, you will subsitute into buying other things to satisfy your preferences and so you will buy less.

2 Law of Demand

The substitution effect is always negative.

The income effect can be positive or negative depending on whether the good is **normal** or **inferior.**

A Giffen Good is an inferior good where where when the price of a good goes up, the income effect is so strong that leads to an increase in **demand**.

Three possibilities:

Ordinay, Normal. (Starbucks coffee)

Ordinary, Inferior.

Giffen, Inferior.

3 Slutksy Decoposition

How do we determine mathematically how much of the change in demand for a good is due to the substitution effect and how much is due to the income effect?

Suppose the price of the good changes, but I give you enough money at the new price to buy exactly the bundle you were buying before.

Suppose you were buying $(10, 10)$ but the price of x_1 went up and your demand changes to $(5, 15)$. And now I give you extra money so you could still afford $(10, 10)$ at the new prices, but instead you buy $(7, 12)$.

4 Sluskty Decomposition Problem

Exercise 3.

$$u(x_1, x_2) = x_1 x_2$$

$p_1 = 100, p_2 = 100$ and $m = 1200$

Find the marshallian demand for $x_1 x_2$:

Budget Condition:

$$p_1 x_1 + p_2 x_2 = m$$

Equal-slope condition:

$$MRS = -\frac{p_1}{p_2}$$

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

Two equations and two unknowns. Let's solve them.

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

Let's get rid of the negatives by multiplying both sides by -1.

$$\frac{x_2}{x_1} = \frac{p_1}{p_2}$$

Multiply both sides by x_1

$$x_1 \frac{x_2}{x_1} = x_1 \frac{p_1}{p_2}$$

$$x_2 = x_1 \frac{p_1}{p_2}$$

Plug this into the budget equation:

$$p_1 x_1 + p_2 \left(x_1 \frac{p_1}{p_2} \right) = m$$

$$p_1 x_1 + p_1 x_1 = m$$

$$2 p_1 x_1 = m$$

Divide both sides by $2p_1$

$$x_1 = \frac{m}{2p_1}$$

$$x_1 = \frac{\frac{1}{2}m}{p_1}$$

Plug this back into the equal slope condition:

$$x_2 = x_1 \frac{p_1}{p_2}$$

$$x_2 = \frac{\frac{1}{2}m}{p_1} \frac{p_1}{p_2}$$

The p_1 cancel:

$$x_2 = \frac{\frac{1}{2}m}{p_2}$$

$$\left(\frac{\frac{1}{2}m}{p_1}, \frac{\frac{1}{2}m}{p_2} \right)$$

$p_1 = 100, p_2 = 100$ and $m = 1200$

a) $\frac{\frac{1}{2}1200}{100}, \frac{\frac{1}{2}1200}{100}$

$$(6, 6)$$

b) $\frac{\frac{1}{2}1200}{200}, \frac{\frac{1}{2}1200}{100}$

$$(3, 6)$$

Total change in demand is -3.

c) What is the price of the old bundle at the new prices?

$$(200 * 6) + (100 * 6) = 1800$$

d) What do they but at $p_1 = 200, p_2 = 100, m = 1800$?

$$\left(\frac{\frac{1}{2}1800}{200}, \frac{\frac{1}{2}1800}{100}\right)$$

$$(4.5, 9)$$

e) The substitution effect is -1.5 (difference between original 6 of x_1 and 4.5 of x_1)

f) Income effect is the remainder. Total effect was -3. Substitution effect is -1.5 of that. So, income effect is -1.5.