MICROECONOMICS MADE SIMPLE

The Slutsky Equation

One price change. Two effects. One clear explanation.

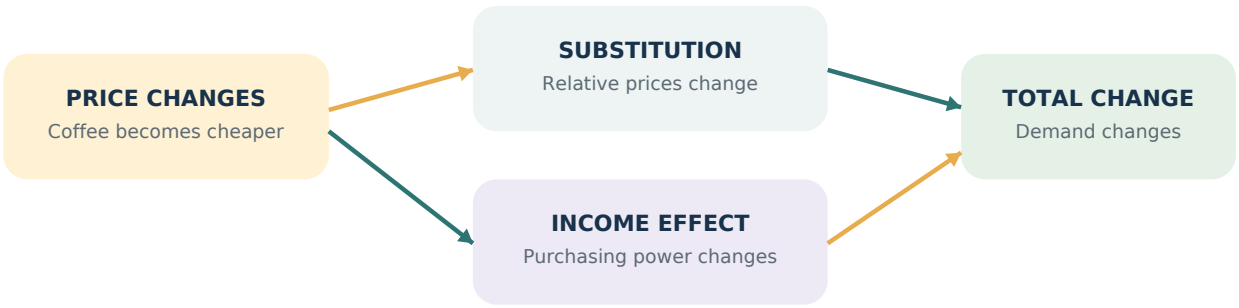
Imagine this...

The price of coffee falls, but your weekly budget stays the same. You may buy more coffee because it is cheaper compared with other goods. You also discover that your money now goes further. Two things changed at once.

Economists separate the two effects

The Slutsky equation helps us split the total change in demand after a price change into a substitution effect and an income effect.

THE STORY IN ONE PICTURE



Think of it as splitting one big change into two smaller, understandable changes.

The key idea

Total effect = Substitution effect + Income effect

Memory trick: Substitution = “relative price” effect. Income = “my money goes further” effect.

UNDERSTAND THE TWO EFFECTS

Why does demand change?

A price change affects both the deal you get compared with other goods and what your budget can buy.

1 Substitution effect

This is the change in consumption caused by a change in relative prices, while purchasing power is adjusted to isolate that price-choice effect. If coffee becomes cheaper than tea, coffee is now the relatively cheaper option - so you tend to substitute toward coffee.

Own-price substitution effect: price down -> quantity demanded up (or unchanged)

2 Income effect

When a price falls, your budget can now buy more. Your real purchasing power rises, even though your money income has not changed. How your demand responds depends on the type of good.

Normal good: income effect raises demand

Inferior good: income effect lowers demand

And what about a Giffen good?

A Giffen good is an unusual inferior good where the negative income effect is so strong that it outweighs the substitution effect. Then, when its price falls, the quantity demanded can fall too.

Important

The substitution effect for a good’s own price moves opposite to the price change. The income effect may reinforce it or partly offset it.

A WORKED NUMERICAL EXAMPLE

Let us calculate it

Suppose a consumer buys goods X and Y. Preferences are U = X × Y, income is 120, and the price of Y is 10. The price of X falls from 10 to 5.

For these preferences, the demand for X is

$$X = \text{Income} / (2 \times \text{Price of X})$$

Situation	Income	Price of X	Quantity of X
Before price change	120	10	**120 / 20 = 6**
Compensated budget	90	5	**90 / 10 = 9**
After price change	120	5	**120 / 10 = 12**

Step-by-step decomposition

1 **Total effect**

Quantity rises from 6 to 12. Total effect = 12 − 6 = +6 units.

2 **Substitution effect**

At the new price, reduce income to 90 so the original bundle (6 of X and 6 of Y) is just affordable. Demand for X becomes 9. So the substitution effect = 9 − 6 = +3.

3 **Income effect**

Restore income to 120 while keeping the new price. Demand rises from 9 to 12. So the income effect = 12 − 9 = +3.

+6 = +3 (substitution) + +3 (income)

These values are illustrative, derived from the stated utility function and prices. The Slutsky compensation keeps the original bundle affordable at the new prices; it does not hold utility exactly constant.

FORMULA + EXAM REVISION

The equation, decoded

The full Slutsky equation separates a price effect on ordinary demand into a compensated substitution effect and an income effect.

$$\partial x_i/\partial p_j = \partial h_i/\partial p_j - x_j\,(\partial x_i/\partial m)$$

For the own-price case (j = i):

$$\partial x_i/\partial p_i = \partial h_i/\partial p_i - x_i\,(\partial x_i/\partial m)$$

What do the symbols mean?

x_i	Ordinary (Marshallian) demand for good i.
p_j	Price of good j.
h_i	Compensated (Hicksian) demand: demand when utility is held constant.
m	Money income.
$x_j\,(\partial x_i/\partial m)$	The income-effect term: how demand responds to income, scaled by quantity j.

One subtle but important distinction

Slutsky compensation: adjust income so the original bundle remains affordable at the new prices. Hicks compensation: adjust income so the consumer stays at the original utility level. Both isolate substitution, but they define the compensation differently.

Exam-ready answer

The Slutsky equation decomposes the total effect of a price change on demand into a substitution effect and an income effect. The substitution effect captures the response to changed relative prices after compensating purchasing power; the income effect captures the response to the resulting change in real purchasing power.

Remember: Total effect = Substitution effect + Income effect