

Income and Substitution Effects — A Summary

What are Income and Substitution Effects?

When the price of q_1 , p_1 , changes there are two effects on the consumer. First, the price of q_1 relative to the other products (q_2, q_3, \dots, q_n) has changed. Second, due to the change in p_1 , the consumer's real income changes. When we compute the change in the optimal consumption as a result of the price change, we do not usually separate these two effects. Sometimes we might want to separate the effects.

The Substitution Effect is the effect due only to the relative price change, controlling for the change in real income. In order to compute it we ask what is the bundle that would make the consumer just as happy as before the price change, but if they had to make their choice faced with the new prices. To find this point we consider a budget line characterized by the new prices but with a level of income such that it is tangent to the initial indifference curve. In the diagram on the next page, the initial consumer equilibrium is at point A where the initial budget line is tangent to the higher indifference curve. Consumption at this point is 11 units of good 1 and 8 units of good 2. After an increase in the price of good 1, the consumer moves to point E, where the new budget line is tangent to the lower indifference curve. Consumption of good 1 has fallen to 4 units while consumption of good 2 has increased to 10 units. The substitution effect is the movement from point A to point G. This point is characterized by two things. (1) It is on the same indifference curve as the original consumption bundle; AND (2) it is the point where a budget line that is parallel to the new budget line is just tangent to initial indifference curve. This "intermediate" budget line is attempting to hold real income fixed so we can isolate the substitution effect. The point G reflects the consumer's choice if faced with the new prices (the budget line has the slope reflecting the new prices) and the compensated income (i.e., an income level that holds real income fixed). The substitution effect is the difference between the original consumption and the new "intermediate" consumption. In this case consumption of good 1 falls from 11 to 6.84 while consumption of good 2 increases to 14.27.

When p_1 goes up the Substitution Effect will always be non-positive (i.e., negative or zero).

The Income Effect is the effect due to the change in real income. For example, when the price goes up the consumer is not able to buy as many bundles that she could purchase before. This means that in real terms she has become worse off. The effect is measured as the difference between the "intermediate" consumption" at G and the final consumption of q_1 and q_2 at E.

Unlike the Substitution Effect, the Income Effect can be both positive and negative depending on whether the product is a normal or inferior good. By the way we constructed them, the Substitution Effect plus the Income Effect equals the total effect of the price change.

Alternative Way of Analyzing a Price Change

One can also analyze the income and substitution effects by first considering the income change necessary to move the consumer to the new utility level at the initial prices. This constitutes the income effect. The movement along the new indifference curve from the intermediate point to the new equilibrium as the slope of the price line changes is then the substitution effect. See if you can identify the "intermediate" point on the lower indifference curve by shifting the budget line (Hint: q_1 and q_2 both fall.).

Substitution and Income Effects

Increase in the price of good 1

