The basic indifference curve-budget constraint model of consumer choice has wide applicability in many analyses. Labor economists use similar models to explore the nature of a firm’s resource mixture and in examining the decision to work.

This document briefly examines the income and substitution effects that come from a change in the price of a good. The model below is just that: a model - a simplified representation of a phenomenon (in this case, a model of how a consumer chooses between two goods). It is an abstract representation, but it does capture the essential elements of consumer choice.

According to the law of demand, when the price of a good changes, the amount of that good that consumers are willing and able to buy changes in the opposite direction. For example, when the price of Coke rises, the quantity demanded of Coke falls (all else equal).

Why is this so? Economists have identified two important components of a change in price. First (and the most obvious effect), when the price of a good rises, the money that a consumer has budgeted for consumption has a lower purchasing power. So, even though a consumer’s budget hasn’t changed, the price increase makes it as if her budget has decreased, just like a decrease in the consumer’s income. The way the consumer responds to this altering of purchasing power is referred to as the income effect.

Second (and less obvious), when the price of a Coke rises, given the purchasing power of the consumer, the amount of other goods that I must sacrifice to acquire one unit of the good increases. Thus, Coke is relatively less-expensive compared to other goods. The relative price of a good is the amount of some other good that must be sacrificed to obtain the good in question. For example, if Coke costs $0.50 and a Snickers bar costs $1.00, then each Coke “costs” $0.50 of a Snickers bar. Therefore, the relative price of Coke is one half that of a Snickers bar. Similarly, each Snickers bar “costs” one half of Coke. The relative price of a good just expresses its cost in terms of another good.

Now, if the dollar price of Coke rises to $1, the consumer must now give up 1 Snicker to acquire each Coke (Coke is relatively more expensive), but the consumer now need only give up 1 Coke to acquire a Snickers bar (Snickers are relatively less expensive). With the substitution effect, the consumer, taking into account the new relative prices, switches between goods in order to keep her overall level of satisfaction unchanged.

We can use indifference curve analysis to illustrate the two effects. Recall that an indifference curve represents the preferences of a consumer between (in our case) two goods. Its slope, the marginal rate of substitution, shows how willing the consumer is to switch between the goods. The budget constraint shows the line of available opportunities when the consumer allocates her entire budget between the two goods. Its
slope is the relative price of the two goods. The consumer is assumed to maximize overall satisfaction (utility) while spending her entire budget on the two goods. With an interior solution, this occurs where the indifference curve and budget constraint are tangent to one another.

The consumer maximizes overall satisfaction by picking a point on her budget line that touches the highest indifference curve (point 1). At that point, the consumer’s marginal rate of substitution exactly equals the relative price.

When the price of good X increases, the budget constraint rotates clockwise about the Y axis. The old level of satisfaction is no longer attainable and the consumer faces a new relative price (shown by the slope of the red budget constraint below).

Facing the new budget constraint (the red line), the consumer finds a new point of equilibrium (point 3) in which the consumer buys more Y (50 to 75) and less X (100 to 10). The movement from points 1 to 3 represents the overall effect of the price change.

To isolate the income and substitution effects, consider them separately. First, consider the substitution effect. With the substitution effect, we ask (theoretically) “what if the consumer only faced the new relative price but could still attain the old level of utility. How would the consumer switch between the goods?” The answer to this question is shown below.
Since the consumer is assumed to be able to reach the same indifference curve but at the new relative price, we sketch a blue budget constraint that is parallel to the red budget constraint but tangent to the old indifference curve.

In an attempt to keep satisfaction constant, the consumer moves from point 1 to point 2. In terms of the goods, the consumer buys 70 fewer units of X and 35 more units of Y. In other words, with the substitution effect, the consumer buys more of the relatively less expensive good and less of the other good.

To examine the income effect, we assume the substitution effect has already taken place (i.e. the consumer has already accounted for the change in relative prices). Since the income effect describes how consumers react to a change in their purchasing power given the new relative price.

When the consumer’s purchasing power falls, the budget constraint shifts in (in this example, from the red constraint to the blue constraint). The relative prices of the goods are unchanged at this point. Why?

With the fall in purchasing power, the consumer buys less of both goods (suggesting they are both normal goods – this is not always the case. It’s just the way I’ve sketched it here). The income effect is shown by a movement from point 2 to point 3.

Summarizing, we separate the overall effect of a price change into an income effect and a substitution effect. With the substitution effect, the consumer switches between goods to a. take advantage of the change in relative prices and b. to attempt to keep overall satisfaction at the same level as before. The substitution effect is the movement from point 1 to point 2. With the income effect, the consumer alters the amounts of the goods bought because a change in prices alters the purchasing power of the consumer’s budget (point 2 to point 3). See the figure below.