Major determinant of cross-elasticity of demand

When it comes to Cross-elasticity of demand, we must first illustrate the concept of elasticity of demand. We can say that elasticity of demand is the foundation of the theory of cross-elasticity of demand because elasticity of demand is related to only one good while cross-elasticity of demand is about the relation of 2 goods. We should first compare the elasticity of demand with the cross-elasticity of demand.

Introduction of Elasticity of Demand

Elasticity of demand is often referred to as the own-price elasticity of demand for a certain good, such as the elasticity of demand with respect to the price of a good. Elastic demand reflects that consumers are very price sensitive.

This concept is understandable because we all know price is one of important determinant of quantity, and the quantity demanded of a good is negatively related to its price. We can suppose: for a seller, lower price promotes sales; for a buyer, higher price constraints their desire of purchase.

Take the example from the textbook, suppose that a 10% increase in the price of an ice-cream cone causes the amount of ice cream you buy to fall by 20%. According to the formula

We calculate your elasticity of demand as 20%/10%= 2. This result can be explained as the elasticity 2 reflects the change in the quantity demanded is twice as large as the change in the price in proportion. This result owes to reasons as follows: First, market for ice cream is very competitive instead of monopolistic. Second, consumers have choices of other substitutes such as

other desserts. Third, when the price of ice cream rises, consumers can buy cakes, milk-shake or other desserts.

The above formula usually yields a negative value, because of the inverse nature of the relationship between price and quantity demanded. They are described by the “ law of demand” (Gillespie, Andrew (2007). p. 43.) but economists tend to refer to price elasticity of demand as a positive value (i. e., in absolute value terms).

Definition of Cross-elasticity of Demand

Based on the theory mentioned above about price elasticity of demand, we can go further to find out the relation of two goods. In order to distinguish it from the elasticity of demand for that good with respect to the change in the price of some other good, i. e., a complementary or substitute good. (Png, Ivan (1999). p. 57.) The latter type of elasticity measure is called a cross-price elasticity of demand.

In microeconomics, cross-elasticity of demand is also called cross-price elasticity of demand, which measures the responsiveness of the demand for a good when there is a change in the price of another good. According to its definition, it is measured as the change in demand in percentage for the good A that occurs in response to a change in price in percentage of the good B. The formula to calculate cross-elasticity of demand is as follows:

Major Determinant

The cross-price elasticity of demand is often used to see how sensitive the demand for a good is to a price change of another good. The major

determinant of cross-elasticity of demand is the closeness of the substitute or complement. A high positive cross-price elasticity indicates that if the price of a certain good goes up, the demand for the other good goes up as well. A negative one tells us the opposite – that an increase in the price of one good causes a decrease in the demand for the other good. A small value (either negative or positive) tells us that there is little or no relation between the two goods. They are listed in the table below:

Cross-price Elasticity

Indication

Example

Graph

A positive cross-price elasticity

If the price of one good goes up, the demand for the other good goes up as well.

Pork and chicken, etc.

A negative cross-price elasticity

An increase in the price of one good causes a drop in the demand for the other good.

Bicycles and helmets; Petroleum and cars, etc.

A small value

There is little relation between the two goods.

Things have little or no relation at all

For example, if we suppose the price of chicken goes up by 20%, and as a result the quantity demanded of pork increases by 10%, at the premise that there is no change in the price of pork or anything else that would have influence on the demand for pork (such as quality, advertising, location, etc). Then the cross-elasticity of demand for pork, with respect to the price of chicken, is 10%/20% = 0. 5.

This concept is also easy to understand. Firstly, as we know that for two goods that complement each other show a negative cross elasticity of demand, which means that an increase in the price of one good cuts the demand for the other. For instance, if the price of bicycles goes up, we will expect to see a decline in the demand for bike helmets; if the price of petroleum goes down, the demand for car will be expected to rise. In this sort of case, we can say the goods are complements and they have a close link in price and demand.

Secondly, on the contrary, two goods that are substitutes have a positive cross elasticity, it means that an increase in the price of one good will therefore increase the demand for the other good. When we observe a positive cross-elasticity, we can assume that the two goods are substitutes, as with chicken and pork, butter and margarine.

The Third circumstance is two independent goods. If two goods are independent, undoubtedly they have a zero cross elasticity of demand.

Practical Application

For firms and corporations, it is necessary for them to know the cross-elasticity of demand for their products when they consider the effect on the demand for their products of a change facing with the challenging price of a rival’s product or a complementary product. If the quality and appearance is almost the same (regardless of the factors of affection location, and loyalty, etc.) but the price of Firm A is higher than that of Firm B, most consumers will choose the products of Firms B. Among theories of marketing, “ pricing” is not only difficult but technical. These are vital pieces of information for firms when making their production and strategic plans.

However, for goods those complement each other, a firm is supposed to promote the sales of both the products and their complements. Nowadays, the price of petroleum is constantly high and it will continuously get higher in the near future. This is definitely a disaster for automotive industry. Some of the automobile companies adopt the strategy of reduction but gets an unsatisfactory feedback. What affects the decision of a consumer is mainly the price of petroleum instead of the automobile, so some companies think out of a promotional tactic: buy car get petro discounted (though the price of a car may be very expensive), and this may be to some extent cater to the consumers’ psychology.

Another application of the concept of cross-elasticity of demand is in the field of international trade as well as the balance of payments around the world. What’s more, for different industries and fields, the concept of cross-elasticity of demand can be used to measure the closeness of relation of

each other. For those monopoly enterprises, they are the unique suppliers in market and they are powerful enough to control the whole market, so they won’t suffer the pressure from others. However, for some industries, such as Ministry of Railway, if it decides to raise the price in a large scale, many passengers will prefer other transportation, which will make aviation industry or highroad industry prosperous. This will undoubtedly lay itself in an unadvantageous position.