

Principle of Economics

Elasticity

- ✓ Instructor : Vladimir Hlasny
- ✓ Institution : 이화여자대학교
- ✓ Dictated by : 구수현, 주연경, 최현석, 조용원, 김서연

In the previous chapter, we studied the model of supply and demand.

And we talked a little bit about the shapes of market demand and market supply curves.

In this chapter, we will study the more exact shapes of market curves and we will study exact magnitude by which quantity demanded and quantity supplied change when some factor changes.

The name of this chapter is 'elasticity'.

In general, elasticity is a name for the magnitude of a relationship between two variables.

We will start by studying the price elasticity of demand which is the relationship between price and quantity demanded of a product.

And later we will look at some other interesting forms of elasticity.

We will look at other economic variables and we will study the magnitude of the relationship between them.

When we say elasticity, we should be careful to realize that it's, elasticity gives us the percentage change in one variable in response to a percentage change in another variable.

So when we discuss price elasticity of demand, we're discussing the percentage change in quantity demanded for one percent change in the price of commodity.

Okay? Let's illustrate a little bit.

So last time we said that market demand curve is usually a downward sloping line.

And we might be interested in studying the exact shape of this demand curve.

We may want to know by how much exactly quantity demanded increases when price falls by a certain percentage.

The reason why elasticity is a good measure of responsiveness between two variables, rather than, let's see, a slope of a demand curve, is that elasticity doesn't depend on units of the two variables.

We can discuss the percentage change in the two variables without knowing if quantities are in units or one thousand units, or one thousand of a unit of commodity.

We don't have to know whether the price is in Korean won or dollars or in one thousand dollars and so on.

So economists usually prefer to report elasticity in the response of, between two variables, rather than the slope of a curve between two variables.

We will use the midpoint method, formula for calculating elasticity, because it will give us the same measure of elasticity regardless whether we're studying a change in this direction or a change in this direction on the graph.

Right? Just to review, elasticity is the percentage change in, so price elasticity of demand is the percentage change in quantity demanded for percentage change in price.

You may think that between these two points, if we are looking at the change in this direction, we will find some particular percentage change in quantity and some particular change in price.

But if we studied a movement from this quantity demanded to this quantity demanded, we would find different percentage change in quantity and different change in price.

So using the simplest formula for elasticity, which is the percentage change in, let's see, quantity for a percent change in price.

Depending on which way we move on the graph, we will get a different measure of elasticity.

And, so what is the percentage change in quantity and what is the percentage change in price? Normally, we would, in the simplest formula for elasticity, we would take the difference between Q_2 and Q_1 and divided by Q_1 , the starting level of quantity.

And for percentage change in price, we would look at the difference between the original and final price, and divided by the original price.

But notice that if we move on the demand curve in this direction or in the opposite direction, we will get a different, we will use a different starting quantity and starting price.

So to avoid this problem, we will divide the change in quantity by the midpoint of quantities.

And we will divide the change in prices by the midpoint of starting and the final price.

Okay? What determines price elasticity of demand? So in general, what determines the shape of a demand curve? We can say that the shape of the demand curve depends on the availability of close substitutes.

Intuitively if the price of a commodity increases, how easy it is, how easy is it for consumers to change their behavior to start buying cheaper commodity and quit buying the more expensive commodity.

The shape of the demand curve also depends on whether the good is a necessity or a luxury.

Even if there are no substitute goods, you may think that consumers have different ways in which they can spend money.

If a commodity is a necessity, then if the price of the commodity increases, the consumers might not be able to exit the market as easily.

They may be forced to buy some quantity of the product.

On the other hand, if the product is a luxury, if the price of the commodity increases, the consumers might exit the market, they might choose to buy completely different commodity with their money.

Or they may decide not to earn as much money to purchase luxuries.

They might decide to enjoy their life more, get more leisure time, not earn as much and not buy commodities in the marketplace.

So in other words, we will say that the shape of demand curve or price elasticity of demand depends on the a....

definition of the product and definition of the market.

How hard is it to find substitute goods in the same time space so how many available substitutes are there.

We will say that the price elasticity of demand increases, the more narrowly defined the product is, the more widely defined the area, or the time is.

Intuitively, the more narrow of a category of the product we are talking about, the more available substitutes there are.

If we talk about particular kind of a soda or particular kind of a candy, we should think

there are other brands, other kinds of a candy or soda or drinks that consumers can buy.

If we are talking about drinks overall, or food overall, we may think that it can be harder to find substitutes for food.

The more....

The wider the market is, the easier food consumer to find a..other stores, and other products in..in the market place.

The longer the time period, the more ability consumers have to think about their consumption choices and the easier it is to come up with substitutes.

Let's run through some examples of demand curves and observe what happens, what is the price elasticity of demand on this demand curves.

Surprisingly, even if we have a simple linear demand curve, we will realize that price elasticity of demand varies along this curve, exactly in the middle of this demand curve, we will have unit price elasticity of demand which means price elasticity of demand equal to one and above this mid-point, price elasticity of demand will be greater than one, we will say that the product is elastic, the demand for this product is elastic in this region, and it is inelastic in the region below the mid-point.

If we had a perfectly vertical demand curve, we will say that this a....demand curve exhibit a.....perfect a..... inelasticity.

This is perfectly inelastic demand because no matter what the change in price is the consumers will not change their consumption level at all.

And as demand curve becomes flatter, we will say that price elasticity of demand increases on this demand curves.

Up until the perfectly horizontal demand curve which is the perfectly elastic demand curve.

If the price of the product change even a little bit, the consumers would choose to switch from some positive amount of consumption to zero consumption.

If from some original price level the price decreased, we will say that the consumer will switch from some positive amount of consumption to desiring to consume and infinite amount of the product.

And one interesting point to make about different price elasticity of demand is that depending on the price elasticity of demand a..producers in the market will face different revenues.

And if the price in the market changes, the revenues of producers will increase or decrease depending on whether the..a..demand curve was elastic or inelastic.

So let's look at an inelastic demand curve, and suppose that the price in the market changes from one dollar to three dollars.

In this case, we can see that the revenues of producers and we should think that revenues of producers are just quantity times price that the producers charges, revenues of consumers increased.

On the other hand, if we looked at an elastic demand curve, if the price in the marketplace increases, the revenues of producers will decrease.

And this should be quite intuitive, you should think that we are comparing the relative width of these squares, and...the relative height of them.

And with elastic demand curves, if we increase price, the percentage change in quantity will be greater than the percentage change in price.

Whereas with an inelastic demand curve, the percentage change in quantity would be smaller than percentage change in price.

So we can summarize that with elastic demand curves, if the price in the market increases, a...companies get lower revenues than before and with inelastic demand curves companies revenues increase when the price increases.

Okay, so we have looked at the price elasticity of demand and but price and quantity demanded are not the only two variables that we could study together.

We might look at the relationship between income of the consumer and quantity demanded, or we could be interested in studying the relationship between prices of one product and quantity demanded for another product if the two products are somehow related to each other.

This will be interesting to study for a..complements or substitutes.

The commodities that between which a... consumers are choosing.

And finally, so these three measures a... looked at a...factors determining a... quantity demanded but similarly we could look at factors determining a..supply curve and the a...we could look at the price elasticity of supply.

Let me summarize what we say about different elasticities.

So we think that price elasticity of demand can be anywhere from zero to negative infinity.

Here as a side note a... we should remember that if the demand curve is downward sloping, then price elasticity of demand would always be a negative number and it is only because economists are a little bit lazy that we will omit the negative sign on the elasticity realizing that price elasticity of demand is always negative and we can

report it as a positive number.

To be completely accurate, we will report it as a negative number we will realize that there are strange cases when we could draw even positive, positively sloped demand curve, for given goods for which a... price elasticity of demand could be positive.

So to summarize what we know, we would say that if price elasticity of demand is between zero and minus one, we will say that demand is inelastic.

If price elasticity of demand is exactly minus one, we would say that demand is unit elastic and if elasticity is smaller than minus one, we would say that we have a elastic demand.

And if we have positive price elasticity of demand, we would talk about given goods.

For income elasticity of demand we could distinguish the cases when income elasticity of demand is positive, which happens for normal goods, and when income elasticity of demand is negative, which happens for inferior goods.

And we could also distinguish the case when income elasticity of demand is greater than one, which happens for luxuries, and case when income elasticity of demand is between zero and one in which case the product is a...necessity.

And finally, I want to mention that for cross price elasticity of demand, we can distinguish perfect we can distinguish substitutes and complements, we would say that, if the price of one commodity increases and as a result a...consumers will buy more of another commodity, so that the products are substitutes, we have positive cross price elasticity of demand.

On the other hand, if increase in the one commodity decreases a... quantity demanded of both commodities which is the case of complementary goods, we would have negative cross price elasticity of demand.

The factors that determine the price elasticity of supply are similar to the factors determining price elasticity of demand.

Again, the shape of supply curve depends on availability of different inputs into production they depend on the definition of the product and market, they depend of the time period under considerations and they depend on the possibility of new companies to enter the market.

Finally now that we have discussed the magnitude relationships between economic variables we can look at some applications.

First of all, at the end of this chapter there are three examples.

One is the example of wheat market in which during a particular season, there is an unusually high harvest of wheat.

We may want to know what happens to the price of wheat if there is an unusually high harvest and what happens to revenues of farmers in this industry.

In general, in examining this situation, we should start by looking whether the supply in the market or the demand in the market changed, which way the market curves shifted.

And the goal in this chapter will be to estimate the magnitude of the change in quantity and the price, and maybe the change in the revenues of producers.

So, in the wheat market, we would realize that, because wheat is necessity, the demand curve is fairly stiff.

And we should also think that the supply of the wheat is inelastic because the quantity of wheat cannot be changed easily depends on weather, the amount of fields.

And because of the shape of the demand curve, if the supply of wheat increases we will notice that the price of wheat will change by greater percentage than the change of quantity and revenues of farmers will fall.

As another example, let's look at the market for illegal drugs.

We start by looking at a demand curve for illegal drugs and a supply curve for illegal drugs.

And we might evaluate two possible government policies dealing with illegal drugs.

One possibility is to create penalties on producers of illegal drugs which would affectively shift the supply curve upward.

Another possibility is to start education programs whose goal would be to lower the demand for illegal drugs.

And depending on the exact policy used, we would realize that for the same change in price of illegal drugs, we might observe a small reduction in the quantity of drugs if it was the supply curve that shifted, or we could observe a large reduction in the quantity demanded if it was the demand curve that shifted.

In particular, because the demand for illegal drugs is fairly inelastic, we would expect that this policy may be more successful in dealing with the problem, the usage of illegal drugs.

So, in this chapter, we continued with the discussion of competitive market we looked at the exact shapes of market curves and the exact magnitudes of relationships among economic variables.

And we can use this information in the following chapters when we discuss a

different government policies dealing with markets.