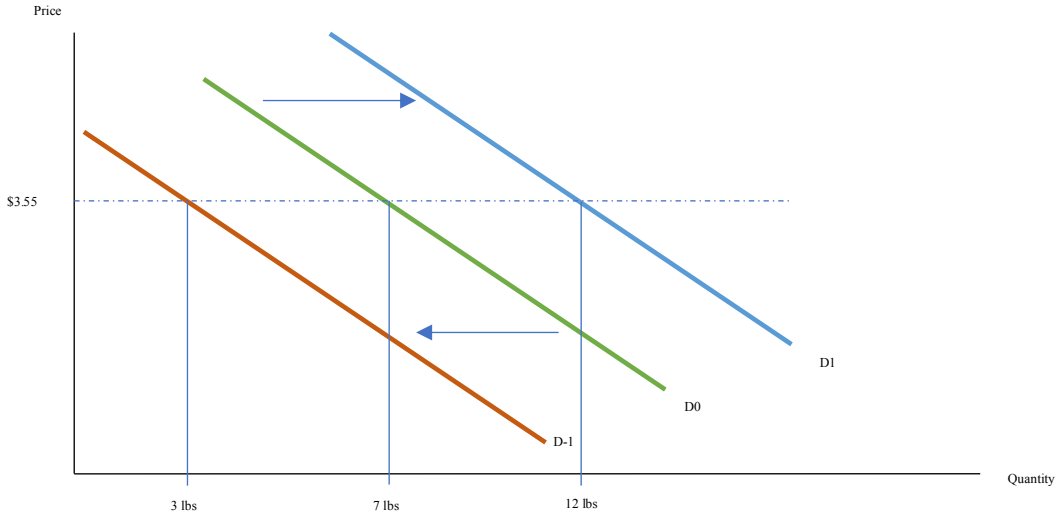
CHAPTER 3

UNDERSTANDING CONSUMER CHANGES IN DEMAND

Consumers change the amounts of a good that they demand for several reasons. We must first define two ways that demand is affected. The first is a change in total demand, and the second is a change in the quantity demanded. While the terms sound similar, they are very different concepts.

A. Change in Demand

This type of change affects the entire demand curve. It is a change in the position of the demand curve. Consider the below illustration of an increase or decrease in an example demand curve.



An increase in demand is a shift of the entire demand curve to the right, which gives more of a quantity purchased at any given price. For example, at a price of $3.55 on the original demand curve D_0 the quantity demanded is 7.00 lbs of chicken. An increase in demand to D_1 will give a demand of 7.5 lbs of chicken at the same price of $3.55. A shift to the left illustrates a decrease in demand D_{-1}, and has the opposite effect from the increase, with less of the good being demanded at the same price.

Several market-altering situations will cause a change in demand.

Factors Creating a Change in Demand

Consumer Income
Taste and Preferences
Related Product Prices
Consumer Satisfaction
Population

B. Change in <u>Quantity Demanded</u>

This is a change not in total demand, but rather a change in the quantity demanded. This is a movement <u>along</u> the same demand curve. Note that with a change in ***Quantity Demanded***, the demand curve does not move. Only the point of interest on the demand curve changes. The following example illustrates this with an example of demand for chicken.

The first point along the demand curve for chicken represents at a price of $3.90 per lb, consumers will demand 5.75 lbs of chicken. A lesser price is represented through the lower point of $3.55 per lb, with a resulting quantity demanded of 7 lbs. This is the negative relationship between price and quantity that makes up demand.

However, if prices continually change, why is it important to understand these relationships? The answer is because a demand curve can predict what the reaction to a price change will be, whether large or small.

This sensitivity analysis is referred to as ***demand elasticity***.

C. Demand Elasticity

Demand elasticity measures the responsiveness of quantity demanded for a change in the price, holding all other things constant. Holding all other things constant is referred to as *ceteris paribus* and is important because you cannot consider all factors of other related products.

Demand elasticity is referred to as **the percent change in quantity demanded divided by the percent change in the price**. This formula is similar to determining the slope of a line. The more responsive the change in quantity demanded, the greater the slope. The less responsive change in demand, the lesser slope of the line. Remember, the relationship of price to quantity demanded is inverse, so if price increases, quantity demanded decreases and vice-versa. The following is our formula for determining price elasticity.

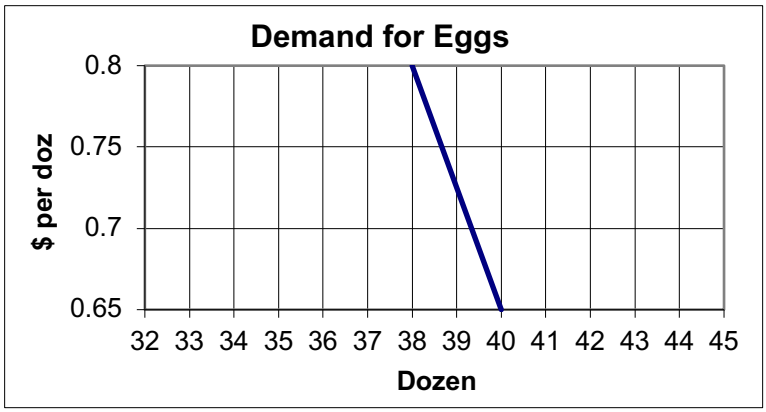
$$\text{Elasticity of Demand} = \frac{\left[\dfrac{Q1 - Q2}{(Q1 + Q2)/2}\right]}{\left[\dfrac{P1 - P2}{(P1 + P2)/2}\right]}$$

An easy way to remember the formula is:

difference over average for Quantity, divided by difference over average for Price.

Note that if you just want to look at the elasticity number, the 2s in the denominators will cancel, and you can just use ***difference over sum****, rather than* ***difference over average****. However, the numbers you get in the numerator and denominator of the equation will not be the percentage change in price and quantity, but will be one-half the percentage change.*

Let's work an example for the demand of eggs. Consider the following information on the demand curve, prices and quantities:



We have a graph that represents the demand for eggs by the dozen when priced from 0.80 to 0.65 per dozen. The elasticity demand for eggs will consider what the affect is if the price of eggs drops from 0.80 to .065 per dozen, and is calculated as follows:

$$ED = \frac{(38-40) / (38+40) / 2}{(0.80-0.65) / (0.80+0.65)/2}$$

-2 / 39 = -0.051 or 5.1% increase in quantity

0.15 / 0.725 = 0.207 or 20.7% decrease in price

= -0.2476 Elasticity of Demand

Inelastic

This illustrates that the quantity demanded for eggs increases 5.1% from a decrease in the price of 20.7%. Notice the negative sign in the answer. We are illustrating a negative relationship line, since the slope of a demand curve will always be negative. Using the negative in your answer may get in the way of correctly identifying the slope, so realize that our answer will always be negative.

Many people (economists included!), ignore the negative sign when reporting demand elasticity numbers.

We knew that if the price dropped, the quantity demanded would increase, but we now know by how much. So, if you sold eggs and this was your market, would you place eggs on sale? Why or why not?

The answer is no, because you will drop the price 20.7% and only gain 5.1% in sale increases. This low response to quantity demanded is referred to as an ***inelastic demand***. Inelastic demand curves have an elasticity of less than 1. This is because the change in quantity is small (numerator) and the change in the price is larger (denominator), which creates a number less than a value of 1 (absolute value).

Another type of elasticity is ***elastic demand***. With elastic demand, there is a large change in quantity demanded for a small change in price. Consider another example:

This information for egg prices and quantity demanded illustrates a different situation. The price has changed from $.80 to $.65 per dozen with the quantity dropping from 20 to 40 dozens purchased by consumers. We plug this information in to our elasticity formulas as follows:

$$ED = \frac{(20-40) / (20+40)/2}{(.80-.65) / (.80+.65)/2}$$

-20 / 30 = -0.667 or 66.7% increase in quantity
0.15 / 0.725 = 0.207 or 20.7% decrease in price

= -3.2205 Elasticity of Demand
Elastic Demand

This situation gives a 66.7% change in quantity demanded when the price changes 20.7%. If the price drops, the quantity demanded will increase by a greater percentage. So would you find it beneficial to place these eggs in this market on sale at discounted price?

The answer is yes, because the drop in price will be met with an increase in the quantity sold.

Factors that influence the quantity demanded include available substitutes, product use, or importance.

A third type of elasticity exists where the percentage change in price is exactly equal to the percentage change in quantity. The good is said to have demand elasticity equal to 1, and is called ***unitary elasticity***.

D. Cross Price Elasticity of Demand

Cross price elasticity measures the percent change in quantity demanded of one good to the percent change in price of another good. This demonstrates how the two products are related. If Ford

dropped the price of its pickups, do you think that sales (quantity demanded) of Chevrolet pickups would be affected? Probably so.

Products in the market can be related as substitutes or complements. Substitutes are goods that can be exchanged to meet demanded needs, and complements are used together with another product to meet demanded needs.

The formula to figure cross price elasticity is the same as our first elasticity formula except it deals with two products. The formula is as follows:

$$\text{Elasticity Demand} = \frac{(Qx1-Qx2) / (Qx1+Qx2)/2}{(Py1-Py2) / (Py1+Py2)/2}$$

use quantities of good "x"

use prices of good "y"

The formula uses the quantity change of good "x" and a percent and how that related to the price change of good "y". If the elasticity solution is positive "+", then the goods are substitutes. This is because the reaction of the quantity of good "x", is an equal reaction from good "y". If the solution is negative, then the goods are complements and price and quantity are inversely related.

An example of a substitute is beef and pork. If the price of pork rises (y), then most likely the quantity consumed of beef (x) would increase. This dictates that the numerator is "+", and the denominator is "+", which creates a positive solution, which illustrates a substitute good.

An example of complementary goods are nuts and bolts. If the price of a certain size nut rises (y), then the quantity of the corresponding bolt (x) falls. This dictates that the numerator is "-" and the denominator is "+", which creates a negative solution, and illustrates a complementary good.

Studies of consumers involving demand help create information with the price behavior, and what price a market may expect.

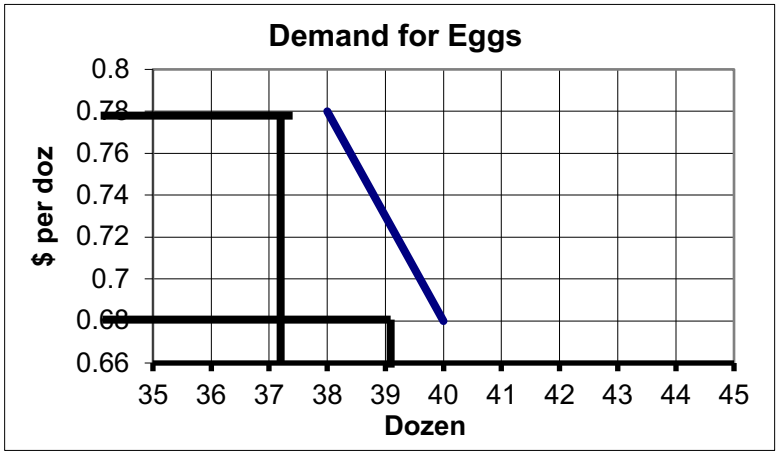
E. Using Elasticities and Graphs

Agricultural product elasticities vary, but for the most part tend to be inelastic. A large reason is that the products are necessary, and will still be purchased under most market conditions. Graphs can provide some insight into what type of demand elasticity exists.

Elastic situations illustrate that there is a large change in quantity for change in price, and exhibit a large sloping demand curve. Our earlier chicken example illustrated the following elastic demand curve:

The price dropped from $3.90 to $3.54, but had a larger percentage increase in quantity from 5.75 to 7 lbs of chicken.

An example of inelastic demand from the first egg example:



The price dropped from $0.78 per dozen to $0.68 per dozen (a 14% drop), and quantity only increased by about 5%.

The slope of the demand line is the line's elasticity, and informs policy makers, consumers, and producers of how a market change may affect some group of products. Remember, not all demand curves are straight, so demand elasticity at one price change may not be the same as at some other price level. Generally, higher priced products are more elastic and lower price products are more inelastic. Agricultural products in the United States are relatively low in expense compared to the world price, and they typically correspond with having low elasticities of demand.