

**Homework 2 Due October 6th**

1. Suppose that the demand for scanners on the UWL campus can be represented by the demand function,  
 $Q = 2000 - 10P$ . Suppose the supply can be represented by the supply function,  $Q = 800 + 2P$ .

- a. Solve for the equilibrium price and quantity for scanners using algebra.
- b. Graph the supply and demand curves. Label the graph carefully indicating the equilibrium point.

Solve for the equilibrium price and quantity for scanners using algebra.

Setting the supply and the demand function equal to one another, you get:

$$2000 - 10P = 800 + 2P$$

Rearranging and using a bit of algebra, you get:

$$1200 = 12P$$

$$P = 100$$

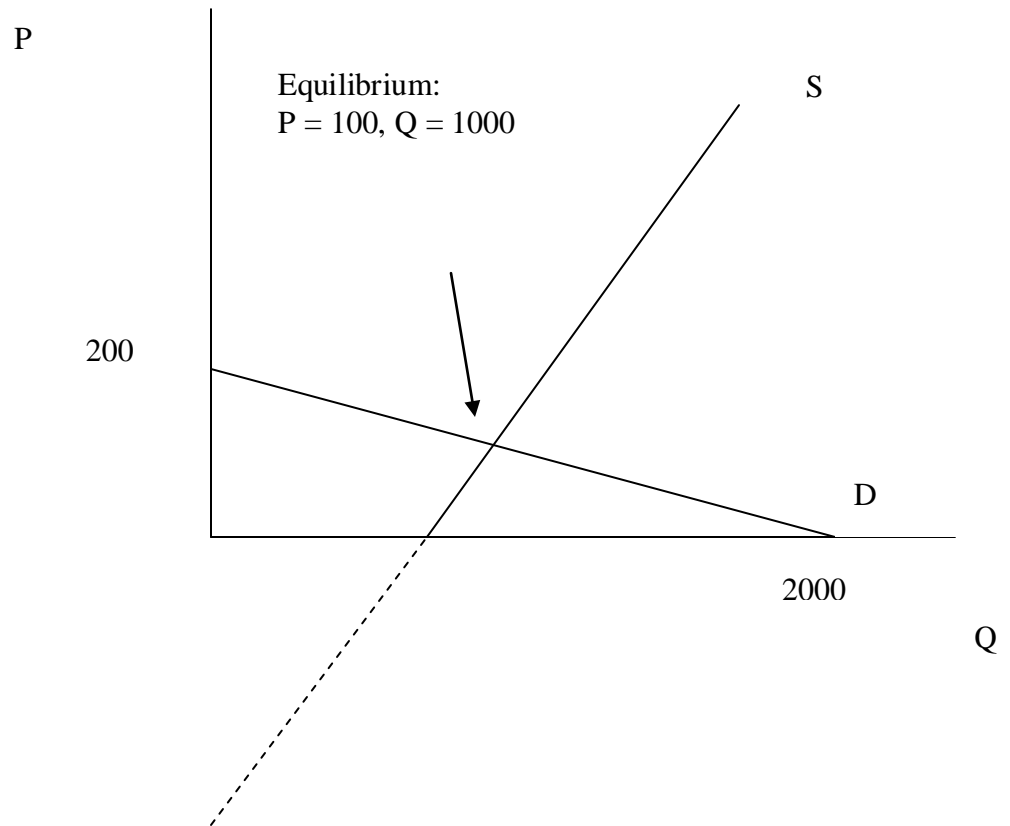
To get the equilibrium quantities of supply and demand, plug the value for P into either equation. For example:

$$Q = 800 + 2(100) = 1000$$

Or

$$Q = 2000 - 10(100) = 1000$$

## Market For Scanners



2. Suppose you read the following text in a newspaper article:

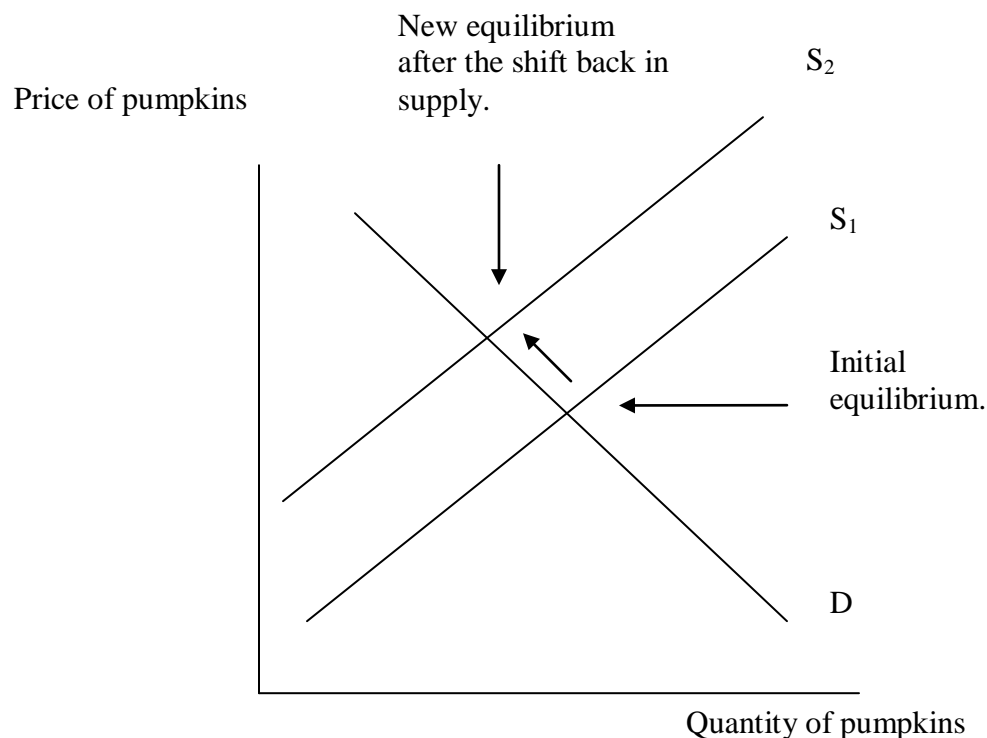
“Wet conditions across the mid-western United States has led to a relatively small pumpkin crop, causing the supply of pumpkins to fall. The decrease in supply will raise the price. The higher price will decrease demand, and the decrease in demand will decrease the price. The overall effect on price and quantity of pumpkins will depend on the relative shifts in supply and demand.”

Use supply and demand analysis to analyze the truth of this statement.

Wet conditions leading to a small pumpkin crop will affect the supply curve. Fewer pumpkins will shift the supply curve back (in the market for pumpkins or other autumnal regalia specialty stores).

The article gets that part right, but the very next step is where they seem to go all wrong. While the shift back in supply will, in fact, increase prices, that does not cause a decrease in demand. It causes a decrease in the quantity demanded, and a movement back on the demand curve. So, the logic goes like this, the bad crop causes supply to shift back, causing the price of pumpkins to increase, and the quantity demanded of pumpkins to fall.

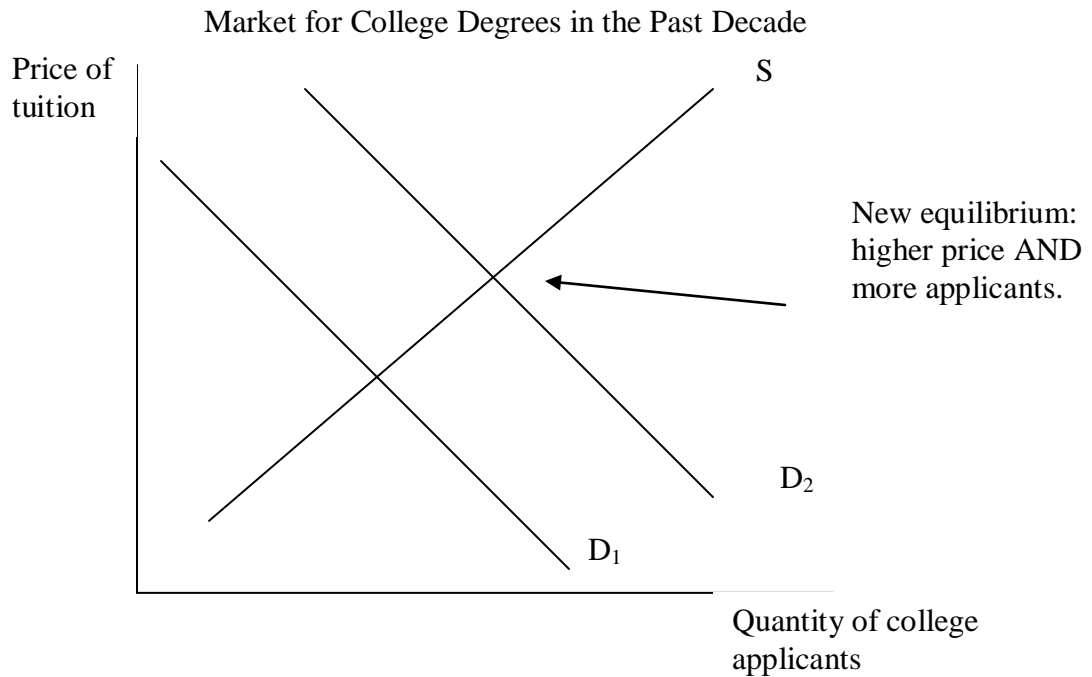
Demand doesn't shift in response to this supply shock, so we don't have to worry about any relative sizes of shifts in demand or supply. We know, unequivocally, that the price of pumpkins will rise, and the quantity sold in the market will drop.



3. According to an article in the September, 2007 issue of *Minnesota Monthly*, The percentage increase in tuition at the University of Minnesota between 1971 (\$522 annually) and 1997 (\$9,432 annually) is 1,707. This is not unusual. College tuition in the U.S. has increased at rates far faster than general inflation, yet applications to colleges continues to rise. Is this a violation of the law of demand? Why or why not? Illustrate your answer with a graph.

This is both a *ceteris paribus* issue, and an issue of having few (if any) substitutes (i.e. inelastic demand). Of course, many things have changed as well as the price of college tuition. Possibly income, the prices of other goods, tastes, expectations *and* the number of buyers has changed. I suspect further that the demand for

college education has become more inelastic over time (how many times have you heard people say that a college education is what a high-school education used to be. . . You can't succeed without it! Or maybe that was just *my dad* speaking). For it to be just an elasticity argument, demand for college would have to be perfectly inelastic which, of course, it is not. Graphically, you could show this effect by showing a shift outward in demand. We can assume that the law of demand has not been violated, so in order for us to observe a rise in applications to college at the same time we observe an increase in price, this must be explained by a shift outward in demand.



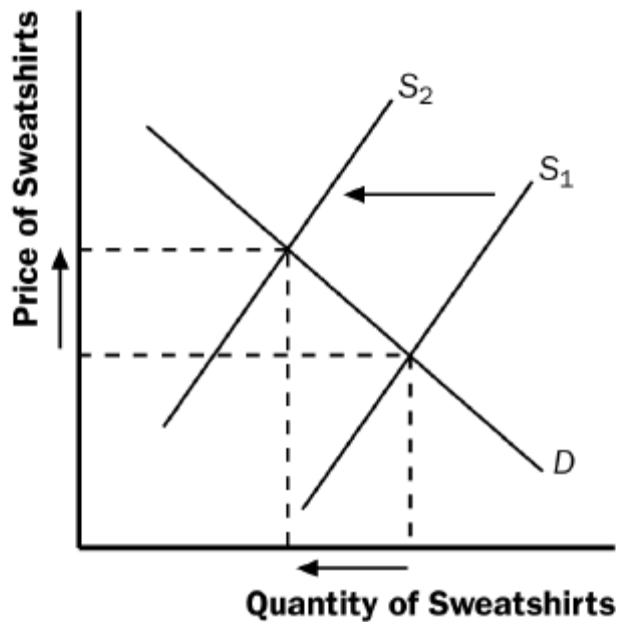
We could complicate the story a bit more. Certainly the supply of college degrees has increased (if nowhere else, but the Internet). For a thought experiment, can you imagine how this would complicate the argument? How would you graph this and what are the results?

4. Define and provide real world examples for each of the following. Your definitions may be based on those found in your textbook, but your examples may not.
  - a. an inferior good
  - b. Two goods that are substitutes for each other.
  - c. A competitive market.

For this problem, answers may vary widely. The least subjective answer should be for part c. Here examples must be based on the assumptions of a competitive market including: many buyers, low barriers to entry and a homogenous good. One good example is any commodity market, such as wheat or eggs.

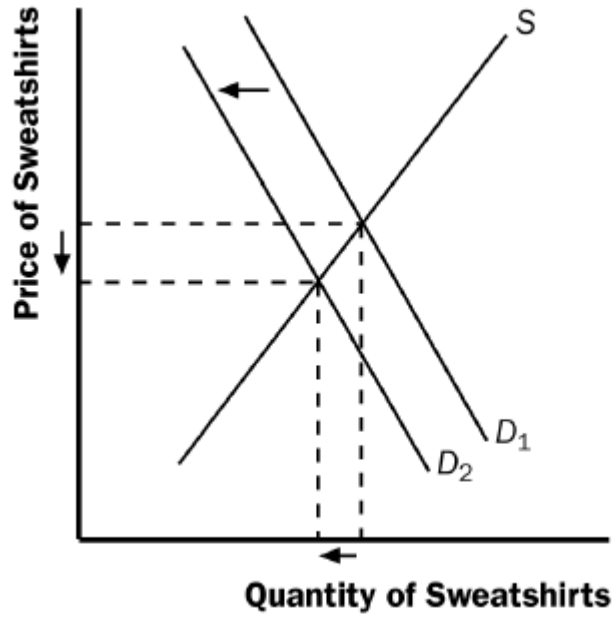
5. Chapter 4, number 7 page 86 (in the fourth edition). Using supply-and-demand diagrams, show the effect of the following events on the market for sweatshirts (i.e. graph, identify and discuss with one sentence the effect on quantity supplied, quantity demanded and price).
- A hurricane in South Carolina damages the cotton crop.
  - The price of leather jackets falls.
  - All colleges require morning exercise in appropriate attire.
  - New knitting machines are invented.

When a hurricane in South Carolina damages the cotton crop, it raises input prices for producing sweatshirts. As a result, the supply of sweatshirts shifts to the left, as shown below. The new equilibrium price is higher and the new equilibrium quantity of sweatshirts is lower.

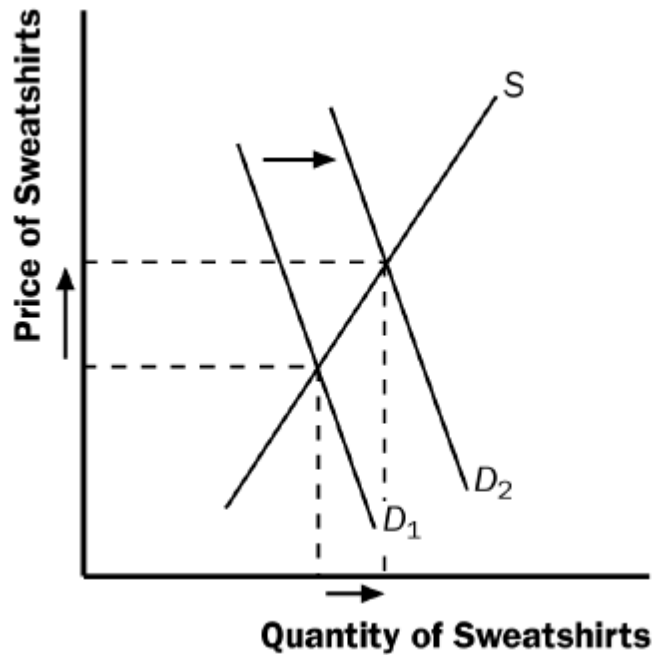


- The price of leather jackets falls.

A decline in the price of leather jackets leads more people to buy leather jackets, reducing the demand for sweatshirts. The result, shown below, is a decline in both the equilibrium price and quantity of sweatshirts.

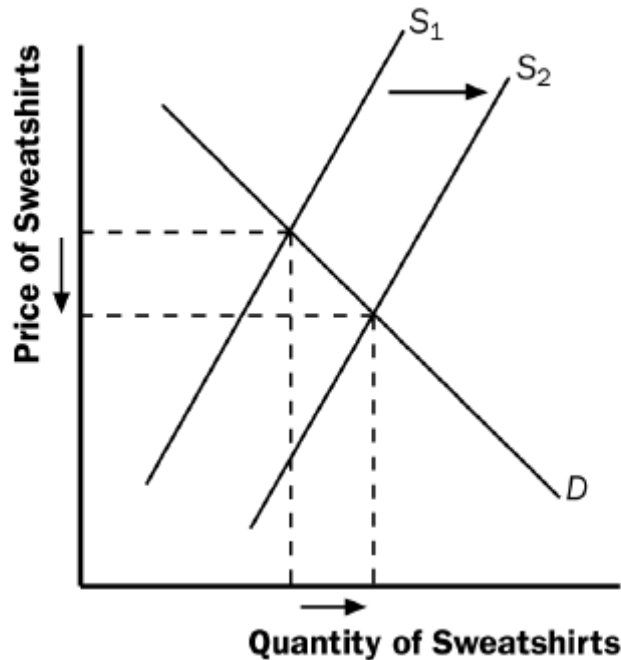


b. All colleges require morning exercise in appropriate attire.  
 The effects of colleges requiring students to engage in morning exercise in appropriate attire raises the demand for sweatshirts, as shown below. The result is an increase in both the equilibrium price and quantity of sweatshirts.



c. New knitting machines are invented.

The invention of new knitting machines increases the supply of sweatshirts. As shown below, the result is a reduction in the equilibrium price and an increase in the equilibrium quantity of sweatshirts.



6. Game Stop Corporation is an American video game and entertainment software retailer. According to Wikipedia, the corporation operates over 6,500 retail stores around the world. In the fiscal year ending in May of 2010, the company earned 48.1% of its profits from the sale of used video products. Using a supply and demand graph, analyze the effects of the sale of used video games on the (non-pre-owned) video game market.

Used video games are a substitute for new video games. The introduction of a market for used video games will cause the demand for new video games to fall (a shift back in demand) and a fall in equilibrium price and quantity.

7. The *New York Times* reported that subway ridership declined after a fare increase: “There were nearly four million fewer riders in December 1995, the first full month after the price of a token increased 25 cents to \$1.50, than in the previous December, a 4.3 percent decline.”

- a. Use this data to estimate the price elasticity of demand for subway rides

Price elasticity of demand is %change in Qd/ %change in price

You are given the percent change in Quantity Demanded and can calculate the percent change in price given the information.  $P_2 = \$1.50$  and  $P_1 = \$1.25$ .

Percent change in price (using the arc elasticity formula) =  $(P_2 - P_1)/(p_1 + p_2)/2$

So, percent change in price = 18

$E = 4.3/18 = 0.23$

- b. According to your estimate, what happens to the Transit Authority's revenue when the fare rises?

This demand is quite inelastic meaning that as prices went up people still use the subway. Another way to interpret it is that they might still feel like it is a deal to use the subway at \$1.50. So, even though prices increased by 18%, they still use the service.

8. Consider public policy aimed at smoking.
- a. Studies indicate that the price elasticity of demand for cigarettes is about 0.4. If a pack of cigarettes currently costs \$2 and the government wants to reduce smoking by 20%, by how much should it increase the price?

Price elasticity of demand = percent change in quantity demanded / percent change in price.

You are given the price elasticity of demand, the goal of a percent decrease in quantity demanded and the initial price. The idea of the question is to find the new price that would have to be in place to achieve the desired decrease in quantity demanded.

Using the formula:

$$0.4 = 20/\% \text{ change in Price}$$

$$\text{So } \% \text{ change in price} = 20/0.4 = 50$$

So, there needs to be a 50% increase in the price. If the initial price is \$2, then that means that they must have to increase the price to \$3 to get the desired decline in quantity demanded.

- b. If the government permanently increases the price of cigarettes, will the policy have a larger effect on smoking 1 year from now or 5 years from now?

It will have a larger effect in 5 years. Why? Well, certainly in the short run the demand for cigarettes is inelastic. However, in the long run, people may undergo programs to quit smoking or avoid it altogether given the high price.

- c. Studies also find that teenagers have a higher price elasticity of demand than do adults. Why might this be true?

Teenagers are not addicted yet, so they can respond to a change in price.

9. A study done on rent de-control in Washington DC (by, in part, yours truly! See this link if you're interested: <http://www.nmhc.org/Content/ServeFile.cfm?FileID=117>) found that the average prices of rent would not change if the rent control law was removed. Show graphically what is going on in this market.

It must be that the price ceiling was non binding. Graphically, the price ceiling is ABOVE the equilibrium.

10. Consider the following situation: On campus, there are long lines to obtain a fixed number of campus parking permits priced at \$100 per year. Many students that want a permit are turned

away. Use a demand and supply model to illustrate this situation for campus parking permits. Label clearly. What can be done to solve this problem?

There is a shortage in this market at  $P = \$100$ . You could increase the price, lower the demand (create a policy that would cause demand to shift back) or cause supply to shift out.