

**Problem Set 1**  
Due Lecture 2 in class on paper

For this and all future problem sets, questions are from the “Problems” section of the questions at the end of the chapter.

1. GLS Chapter 2, Question 8

Both supply and demand must shift outward. Old curves are in black, and new curves are in red:



2. Market Equilibrium

Suppose that the supply of Epi-pens is represented by  $Q_S = 15P$ , and that the demand for Epi-pens is represented by  $Q_D = 10,000 - 25P$ .

- (a) What is the current equilibrium price and quantity?

You can find equilibrium price and quantity by setting  $Q_D = Q_S$ :

$$\begin{aligned} Q_D &= Q_S \\ 10,000 - 25P &= 15P \\ 10,000 &= 40P \\ P &= 250 \end{aligned}$$

Solve for  $Q$  by plugging in to either the supply or demand equation. Using the supply curve,  $Q = 25(250) = 6250$ .

- (b) Suppose that a generic producer enters the market and produces an additional 1,000 Epi-pens. What is the new supply curve (assuming that the generic and the brand name are perfect substitutes)?

Supply increases but is not a function of price. In other words, there are 1000 more units available, so  $Q_S = 1000 + 15P$ .

- (c) Without doing any algebra, what do you anticipate should happen to price and quantity after the introduction of the generic alternative? Draw a diagram to illustrate what is going on.

Draw a downward sloping demand curve and an upward sloping supply curve. In our example, demand is unchanged and supply increases, which means the supply curve shifts outward. Price falls and equilibrium quantity increases.

- (d) What is the new equilibrium price and quantity?

To find the new equilibrium quantity, follow the same steps as before by setting  $Q_D = Q_S$ :

$$\begin{aligned} Q_D &= Q_S \\ 10,000 - 25P &= 1,000 + 15P \\ 9,000 &= 40P \\ P &= 225 \end{aligned}$$

The new equilibrium quantity is  $Q_S = 1000 + 25(225) = 6,625$ . Alternatively, you can put the equilibrium price in the  $Q_D$  equation.

### 3. Elasticity

- (a) Suppose that house prices increase by 10%, and the total quantity of homes in the market increases by 6%. What is the elasticity of supply of housing? Interpret your answer in the

context of a 1% change in home prices.

Elasticity of supply is

$$E_S = \frac{\% \Delta Q}{\% \Delta P} = \frac{0.06}{0.10} = .6$$

If the price of housing increases by 1%, housing supply increases by 0.6% – so the housing supply increases by less than the price.

(b) There is substantial disagreement in the economics profession about the exact magnitude of the housing supply elasticity (note that this is critically important in the policy discussion about rising home prices). One seminal article (Topel and Rosen, 1988) estimates that the elasticity is 1.0 for a one-year change in prices, and 1.7 for an eight-year change in prices. Interpret each elasticity in light of a 1% change in home prices, and give some intuition about why the 8-year elasticity is larger than the one-year elasticity.

A 1.0 estimate of housing supply elasticity means that if home prices increase by 1%, the supply of homes increases by 1%. The estimate of 1.7 means that an increase of 1% in home prices implies a 1.8% increase in the supply of homes. (Note that if supply outpaces demand, we anticipate home prices will fall.)

In general, we expect long-run elasticities to be larger than short-run elasticities because suppliers have a greater ability to respond in the long run. In the case of home builders, there may be a lag between an increase in prices and the builder's ability to acquire land, get permits, and get construction underway – particularly for large builders.

4. Give two recent examples of (i) when you have moved along the demand curve and (ii) when your personal demand curve has shifted. Briefly explain why each behavior is a shift or a move along the curve.

Here we accept any well-reasoned argument. The key is that movements along the demand curve are caused by changes in price. Shifts in the demand curve are due to other factors, such as changes in taste, or changes in income.