Practice Questions
Econ 339 Health Economics

1. Graph the health production function

$$HS = F(HC, E, K, L) = 100 \times \left(HC^{0.1} + E^{0.25} + K^{0.4}L^{0.2}\right)^{0.5},$$

where HC is health care inputs measured in dollars, E are environmental inputs measured in dollars, K is capital, and L is labor. Graph the function $F(HC, E = 10, K = 5, L = 7)$ in a graph with output on the vertical axis and health care on the horizontal axis. Graph the marginal product of health inputs. Is it increasing or decreasing? Show how the health production and the marginal curve change when E is increased to 15. Draw detailed graphs!

2. Demand and Supply Shifts:
Using a supply-and-demand graph and assuming competitive markets, show and explain the effect on equilibrium price and quantity of the following events:

   (a) A technological change that increases the cost of producing cancer tests and at the same time reduces the necessity of repeat testing on the market for physician clinic services.
   (b) Increased graduations of new nurses on the market for doctor/physician services (careful, these are linked markets).
   (c) The virtual elimination of clean air in inner cities on the market for hospital services.
   (d) A price floor placed on wages in the market for hospital labor.

3. Consider the following demand function:

$$Q = 533 - 1.5P.$$

Assume the initial price is $P = \$30$.

   (a) Consider a price change of \$1 and calculate the demand price elasticity.
   (b) Draw a detailed function of the demand, the price and quantity combination of the old price and the price and quantity combination of the new price.

4. Consider the following supply function:

$$Q = 533 + 1.5P.$$

Assume the initial quantity is $q = 600$.

   (a) Consider a price change of \$1 from the market price and calculate the supply price elasticity.
   (b) Draw a detailed function of the demand, the price and quantity combination of the old price and the price and quantity combination of the new price.

5. Demand and Supply and Total Surplus

$$\begin{aligned} p &= 190 - 30q, \\ p &= 30 + 20q. \end{aligned}$$

(a) Calculate equilibrium prices and quantities, draw the demand and supply into a DETAILED graph, then calculate consumer surplus (CS), producer surplus (PS), and total surplus (TS).

(b) Now introduce a price ceiling of $p_c = \$35$ and calculate the new equilibrium price and quantity, and the new CS, PS, and TS. Draw a detailed graph! What happens to consumer and producer surplus compared to point (a)?

(c) Now introduce a price floor of $p_f = \$145$. How does the price floor affect equilibrium price and quantity. Calculate the new CS, PS, and TS of this economy. What happens to consumer surplus and producer surplus compared to point (a)?

6. Demand and Supply and Total Surplus

$$\begin{aligned} p &= 190 - 30q, \\ q &= \frac{p}{26} - \frac{30}{25}. \end{aligned}$$

(a) Calculate equilibrium prices and quantities, draw the demand and supply into a DETAILED graph, then calculate consumer surplus (CS), producer surplus (PS), and total surplus (TS).

(b) Now introduce a price ceiling of $p_c = \$33$ and calculate the new equilibrium price and quantity, and the new CS, PS, and TS. Draw a detailed graph! What happens to consumer and producer surplus compared to point (a)?

(c) Now introduce a quota $\bar{q} = 1.2$. How does the quota affect equilibrium price and quantity. Calculate the new CS, PS, and TS of this economy. What happens to consumer surplus and producer surplus compared to point (a)?

7. Demand and Supply and Total Surplus

$$\begin{aligned} q &= \frac{180}{32} - \frac{1}{30}p, \\ p &= 20q. \end{aligned}$$

(a) Calculate equilibrium prices and quantities, draw the demand and supply into a DETAILED graph, then calculate consumer surplus (CS), producer surplus (PS), and total surplus (TS).

(b) Now introduce a price ceiling of $p_c = \$30$ and calculate the new equilibrium price and quantity, and the new CS, PS, and TS. Draw a detailed graph! What happens to consumer and producer surplus compared to point (a)?

(c) Now introduce a price floor of $p_f = \$140$. How does the price floor affect equilibrium price and quantity. Calculate the new CS, PS, and TS of this economy. What happens to consumer surplus and producer surplus compared to point (a)?

8. Demand and Supply and Total Surplus

$$\begin{aligned} p &= 90 - 3q, \\ p &= 20. \end{aligned}$$

(a) Calculate equilibrium prices and quantities, draw the demand and supply into a DETAILED graph, then calculate consumer surplus (CS), producer surplus (PS), and total surplus (TS).

(b) Now introduce a price ceiling of $p_c = \$10$ and calculate the new equilibrium price and quantity, and the new CS, PS, and TS. Draw a detailed graph! What happens to consumer and producer surplus compared to point (a)?

(c) Now introduce a price floor of $p_f = \$40$. How does the price floor affect equilibrium price and quantity. Calculate the new CS, PS, and TS of this economy. What happens to consumer surplus and producer surplus compared to point (a)?