Sample Exam 2 for COMM 220

Problem 1:

A competitive firm sells its product at a price of $0.10 per unit. Its total and marginal cost functions are:

$$TC = 5 - 0.5Q + 0.001Q^2$$

where TC is total cost ($) and Q is output rate (units per time period).
a. Determine the output rate that maximizes profit or minimizes losses in the short-term.
b. If input prices increase and cause the cost functions to become $TC = 5 - 0.10Q + 0.002Q^2$ what will the new equilibrium output rate be? Explain what happened to the profit maximizing output rate when input prices were increased.

Answer:

a. TR = PQ = 0.10Q MR = 0.10
TC = 5 - 0.5Q + 0.001Q2
MC = - 0.5 + 0.002Q = 0.10 = MR
Q = 300

b. MC = - 0.10 + 0.004Q = 0.10 = MR
Q = 50
As a result of the increase in input costs, the firm' s marginal cost increased. This caused the intersection of MC to occur at the lower production rate, 50 vs. 300. This also reduced the firm' s level of profit.

Problem 2:

The market for semiskilled labor can be represented by the following supply and demand curves:

$$LD = 32000 - 4000W \quad LS = -8000 + 6000W,$$

where L = millions of person hours per year, and W = the wage in dollars per hour.
a. Calculate the equilibrium price and quantity that would exist under a free market. What impact does a minimum wage of $3.35 per hour have on the market?
b. The government is contemplating an increase in the minimum wage to $5.00 per hour. Calculate the impact of the new minimum wage on the quantity of labor supplied and demanded.
c. Calculate producer surplus (laborers' surplus) before and after the proposed change.
d. Is the policy efficient from an economist' s viewpoint?

Answer:
a. Equate L_D to Ls
32000 - 4000W = -8000 + 6000W
40000 = 10,000W
W = $4 per hour
L_D = 32,000 - 4000(4)
L_D = 16000 million person hours

A minimum wage of $3.35 would not be binding, and therefore the market would attain its free market equilibrium.

b. At the $5.00 proposed minimum:

At the $5.00 proposed minimum:
L_D = 32,000 - 4000(5)
L_D = 12,000
L_S = - 8000 + 6000(5)
L_S = 22,000
The new minimum wage would create unemployment of 10,000 person hours per year.

c. Rewrite LS and LD with W on left- hand side:
L_D = 32,000 - 4000W
W = 8 - 0.00025LD
L_S = - 8000 + 6000W
W = 1.33 + 0.000167LS

Producer surplus at $4.00 wage:
P. S. = 0.5(4 - 1.33) 16,000 = 21,360
Determine reservation wage at 12,000
W = 1.33 + 0.000167(12000)
W = 3.33

Producer surplus at $5.00 wage:
P. S. = 0.5 (3.33 - 1.33)*12,000 + (5.00 - 3.33)*12,000 = 32,040

Workers as a whole have been made better off as indicated by the increase in producer surplus. Individual workers who are displaced from labor force are worse off, however. This policy differs from agricultural supports in that government does not buy up the surplus. When government buys the surplus, every producer is better off from the policy.

d. No, there is a loss in consumer surplus (employer surplus) that has not been calculated. When the loss in consumer surplus is accounted for, it is apparent that there is a deadweight loss from the minimum wage.