PROBLEM SET 11

You are not required to submit this problem set. But you should attempt it the way you would any other problem set.

QUESTION 1

In a perfectly competitive market, the market demand curve is $Q_D = 10 - p_d$, and the market supply curve is $Q_S = \frac{3}{2}p_s$.

(a) Find the equilibrium market price and market quantity in the absence of government intervention.

(b) Suppose a per-unit subsidy of $\$5$ is paid to producers. Find the equilibrium price paid by consumers. Calculate the deadweight loss of the subsidy.

QUESTION 2

Suppose the coal mining industry is perfectly competitive. The short-run market supply curve is given by $S(p) = 60p - 120$ if $p \geq 2$ and $S(p) = 0$ if $p < 2$. The short-run market demand curve is given by $D(p) = 880 - 40p$. Price is measured in $\$$ per ton and quantity is measured in tons.

(a) Find the equilibrium market price and market quantity of coal.

(b) Since coal-fired power plant emissions have adverse health and environmental effects, the government has decided to limit the production of coal by imposing a production quota of 360 tons, i.e., the government stipulates that the total amount of coal produced in the market cannot be more than 360 tons. What will the market price be?

(c) Instead of imposing a quota, the government introduces an excise tax on all coal producers. The government wants the market to produce 360 tons of coal. How much should the tax be?

(d) Compare the production quota in (b) and the excise tax in (c). Which policy generates a larger deadweight loss? Which policy generates a larger consumer surplus? Which policy generates a larger producer surplus?

QUESTION 3

In Chicago (a city in Illinois), the demand for low-skilled labor is given by $L_D(w) = 170 - 10w$ and the supply of low-skilled labor is given by $L_S(w) = 25w - 75$, where w is the hourly wage rate and L is the quantity of labor in millions of hours per year.

(a) Find the equilibrium wage and equilibrium quantity of labor.

Suppose a minimum wage of $\$8.25$ per hour is introduced in all cities in Illinois.

(b) At this minimum wage, calculate the extent of the shortage or surplus in Chicago.

(c) Calculate the change in consumer (employer) surplus, the change in producer (employee) surplus, and the deadweight loss.

(d) Will the consumer (employer) surplus always decrease with a minimum wage? Will the producer (employee) surplus always increase with a minimum wage?

QUESTION 4

The market for corn is perfectly competitive. The market supply curve is given by $S(p) = 10p$ and the market demand curve is given by $D(p) = 4{,}500 - 5p$. Price is measured in cents per ton and quantity is measured in tons.

(a) Find the equilibrium market price and market quantity of corn.

Suppose the government decides to increase the price of corn to 400 cents per ton. The government is evaluating two policies.

(b) Introduce a government purchase program, i.e., the government purchases as much as corn as necessary to keep the market price of corn at 400 cents per ton. How much corn does the government need to purchase? How much does the government spend?

(c) Introduce an acreage limitation program, i.e., the government offers cash payment to farmers for reducing their production. To support a price of 400 cents per ton, how much compensation should the government offer farmers?

(d) Compare the government purchase program in (b) and the acreage limitation program in (c). Which policy generates a larger deadweight loss? Which policy generates a larger consumer surplus? Which policy generates a larger producer surplus?