Chapter 1.3: Government Intervention

Question 1

The demand and supply functions for good Zeta are given by $Q_D = 10 − 4P$ and $Q_S = −2 + 8P$, where Q_D and Q_S are quantity demanded and supplied respectively in units per day, and P is the price of Zeta in $.

a. Calculate the equilibrium price and quantity in the Zeta market.

b. Graph the demand and supply curves up to a price of $2.00.

c. Using the demand and supply functions above, calculate price elasticity of demand (*PED*) and price elasticity of supply (*PES*) for a price increase from $1.00 to $1.50, and state if demand and supply are price elastic or price inelastic in this price range.

d. The government imposes an indirect (excise) tax of $0.75 per unit of Zeta. State the new supply function, and draw the new, post-tax supply curve in your diagram.

e. Use the demand function and the new supply function to calculate the post-tax equilibrium price and quantity in the Zeta market.

f. State the price paid by consumers, the price received by producers, and the quantity that is bought and sold. Show these in your diagram.

g. Calculate government revenue that arises from the imposition of the tax.

h. Calculate the tax incidence on consumers and the tax incidence on producers.

i. Using the results of your elasticity calculations in part (c), explain why the tax incidence on consumers and producers differs.

Question 2

Riverland has a competitive market for good kappa. Demand for kappa is given by $Q_D = 10 − P$, and supply of kappa by $Q_S = − 4 + P$, where P is price in Rvl (the local currency), and Q d and Q s are the quantity of kappa demanded and supplied in units per day.

a. Calculate the equilibrium price and quantity in the kappa market.

b. Graph the demand and supply curves up to a price of Rvl 10.

c. The government imposes an indirect (excise) tax of Rvl 2 per unit of kappa. Draw the new supply curve in your diagram.

d. State the new supply function.

e. Use the demand function and the post-tax supply function to calculate the post-tax equilibrium price and quantity; show these in your diagram.

f. Explain why the imposition of the tax of Rvl 2 per unit of kappa does not increase the post-tax equilibrium price by Rvl 2.

g. State the amount of tax incidence on consumers and on producers per unit of kappa, and outline how these are related to the government's revenue per unit of kappa.

h. State the total amount of tax paid by consumers and the total amount paid by producers, and indicate how these are related to the government's total revenue from this tax.

i. In your diagram, identify consumer surplus, producer surplus, government revenues and welfare (deadweight) loss that result in the post-tax situation.

j. Explain the relationship between marginal benefits and marginal costs at the new post-tax equilibrium, and describe the impact of the tax on allocative efficiency.

k. Draw a demand and supply diagram showing competitive market equilibrium; identify consumer and producer surplus.

l. Using the concepts of marginal benefits and marginal costs, explain the significance of competitive market equilibrium for allocative efficiency (assuming no market failures).

m. Calculate social surplus (consumer plus producer surplus) at competitive market equilibrium before the imposition of the tax.

n. Calculate consumer and producer surplus after the imposition of the tax.

o. Calculate the change in consumer and producer surplus due to the imposition of the tax.

p. Calculate consumer expenditure and producer revenue before the imposition of the tax.

q. Calculate consumer expenditure and producer revenue after the imposition of the tax.

r. Calculate the change in consumer expenditure and producer revenue due to the imposition of the tax.

s. Calculate the increase in government revenue due to the imposition of the tax.

t. Explain why social surplus (the sum of consumer surplus, producer surplus, and government revenue) after the imposition of the tax is less than social surplus before the imposition of the tax.

Question 3

The government of Riverland decides it would like to encourage the production of kappa, and so removes the tax on kappa (see question 2), and grants instead a subsidy of Rvl 2 per unit of kappa, together with a purchase programme for the excess supply of kappa.

a. Using the same demand and supply functions as in question 2 ($Q_D = 10 - P$ and $Q_S = -4 + P$) graph the pre-subsidy demand and supply curves (up to a price of Rvl 10), and calculate equilibrium price and quantity.

b. State the new supply function that results following the granting of the subsidy.

c. Using the demand function and the new supply function, determine the new equilibrium price and quantity.

d. Draw the new supply curve in your diagram, and show the price paid by consumers, the price received by producers, and the quantity bought and sold.

e. Explain why the equilibrium quantity produced has increased following the granting of the subsidy.

f. Explain how the subsidy of Rvl 2 per unit of kappa is shared by consumers and producers.

g. Identify in your diagram the gain in consumer surplus and the gain in producer surplus that results from the granting of the subsidy.

h. Explain the relationship between marginal benefits and marginal costs at the post-subsidy equilibrium, and describe the impacts of the subsidy on allocative efficiency.

i. Calculate consumer expenditure and producer revenue before the subsidy is granted.

j. Calculate consumer expenditure and producer revenue after the subsidy is granted.

k. Calculate the change in consumer expenditure and producer revenue due to the granting of the subsidy.

l. Calculate the amount of government spending on the subsidy.

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m. Calculate consumer and producer surplus in competitive market equilibrium before the subsidy is granted.

n. Calculate consumer and producer surplus after the granting of the subsidy.

o. Calculate the change in consumer surplus and producer surplus due to the granting of the subsidy.

p. Identify in your diagram the welfare (deadweight) loss that arises due to the subsidy.

q. Explain why social welfare is reduced after the granting of the subsidy, even though consumer and producer surplus have increased.

r. Outline two reasons why governments grant subsidies.

Question 4

A market is defined by the following equations: Q_D = 14 − 2P, and Q_S = 2 + 2P, where P is in \$ and Q_D and Q_S are quantity demanded and supplied of good Z in tonnes per day.

a. Calculate the equilibrium price and quantity and graph the demand and supply curves.

b. The government imposes a price ceiling at **P = \$2.** Draw the price ceiling in your diagram.

c. Calculate the shortage (excess demand).

d. Calculate the change in consumer expenditure and the change in producer revenue that arise due to the price ceiling.

e. Use your diagram to show the welfare effects (deadweight or welfare loss) arising from the price ceiling.

Suppose the market defined above is an agricultural product market in which the government imposes a price floor at P = \$5, with government purchases of the excess supply.

f. Draw a diagram illustrating the price floor in relation to equilibrium price and quantity.

g. Calculate the surplus (excess supply).

h. Calculate the change in consumer expenditure, the change in producer revenue, and government expenditure needed to purchase the surplus (excess supply) and maintain the price floor.

i. Use your diagram to show the welfare effects (deadweight loss) arising from the price floor.

Now suppose that the equations above define instead a labour market, where **P** denotes the hourly wage in \$, and **Q_D** and **Q_S** refer to quantity of labour demanded and supplied in millions of unskilled workers. The government imposes a minimum wage of \$4.00 per hour.

j. Draw a diagram illustrating the minimum wage in relation to the equilibrium wage and quantity of labour.

k. Calculate the number of unemployed workers, showing how many of these are due to the fall in quantity of labour demanded and how many due to an increase in quantity of labour supplied

Chapter 1.4: Market Failure

No topics covered by HL paper 3.