

International Energy Markets

Chapter 4: Energy Taxes, Subsidies, and Social Welfare Keywords

Study Questions

Study Question 4.1 When considering investment in another country, it is important to investigate the tax regimes. <http://www.taxsites.com/> is a good link for tax information and links to large accounting firms. Explore this link and note differences across countries.

Study Question 4.2 Severance taxes are one of a variety of taxes collected by U.S. states. See <http://www.census.gov/govs/statetax/> to compare the different ways states collect taxes.

Study Question 4.3 Let $Q_d = a - bP_d$ and $Q_s = c + dP_d$ and the unit tax is t_x . Mathematically show that a unit energy tax on the consumer in the competitive case is identical to the tax on the producer. Thus, unless the costs of collection are different it doesn't matter where the tax is collected.

Study Question 4.4 The tax could be on the value of the product sold (ad valorem) instead of on each unit sold. Let's say the rate for an ad valorem tax is t_a , which is now a share. Such a tax on the supplier price could be represented as t_a and the market is in equilibrium where

$$P_d = (1 + t_a)P_s.$$

4.4a Graph this market with the old and new supply curve.

4.4b If the tax is 10% or $t_a = 0.10$, what are the new equilibrium price and quantity for the following market?

$$Q_d = 50 - 2P_d$$

$$Q_s = -10 + 3P_s$$

4.4c Who pays the tax? What are government revenues?

4.4d If the tax is on the end demand price it could be represented by $t_a P_d$ and equilibrium would be where $P_d(1 - t_a) = P_s$. If the same tax rate were implemented on the supply price the equilibrium condition would be $P_d = P_s((1 + t))$ In this case, does it matter whether the tax of t is levied on the consumer or the producer?

Study Question 4.5 The prices for some of the products in Table ?? are below world prices. This implies that they are subsidized instead of taxed. Think about how a subsidy works in a competitive market. Would the consumer or the producer receive the subsidy?

Study Question 4.6 We can think of the social security tax as a tax on labor. Use the above analysis on incidence of a tax to discuss who pays this tax - the employee or the employer. The price of labor is the wage rate and the quantity is hours worked.

Study Question 4.7 Compute the deadweight loss for the ad valorem tax in Study Question 4.4.

Study Question 4.8 State governments frequently regard severance taxes as a revenue source with a minimal burden to the State's own residents, especially if the taxed resources are exported to customers in other States. Based on the above discussion, do you agree or disagree?

Study Question 4.9 Suppose that demand and supply of Chinese coal are

$$Q_d = 60 - 0.5P.$$

$$Q_s = -2 + 2P.$$

4.9a What are equilibrium price and quantity in the Chinese coal market?

4.9b What happens to price and quantity if a subsidy of \$10 is paid on Chinese coal?

4.9c What are the costs to the government of a subsidy?

4.9d What are the gains in consumer surplus from the subsidy?

4.9e What are the gains in producer surplus from the subsidy?

4.9f What are the dead weight losses of the subsidy (Government cost - gain in producer surplus minus gain in consumer surplus)?

4.9g Show the costs, gains in consumer surplus, gains in producer surplus and deadweight losses from a subsidy on a graph.

Study Question 4.10 Suppose the demand equation for shale gas is $Q_d = 10P^{-1.8}$ and the supply equation $Q_s = 2P^{0.2}$.

4.10a What is the price elasticity of demand?

4.10b What is the price elasticity of supply?

4.10c What is the incidence of a \$2 tax?