

U8213 Colloquium on Policy Analysis Section 3
Spring 2001
Problem Set 4: Taxation, cost-benefit analysis

1. Suppose demand is given by $P = 25 - 0.10Q$ and supply is given by $P=15$ (supply is perfectly elastic), wherein P represents dollar price and Q represents the number of units sold each year. Calculate the annual value of aggregate consumer and producer surplus.

2. The utility commission is currently examining pay telephone service in the city. The commission has been asked to evaluate a proposal by a city council member to place a \$0.10 price ceiling on local pay phone service. The staff economist at the commission estimates the following supply and demand equations:

$$Q_D = 1600 - 2400P$$

$$Q_S = 200 + 3200P$$

wherein P = price of a pay telephone call and Q is the number of calls per month.

- a. Determine equilibrium price and quantity without a price ceiling.
 - b. Determine price and quantity with the price ceiling.
 - c. Calculate consumer surplus and producer surplus without the ceiling.
 - d. Calculate consumer and producer surplus if the price ceiling is imposed.
 - e. The city council wishes to prevent the telephone company from curtailing pay phone service in response to the ceiling and plans to impose a requirement that the phone company must maintain the existing number of phones. Think of some options the phone company may have to reduce its cost of complying with the requirement.
 - f. The city council proposes to completely eliminate all pay phones from the city because they are said to aid drug dealers. What would be the cost to the consumer?
3. Let demand and supply for Katherine Harris Halloween masks be given by:

$$Q_D = 100 - 2P$$

$$Q_S = -50 + 3P.$$

- a. Determine equilibrium price and quantity.
- b. Calculate and sketch the consumer and producer surplus graphically.
- c. President Bush is mortified at the thought of millions of Katherine Harris look-alikes loose in the country, and he wants to impose a \$1 per unit tax on the masks. Determine the new equilibrium price and quantity if the tax goes into effect.
- d. Calculate the change in consumer and producer surplus, the tax revenue, and the deadweight loss. Sketch the change graphically.

- e. Who bears the burden of the tax? Show that the after-tax equilibrium is the same whether the supply or demand curve is shifted.
4. Elected officials in a west coast university town are concerned about the “exploitative” rents being charged to students. The town council is considering a rent ceiling of \$350 a month for a one-room apartment. A university economist estimates demand and supply to be:
- $$Q_D = 5600 - 8P$$
- $$Q_S = 500 + 4P,$$
- wherein P is rent in this case and Q is the number of apartments (let all apartments be identical).
- a. Calculate equilibrium price and quantity and consumer and producer surplus without rent control. Illustrate on a graph.
- b. If rent control is enacted, calculate the new price, quantity, and consumer and producer surplus. Calculate any gains or losses in consumer/producer surplus.
- c. Does rent control result in net welfare gains?
5. Given $Q_D = 10 - P$ and $Q_S = 4 + P$, determine the full effect on P , Q , consumer/producer surplus, and efficiency if a \$1 subsidy is given to producers. Do the same if the subsidy is given to consumers.
6. From Gulliver’s visit to the Academy at Balnibarbi:

I heard a very warm debate between two professors, about the most commodious and effectual Ways and Means of raising Money without grieving the Subject. The first affirmed, the justest Method would be to lay a certain Tax upon Vices and Folly; the sum fixed upon every Man, to be rated after the fairest Manner by a Jury of his Neighbors. The second was of an Opinion directly contrary; to tax those Qualities of Body and Mind for which Men chiefly value themselves; the rate to be more or less according to the Degrees of excelling; the Decision whereof to be left entirely to their own Breast. The highest Tax was upon Men, who are the greatest Favorites of the Other Sex; and Assessments according to the Number and Nature of the Favors they have received; for which they are allowed to be their own Vouchers. Wit, Valor, and Politeness were likewise proposed to be largely taxed, and collected in the same Manner, by every Person giving his own Word for the Quantum of what he possessed. But, as to Honor, Justice, Wisdom, and Learning, they should not be taxed at all; because, they are Qualifications of so singular a kind, that no Man will either allow them in his Neighbor, or value them in himself.

— Jonathan Swift, Gulliver’s Travels, 1977 edition, 187.

Discuss the two tax systems from the standpoint of both efficiency and fairness. Answer the following questions in your discussion: (1) What distortions do they cause? (2) Do they offset any distortions? (3) How do the tax rates compare and does the rate affect the size of the distortion?