

Problem Set 3
Economics 43565, Health Economics

Bill Evans
Fall 2013

1. Consumer and Producer's Surplus Review: The domestic supply and demand for a new alloy can be described by the curves:
Inverse supply: $P=40+4Q$
Inverse demand: $P=400-8Q$
What is market-clearing price and quantity in this market? What are the values of consumer's and producer's surplus?
2. Suppose that in the previous problem, the EPA determines that the manufacturing process used to produce the alloy generates toxic waste that the producers discharge into local waterways. The toxic release has been linked to a higher-incidence of cancer deaths. A Federal agency has estimated that the social marginal cost of the toxic waste is \$12 per unit produced, so the SMC curve is $SMC=52+4Q$. What would be the socially optimal level of output and price for the product? What is the dead-weight-loss associated with overproduction of the product?
3. Suppose the demand for alcohol can be described by the inverse function $P=80-Q$ and the inverse supply curve is given as $P=8+2Q$. What is the market equilibrium price and quantity in this market? Suppose that alcohol use generates consumption externalities such that the marginal social benefit is given by the equation $MSB=80-2Q$. What are socially optimal value if quantity? Given your two previous answers, what is the dead weight loss of over consumption of alcohol? Suppose the government were to levy an excise tax on alcohol consumption to try to internalize the external costs of alcohol. On your graph, indicate the tax level that would effectively internalize costs. Calculate this value.
4. Suppose in a market the supply curve is vertical and demand is downward sloping. Suppose also that consumption generates an externality such that the marginal social benefit curve falls below demand. On a graph, indicate the market clearing prices and quantity and the socially optimal values as well. What is the dead weight loss from the externality in this case.
5. Most people receive health insurance through employers. One way to internalize some of the costs associated with the lack of exercise, smoking or excessive alcohol consumption is to charge employees with poor health habits higher insurance premiums. Why do insurance companies or firms typically not use this method to internalize costs?
6. In a nationally-representative survey, adults indicated they were willing to pay on average an extra \$76 in annual transportation costs if car manufacturers could produce a car that reduced annual motor vehicle death rates by 25%. Assume the annual chance of death by motor vehicle accident is 0.0001. What is the 'value of statistical life' implied by these survey responses?
7. Most 'value of a statistical life' estimates come from labor market studies which find that those with higher on-the-job risks receive higher wages. What assumptions about the labor market must the authors of these studies make such that these numbers can be transformed into accurately estimates of the value of a statistical life?
8. The EPA uses "value of a statistical life" estimates when it constructs estimates of the benefits of certain regulatory programs. If V is the value of a statistical life and N is the number of lives saved by the program, then the estimated benefit is $B=V*N$. Using Google, find out what is the number the EPA currently uses for V .

9. In 2002, the state of Indiana raised cigarette taxes by \$0.40 per pack. Below are numbers for average retail price and per capita consumption for two time periods, before (2002) and after (2003) the tax hike, for Indiana and states that did not change taxes over the 1990-2004 time period. What is the difference in difference estimate of the impact of the tax hike on retail prices and cigarette consumption in Indiana? Using these estimates, what is the implied elasticity of demand for cigarettes?

	Average Retail Price per Pack		Per capita consumption in packs per year	
	Before	After	Before	After
IN	\$3.10	\$3.55	121	101
States w/ out a tax change	\$2.94	\$3.07	104	98

10. Review of demand elasticities: During the mid to late 1990s, all states filed civil law suits against tobacco manufacturers seeking to recover the increased costs of operating Medicaid programs that can be attributed to smoking. In December of 1998, cigarette manufacturers and the states agreed to an out-of-court settlement that ended these suits. As a result of an agreement, cigarette manufacturers increased cigarette prices by 55 cents/pack. Before the agreement, the average retail price of cigarettes was \$1.90 and 21 million packs of cigarettes were sold per year. If the elasticity of demand for cigarettes is -0.40, how much will smoking fall as a result of the settlement?