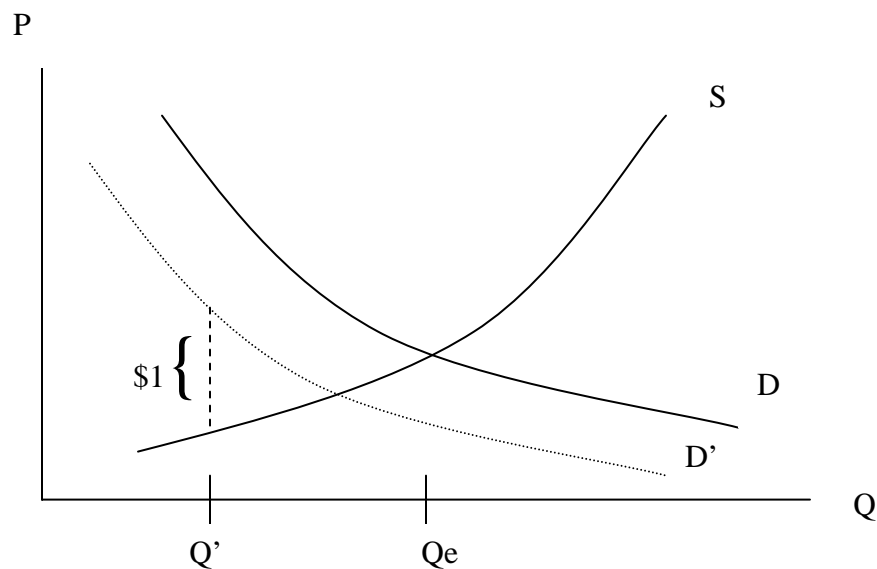


**Problem Set #4**  
**Principles of Microeconomics**  
**Professor Hungerman**

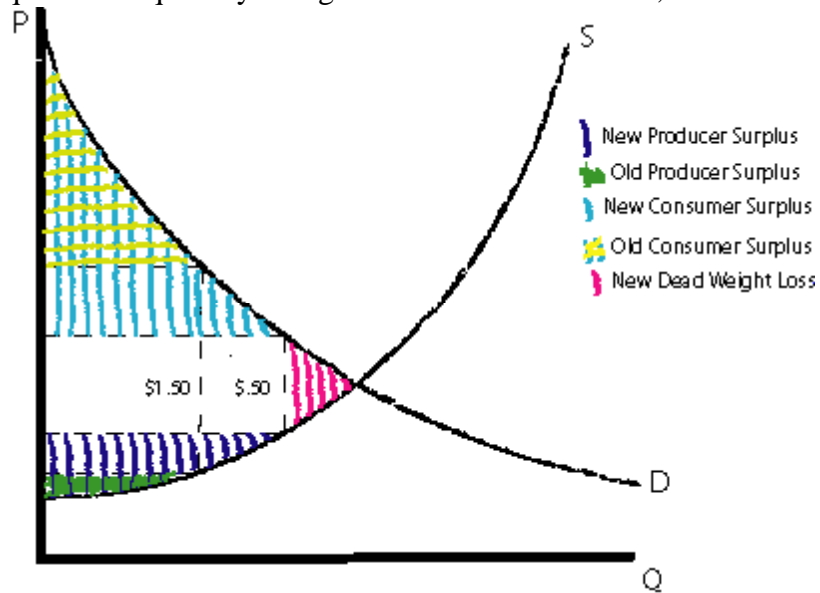
1. Suppose that the South Bend government begins to tax beer at \$1 a can to raise money for a new highway. Would you guess that demand for alcoholic drinks is elastic or inelastic? Now suppose that at the same time this happened, tickets to Notre Dame football games tripled. Consumers view football tickets and beer as compliments. Graph how both the tax increase and the football ticket hike will affect the market for beer.



*When the price of a compliment goes up, demand for the good in question falls. So there is both a decrease in demand and a tax imposed that drives a wedge between demand and supply.*

*Both the tax and the shift in demand lower the quantity of beer consumed in the market. Both changes also lower the price producers of beer receive. For demand, the decrease in demand will lower the price consumers pay, but the tax will increase the price they have to pay, and the net effect is ambiguous.*

2. Suppose that the New York City government decided to lower the tax on cigarette packs from \$1.50 to just \$0.50. Explain how this will affect consumer surplus, producer surplus, the equilibrium quantity of cigarettes sold in the market, and dead weight loss.



*Intuitively, a lower tax means that suppliers can now charge more and consumers can spend less—at the same time. So both parties have an incentive to exchange more cigarettes than before. Graphically, the wedge between the supply and demand curves will shrink, and the quantity of cigarettes will rise. DWL shrinks and becomes the small shaded triangle. Producer surplus and consumer surplus both grow by the respective shaded areas.*

3. A good thing about the EITC program is that it can benefit low-income workers by raising the wages they receive. However, a potential concern with the EITC is that it creates dead weight loss because it leads to excessively high levels of employment. (The EITC also requires that the government raise revenue through taxation, but let us put aside problems created by any taxes used to fund the EITC.) Can you draw a picture of a labor market where (a) the entire benefit of the EITC goes to workers (and not to the firms that hire the workers) and (b) the EITC does not create any dead weight loss through changes in employment? Think about what Jesse Rothstein learned when studying the EITC. Does your picture seem realistic, in light of Rothstein's research?

*You should verify for yourself that a labor market with a perfectly inelastic supply curve satisfies the two conditions described in the problem. Rothstein found that (1) the EITC increased employment and (2) the EITC had very little effect on the wages that firms paid. The second finding, that there is little effect on the wages firms pay (as opposed to the wages workers receive) fits with a market that has perfectly inelastic supply. However, with perfectly inelastic supply, the EITC has no effect on employment, in contrast to what Rothstein discovered.*

4. In the above question, it states that a potential problem with the EITC is that it “creates dead weight loss because it leads to excessively high levels of employment.” How could high levels of employment possibly be bad? Draw a picture of a labor market where the EITC creates dead weight loss through excessive employment (this should be easy). Explain why there is “too much” employment in the picture.

*Employment is excessive in that, for quantities of labor above the original equilibrium level, the wages that workers require exceed the wages firms are willing to pay. The only reason these people are working is because of the subsidy. If a firm only values a worker's labor enough that the firm will pay the worker a wage of (say) 5\$, but the worker needs to make \$7 in order to be willing to take the job, then there is no way for the firm to hire the worker so that anyone gains surplus. But such people will be hired under the EITC. The EITC thus pays to have people hired even though there is no consumer or producer surplus created. The deadweight loss thus measures the resources spent for which no surplus is created.*

*To be fair, supporters of the EITC say that society as a whole benefits when low income people work more and this sort of benefit is not captured by our model. So maybe we are being too hard on the EITC here.*

5. Suppose you are consuming cans of red bull energy drink. Suppose we can represent your utility from consuming red bull using a *utility function*

$$u(c) = \sqrt{c}$$

This equation says that your utility from drinking red-bull,  $u$ , equals the square root of the number of cans of red bull that you drink. Make a table where the first column is cans of red bull consumed (from 1 to 6). Then write down utility at each level of consumption and (using a calculator) calculate the marginal utility gained from each additional can consumed. Is the law of diminishing marginal utility violated?

*Here is the table*

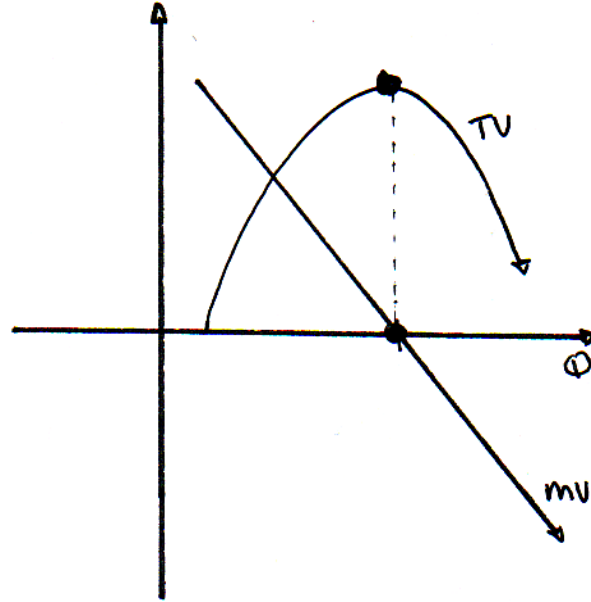
<i>Quantity</i>	<i>Utility</i>	<i>Marginal Utility</i>
1	1.00	0.41
2	1.41	0.32
3	1.73	0.27
4	2.00	0.24
5	2.24	0.21
6	2.45	

*The law of diminishing marginal utility is not violated. It might be helpful for you to try graphing utility and marginal utility here on two separate graphs the way we did in class (where quantity is on the x-axis in each graph and in one graph MU is on the y axis and in the other graph TU is on the y axis).*

6. Suppose that you learned that the demand for milk was inelastic. Does this suggest anything about the marginal utility for milk?

*Yes, it suggests that the marginal utility of milk will quickly change as the quantity consumed changes. This may make sense if people view milk as a necessity, rather than as a luxury good.*

7. Suppose I tell you that someone's marginal utility is falling. Based on that fact alone, what does this tell you about total utility? What if I tell you that marginal utility is positive and falling?



*Based on that fact alone, I know that total utility is either growing by ever-smaller amounts, or it is falling by ever-larger amounts. If I know that marginal utility is positive, then I know that it is the first case—total utility is growing by ever-smaller amounts.*