1) (35 points) As you know, the high price of gasoline over the last 12 months has been a concern because it has slowed the rate of U.S. economic growth. Gasoline's ability to slow economic growth results from the combination of two factors:

- In the short run, at least, the demand for gasoline is quite inelastic with respect to its own price.

- Much of the customer income paid for more expensive gasoline goes directly to oil producers in foreign countries.

a) (15 points). Begin with a typical consumer we will call Louie. Louie spends his money on two things – gasoline and hamburgers. Set up indifference curve axes with gasoline on one axis and hamburgers on the other axis. Using these axes, illustrate the following:

- Two or three increases in the price of gasoline (assume that the price of hamburger and Louie's income remain constant).

- A carefully drawn set of three or four indifference curves that lead to Louie's having a very inelastic demand curve for gasoline as the price of gasoline rises.

Answer for 1 a):
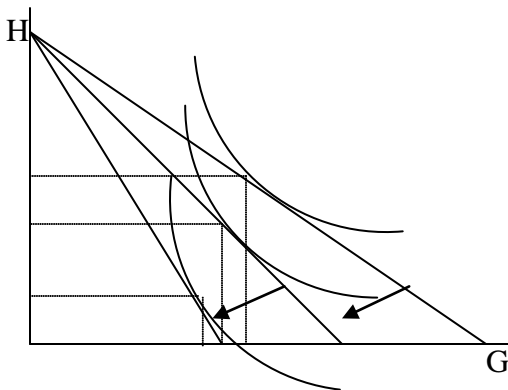
This diagram shows the budget constraint of Louie swinging in as the price of gasoline increases. According to the indifference curves, Louie's consumption of gasoline does not change much as the price of gasoline increases. This means that he has a relatively inelastic demand curve for gasoline.

b) (10 points) Draw Louie's demand curve for **hamburgers** before the price of gasoline began to rise. Using words and your diagram, explain what, if anything, happens to this demand curve when the price of gasoline rises.

Answer for 1 b):

$/H

H/time period
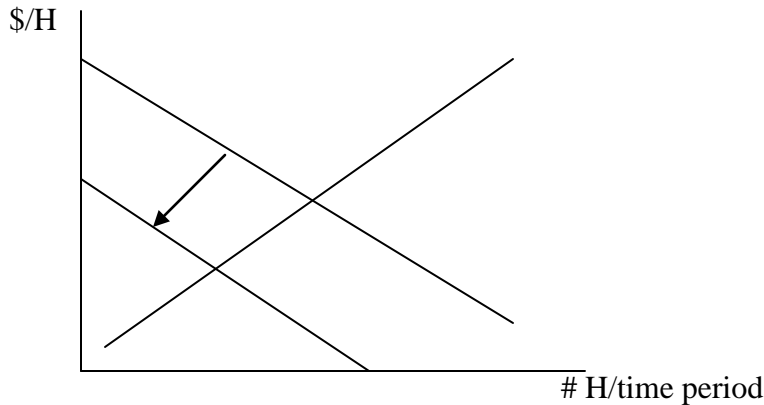
Given the answer in 1 a), we know that Louie shifts his consumption after the gasoline price increases. In this case, he consumes both less gasoline and fewer hamburgers, but we also know that he has an inelastic demand curve for gasoline. Therefore, the majority of his consumption decline is in his reduced consumption of hamburgers (the increased price of gas means less money to spend on hamburgers). Therefore, his demand curve for hamburgers shifts in as depicted by the above diagram.

c) (10 points) We now go back to the real world where people spend their money on many goods – not just two goods. In this real world, another issue of economic concern is the rising cost of medical care. Using common sense and any relevant information contained in this problem, explain why the rising cost of medical care should or should not exert the same negative effect on U.S. economic growth as the rising price of gasoline.

Answer for 1 c):

The rising cost of health care in the U.S. will not have the same negative effect on U.S. economic growth as the rising price of gasoline because the money paid to health care providers stays within the U.S. economy (unlike the gasoline example, when the increased money charged for gasoline goes abroad to the oil producing foreign companies). Therefore, this money can be used to pay for the salaries of health care providers and owners of health care facilities, who in turn consume goods and invest in the American economy.

2) (30 points) The collapse of the dot.com bubble caused the labor demand curve in Silicon Valley to shift inward. When a demand curve shifts inward, a market can reach a new equilibrium primarily through a quantity adjustment or primarily through a price adjustment.

2

a) (15 points). Use two supply-demand graphs to illustrate these two processes by which the valley labor could adjust to the new demand curve. Explain in words what is happening in each case. What difference, if any, exists in the elasticity of the labor supply curves in the two processes? In which case does the equilibrium wage fall further?

Answer for 2 a):

W/yr

W/yr

#worker/yr.   **#worker/yr.**
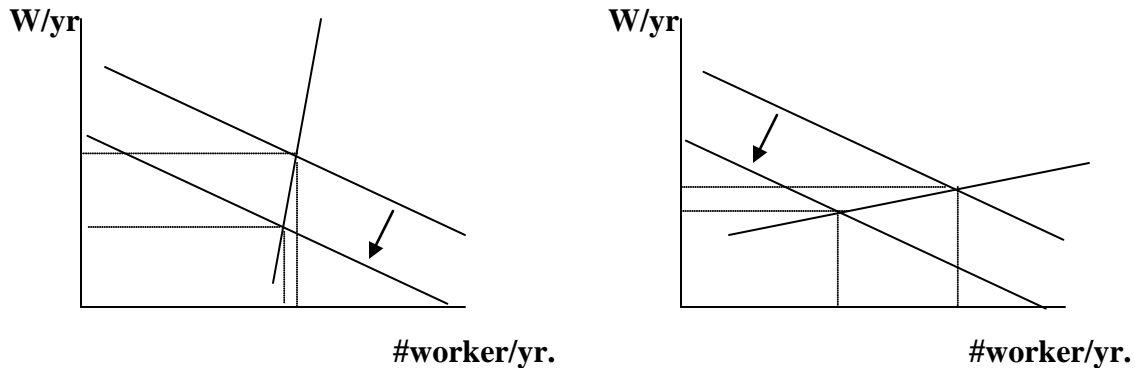
In the first graph, the valley labor market has an inelastic demand curve and so the adjustment to the new demand curve involves a large decline in the equilibrium wage and only a small decline in the number of workers employed in the dot com industry (in this scenario, labor is immobile, but highly flexible in terms of the salary that it commands). The other possibility is an elastic demand curve and an adjustment characterized by a small decline in the wage of dot com workers but a significant decline in the number of dot com workers employed in the industry (in this scenario, labor is highly flexible in terms of where it is employed, but rigid in terms of the salary it commands). The elasticity of the labor supply curves determines which of these scenarios applies (inelastic supply means a dramatic decline in wages and an elastic supply means a dramatic decline in the number of workers employed as described above).

b) (15 points) Suppose that at the time of the collapse, many area dot.com workers were recent arrivals who had bought their houses in the two or three years before the collapse occurred. Explain, as carefully as you can, how this fact might interfere with the labor market returning to equilibrium.

Answer for 2 b):

This fact interferes with the labor market returning to equilibrium for two main reasons. First, dot.com employees are accustomed to holding a relatively high salary (in fact they bought their recently purchased homes with this assumption in mind, so they have expensive mortgage payments). Therefore, unemployed former dot.com workers are likely to hold out for jobs that pay a comparable amount to the jobs they recently lost (we will observe a high degree of wage rigidity). Second,

former dot.com employees will not want to sell their recently purchased homes so quickly after purchasing them because it will result in an economic loss for them (the homes will not have had time to appreciate enough to offset the costs they incurred at closing on their home – if anything, the bubble burst will have reduced the value of their homes compared to when they purchased them; this condition is also known as "under water"). Therefore, they will not want to sell their homes in order to move to another city and take different jobs. This means that we will observe a persistently high rate of unemployment among these former dot.com workers as they do not accept jobs that pay lower wages and do not move to other cities in search of other jobs.

3) (35 points) Suppose your utility function is defined over two goods, beer and salads. The utility function itself can be written:

$$U = 10 \times LN(beer) + 20 \times LN(salads)$$

$P_{BEER} = \$2.00$, $P_{SALAD} = \$5.00$, and your income is $30.00

Suppose also that the government imposes a 25 percent tax on the price of each beer sold.

a) (10 points) Solve your utility maximizing problem.

Answer to 3 a):

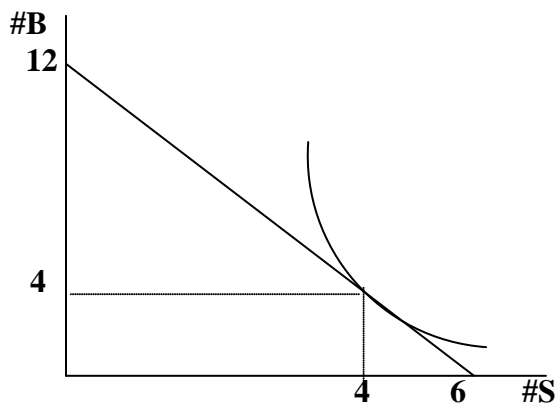**$30 = 2.50B + 5S**

Marginal Utility of Beer = 10/B   Marginal Utility of Salad = 20/S

Equal Slopes Condition:

(10/B)/2.50 = (20/S)/5
(50/B) = (50/S)
B = S

Substitute into the income equation:
30 = 2.5 (S) + 5S
30 = 7.5S
4 = S
4 = B

b) (15 points) In order to raise additional revenue, the government is considering raising the tax rate on the price of beer from 25 percent to 50 percent. Senator Coors argues that this will not increase tax revenue – that the higher price will cause people to cut back on beer consumption so much that tax revenue will actually fall. Assuming everybody else has the same utility function you do, assess the accuracy of the senator's argument. (It is okay to buy fractional beers.)

Answer to 3 b):
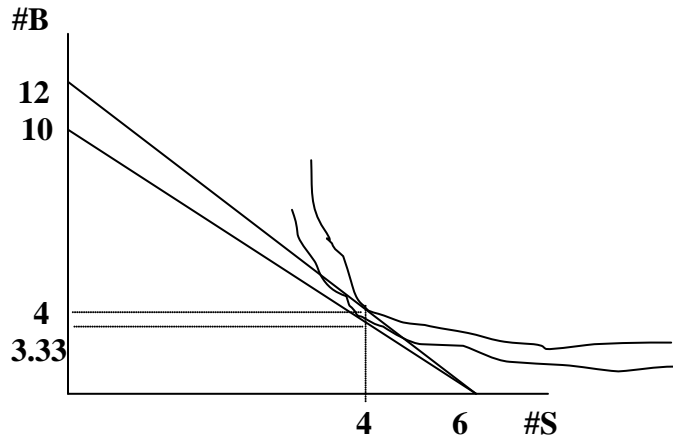
$30 = 3B + 5S

Marginal Utility of Beer = 10/B   **Marginal Utility of Salad = 20/S**

Equal Slopes Condition:

(10/B)/3 = (20/S)/5
** (50/B) = (60/S)**
**   50S = 60B**
**   S = (6/5)B**

Substitute into the income equation:

30 = 3B + 5 (6/5)B
30 = 3B + 6B
30 = 9B
3.33 = B
4 = S

What was the effect on tax revenue?

25% tax: **50% tax:**

Tax Revenue = [0.25(2)]4   **Tax Revenue = [0.50(2)]3.33**
Tax Revenue = $2   **Tax Revenue = $3.33**

So tax revenue actually increased when the higher tax was applied to beer (Senator Coors is wrong and probably just trying to protect special interests).

5

c) (10 points) Based on the calculations you have been making so far, explain in as much detail as you can what you can say about the elasticity of your individual demand curve for beer. If you can't say anything, explain why you can't.

Answer to 3 c):

Based on the calculations so far, we can say that the elasticity of this individual demand curve for beer is unitary (elasticity = -1). We know this because the total amount of money that we spend on beer does not fluctuate when the price changed (i.e., when we calculated what would happen when the tax increased). Instead, the proportion of our money going to the government in the form of taxes increased and the proportion of our money going to the beer producer decreased. Keep in mind that the total amount of beer that we purchased did change, but that our reduced consumption was offset by the increased price, leaving our total spending on beer unchanged.

Total amount of money spent on beer when beer cost $2.50:

$2.50 x 4 beers = $10 on beer ($2 in tax and $8 to the beer producer)

Total amount of money spent on beer when beer cost $3.00:

$3.00 x 3.33 beers = $10 on beer ($3.33 in tax and $6.66 to the beer producer)

11.203 Microeconomics
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