Problem Set 2 ANSWERS

Studies indicate that producers of chewing tobacco have an aggregate supply curve given by:

S = 40p – 5

in which S indicates the number (in millions) of chewing tobacco packs that firms would like to sell when the market price is p dollars per packet. It is understood that consumers currently have a demand curve of the form:

D = 35 – 10p

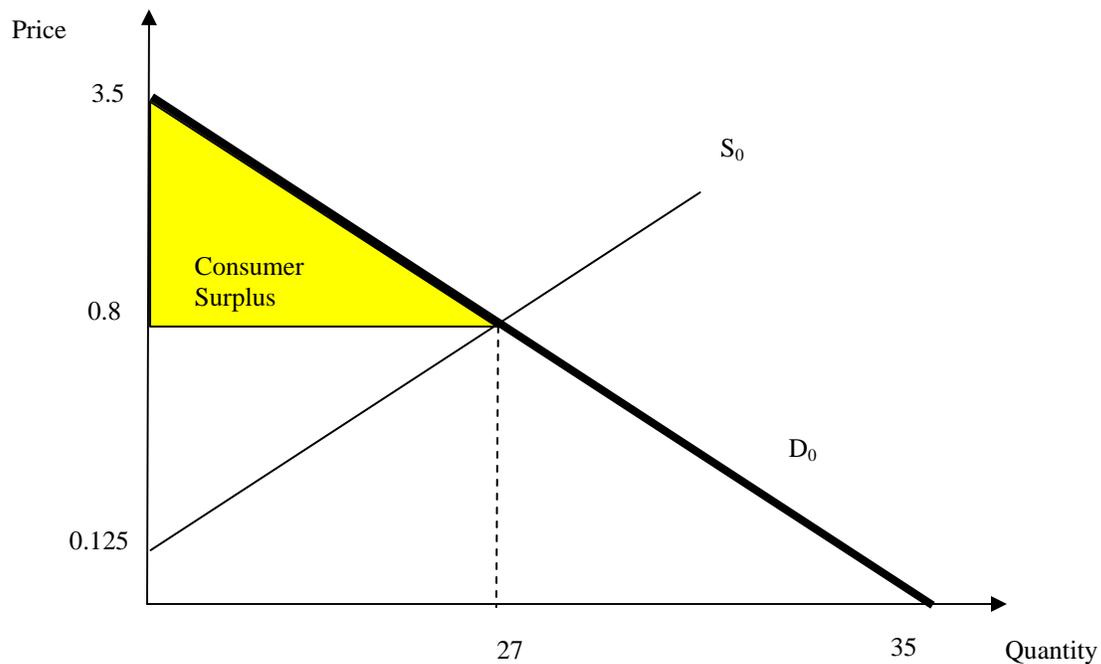a) At what price will tobacco sell, and what quantity will be sold?

Assume a competitive market, the market equilibrium price will be where S = D:
40p – 5 = 35 – 10p
50p = 40
p = 0.8
q = 27

b) The government is then lobbied by the Jaw Cancer Foundation which wants to stop the practice of chewing tobacco. In response, the government imposes a tax on chewing tobacco of one dollar per packet. What will be the new price of chewing tobacco on the market and what tax revenue will the government collect from the tax?

Now consumers face a price of 1+p, therefore the new equilibrium will be:

$35 - 10 * (1+p) = 40p - 5$
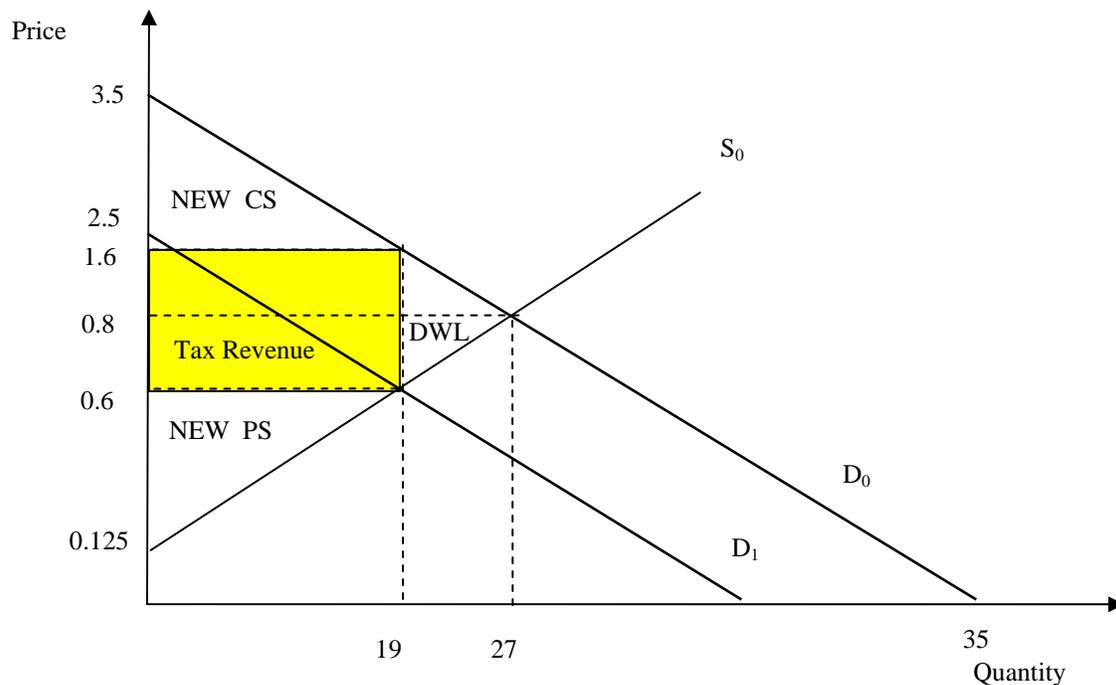**$35 - 10 - 10p = 40p - 5$**
$50p = 30$
$p = 0.6$, the price received by the sellers

The price paid by consumers is 0.6 + the $1 tax, thus they demand:

$Q = 35 - 10 (1.6)$
$Q = 19$

The tax revenue will be $1 per pack = $19

c) Who bears the burden of this tax? In order to answer this question, please calculate the change in consumer surplus and the change in producer surplus that accompany the imposition of the tax. Why (in words) do the relative burdens look the way that they do? If the change in consumer surplus plus producer surplus differs from the amount of tax collected, please explain why it does.

The Old Producer's Surplus = ½ * 27 * .675 = 9.1125
The Old Consumer's Surplus = ½ * 27 * 2.7 = 36.45

After tax PS = ½ * 19 * .475 = 4.5125
After tax CS = ½ * 19 * 1.9 = 18.05

Total loss in surplus = 23
>   **Loss in CS = 36.45 – 18.05 = 18.4**
>   **Loss in PS = 9.1125 – 4.5125 = 4.6**

Total revenue = 19
>   **Tax revenue paid by consumers = 0.8 * 19 = 15.2**
>   **Tax revenue paid by suppliers = 0.2 * 19 = 3.8**

Total DWL = 4

The change in consumer surplus plus producer surplus differs from the amount of collected tax revenue because some of the change results in deadweight loss, the substitution effect of the price changes. The consumers are bearing more of the tax burden because their demand is less elastic to price changes than suppliers – that is they respond less to changes in price.

d) Calculate the change in consumer surplus as a fraction of original pre-tax consumer surplus, and the change in producer surplus as a fraction of original (pre-tax) producer surplus. Please explain why these fractions do or do not differ.

Although consumers lose more than producers in absolute numbers of dollars, both lose the same percentage of surplus they originally had.

Producers: (4.6)/(9.11) = 50.48%
Consumers: (18.4)/(36.45) = 50.48%

The fractions are the same because their <u>relative elasticities</u> determine both the portion of the tax burden borne as well as how much surplus each party had relative to the other.

e) Discuss what some of the general equilibrium effects in the economy of instituting such a tax might be. Assume growing tobacco is a labor-intensive process.

To consider the general equilibrium effects, one can look at both the sources and uses side of the tax incidence and in related sectors.

When a tax on a commodity is imposed, its relative price rises so consumers may start to substitute other goods for chewing tobacco. With the lower price received by the producers and lower quantity demanded at that new price, producers will produce less of chewing tobacco. We know that from the partial equilibrium analysis.

With GE analysis we can also say that the <u>demand for substitute goods will increase (chewing gum) and so the equilibrium price and quantity will increase for that good</u>.

Furthermore, some of the inputs that were used for producing chewing tobacco will be used elsewhere in the economy. Since producing chewing tobacco is a relatively labor intensive process, relatively large amounts of labor must be absorbed in other sectors – <u>the relative price of labor to capital and other inputs, will fall</u>. The decline in wages depends on how easily substitutable labor is for capital in other sectors; if it is not easily substitutable, there will be a surplus of labor (unemployment) and the decline in wages will be greater. In any case, labor would bear a greater burden from the tax than holders of capital on the sources side. <u>The total incidence depends on whether there is a difference in the use of chewing tobacco between wage laborers and capitalists</u>.

The amount of impact of the tax <u>depends on the price elasticity of demand</u> for chewing tobacco. If it is very high, the greater the decrease in quantity demanded and the impacts in the economy in general. If it is low (addictive), then the change in quantity will be low.

QUESTION 2:
In practice, what makes property taxes a good source of tax revenue for local governments? What makes it a problematic source of tax revenue?

<u>+'s:</u>
<u>potential tax buoyancy</u>
<u>An important part of local government revenue</u> because land is something that is fixed and durable and so administered better locally.

<u>-'s</u>
Property taxes are problematic because any of the tax goals of efficiency and equity are comprised in practice by:
1) <u>problems with tax base and rate structures</u>: property taxes systems are often a mix of uncoordinated taxes whose effects may offset each other and impede efficiency. Ex: tax bases may be altered through a variety of exemptions and deductions, valuation systems may require the assumption of widespread homogeneous rental properties (rental value system) or outdated manuals (sales value system)
2) <u>infrequency of assessment</u>: usually done about every 5-7 years means that this source of tax revenue is not only not as buoyant but its inelasticity again undermines efficiency.
3) <u>the use of property taxes for other policy objectives</u> such as land use control, rent control, etc. which can again impede and sometimes counteract progressive tax rate structures. This results in a common state of an uncoordinated property tax system.
4) <u>limited administrative capacity</u> to implement and enforce taxes which lessens buoyancy of this revenue source.
5) <u>political economy</u> reasons – resistance to reforms in tax policies by elites and bureaucrats: again lessens collection