PRINCIPLES OF MICROECONOMICS, SEMESTER 1, 2016

Tutorial 3 (Week 4)

Q1. What would you expect the price elasticity of demand to be in the markets for the following products? *Ceteris paribus*, what would be the most effective way for the suppliers (if they acted together as a group) to increase their total revenue in these markets?

a. food — Inelastic [necessity, no subsitutes]

b. rice — Inelastic [staple food, necessity]

c. pork roasts — Elastic [many substitutes, also a (somewhat) luxury item]

d. beer — Inelastic [addictive!]

e. Ferraris — Elastic [large budget item, luxury item]

f. matchboxes — Inelastic [small budget item]

g. refrigerators — Elastic [large budget item, durable product]

Q2. What would you expect the cross-price of elasticity to be between the following pairs of markets?

a. pens and pencils — Positive (substitutes)

b. paper and printers — Negative (complements)

c. tomatoes and softdrink — Zero (unrelated!)

d. tables and chairs — Negative (complements)

e. shampoo and conditioner

Usually these are complements, but in PNG they might be used as substitutes as well? I still think it would be negative overall (stronger complements than substitutes!)

Q3. What would you expect the income elasticity of demand to be in the following markets in Australia? Categorise each of the products as either inferior, normal, and superior. Would any of you answers change if we considered the equivalent markets in rural India?

a. rice — Inferior

b. vegetables — Normal

d. bicycles — *Probably* normal

e. tablet computers — Superior

f. handbags — Normal

g. Prada handbags — Superior

Q4. Consider a public policy aimed to reduce the amount of smoking.

a. Studies indicate that the price elasticity of demand for cigarettes is about 0.4. If a packet of cigarettes currently costs K8 and the government wants to reduce smoking by 20%, by how much should it increase the price?

$P\varepsilon_D = \%\Delta QD / \%\Delta P$

$0.4 = 0.2 / \%\Delta P$ => x = 0.2 /0.4 => $\%\Delta P = 0.5 = 50\%$ => Thus **price needs to increase by K4** (50% of K8)

b. If the government permanently increases the price of cigarettes, will the policy have a larger effect on smoking 1 year from now or 5 years from now?

In 5years, because Demand becomes more elastic when analysed over a longer time period - people have longer to adjust their behaviour, and so can adjust more fully and effectively (the same is true of suppliers).

Q5. We have a market with the following supply and demand functions:

$$Q_D = 250 - 3P \quad \text{and} \quad Q_S = 2P$$

a. Graph the market.
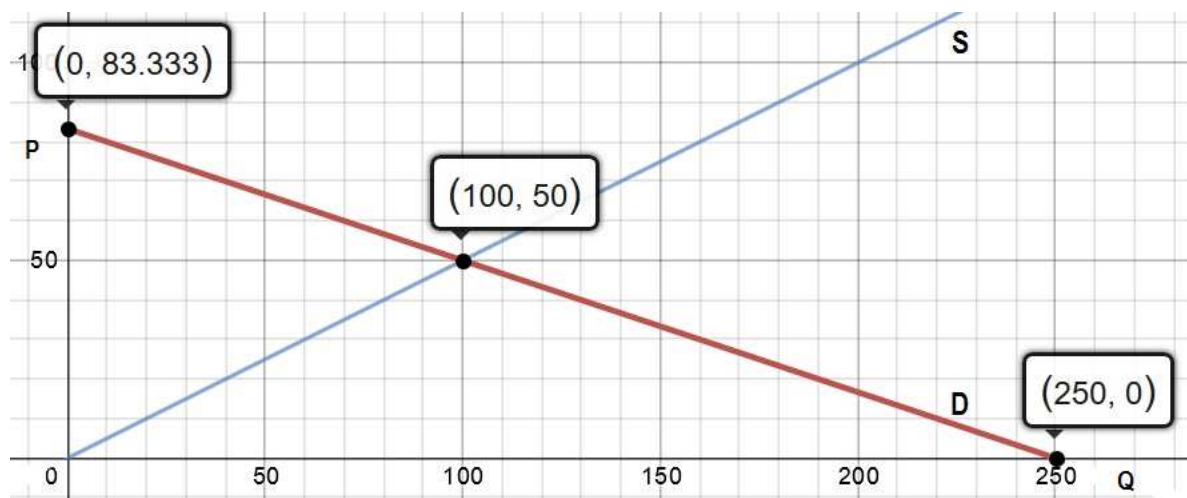
b. Calculate the equilibrium price and quantity in the market.

$250 - 3P = 2P \implies 250 = 5P \implies$ **P = 50**

Therefore, **Q = 100** (substitute P = 50 into either the Q_D or Q_S equation)

c. At the market equilibrium point, calculate the price elasticity of supply and the price elasticity of demand.

I decided this was too hard for Principles level, but you could use the midpoint formula (slide 11 of Lecture 4) if you were keen...!

d. Calculate the consumer and producer surplus in the market.

CS = {(83.333 - 50) * 100} / 2 = (33.333*100) / 2 = 3333.33/2 = **1666.66**

PS = (50 * 100) / 2 = 5000 / 2 = **2500**

e. Suppose a K10 per unit tax was levied on suppliers. Who would bear a larger share of the total tax burden?

We need to contract the supply curve by a vertical distance of 10 Kina... the way to do this is to change the equation for the supply curve, so that it is: $Q_S = 2(P - 10)$; then we just solve for the new equilibrium:

250 - 3P = 2(P - 10)   => 250 - 3P = 2P - 20   => 270 = 5P   => **P = 54**

This is the price that consumers pay. However, the price that suppliers receive is 10 Kina less than this (as the tax must be paid to the government!); thus, the price suppliers receive is 54 - 10 **= 44**.

This means that, compared to the pre-tax price of 50, consumers are bearing K4 of the tax and suppliers are bearing K6; consumers thus bear 40% (K4 out of K10) of the tax and suppliers bear 60% (K6 out of K10); **suppliers bear the bigger burden**. We could have predicted this if we had calculated the elasticities in 3c) above (***the more price inelastic party always bears the bigger burden of the tax***).

e. Now calculate the actual equilibrium with a K10 per unit tax and graph the new equilibrium. What are the new equilibrium price(s) and quantity?
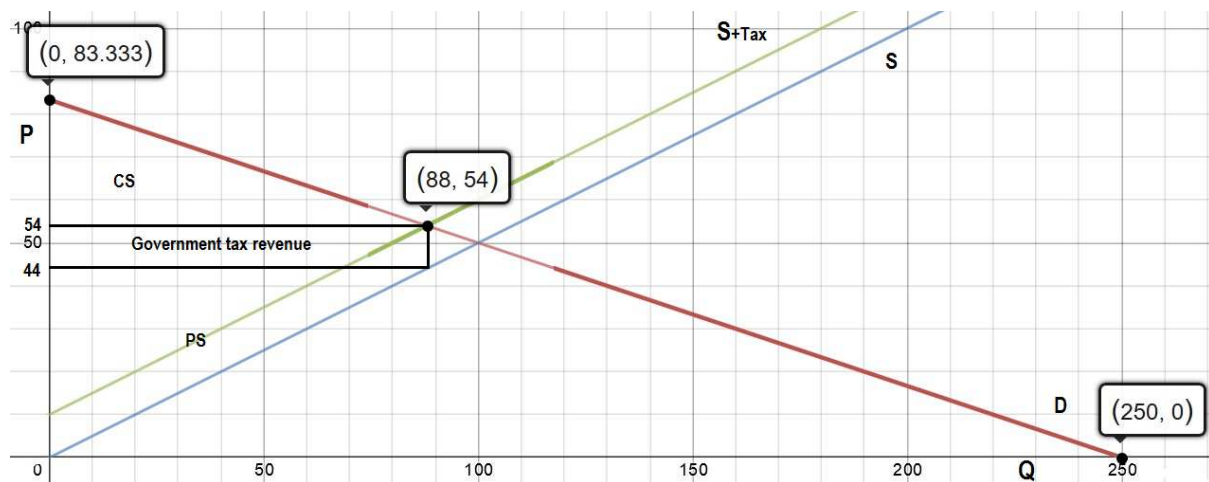
New equilibrium is P = 54, Q = 88 (the price the producers receive after giving the K10 tax money to the government is P = 44; P = 54 is what the product is sold for on the market)

To calculate Q = 88, all we did was substitute P = 54 into the demand curve equation:

250 - 3P = 250 - (3*54) = 250 - 162 = **88**

f. What is the total tax revenue? What fraction of this tax is borne by suppliers and what fraction by consumers?

Tax revenue is just the size of the tax (K10) multiplied by the quantity of products sold:

Tax revenue = 10 *88 = 880 Kina

g. Calculate the new consumer and producer surplus in the market. Add these amounts to the total tax revenue, an compare this answer with your answer to (d). What has happened to the market?

CS = {(83.33 - 54) *88} / 2 = 1290.66   PS = (44 * 88) / 2 = 1936

With the tax: CS + PS + Tax Revenue = 1290.66 + 1936 + 880 **= 4106.66**

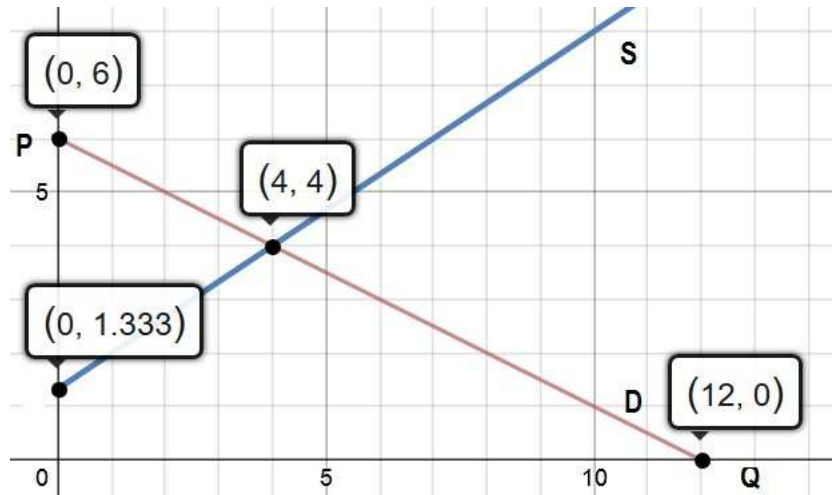Without the tax: CS + PS = 1666.66 + 2500 = **4166.66**

The market has become less efficient than before - the total benefit is 100 Kina less

=> **the tax has lead to a DWL of 100 Kina.**

Q6. Consider a market with the following supply and demand functions:

$$Q_D = 12 - 2P \quad \text{and} \quad Q_S = 1.5P - 2$$

a. Graph the market.

b. Calculate the equilibrium price and quantity in the market.

12 - 2P = 1.5P - 2   => 14 = 3.5P   => 14/3.5 = P   => **P = 4**

Substitute P = 4 into either the Q_S or Q_D equation => **Q = 4**

c. Calculate the consumer and producer surplus in the market.

CS = {(6 - 4) * 4} /2 = 8/2 = **4**   PS = {(4 - 1.333) * 4} /2 = (2.666 * 4) /2 = 10.666/2 = **5.33**

d. Now assume that the government intervenes in the market and fixes the price at K5. What type of price control is this? Calculate the new Q_D and Q_S. Using this information, what has this price control resulted in?

It is a price floor. The new Q_D = 12 - (2 * 5) = **2**, and new Qs = (1.5 * 5) - 2 = **5.5**; the price floor has resulted in a **surplus** (Q_S>Q_D).

f. Calculate the new consumer and producer surplus in the market. Compare this with your answer to (c). What has happened to the market?

CS = {(6 - 5) * 2} / 2 = **1**

Calculating P on the supply curve where Q_S = 2; => 2 = 1.5P - 2 => 4 = 1.5P; P = 2.666 [we needed this to calculate the area of PS!]

PS = Triangle + Rectangle = [{(2.666 - 1.333)*2} / 2] + {(5 - 2.666)*2} = 2.666/2 + 4.666 = **6**

The market has less CS, more PS, and more DWL (we didn't have to calculate it for the question, but we can quickly work out that that DWL is equal to the [CS + PS] in part c), minus the [CS + PS] in part f); => 9.333 - 7 = **2.333**).

g. Consider the government's policy. Who is it intended to protect? What did it result in? Critically assess the effectiveness of the policy.

It is intended to protect the producer. It did result in more PS, but we don't know how that PS is distributed amongst the suppliers in the market (because they are also producing a surplus of products which is not being sold!); it also resulted in less CS, and in DWL (inefficiency!). Personally, I think it is not a good policy because of the inefficiency it is creating.

h. Seeing the challenges its policy has created, the government is considering subsidising the suppliers in the market. If you were employed as an economic consultant by the government, what would your advice be regarding their plan? If there aim is to protect the producer, what would you suggest instead? What if the government's aim was to create market efficiency?

If you did intend to protect the producer, there are worse policies to choose than a subsidy... but a subsidy *also* creates DWL. I think a better policy would be to help reduce the producers costs by providing relevant public goods (i.e. new and reliable infrastructure, reliable utilities, well-educated employees, etc.). This would also have a lot of positive spillover benefits, and would not result in DWL! If the government's aim was just to create market efficiency, they could just remove the price floor and leave the market alone!