

Problem Set 4

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Section B

1.

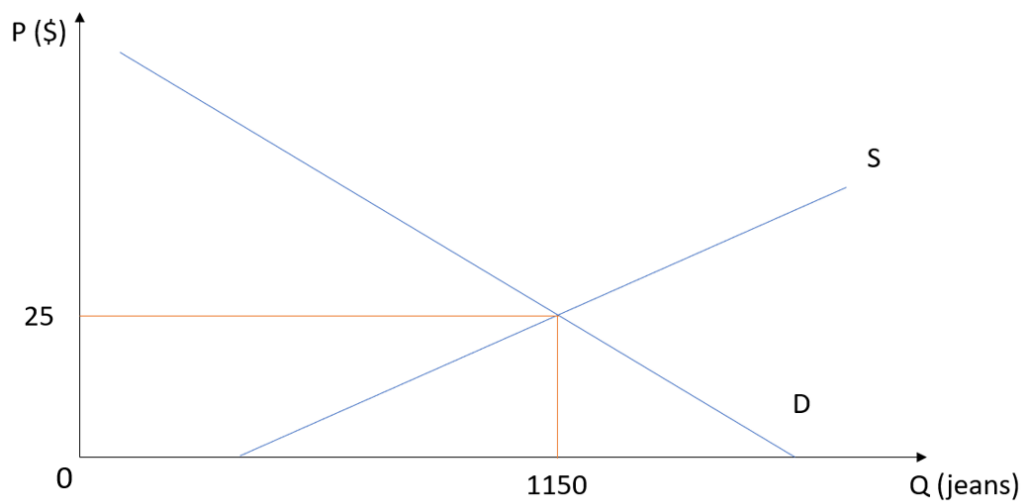
$$Q_s = 650 + 20P$$

$$Q_d = 1400 - 10P$$

(a) At equilibrium point $\rightarrow Q_s = Q_d \rightarrow 650 + 20P = 1400 - 10P$

$$P^* = 25$$

$$Q^* = 1150$$



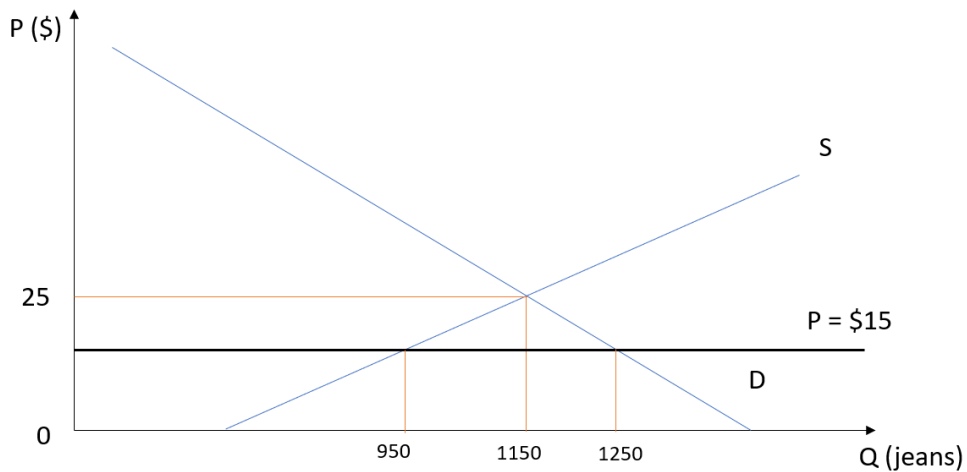
1.

(b) Government official X introduces a price ceiling of \$15 per pair.

At the price ceiling of $P = \$15$,

$Q_s = 950$

$Q_d = 1250$



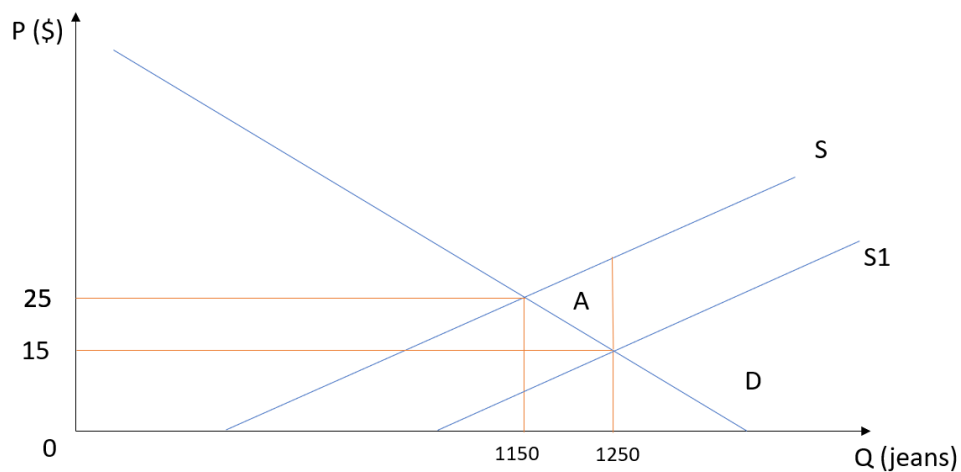
Since the price ceiling of $P = \$15$ is below the equilibrium price, the price ceiling is a binding constraint on the price, resulting in a shortage. It causes a shortage of 300 ($1250 - 950$) as there will be a greater quantity demanded than the quantity supplied. Due to unfulfilled demand, this may ensue in a black market, whereby sale of jeans may occur at a price above the price ceiling. In the case of a resulting black market for jeans, sellers would price jeans greater than or equal to \$25, which was the initial equilibrium price.

1.

(c) According to government official Y, the introduction of subsidy z would also result in buyers paying \$15 per pair of jeans.

Given that subsidy z will also result in buyers paying \$15 for each pair, z would be a subsidy of \$10 ($25-15$).

A result of the subsidy would be deadweight loss, caused by the fall in total surplus. The deadweight loss of the subsidy is represented by triangle A, where the cost of producing jeans is greater than the value of the units to buyers, resulting in wasteful trade.



2.

Weekly $Q_d = 12500 - 100P$

Weekly $Q_s = 25P$

(a)

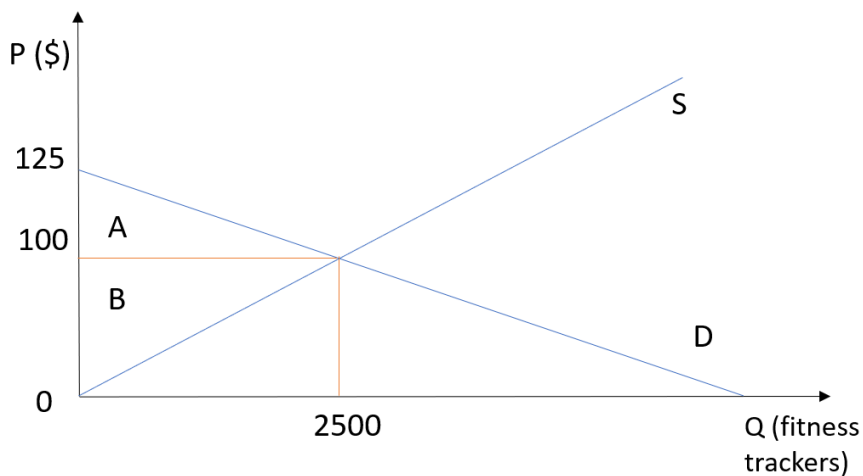
Equilibrium price and quantity $\rightarrow Q_d = Q_s$

$$12500 - 100P = 25P$$

$$P^* = \$100$$

$$Q^* = 2500$$

(b)



$$\text{Consumer surplus (A)} = 0.5(25)(2500) = 32500$$

$$\text{Producer surplus (B)} = 0.5(100)(2500) = 125000$$

$$\text{Total surplus (A+B)} = 157,500$$

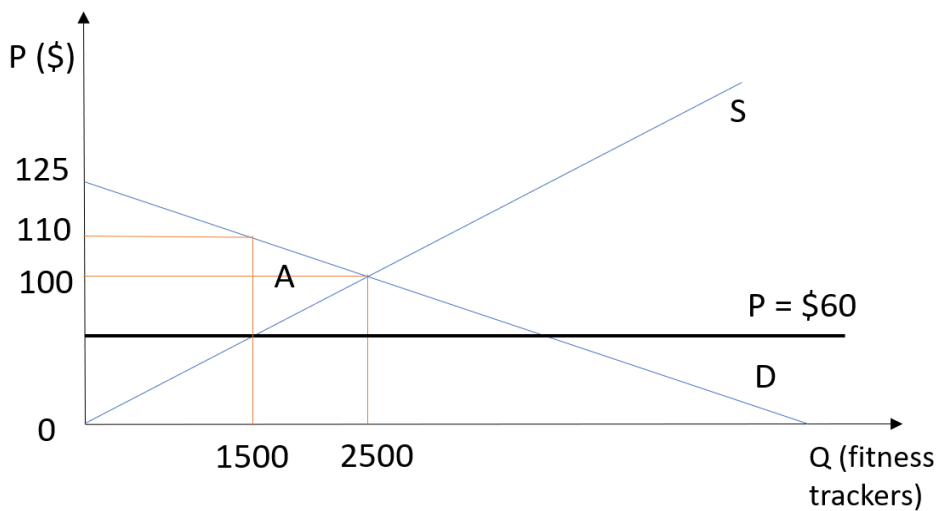
(c)

Price ceiling $P = \$60$, At $P = \$60$, $Q_s = 1500$

$$\text{At } 1500 \rightarrow 1500 = 12500 - 100P$$

$$P = \$110$$

$$\text{DWL} = \text{area of triangle A} = 0.5(1000)(50) = 25000$$

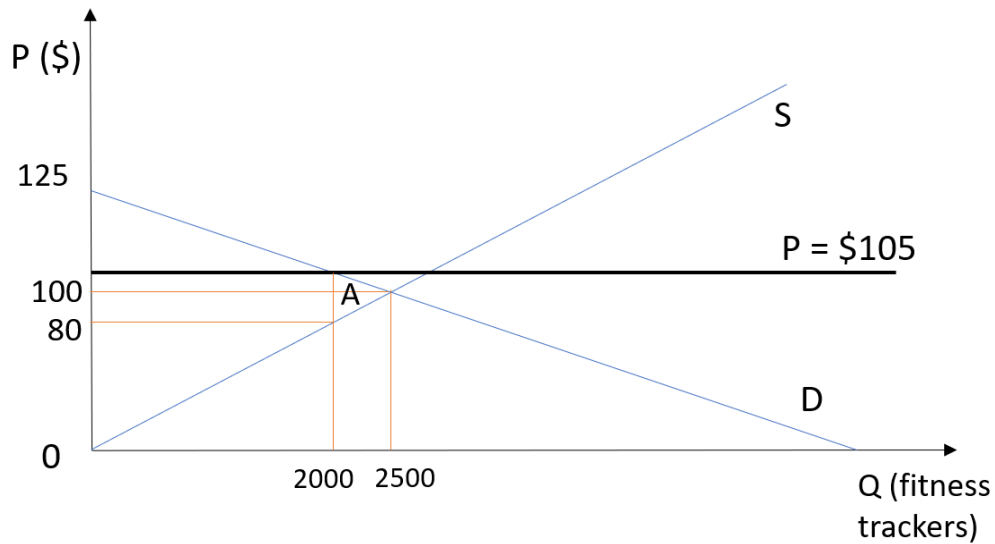


(d)

Price floor $P = \$105$, At $P = 105$, $Q_d = 12500 - 100(105) = 2000$

At 2000, $P = 2000/25 = 80$

DWL = area of triangle A = $0.5(500)(20) = 5000$



(e)

Deadweight loss is the fall in total surplus due to a market distortion such as a tax, subsidy, price ceiling or price floor. Deadweight loss can be found from the sum of consumer and producer surplus and total government revenue subtracted from the total surplus.

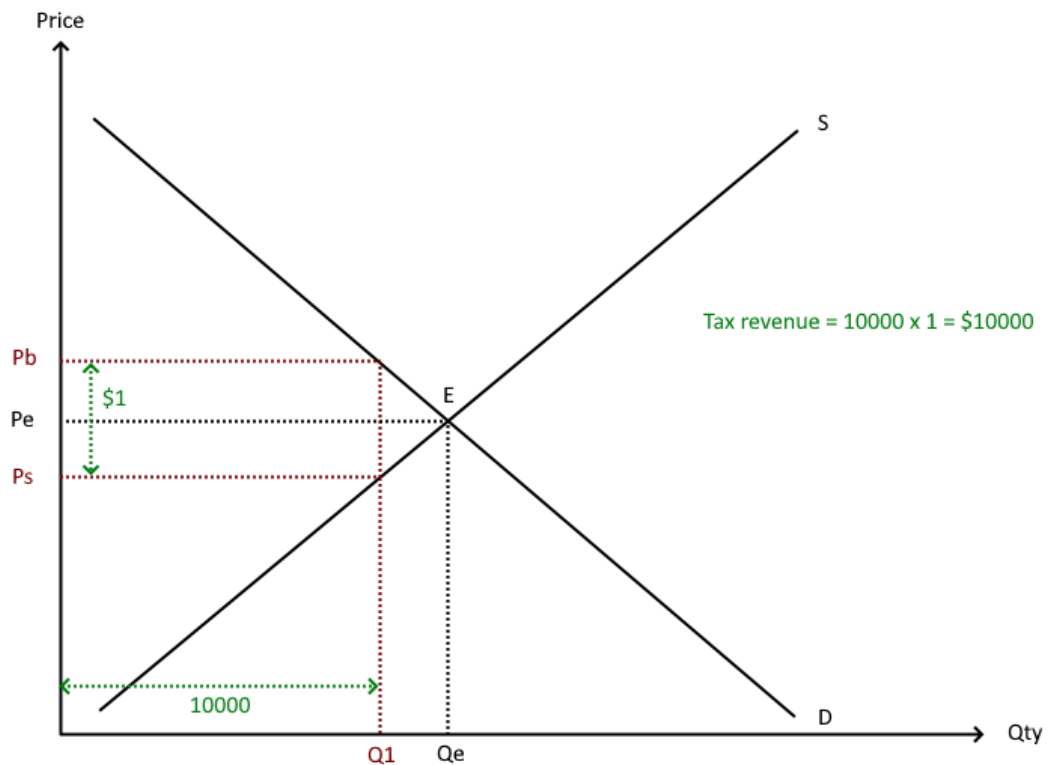
3.

In the beginning:

Qty of widgets = $10000/1 = 10000$

Qty of gadgets = $10000/1 = 100$

Scenario 1: Assuming that demand and supply of both widgets and gadgets have price elasticity > 0 , and suppose that:



Let $D = -Q+a$, $S = Q+b$ (this is assuming that $PED \& PES = 1$), we deduce that:

When tax is \$1, $Q=10000$ and $D-S=\$1$ (amount taxed).

$$D=S+1$$

$$-10000+a=10000+b+1$$

$$a=b+20001$$

Looking at equilibrium point E, Q_e should be a constant like a and b.

At this point, $D=S$

$$-Q_e+a=Q_e+b$$

$$a=2Q_e+b$$

$$b+20001=2Q_e+b$$

$2Q_e=20001$, and the equilibrium quantity(Q_e) is therefore 10000.5

Now suppose we double the tax on widgets from \$1 to \$2:

$$D = S + 2$$

$$-Q_2 + a = Q_2 + b + 2$$

$$a = 2Q_2 + b + 2$$

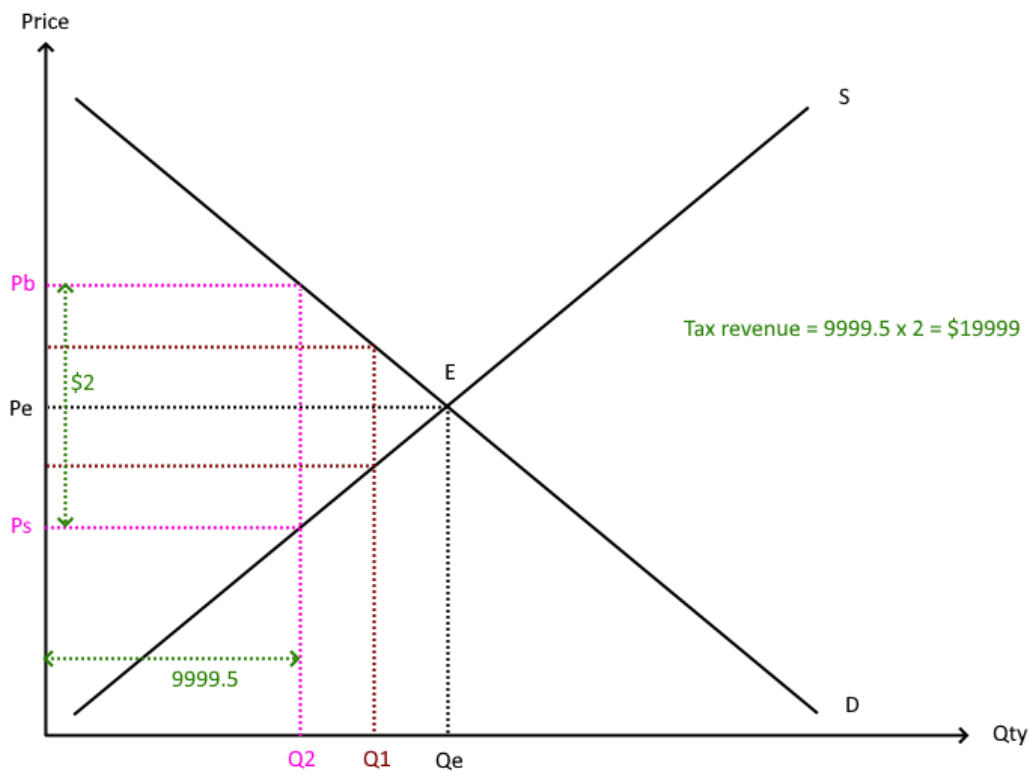
$$a - b = 2Q_2 + 2$$

From earlier we know that $a = b + 20001$, so $a - b = 20001$

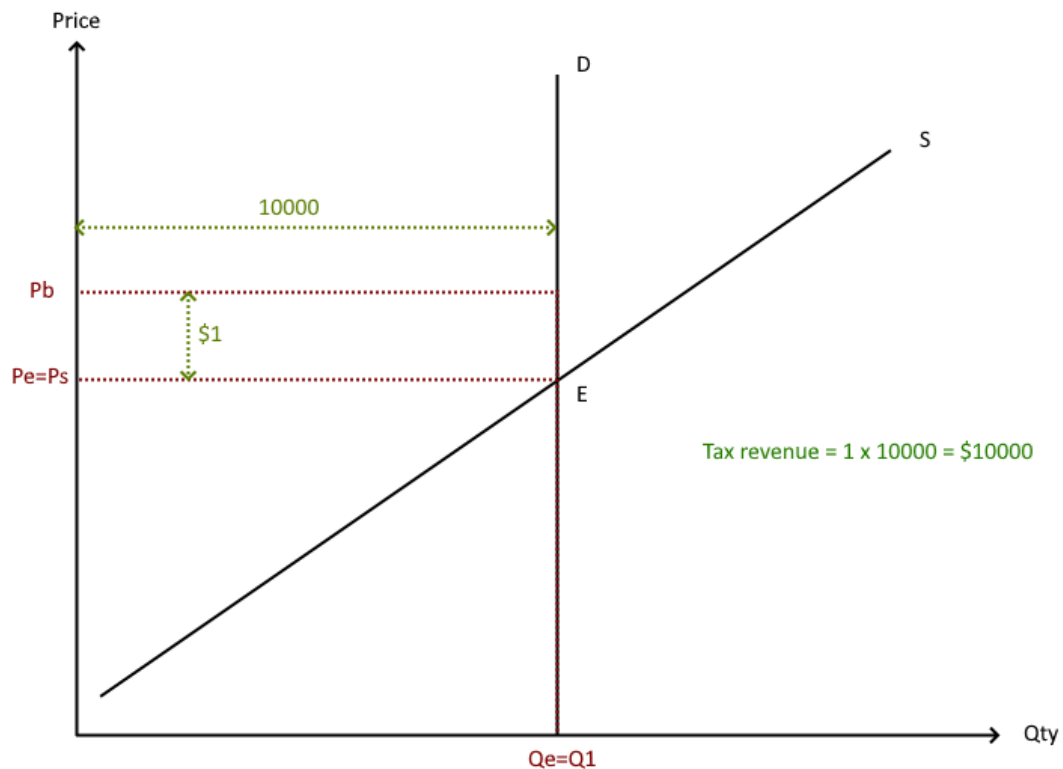
$$2Q_2 + 2 = 20001$$

$$Q_2 = 9999.5$$

Total tax revenue will be $2 \times 9999.5 = \$19999$, which is less than before (though \$1 is very insignificant in this case). This is because some consumers and producers have left the market due to reduced willingness to pay and increased cost. While the tax amount has doubled, the quantity has fallen.



Scenario 2: What if demand of widget is perfectly price inelastic:

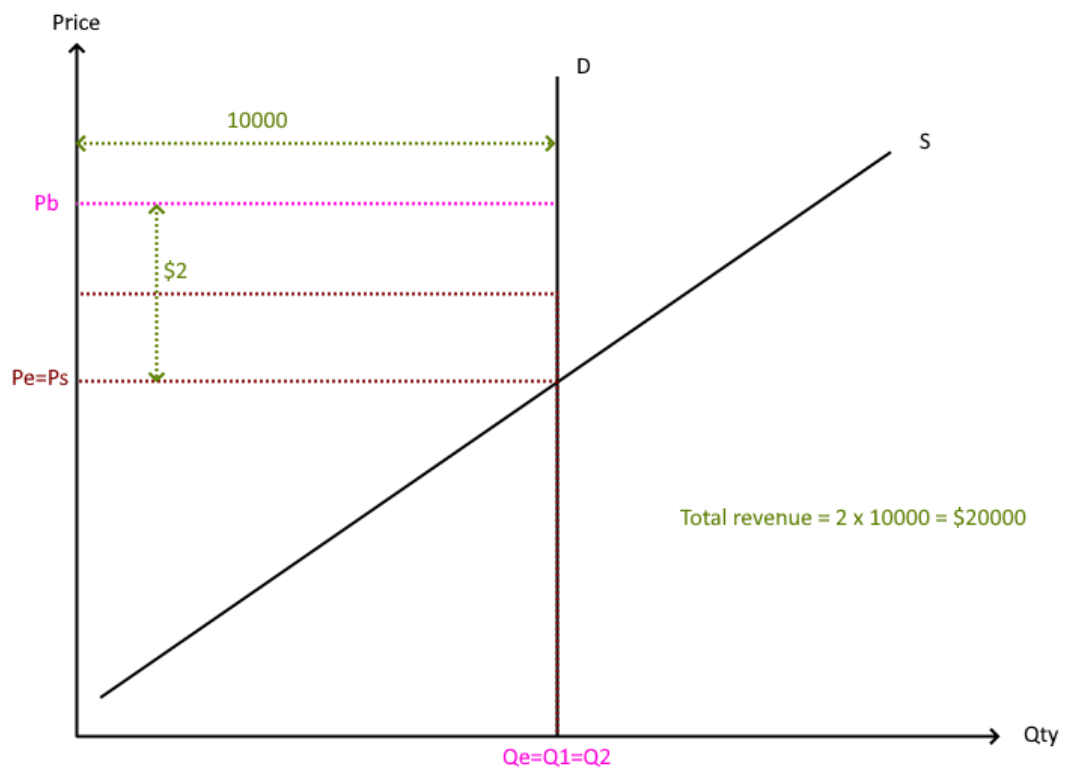


When PED of widget = 0, all of the tax burden is borne by the consumers. The tax revenue collected is \$10000 and total tax revenue is \$20000.

When the government increases the tax from \$1 to \$2, no consumers exit the market because the demand for widgets is perfectly price inelastic. Q_2 is still the same as Q_1 and Q_e . Instead, the consumers will bear the full brunt of the increased tax and still consume the same amount of widgets.

Therefore, the quantity remains as 10000 units while tax collected per unit is now \$2. Total tax revenue is still \$20000.

(This is the same as when producers have perfectly price inelastic supply. Instead of the consumers bearing all of the tax incidence, the producers will receive \$2 less and still produce at Q_e)

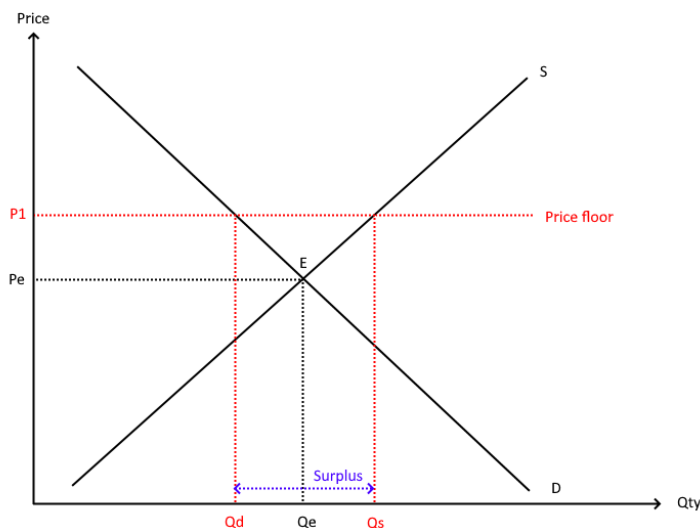


(Also assume that we are only looking at the short run effects of the changes in tax)

4.

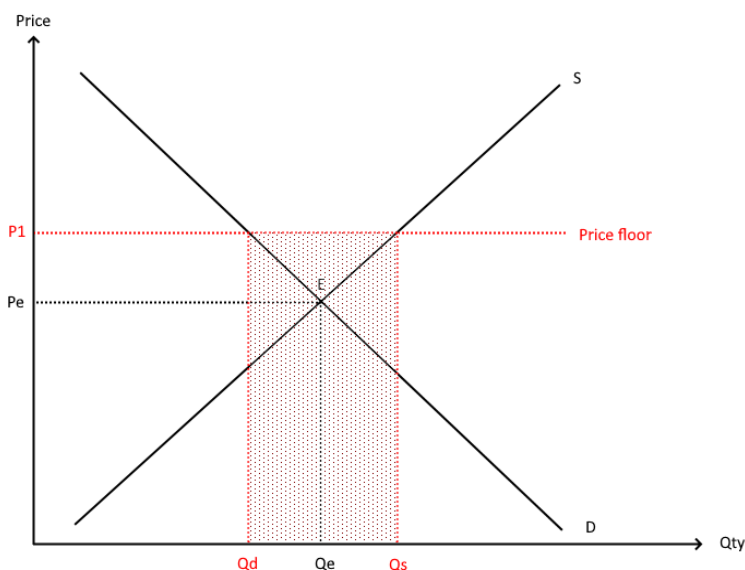
(a) From page 1, paragraph 2: “The two-year-old policy of paying farmers more for rice than it is worth on international markets is straining the country’s finances, has cost Thailand its spot as world’s top exporter of the grain and has provoked concern at the World Trade Organisation.”

The government is essentially setting a price floor that is higher than equilibrium market



price.

Normally this would result in a surplus, as at price = P_1 , only Q_d amount of rice is demanded, yet Q_s amount of rice is supplied. $Q_s - Q_d$ is the qty of surplus. However, the government policy is to buy up the surplus at the price floor. (expenditure on buying the surplus rice as illustrated by the **red shaded area**)



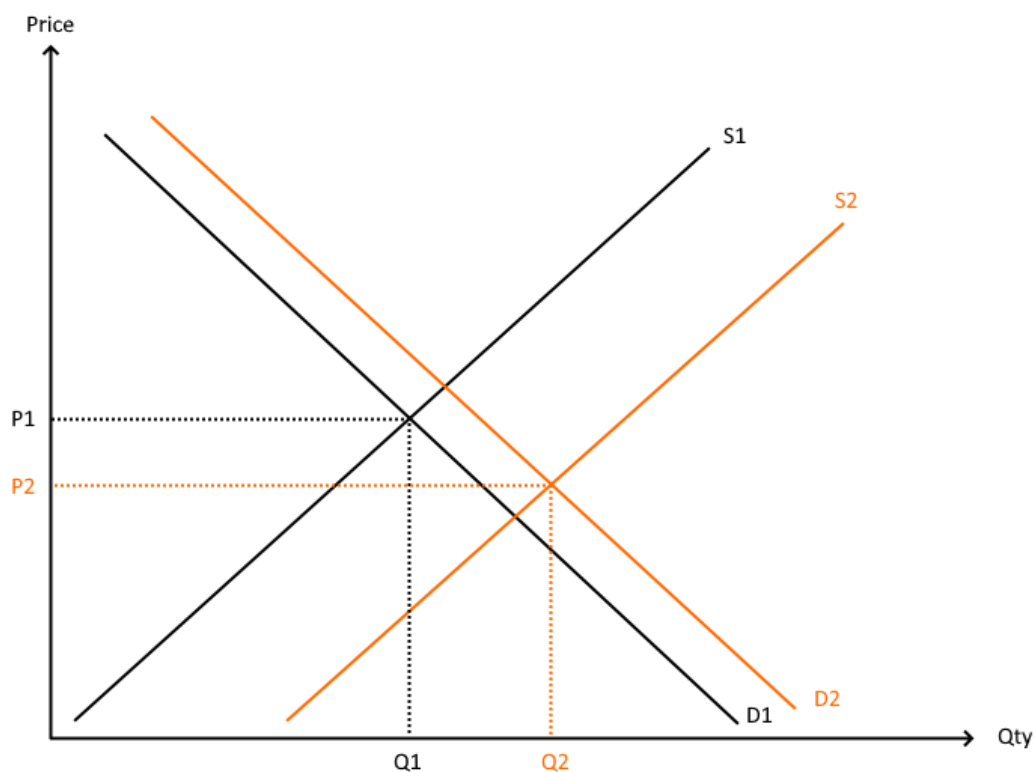
(b) The Thai government has plans to “dump” the accumulated rice in its reserves as it becomes desperate to recoup losses before the rice deteriorates and clear up storage space. This will result in an increase in the supply of rice on the international market. (a rather substantial one too given how much the Thai government has stockpiled).

However, the demand for rice on the international market is likely to meet the supply somewhere in the middle, thus dampening the effect somewhat.

From page 3, paragraph 2 to 3: “There are some different potential outcomes: Samarendu Mohanty, a senior economist at the International Rice Research Institute, based in Manila, said that while rice consumption in 2013 should remain strong, global rice prices would fall if Thailand unloaded its stocks.

Kiattisak Kalayasirivat of Novel Agritrade warned that prices could drop by \$20 to \$30 per metric ton if Thailand sold stocks, although demand from Africa or China would probably provide support.”

The supply of rice has increased due to Thailand’s dumping onto the international market, but the demand for rice is also rising, **albeit not as drastic as the surge in supply**.



This leads to overall lower prices and increased quantity transacted.

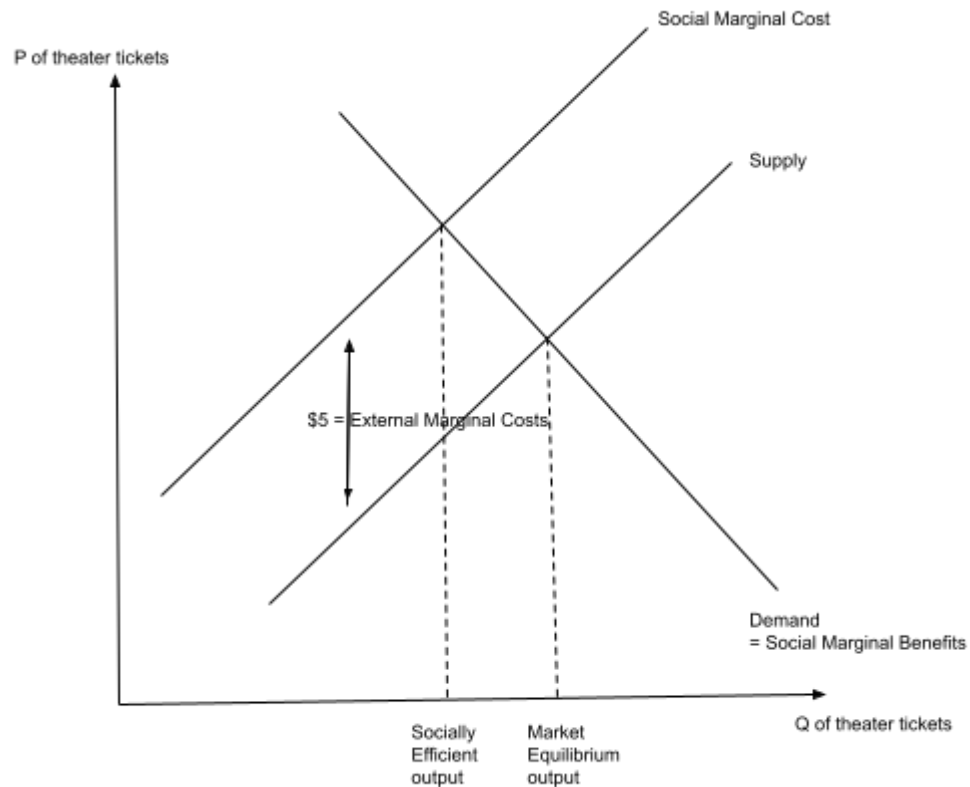
- a. The consumption of potable water is rival as one unit consumed by a person means there would be less water for everyone else, assuming water is a scarce and limited resource. Furthermore, the consumption of potable water is excludable as people who do not pay for the consumption can be excluded from consuming the good. Therefore, potable water is a private good. However, since drinking water is a necessity, the demand curve is almost perfectly price inelastic since Q does not change regardless of P .
 - i. Profit maximising firms who provide potable water would leverage on this fact by increasing prices to maximise revenues and hence profits. This would lead to a loss in Consumer Surplus and most importantly it is unfair since those with little ability to pay would be excluded from the consumption. Hence, public provision is justified as government firms will be able to set a price ceiling which ensures equal access to potable water for everyone.
 - ii. Furthermore, public provision would ensure the continuity of provision. If private firms decide to exit the market due to losses, it would be difficult to find a new firm to provide drinkable water in such a short time period. However, in the event that government owned firms make losses, they would be able to continue financing their operations using tax money and national reserves.
- b. The consumption of education is a private good. Education is excludable as people who do not pay can be excluded from consuming. Furthermore, it is also rival as the consumption of education by one person reduces the amount available to others. This is reflected through admission slots in primary, secondary and tertiary, and most importantly university education. Furthermore, as more students enrol in a school, there would be more students sharing the same educational resources which entails less resources enjoyed by the average student.
 - i. Public provision of education is necessary for the most basic and fundamental education (kindergarten, primary and secondary) as the marginal external benefits reaped from secondary and primary education is very high as an increase in the amount of primary school graduates would significantly increase literacy rates nationwide which benefits all residents from higher levels of foreign direct investments and higher levels of employment. If this is left to the private market, there would be an underproduction of primary and secondary education (Deadweight Loss). Furthermore, public provision for primary and tertiary is also essential as it is important to standardise the curriculum for all students nationwide. Both students and teachers would definitely benefit from the standardised curriculum due to less resources wasted in creating different curricula for different types of schools.
 - ii. Public provision is also important for tertiary education as the government is able to fund research and development in tertiary institutions better than private firms. However, public provision of tertiary education is not as important as compared to primary and secondary as the EMB is lower than that of primary and secondary schools. For tertiary education, the benefits are mostly reaped by the students studying the course as they are pursuing a path they want to specialise in.
- c. Dissemination of news is classified as private good. This is because a person who does not want to pay can be excluded from disseminating the news that they want to share on social traditional media and established media channels on the internet.

Furthermore, it is rival as the dissemination of news from one source will reduce the amount available to other people who want to disseminate different information (e.g. newspapers only have certain amount of pages, television can only air 24 hours per day).

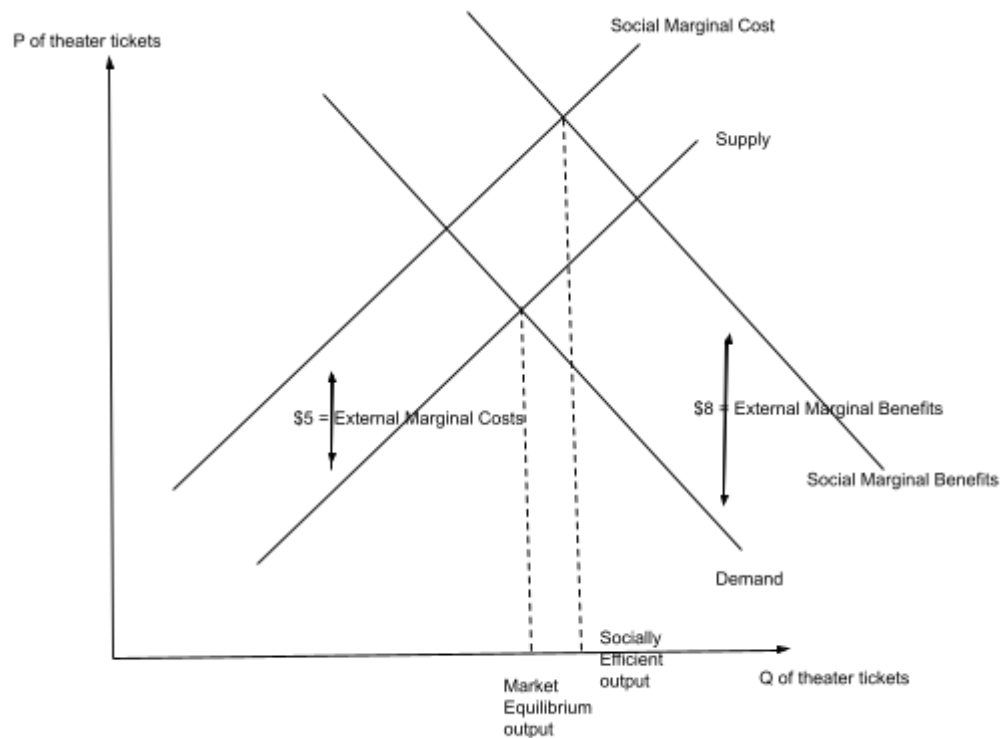
- d. Consumption of news is classified as natural monopoly. This is because a person can be excluded from consuming news if they do not pay subscription fees (e.g. pay-per-view television, subscription fees for news website). When a person consumes news, it does not reduce the amount available for others, hence it is rival.
- e. Classifying dissemination of news as public good would mean that the government recognises the good as non-rival and non-excludable. Since it is classified as public good, the government will try to provide the good (dissemination of news) since it is assumed that private firms will not provide the good.

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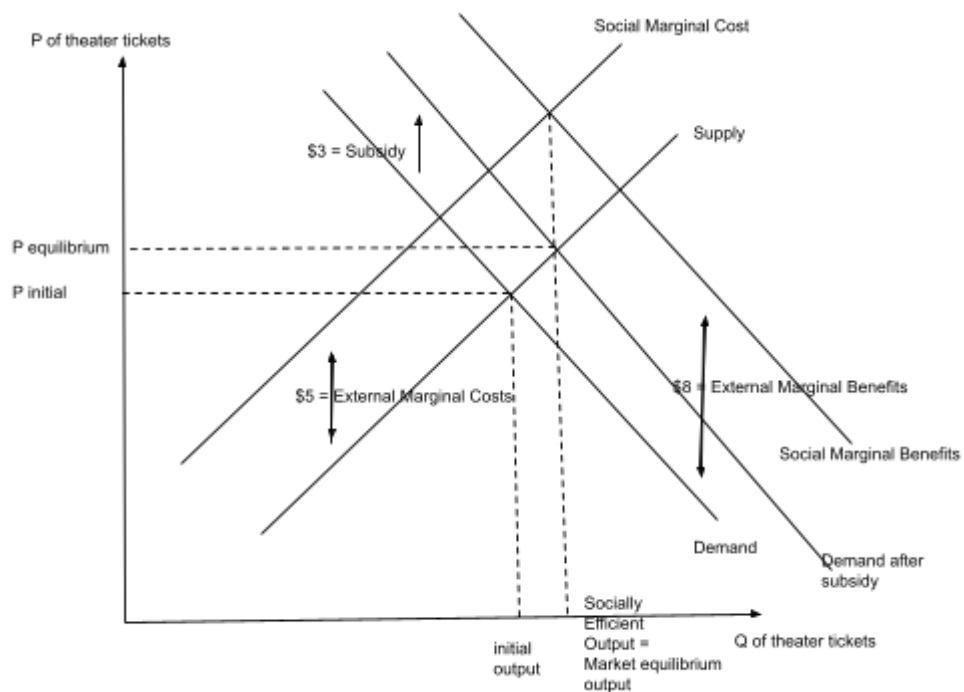
- a. This externality is External Marginal Cost (EMC). One person that buys one more ticket from the cinema will contribute to the worsening of the traffic jam which entails loss in productivity and time by third parties (nearby drivers and passengers) and this represents EMC.

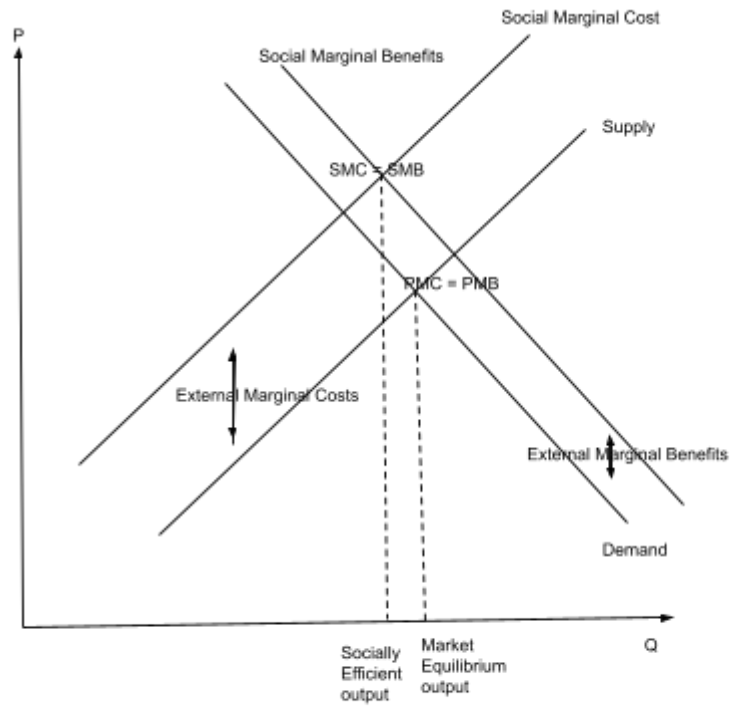


- b.
- c. This externality is the External Marginal Benefits (EMB). One person that buys one more ticket from the cinema will contribute to an increase in foot traffic which will result in an increase in safety of third parties (people who stay near the area). As the area becomes safer, there will be less time wasted by residents in trying various ways to secure their compounds. Furthermore, there will also be a decrease in loss of lives and belongings. This is represented by the EMB.



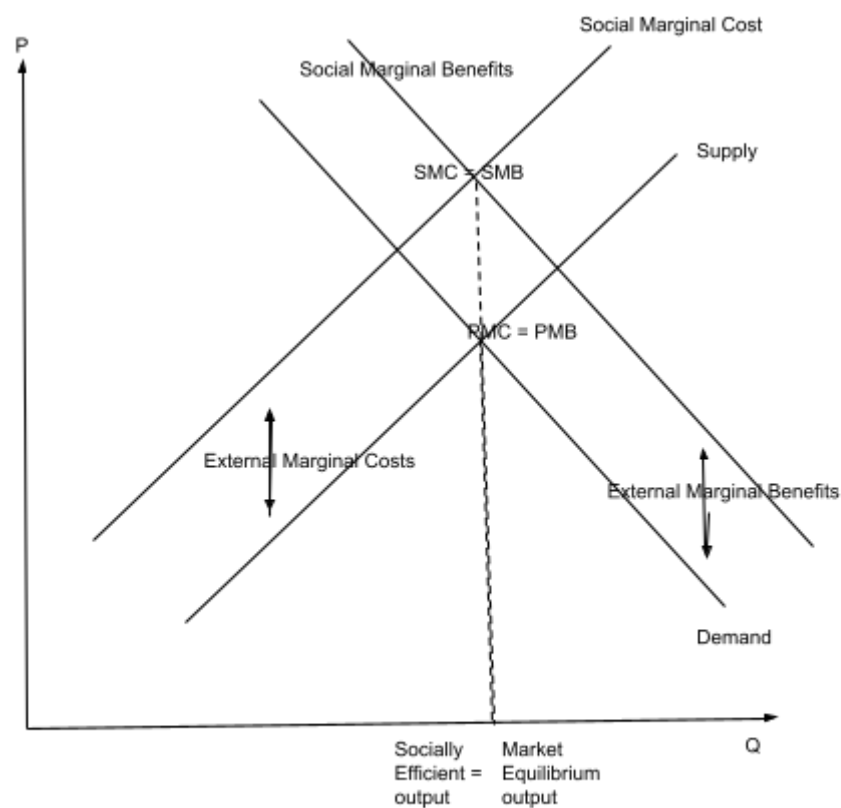
- d.
- e. A subsidy of $\$8 - \$5 = \$3$ per ticket would result in a more efficient market allocation. This is because $\text{Net EMB} = \text{EMB} - \text{EMC} = \$8 - \$5 = \3 per unit regardless of quantity. This \$3 per unit subsidy would increase demand for concert tickets as consumers will benefit from lower prices after subsidy. This will shift demand curve upwards by \$3. The resulting market equilibrium output would be equal to the socially efficient output





Case where $EMB < EMC$

f.



Case where $EMC = EMB$