Economics Assigment 2 - BSDS

Abhinavan OS - bsdbg2401

24th September 2024

Q1. Many changes are affecting the market for oil. Predict how each of the following events will affect the equilibrium price and quantity in the market for oil. In each case, state how the event will affect the supply and demand diagram. Create a sketch of the diagram if necessary.

a) Cars are becoming more fuel efficient, and therefore get more miles to the gallon.

b) A major discovery of new oil is made off the coast of Norway.

c) The price of solar energy falls dramatically.

d) Chemical companies invent a new, popular kind of plastic made from oil.

Ans 1: (a) if cars become fuel efficient and get more miles per gallon, essentially less fuel is needed for the same distance, so demand for oil decreases and hence it's price, the decrease in demand results in the demand curve shifting leftward indicating less price willing to be paid for same amount of oil,hence equilibrium point shifts toward bottom left.There's no direct effect on supply

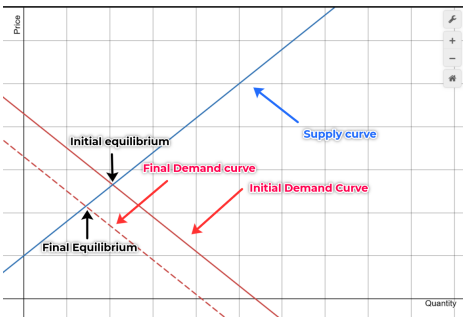

Figure 1: Fig for parts (a) and (c)

(b) Discovery of new source of oil will increase it's supply, hence the supply curve will shifts rightward, same amount of oil can be sold for lesser price now, hence price decreases. equilibrium point shifts towards bottom right. There's no direct effect on demand

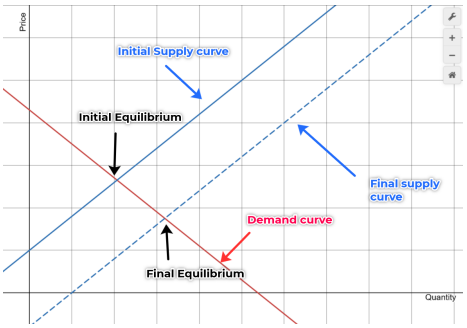

Figure 2: Fig for part (b)

(c) As price of Solar energy falls, consumers actively switch to it causing the demand for oil to fall, hence the effect on supply-demand curve and equilibrium point will be similar to that of part (a) because the demand falls there too and here also there is no direct effect in supply.

(d) A new plastic made from oil will cause the demand for oil to rise and hence the demand curve will shift rightward indicating that price of oil rises. the equilibrium point shifts toward top right. there's no direct effect in supply

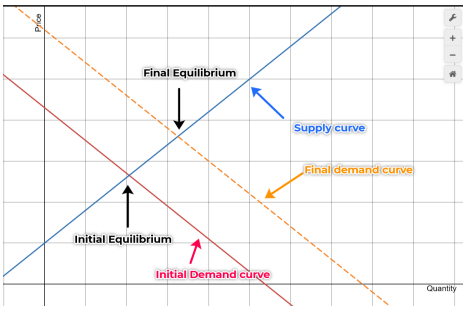

Figure 3: Fig for part (d)

Q2. We know that a change in the price of a product causes a movement along the demand curve. Suppose consumers believe that prices will be rising in the future. How will that affect demand for the product in the present? Show this graphically.

Ans 2: If consumers believe that price of a product will rise in future, they will be eager to buy more of the product in the present. Hence increasing the demand for the product in the present. Increase in demand is shown graphically as follows(the effect is same as that in Q1 part (d) so I'll use the same figure:

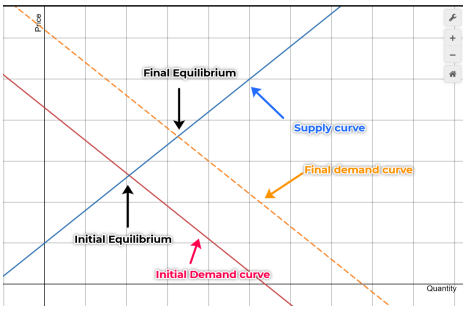

Figure 4: Fig for part (d)

Q3. Consider public policy aimed at smoking.

a) Studies indicate that the price elasticity of demand for cigarettes is about 0.4. If a pack of cigarettes currently costs $2 and the government wants to reduce smoking by 20 percent, by how much should it increase the price?

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

c) Studies also find that teenagers have a higher price elasticity than do adults. Why might this be true?

Ans 3:
(a)
Assuming reducing demand for cigarettes by x % will reduce smoking by x %:

Given: Elasticity of Demand = $E_d = 0.4$

$E_d = \frac{\%\Delta Q_d}{\%\Delta P}$ where D and P are Demand

$\%\Delta Q_d = 20$

$0.4 = \frac{20}{\%\Delta P}$

$\%\Delta P = \frac{20}{0.4} = 50$

So price must increase by 50 %
currently, price = 2 $
50% of 2 $ = 1 $
so price must increase by one dollar and become 3 dollars: 2$ + 1$ = 3$

(b) No, it is more likely that the effect of the change of price in cigarettes will be more effective in reducing smoking in 5 years than in 1 year as 1 year will most probably not be enough time for addicted people to quite and for the effect to set in but in 5 years period, more people smoking will quit and less

people will start after the 5 years time. We can say the demand is more elastic in the long run.

(c) Teenagers usually have lesser money to spend and less freedom for the choice it spend money, making them much more vulnerable to switch to alternatives or quit smoking even if the price of cigarettes rises a little bit. Also they are young so they will not be as addicted it smoking as adults who might been doing it for years and hence have a harder time quitting.

Q4. Use calculus to prove that the elasticity of demand is a constant ϵ everywhere along the demand curve whose demand function is $q = Ap^{\epsilon}$.

Ans 4: Elasticity of Demand = (E_d)

$$E_d = \frac{\frac{\mathrm{d}q}{q}}{\frac{\mathrm{d}p}{p}} = \frac{\mathrm{d}q}{\mathrm{d}p}\left(\frac{p}{q}\right) \tag{1}$$

Given:

$$q = Ap^{\epsilon} \tag{2}$$

Differentiate on both sides by p

$$\frac{\mathrm{d}q}{\mathrm{d}p} = A\epsilon p^{\epsilon-1} \tag{3}$$

Substitute Equation (3) and (2) in (1)

$$E_d = A\epsilon p^{\epsilon-1}\,\frac{p}{Ap^{\epsilon}} = \epsilon \tag{4}$$

Therefore elasticity of demand is constant along the demand curve and is equal to ϵ

Q5. The government has decided that the freemarket price of cheese is too low.

a) Suppose the government imposes a binding price floor in the cheese market. Draw a supply and demand diagram to show the effect of this policy on the price of cheese and the quantity of cheese sold. Is there a shortage or surplus of cheese?

b) Farmers complain that the price floor has reduced their total revenue. Is this possible? Explain.

c) In response to farmers' complaints, the government agrees to purchase all the surplus cheese at the price floor. Compared to the basic price floor, who benefits from this new policy? Who loses?

Ans 5:

(a) Suppose here is how the supply-demand graph looks initially: A forceful floor in the price of cheese would not in-fact alter the supply and demand curves, only

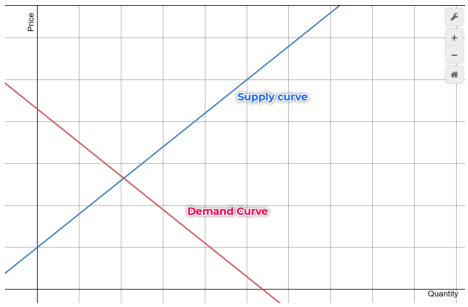

Figure 5: supply-demand graph

a movement along them. A supply curve changes if the factors of supply such as production or logistics cost change, and a demand curve changes if consumers perception towards buying the product changes. With the price floor, consumers will just buy lesser cheese for same money or same amount of cheese with more money which is just a movement along the demand curve. Similarly, with a price floor, the producers of cheese will produce same amount of cheese and sell it for higher price or will sell lesser amount of cheese for the same price as before. Again this is a movement along the supply curve.Since producers produce more and consumers buy less, this results in a surplus

(b) Yes, this is possible as there may be cases where the rise in price loses so many customers that even with the higher profit per unit of cheese, the revenue (= price/unit $\times$ quantity sold) is lower than before due to drastic reduction of quantity sold.

(c) The Farmers benefit from the new policy as they can now sell their more expensive cheese at a high quantity boosting their revenue. The consumers lose as now there is no incentive also for the farmers to reduce their prices too close to the floor. Also we can consider the government losing as they have to buy surplus cheese at higher price but in reality it's the consumers whose tax is used by the governments to buy the surplus cheese. It's almost like government is subtly transferring money from consumers to the farmers.

Q6.

6. A recent study found that the demand and supply schedules for Frisbees are as follows:

Price per Frisbee	Quantity Demanded	Quantity Supplied
$11	1 million Frisbees	15 million Frisbees
10	2	12
9	4	9
8	6	6
7	8	3
6	10	1

a) What are the equilibrium price and quantity of Frisbees?
b) Frisbee manufacturers persuade the government that Frisbee production improves scientists' understanding of aerodynamics and thus is important for national security. A concerned Congress votes to impose a price floor $2 above the equilibrium price. What is the new market price? How many Frisbees are sold?
c) Irate college students march on Washington and demand a reduction in the price of Frisbees. An even more concerned Congress votes to repeal the price floor and impose a price ceiling $1 below the former price floor. What is the new market price? How many Frisbees are sold? (2+3+3=8)

Figure 6: Q6

Ans 6: The Problem is better visualized with a supply-demand graph:

Red is demand curve and Blue is supply curve

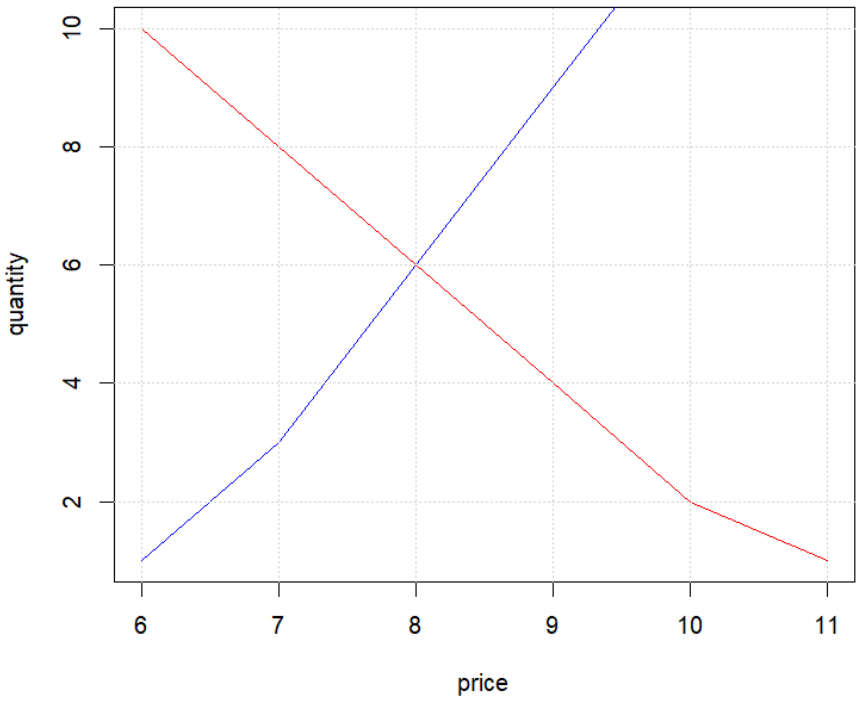

Figure 7: supplu-demand curve

(a) As we can see from the figure, equilibrium position is at price = 8$ and quantity = 6 million

(b) floor is 2$ above equilibrium price. Equilibrium price was 8$, hence now the floor is 8$ + 2$ = 10$ which will approximately be equal to the market price. From the demand curve, we observe that now the quantity that will be sold is 2 million frisbees.

(c) The new Ceiling will be 1$ below the price floor which was 10$, so the ceiling price = 10 - 1 = 9$ which will approximately be equal to the market price. From the demand curve, we observer that now the quantity that will be sold is 4 million frisbees.