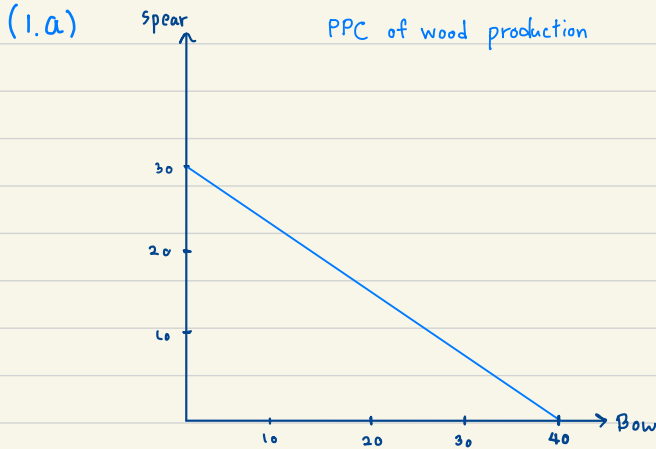


1. A human civilization finds a new wood source of total 120 units. Wood can either be used to produce spear or bow for hunting. A wood master then calculates that in order to produce a spear, it takes 4 units of wood while 3 units for a bow. Answer the following questions.

| resource | Production PPC |
|------------------------------------|------------------------------------|
| 1 spear use 4 woods Have 120 woods | if Spear only To 30 spears (0, 30) |
| 1 Bow use 3 woods | if Bow only To 40 spears (40, 0) |

1.a) Assumed that the opportunity cost of using this 120 units of wood to produce the products is constant, draw a production possibility curve (PPC), displaying quantity of spear on the vertical axis and quantity of bow on the horizontal axis, and indicate all the essential details in the graph and explain.



1.b) How much is the opportunity cost for a spear, in terms of bow? Show how you calculate this figure.

$$(B = \text{Bow}, S = \text{spear})$$

$$(1.b) \text{ Opportunity Cost of spear: } \frac{\Delta B}{\Delta S} = \frac{40 - 0}{0 - 30} = \frac{-4}{3}$$

Ans if we produce 1 more spear, we must sacrifice $\frac{4}{3}$ bows

1.c) With this newly found resource, is it possible for this civilization to produce 20 spears and 12 bows? If it is, is this option efficient? Display this option on a graph from (a) and explain.

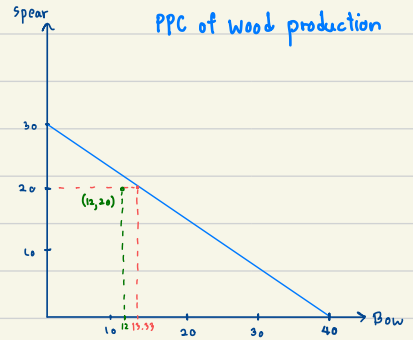
(1.c)

produce 20 spears and 12 Bow?

if we produce 1 more spears \rightarrow we must sacrifice $\frac{1}{3}$ bows

if we produce 20 more spears \rightarrow we must sacrifice 26.67 bows

\therefore We can produce 20 spears, with maximum of $40 - 26.67 = 13.33$ bows

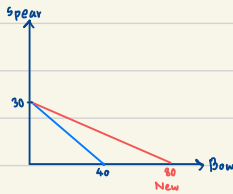


Ans We can produce, but it is inefficient because we produce 20 spears with 13.33 bows that use more bows. That is why this option is below the PPC.

1.d) If a new method of making bow is discovered and requires only 1.5 units of wood for each bow, how does it affect the PPC and the opportunity cost for a spear? Illustrate the change and explain.

(1.d) New method

1 bow uses 1.5 woods, Have 120 woods \rightarrow Can produce 80 bows



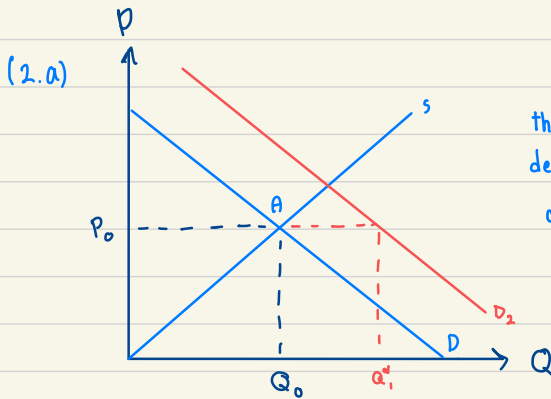
PPC will shift outward only for Bow

$$\text{Opportunity cost of spear } \frac{\Delta B}{\Delta S} = \frac{80-0}{0-30} = -\frac{8}{3} \text{ or } -2.67$$

\therefore Since we can produce more bow, the Opportunity Cost of spear will also increase.

2. Assumed that a computer devices market is perfectly competitive, answer the following questions in detail.

2.a) Draw a graph showing that the computer devices market is in equilibrium at a certain original equilibrium price P_0 and equilibrium quantity Q_0 . During the pandemic, many people are assigned to work from home and computer devices are crucial. Does the market demand or market supply of computer devices change? Explain.



Since, people start to work from home, they need their own personal computer for working. Thus, the market demand will shift rightward according to the increasing of quantity demanded for buying computer.

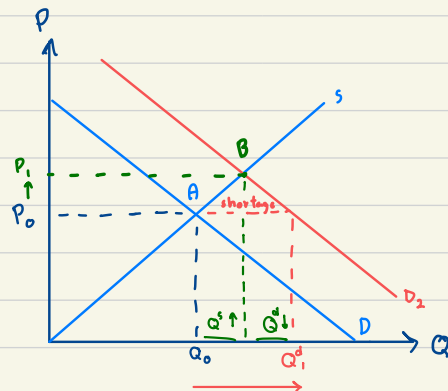
2.b) After what happened in 2.a), at the original equilibrium price P_0 will there be excess demand or excess supply? Show the new market equilibrium and state the equilibrium condition. Does the pandemic cause the equilibrium price and quantity to increase or decrease?

(2.b) P_0 : Q^d goes up from Q_0^d to Q_1^d (from shifting demand)
when $Q_1^d > Q_0^d$ that is 'excess demand'

∵ Demanded and Supplied are both adjust and the price will increase because of 'excess demand'.

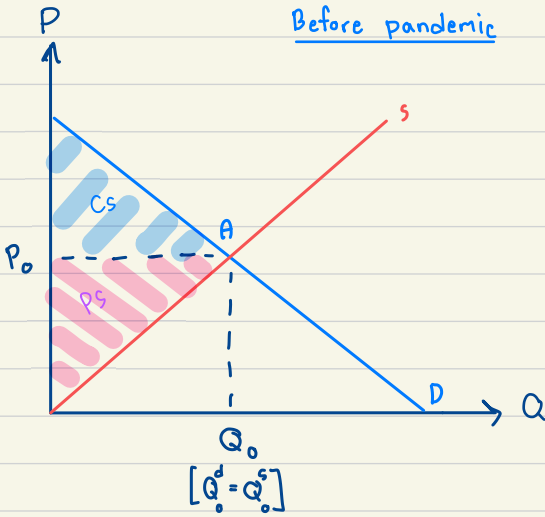
P_0 : $Q^d > Q^s \rightarrow P$ goes up
 $-P_1 \rightarrow Q^d$ goes down
 $-P_1 \rightarrow Q^s$ goes up } $Q^d = Q^s$

∴ New equilibrium P and Q are both increase.

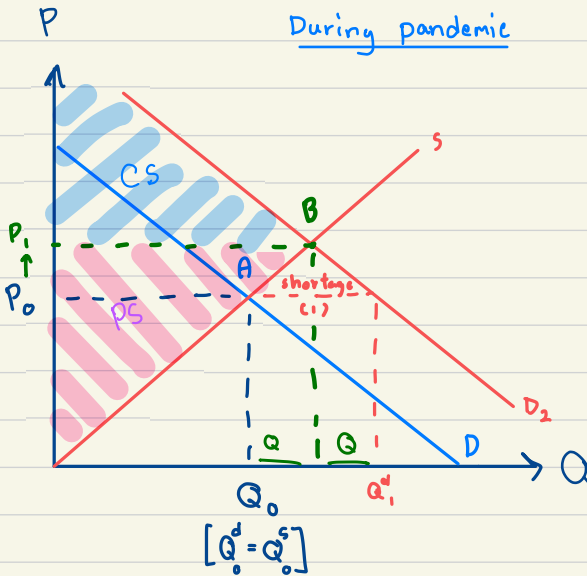


2.c) From the situation in 2.b), compare the consumer surplus and producer surplus in this computer market before and during the pandemic.

(2.c)

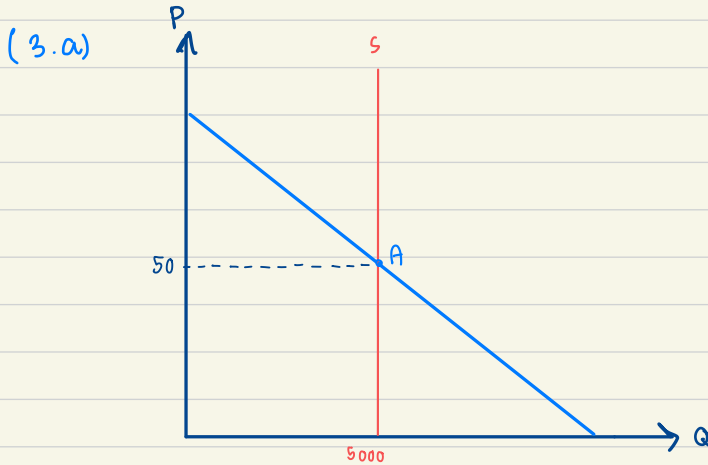


CS: consumer surplus
PS: producer surplus



3. Consider a System-on-a-Chip (SoC) market that is assumed to be perfectly competitive, due to a technical problem of production, there are only a few factories that can produce the next generation SoC. Answer the following questions in detail.

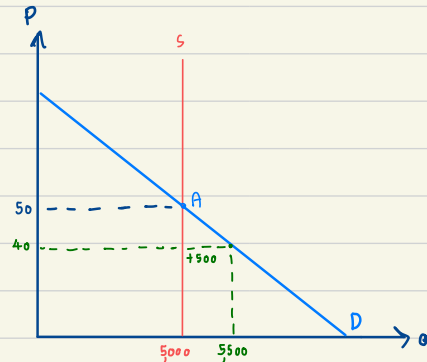
3.a) Draw a demand and supply on graph when the demand has normal downward slope while the supply is perfectly inelastic. The equilibrium price is at \$50 and the equilibrium quantity is at 5,000 units a day.



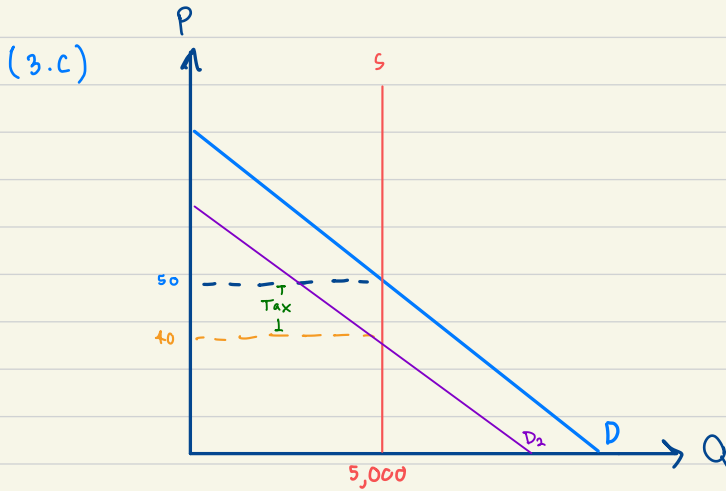
3.b) With the situation in 3.a), a study reveals that when the price drops to \$40, there will be 500 units of excess demand. Calculate the price elasticity of demand and supply **at the equilibrium**.

(3.b) PED: $\frac{\Delta Q}{\Delta P} \times \frac{P}{Q} = \frac{5,000 - 5,500}{50 - 40} \times \frac{50}{5,000}$
 $= \frac{-500}{10} \times \frac{50}{5,000} = -0.5$

PES: $\frac{\Delta Q}{\Delta P} \times \frac{P}{Q} = \frac{5,000 - 5,000}{50 - 40} \times \frac{50}{5,000}$
 $= \frac{0}{10} \times \frac{1}{100} = 0$



3.c) With the situation in 3.a), if a unit tax is imposed on buyers for \$10, portray the result of this intervention including the new equilibrium price and quantity, deadweight loss, and tax burden. Also, indicate which part of the burden belongs to either the buyers or the sellers.



Demand shift leftward

Ans

- P goes down = 40
- No death weigh loss (DWL) in this case
- $\bar{Q} = 5,000$
- Tax burden all belong to seller at
 $(50 - 40) \cdot 5,000 = 50,000$