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## Instructions

- (1) Please read the instruction carefully. Also take this habit with you into the exam room.
- (2) Please read each question carefully and answer the questions straightforwardly. Always provide economic reasons at least a paragraph for your analysis, or a graph when necessary, even when the question does not indicate so.
- (3) Handing and submitting assignments are only available via BE Moodle.

## Answering the questions and preparing answer sheets

- (1) Answers are to be handwritten, in either digital or analog form, in a blank canvas or any clean paper. Make sure that your handwriting is clearly visible and readable.
- (2) There is no need to rewrite the question. Just indicate the question number clearly for each of the answer, such as 1.a).
- (3) When done, for the digital case, collage all the pages into a single PDF file. For those who write on sheets of paper, take photo of all pages then convert all of them into a single PDF file as well.
- (4) Name your PDF file as StudentID\_YourNickname, such as 640123456\_Bo.

## Submitting your answers

- (1) Make sure your file does not exceed 10MB. This is the maximum file size for BE Moodle upload.
- (2) Login to BE Moodle, head into the course, then the assignment topic.
- (3) Choose your file to submit. Done. There will be timestamp for your upload date and time, so please make sure to not submit later than that.

## Assignment 1

Assigned on Sep 7<sup>th</sup>, 2021. To be submitted on Sep 14<sup>th</sup>, 2021 before midnight.

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.

spear  $\Rightarrow$  4 woods  
bow  $\Rightarrow$  3 woods

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.

bow / spear

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.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.

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.

demand  $\uparrow$   $\hookrightarrow$   $\uparrow$   $\rightarrow$   $\uparrow$

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?

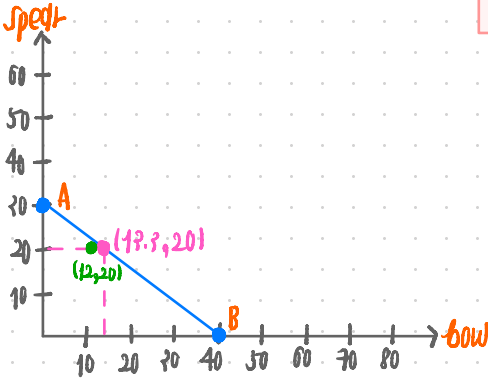
$P \uparrow$   $Q \uparrow$

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

- 1d.  $y$  spear  $\Rightarrow$  4 units of wood  
 $x$  bow  $\Rightarrow$  3 units of wood

	$x$	$y$
A	0	30
B	40	0

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- 1b. opportunity costs for spear

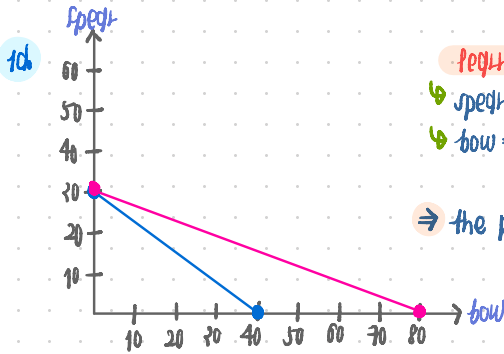
$$\frac{dy}{dx} \Rightarrow \frac{40-0}{0-30} \frac{\text{bow}}{\text{spear}} \Rightarrow -\frac{4}{3}$$

if we produce 1 more spear, we will loss 1.33 bows

- 1c. producing 1 spear, decrease 1.33 bows

producing 20 spears, decrease 26.6 bows  $\Rightarrow (20 \times 1.33) = 26.6$

$\Rightarrow$  It's possible to produce 20 spears and 12 bows because they have enough resources. According to opportunity cost for spear, they can produce 20 spear but they sacrificed 26.6 bows. However, it's inefficient because they can produce 20 spears and 33.3 bows in this production process.



getting new method

- $y$  spear  $\Rightarrow$  4 units of wood
- $x$  bow  $\Rightarrow$  1.5 units of wood

new method	
$x$	$y$
0	30
80	0

$\Rightarrow$  the ppc graph will shifting outward because it uses the small amount of wood to produce bows

- $\Rightarrow$  opportunity cost for spear

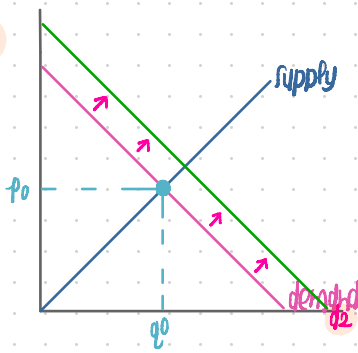
$$\frac{dy}{dx} \frac{\text{bow}}{\text{spear}} \Rightarrow \frac{80-0}{0-30} \Rightarrow -\frac{8}{3} \text{ or } -2.67$$

- $\Rightarrow$  the opportunity cost for spear increase because

they produce 1 more spear, they will sacrifice 2.67 bows.

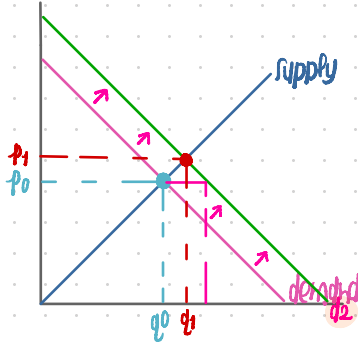
They have ability to produce bows more due to new methods, so they will loss more opportunity

2d.



⇒ the quantity demand shifting to the right because external forces affect which is pandemic situation. People need to buy computer to do their work at home and contact with colleagues.

2b.



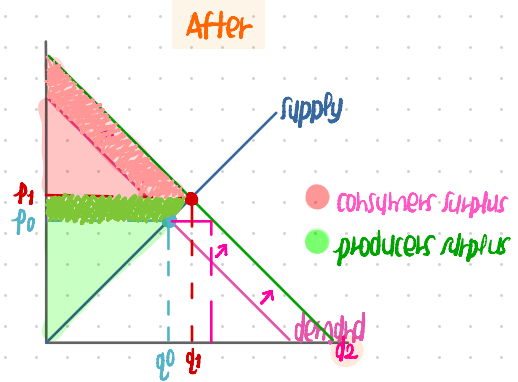
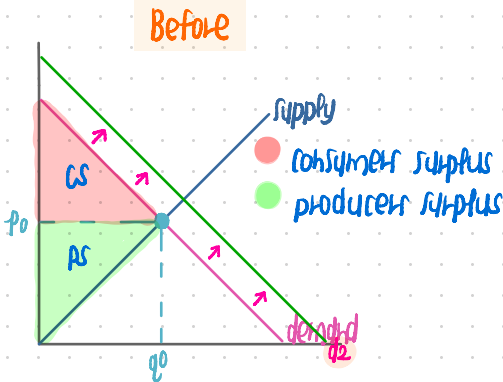
- at the original equilibrium price

⇒ there is excess demand because during pandemic computer are necessary for them to do their work. It becomes shortage. The price increases leading to the quantity supply increase but the quantity demand decrease until it reaches the new equilibrium.

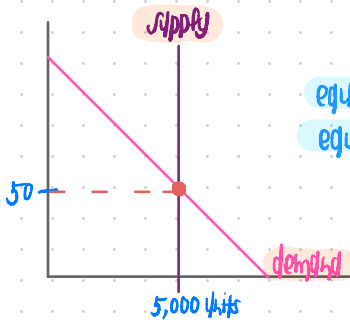
- new equilibrium

⇒ the quantity and price at new equilibrium are increase

2c.



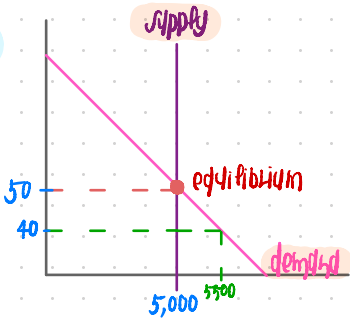
3d.



equilibrium price  $\Rightarrow$  50 \$

equilibrium quantity  $\Rightarrow$  5000 units

3b.



price elasticity demand at the equilibrium

$$\Rightarrow \frac{Q_2 - Q_1}{P_2 - P_1} \cdot \frac{P}{Q} \Rightarrow \frac{5500 - 5000}{40 - 50} \cdot \frac{50}{5000} \Rightarrow -0.5\%$$

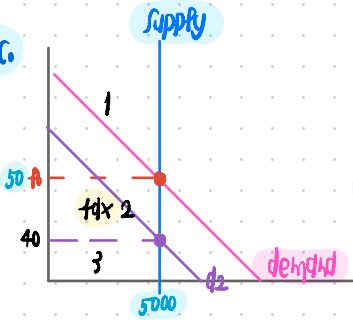
$\Rightarrow$  when the price increase for 1%, the quantity demand change for 0.5%

price elasticity of supply

$$\Rightarrow \frac{5000 - 5000}{50 - 40} \cdot \frac{50}{5000} \Rightarrow 0$$

$\Rightarrow$  when the price increase for 1%, the quantity supply doesn't change because the quantity supply is inelastic.

3c.



tax 10 \$	Before	After	different	Taxburden
CS	1	1	-	-
AS	2 and 3	3	-2	2
gov. revenue	none	2	2	-
total	1 2 3	1 2 3	none dwl.	-

$\Rightarrow$  new equilibrium at 40 \$

$\Rightarrow$  producers pay all the burden of tax because supply inelastic. It means that even though the price increase or decrease the quantity supply will remain constant  $(50 - 40) \times 5000 \Rightarrow 50,000$  \$ (Tax)

$\Rightarrow$  no deadweight loss

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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.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.