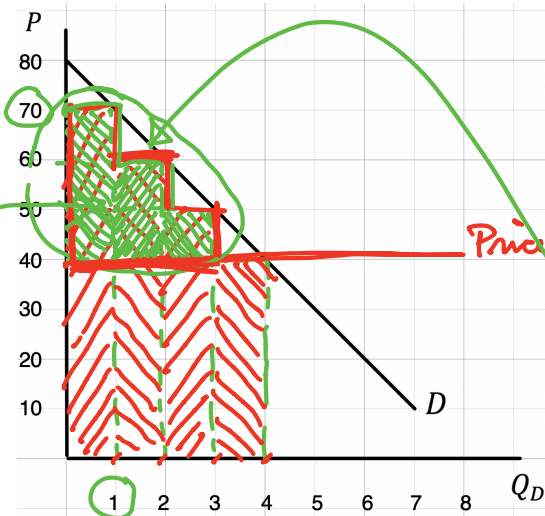


Chapter 9 Consumer's and Producer's Surpluses

Consumer's Surplus is the value of the quantity bought in the mind of the buyer(s) subtracted by the total amount paid.

Given an individual demand D , suppose the buyer buys in full unit 0, 1, 2, ...



Q_D	P
1	70
2	60
3	50
4	40
5	

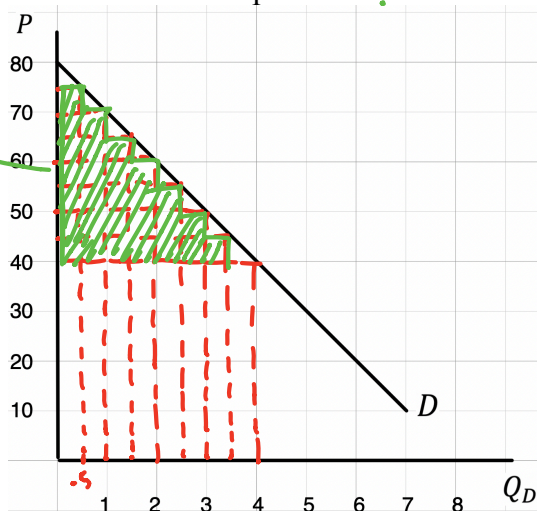
~~Price~~
 $Value \geq \text{money paid}$
 If $Value < \text{money paid}$, the buyer will not buy.
 Value 100
 price 10.
 $90 = \text{consumer's surplus}$
 Value & no purchase price to
 Value received for 1st unit bought = 70
 Value received for 2nd unit bought = 60
 Value received for 3rd unit = 50
 Value received for 4th unit = 40

- If the price is set at $P = 40$, for all units.

Total amount spent = 4 units bought at $P = 40$ total paid = $4 \times 40 = 160$
 The total value the buyer receives =
 Consumer's Surplus = $70 + 60 + 50 + 40 = 220$ — $160 = 60 = \text{consumer's surplus}$

- If the buyer is allowed to buy in half units, 0, 0.5, 1, 1.5, 2, ...

With $P = 40$, total amount spent = 160 -
 The total value the buyer receives = ?
 Consumer's Surplus = ?



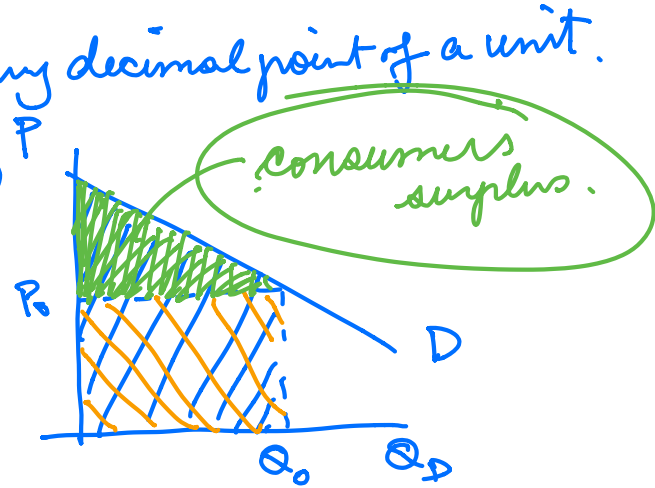
Q_D	P
0.5	75
1	70
1.5	65
2	60
2.5	55
3	50
3.5	45
4	40

- What if the buyer can buy 0.25 unit at a time.
the area representing the consumer's surplus will be stairs-shape of even finer steps.

If the consumer is allowed to buy any decimal point of a unit.

Given a price P_0 , the consumer's surplus will be the area under the Demand, subtracted by the amount paid ($P_0 \cdot Q_0$)

Q_0



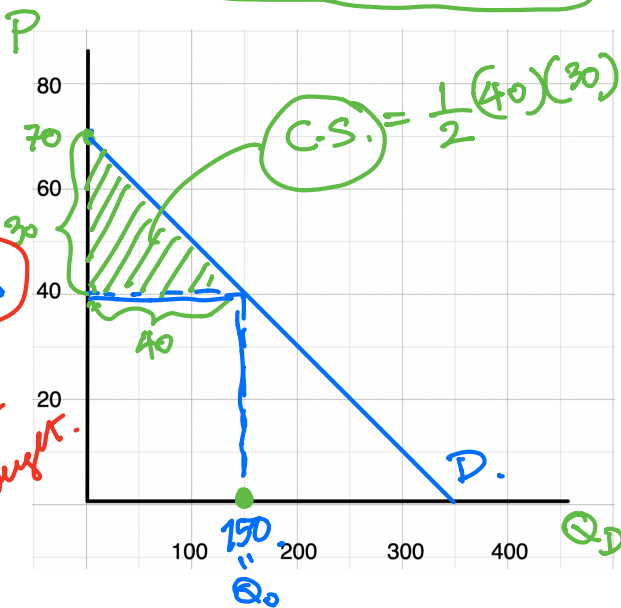
individual

Given a price P_0 , the demand tells us

1. Quantity demanded Q_0 at the price P_0
2. The consumer's surplus

If the market demand is given

Demand: $P = 70 - \frac{1}{5} Q_D$



Given a price P_0 , with similar reasoning as in the case of individual demand, the market demand tells us

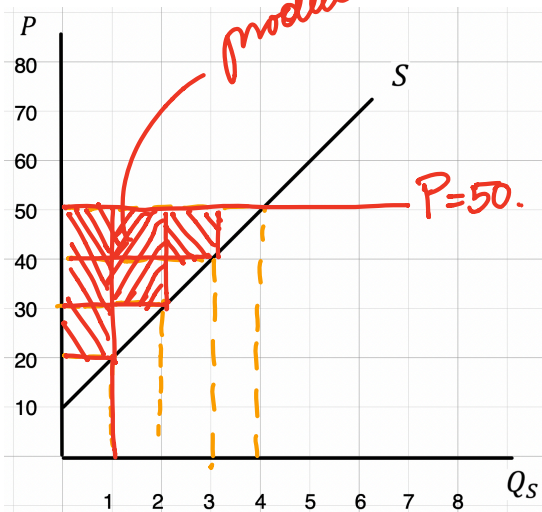
1. Quantity demanded Q_0 at the price P_0
2. Consumer's surplus
3. The value of the last unit bought in the mind of the buyer is equal to the price P_0

*value of the 150th unit = 40 \$,
because if the value < 40 \$ - no buy,
if the value > 40 \$ - say 42 \$
there would have been someone who buys more
because his value is 41 \$.*

Cost = 25.
price = 20.

Producer's Surplus of a quantity sold is the total revenue earned subtracted by the sum of the price the seller(s) is (are) willing to produce each consecutive unit of output.

Given an individual supply S , suppose the seller sells in full unit 0, 1, 2, ...



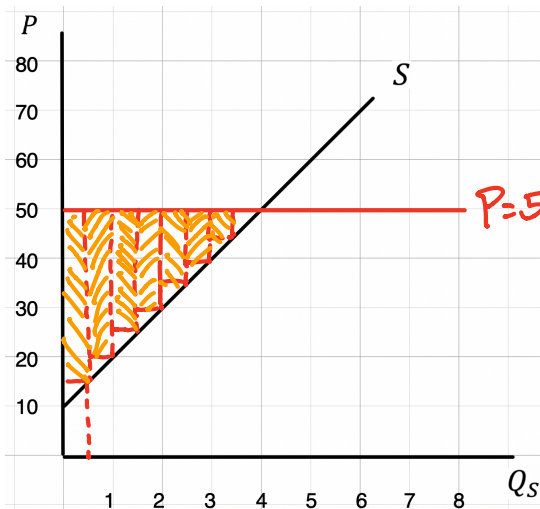
Q_s	P
1	20 ✓
2	30
3	40
4	50 ✓
5	

≤ 20 Cost of producing 1st
 ≤ 30 2nd
 ≤ 40 3rd
 ≤ 50

- If the price is set at $P = \frac{50}{40}$,

The total revenue received = $P \cdot Q_s = (50)(4) = 200 \text{ B}$
 The total of prices seller is willing to sell each unit = $20 + 30 + 40 + 50 = 140 \text{ B}$.
Producer's Surplus = $200 - 140 = 60 \text{ B}$

- If the seller is allowed to sell in half units, 0, 0.5, 1, 1.5, 2, ...



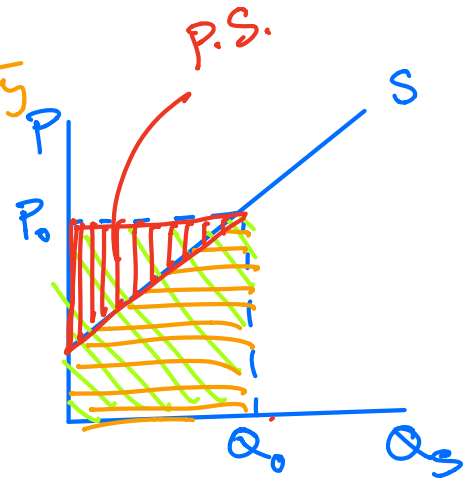
Q_s	P
0.5	.
1	.
1.5	.
2	.
2.5	.
3	.
3.5	.
4	.

With $P = \frac{50}{40}$ the total revenue received = 200 B .
 The total of prices seller is willing to sell each unit =
 Producer's Surplus =

- What if the seller can sell 0.25 unit at a time.

If seller is allowed to sell any quantity

Given a price P_0 , the producer's surplus will be the total revenue ($P_0 \cdot Q_0$) subtracted by the area under the Supply S .



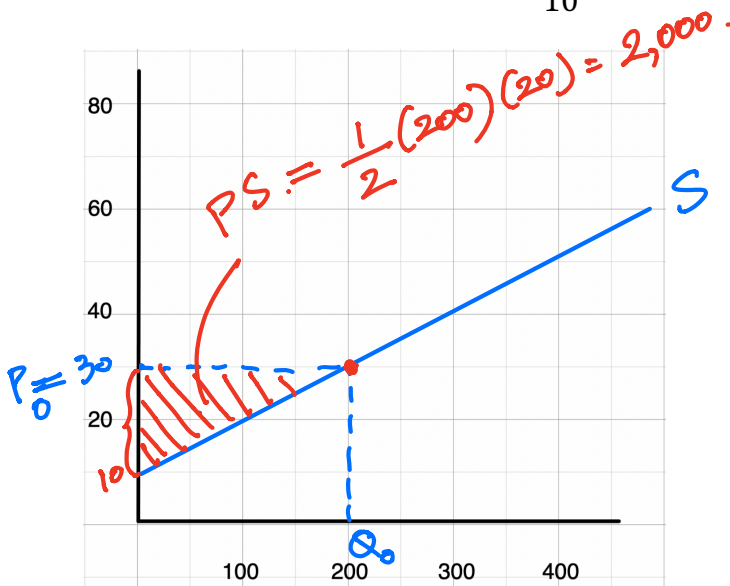
individual.

Given a price P_0 , the supply tells us

1. Quantity supplied Q_0 at the price P_0
2. The producer's surplus

If the market supply is given

$$\text{Supply: } P = 10 + \frac{1}{10} Q_S$$



Given a price P_0 , with similar reasoning as in the case of individual supply, the market supply tells us

1. Quantity ^{supplied} demanded Q_0 at the price P_0
2. Producer's surplus
3. The cost of the last unit sold is equal to the price

P_0

Price = 30 cost of the 200th unit = 30 \$
because if cost < 30 \$ the seller would be unwilling to sell the 200th unit.

If the cost of the 200th unit = 28
some seller would have wanted to sell more because his cost is 29 \$

Market Equilibrium, Market Efficiency and Social Welfare Maximization

At the equilibrium of a market with perfect competition, we have

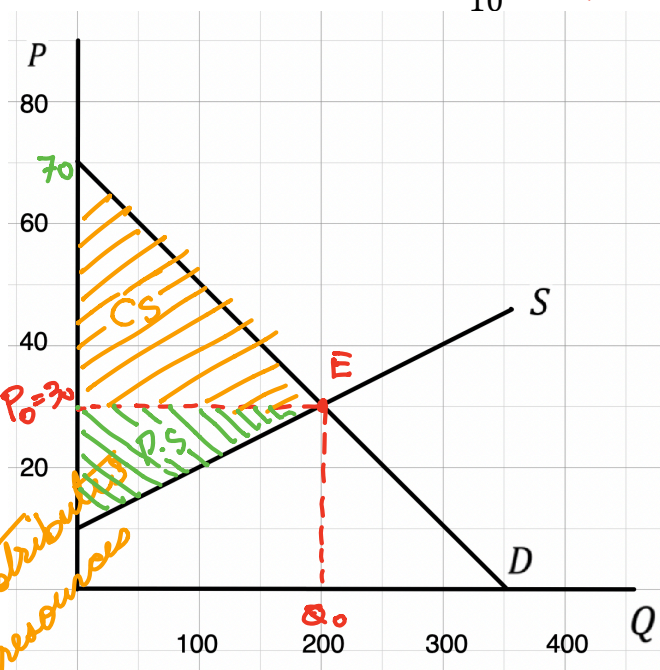
Eg. Conditions

1. Equilibrium Condition: At $E = (Q_0, P_0)$

- a) Excess Demand = 0, or equivalently
- b) $Q_D = Q_S$

Demand: $P = 70 - \frac{1}{5} Q_D$
Supply: $P = 10 + \frac{1}{10} Q_S$

$\Rightarrow Q_0 = 200$
 $P_0 = 30$
 $Q_D = 200$
 $Q_S = 200$



$CS = \frac{1}{2} (200)(40) = 4,000 \text{ \$}$
 $PS = \frac{1}{2} (200)(20) = 2,000 \text{ \$}$
 $Social\ Welfare = CS + P.S.$
 $= 4,000 + 2,000$
 $= 6,000 \text{ \$}$
In producing $Q_0 = 200$, the producers create additional value on top of the cost of resources = 6000\$.

*market distribution
the use of resources*

2. At equilibrium $E = (Q_0, P_0) = (200, 30)$, the equilibrium price

$P_0 =$ value the placed on the last unit bought
= cost of producing the last unit sold

We have market efficiency.

Producers gather resources (land, labor and capital) to produce until the cost of the last unit made is equal to the value the consumers placed on the last unit bought.

according to D.

(28)
 $32 \text{ \$}$
Cost of 200th unit
= value of the 200th unit.
" 30 \\$.

3. Social Welfare = Consumer's Surplus + Producer's Surplus

At the equilibrium $E = (Q_0, P_0)$, this social welfare is maximized. That is, at any price other than P , social

producers use too much resources into producing the last unit.

welfare will be less than this. This will be demonstrated in the next section on Applications.