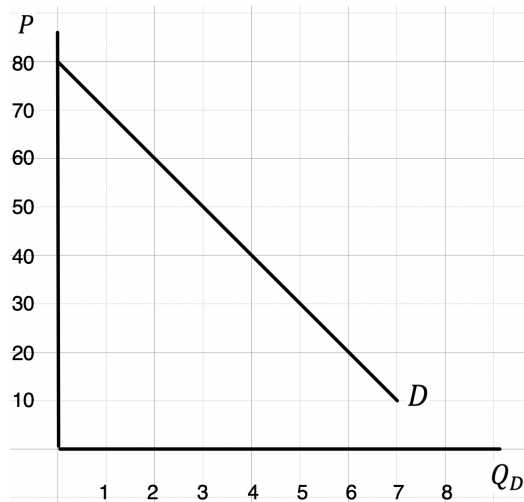


Chapter 9 Consumer's and Producer's Surpluses

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, ...



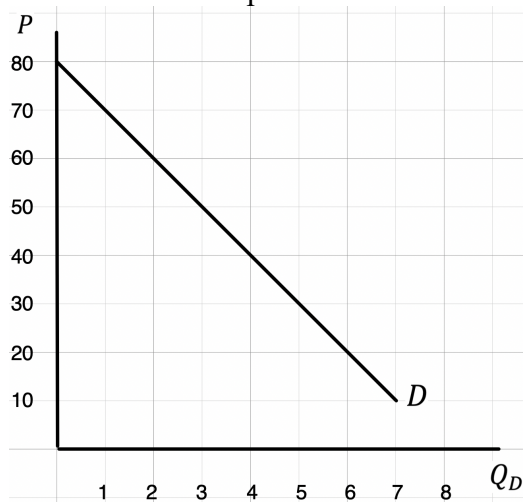
Q_D	P
1	70
2	60
3	50
4	40
5	

- If the price is set at $P = 40$,

Total amount spent =
The total value the buyer receives =
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 =
The total value the buyer receives =
Consumer's Surplus =



Q_D	P
0.5	
1	
1.5	
2	
2.5	
3	
3.5	
4	

- What if the buyer can buy 0.25 unit at a time.

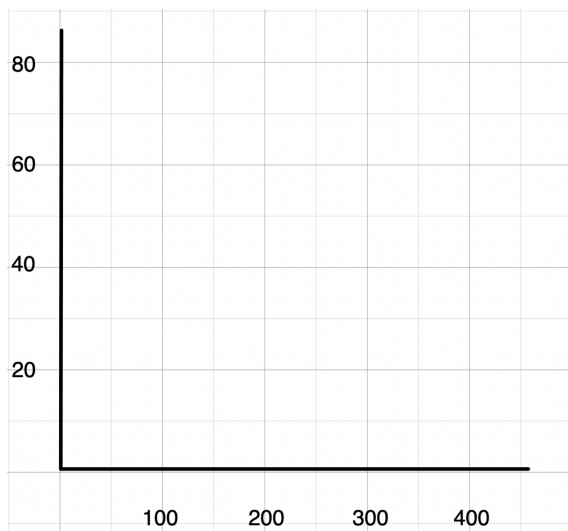
Given a price P_0 , the consumer's surplus will be the area under the Demand, subtracted by the amount paid ($P_0 \cdot Q_0$)

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

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

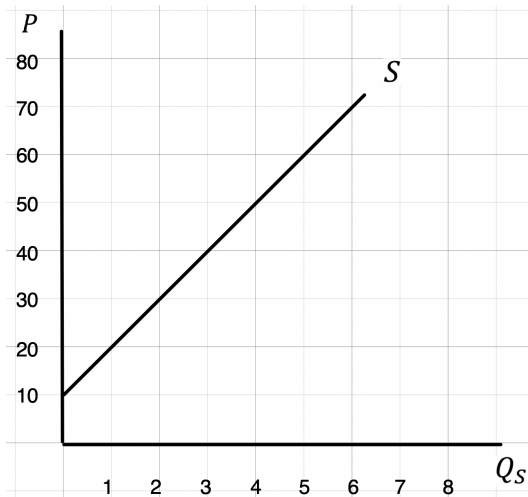


Given a price P_0 , with similar reasoning as in the case of individual demand, the market demand tells us

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

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	

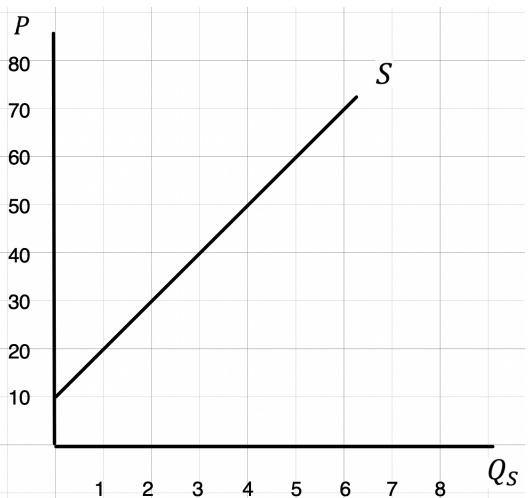
- If the price is set at $P = 40$,

The total revenue received =

The total of prices seller is willing to sell each unit =

Producer's Surplus =

- 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 $P = 40$, the total revenue received =

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.

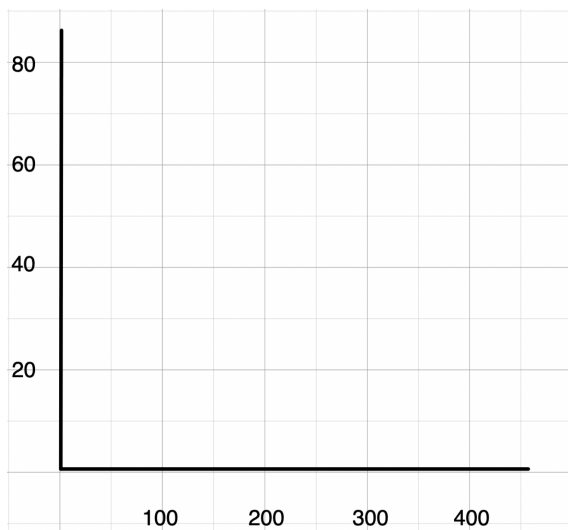
Given a price P_0 , the producer's surplus will be the total revenue ($P_0 \cdot Q_0$) subtracted by the area under the Supply S .

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 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

Market Equilibrium, Market Efficiency and Social Welfare Maximization

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

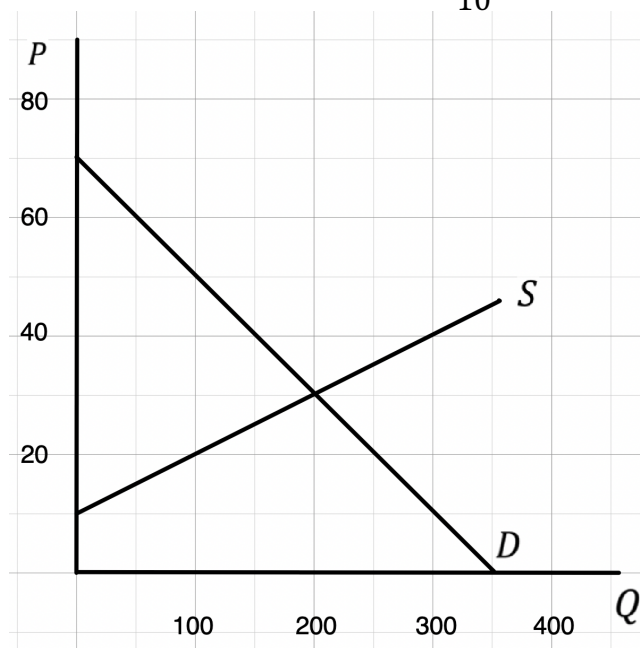
1. Equilibrium Condition: At $E = (Q_0, P_0)$

a) *Excess Demand* = 0, or equivalently

b) $Q_D = Q_S$

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

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



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

$P_0 = \text{value the placed on the last unit bought}$
 $= \text{cost of producing the last unit sold}$

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.

3. $\text{Social Welfare} = \text{Consumer's Surplus}$
 $+ \text{Producer's Surplus}$

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

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