



***CFA® Level 1***  
***Economics: Microeconomic Analysis***  
***Study Session 4***



# *Elasticity*



## ***Understanding Price Elasticity of Demand***

### **Definition - Price Elasticity of Demand**

Price Elasticity of Demand is the percentage change in the quantity demanded in response to a percentage change in price.

### **Formula – Price Elasticity of Demand**

**Price Elasticity of Demand =  $\frac{\% \text{ Change in Quantity Demanded}}{\% \text{ Change in Price}}$**

### **Unit-Free Measure**

When demand curves are drawn up for various products, different units of measurement are used, that are suitable for each product.

- *For this reason the slopes of the demand curves of various products cannot be directly compared.*
- ***Elasticity on the other hand, is a unit free measure that allows for a direct comparison between different products, for measuring the responsiveness of quantity demanded to a specified change in price.***



## Calculating Price Elasticity of Demand – Example 1

### Calculation Example 1

Assume that at a price of \$10 per bag, 20 bags are sold. If price falls to \$5 per bag, 30 bags are sold. Calculate Price Elasticity of Demand for the bags. (In calculating the percentage change in the elasticity formula, the base value used will always be the average of the two values).

$$\begin{aligned}\% \text{ Change in Quantity Demanded} &= \Delta \text{ Qty} / \text{Average Qty} \\ & [ (30 - 20) / 25 ] \times 100 = 40\%\end{aligned}$$

$$\begin{aligned}\% \text{ Change in Price} &= \Delta \text{ Price} / \text{Average Price} \\ & [ (5 - 10) / 7.5 ] \times 100 = - 66.67\%\end{aligned}$$

### Price Elasticity of Demand

40% / - 66.67% = - 0.6 (For Price Elasticity, Ignore the Negative Sign and focus only on Magnitude of Calculated Elasticity Number).



## Calculating Price Elasticity of Demand – Example 2

### Calculation Example 2

Let us work a slightly different example. Assume that at a price of \$10.00 , 20 bags are sold. If price falls to \$5.00 , 60 bags are sold. Calculate Price Elasticity of Demand of the bags.

#### **% Change in Quantity Demanded**

$$[ (60 - 20) / 40 ] \times 100 = 100 \%$$

#### **% Change in Price**

$$[ (5 - 10) / 7.5 ] \times 100 = - 66.67\%$$

### Price Elasticity of Demand

100% / - 66.67% = - 1.49 (Ignore negative sign for price elasticity of demand. Only view the absolute value).



## *Elastic and Inelastic Demand*

### Example 1 Analysis

- In example 1, a 66.67% decrease in price brought about a 40% increase in quantity demanded.

### Example 2 Analysis

- In contrast, in example 2, a 66.67% decrease in price brought about a 100% increase in quantity demanded.

### Comparison of Responsiveness

- This means that for the bags in example 2, consumers are more sensitive to a price change, compared to the bags in example 1, even though the price changes by the same percentage in both cases.

### Elastic Demand – Bags in Example 1

- Goods for which demand changes by a greater percentage than the percentage change in price, are said to have **Elastic Demand** (100% is  $>$  66.67%).

### Inelastic Demand – Bags in Example 2

- Goods for which demand changes by a lesser percentage than the % change in price, are said to have **Inelastic Demand** ( Example 2, 40% is  $<$  66.67%).



## ***Extreme Case of No Sensitivity to Price Change***

### **Perfectly Inelastic Demand**

- Most products have demand curves that reflect varying degrees of elasticity or inelasticity based on how sensitive consumers are to a change in the product's price.
- Next, we review an extreme case of those products for which consumers display **ABSOLUTELY NO SENSITIVITY** to a change in price.
  
- Demand for such products is said to be **Perfectly Inelastic**.



## Perfectly Inelastic Demand

### Perfectly Inelastic Demand - Vertical Demand Curve

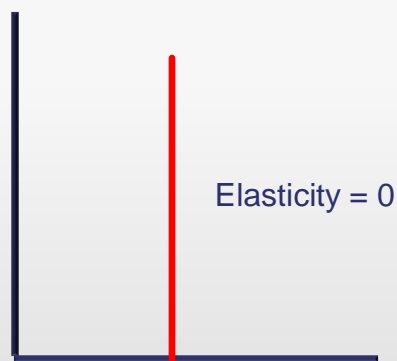
- Perfectly Inelastic Demand is represented by a vertical demand curve.



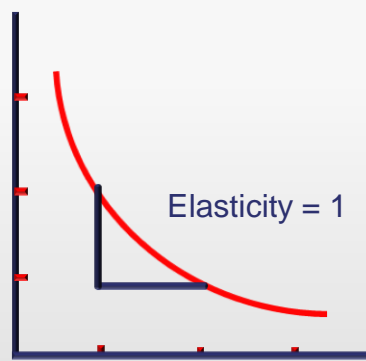
- Products that show such a demand curve are considered indispensable by the user;
  - *An example would be a medical drug on which a patient depends for staying alive.*
- Whatever the price changes are, (within a price range), the patient will consume the prescribed quantity;
  - *The calculated elasticity in this case will be '0' or close to '0' and the demand is described as 'Perfectly Inelastic'.*



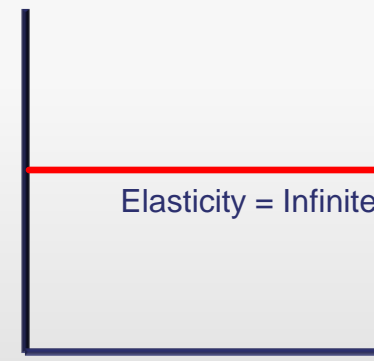
## Comparison of Constant Elasticity Demand Curves



*Perfectly Inelastic Demand*



*Unit Elastic Demand*



*Perfectly Elastic Demand*

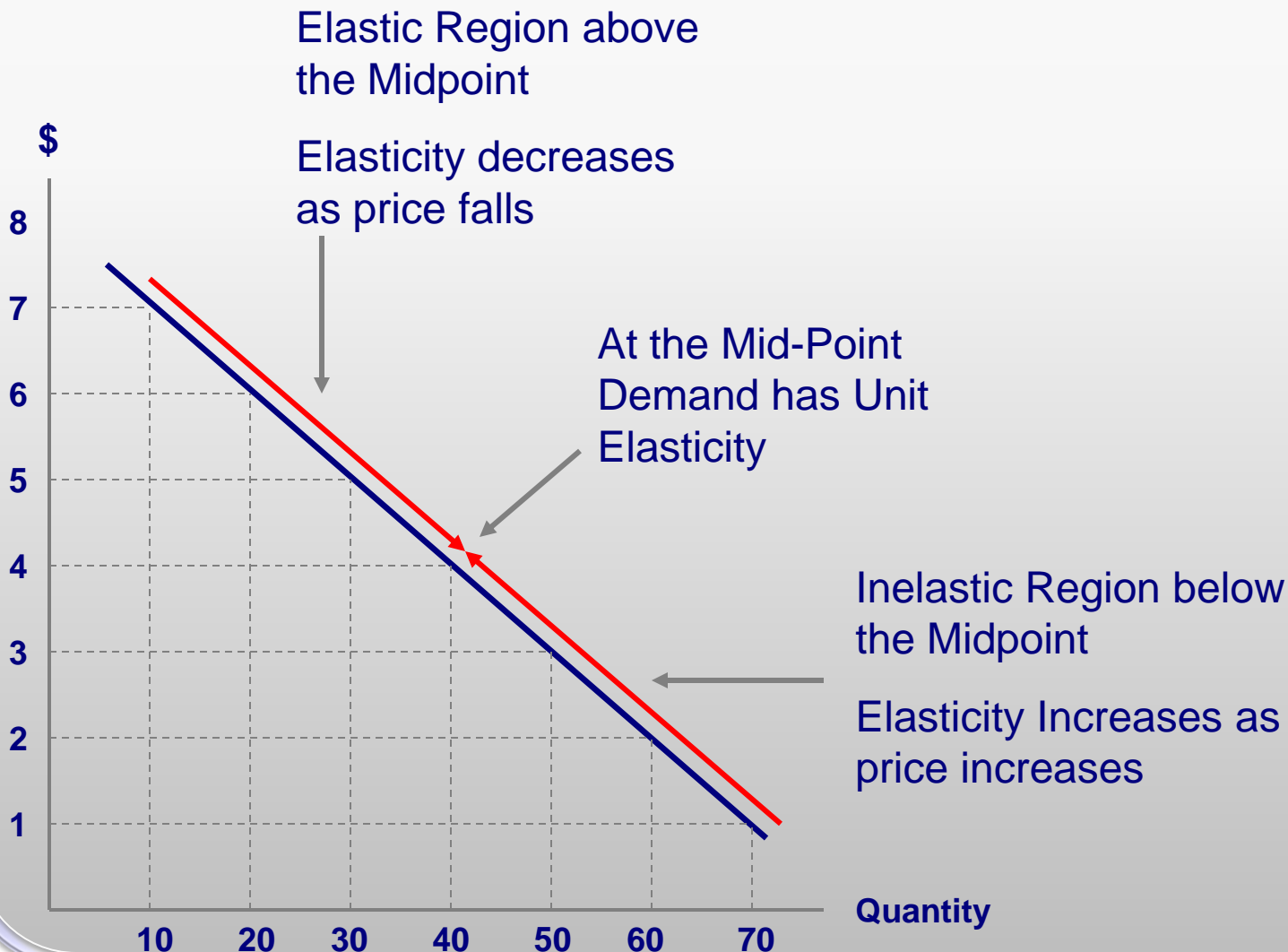
Vertical Demand Curve = Elasticity is '0' **Perfectly Inelastic**

Unit Elastic Demand Curve = Elasticity is '1' **Unit Elasticity**

Horizontal Demand Curve = Elasticity is 'Infinite' **Perfectly Elastic**

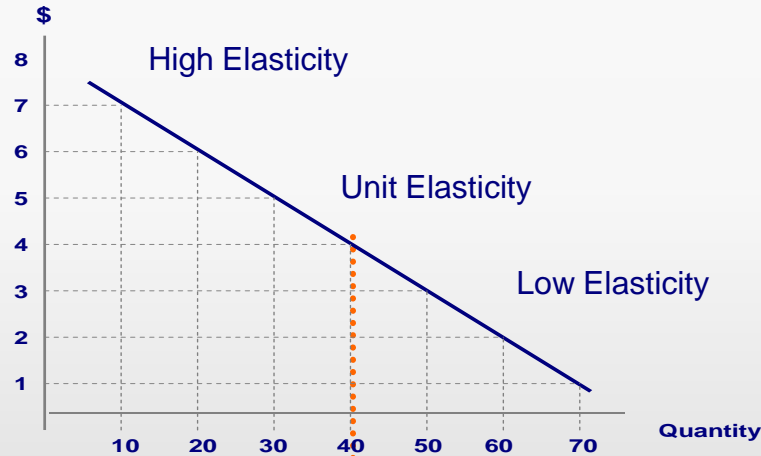


# Straight-Line Demand Curve, Elasticity is Not Slope





# Elasticity and Revenue



Total Revenue

When Demand is Elastic, Price Cut Increases Total Revenue

When Demand is Inelastic, Price Cut Decreases Total Revenue

Quantity



## ***Factors Influencing Price Elasticity of Demand***

### **Availability of Substitutes**

- If the product has a good number of close substitutes, the Demand for that product will be more elastic since consumer has the option of switching to substitute products.

### **Percentage of income spent on Product**

- The greater the percentage of your income spent on a product, the more elastic your demand will be for that product.
- Since such a product represents a large part of your income, you would be more sensitive to a change in its price.

### **Time since Change in Prices**

- The longer the time since a change in price has been affected, the more elastic your Demand be for that product.
- Longer time will give you more of an opportunity to adjust your consumption behavior.
  - ***Demand will be more Elastic in the Long run compared to the short run.***



## Cross Elasticity of Demand

### The effect of substitutes and complements

- Tea is a substitute for Coffee
- Milk is a complement for Tea

### Definition – Cross Elasticity of Demand

- Cross Elasticity of Demand is the percentage change in quantity demanded of a product in response to a change in the price of a substitute or complementary product.

### Formula

$$\text{Cross Elasticity of Demand} = \frac{\% \text{ change in quantity demanded}}{\% \text{ change in price of Substitute or Complement}}$$

- % Change in quantity demanded =  $\Delta \text{ Qty} / \text{Average Qty}$ , and
- % Change in price =  $\Delta \text{ Price} / \text{Average Price}$

### Substitutes and complements

- The Cross Elasticity of Demand will be **positive for substitute products** and **negative for complement products** (In Price Elasticity of Demand, we ignored the minus sign, here we do not ignore the sign. The sign takes on relevance, as you will soon learn).



## Calculating Cross Elasticity of Demand - Substitutes

### Cross Elasticity of Demand

$$= \frac{\% \text{ change in quantity demanded}}{\% \text{ change in price of substitute or complement}}$$

- % Change in quantity demanded =  $\Delta \text{ Qty} / \text{Average Qty}$ , and
- % Change in price =  $\Delta \text{ Price} / \text{Average Price}$

### Calculation example

- Assume that a shop sells Burgers and Sandwiches. 10 Burgers are sold every hour. And a sharp increases the price of sandwiches from \$2.00 to \$3.00, the number of Burgers sold per hour increases to 20. calculate cross Elasticity Demand for Burgers. Indicate whether burgers and sandwiches are complements or substitutes.
- % Change in Quantity Demanded (of Burgers)
  - $[(20 - 10) / 15] \times 100 = 66.67\%$
- % Change in Price (of Substitute or Complement – the Sandwiches)
  - $[(3 - 2) / 2.5] \times 100 = 40\%$
- Cross Elasticity of Demand
  - $66.67\% / 40\% = 1.667$  (Positive Cross Elasticity, so Products are Substitutes).
  - **Burgers and Sandwiches are Substitutes.**



## Calculating Cross Elasticity of Demand - Complements

### Calculation example

- Assume that a shop sells Burgers and Pepsi. 10 Bottles of Pepsi are sold every hour. A decrease in the price of Burgers from \$3.00 to \$2.00 causes the number of Pepsi drinks sold, to increase from 10 to 20 per hour. Calculate cross Elasticity of Demand for Pepsi. Indicate whether Pepsi and Burgers are complements or substitutes.
  
- **% Change in Quantity Demanded (of Pepsi)**
  - $[(20 - 10) / 10] \times 100 = 100\%$
  
- **% Change in Price (of Substitute or Complement – the Sandwiches)**
  - $[(2 - 3) / 2.5] \times 100 = -40\%$
  
- **Cross Elasticity of Demand**
  - $100\% / -40\% = -2.5$  (Negative Cross Elasticity, so Products are Complements)
  - **Burgers and Pepsi are Complements.**



## ***Income Elasticity of Demand***

### **Effect of Income Levels on Product Demand**

- When income levels increase, consumers could start purchasing more branded goods and other life-style products. Decreasing income levels could cause an increase in purchases of imitations or lower priced goods.

### **Normal Goods**

- These are products whose quantity demanded **increases** as income levels rise. There are two further categories of Normal Goods:
  - **Normal Goods – Luxuries;** *For Luxuries, the percentage increase in quantity demanded is greater than the percentage increase in income. Normal Goods that are luxuries, show 'Income Elastic Demand'  $> 1$*
  - **Normal Goods – Necessities;** *For Necessities, the percentage increase in quantity demanded is less than the percentage increase in income. Normal Goods that are necessities, show 'Income Inelastic Demand'  $< 1$  but positive.*
- Note that both types of **Normal Goods above have Positive Income Elasticity of Demand**, as their demand increases with rising income.

### **Inferior Goods**

- There are products whose quantity demanded **decreases** as income levels rise. When incomes fall, more 'Inferior Goods' are purchased. Since quantity demanded and change in income are inversely related, **for inferior goods, the income elasticity of demand is negative.**
  - *Inferior Goods - The calculated Income Elasticity of Demand for Inferior Goods is  $< 0$*



## ***Income Elasticity of Demand***

### **Definition**

- Percentage change in the quantity demanded of a product, in response to a change in income levels.

### **Formula**

$$\text{Income Elasticity of Demand} = \frac{\% \text{ change in quantity demanded}}{\% \text{ change in Income}}$$

- % Change in quantity demanded =  $\Delta \text{ Qty} / \text{Average Qty}$ , and
- % Change in price =  $\Delta \text{ Income} / \text{Average Income}$ .



## Calculating Income Elasticity of Demand

### Calculation example

- Assume that income levels rise from \$2000 a week to \$3000 a week. In response, the number of dinner bookings at a high end restaurant go up from once per week to twice per week. Calculate Income Elasticity of Demand and indicate whether Dinner at high end restaurants is a Luxury Normal Good, Necessity Normal Good or Inferior Good.
  
- **% Change in Quantity Demanded (of Dinner Bookings per week)**
  - $[(2 - 1) / 1.5] \times 100 = 66.67\%$
  
- **% Change in Income**
  - $[(3000 - 2000) / 2500] \times 100 = 40\%$

### Cross Elasticity of Demand

- $66.67\% / 40\% = 1.667$
  
- *Income Elasticity is > 1*
- *Dinner at High End Restaurants is a Normal Good – Luxury.*



## Calculating Income Elasticity of Demand

### Calculation example

- Assume that income levels fall from \$2000 a week to \$1000 a week. In response, the number of low-priced take-away dinners from a super-market chain, increase from 2 per week to 3 per week. Calculate Income Elasticity of Demand and indicate whether low priced takeaways are a Luxury Normal Good, Necessity, Normal Good or Inferior Good.
  
- **% Change in Quantity Demanded (of Low Priced Takeaways)**
  - $[(3 - 2) / 2.5] \times 100 = 40\%$
  
- **% Change in Income**
  - $[(1000 - 2000) / 1500] \times 100 = -66.67\%$
  
- **Cross Elasticity of Demand**
  - $40\% / -66.67\% = -0.6\%$
  
  - *Income Elasticity is < 0*
  
  - *Low Price Takeaways are Inferior Goods.*



## ***Elasticity of Supply***

### **Definition – Elasticity of Supply**

- Percentage change in quantity supplied in response to a change in price.

### **Formula – Elasticity of Supply**

$$\text{Elasticity of Supply} = \frac{\% \text{ change in quantity Supplied}}{\% \text{ change in Price}}$$

- % Change in quantity Supplied =  $\Delta \text{ Qty} / \text{Average Qty}$ , and
- % Change in price =  $\Delta \text{ Price} / \text{Average Price}$

### **Perfectly Inelastic Supply**

- **Elasticity of Supply = 0.** A constant quantity is supplied regardless of price. The Supply Curve is vertical.

### **Unit Elastic Supply**

- **Elasticity of Supply = 1.** A Supply curve that is Linear, passing through the origin (with any slope) will represent unit elasticity of supply. (A non-linear supply curve, or one that is not passing through the origin, will not have unit elasticity).

### **Perfectly Elastic Supply**

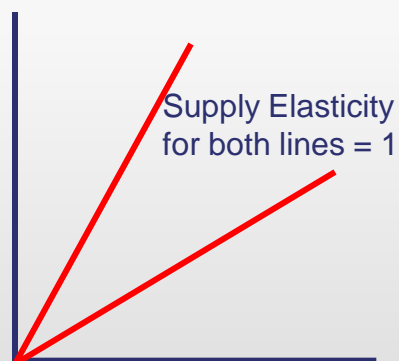
- **Elasticity of Supply = Infinite**
- Represents a situation in which there is a certain price level at which suppliers are willing to supply any quantity of the product. Supply Curve is horizontal.



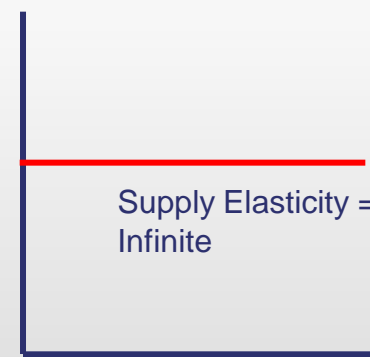
## Comparison of Constant Elasticity Supply Curves



Perfectly Inelastic Supply



Unit Elastic Supply



Perfectly Elastic Supply

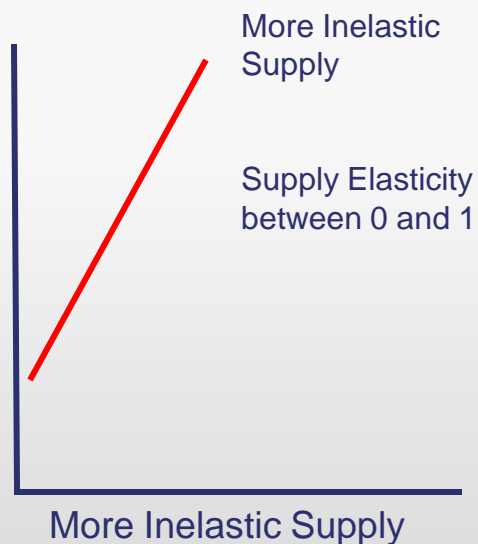
Vertical Supply Curve = Elasticity is '0' **Perfectly Inelastic**

Unit Elastic Supply Curve = Elasticity is '1' **(Linear, through Origin)**

Horizontal Supply Curve = Elasticity is 'Infinite' **Perfectly Elastic**



## *Inelastic and Elastic Supply*



The steeper a supply curve (but not passing through the origin), the more Inelastic the Supply.

The flatter a supply curve (but not passing through the origin), the more Elastic the Supply.



## ***Factors Influencing Elasticity of Supply***

### **Possibilities of Resource Substitution**

- For Supply Elasticity we focus on those inputs that go into the process of manufacturing the product – Resource Inputs.
- Those products for which the resource inputs are scarce or unique, the supplier has limited choices in obtaining those. Supply is therefore more Inelastic.
- On the other hand, If resource inputs are abundant or one can be substituted by another, supply will be more Elastic.

### **Supply Decision Time Frame**

- **Short Run:** In the short run, most goods have more inelastic supply curves.
- Most Resource Inputs cannot be quickly obtained.
- Generally, the addition of labor is an option available to a manufacturer to increase output by adding on extra shifts.
- There is little else that can be done in the short run.
  - *Short run supply is therefore relatively Inelastic.*
- **Long Run:** Most changes can be accommodated in the long run.
- Labor, plant, equipment and new technology make possible larger response in output levels in the long run.
  - *Long Run supply is relatively more Elastic.*

***“Momentary Supply is the immediate response in supply to a price change. This is often the most inelastic”.***

Elasticity	Value or Magnitude
<b>Price Elasticity of Demand</b>	
Perfectly Elastic or Infinitely Elastic Elastic Unit Elastic Inelastic Perfectly Inelastic or Completely Inelastic	Infinity Less than Infinity but $> 1$ $= 1$ $> 0$ , but $< 1$ $= 0$
<b>Price Elasticity of Supply</b>	
Perfectly Elastic Elastic Inelastic Perfectly Inelastic	Infinity $< \text{Infinity}$ , but $> 1$ $> 0$ , but $< 1$ $= 0$
<b>Cross Elasticity of Demand</b>	
Perfect Substitutes Substitutes Independent Complements	Infinity Positive, but $< \text{Infinity}$ $= 0$ Negative (Less than 0)
<b>Income Elasticity of Demand</b>	
Income Elastic (Normal Good) Income Inelastic (Normal Good) Negative Income Elastic (Inferior Good)	$> 1$ $< 1$ , but $> 0$ Negative ( $< 0$ )



# *Efficiency and Equity*



## ***Spending Resources on Goods and Services***

### **Self-Interest**

- People act in **'Self Interest'**.
- Their actions reflect their personal views on how their incomes should be spent.

### **Market Mechanism**

- The markets have the effect of coordinating the actions of several people.
- This determines the collective allocation of resources to various goods and services.**



## ***Allocative Efficiency and Social Interest***

### **Allocative Efficiency**

- The concept of Allocative Efficiency relates to the pursuit of the collective '**Social Interest**', rather than self interest.
  - ***It forms the basis of determining the allocation of resources between various goods and services.***

### **Efficient Allocation of Resources**

- Allocation of resources is considered efficient when parity of value has been achieved between the various goods and services produced.
  - ***More units of a particular good cannot be produced without sacrificing another good that is more highly valued .***
    - Parity in Value to consumers is achieved
    - And, consumer cannot be made better off without making someone else worse off.



## Marginal Cost Curve

### Marginal Cost (MC) - Definition

- This is the '**Opportunity Cost**' of producing an incremental unit of a good or service.
- In units, Marginal Cost for one good can be expressed as the **number of units of another good that *must be foregone*** in order to produce an incremental unit of this good.
- In money terms, it can be expressed as the **dollar cost of the best alternative good that *must be given up*** to produce an incremental unit of this good.

### Marginal Cost - Example

- *Assume that in order to produce an incremental unit of a burger you have to forego production of 1.5 sandwiches. A sandwich costs £ 2 to produce.*
- *The MC in money terms of an incremental burger will be;*
- *(1.5 x £ 2 = £ 3)*

### Marginal Cost Increase (*Principal of Increasing Marginal Cost*)

- As more and more units of a good or service are produced, their **marginal cost increases**.

### Marginal Cost is the Supply Curve

- **A Supply Curve is a 'Marginal Cost Curve'**.
- The supply curve (MC) is an upward sloping curve.



## Marginal Benefit Curve

### Marginal Benefit (MB) - Definition

- This is the '**Benefit derived by a Consumer**' by consuming an incremental unit of a good or service.
- In units, Marginal Benefit for one good can be expressed as the **number of units of another good people are willing to forego** in order to consume an incremental unit of this good.
- In money terms, it can be expressed as the **dollar cost of the best alternative good that is willingly given up** so that an incremental unit of this good can be consumed.

### Marginal Benefit - Example

- *Assume that in order to consume an incremental unit of a burger you are willing to forego consumption of 1 sandwich. A sandwich is priced at £ 2.75.*
- *The MB in money terms of an incremental burger will be;*
- *(1 x £ 2.75 = £ 2.75)*

### Marginal Benefit Decreases (*Principal of Decreasing Marginal Utility*)

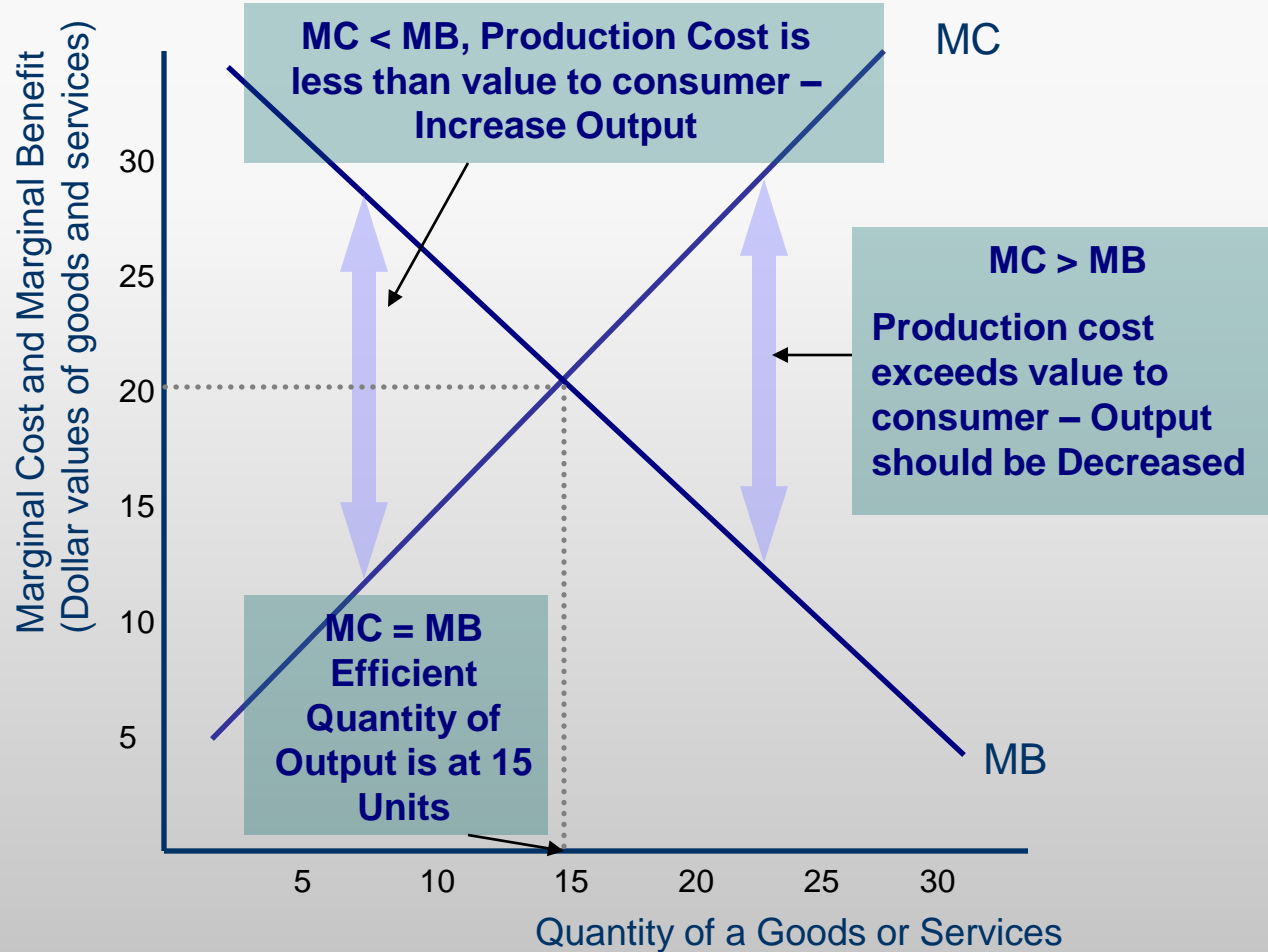
- As more and more units of a good or service are consumed, the **marginal benefit decreases**.

### Marginal Benefit is the Demand Curve

- **A Demand Curve is a 'Marginal Benefit Curve'**.
- The demand curve (MB) is a downward sloping curve.



# Allocative Efficiency, MC and MB





## ***Achieving Allocative Efficiency***

### **Calibrating Allocative Efficiency**

- Allocative Efficiency is calibrated using the concepts of:
  - *Marginal Costs (MC), and*
  - *Marginal Benefit (MB)*
- The Efficient Quantity is achieved when  $MC = MB$ 
  - *The number of units produced is equal to what the consumers want*
  - *Units are produced at a cost that is equal to the value consumers derive from these, hence allocation of resources is optimal.*

### **Inefficient Allocation of Resources**

- If a good is produced at a quantity level where the  $MC > MB$ 
  - *It means more units are being produced than consumers want*
  - *Excess units are being produced at a higher costs relative to the value consumers derive from these. Quantity should be decreased.*
- If a good is produced at a quantity at which the  $MC < MB$ 
  - *It means less units are being produced than consumers want*
  - *More units could be produced at a lower cost relative to the value consumers derive from these. Quantity should be increased.*



## ***Distinguishing between Value and Price***

### **Value Derived from a Product is MB**

- Value derived from a product is the ‘Marginal Benefit’ we gain as a result of consuming an incremental unit of that product.
  - *It reflects that maximum price we are willing to pay for consuming an extra unit of that product.*

### **Price Paid for the Product**

- Price paid for a product is simply the purchase price.
  - *It is possible however that we may be getting a bargain and not paying the maximum price that we were actually willing to pay.*



## ***Understanding the Demand Curve***

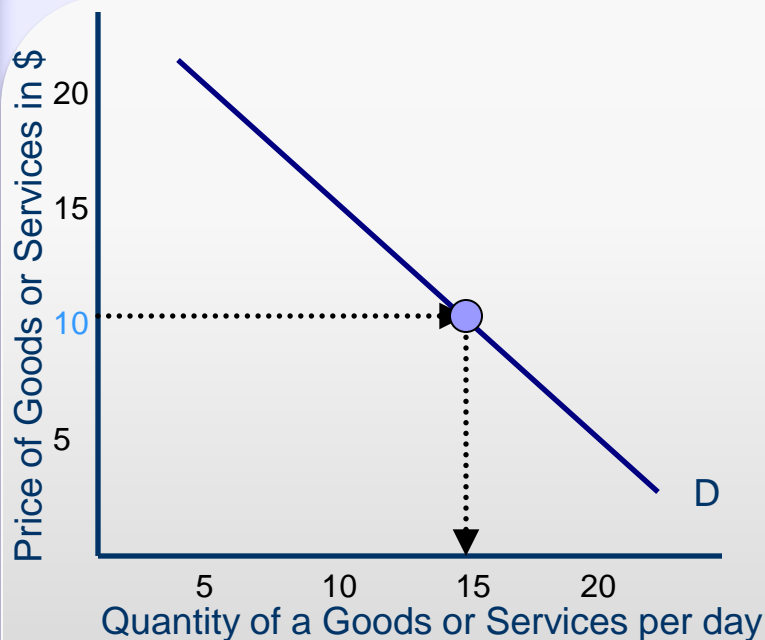
***The willingness of a consumer to pay for a good, determines its demand.***

### **Demand Curve**

- The Demand Curve depicts the quantity demanded of a good or service at each given Price Level.
  - ***This Price is not a ‘Money Price’, but the price of the goods or services that the consumer is willing to forego in order to purchase an incremental unit of this product. This is also what the Marginal Benefit Curve tells us.***
- The Demand Curve is thus a Marginal Benefit Curve.
- The Demand Curve Slopes Downwards.

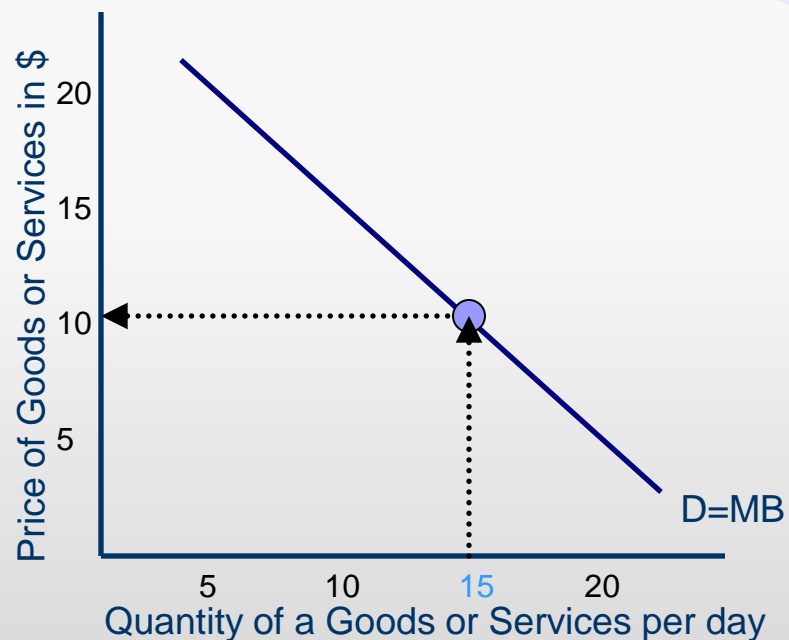


## Readings on the Demand Curve



### First Interpretation

At a price of \$10 the quantity demanded per day is 15 units



### Second Interpretation

If a fixed quantity of 15 units is produced each day, the price that the consumer is willing to pay for the last unit is \$ 10



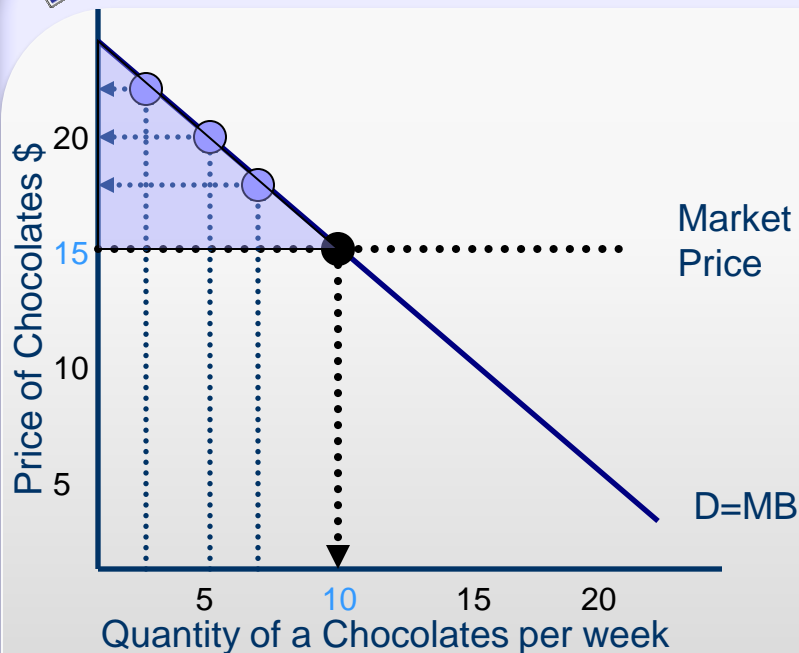
## ***Market Price Determination***

### **How Market Price is Determined**

- Recall from Allocative Efficiency that market price is determined by the intersection of the Marginal Benefit (Demand Curve) and the Marginal Cost (Supply Curve).
- At this intersection, an efficient quantity is produced, which also corresponds to a market price level for the product.
- Taking this Market Price Level as a given, we will next look at the how an **Individual Consumer's Marginal Benefit Curve** Interacts with the **Market Price Level**.



## Consumer Surplus – A Consumer's Demand Curve



**Consumer Surplus Calculation for each unit:**

**For 5<sup>th</sup> Unit = \$20 - \$15 = \$ 5**

**For 10<sup>th</sup> Unit = \$15 - \$15 = \$0**

**Total Consumer Surplus is Area of Triangle:**

**$\frac{1}{2} \times \text{Ht} \times \text{Base} = \frac{1}{2} \times 10 \times 10 = \$50$**

**Diagram shows an Individual Consumer's Demand Curve (MB)**

**Consuming the 2nd chocolate during a week provides the consumer a benefit that he values at about \$22**

**Consuming the 5<sup>th</sup> chocolate during the same week provides a benefit that the consumer values equivalent to \$20. We can see that the benefit to consumer falls as more units are consumed**

**The price that the consumer pays for all units depends on the Market- Determined price level, which is \$15. For the 10<sup>th</sup> unit consumed the Price Paid = Marginal Benefit**

**Up to the 10<sup>th</sup> unit, the consumer is willing to pay more than the market price of chocolates, but he actually always pays the market price. The excess of Value over Price for each unit collectively is called 'Consumer Surplus'**



## ***Distinguishing between Cost and Price***

### **Cost Incurred in Making a Product**

- For producing an incremental unit of a product, a producer incurs a certain cost. The cost of producing each incremental unit is referred to as 'Marginal Cost'.
  - *A Producer would like to make a profit, but he MUST recover the cost he incurs. This cost thus reflects the minimum price that a producer will be willing to accept in order to keep producing the product.*

### **Price Received for the Product**

- Price received is simply the Sale Price.
  - *The Producer is often able to sell the product at a price that exceeds his cost of production (Remember that cost of production is the minimum he will accept – Anything received in excess of that will be profit).*



## ***Understanding the Supply Curve***

***The minimum price acceptable by a producer will determine the quantity he supplies.***

### **Supply Curve**

- The Supply Curve depicts the quantity supplied at each given Price Level.
  - ***Just as in the case of the consumer, the Price is not a 'Money Price', but the price of the goods or services that the producer must divert resources from in order to produce an incremental unit of this product.***
    - This is also what the Marginal Cost Curve tells us.
- The Supply Curve is thus a Marginal Cost Curve.
- The Supply Curve Slopes Upwards.

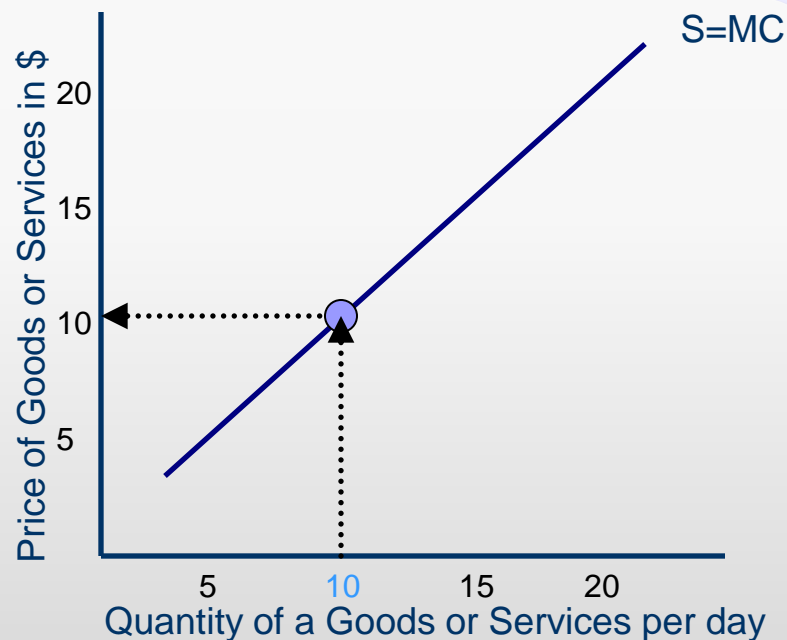


## Readings on the Supply Curve



### First Interpretation

At a price of \$10 the quantity supplied per day is 10 units



### Second Interpretation

To induce a producer to produce 10 units per day, the minimum price he will accept for the 10<sup>th</sup> unit will be \$10



## Producer Surplus – A Producer's Supply Curve

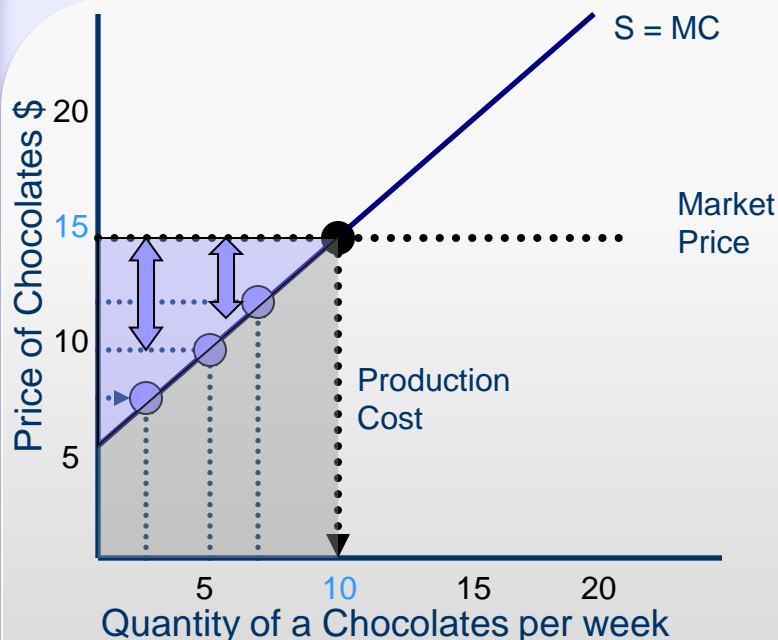


Diagram shows an Individual Producer's Supply Curve (MC)

At a price of \$7, the Producer will produce and sell 2 units per week

We can see that he must be offered a minimum of \$10 to produce and sell the 5<sup>th</sup> chocolate

At a price of \$15, he will produce 10 units. At this level the price he receives is equal to the minimum price he expects for producing the output. This will thus be the maximum quantity he will produce

Up to the 10<sup>th</sup> unit, the producer is receiving a price that is higher than his production cost, he receives the market determined price of \$15 for each unit sold. The excess of Price received over cost for each unit collectively is called 'Producer Surplus'

**Producer Surplus Calculation for each unit:**

For 5<sup>th</sup> Unit = \$15 – 10 = \$ 5

For 10<sup>th</sup> Unit = \$15 - \$15 = \$0

**Total Consumer Surplus is Area of Triangle:**

$\frac{1}{2} \times \text{Ht} \times \text{Base} = \frac{1}{2} \times 10 \times 10 = \$50$

**Total Production Cost is the Area under the MC**



## ***Benefits and Costs to Society***

### **Marginal Social Benefit – MSB**

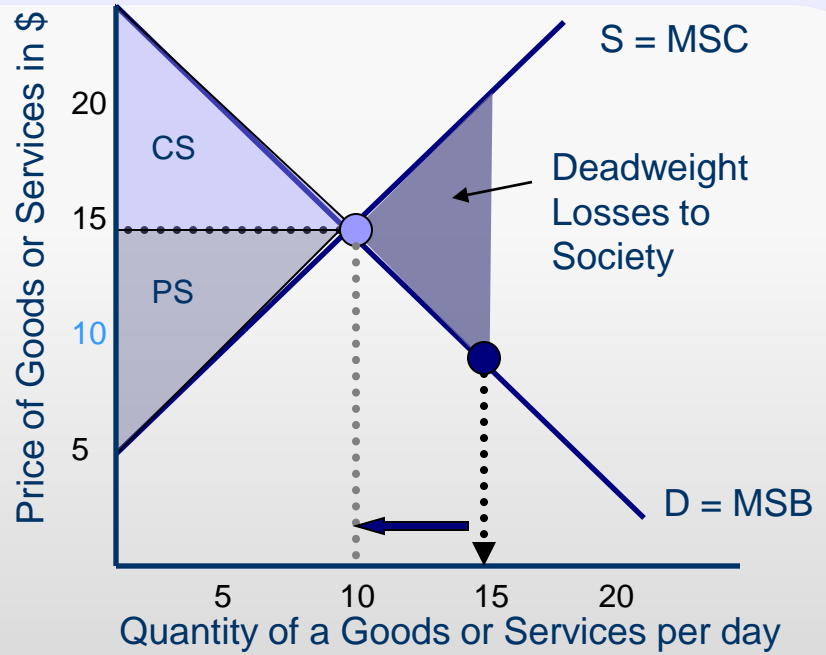
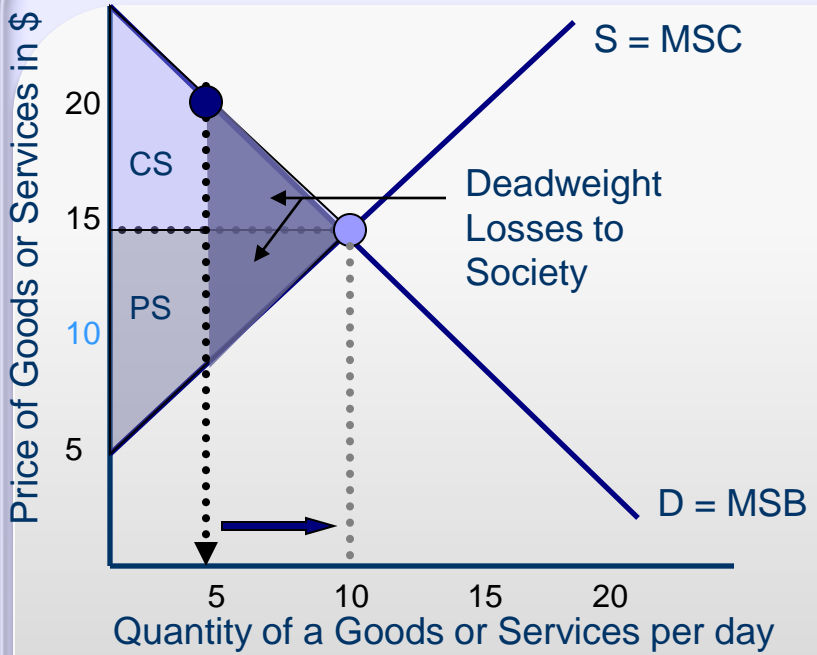
- The aggregate of the Marginal Benefit curve of all individual consumers can be considered the '**Marginal Social Benefit**' curve for the whole society.
  - *An important condition is that the benefit from the product in question must be derived only by the buyers of that product (simplifying assumption).*
- The Demand Curve is the MSB curve.

### **Marginal Social Cost – MSC**

- Similarly, the aggregated Marginal Cost curve of all individual producers can be considered the '**Marginal Social Cost**' curve for the whole society.
  - *Assumption is that all costs of production are borne by the producers, whose curves are being aggregated (simplifying assumption).*
- The Supply Curve is the MSC curve.



# Consumer Surplus and Producer Surplus



**In Competitive Markets, Efficient Quantity occurs at the Intersection of Demand and Supply – The sum of the Consumer Surplus and Producer Surplus is Maximized**

**At Output Levels above or below the efficient quantity, there will be Deadweight losses to society.**

**Total Benefit to Society = CS + PS - DWL**



## ***Ideas about the Fairness Principle - Utilitarianism***

### ***Utilitarianism – Seeks Fairness of RESULTS***

#### **Utilitarianism**

- ❑ Objective of achieving the “**Greatest level of happiness (Benefit) for the largest number of people**”.
- ❑ The idea is based on transferring wealth from the rich to the poor till equality is achieved (By **Taxing the Rich**).
- ❑ There would be overall gains to society if this principle were implemented since the **Marginal Utility** of the millionth dollar taken away from a rich person would be much less than the utility that a poor person would derive from it.

#### **Problems with Utilitarianism**

- ❑ Huge **costs** of achieving such income transfers.
- ❑ Higher taxation creates **disincentive to earn more** (by working hard) and creates a **disincentive to save more**.
- ❑ Result is lower availability of labour and capital, with the effect that the **economic pie shrinks** when we attempt to subdivide equally among all.
- ❑ Essentially, a trade-off exists here between Fairness and Efficiency (Referred to as the ‘**Big Trade-off**’).
- ❑ Further, there are **administrative losses** along the way in collecting and then distributing taxes. (Thus one dollar taxed results in a transfer to the poor of less than a dollar).



## ***Ideas about the Fairness Principle - Symmetry***

### ***Symmetry Principle – Seeks Fairness of RULES***

#### **Symmetry Principle**

- Based on **Equality of Opportunity**;
- Everyone is equal and so all should have similar opportunities.
- According to this principle, fair play is possible only when there are fair rules.
- Two '**Fair Rules**' relating to ownership of resources were put forward by Robert Nozick;
  - ***All resources should be under private ownership (If nobody has ownership rights of resources, the most powerful will effectively acquire control – Result is 'Unfairness').***
  - ***Transfer of all resources should be through voluntary exchange (No theft or appropriation by force).***
    - ***The distribution of wealth under this principle is not supposed to be equal but it is supposed to be Fair.***



# *Markets in Action*



## ***Market Equilibrium***

### **Short Run Supply Curve**

- The Short Run Supply Curve is upward sloping and changes in response to movements in the price level.

### **Long Run Supply Curve**

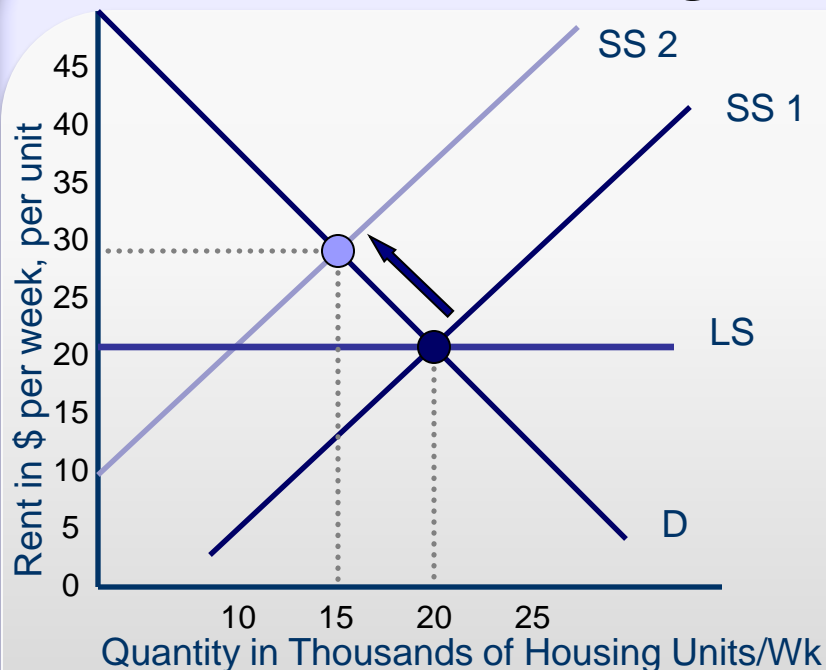
- In the Long Run, the Supply Curve for any resource is 'Perfectly Elastic' – It is a horizontal supply curve.

### **Market Equilibrium**

- Market Equilibrium is determined by the intersection of the ***Demand Curve*** and the ***Short Run Supply Curve***.

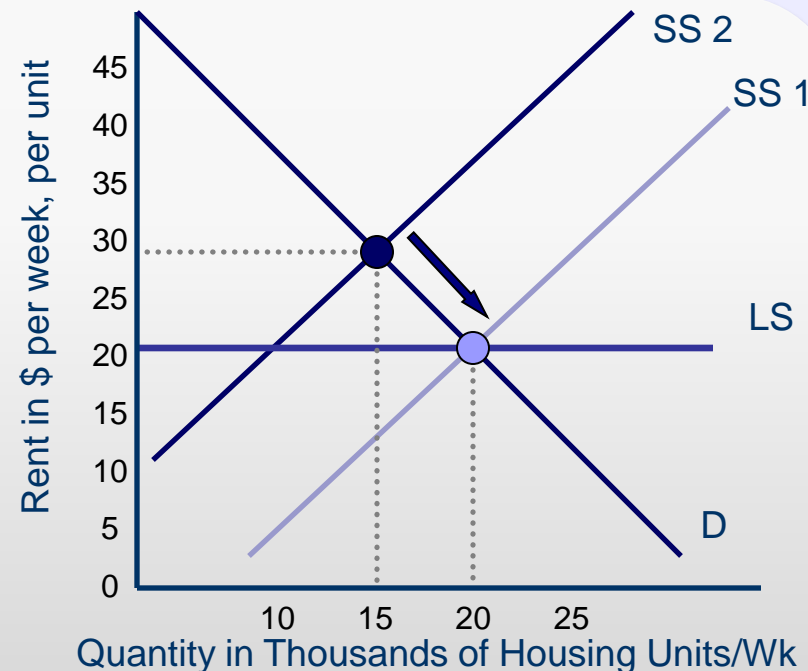


## Short Term and Long Term Effects of Outside Shocks



A Short Run Supply Shock – will cause the short run supply curve to move from SS 1 to SS 2. The temporary shortage will push prices up from \$20 to \$30.

Note that at this point the revenue from housing exceeds its Marginal Cost (LS)



New housing supply will gradually come into the market since the revenue exceeds marginal cost, as given by the Long Run Supply Curve – LS.

The short run supply curve will move to the right again and rents will return to their original levels gradually, in the long run



## ***Effect of Rent Ceilings on Black Markets and Efficiency***

### **Price Ceiling**

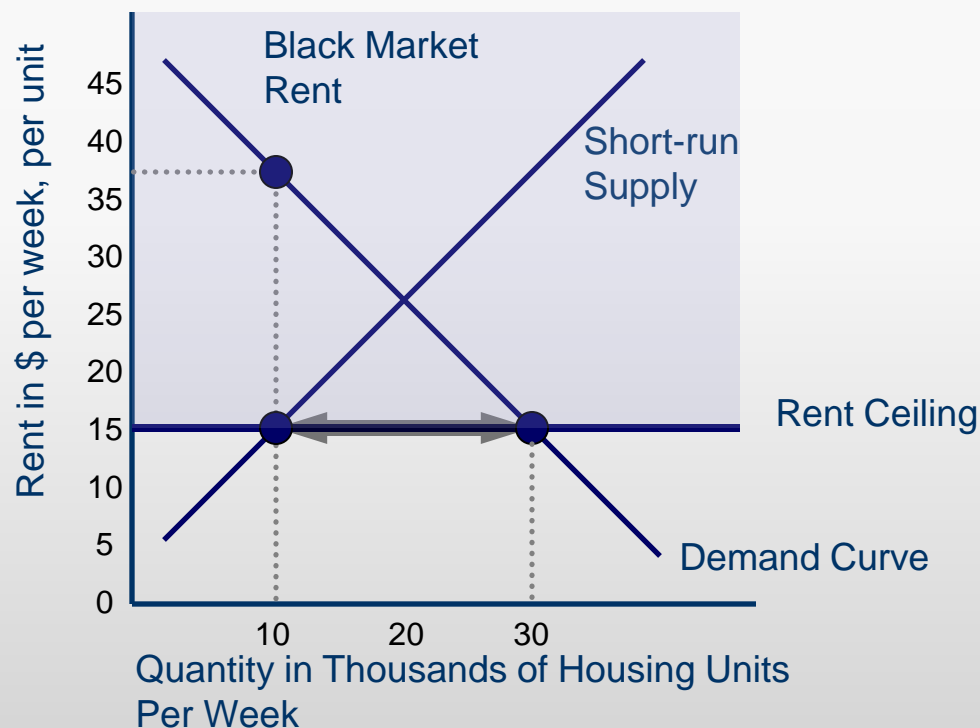
- **Is always set at a price below the equilibrium price level.**
- **A ceiling on rents is referred to as a ‘Rent Ceiling’.**

### **Effects of a Price Ceiling**

- **A *Shortage*** is created at the regulated price level, which results in;
  - ***‘Search Activity’ increases as people spend time and effort to look for the resource.***
  - ***Black Market activity is created since there will be frustrated buyers willing to pay a higher price than the regulated value just to ensure they are able to gain access to the resource.***
    - **Scarce resource are then distributed through lotteries, Queues or through Discrimination.**



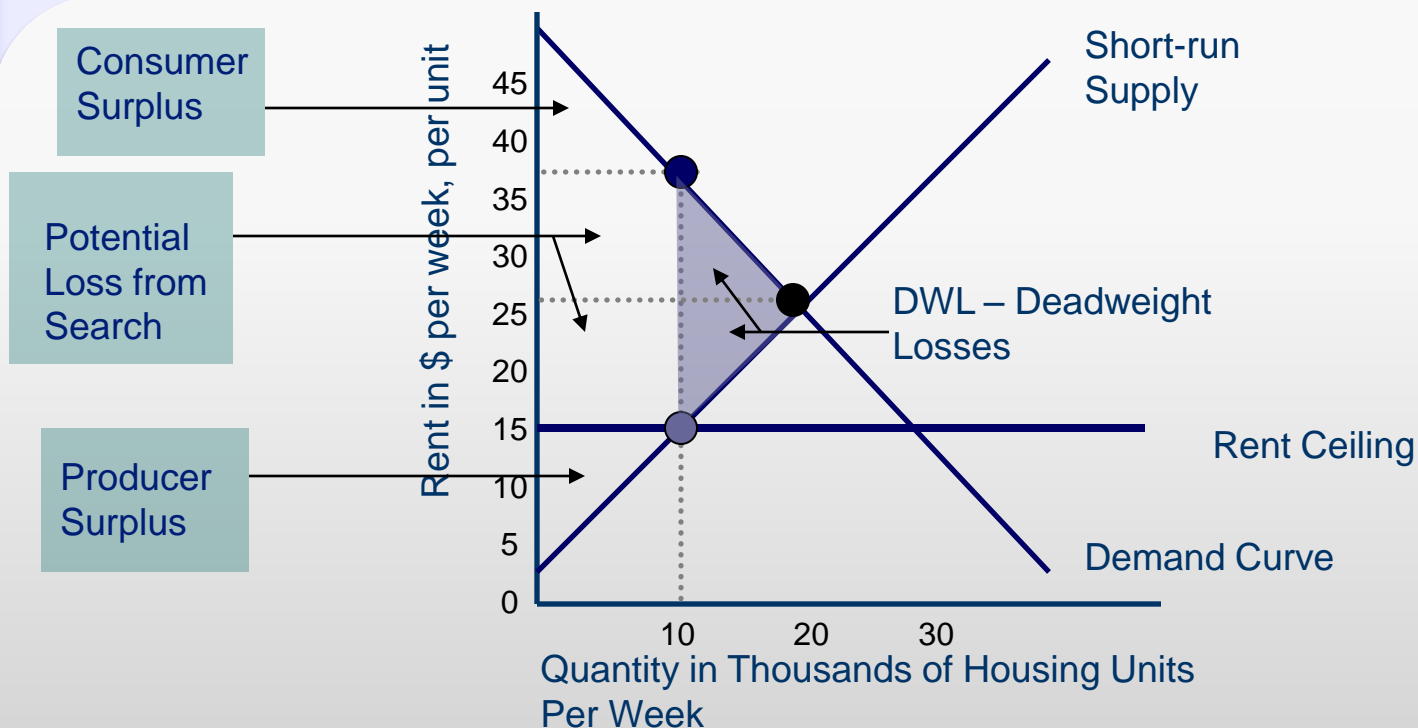
## Rent Ceilings



**A Rent Ceiling is placed below the equilibrium price level.** At this level demand outstrips supply and a shortage is created. An illegal market develops to cater to those people who wish to bypass the shortage and are willing to pay higher prices for the resource they seek. It is thus possible to end up with a situation where supply is constrained below equilibrium levels and prices could be higher than equilibrium due to black markets



## Inefficiency of Rent Ceilings



Both Producer Surplus and Consumer Surplus shrink as a result of Price Ceilings. Deadweight Losses result.

Consumer Surplus and Producer Surplus may shrink further due to an increase in Search Costs



## ***Labour Market Equilibrium***

### **Short Run Supply of Labour**

- In the short run, there are a limited number of people that form part of the labour market.
- These people respond to wage rate changes and increase or decrease the supply of labour (number of hours worked).

### **Long Run Supply of Labour**

- In the long run, people may enter or leave the labour market.
- Given complete freedom of entry or exit from the labour market, the long run supply of labour is '***Perfectly Elastic***' (Horizontal).

### **Labour Market Equilibrium**

- Labour market equilibrium is determined by intersection of the ***Short Run Labour Supply*** curve and the ***Demand Curve***.



## ***Effects of Minimum Wage Floor***

### **A Minimum Wage (Price Floor)**

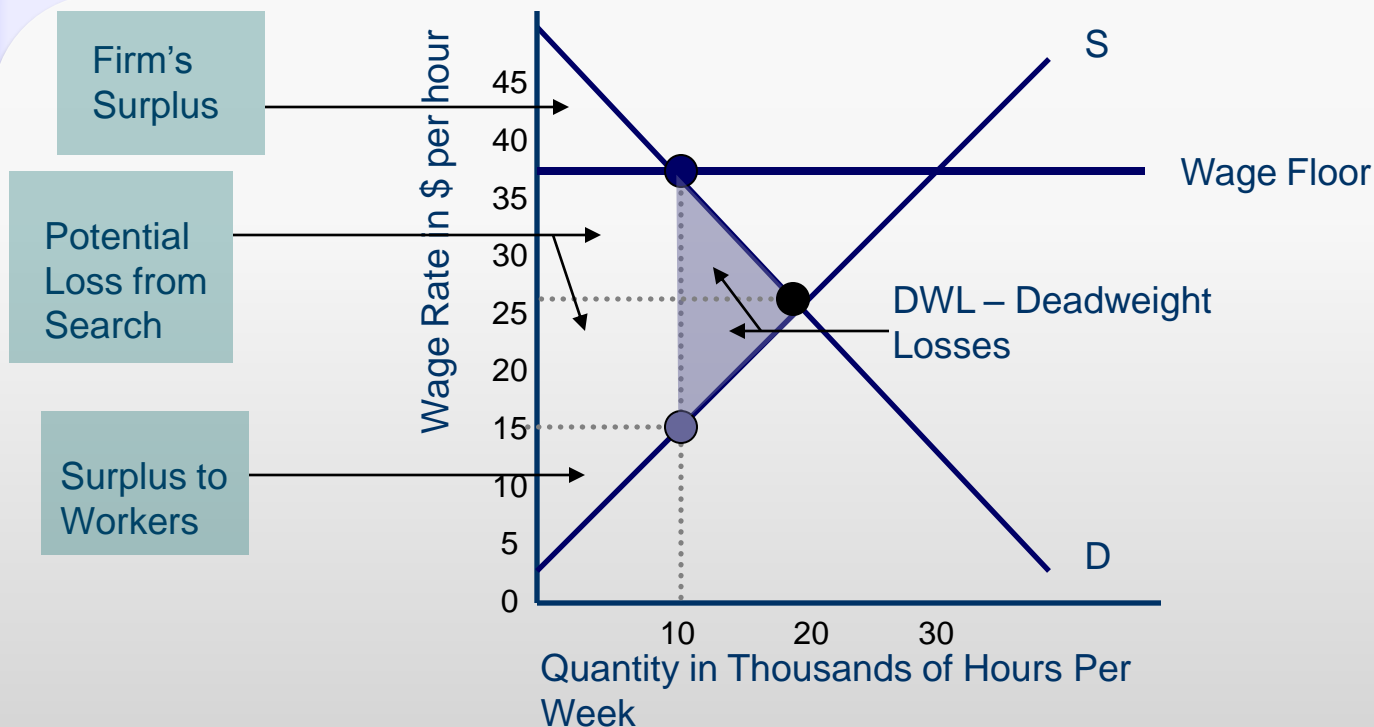
- Is *always set at a price ABOVE the equilibrium price* level.
- A price floor on wages is referred to as a '***Wage Floor***'.

### **Effects of a Minimum Wage (Price Floor)**

- Minimum Wage creates ***Unemployment***;
- Deadweight Losses occur because employment levels are lower, relative to the equilibrium levels.
- An inefficient amount of '***Search Activity***' happens as people spend time and effort to look for jobs or for employees.
- At the decreased level of overall employment, the value that the firm derives from marginal labour is more than the wage at which people are willing to work.



## Inefficiency of Wage Floor



Both Firm's Surplus and Worker's Surplus shrink as a result of Wage Floors. Deadweight Losses result.

The Surpluses may shrink further due to an increase in Search Costs



## ***Impact of Taxes on Supply and Demand Curve***

### **Tax on Sellers**

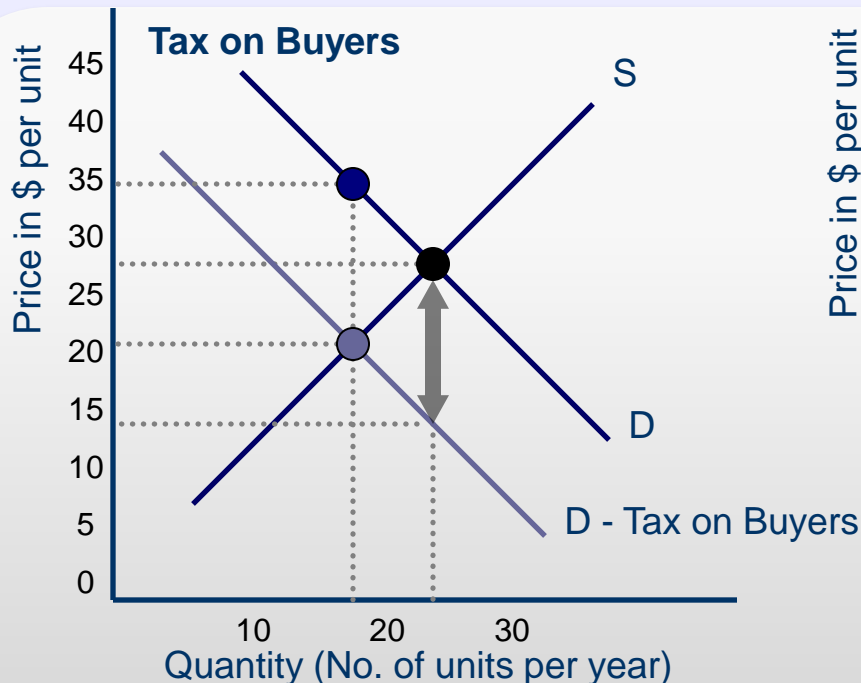
- A tax on sellers will function like an addition to cost.
- The result will be a ***decrease in supply.***
- Thus a tax on sellers will shift the supply curve ***'upwards and to the left'.***

### **Tax on Buyers**

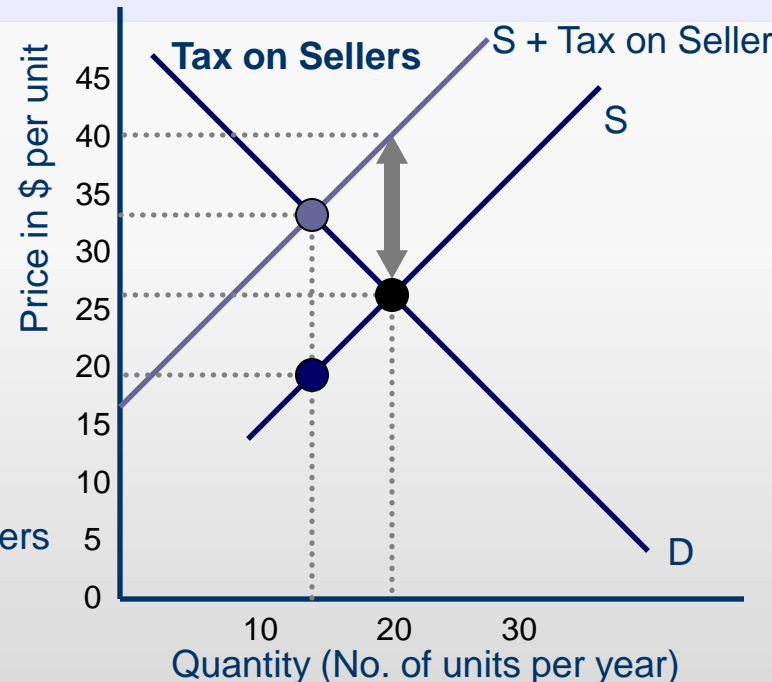
- A tax on buyers has the effect of decreasing the amount that buyers are willing to pay to the sellers.
- As a result, there will be a decrease in demand.
- Thus a tax on buyers will shift the demand curve ***'downwards and to the left'.***



# Effect of Taxes on Supply Curve and Demand Curve



A \$14 Tax on Buyers causes the demand curve to move down by that amount. The equilibrium quantity decreases from 24 units to 18 units. Buyers now pay \$35 and sellers receive about \$21. The equilibrium price was \$27. Buyers end up paying \$ 8 ( $35 - 27$ ) of the tax burden and sellers end up paying \$6 ( $27 - 21$ ). [Total Tax =  $8 + 6 = \$14$ ]



Equilibrium price is \$27. A \$14 tax on suppliers causes the supply curve to move up by that amount. Quantity decreases from 20 units to 14 units. Buyers now pay \$33 and sellers receive \$19. Tax burden on buyers has been \$6 ( $33 - 27$ ) and tax burden on sellers is \$8 ( $27 - 19$ ). [Total Tax,  $6+8 = 14$ ]



## ***Actual versus Statutory Incidence of Tax***

### **Observations from the Previous Example**

- In the previous example we have observed that when the tax was imposed on sellers, buyers had to also bear a certain portion of the tax burden.
- And, when the tax was imposed on buyers, sellers also ended up bearing the burden of the tax.
- In both cases;
  - ***Equilibrium quantity decreased,***
  - ***Price to consumer was raised,***
  - ***Revenue to seller was lowered.***
- The question then arises; ***“Who bears more of the Actual Tax Burden when a Statutory Tax is imposed on one of the parties, and why? Further, is it possible that only party would bear the entire tax?”***



## ***How the Actual Incidence of Taxes is Determined***

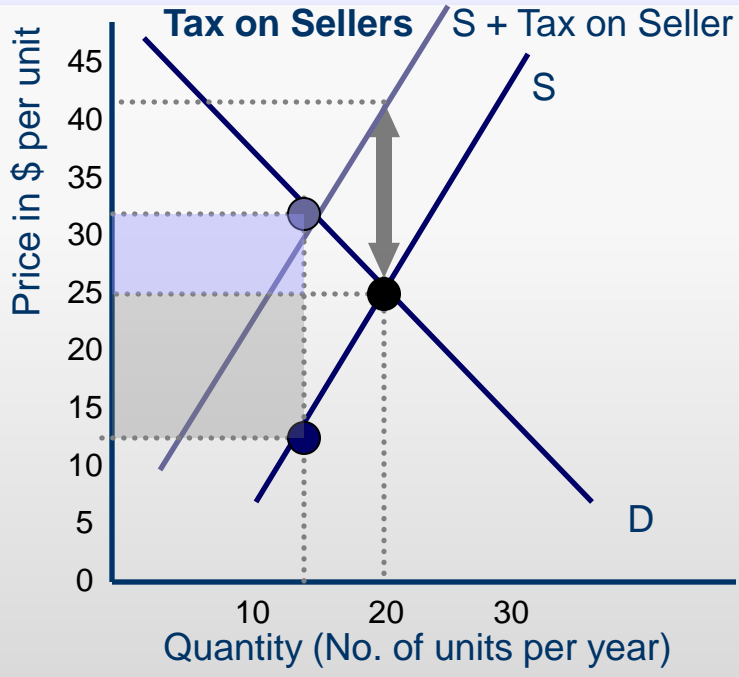
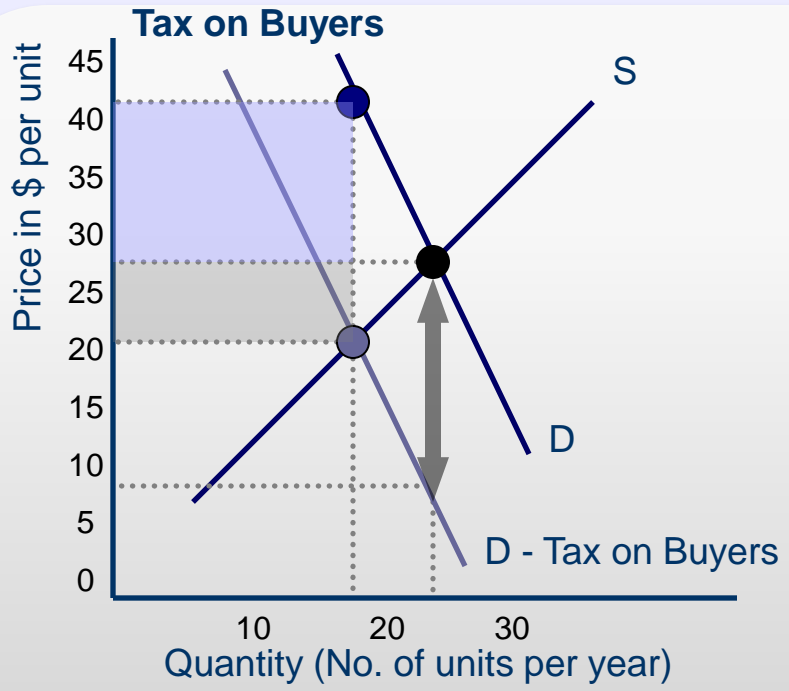
### **Relative Elasticity of Demand and Supply**

- If Demand is more Inelastic relative to supply, the actual incidence of taxes will be higher on the buyers.
  - ***Buyers will bear more of the tax if demand is more inelastic.***
- If Supply is more Inelastic relative to demand, then the actual incidence of taxes will be higher on the sellers.
  - ***Sellers will end up bearing more of the tax if supply is inelastic.***

***The more Inelastic party will bear more of the tax burden regardless of who the tax is statutorily imposed on.***



# Effect of Taxes on Supply and Demand Curves



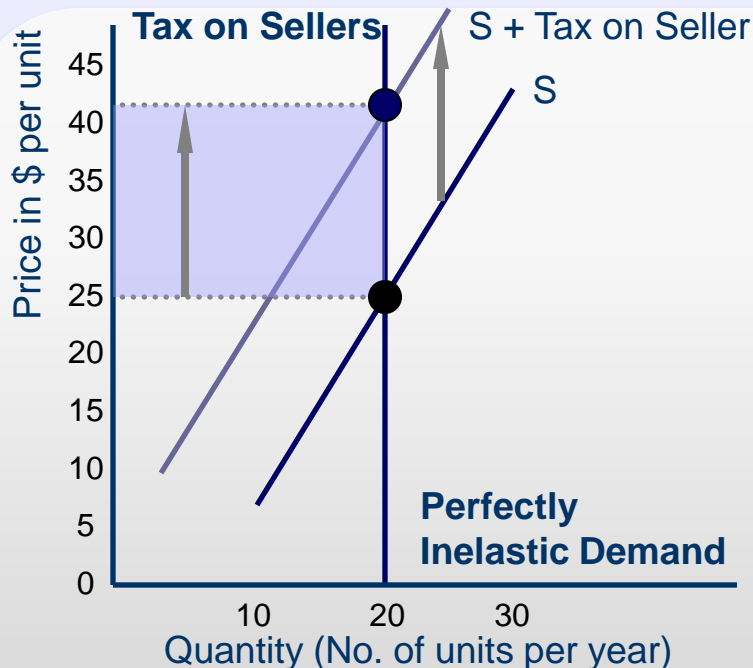
When demand is more inelastic (more vertical) relative to supply, the buyers bear more of the tax burden. Actual Incidence of the tax on buyers is shown by the blue triangle, which is greater than the incidence falling on sellers. The actual incidence of tax on sellers is shown by the grey triangle.

When supply is more inelastic (more vertical) relative to demand, the sellers bear more of the tax burden. Actual Incidence of tax on sellers is shown in grey, which is much larger than the tax incidence on buyers (shown in blue).

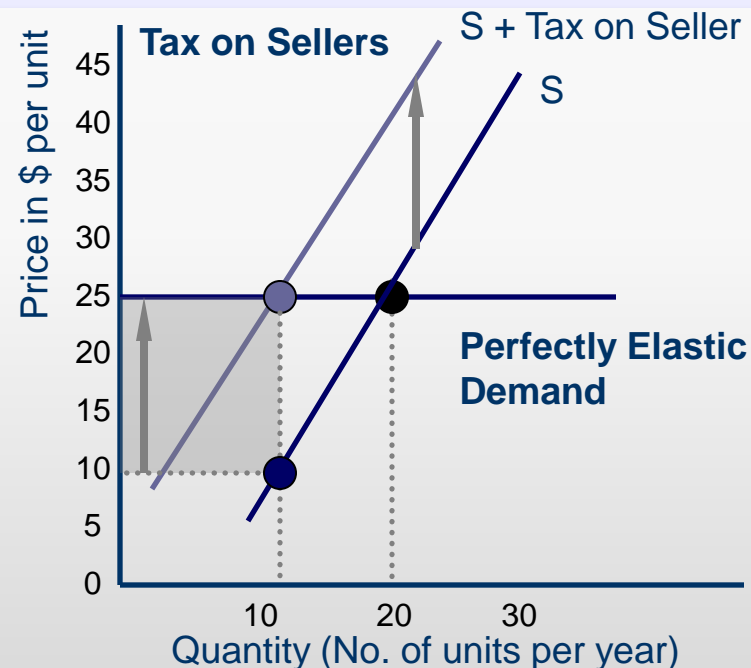
**Actual Incidence is independent of who the tax is levied on.**



## Taxes - Perfectly Inelastic & Perfectly Elastic Demand



**With Perfectly Inelastic Demand** (Vertical Demand Curve), the entire burden of tax is borne by Buyers (Blue Rectangle). Even though the statutory tax has been imposed on sellers, the actual incidence is entirely on the buyers. This is due to the fact that demand is perfectly inelastic (Buyers are completely inflexible in the quantity they demand) (No change in Quantity).



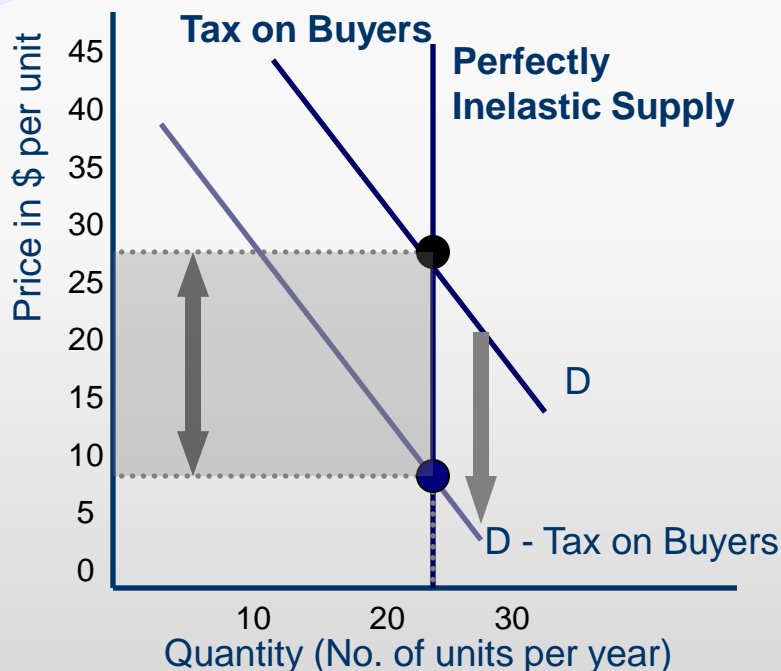
**With Perfectly Elastic Demand** (Horizontal Demand Curve), the entire burden of tax is borne by the Sellers (Grey Rectangle).

Buyers are extremely sensitive to price, thus the tax burden is borne by the sellers.

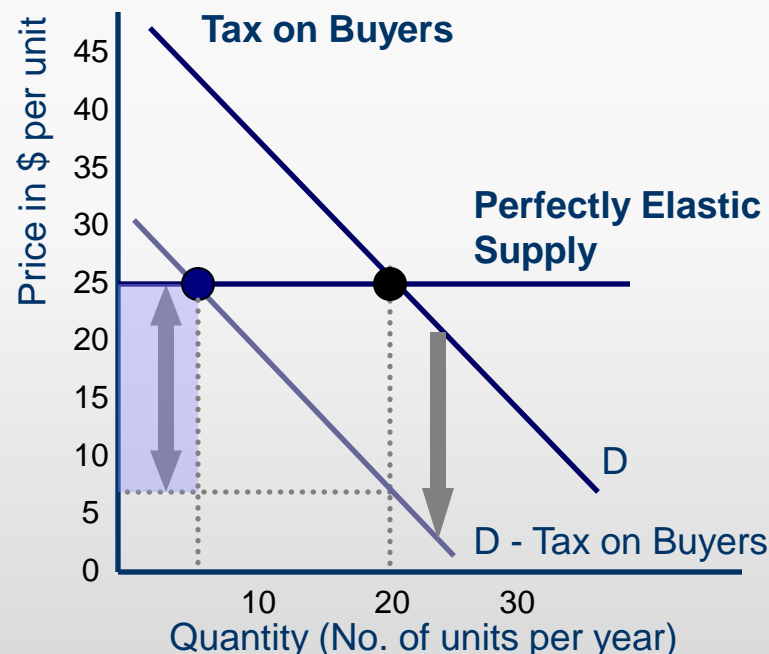
Actual and Statutory incidence of tax is the same.



## Taxes – Perfectly Inelastic & Perfectly Elastic Supply



**With Perfectly Inelastic Supply** (Vertical Supply Curve), the entire burden of tax is borne by Sellers (Grey Rectangle). Even though the statutory tax has been imposed on buyers, the actual incidence is entirely on the sellers. This is due to the fact that supply is perfectly inelastic (Sellers are completely inflexible in the quantity they supply) (No change in quantity)



**With Perfectly Elastic Supply** (Horizontal Supply Curve), the entire burden of tax is borne by the Buyers (Blue Rectangle)

Sellers are extremely sensitive to price, thus the tax burden is borne by the buyers. Here we see that Actual and Statutory incidence of tax is the same



## ***Agricultural Output and Revenue to Farmer***

### **Momentary Supply Curve**

- Once farmers have harvested a crop, the ***Momentary Supply curve will be vertical.***
- A bumper crop will mean that the momentary supply curve will be to the right of the average value. A poor harvest will mean that the momentary supply curve will be to the left of the average value. ***It is important to note that the normal supply curve will be upward sloping, however, momentarily, after a harvest, it becomes vertical.***

### **Demand for Agricultural Products**

- The demand curve slopes downwards. The demand for agricultural output, e.g. wheat is Inelastic.
  - ***This means that the % change in quantity demanded will be less than the % change in price.***

### **Impact on Farm Revenue (Farm Revenue is higher when harvest is poor)**

- A bumper crop will increase supply (shift vertical supply curve to right) and price will decrease;
  - ***The revenue to farmers collectively will however be lower (due to inelastic demand).***
- A poor harvest decreases supply (vertical supply curve to the left) and increases price;
  - ***The revenue to farmers collectively will be higher (due to inelastic demand).***



## ***Subsidies – Intervention in Farm Product Markets***

### **Subsidies**

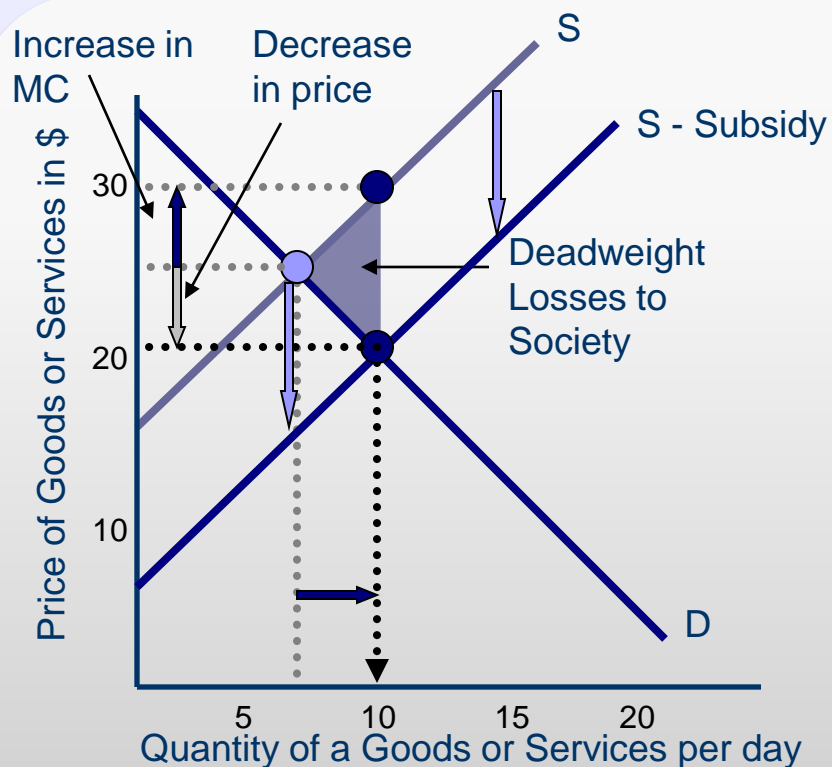
- ***A Subsidy is like a ‘Negative Tax’***; a payment made to the farmer by the government with the primary ***objective of increasing output*** levels of agricultural products.
  - ***The subsidy payment effectively reduces the cost to the farmer.***
  - ***Graphically, it has the effect of shifting the (upward sloping) supply curve, to the right.***

### **Equilibrium Effects**

- The equilibrium quantity increases,
- The price to the consumer decreases.
  - ***The decrease in price is less than the subsidy (See Graph)***
  - ***Part of the Subsidy goes towards an increase in marginal costs of production ( $MC > MB$  when output is pushed above equilibrium)***
- The farmer receives the lower price but the shortfall is paid to him by the government.
- A Deadweight loss occurs due to overproduction.
  - ***Subsidies create inefficiency.***
  - ***The effect of subsidies is transmitted globally due to exports.***



## Inefficiencies due to Subsidy



A \$10 subsidy causes the supply curve to shift down and to the right by that amount. Output is increased from 7 to 10, and price is lowered from \$25 to \$20. (A decrease in price of \$5)

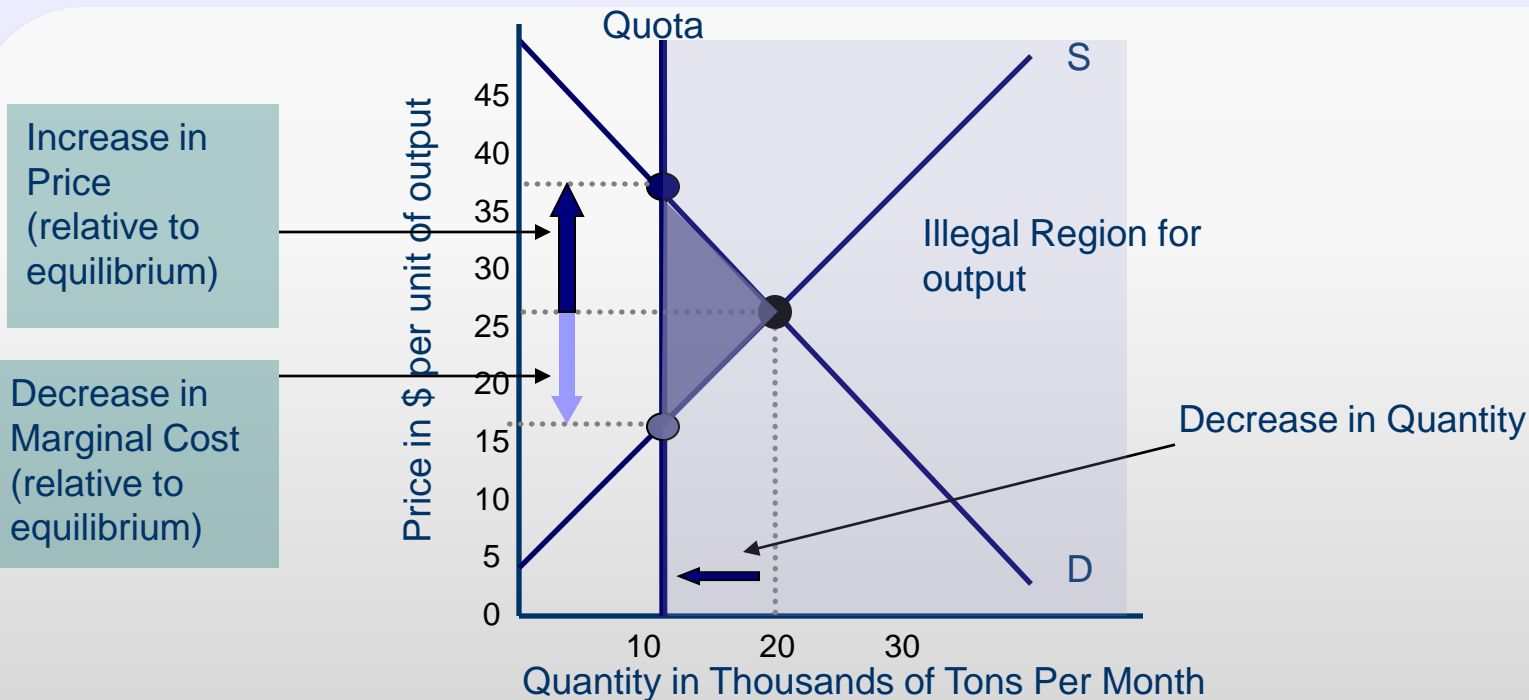
After the subsidy, the MC, given by the original supply curve, exceeds MB, the new point of intersection with the demand curve. MC increases by \$5 (from \$25 to \$30)

Farmer receives \$20 on market sales and receives \$10 extra from the government.

A deadweight loss occurs due to overproduction



## Production Quota – Intervention in farm Markets



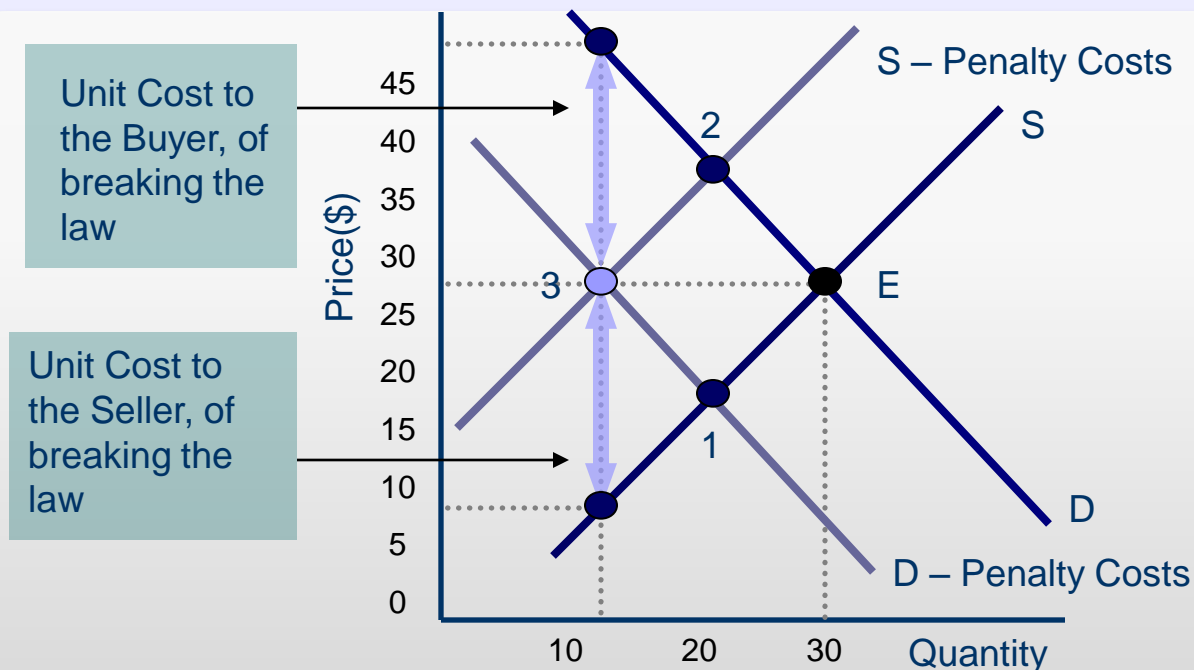
**A Quota** decreases output from 20 thousand tons to 10 thousand tons per month. Price increases as output is restricted, though individual producers have an incentive to over-produce

At the new output level, the Marginal Cost to the farmer is also reduced (from \$25 to \$15). The new Marginal Cost is less than the Marginal Benefit to the consumer

Deadweight Losses arise due to underproduction. For this reason, production quotas are inefficient. (A quota is relevant only when placed at an output level below equilibrium output)



## Market for Illegal Goods



For a Legal Product, equilibrium quantity and price would be point 'E'. Illegal Products attract a penalty or fine if people are found trading in them. A penalty could be imposed on Sellers only, Buyers only or on both. If a fine is imposed on sellers only, the supply curve shifts upwards by that amount. It becomes more costly for sellers to sell this product once the fines are factored in. Price would rise and quantity sold would decrease. The transacting price and quantity levels would be shown by point '2'

If a fine is imposed on buyers, the demand curve shifts down by the amount of the penalty. The new level is given by '1'. If a fine is placed on both, point '3' indicates the new price (same as equilibrium price) but a lower quantity is traded.



# *Organizing Production*



## ***Opportunity Costs - Explicit***

### **Opportunity Costs**

- Allow us to compare the cost of pursuing different alternatives.
- Opportunity Costs measure the cost of the ***'Foregone alternative that has the highest value among the various options'***.

### **Explicit Costs**

- These are a component of opportunity costs.
- ***These costs are actually paid out in money terms.***
- For a firm, these costs represent an amount that could have been used on alternative resources.



## Opportunity Costs - Implicit

### Implicit Costs

- These represent an opportunity costs but are ***not actual costs paid out in money.***
- For firm, the use of its own time, financial capital or other resources represents an implicit cost, since these resources could be used in pursuing other goals or could be rented out for use by others.

### Implicit Costs of Firms Own Capital

- **Foregone Interest** – Is an implicit costs of using one's own capital due to foregone interest.
- **Economic Depreciation** – Is also an implicit cost of using own capital due to the loss in its value.
  - ***For example, capital is used to purchase equipment, which later loses value after use.***



## ***Opportunity Costs – Normal profit (Implicit Cost)***

### **Normal Profit**

- An entrepreneur earns a return or profit on his initiative.
- ‘Normal Profit’** is the average profit that an entrepreneur can expect to earning.

### **Normal Profit is an Opportunity Cost**

- It represents an opportunity costs since the entrepreneur could have worked for another company for a salary or could have run another business.



## ***Relationship of Opportunity Costs and Economic Profit***

### **Economic Profit**

- Is calculated as a firm's '***Total Revenue minus Opportunity Costs***'
- Itemized Opportunity Costs would be;
  - ***Explicit Costs;***
    - Interest Expenses Paid
    - Staff Salary Expenses Paid
    - Materials Costs Incurred
    - Utilities and Administrative Expenses Paid
  - ***Implicit Costs;***
    - Foregone Interest
    - Economic Depreciation (Loss in value of capital)
    - Foregone Wage Equivalent for Entrepreneur
    - Normal Profit
- Subtracting these Opportunity Costs from Total Revenue would provided the firm's '***Economic Profit***'.



## ***Profit Maximizing Goal – Constraints faced by a Firm***

### **Profit Maximization Goal**

- All firms pursue the goal of profit maximization.
- Certain constraints limit the firm's ability to increase its profits.

### **Constraints Faced by a Firm**

- Technological Constraints,
- Information Constraints,
- Market Constraints.



## ***Constraints Faced by a Firm***

### **Technological Constraints**

- Technological progress has enhanced, and has created additional profit opportunities;
  - ***The limit to increase profitability by employing technology, is limited by the stage of the technology itself.***

### **Information Constraints**

- Access to complete information, and analysis of that information creates opportunities for increasing profits;
  - ***Complete information however, is not available at all times, and vast resources may sometimes be necessary for processing that information.***

### **Market Constraints**

- These are constraints related to the expectations and requirements set by the market environment;
  - ***These include price levels, accessing labour and material resources etc.***



## ***Technological versus Economic Efficiency***

### **Definition of 'Efficient Production'**

- Production Efficiency can be viewed along two dimensions;
  - ***Technological Efficiency,***
  - ***Economic Efficiency.***

### **Technological Efficiency**

- This type of efficiency occurs when a firm produces output, utilizing the fewest possible resources (Due to its technological prowess).

### **Economic Efficiency**

- This type of efficiency occurs when a firm produces output, at the lowest possible cost;
  - ***(Note that a technologically inefficient process cannot be economically efficient).***



## Calculating Economic Efficiency

### Economic Efficiency Example

- Consider two process;
  - **Process A)** uses 200 units of labour and 15 units of capital per unit of output (labour intensive process).
  - **Process B)** uses 10 units of labour and 40 units of capital per unit of output (capital intensive process).
  - Cost of each labour unit is \$60 and each capital unit is \$500. On the basis of per unit costs, which process is more economically efficient?

### Solution

- A)  $\$60(200) + \$500(15) = \$19,500$  per unit of output.
- B)  $\$60(10) + \$500(40) = \$ 20,600$  per unit of output.
  - **Process A) is more 'Economically Efficient' since it produces output at the lowest possible cost per unit.**



## ***Command and Incentive Systems for Organisations***

### **Command Systems**

- This is a method of organizing production of goods and services through a formalized hierarchy:
  - ***Commands flow downwards,***
  - ***Information Flows upwards, in the hierarchy.***
    - Example; Management Hierarchy Command Structure
    - Military Hierarchy Command Structure

### **Incentive Systems (Incentive-based compensation)**

- This is a method for organizing production of goods and services through an incentive-based compensation system:
  - ***This system is directed towards channelling the activities of organizational members towards activities that will maximize the firm's profit.***



## ***The Principal Agent Problem***

***Principal-Agent Problem arises in the context of Incentive Based Compensation Systems.***

### **Principal-Agent Problem**

- The firm is the '**Principal**' and its managers and other staff are the '**Agents**'.
- Compensation systems are designed to align the interests and activities of the agents such that they act in the best interest of the principal:
  - ***Agents may also have their own self-interests.***
  - ***The self interests of the agents may not be promoting the interests of the principal, or,***
  - ***These may be in direct conflict with the interests of the principal.***
- The firm has various means and mechanisms for dealing with the Principal-Agent problem.



## ***Methods for Reducing the Principal-Agent Problem***

### **Ownership Stake for the Agents**

- When employees have an ownership stake in an organization, they are in fact their ***own principals***.
- ***Meaningful ownership rewards*** for employees can be very effective in aligning the interests of the organization and its workers.

### **Incentive Pay**

- Compensation that is ***linked with the performance*** of an employee can reduce the principal agent problem.

### **Length of Contracts**

- When employees are brought in to ***serve a longer tenure*** with a company, they are less likely to engage in short-term, self-serving activities, and are more likely to take a longer-term view for promoting the organizational interests and goals.



# Business Organizations, Advantages and Disadvantages

## Sole Proprietorship

- ❑ **Organization has a single owner, and the owner is exposed to unlimited liability.**
- ❑ **Advantages:** Complete Control over business and full share of the profits, Profits taxed at personal rate of taxation relevant to the owner and **No Principal-Agent problem.**
- ❑ **Disadvantages:** The personal wealth and property of the owner is exposed, Cost of Capital is high, and Decision-making quality is only as good as the owner's ability.

## Partnership

- ❑ **Structure has 'Joint Unlimited Liability'. Two or more owners work as partners.**
- ❑ **Advantages:** Profits taxed at personal income tax rate for the partners and Partners share the profits and losses in agreed proportion.
- ❑ **Disadvantages:** **'Agency'** problem exists since a partner can bind the firm in legal contracts, Cost of Capital is high, Business relies heavily on partners for capital and expertise and Partners' personal wealth is exposed.

## Corporation

- ❑ **'Limited Liability' business structure which can be owned by one or more individuals.**
- ❑ **Advantages:** Personal wealth of the owners is NOT exposed, Cost of Capital is low for a corporation, Perpetual Life (On-going Legal Entity) and Professional Managers are employed.
- ❑ **Disadvantages:** Retained Earnings are taxed twice; as corporate profits and as stockholder's capital gain income, Decision-Making may be complex and **Principal-Agent Problem** exists.



## **Market Classifications based on degree of Competition**

### **Perfect Competition**

- **Market structure with highest degree of competition:**
  - *There are a large number of market players,*
  - *No barriers to entering or exiting the market,*
  - *All firms sell an almost identical product.*

### **Monopolistic Competition**

- **Fewer firms than perfect competition, but still a fairly high level of competition:**
  - *Products are slightly differentiated (Differentiated products and a large number of competitors is the distinguishing feature of monopolistic competition),*
  - *Large number of firms.*

### **Oligopoly**

- **A few large, market players, who often collude for enhancing profits:**
  - *Higher level of entry and exit barriers,*
  - *Products may be identical or they may be differentiated.*

### **Monopoly**

- **Market structure with a single Dominant firm:**
  - *Product sold is likely to be Unique, with no close substitutes,*
  - *Entry and Exit barriers are very high.*



## ***Measuring Competition Levels in the Markets***

***The Degree of Competition in a market is used as a basis of determining Market Structure.***

### **Measures of Concentration**

- These help us measure the extent to which a market is dominated by a small number of firms
- **Two Commonly Used Measures of Concentration are:**
  - ***The Four-Firm Concentration Ratio***
  - ***The Herfindahl-Hirschman Index***



## Calculating the Four-Firm Concentration Ratio

### Definition

- **'Four-Firm Concentration Ratio'** is the percentage of Total Industry Sales (In Money Terms) that is accounted for by the '4' largest firms in the industry.

### Example

- Assume there are 6 firms in an industry. The dollar value of sales of these firms is;
  - $A=\$100,000$ ,  $B=\$90,000$ ,  $C=\$80,000$ ,  $D=\$80,000$ ,  $E=\$40,000$ , and  $F=\$30,000$

- '4'Firm Concentration Ratio:

$$\frac{(100,000 + 90,000 + 80,000 + 80,000)}{(100,000+90,000+80,000+80,000+40,000+30,000)} \times 100 = 83.33\%$$

- This market is clearly a Concentrated Oligopoly.

### Interpretation

- A ratio close to 1% indicates Perfect Competition.
- **A ratio of 40% or less still indicates a Competitive Market.**
  - *Between 40 – 60%, the market structure reflects increasing levels of Market Concentration.*
- **A ratio of 60% or greater indicates Oligopoly.**
- A ratio of 100% reveals a Monopoly Structure.

***“A Low Ratio indicates a high degree of Competition”.***



## Calculating the Herfindahl-Hirschman Index (HHI)

### Definition

- The HHI is calculated as the **sum of the squares** of the **percentage market shares** of **ALL** firms in an industry.

### Example

- Assume there are 11 firms in an industry, with the following market shares; 40%, 20%, 10%, 7%, 6%, 5%, 5%, 3%, 2%, 1%, 1%. Calculate the HHI.
- HHI will be:
  - $40^2 + 20^2 + 10^2 + 7^2 + 6^2 + 5^2 + 5^2 + 3^2 + 2^2 + 1^2 + 1^2 = 2250$
  - *This is an Un-Competitive Market.*

### Interpretation

- For a Monopoly, the HHI will be 10,000:
  - *A Monopoly will have 100% market share, so  $100^2 = 10,000$*
- Perfect Competition will have an HHI close to '0'. Generally, HHI less than 1000 indicates a Competitive Market.
- HHI between 1000 – 1800 is Moderately Competitive.
- HHI greater than 1800 is considered Un-Competitive.
  - *Regulatory Agencies in the US are likely to challenge Mergers in an industry for which the HHI exceeds 1800.*



## ***Efficiency Comparisons, Firms vs. Markets***

### **Coordination of Economic Activity**

- Economic Activity can be coordinated by Firms or by Markets
- These activities include;
  - *Hiring and Organizing factors of productions,*
  - *Producing output at levels that closely match demand,*
  - *Distributing and selling output (engaging in transactions).*
- Firms are more efficient at coordinating such economic activity, and they do so at lower costs.
  - *If firms were to be engaged in this process at higher costs relative to the market mechanism it would make the firm unviable as a business entity.*



## ***Firms' Efficiency in coordinating Economic Activity***

### **Transaction Costs are Lower**

- Firms can engage in many economic processes at lower transaction costs compared to the market mechanism.

### **Economies of Scale**

- Unit costs of production go down when firms produce output at high volumes.

### **Economies of Scope**

- Reduction of overall costs when a firm is able to use its resources across a broad range of activities.

### **Economies of Team Production**

- Coordinate organizational activity can generate significant cost benefits to a firm if such team activity is coordinated and managed well.



# *Output and Costs*



## ***Short Run Decision Time Frame***

### **Resource Quantities are Fixed**

- In the Short Run, most resources are fixed:
  - ***These could be plant and machinery,***
  - ***Building or Factory,***
  - ***Management Organization.***
- These fixed resources place a constraint on expanding output.

### **Variable Inputs can be Increased**

- In the Short Run, output can only be increased by increasing variable inputs in the production process.
- ***The variable input that can most easily be increased is the Quantity of Labour.***
  - ***The number of shifts operated each day can also be increased to operate full time.***
  - ***Short Run Decisions are Easily Reversed.***



## ***Long Run Decision Time Frames***

### **All Resource Quantities are Variable**

- In the Long Run, quantities of all resources can be changed;
  - ***New Plant and Machinery can be Installed,***
  - ***New Buildings or Factories can be built,***
  - ***The Management Organization can be expanded.***
- There is no constraint on expanding output in the Long Run.
  - ***Long Run Decisions are NOT EASILY REVERSED.***



## ***Short Run 'Labour Productivity Measures'***

### **Total Product of Labour**

- **'Total Product'** is the maximum number of units that can be produced, per day, with a given quantity of labour.

### **Marginal Product**

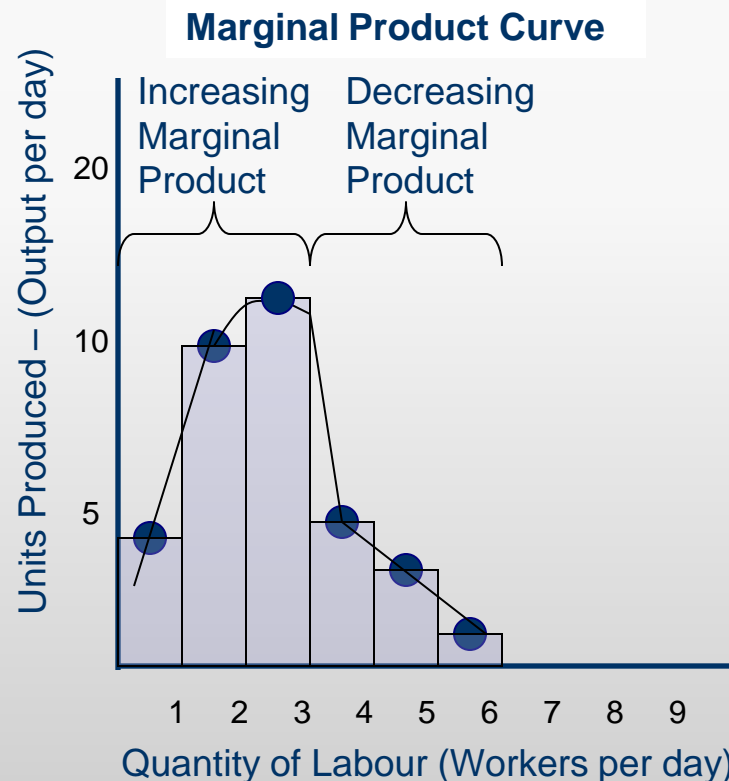
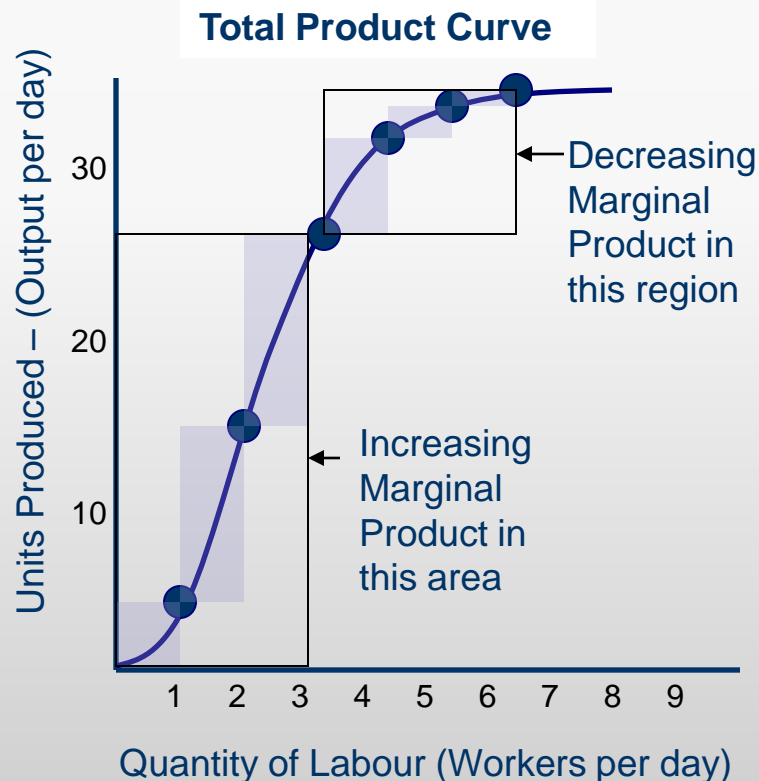
- **'Marginal Product'** is the increase in number of units produced per day, by using an additional worker.

### **Average Product**

- **'Average Product'** is the total number of units produced per day, divided by the total number of workers used.
  - ***Average Product is an indicator of the Productivity Level of workers.***



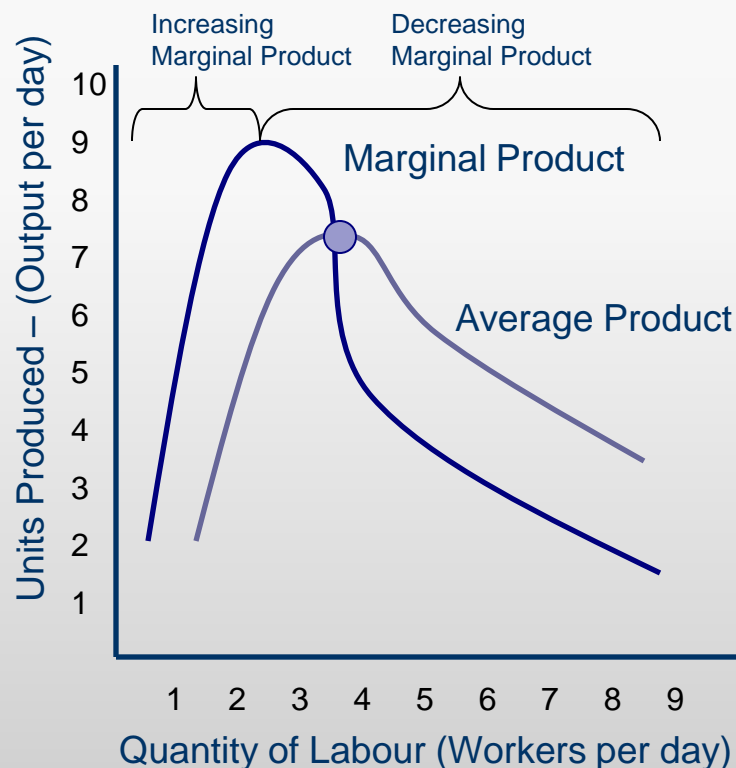
# Total Product Curve and Marginal Product Curve



As more workers are added (variable resource), output levels increase. Increasing Marginal Product is observed. As more of the variable resource (labour) is added to a fixed resource (plant and machinery), the increase in output becomes less and less. This causes the firm to experience decreasing marginal productivity. This is shown on both graphs above, the Total Product Curve and the Marginal Product Curve.



## Average Product Curve



**Average Product Curve**

On the Marginal Product Curve, we first see the region of increasing marginal returns and then a region of decreasing marginal returns.

The Average Product Curve however continues to rise for a while even after the MP curve peaks and turns down. This is because the average product curve carries in it the weight of the earlier effect of increasing productivity. As productivity diminishes further, the average product curve also peaks and turns down.

The point where the two curves intersect, is the point where Average Product is at its maximum. After this point, since marginal product is less than average product, the average product curve continues to be pulled downwards.



## ***Increasing and Decreasing Marginal Returns***

### **Definition – Increasing Marginal Returns**

- When the Marginal Product of an incremental unit of labour is higher than the marginal product of the previous unit of labour, a firm will experience 'Increasing Marginal Returns'.
  - *The Total Product Curve will rise,*
  - *The Marginal Product Curve will rise,*
  - *The Average Product Curve will rise.*

### **Definition – Decreasing Marginal Returns**

- When the Marginal Product of an incremental unit of labour is lower than the marginal product of the previous unit of labour, a firm will experience 'Decreasing Marginal Returns':
  - *The Total Product Curve will begin to flatten out,*
  - *The Marginal Product Curve will peak and turn down,*
  - *The Average Product Curve will;*
    - Continue to rise initially, as MP is above AP.
    - Then peak and turn down, as MP moves below AP, also pulling down the average.



## ***The Law of Diminishing Returns***

### **Definition – Law of Diminishing Returns**

- **‘As more of a variable input is added to a fixed input, the Marginal Product of the variable input eventually decreases’.**
- The Law of Diminishing Returns explains the behaviour of the three curves we have studied.
  - ***It causes the flattening of the Total Product Curve,***
  - ***Causes the MP to peak and turn down,***
  - ***Caused the AP to peak and turn down, a little later.***



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