Supply

- Supply refers to the quantity of a commodity that producers are willing to produce and sell at a given price per unit of time. The word 'supply' has the following features.
- The supply of a commodity is stated in quantitative terms as the desired quantities.
- Formally, supply of a commodity refers to the quantity that a producer is willing to sell at different prices.

Supply in Product/Output Markets

- Firms build factories, hire workers, and buy raw materials because they believe they can sell the products they make for more than it costs to produce them.
- **profit** The difference between revenues and costs.

Price and Quantity Supplied: The Law of Supply

- **quantity supplied** The amount of a particular product that a firm would be willing and able to offer for sale at a particular price during a given time period.
- **supply schedule** Shows how much of a product firms will sell at alternative prices.

Price and Quantity Supplied: The Law of Supply

- **law of supply** The positive relationship between price and quantity of a good supplied: An increase in market price, *ceteris paribus*, will lead to an increase in quantity supplied, and a decrease in market price will lead to a decrease in quantity supplied.
- **supply curve** A graph illustrating how much of a product a firm will sell at different prices.

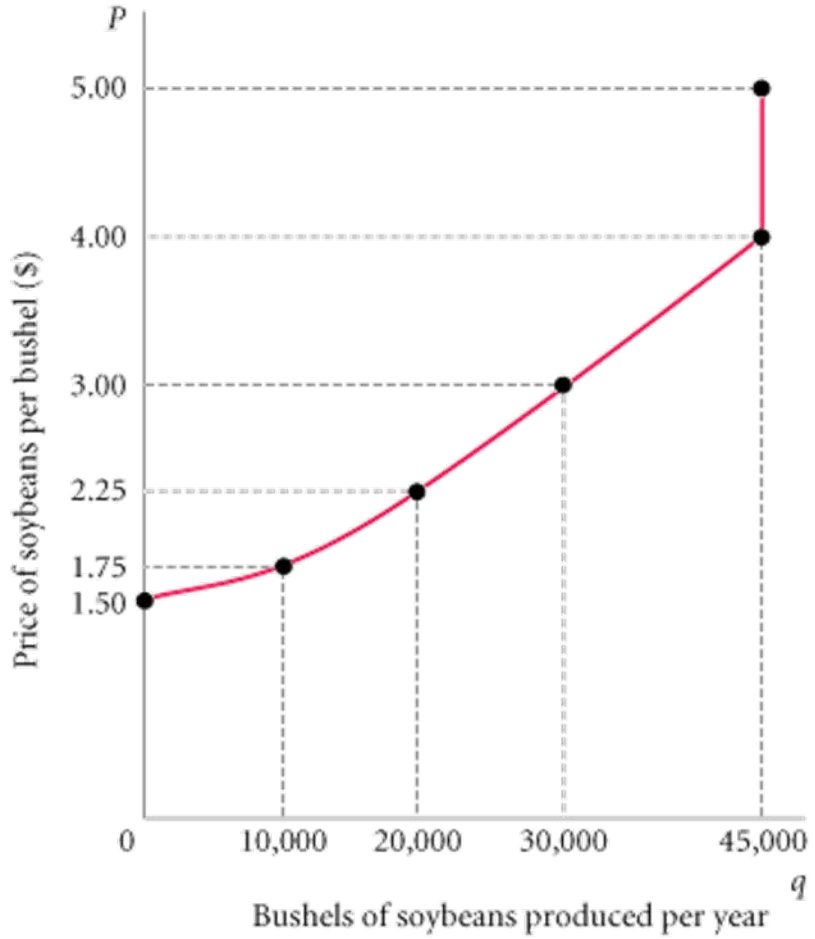
TABLE 3.3 Clarence Brown's Supply Schedule for Soybeans

Price (per Bushel)	Quantity Supplied (Bushels per Year)
$1.50	0
1.75	10,000
2.25	20,000
3.00	30,000
4.00	45,000
5.00	45,000

A producer will supply more when the price of output is higher. The slope of a supply curve is positive.

Note that the supply curve is red: Supply is determined by choices made by firms.

FIGURE 3.6 Clarence Brown's Individual Supply Curve



Determinants of Supply

- Price
- The Cost of Production
- The Prices of Related Products
- Technology
- Expectation
- Natural Factors
- Price of Input Factors
- Goal of Firm

Prices of Other Goods and Services

- **substitutes** Goods that can serve as replacements for one another. An increase in the price of one substitute good causes a decrease in the supply of the other.
- **complements, complementary goods** Goods that "go together"; a increase in the price of good y, increase in supply of good x and vice versa.

Shift of Supply versus Movement along a Supply Curve

- **movement along a supply curve** The change in quantity supplied brought about by a change in price.

- **shift of a supply curve** The change that takes place in a supply curve corresponding to a new relationship between quantity supplied of a good and the price of that good. The shift is brought about by a change in the original conditions.

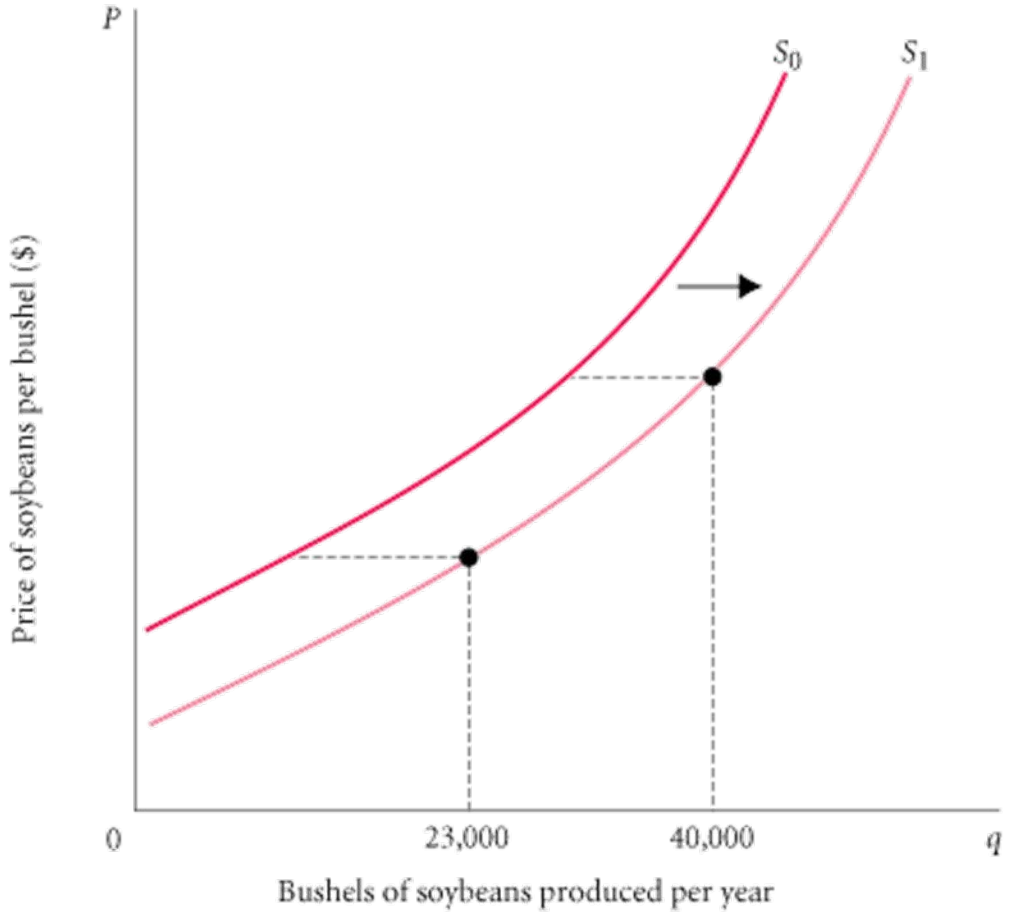
TABLE 3.4 Shift of Supply Schedule for Soybeans following Development of a New Disease-Resistant Seed Strain

Price (per Bushel)	Schedule S_0 Quantity Supplied (Bushels per Year Using Old Seed)	Schedule S_1 Quantity Supplied (Bushels per Year Using New Seed)
$1.50	0	5,000
1.75	10,000	23,000
2.25	20,000	33,000
3.00	30,000	40,000
4.00	45,000	54,000
5.00	45,000	54,000

FIGURE 3.7 Shift of the Supply Curve for Soybeans Following Development of a New Seed Strain

When the price of a product changes, we move *along* the supply curve for that product; the quantity supplied rises or falls.

When any other factor affecting supply changes, the supply curve *shifts*.



Shift of Supply versus Movement along a Supply Curve

- It is very important to distinguish between movements along supply curves (changes in quantity supplied) and shifts in supply curves (changes in supply):
- Change in price of a good or service leads to

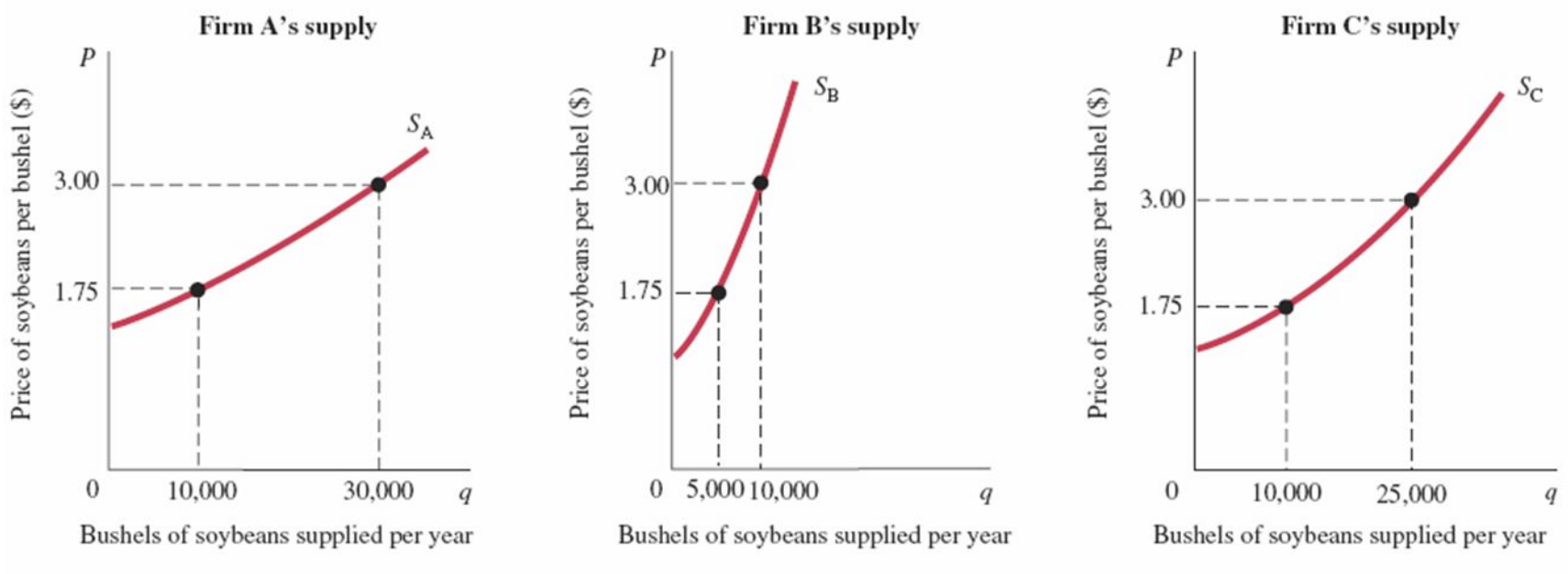
  change in *quantity supplied* (**movement along a supply curve**).
- Change in costs, input prices, technology, or prices of related goods and services leads to

  change in *supply* (**shift of a supply curve**).

Why Supply Curve Shifts?

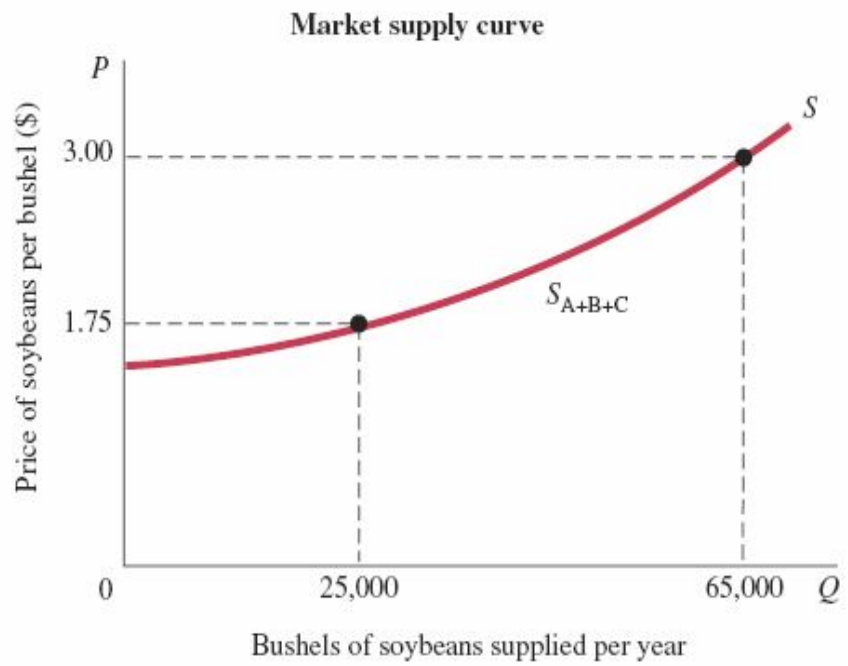
- Change in the prices of other commodities
- Change in the prices of factors of production
- Change in technology:

FIGURE 3.8 Deriving Market Supply from Individual Firm Supply Curves



Total supply in the marketplace is the sum of all the amounts supplied by all the firms selling in the market. It is the sum of all the individual quantities supplied at each price.

FIGURE 3.8 Deriving Market Supply from Individual Firm Supply Curves (cont'd)



Price	Quantity (q) Supplied by A	B	C	Total Quantity Supplied in the Market (Q)
$3.00	30,000 +	10,000 +	25,000	= 65,000
1.75	10,000 +	5,000 +	10,000	= 25,000

Total supply in the marketplace is the sum of all the amounts supplied by all the firms selling in the market. It is the sum of all the individual quantities supplied at each price.

Supply Function

- The supply function is a shorthand expression of the various factors affecting supply of a commodity.
- Thus, the supply of a commodity can be put as a function of price of that commodity, the price of all other commodities; the prices of factors of production, technology, the objectives of producers and other factors.
- This relationship must be expressed with the help of following symbols.
- QS = f(P 1 , P 2 , P3 .... Pn , F1 ... Fn T, O, OF where QS stands for the supply of commodity ……P 1 is the price of that commodity, P 2 , P3 ...Pn are the prices of all other commodities, F1……Fn are the prices of all factors of production.
- T is the state of technology, O is the objective of the producer and OF stands for other factors influencing supply.

Supply Schedule of a Pen Producer

Price(in Rs) Per Pen	Quantity Supplied (In thousand) Per Month
2	25
3	40
4	50
5	60
6	70

The schedule presented in Table shows that at a price of Rs 2 per pen the producer is willing to supply 25 thousand pens per month.

And at a higher price of Rs 3 per pen he is willing to supply 40 thousand pens per month and as price of pens keep rising he is willing to supply more and more quantity of pens per month as shown in the supply schedule.

This supply schedule has been so drawn as to depict a direct relationship between price per pen and quantity supplied of pens per month.

Supply Curve

- A supply curve is a graphical illustration of the correlation between the quantity of an item or service in supply and the price of the good or service over a given period. The supply curve is represented graphically with the price on the vertical axis and the number of items on the horizontal axis.

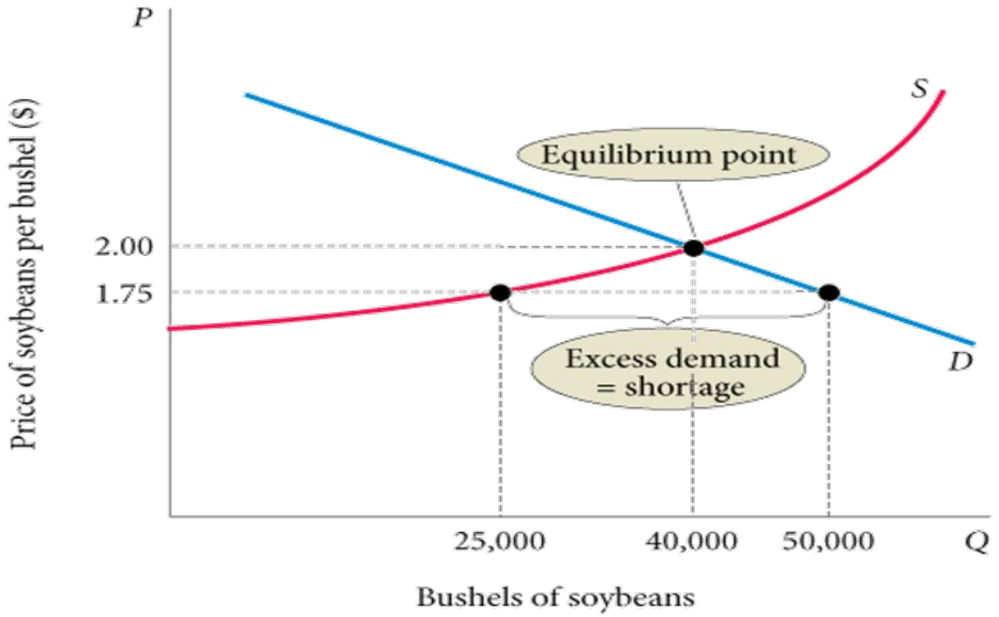
Market Equlibrium

- **Equilibrium** The condition that exists when quantity supplied and quantity demanded are equal. At equilibrium, there is no tendency for price to change.

Excess Demand

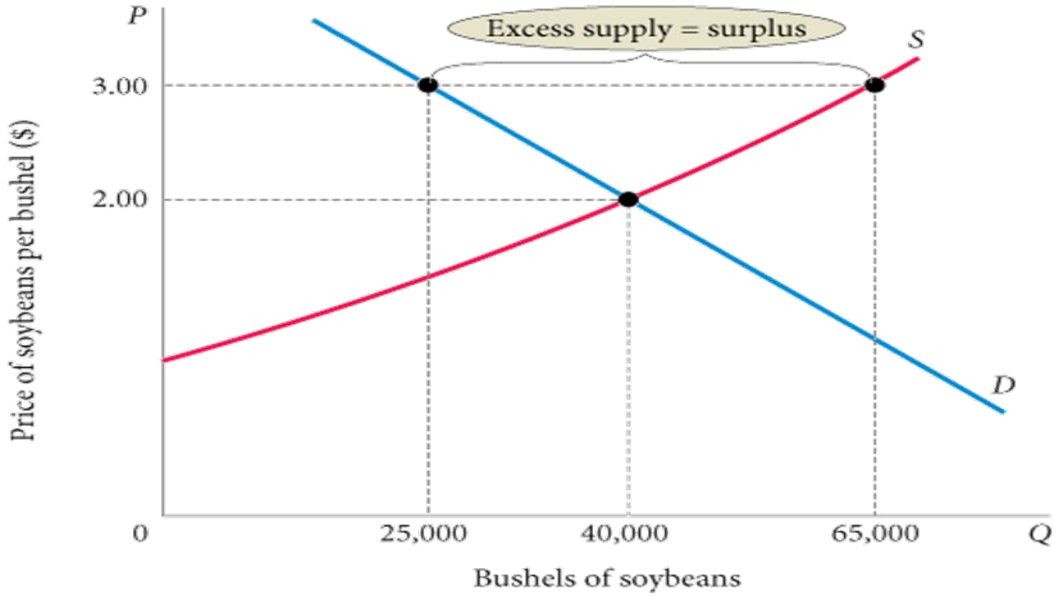
- **excess demand or shortage** The condition that exists when quantity demanded exceeds quantity supplied at the current price.

Excess Demand, or Shortage



- At a price of $1.75 per bushel, quantity demanded exceeds quantity supplied.
- When *excess demand* exists, there is a tendency for price to rise.
- When quantity demanded equals quantity supplied, excess demand is eliminated and the market is in equilibrium.
- Here the equilibrium price is $2.00, and the equilibrium quantity is 40,000 bushels.
- Here the equilibrium price is $2.00, and the equilibrium quantity is 40,000 bushels.

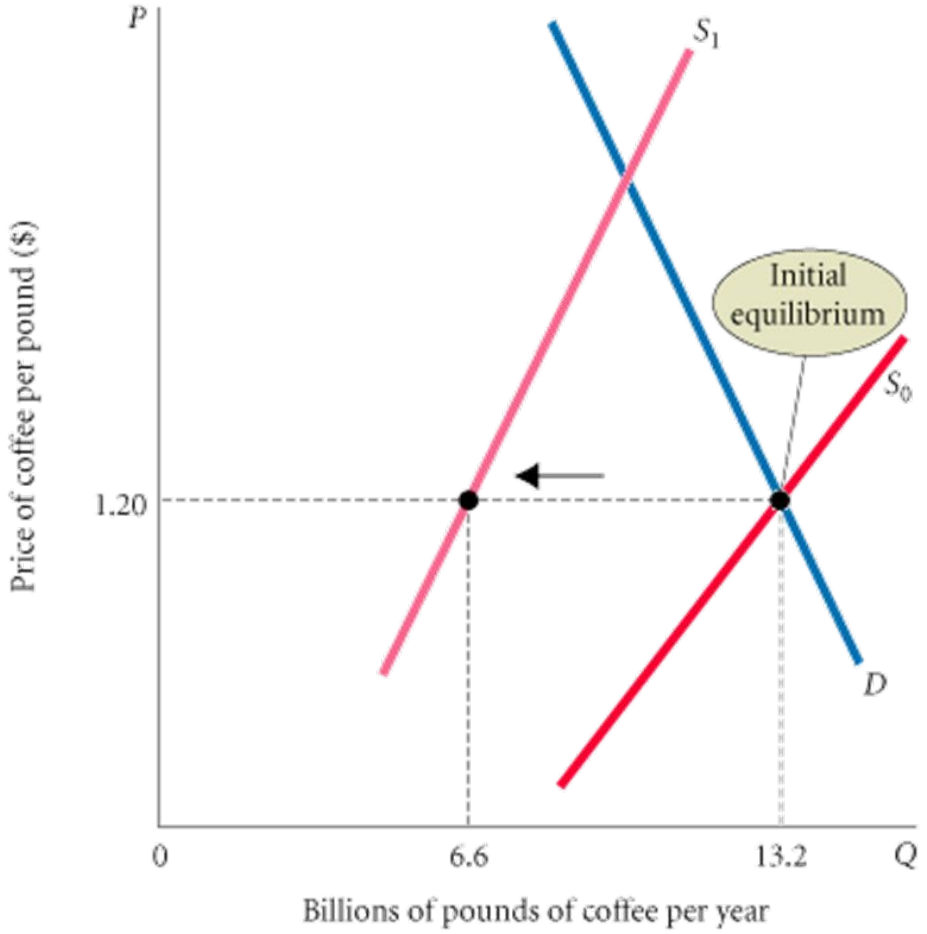
Excess Supply, or Surplus



At a price of $3.00, quantity supplied exceeds quantity demanded by 40,000 bushels.
This excess supply will cause the price to fall.

The Coffee Market: A Shift of Supply and Subsequent Price Adjustment

- Before the freeze, the coffee market was in equilibrium at a price of $1.20 per pound.
- At that price, quantity demanded equaled quantity supplied.
- The freeze shifted the supply curve to the left (from S_0 to S_1), increasing the equilibrium price to $2.40.



Example

- Let the demand and supply function for good x as follows:

$Qd=80-40p$

$Qs = -10+20p$

Find equilibrium level of Price, Quantity demand and quantity supply respectively.

Household Choice in Output Markets

- Every household must make three basic decisions:

1. How much of each product, or output, to demand
2. How much labor to supply
3. How much to spend today and how much to save for the future

The Budget Constraint

- **Budget constraint** The limits imposed on household choices by income, wealth, and product prices.
- **Choice set** or **Opportunity set** The set of options that is defined and limited by a budget constraint.

TABLE 6.1 Possible Budget Choices of a Person Earning $1,000 per Month after Taxes

Option	Monthly Rent	Food	Other Expenses	Total	Available?
A	$ 400	$250	$350	$1,000	Yes
B	600	200	200	1,000	Yes
C	700	150	150	1,000	Yes
D	1,000	100	100	1,200	No

The Budget Constraint

Preferences, Tastes, Trade-offs, and Opportunity Cost

- Within the constraints imposed by limited incomes and fixed prices, households are free to choose what they will and will not buy.

- A household makes a choice by ranking the good or service that it chooses against all the other things that the same money could buy.

- With a limited budget, the real cost of any good or service is the value of the other goods and services that could have been purchased with the same amount of money.

Household Behavior and Consumer choice

Budget constraint and its role

The budget constraint shows the various bundles of goods that the consumer can buy for a given income. Here the consumer buys bundles of pizza and Pepsi. The table and graph show what the consumer can afford if her income is $1,000, the price of pizza is $10, and the price of Pepsi is $2.

Number of Pizzas	Liters of Pepsi	Spending on Pizza	Spending on Pepsi	Total Spending
100	0	$1,000	$ 0	$1,000
90	50	900	100	1,000
80	100	800	200	1,000
70	150	700	300	1,000
60	200	600	400	1,000
50	250	500	500	1,000
40	300	400	600	1,000
30	350	300	700	1,000
20	400	200	800	1,000
10	450	100	900	1,000
0	500	0	1,000	1,000

The Consumer's Budget Constraint

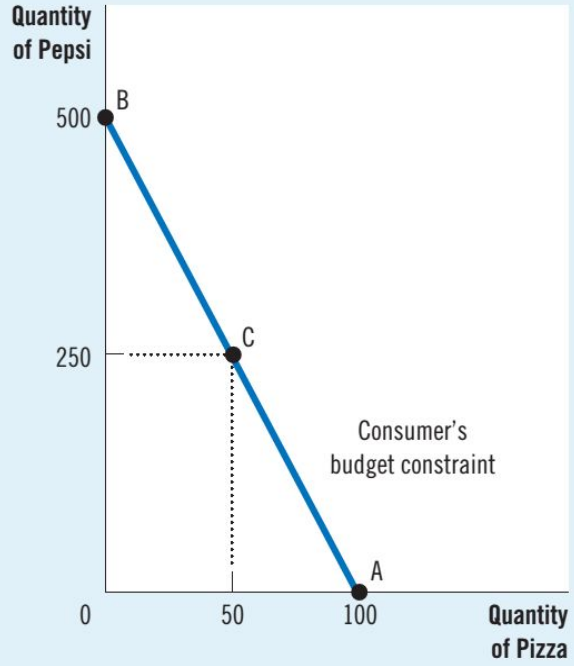
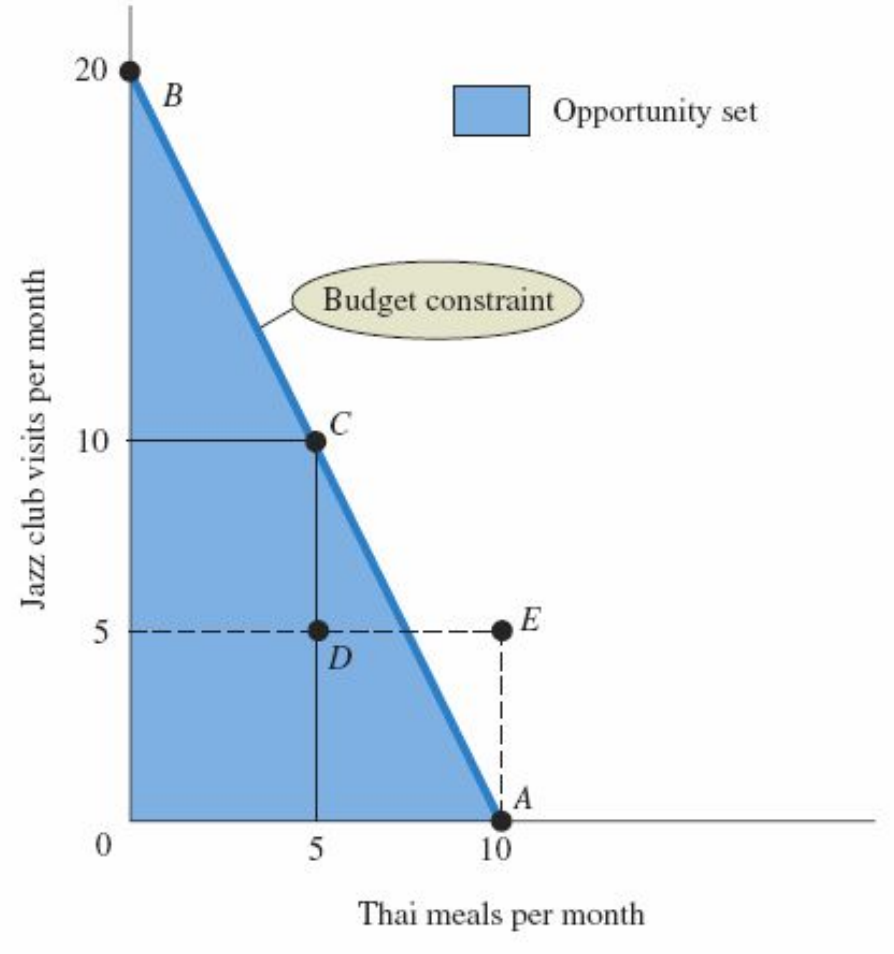


FIGURE 6.1 Budget Constraint and Opportunity Set for Ann and Tom

A budget constraint separates those combinations of goods and services (e.g., point *C*) that are available, given limited income, from those that are not (e.g., point *E*).

The available combinations make up the opportunity set.



The Budget Constraint

The Budget Constraint More Formally

- Both prices and income affect the size of a household's opportunity set.
- **Real income** The set of opportunities to purchase real goods and services available to a household as determined by prices and money income.

The Equation of the Budget Constraint

- In general, the budget constraint can be written:

$$P_X X + P_Y Y = I,$$

where:

P_X = the price of X
X = the quantity of X consumed
P_Y = the price of Y
Y = the quantity of Y consumed
I = household income

Example

- Amar has ₹ 500 a week to spend on clothing and food. The price of clothing is ₹ 25 and the price of food is ₹ 10. The clothing and food pairs in Amar's choice set include _____ units of clothing and _____ units of food.

A) 50; 50

B) 20; 50

C) 15; 25

D) 8; 30

Example

- Abhay has $500 a week to spend on clothing (c) and food (f). The price of clothing is $25 and the price of food is $10. What is the equation for Abhay's budget constraint?
- A) ($25 × Clothing) × ($10 × Food) < $500
- B) $25 × Clothing + $10 × Food ≥ $500
- C) ($25 × Clothing) / ($10 × Food) = $500
- D) $25 × Clothing + $10 × Food = $500

Example

- A consumer can consume books or soap. The price of the book is Rs.5 per book, and the price of soap is Rs10 per soap. Find and draw the budget constraint if the consumer’s total income is Rs. 100.

The Budget Constraint

- Rotation
- Shift

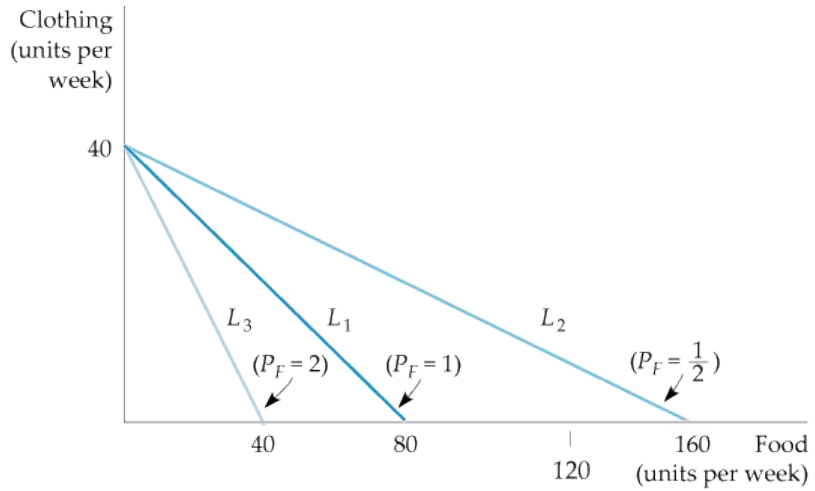
EFFECTS OF A CHANGE IN PRICE ON THE BUDGET LINE

PRICE CHANGES

A change in the price of one good (with income unchanged) causes the budget line to rotate about one intercept.

When the price of food falls from \$1.00 to \$0.50, the budget line rotates outward from L_1 to L_2.

However, when the price increases from \$1.00 to \$2.00, the line rotates inward from L_1 to L_3.



The Effects of Changes in Income and Prices

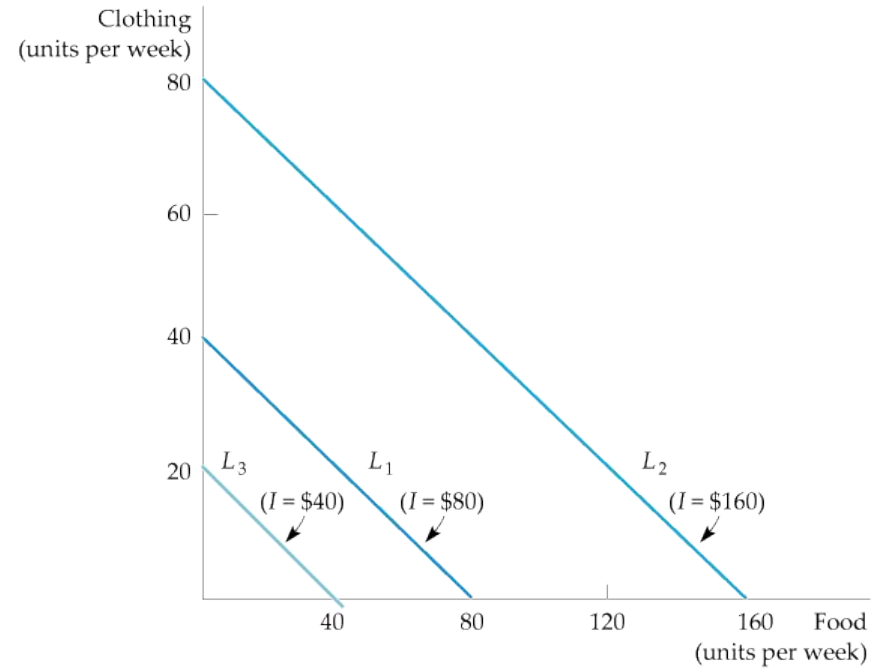
EFFECTS OF A CHANGE IN INCOME ON THE BUDGET LINE

INCOME CHANGES

A change in income (with prices unchanged) causes the budget line to shift parallel to the original line (L_1).

When the income of \$80 (on L_1) is increased to \$160, the budget line shifts outward to L_2.

If the income falls to \$40, the line shifts inward to L_3.



The Basis of Choice: Utility

- **Utility** The satisfaction a product yields

- **Total utility** The total satisfaction a product yields.

- **Marginal utility (*MU*)** The additional satisfaction gained by the consumption of *one more* unit of a good or service.

Diminishing Marginal Utility

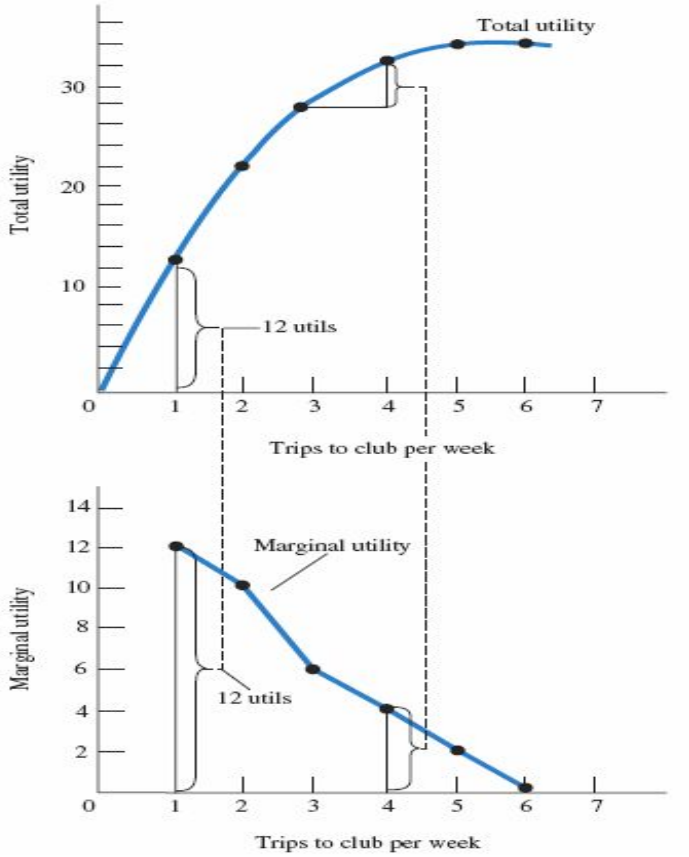
- **law of diminishing marginal utility** The more of any one good consumed in a given period, the less satisfaction (utility) generated by consuming each additional (marginal) unit of the same good.

Total Utility and Marginal Utility of Trips to the Club per Week

Trips to Club	Total Utility	Marginal Utility
1	12	12
2	22	10
3	28	6
4	32	4
5	34	2
6	34	0

- Marginal utility is the additional utility gained by consuming one additional unit of a commodity—in this case, trips to the club.
- When marginal utility is zero, total utility stops rising.

FIGURE 6.3 Graphs of Frank's Total and Marginal Utility



Allocating Income to Maximize Utility

TABLE 6.3 Allocation of Fixed Expenditure per Week between Two Alternatives

(1) Trips to Club per Week	(2) Total Utility	(3) Marginal Utility (*MU*)	(4) Price (*P*)	(5) Marginal Utility per Dollar (*MU/P*)
1	12	12	$3.00	4.0
2	22	10	3.00	3.3
3	28	6	3.00	2.0
4	32	4	3.00	1.3
5	34	2	3.00	0.7
6	34	0	3.00	0

(1) Basketball Games per Week	(2) Total Utility	(3) Marginal Utility (*MU*)	(4) Price (*P*)	(5) Marginal Utility per Dollar (*MU/P*)
1	21	21	$6.00	3.5
2	33	12	6.00	2.0
3	42	9	6.00	1.5
4	48	6	6.00	1.0
5	51	3	6.00	0.5
6	51	0	6.00	0

Income ($21) and prices ($3 and $6) define Frank's budget constraint

The Utility-Maximizing Rule

- Utility-maximizing consumers spread out their expenditures until the following condition holds:

$$\text{Utility} - \text{Maximizing rule}: \frac{MU_X}{P_X} = \frac{MU_Y}{P_Y} \text{ for all goods,}$$

where MU_X is the marginal utility derived from the last unit of X consumed, MU_Y is the marginal utility derived from the last unit of Y consumed, P_X is the price per unit of X, and P_Y is the price per unit of Y.

The Utility-Maximizing Rule

- **Utility-maximizing rule** Equating the ratio of the marginal utility of a good to its price for all goods.

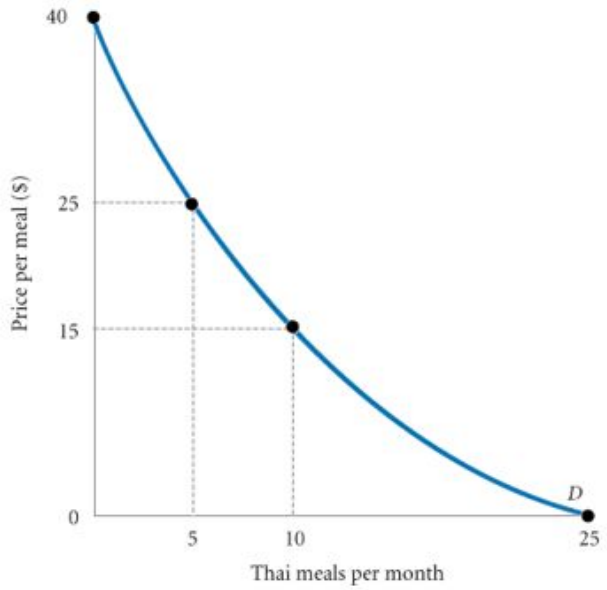
- **Diamond/water paradox**

- One of the most disconcerting problems to Adam_Smith, the father of modern economics, was he could not resolve the issue of valuation in human preferences. He described this problem in *The Wealth of Nations* by comparing the high value of a diamond, which is unessential to human life, to the low value of water, without which humans would die. He determined "value in use" was irrationally separated from "value in exchange

- A paradox stating that (1) the things with the greatest value in use frequently have little or no value in exchange and (2) the things with the greatest value in exchange frequently have little or no value in use.

Diminishing Marginal Utility and Downward-Sloping Demand

FIGURE 6.4 Diminishing Marginal Utility and Downward-Sloping Demand



At a price of $40, the utility gained from even the first Thai meal is not worth the price.

However, a lower price of $25 lures Ann and Tom into the Thai restaurant 5 times a month. (The utility from the sixth meal is not worth $25.)

If the price is $15, Ann and Tom will eat Thai meals 10 times a month—until the marginal utility of a Thai meal drops below the utility they could gain from spending $15 on other goods.

At 25 meals a month, they cannot tolerate the thought of another Thai meal, even if it is free.

Indifference Curves

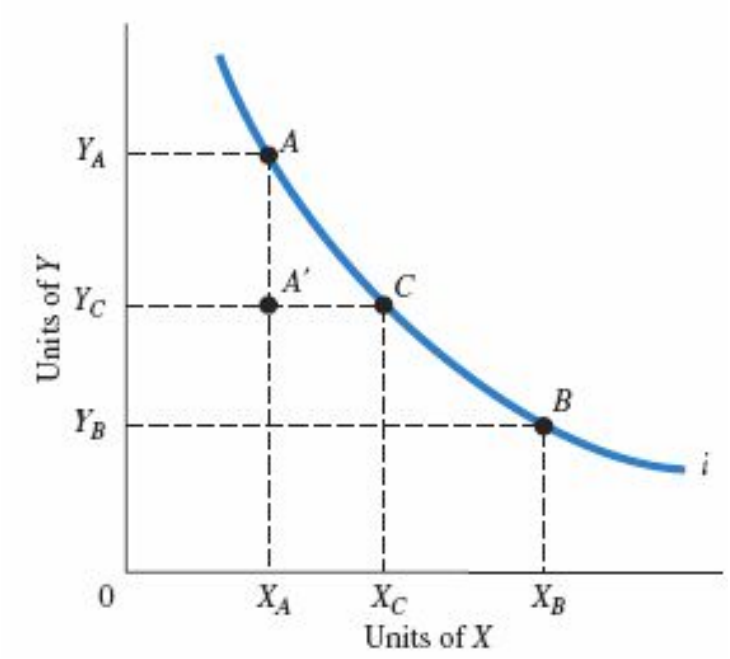
- *An IC is the locus of points – particular combinations that yield the same utility or level of satisfaction to the consumer so that he is indifferent as to the particular combination he consumes.*
- The consumer's preferences allow her to choose among different bundles of pizza and Pepsi.
- If you offer the consumer two different bundles, she chooses the bundle that best suits her tastes.

Assumptions of Indifference Curves

1. Goods yield positive marginal utility (i.e., “more is better”).
2. The marginal rate of substitution, the ratio at which a household is willing to substitute X for Y (MU_X/MU_Y,), is diminishing.
3. Consumers have the ability to choose among the combinations of goods and services available.
4. Consumer choices are consistent with a simple assumption of rationality.

Deriving Indifference Curves

FIGURE 6A.1 An Indifference Curve



An indifference curve is a set of points, each representing a combination of some amount of good X and some amount of good Y, that all yield the same amount of total utility.

The consumer depicted here is indifferent between bundles A and B, B and C, and A and C.

Because “more is better,” our consumer is unequivocally worse off at A' than at A.

Example of MRS

- Let the utility function is U = xy

Find the MRS_{xy}

Indifference Maps

Indifference map Graph containing a set of indifference curves
showing the market baskets among which a consumer is indifferent.

AN INDIFFERENCE MAP

An indifference map is a set of indifference curves that describes a person's preferences.

Any market basket on indifference curve U_3, such as basket *A*, is preferred to any basket on curve U_2 (e.g., basket *B*), which in turn is preferred to any basket on U_1, such as *D*.

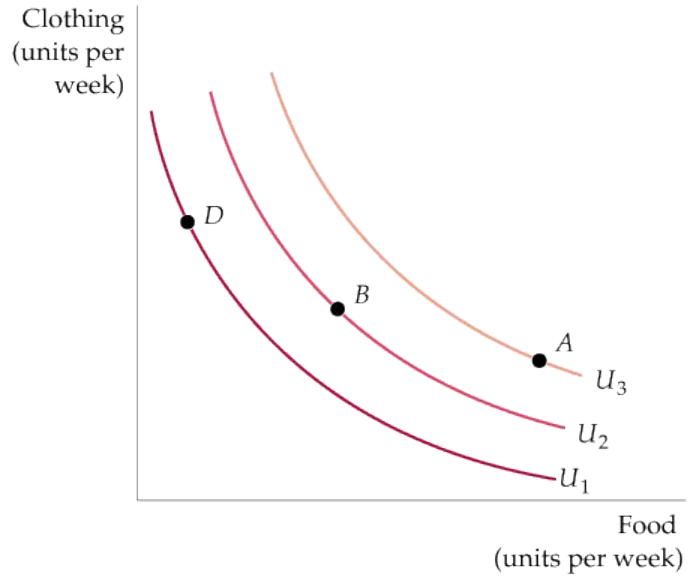
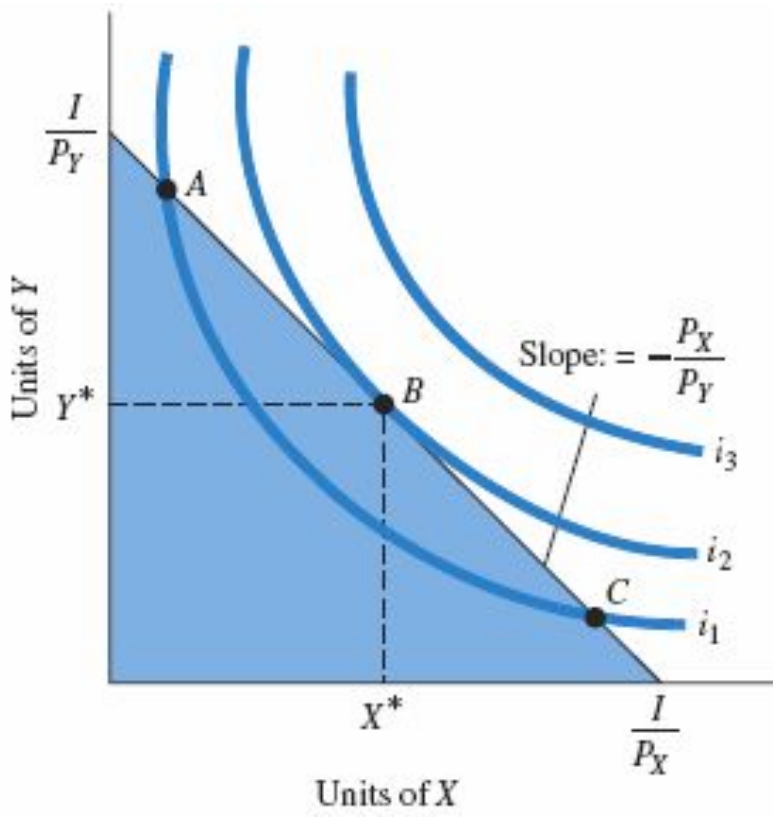


FIGURE 6A.3 Consumer Utility-Maximizing Equilibrium

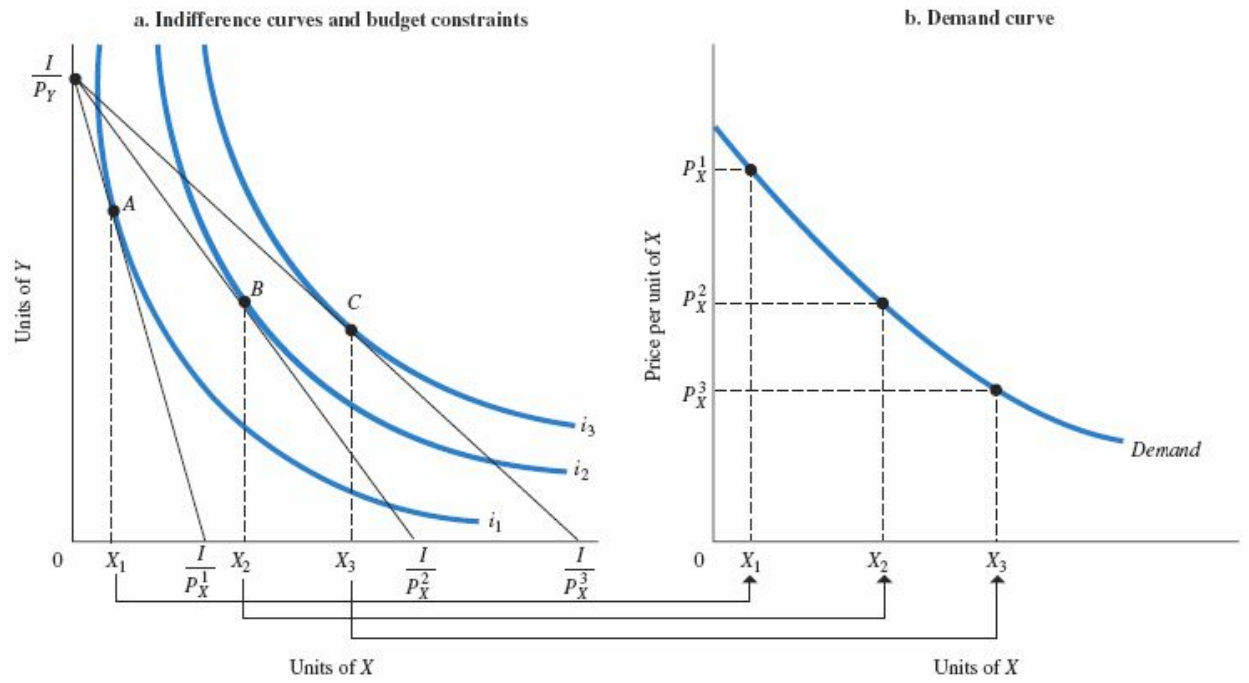


Consumers will choose the combination of *X* and *Y* that maximizes total utility. Graphically, the consumer will move along the budget constraint until the highest possible indifference curve is reached.

At that point, the budget constraint and the indifference curve are tangent. This point of tangency occurs at X^* and Y^* (point *B*).

Deriving a Demand Curve from Indifference Curves and Budget Constraints

FIGURE 6A.4 Deriving a Demand Curve from Indifference Curves and Budget Constraint



Indifference curves are labeled i_1, i_2, and i_3; budget constraints are shown by the three diagonal lines from I/P_Y to I/P_X^1, I/P_X^2, and I/P_X^3. Lowering the price of *X* from P_X^1 to P_X^2 and then to P_X^3 swivels the budget constraint to the right. At each price, there is a different utility-maximizing combination of *X* and *Y*. Utility is maximized at point *A* on i_1, point *B* on i_2, and point *C* on i_3. Plotting the three prices against the quantities of *X* chosen results in a standard downward-sloping demand curve.

Example

Let the utility function $U = 3xy^2$

S.t: $120 = 4x + 5y$

Find the optimal combination of x and y so that the utility is maximized.

Ans: 10=x. 16=y

Example

Assume that the utility function is $U = q_1 q_2$, that p_1=2 dollar, p_2=5 dollar, and that the consumer's income for the period is 100 dollars. Find the optimal combination of q_1 and q_2 so that the utility is maximized.

Income and Substitution Effects

- Another explanation for downward-sloping demand curves centers on income and substitution effects.

The Income Effect

- Assuming nothing else changes, a price decline in a product makes you better off because you have more income left over.
- The change in consumption of X due to this improvement in well-being is called the *income effect of a price change*.

Classification of Goods

- Normal Goods
- Inferior Goods
- Giffen Goods

- Normal Goods, Inferior Goods, and Giffen Goods are three types of goods with different effects on the demand for the commodity when the income of the consumer or the price of the commodity changes.

Normal Goods

- The goods whose demand increases when there is an increase in the income of consumer are known as **Normal Goods**.
- These include the commodities which we usually purchase. Besides, in general, consumers purchase more normal goods when their income increases and purchase less of these goods when their income falls.
- **For example,** if demand for Refrigerator increases with an increase in income, then the Refrigerator will be said to be a normal good.
- The income effect of normal goods is positive.

Inferior Goods

- The goods whose demand reduces when there is an increase in the income of consumer are known as **Inferior Goods.**
- In simple terms, there exists an inverse relationship between the consumer's income and demand for inferior goods. Therefore, the income effect of inferior goods is negative.
- Consumers usually purchase inferior goods because they are essential for their life; like, coarse grains, etc.
- **For example,** if the consumer's income increases and he prefers to replace his single-door refrigerator with French Door Style Refrigerator, then the demand for Single Door Refrigerator will fall. Also, in this case, the Single Door Refrigerator is the Inferior Good.

Giffen Goods

- The goods whose demand increases even when there is an increase in the price of the commodity are known as **Giffen Goods.**
- The income effect of Giffen goods is negative. In simple terms, Giffen goods are the rare form of inferior goods for which there is no substitute.
- **For example,** even though the price of rice increases, the consumer will have to cut short on his other expenses and have to purchase rice, increasing the demand for rice.

Differences

Basis	Normal Goods	Inferior Goods	Giffen Goods
Meaning	These are the goods whose demand increases when there is an increase in the income of consumer.	These are the goods whose demand reduces when there is an increase in the income of consumer.	These are the goods whose demand increases even when there is an increase in the price of the commodity.
Relation	There is a direct relationship between the income of the consumer and demand for normal goods.	There is an inverse relationship between the income of the consumer and demand for inferior goods.	There is a direct relationship between the price of the commodity and demand for Giffen goods.
Law of Demand	Normal Goods follow the Law of Demand. It means that there is an inverse relationship between the price of normal goods and its quantity demanded.	Inferior Goods may or may not follow the Law of Demand. It means that there may or may not be an inverse relationship between the price of inferior goods and its quantity demanded.	Giffen Goods does not follow the Law of Demand. It means that even though the price of the commodity increases, the demand for Giffen goods will also increase.
Example	Garlic Butter is a normal good, and its demand increases when there is an increase in income.	Plain Butter is an inferior good, and its demand decreases when there is an increase in income.	Potato is a Giffen good because it has no substitute, and its demand increases even when its price rises.

Elasticity of demand

Elasticity – the concept

- The responsiveness of one variable to changes in another
- When price rises, what happens to demand?
- Demand falls
- BUT!
- How much does demand fall?

Elasticity – the concept

- **If price rises by 10% - what happens to demand?**
- We know demand will fall
- By more than 10%?
- By less than 10%?
- **Elasticity measures the extent to which demand will change**

Types of Elasticity of demand

- **5 basic types used:**
- **Price elasticity of demand**
- **Income elasticity of demand**
- **Cross elasticity**
- **Advertising elasticity of demand**
- **Elasticity of price expectations**

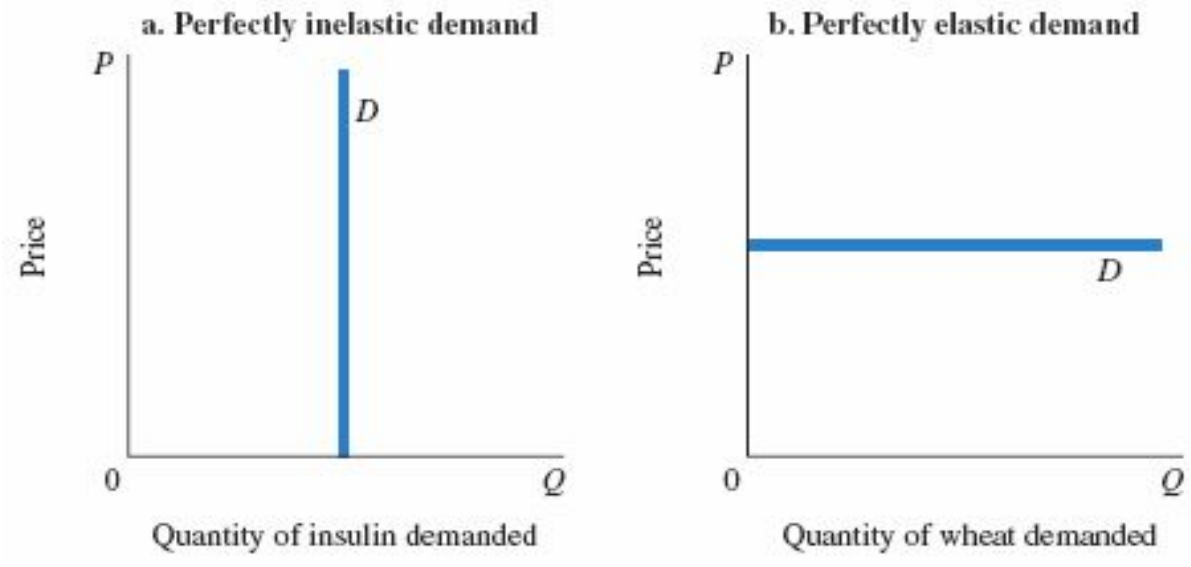
Elasticity

- **Price Elasticity of Demand**
  - The responsiveness of demand to changes in price
  - Where % change in demand is greater than % change in price – **elastic**
  - Where % change in demand is less than % change in price - **inelastic**

Types of Price Elasticity of Demand(Extreme cases)

- **perfectly inelastic demand** Demand in which quantity demanded does not respond at all to a change in price.
- **perfectly elastic demand** Demand in which quantity drops to zero at the slightest increase in price.

Perfectly Inelastic and Perfectly Elastic Demand Curves



Types of Elasticity of Demand

- **elastic demand** A demand relationship in which the percentage change in quantity demanded is larger than the percentage change in price in absolute value (a demand elasticity with an absolute value greater than 1).
- **inelastic demand** Demand that responds somewhat, but not a great deal, to changes in price. Inelastic demand always has a numerical value between 0 and 1.

Types of Elasticity of Demand

- **unitary elasticity** A demand relationship in which the percentage change in quantity of a product demanded is the same as the percentage change in price in absolute value (a demand elasticity with an absolute value of 1).

Calculating Elasticities

$$\text{price elasticity of demand} = \frac{\%\ \text{change in quantity demanded}}{\%\text{change in price}} \times 100\%$$

$$e_{(p)} = \frac{dQ/Q}{dP/P}$$

Examples

Suppose that price of a commodity falls down from Rs.10 to Rs. 9 per unit and due to this, quantity demand of the commodity increased from 100 units to 120 units. What is the price elasticity of demand?

Ans: 2

Examples-2

- When the price of CD increased from $20 to $22, the quantity of CDs demanded decreased from 100 to 87.

What is the price elasticity of demand for CDs?

Ans: 1.3

Factors Influencing Elasticity of Demand

- Nature of commodity
- Availability of substitutes
- Number of uses
- Consumer’s income
- Proportion of expenditure (Income spent)
- Durability of the commodity
- Habit
- Time
- Possibility of postponement

The Midpoint Formula

- **midpoint formula** A more precise way of calculating percentages using the value halfway between P_1 and P_2 for the base in calculating the percentage change in price and the value halfway between Q_1 and Q_2 as the base for calculating the percentage change in quantity demanded.

- **Price elasticity of demand = (Q2 - Q1) / [(Q2 + Q1) / 2] / (P2 - P1) / [(P2 + P1) / 2]**

Point Elasticity

- Elasticity is the percentage change in quantity demanded divided by the percentage change in price, i.e.,

$$\frac{\frac{\Delta Q}{Q_1}}{\frac{\Delta P}{P_1}}$$

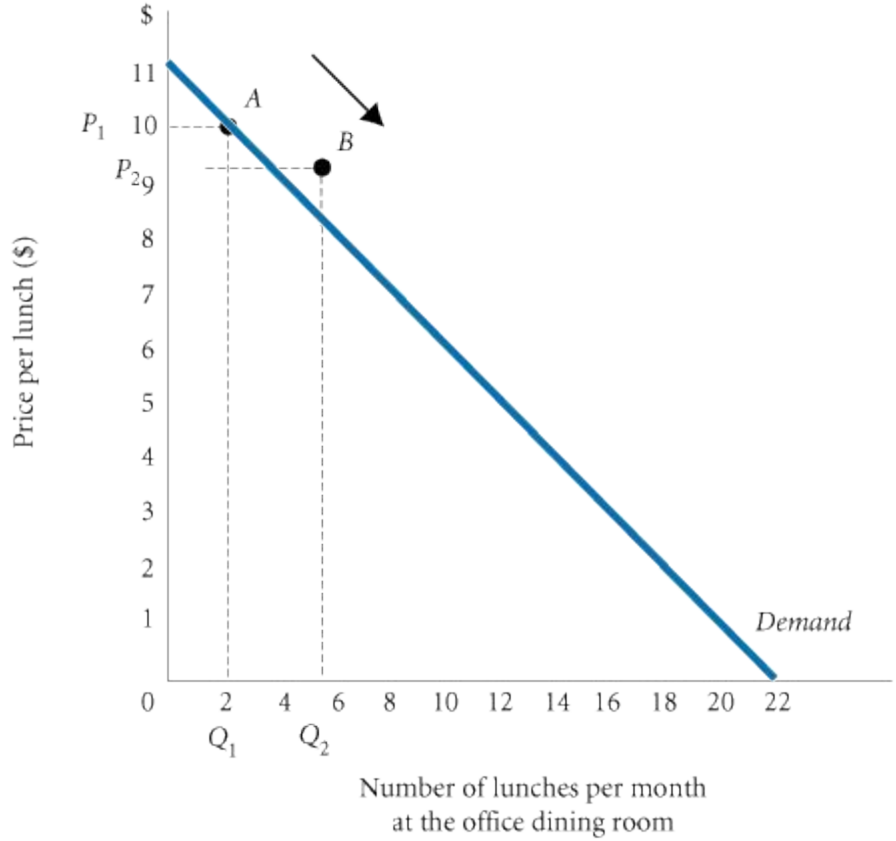
where Δ denotes a small change and Q1 and P1 refer to the original price and quantity demanded.

Elasticity Changes along a Straight-Line Demand Curve

TABLE 5.1 Demand Schedule for Office Dining Room Lunches

Price (per Lunch)	Quantity Demanded (Lunches per Month)
$11	0
10	2
9	4
8	6
7	8
6	10
5	12
4	14
3	16
2	18
1	20
0	22

FIGURE 5.3 Demand Curve for Lunch at the Office Dining Room



To calculate price elasticity of demand between points *A* and *B* on the demand curve, first calculate the percentage change in quantity demanded:

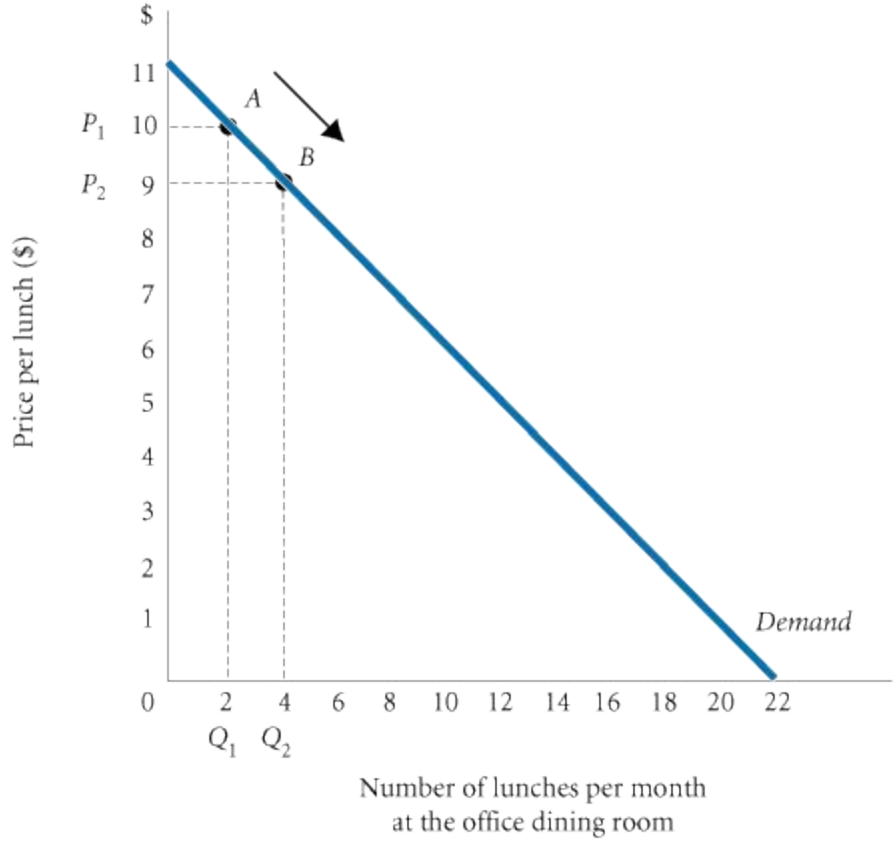
$$\%\text{ change in quantity demanded} = \frac{4-2}{(2+4)/2} \times 100\% = \frac{2}{3} \times 100\% = 66.7\%$$

Elasticity Changes along a Straight-Line Demand Curve

TABLE 5.1 Demand Schedule for Office Dining Room Lunches

Price (per Lunch)	Quantity Demanded (Lunches per Month)
$11	0
10	2
9	4
8	6
7	8
6	10
5	12
4	14
3	16
2	18
1	20
0	22

FIGURE 5.3 Demand Curve for Lunch at the Office Dining Room



Next, calculate the percentage change in price:

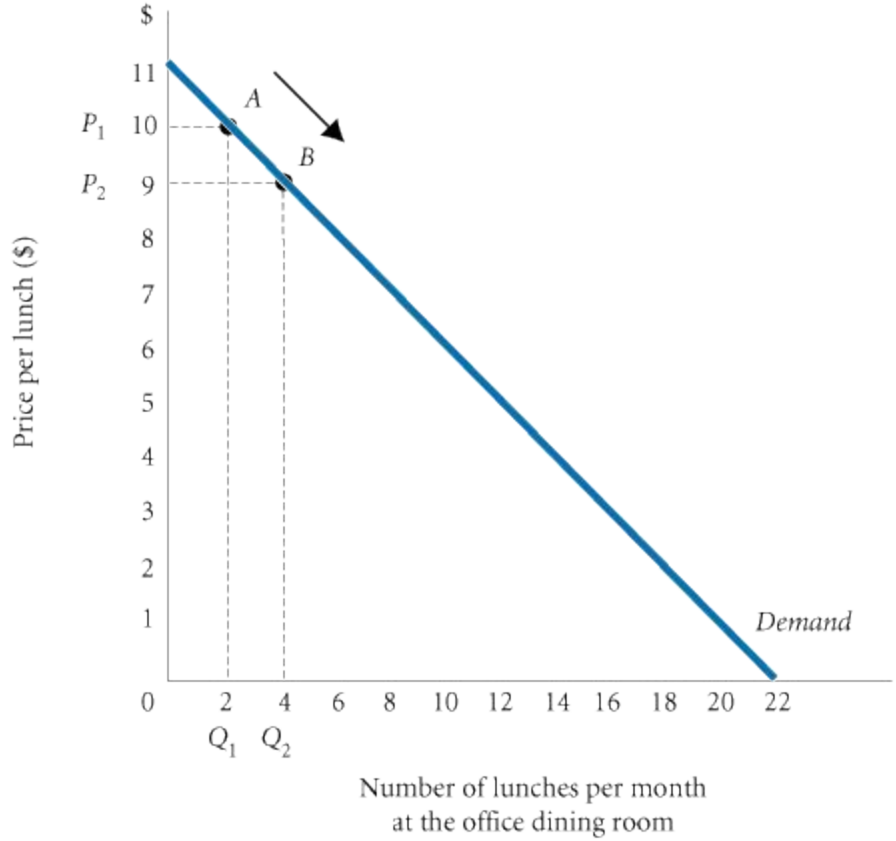
$$\%\ \text{change in price} = \frac{9-10}{(10+9)/2} \times 100\% = \frac{-1}{9.5} \times 100\% = -10.5\%$$

Elasticity Changes along a Straight-Line Demand Curve

TABLE 5.1 Demand Schedule for Office Dining Room Lunches

Price (per Lunch)	Quantity Demanded (Lunches per Month)
$11	0
10	2
9	4
8	6
7	8
6	10
5	12
4	14
3	16
2	18
1	20
0	22

FIGURE 5.3 Demand Curve for Lunch at the Office Dining Room



Finally, calculate elasticity:

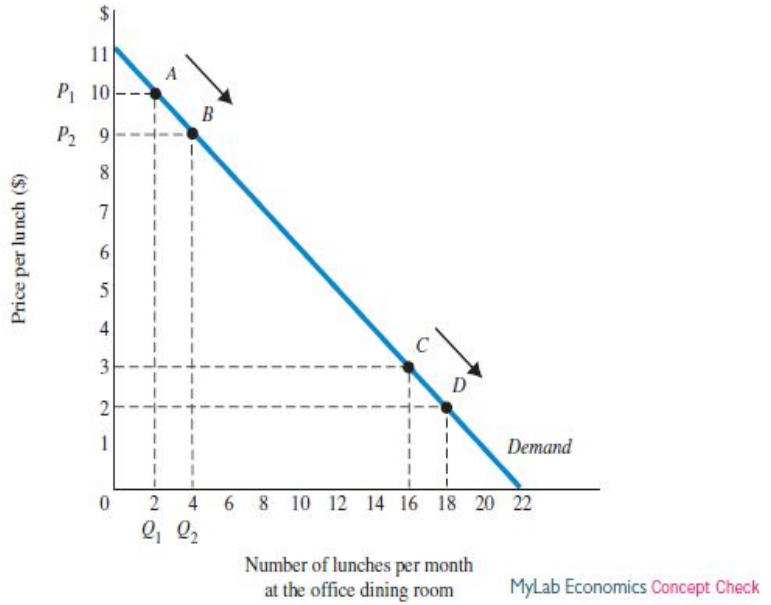
$$\text{elasticity of demand} = \frac{66.7\%}{-10.5\%} = -6.33$$

Elasticity Changes along a Straight-Line Demand Curve

TABLE 5.1 Demand Schedule for Office Dining Room Lunches

Price (per Lunch)	Quantity Demanded (Lunches per Month)
$11	0
10	2
9	4
8	6
7	8
6	10
5	12
4	14
3	16
2	18
1	20
0	22

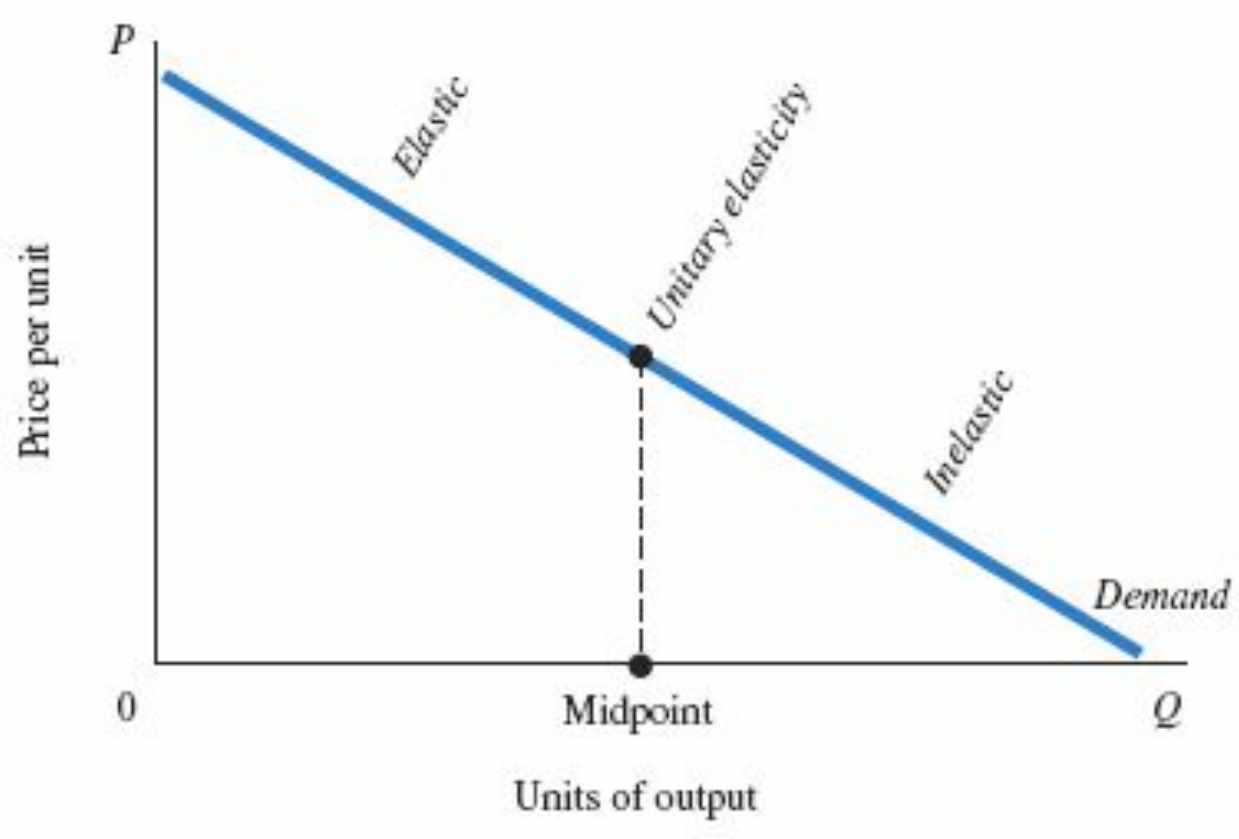
FIGURE 5.3 Demand Curve for Lunch at the Office Dining Room



MyLab Economics Concept Check

Between points A and B, demand is quite elastic, at −6.33.
Between points C and D, demand is quite inelastic, at −.294.

FIGURE 5.4 Point Elasticity Changes along a Demand Curve



Elasticity and Total Revenue

Effect of price increase on
a product with inelastic demand: $\uparrow P \times Q_D \downarrow = TR \uparrow$

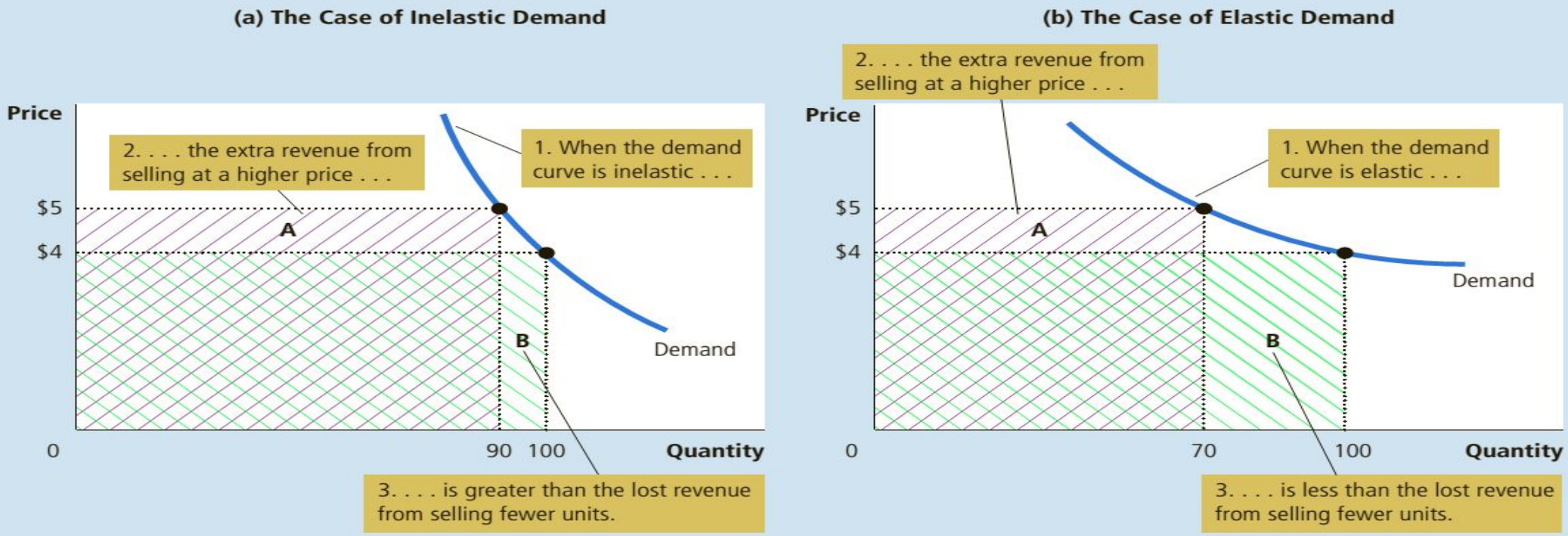
Effect of price increase on
a product with elastic demand: $\uparrow P \times Q_D \downarrow = TR \downarrow$

Elasticity and Total Revenue

FIGURE 3

How Total Revenue Changes When Price Changes

The impact of a price change on total revenue (the product of price and quantity) depends on the elasticity of demand. In panel (a), the demand curve is inelastic. In this case, an increase in the price leads to a decrease in quantity demanded that is proportionately smaller, so total revenue increases. Here an increase in the price from $4 to $5 causes the quantity demanded to fall from 100 to 90. Total revenue rises from $400 to $450. In panel (b), the demand curve is elastic. In this case, an increase in the price leads to a decrease in quantity demanded that is proportionately larger, so total revenue decreases. Here an increase in the price from $4 to $5 causes the quantity demanded to fall from 100 to 70. Total revenue falls from $400 to $350.



Exercise

The equation for the demand curve is given by $Qd = 60 - 15P + P^2$. Calculate the price elasticity of demand for the above demand curve at a price of ₹ 3.

Example

When Mr. Aryan had a monthly income of ₹ 4,000, they usually ate 8 times a month at restaurants. Now Aryan earns ₹ 4,500 a month and eats 10 times a month at restaurants. Compute the income elasticity of demand for Aryan using the midpoint method. Is a restaurant meal normal or inferior good as per your calculation?

Other Important Elasticities

Cross-Price Elasticity of Demand

A measure of the response of the quantity of one good demanded to a change in the price of another good.

$$\text{cross} - \text{price elasticity of demand} = \frac{\%\text{change in quantity of } Y \text{ demanded}}{\%\text{change in price of } X}$$

Elasticity

- **Cross Elasticity:**
- The responsiveness of demand of one good to changes in the price of a related good – either a substitute or a complement

$$\text{Xed} = \frac{\%\ \Delta\ \text{Qd of good t}}{\%\ \Delta\ \text{Price of good y}}$$

Cross-Price Elasticity of Demand

Substitutes

Cross-price elasticities tend to be ***positive*** when two goods are **substitutes** e.g., Tea and Coffee.

Complements

Cross-price elasticities tend to be **negative** when two goods are complement.

Example

- The price of the Burger is ₹ 8, and the quantity demand for Dosa is 200 per day. When the price of Burger increased to ₹ 12, the quantity demand for Dosa increased to 210 per day. Calculate the cross-price elasticity of demand for Dosa by using the midpoint method. Based on your calculation, what can you conclude about the relationship between Burgers and Dosa?
- Ans:0.12

Example-2

- The annual price of cinema tickets sold in the year 2010 was $ 3.5 whereas the number of popcorns sold at cinema halls was 100,000. The ticket price increased from $ 3.5 in 2010 to $ 6 in the year 2015. There was a decrease in the sale of popcorns to 80,000 units.
- Ans: -0.42

Elasticity

- **Income Elasticity of Demand:**
  - The responsiveness of demand to changes in incomes
- **Normal Good** – demand rises as income rises and vice versa
- **Inferior Good** – demand falls as income rises and vice versa

Elasticity

- **Income Elasticity of Demand:**

- A positive sign denotes a normal good
- A negative sign denotes an inferior good

INCOME ELASTICITY OF DEMAND:

Income is another determinants of demand. income elasticity of Demand Shows The Extent To Which A Consumers Demand For The Commodity Changes As A Result Of A Change In Income. It May Be Defined As A Ratio Of Percentage Change In The Quantity Demanded Of A good To The Percentage change in the income of the consumer.

$$E_Y = \frac{\text{PERCENTAGE CHANGE IN QUANTITY DEMANDED OF GOOD}}{\text{PERCENTAGE CHANGE IN INCOME}}$$

$$\frac{\Delta Q}{Q} \Big/ \frac{\Delta Y}{Y} = \frac{\Delta Q}{\Delta Y} \times \frac{Y}{Q}$$

Q=quantity demand of good x
Y=income of the consumer.

Elasticity

- For example:
- Yed = - 0.6: Good is an **inferior good** but **inelastic** – a rise in income of 3% would lead to demand falling by 1.8%
- Yed = + 0.4: Good is a **normal good** but **inelastic** – a rise in incomes of 3% would lead to demand rising by 1.2%
- Yed = + 1.6: Good is a **normal good** and **elastic** – a rise in incomes of 3% would lead to demand rising by 4.8%
- Yed = - 2.1: Good is an **inferior good** and **elastic** – a rise in incomes of 3% would lead to a fall in demand of 6.3%

Determinants of Elasticity

- **Time period** – the longer the time under consideration the more elastic a good is likely to be
- **Number and closeness of substitutes** – the greater the number of substitutes, the more elastic
- **The proportion of income taken up by the product** – the smaller the proportion the more inelastic
- **Luxury or Necessity** - for example, addictive drugs

Nature of commodity:

Luxury and comforts-price elastic

Necessary-price inelastic

Availability of substitutes:

No substitutes-inelastic

Large substitute-more elastic

Habit:

demand is inelastic.

Time:

Short period-demand is less elastic.

Long period-more elastic

Importance of Elasticity

- Relationship between changes in price and total revenue
- Importance in analysing time lags in production
- Influences the behaviour of a firm

Advertising elasticity of demand:

Advertising elasticity of demand measures the response of quantity demand to change in in expenditure on advertising and other sales promotion activities.

$$EA = \frac{\Delta Q}{\Delta A} \times \frac{A}{Q}$$

Q= quantity of good x sold.

A= unit of advertising expenditure on good x.

- At initial advertisement expenditure of Rs 50,000 the demand for a firm’s product is 80,000.when the advertisement budget is increased to Rs60,000 the sales volume increased to Rs90,000 units.

Elasticity of price expectations : consumers price expectations play a much more important role than any other factor in determining the determining the demand for a commodity .Price expectation elasticity refers to the expected change in future price as a result of change in current prices of a product .the elasticity of price expectation is defined and measured by the formula
given below.

$$Ex = \frac{\Delta P_f / P_f}{\Delta Pc / Pc} = \Delta Pf / \Delta Pc \times Pf / Pc$$

- Example: Let us suppose that a consumer sees that the current price of a commodity has increased by 25% and he expects it to go up further by 50% in future, so it has an elasticity of price expectations equal to 2.

- Where P**c** and P**f** are current and future prices respectively.
- If Ex >1future change in price will be greater than present change in price.
- If Ex=1 future change in price will be proportionately equal to the change
- in the current price.
- If Ex<1 future change in price will be lesser than present change in price.

•Problems

- If a consumer's demand for a commodity increases from 100 units per week to 200 units per week when his income rises from Rs 2,000 to Rs 3,000,find his income elasticity of demand?

❑ Suppose the price of sugar fall from Rs 20 TO Rs10 .due to this fall in price quantity demand increase from 15 kg to 20 kg. what is the price elasticity of demand.

❑ The price of coffee increases from rs50 per kg.to rs70 per kg,and as a result the demand for tea increases from 5 kg to 10 kg. what is the cross elasticity of demand of tea for coffee?

Case-1

- According to a chamber of commerce study in Mumbai's VCD –rental market, the price elasticity of demand for VCD rentals is 0.7. a 10% rise in rentals implies a decline the demand for VCDs on rentals by 7%.that means, the demand for VCDs on rentals is inelastic. based on this information, the owner of Andheri Music Stores ,a B.COM graduate, increased the rentals by 25% in order to enhance its total revenue decreased, in consequence .what is the mystery?

Continue……

- But In An Isolated Case, when well, there is no mistery.it is a matter of simple economic behavior of the customers. the study reported the measure of elasticity by assuming: if all VCD rental stores in Mumbai increased their prices by 10%,the market Demand Will Drop By 7%. but in an isolated case when the particular seller only charges a high price ,the customer can easily shift to the other competitors in the vicinity.then,the individual concerned seller looses his sales. in this case, the demand facing an individual seller tends to be elastic, though as a whole market demand for the product is inelastic. as such the increase in price by an individual seller causes a decrease in his total sales revenue .the Andheri music store ,obviously, experienced a decline in its total revenue ,owing to its isolated action.

Case-elasticity of demand

Ratan Sethi opened a petrol pump cum retail store on Delhi Agra high Way, about two hour drive from Delhi. His store sells typical items needed by high way like fastfoods,colddrinks,chocolates,

hotcoffee,children's toys etc. He charges higher price compared to the sellers of Delhi,yet he is able to maintain high sale –particularly of "yours special pack"(YSP) consisting of soft drink in a disposable plastic bottle and a packet of light snacks. The high way travellers prefer to stop at his store because ,while their cars wait for petrol filling ,they in the mean time can enjoy YSP.

And in the some cases would help themselves with some other items in the store .each year he would substantially enhance his sales by providing special summer price on YSP which is almost half of its regular price.

Last year while returning from Delhi ,Ratan found that a new ,big and modern grocery shop has come up 15 km from Delhi on the national high way .it has affected his sales but only marginally .but last month another large convenience store has opened just 5 km away from his store. He knows that the challenge has come to his door steps and he expects to be adversely affected by the existence of these two stores.

He needs to meet this challenge and decides to use the pricing strategy which he has been using quite effectively till recently .he now permanently reduces the price of YSP to half of its existing price .but at the end of the year RATAN finds that his sales in general and of YSP in particular had declined by 20%.

Where has Ratan Sethi gone wrong ? if he was a managerial economist ,how would you think he would have handled the situation

Thank you