

Paper 1: Fundamentals of Economics and Management (FEM)

Concept of Monopoly

A situation in which a single company or group owns all or nearly all of the market for a given type of product or service. By definition, monopoly is characterized by an absence of competition, which often results in high prices and inferior products. According to a strict academic definition, a monopoly is a market containing a single firm. In such instances where a single firm holds monopoly power, the company will typically be forced to divest its assets. Antimonopoly regulation protects free markets from being dominated by a single entity.



FACTORS GOVERNING THE GROWTH AND MAINTENANCE OF MONOPOLY:

- Patents, copyrights and trademarks
- Control of an essential raw materials
- Natural monopoly
- Government controls on entry

MONOPOLY, MARGINAL REVENUE AND DEMAND ELASTICITY:

The price elasticity of the demand curve facing a monopoly firm determines if the marginal revenue received by the monopoly is positive (elastic demand) or negative (inelastic demand). This relationship is important for the profit-maximizing production decision that involves equality between marginal revenue and marginal cost. It implies that a monopoly can only maximize profit in the elastic range of the demand curve.

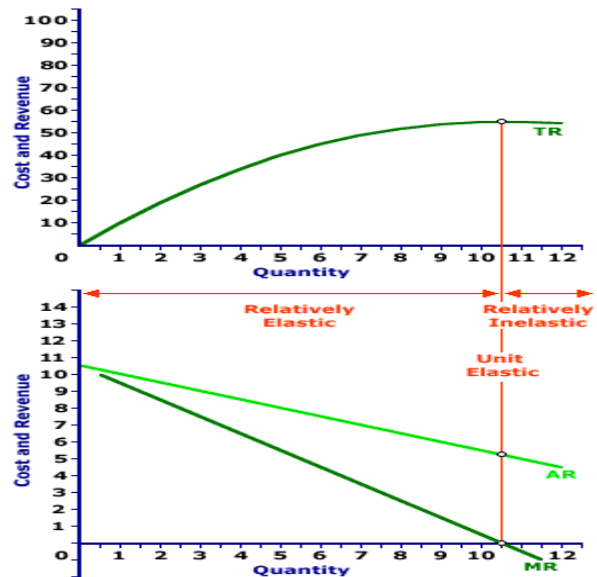
The relation between the price elasticity of demand and the marginal revenue curve indicates that a monopoly is only able to maximize profit by producing a quantity of output that falls in the elastic range of the demand curve. A monopoly cannot maximize profit in the inelastic range of

demand because this involves negative marginal revenue, and by virtue of the profit-maximizing equality between marginal revenue and **marginal cost**, it requires negative marginal cost, which is just not a realistic possibility.

The connection between marginal revenue and elasticity works like this:

- If the demand is elastic, then marginal revenue is positive.
- If the demand is inelastic, then marginal revenue is negative.
- If demand is **unit elastic**, then marginal revenue is zero.

Revenue and Elasticity



A Look at the Curves

To see how this looks, consider the exhibit to the right, which depicts the revenue (total, average, and marginal) received by a well-known monopoly, Feet-First Pharmaceutical. Feet-First Pharmaceutical is the exclusive supplier of the hypothetical drug Amblathan-Plus, the only known treatment for the hypothetical foot ailment, amblathanitis.

The top panel in the exhibit presents a hump-shaped total (TR). It is hump-shaped because Feet-First Pharmaceutical does not charge the same price for each quantity sold. As a monopoly, it must lower the price to sell more output.

The bottom panel then presents the **average revenue curve** (AR), which is also the market demand curve and the demand curve facing Feet-First Pharmaceutical, and the **marginal revenue curve** (MR), which indicates the extra revenue received for selling each extra ounce of Amblathan-Plus.

Now consider the price elasticity of the average revenue (demand) curve. A straight-line demand curve such as this one has different ranges of elasticity.

- For relatively high prices and small quantities, the average revenue (demand) curve is **relatively elastic**.
- For relatively low prices and large quantities, the average revenue (demand) curve is **relatively inelastic**.



- The average revenue (demand) curve is unit elastic at the exact midpoint of the line, which in this case is 10.5 ounces of Amblathan-Plus.

The key question is how these elasticity alternatives relate to marginal revenue and total revenue.

- When the average revenue (demand) curve is elastic, marginal revenue is positive and total revenue is increasing.
- When the average revenue (demand) curve is inelastic, marginal revenue is negative and total revenue is decreasing.
- When average revenue (demand) curve is unit elastic, marginal revenue is zero and total revenue is not changing.

The primary conclusion is that marginal revenue is negative and total revenue is decreasing in the inelastic portion of the average revenue (demand) curve. For Feet-First Pharmaceutical to maximize profit in the inelastic range it needs negative marginal cost, which is just not realistic.

The Monopoly Dream

To see why this conclusion is so important, consider how it appears to contradict what would seem to be dream of any aspiring monopoly.

To achieve monopoly status, a firm must supply a good that has no close substitutes. Buyers must be forced to buy from the monopoly if they buy the good at all. However, the availability of substitutes is a key determinant of demand elasticity.

- **Elastic Demand:** A good with many close substitutes tends to have an elastic demand. Because buyers are easily able to switch between substitutes, they are relatively sensitive to price changes.
- **Inelastic Demand:** A good with very few close substitutes tends to have an inelastic demand. Because buyers are not able to switch between substitutes, they are not very sensitive to price changes.

The dream of any monopoly seller is to provide a good for which there are no alternatives. Such a good, however, tends to be relatively inelastic. And consequently marginal revenue is negative, which prevents profit maximization.

Are these aspiring monopolies misguided? Should they be searching for goods with elastic demand? Are they unaware of the relation between elasticity and marginal revenue? Do they not know that they can never maximize profit if they produce a good with inelastic demand?

A Profitable Journey

The monopoly dream is not as misguided as it might first appear. The key is the phrase "profit maximization." Profit is MAXIMIZED when marginal revenue is positive and demand is elastic. In other words, when profit is maximized there is no way to INCREASE profit by doing something like increasing the price.

While profit maximization means profit can go no higher, the lack of profit maximization only means profit has NOT reached its peak. It does not mean profit is lacking. It does not mean that a monopoly firm is earning NO profit or incurring an economic loss. The lack of profit maximization ONLY means that the monopoly can take steps to increase profit. It can increase profit by doing something like increasing the price.

If a monopoly faces an inelastic demand curve, increasing the price is exactly what it can do. If the price of a good with

inelastic demand is increased, then total revenue and profit also increase. Today the price is \$1. Tomorrow the price is \$2, and profit increases. The next day the price is \$3, and profit increases again. When prices raise so too does profit? As long as demand is inelastic, then profit keeps rising. A "maximum" is not reached.

Is this is such a bad thing for the monopoly?

Not being AT THE MAXIMUM, but ONLY being able to increase profit is not really all that bad. Few firms would turn down the opportunity to be the sole provider of an inelastic product. Sure they might never MAXIMIZE their profit, that is, reach a nice stable equilibrium. But they can increase profit day after day, month after month, year after year, by raising prices. The "problem" is that profit can always go higher.

In the analysis of profit-maximization production, a monopoly NEVER selects an output level in the inelastic range of this demand curve. Feet-First Pharmaceutical NEVER willingly produces more than 10.5 ounces of Amblathan-Plus. Doing so requires that Feet-First Pharmaceutical operate with a quantity that generates negative marginal revenue.

If Feet-First Pharmaceutical found itself doing something like selling 15 ounces of Amblathan-Plus, then it undoubtedly raises the price, which reduces the quantity, which then increases total revenue, and which INCREASES profit. It continues this course until the quantity decreases enough to enter the elastic portion of the demand curve. Only there is Feet-First Pharmaceutical be able to MAXIMIZE profit. However, up to that time, profit merely INCREASES. Not such a bad thing for the monopoly.

Paper 2: Fundamentals of Accounting (FOA)

Capital and Revenue Expenditure

Expenditure on fixed assets may be classified into **Capital Expenditure** and **Revenue Expenditure**. The distinction between the nature of capital and revenue expenditure is important as only capital expenditure is included in the cost of fixed asset.

Capital Expenditure

Capital expenditure includes costs incurred on the acquisition of a fixed asset and any subsequent expenditure that increases the earning capacity of an existing fixed asset.

The cost of acquisition not only includes the cost of purchases but also any additional costs incurred in bringing the fixed asset into its present location and condition (e.g. delivery costs).

Capital expenditure, as opposed to revenue expenditure, is generally of a one-off kind and its benefit is derived over several accounting periods. Capital Expenditure may include the following:

- Purchase costs (less any discount received)
- Delivery costs
- Legal charges
- Installation costs
- Up gradation costs
- Replacement costs

As capital expenditure results in increase in the fixed asset of the entity, the accounting entry is as follows:



Debit	Fixed Assets
Credit	Cash/Payable

Test your Understanding

Which of the following are examples of capital expenditure?

1. Cost incurred in testing whether a newly installed asset is functioning properly.
2. Cost incurred in relocating a machine to a new factory.
3. Cost incurred in replacing an old engine of the aircraft with a new one.

Answer:

1. Testing of assets is necessary in bringing them into usable condition and therefore any associated costs incurred must be capitalized. However, proceeds from sale of any items produced during the test phase must be deducted from the amount to be capitalized as per IAS 16.
2. Recognition of cost ceases when the asset is made capable of operating unless it improves its earning potential. Subsequent expense on shifting an asset from one place to another does not enhance the earning capacity of the asset which is why such costs are classified as revenue expenditure.
3. New engine significantly increases the useful life of the aircraft and as such, its cost must be capitalized. However, the carrying amount of the replaced engine must be derecognized in the same manner as disposal on any fixed asset.

Revenue Expenditure

Revenue expenditure incurred on fixed assets includes costs that are aimed at 'maintaining' rather than enhancing the earning capacity of the assets. These are costs that are incurred on a regular basis and the benefit from these costs is obtained over a relatively short period of time. For example, a company buys a machine for the production of biscuits.

Whereas the initial purchase and installation costs would be classified as capital expenditure, any subsequent repair and maintenance charges incurred in the future will be classified as revenue expenditure. This is so because repair and maintenance costs do not increase the earning capacity of the machine but only maintains it (i.e. machine will produce the same quantity of biscuits as it did when it was first put to use).

Revenue costs therefore comprise of the following:

- Repair costs
- Maintenance charges
- Repainting costs
- Renewal expenses

As revenue costs do not form part of the fixed asset cost, they are expensed in the income statement in the period in which they are incurred. The accounting entry to record revenue expenditure is therefore as follows:

Debit	Revenue Expense (Income Statement)
Credit	Cash/Payable

Difference between Capital and Revenue expenditure

Revenue Expenditure	Capital Expenditure
1. Expenditure for items which are used for the day-to-day running expenses of the business. They are normally used up in less than one accounting period and therefore, only temporarily increase the profit-making capacity of the business. 2. Appears in the Trading and Profit & Loss Accounts as a reduction to profits.	1. Expenditure on assets which last for a long time and permanently increase the profit making capacity of the business. 2. Appears in the Balance Sheet as an increase in the value of assets.

Capital Receipts:

An amount received in the form of capital from the owner and as loan from outsiders is known as capital receipts.

Besides, cash received by selling shares, debentures and permanent assets is also capital receipts. It is of non-recurring type of receipts. It is treated as obligation of the business and shown on liabilities side of the balance sheet.

Items relating to capital receipts:

- Amount received from the owner as capital
- Amount received through the sale of shares and debentures.
- Amount of loan received
- Amount received from the sale of old assets.
- Other receipts of non-recurring nature.

Revenue Receipts

Revenue receipt is an amount which is received from the regular transaction of a business. It is the amount received from the sale of goods and services. It is the main source of income. It is a regular type of income. It is shown on the credit side of the trading and profit and loss accounts.

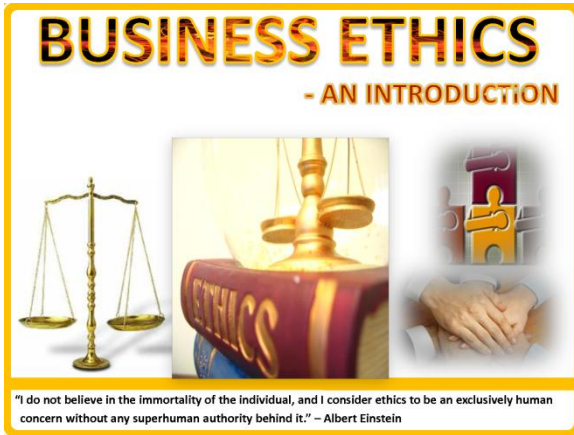
Items relating to revenue receipts:

- Amount received from the sale of goods and services.
- Amount received by way of discount, commission, rent, interest and dividend.
- Amount received from the sale of waste paper and packing cases.

Paper 3: Fundamentals of Laws and Ethics (FLE)

ETHICS AND BUSINESS

Man is a social animal. Though rules of nature control the humans as they control the other living beings, the man himself has derived certain principles to govern his own individual and group behaviour. These rules, in the form of behavioural standards, may differ across cultures and times but their basic objectives are always mutual existence and peace within the particular community or the social group. By ensuring security and protection of the group, these standards help in the survival of the particular community or a social group. These standards of behaviour are called 'ethics.'



Like individuals, organizations are also monitored and evaluated by a set of ethical standards. As in any social group, ethics is inevitable in organizations. Research has already shown that ethics does pay. Since unethical practices cost the industries billions of dollars a year and damage the images of corporations, the emphasis on ethical behaviour in organizations has increased over the recent years.



Business ethics are moral principles that guide the way a business behaves. The same principles that determine an individual's actions also apply to business.

Acting in an ethical way involves distinguishing between "right" and "wrong" and then making the "right" choice. It is relatively easy to identify unethical business practices. For example, companies should not use child labour. They should not unlawfully use copyrighted materials and processes. They should not engage in bribery.

However, it is not always easy to create similar hard-and-fast definitions of good ethical practice. A company must make a competitive return for its shareholders and treat its employees fairly. A company also has wider responsibilities. It should minimise any harm to the environment and work in ways that do not damage the communities in which it operates. This is known as corporate social responsibility.

In the complex global business environment of the 21st century, companies of every size face a multitude of ethical issues. Businesses have the responsibility to develop codes of conduct and ethics that every member of the organization must abide by and put into action. Fundamental ethical issues include concepts such as integrity and trust, but more complex issues include accommodating diversity, decision-making, compliance and governance.

All over the world, there is a growing realisation that ethics is important for any business and to achieve the progress of any society. Ethics give rise to efficient economy. It is not the government or law which will protect the society. But ethics alone can protect it. Ethics are good in itself. Ethics and

profits go together in the long run. An ethically responsible company is one which has developed a culture of caring for people and environment, a culture which flows downwards from the top managers and leaders. Ethics can be described as the conscious appeal to norms and values to which, on reasonable grounds, we hold ourselves obliged, as reciprocally, we hold others obliged to the same norms and values. As a reflection, ethics are the methodical and systematic elaboration of the norms and values we appeal to in our daily activities. Where these activities are organised under business issues, we face ethics in the practical and reflective variety of business ethics.

On innumerable occasions, people in business are facing ethical questions in which a balance has to be found between the different and often conflicting rights and interests of the parties involved. One may even say that the weighing of rights and interests, at stake in determinate circumstances, constitutes the common domain of business ethics.

Ethical rules are guides to moral behaviour. For example: All societies have ethical rules forbidding, lying, stealing, deceiving and harming others, similar to the other ethical rules that approve of honesty, keeping promises, helping others and respecting the right of others. These are the basic rules of behaviour which are of much use for the preservation and continuation of organised life.

Most of the people find major source of ethical guidance and moral meaning in religious beliefs and organisations. The family institution is equally important as it imparts a sense of right and wrong in children when they grow up, as schools and other similar institutions like cultural associations and television etc. The totality of these exposures will create in them a concept of ethics, morality and socially desirable behaviour.

Ethical rules are present in all societies, all organisations and all individuals, though they may vary greatly from one to another. What is considered ethical by one society may be forbidden by another society. One particular religious notion of morality may differ with others. Still ethics is a universal human trait. All people wherever they are, need rules to govern their conduct, rules that tell them whether their actions are right or wrong, moral or immoral, approved or disapproved.

Paper 4: Fundamentals of Business Mathematics and Statistics (FBMS)

Simultaneous Linear Equations

What are simultaneous linear equations?

Simultaneous linear equations have two variables in them. Let us say x and y. Since there are two variables in the equation we cannot solve it by itself. We need another equation with the same variable values to find the answer. When these two equations are solved together we get the values of the variables x and y.

Before studying the Vedic approach to solving simultaneous linear equations (SLE's) let us recall the traditional method of solving them.



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(Q) Find the values of x and y given the equations $2x + 4y = 10$ and $3x + 2y = 11$.

$$2x + 4y = 10 \quad \text{..... (1)}$$

$$3x + 2y = 11 \quad \text{..... (2)}$$

The co-efficients of x are 2 and 3 respectively, and the co-efficients of y are 4 and 2 respectively. In order to proceed with the solution we have to equalize either the co-efficients of x or the co-efficients of y. This can be done by multiplying the equations with suitable numbers.

In this case, we shall multiply equation (1) with 3 and equation (2) with 2. The new equations are:

$$6x + 12y = 30 \quad \text{..... (1)}$$

$$6x + 4y = 22 \quad \text{..... (2)}$$

We can see that the co-efficient of x is same in both equations. Now, we subtract the second equation from the first and get the value of y.

$$6x + 12y = 30 \quad \text{..... (1)}$$

$$\underline{6x + 4y = 22} \quad \text{..... (2)}$$

$$8y = 8$$

We get $8y = 8$ and therefore value of y is 1. Next, we substitute the value of y in the first equation.

$$2x + 4(1) = 10$$

$$2x = 6$$

$$x = 3$$

Answer: The values of x and y are 3 and 1 respectively.

In the traditional method a new set of equations is formed in order to equalize the co-efficients of any one variable. But forming new equations is a time-consuming procedure.

Secondly, equalizing the co-efficients is not always an easy task. If the co-efficients have big numbers or decimal values it becomes very difficult to equalize them by multiplying them with suitable numbers. If the values of x are numbers

Numerator	Denominator
$2x + 1y = 5$ $\underline{3x - 4y = 2}$	$2x + 1y = 5$ $\underline{3x - 4y = 2}$
$= (1 \times 2) - (-4 \times 5)$	$= (1 \times 3) - (-4 \times 2)$
$= 22$	$= 11$
$x = \frac{\text{Numerator}}{\text{Denominator}} = \frac{22}{11} = 2$	

like 0.5 or 0.2 or big numbers like 32 or 54 then it becomes difficult to calculate their values. In each of the two examples mentioned above it is not easy to equalize the co-efficient and involves some effort. Secondly, the possibility of making a mistake with this method is pretty high. We will now study an alternate approach.

METHOD

In this method we will not be forming new equations but instead we will calculate the values of x and y with the given equations only. The value of the variables x and y will be expressed in the form of numerator upon denominator.

$$x = \frac{\text{Numerator}}{\text{Denominator}} \qquad y = \frac{\text{Numerator}}{\text{Denominator}}$$

It should be noted that although one can find the values of both x and y there is no need for doing it. If we obtain the value of either x or y then the value of the other variable can easily be obtained by substitution. We will solve three examples by calculating the value of x and two examples by calculating the value of y.

Calculating the value of 'x'

(Q) Find the values of x and y for the equations $2x + 4y = 10$ and $3x + 2y = 11$.

As I said, we will calculate the value of x as numerator upon denominator. The value of numerator will be:

$$2x + 4y = 10 \quad \text{..... (1)}$$

$$\underline{3x + 2y = 11} \quad \text{..... (2)}$$

The numerator is obtained by cross-multiplying (4×11) and subtracting from it the cross product of (2×10) as shown by the arrows in the diagram above.

$$x = \frac{\text{Numerator}}{\text{Denominator}} = \frac{(4 \times 11) - (2 \times 10)}{\text{Denominator}} = \frac{24}{8}$$

Next, we will calculate the value of the denominator.

$$2x + 4y = 10 \quad \text{..... (1)}$$

$$\underline{3x + 2y = 11} \quad \text{..... (2)}$$

The denominator is obtained by cross-multiplying (4×3) and subtracting from it the cross product of (2×2) as shown by the arrows in the diagram above.

$$x = \frac{\text{Numerator}}{\text{Denominator}} = \frac{24}{(4 \times 3) - (2 \times 2)} = \frac{24}{8} = 3$$

Thus, we have obtained the value of x as 3. Now, we will substitute the value of x in the equation $2x + 4y = 10$

$$2(3) + 4y = 10$$

$$6 + 4y = 10$$

$$y = 1$$

Therefore, the values of x and y are 3 and 1 respectively.

(Q) Solve the equations $2x + y = 5$ and $3x - 4y = 2$.

On substituting the value of x = 2 in equation (1) we get the value of y as 1. The solution set is (2, 1)

Calculating the value of 'y'

The value of y will also be calculated in the form of numerator upon denominator. However, the technique of calculating the denominator is same as the previous technique (in case of x) and so we have to study the technique of calculating the numerator only.



(Q) Solve the equations $6x + 4y = 50$ and $5x + 5y = 50$.

Numerator	Denominator
$\begin{array}{l} 6x + 4y = 50 \\ \times \\ 5x + 5y = 50 \\ \hline = (50 \times 5) - (50 \times 6) \\ = -50 \\ y = \frac{\text{Numerator}}{\text{Denominator}} = \frac{-50}{-10} = 5 \end{array}$	$\begin{array}{l} 6x + 4y = 50 \\ \times \\ 5x + 5y = 50 \\ \hline = (4 \times 5) - (6 \times 5) \\ = -10 \end{array}$

In this case, we have obtained the value of y as 5. We substitute the value of y in equation (1) and get the value of x as 5. The solution set is (5, 5).

(Q) Solve $5x + 4y = 3$, $2x - 3y + 8 = 0$.

The second equation $2x - 3y + 8 = 0$ can be written as $2x - 3y = -8$. We will solve for the value of y and then substitute to find the value of x

Numerator	Denominator
$\begin{array}{l} 5x + 4y = 3 \\ \times \\ 2x - 3y = -8 \\ \hline = (3 \times 2) - (-8 \times 5) \\ = 46 \\ y = \frac{\text{Numerator}}{\text{Denominator}} = \frac{46}{23} = 2 \end{array}$	$\begin{array}{l} 5x + 4y = 3 \\ \times \\ 2x - 3y = -8 \\ \hline = 8 - (-15) \\ = 23 \end{array}$

Substituting the value of y as 2 in equation (1) we get the value of x as -1. The solution set is (-1, 2).

It can be observed that the technique for calculating the denominator is same in either method, viz. solving for x or solving for y. However, the technique of calculating the numerator is different in the second method.

When confronted with a problem, a student can calculate either the value of x or y and substitute its value in the other variable. However, one rule of thumb can be stated here which will help you in deciding which variable to solve.

If the co-efficients of x are big numbers than calculate the value of x and substitute for y and if the co-efficients of y are big numbers than calculate the value of y and substitute for x.

(This happens because when you calculate the value of x you will be dealing with the y co-efficients twice and hence avoiding the big x co-efficients and vice versa.)

SPECIFIC CASE

There is a special sutra of Vedic Mathematics called the 'Sunyam Anyat' which says 'If one is in ratio, the other is zero.' This sutra is useful when the co-efficients of either x or y are in a certain ratio.

Example: 1

$$\begin{array}{l} 5x + 8y = 40 \\ 10x + 11y = 80 \end{array}$$

In the above case, the x co-efficients are in the ratio of 1:2 (5:10) and the constants are also in the ratio of 1:2 (40:80). Now, our sutra says that 'if one (variable) is in ratio, the other one (the other variable) is zero.'

In this case, we see that the variable x is in ratio with the constant terms and therefore 'the other', namely, variable y, is zero. Thus, value of y is zero. The value of y can be substituted as zero in the above equation. If we take equation (1) and substitute the value of y as zero, we have $5x = 40$ and hence $x=8$.

Example: 2

$$\begin{array}{l} 67x + 302y = 1510 \\ 466x + 906y = 4530 \end{array}$$

The y co-efficients are in the ratio of 1:3 (302:906) and the constants are also in the ratio of 1:3 (1510:4530). Since the variable y is in the same ratio as the constant terms, the value of variable x is zero. We now substitute the value of x as zero in the first equation and get the value of y as 5. The values of x and y are 0 and 5 respectively.

In this example, since the co-efficient and constant terms are big numbers it would have been very difficult to calculate the answer. But, thanks to the Sunyam Anyat rule, we can easily solve them by detecting a ratio amongst the variable y.