UNIT 1: THEORY OF DISTRIBUTION

UNIT STRUCTURE

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1.1 LEARNING OBJECTIVES

After going through this unit, you will be able to:

- derive the meaning of Personal distribution and Functional distribution
- state the difference between Personal distribution and Functional distribution
- discuss the concept of Marginal Physical product
- describe the concept of Marginal revenue product and value of marginal product
- explain the concepts of Average factor cost and marginal factor cost.

1.2 INTRODUCTION

Traditionally, Economic theory has been divided into four parts: Production, Consumption, Exchange and Distribution. Economist studied

these four parts separately. In the fourth part 'Distribution', the pricing of 'factors of production' was often discussed as distinct from the pricing of 'product' because it was believed that the pricing of factors was something quite different from product pricing. Thus, the part of economic theory dealing with pricing of commodities was called 'Price theory' while the one concerning factor pricing was known as 'Distribution'. In short, the theory of factor prices is popularly known as *the theory of distribution*. The distribution may be functional or personal. The concept of functional distribution should be carefully distinguished from that personal distribution. In this unit we shall try to discuss the concepts of functional and personal distribution, factor productivity and factor cost.

1.3 PERSONAL DISTRIBUTION

By personal distribution we mean the distribution of income and wealth among various individuals, no matter from which sources it is derived. We all know that national income is not equally distributed among various individuals in the country. Some are rich while others are poor. In fact, there are great inequalities of income between various individuals. The theory of Personal distribution studies how personal incomes of individuals are determined and how the inequalities of income emerge .Under personal distribution, we study the pattern of the distribution of national income and the shares received by different sections of people.

In the words of *Professor Jan Pen*, "Personal Distribution (or the size distribution of income) relates to individuals persons and their incomes. The way in which that income was acquired often remains in the background. What matters is how much someone earns, not so much whether that income consists of wages, interest, profit, pension or whatever."

1.4 FUNCTIONAL DISTRIBUTION

Functional Distribution of income refers to the distinct shares of national income which people receive as compensation for the unique function which their services or service of their property perform in the process of production. In other words, it relates to the distribution of rewards

for the services of factors of production. Rent ,wages , interest and profits are the reward for the services of land , labour, capital and organization respectively. Algebraically it can be stated as: P=f(A,B,C,D)

where total output(P) is a function of Land(A), Labour(B), Capital(C), organization (D).

Thus, functional distribution studies the forces underlying the determination of the prices and shares of the various factors of production.

In the words of *Professor Jan Pen*, "In functional distribution we are no longer concerned with individuals and their individual income, but with factors of production: land, labour, capital and something else that may perhaps best be called entrepreneurial activity. The price of a unit of labour, a unit of capital, a unit of land and being an extension of price theory, it is sometimes called the theory of factor prices."

Personal Distribution Vs Functional Distribution: The distribution theory with which we are concerned in this unit is the *theory of functional distribution.* The concept of functional distribution should be carefully distinguished from that of personal distribution. Personal distribution of national income or what is known as 'size distribution of incomes' means the distribution of national income among various individuals or persons in a society. As you know that national income is not equally distributed among various individuals in the country. Some are rich, while others are poor. In fact, there are large inequalities of income between various individuals. The theory of personal distribution studies how personal incomes of individuals are determined and how the inequalities of income emerge. On the other hand, in the theory of functional distribution we study how the various factors of production are rewarded for their services or functions performed in the production process. Factors of production have been classified by economists under four major heads, viz., land, labour, capital and organization. Thus, in the theory of functional distribution we study how the relative prices of these factors of production are determined. The prices of land, labour, capital and entrepreneurship are called rent, wages, interest and profit respectively. Thus, in the theory of functional distribution we also

discuss how the rent of land, wages of labour, interest on capital and profits of entrepreneur are determined.

The question that now arises is: Is it not the functional distribution that determines the personal distribution of national income. Personal distribution of income only partly depends upon functional distribution. How much income an individual will be able to get depends not only on the price of a particular factor he has but also on the amount of that factor he owns as well as the prices and amounts of other productive factors which he may possess.

Thus, the personal income of a landlord depends not only on the rent but also on the amount of land he owns. Given the rent per acre, the greater quantity of land he owns, the greater will be his income. Further, the landlord may have lent some money to others for which he may be earning interest.

Despite these differences between personal and functional distribution, there is a close relation between the two. The personal distribution in a country is ultimately affected by its functional distribution of income. If the rewards to the factors of production are just and equitable, the distribution of personal income is also just and equitable. As a result individual incomes are high. There is great demand for products and services leading to more investment, more employment which increases production and national income. Higher personal income means higher standard of living and greater efficiency in production. On the other hand, if the functional distribution of income is unjust and based on the exploitation of factors of production, the personal distribution of income is also unjust and inequitable. As a result, the majority of the people will be poor. There will be diminution of economic and social welfare, and loss of peace and prosperity in the country due to a continuous struggle between the rich and the poor.



CHECK YOUR PROGRESS

Q 1: State whether the following statements are true (T) or false (F):

(i) The theory of factor prices is popularly

known as the theory of distribution. (T/F)

(ii) Functional distribution in a country is ultimately affected by its Personal distribution of income. (T/F)

Q 2: Define Functional Distribution. (Answer in about 40 words)

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Q 3: Define Personal Distribution. (Answer in about 40 words)

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1.5 CONCEPTS OF FACTOR PRODUCTIVITY AND FACTOR COST

Before turning to the detailed study of how prices of factors of production are determined under different market conditions, it is essential to know the different concepts of factor productivity and factor cost. In the following we shall explain some of the important concepts relating to factor productivity and factor cost.

1.5.1 Marginal Physical Product (MPP)

Marginal Physical Product (MPP) of a factor is the increase in total output caused by employing an additional unit of the factor, quantity of other factors remaining fixed. In other words, MPP is the addition made to total output by employing an additional unit of a variable factor. It is defined as:

$MPP = TPP_n - TPP_{n-1}$

Where MPP is the Marginal Physical Product, TPP_n is 0the total Physical Product of nth unit, TPP_{n-1} is the total Physical Product of $(n-1)^{th}$ unit.

Example: Suppose in a particular cotton factory 25 workers produce 900 meters of cloth. An additional worker is added to it. Now cloth production becomes 926 meters. In this case, the additional 26 meters will be the marginal physical product.

i.e. MPP = TPP_{26} -TPP_{25}

= (926-900) meters.

= 26 meters.

1.5.2 Marginal Revenue Product (MRP)

Marginal Revenue Product (MRP) is the increment in the total value of the product caused by employing an additional unit of a factor, the expenditure on other factors remaining unchanged. MRP is the marginal physical product of the factor multiplied by marginal revenue. It is defined as:

MRP=MPP X MR.

Where MRP is the Marginal Revenue Product, MPP is the Marginal physical Product, and MR is the marginal revenue.

The above equation can also be defined as:

MRP= TRP_n-$TRP_{(n-1)}$

Where TRP_n and $TRP_{(n-1)}$ is the Total renenue product of n and (n-1) unit respectively.

Example 1: Suppose in a cotton factory 10 workers produce 1000 meters of cloth. An additional worker is added to it. Now the production of cloth in the factory becomes 1100 meters. If the marginal revenue of 11^{th} unit of cloth is 100 then the Marginal Revenue Product(MRP) will be

Marginal Revenue Product (MRP) = (1100-1000) X 100

=100 X 100 =10000

Example 2: Suppose the TRP of 10^{th} worker is Rs30,000/- and that of 11^{th} worker is Rs 35,000/-then the MRP of 11^{th} worker is

MRP=Rs (35,000-30,000)

=Rs 5,000

1.5.3 Value Of Marginal Product (VMP)

Value of Marginal Product (VMP) is the money value of the addition to the physical product by the use of one more unit of a factor input. Thus, it is the money value of MPP. It can be measured as :

VMP= MPP X P

Where, VMP is the Value of Marginal Product, MPP is the Marginal physical product and P is the Market Price.

Example: Suppose in a cotton factory, 30 workers produce 900 meters of cloth and 31 workers produces 925 meters of cloth, then MPP of 31st worker is 925-900=25 meters.

If the market price is Rs 60 then VMP will be

VMP= 25X60

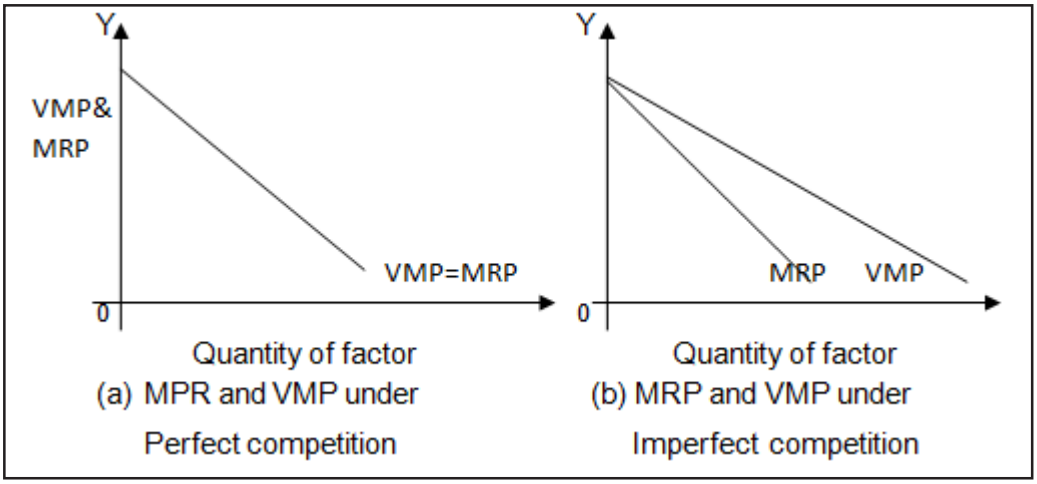
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Relationship between MRP & VMP: Under pure and perfect competition, MRP is same as VMP because the firm can sell any amount of its output at the given and constant price. This means, when MR = P,

MRP = MPP x MR = MPP x P = VMP.

But in case of imperfect competition, difference between MRP and VMP emerges. This is because in this case, the additional output obtained through the employment of one more unit of a factor input will have to be sold at a price lower than the one on which previous output was sold. The VMP and MRP curves in the two market conditions have been shown in Figure 1.1.

Figure 1.1: VMP and MRP Curves under different market conditions



1.5.4 Average Factor Cost (AFC)

Average factor cost (AFC) is the per unit cost of the Variable factor employed by a firm. It is obtained by dividing total factor cost by the units of factor employed,

i.e. AFC= TFC / Units of factor employed, where TFC is the total factor cost.

Example: Suppose the TFC is 20 in the 4^{th} unit of employment of labour, then in that case AFC will be: AFC = 20/4 = 5

1.5.5 Marginal Factor Cost (MFC)

Marginal factor cost (MFC) is the addition to the total factor cost by hiring or purchasing one extra unit of that factor. This is also called marginal input cost or marginal expense (ME) of a factor. It can be defined as

$$MFC = TFC_n - TFC_{(n-1)}$$

Where TFC_n and $TFC_{(n-1)}$ is the total factor cost of n^{th} and $(n-1)^{th}$ unit respectively.

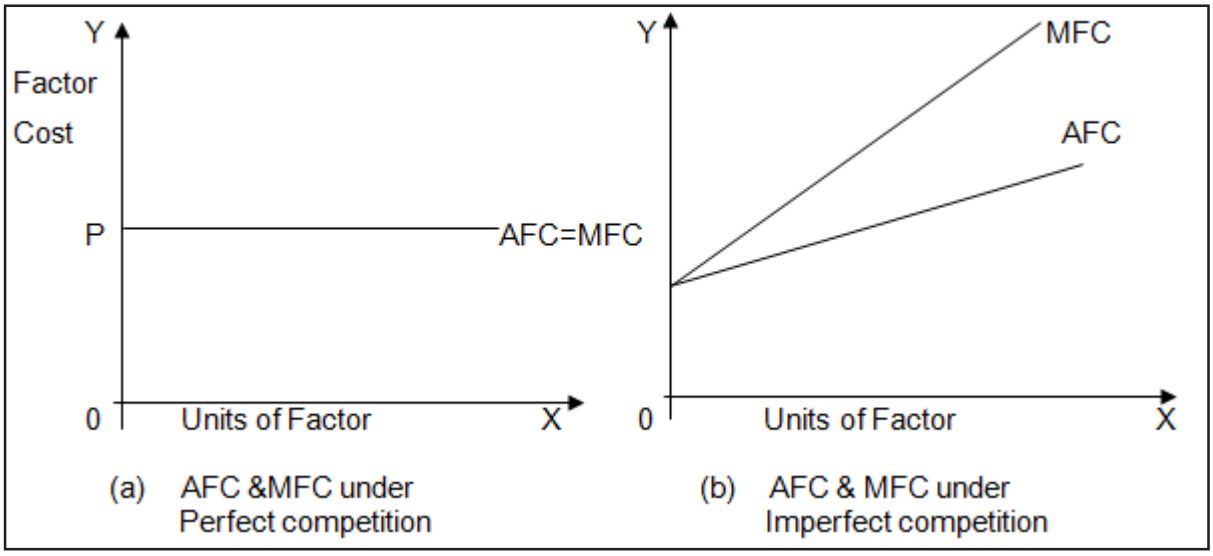
Example: Suppose if the TFC of 10 units of a factor is 120 and 11^{th} units is 150, then MFC will be: MFC= 150-120

=30

Relation between AFC & MFC: The relation between AFC and MFC is different in a perfectly competitive factor market and imperfect factor market. In a perfectly competitive factor market , the price of a factor is determined by its demand and supply. The price of that factor is given for the firm at which it buys as many units as are required, Therefore, the supply of the factor is perfectly elastic at the given price and the supply curve of the factor is a straight line parallel to the X- axis. As the price of the factor is assumed to be given and constant therefore, AFC=MFC=Price of the factor.

But in a imperfectly competitive market, factor supply curve (AFC) is upward slopping to the right and MFC curve is above the AFC curve. It means that if the firm wants to employ more units of that factor, it will have to spend more on each additional unit of the factor. Consequently, MFC of that factor will be more than it AFC. Therefore, the MFC will be above the AFC curve. This has been shown with the help of Figure 1.2.

Fig:1.2 : AFC &MFC under different market condition





CHECK YOUR PROGRESS

Q 4: State whether the following statemetns are true (T) or false (F).

(i) Under imperfect competition MRP=VMP. (T/F).

(ii) AFC and MFC curve under perfect competition is horizontal. (T/F).

Q 5: Explain the relationship between AFC and MFC under perfect competition. (Answer in about 40 words)

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Q 6: Define MPP. (Answer in about 40 words)

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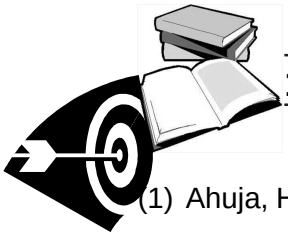
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1.6 LET US SUM UP

- The theory of factor prices is popularly known as the theory of distribution.
- The distribution may be functional or personal.
- By personal distribution we mean that distribution of income and wealth among various individuals no matter from which sources they are derived.
- Functional Distribution of income refers to the distinct shares of national income which people receive as compensation for the unique function which their services or service that their property performs in the process of production.
- Despite the differences between personal and functional distribution, there is a close relation between the two. The personal distribution in a country is affected by its functional distribution of income.
- Marginal Physical Product (MPP) of a factor is the increase in total output caused by employing an additional unit of the factor, quantity of other factors remaining fixed.

- Marginal Revenue Product (MRP) is the increment in the total value of the product caused by employing an additional unit of a factor, the expenditure on other factors remaining unchanged.
- Value of Marginal Product (VMP) is the money value of the addition to the physical product by the use of one more unit of a factor input
- Average factor cost (AFC) is the per unit cost of the variable factor employed by a firm. It is obtained by dividing total factor cost by the unit of factor employed.
- Marginal factor cost (MFC) is the addition to the total factor cost by hiring or purchasing extra unit of that factor. This is also called marginal input cost or marginal expense (ME) of a factor.
- Under perfect competition AFC=MFC=Price of the factor and Under imperfect competition (AFC) is upward slopping to the right and MFC curve is above the AFC curve.



1.7 FURTHER READING

(1) Ahuja, H.L. (2003). *Advanced Economic Theory*. New Delhi: S.Chand & Company Ltd.

(2) Chopra, P.N (2008). *Micro Economics*. Ludhiana: Kalyani Publishers.

(3) Jhingan, M.L. (2007). *Micro Economic Theory.* New Delhi: Vrinda Publications

(4) Koutsoyiannis, A (1979). *Modern Microeconomics*. New Delhi: Macmillan.

1.8 ANSWERS TO CHECK YOUR PROGRESS

Ans to Q No 1: (i) True (ii) False

Ans to Q No 2: Functional Distribution of income refers to the distinct shares of national income which people receive as compensation for the unique function which their services or service of their property

perform in the process of production. In other words, it relates to the distribution of rewards for the services of factors of production.

Ans to Q No 3: Personal distribution is the distribution of income and wealth among various individuals no matter from which sources they are derived. The theory of Personal distribution studies how personal incomes of individuals are determined and how the inequalities of income emerge.

Ans to Q No 4: (i) False (ii) True

Ans to Q No 5: Under perfect competition, MFC equals AFC. This is because in this market the price of the factor is given to the firm. It can employ as many factors as it wants at this given price. The every additional unit of factor will receive the same factor price.

Ans to Q No 6: Marginal Physical Product (MPP)of a factor is the increase in total output caused by employing an additional unit of the factor, quantity of other factors remaining fixed. In other words MPP is the addition made to total output by employing an additional unit of a variable factor.



1.9 MODEL QUESTIONS

Short Questions (Answer each question in about 150 words)

Q 1: Distinguish between personal distribution and functional distribution.

Q 2: Diagrammatically show MRP and VMP under perfect competition and imperfect competition.

Q 3: Diagrammatically show the relationship between AFC and MFC

Essay-type Questions (Answer each question in 300-500 words)

Q 1: Discuss the different concepts of factor productivity and factor cost.

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