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Price Theory and Welfare Economics

Topic –MARGINAL PRODUCTIVITY THEORY

Keywords-Marginal Product, Factor Demand Value of Marginal Product

Presented By

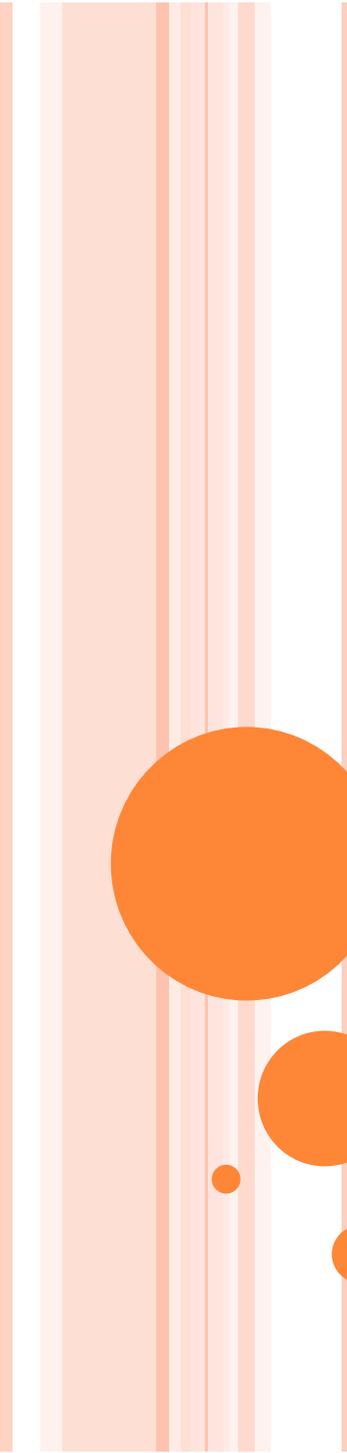
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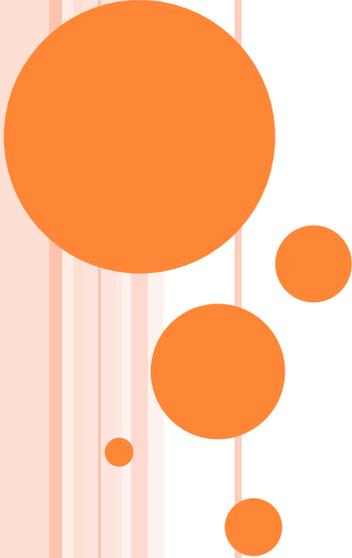
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INTRODUCTION & OUTLINE

The neo-classical approach to factor price determination is based on marginal productivity theory of factor. Marginal productivity theory is regarded as the general micro-theory of factor price determination.

The earliest hint of the concepts of 'marginal product' and its use in the determination of 'natural wage' appeared in Von Thunen's *Der Isolierte Staat* (1826)

This lecture will discuss the Basic Tenets , Approach and Criticisms of MP theory

WHAT IS MARGINAL PRODUCTIVITY THEORY ?

- According to Clark, the marginal productivity principle is a complete theory of wages,
- It could be well applied to other factors of production also.
- Although many theorists, including Marshall and Hicks, have objected to the marginal productivity theory being regarded as theory of wages or as theory of distribution.
- It is regarded as a sound theory of factor price determination.
- Strictly speaking, marginal productivity theory offers only a theory of demand for a factor of production.
- The marginal productivity theory provides an analytical framework for deriving the demand for a factor which is widely used in modern economic analysis

MARGINAL PRODUCTIVITY AND FACTOR DEMAND

- **Demand for a factor is a derived demand**
- Factors are demanded not merely because they are productive but also because the resulting product has a market value.
- Thus, demand for a factor of production depends on the existence of demand for the goods and services that a factor of production can create.
- The derivation of factor demand has been explained with reference to labour demand.

DEMAND FOR A SINGLE FACTOR: LABOUR

- The demand for a variable factor depends on the value of its margin productivity .
- Therefore, we shall first derive the value of marginal productivity (VMP) curve of labour. The VMPL for labour is drawn from the marginal productivity curve (MPL). The MPL curve is shown in Figure 1. The curve MPL shows diminishing returns to the variable factor—labour.
- If we multiply the MPL at each level of employment a constant price P_x , we get the value of marginal physical product curve, as shown by the curve $VMPL = MPL \cdot P_x$.

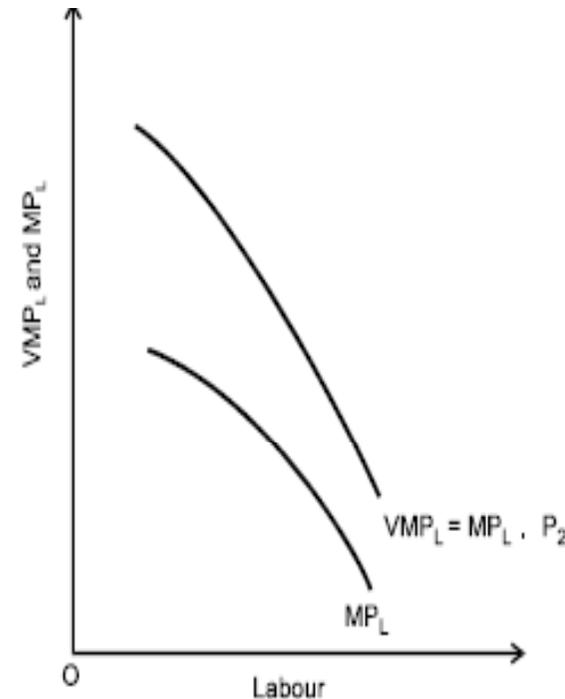


Fig.1 MPP_L and VMP_L Curves

DERIVATION OF A FIRM'S LABOUR

- A firm's demand curve for labour is derived on the basis of the *VMPL curve on the* following assumptions for the sake of simplicity in the analysis.
- (i) Firm's objective is to maximise profit and profit condition is $MR=MC=w$.
- (ii) The firm uses a single variable factor, labour and the price of labour, wages (w), *is constant*.
- (iii) The firm produces a single commodity whose price is constant at P_x .

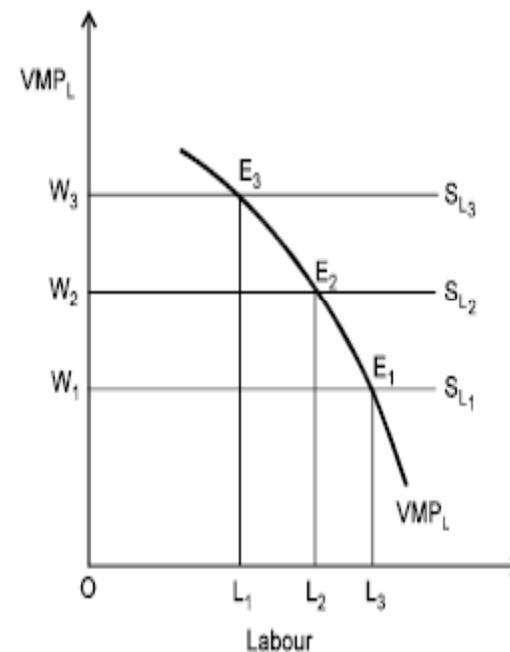
- Given the assumptions and the VMPL curve, we can now derive the firm's demand curve for labour.
- As assumed above, a profit maximising firm produces a quantity of output at which its $MR=MC=w$.
- This profit-maximisation rule can be interpreted as a profit-maximising firm increases its output upto the point at which the marginal cost of available factor (labour) employed equals the value of its product.
- In other words, a profit-maximising firm employs a factor till the marginal cost of the variable factor (labour) equals the value of the marginal product of the factor (i.e., VMPL).

DEMAND FOR A SINGLE FACTOR: LABOUR

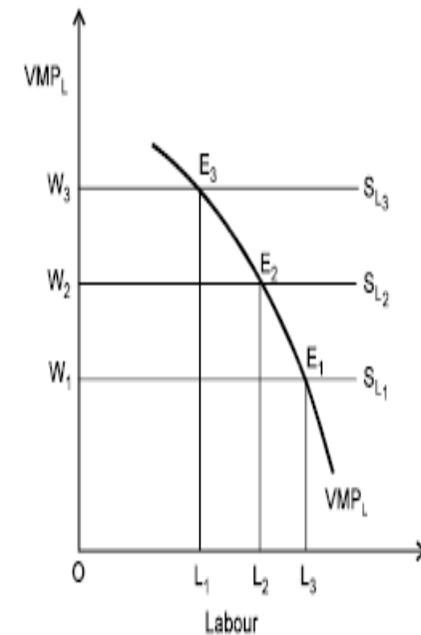
Short run equilibrium

Fig-2 MPPL and VMPL curves

- The short-run equilibrium of the profit-maximising firm is illustrated in Figure -2. The *VMPL curve shows the value of marginal product of labour, the only variable factor*. The *SL lines present the labour supply curves for an individual firm [assumption (b)], at the constant wage rates*. The *VMPL curve and SL3 line intersect each other at point E3, where $VMPL = W_3$* . The profit-maximising firm will, therefore, employ only *OL1 units of labour*. By employing *OL1 units of labour, the firm maximises its profit*.
- Given these conditions, any additional employment of labour will make $W_3 > VMPL$. Hence, the total profit will decrease by $W_3 - VMPL$. Similarly, if one unit less of labour is employed, *VMPL will be greater than W_3 and the total profit is reduced by $VMPL - W_3$* . Thus, given the *VMPL and SL3, the profit maximising firm will demand only OL1 units of labour*.



- The above analysis can be extended to derive the firm's demand curve for labour. If wage rate falls to $OW2$ firm's equilibrium point shifts from point $E3$ to $E2$ increasing the demand for labour from $OL1$ to $OL2$.
- Similarly, when wage rate falls further to $OW1$, firm's equilibrium shifts downward to $E1$ causing an increase in the demand for labour to $OL3$. To summarise, when wage rate is $OW3$, demand for labour $OL1$; when wage rate falls to $OW2$, demand for labour increases to $OL2$; and when wage rate falls further to $OW1$, labour demand increases to $OL3$.
- Obviously, as wage rate falls, demand for labour increases.
- This relationship between the wage rate and labour demand gives a usual downward sloping demand curve for labour, which is, by definition, the same as *VMPL curve*.



VMP_L CURVES

FACTOR PRICE DETERMINATION IN PERFECT MARKET

- We have derived above the market demand curve for labour, as shown by curve D_2 in Figure 3.
- The labour supply curve is shown through the curve SL .
- The labour supply curve (SL) shows that labour supply increases in wage rate.
- The tools may now be applied to illustrate the factor price (wage) determination in perfectly competitive markets. Figure 3 shows the determination of wage in a competitive market.
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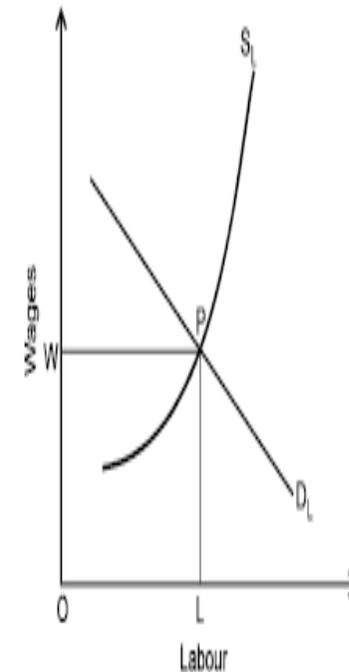
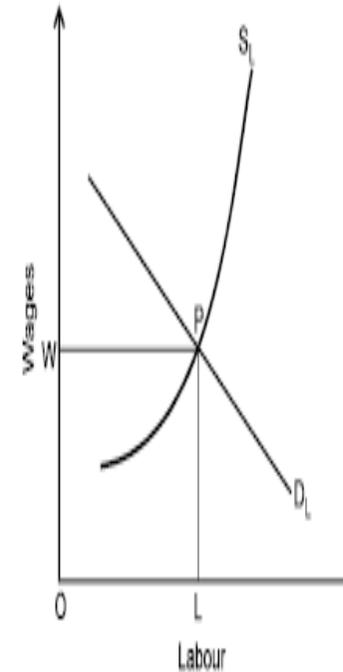


FIG 3-FACTOR PRICE DETERMINATION IN PERFECT MARKET

- As shown in the figure, the demand curve for and supply curve of labour intersect each other at point P , where demand for and supply of labour are equal at OL , and wage-rate is determined at OW .
- *This wage rate will remain stable in a competitive market so long as demand supply conditions do not change.*
- This final analysis of factor price determination gives a brief analysis of *Neo-Classical Approach* marginal productivity theory of factor price determination with reference to labour. **But it applies to other factors also.**



SUMMARY

- ❖ The neo-classical approach to factor price determination is based on marginal productivity theory of factor.
- ❖ Marginal productivity theory is regarded as the general micro-theory of factor price determination.
- ❖ It provides an analytical framework for the analysis of determination of factor prices.
- ❖ According to Clark, the **marginal productivity principle is a complete** theory of wages, which could be well applied to other factors of production also.

Although many theorists, including Marshall and Hicks, have objected to the marginal productivity theory being regarded as theory of wages or as theory of distribution, it is regarded as a sound theory of factor price determination.

- According to the marginal productivity theory, the share of each factor in national income is determined by the marginal productivity of a factor and the number of units of the factor employed, i.e., national income = $VMPL \cdot L + VMPL \cdot K$.

However, there has been a controversy on as to how is the share of each factor in the national income determined.

SELF CHECK YOUR PROGRESS

- 1. WHO DEVELOPED THE MARGINAL PRODUCTIVITY THEORY?**
- 2. HOW DOES ONE GET THE VALUE OF MARGINAL PHYSICAL PRODUCT CURVE?**

ASSESSMENT QUESTIONS AND EXERCISES

SHORT ANSWER QUESTIONS

- 1. WRITE A SHORT NOTE ON THE ORIGINS OF THE MARGINAL PRODUCTIVITY THEORY.**
- 2. BRIEFLY EXPLAIN FACTOR PRICE DETERMINATION IN PERFECT MARKET.**
- 3. WHAT WAS CLARK-WICKSTEED-WALRUS PRODUCT EXHAUSTION THEOREM?**

LONG ANSWER QUESTIONS

1. EXPLAIN THE MARGINAL PRODUCTIVITY THEORY AND DEMAND WITH THE HELP OF FIGURES.
2. DESCRIBE THE ADDING UP CONTROVERSY AND PRODUCT EXHAUSTION THEOREM.
3. DISCUSS HOW A CHANGE IN RELATIVE FACTOR PRICES AFFECT THE RELATIVE FACTOR SHARES AND INCOME DISTRIBUTION.
4. EXAMINE THE EFFECT OF TECHNICAL PROGRESS ON FACTOR PRICE DETERMINATION.

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