Study Material for Economics

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Course Information

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Unit: 2 [**Input market under Imperfect Competition**]

Contents

1 Monopsony

Sometimes there is only a single buyer (firm) of an input. This is called monopsony in the input market. A monopsonist, being the only buyer in the market, faces a positive sloped market supply input curve. As a result, changes in its volume of purchases affect the input price. When the firm increases its purchase of input, the input price increases. The monopsonist, therefore, considers the **marginal expense** of purchasing an additional unit of an input.

Table 1: Monopsony and the Marginal Expense of Input

Units of Variable Input	Price per Unit (in ₹)	Total Cost of Input (in ₹)	Marginal Expense of Input (in ₹)
1	2 00	2 00	-
2	2 50	5 00	3 00
3	3 00	9 00	4 00
4	3 50	14 00	5 00
5	4 00	20 00	6 00
6	4 50	27 00	7 00
7	5 00	35 00	8 00
8	5 50	44 00	9 00
9	6 00	54 00	10 00
10	6 50	65 00	11 00

Marginal expense of an additional unit of input is the change in total cost of input due to purchase of an extra unit of input. This is shown in Table 1. By plotting columns 1 and 2, we get supply curve of the variable input (Figure 1). Hiring of an additional unit of input increases the total cost of input by more than the price of input because the firm has to pay more price per unit to get the additional unit of input.

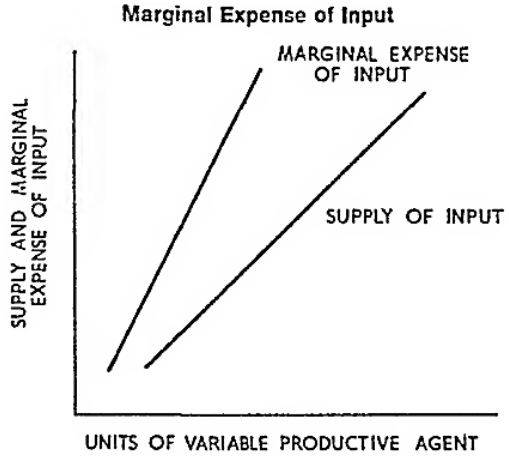

Figure 1

The marginal expense of input, is the curve on left in Figure 1. It is calculated by successive subtraction in the total cost of input column. Since price per unit rises as the employment increases, the marginal expense of input exceeds its price at all levels of

employment and the marginal expense of input curve is positively sloped. It lies to the left of supply of input curve and rises more rapidly than the latter.

[7] These statements can easily be proven Let the input supply function in inverse form be

$$w = g(x) \tag{14 7 1}$$

where w is input price x is the quantity of the input supplied, and $g'(x) = dw/dx > 0$ by assumption (i e the input supply curve is positively sloped) Total variable cost is

$$C(x) = wx = xg(x) \tag{14 7 2}$$

By definition, the marginal expense of input is

$$MEI = \frac{dC(x)}{dx} = g(x) + xg'(x) = w + x\frac{dw}{dx} \tag{14 7 3}$$

Since $g'(x) > 0$ by assumption a comparison of (14 7 1) and (14 7 3) shows that the marginal expense of input curve must lie above the input supply curve for each quantity supplied Usually, the *MEI* curve is positive and rises more rapidly than the input supply curve The slope of the latter is $g'(x)$, while the slope of the former is given by

$$\frac{dMEI}{dx} = 2g'(x) + xg''(x) \tag{14 7 4}$$

Thus *MEI* must be positive and have the steeper slope unless the input supply curve is *very* concave (i.e., $g'' < 0$ and large in absolute value).

Finally, we may relate the *MEI* to input price and input supply elasticity in the same way that marginal revenue is related to commodity price and the elasticity of commodity demand. By definition, the elasticity of input supply is

$$\theta = \frac{ax}{aw}\frac{w}{x}. \tag{14.7.5}$$

Now write (14.7.3) as

$$MEI = w + x\frac{dw}{dx} = w\left(1 + \frac{x\,dw}{w\,dx}\right). \tag{14.7.6}$$

Using (14.7.5) in (14.7.6), one obtains

$$MEI = w\left(1 + \frac{1}{\theta}\right). \tag{14.7.7}$$

When the input supply curve is perfectly elastic, $\theta \to \infty$ and $MEI = w$, that is, monopsony does not exist.

Exercise: State and explain all of the relations between $MR = \left(1 - \frac{1}{\eta}\right)$ and $MEI = w\left(1 + \frac{1}{\theta}\right)$.

1.1 Price and employment under monopsony when one variable input is used

The market demand curve for a productive service is the demand curve of a single buyer under monopsony condition. If only one variable input is used in the production process, the demand curve is the monopsonists marginal revenue product curve. A profit maximising monopsonist will employ a variable productive service until the point is reached at which the marginal expense of input equals its marginal revenue product. The price of the input is determined at the intersection of the two curves (Figure 2).

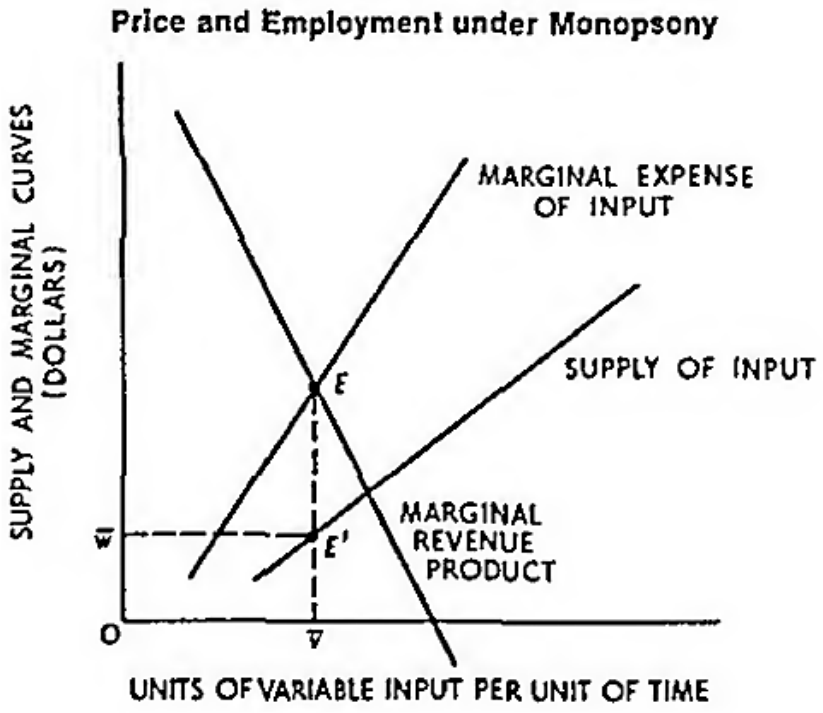

Figure 2

Marginal revenue product is the addition to total revenue attributable to the addition of one unit of the variable input, the marginal expense of input is the addition to total cost resulting from the employment of an additional unit. So long as marginal revenue product exceeds the marginal expense of input, profit of firm will increase by increasing the employment of input. On the other hand, if the marginal expense of input exceeds its marginal revenue product, there will be loss to the firm and it will lower the employment to maximise profit. Thus, profit will be maximised by employing variable input at the intersection of marginal revenue product curve and marginal expense of input curve. Equality occurs at point E. At equilibrium $O\bar{v}$, units of variable input will be employed at price $O\bar{w}$ per unit.

1.2 Price and employment under monopsony when several variable inputs are used

A monopsonist who uses several variable productive inputs will adjust input combination in such a way that the ratio of marginal product to marginal expense of input is the same for all variable inputs used. The least-cost combination is obtained when the marginal rate of technical substitution equals the marginal expense of inputs ratio at the tangency point of iso-quant with iso-cost line. But this proposition holds if the inputs are purchased in perfectly competitive markets. Otherwise a change in input composition will make change in relative input prices.

This can be shown algebraically. Suppose there are two variable inputs, labour (L) and capital (K). Their marginal physical products are denoted by MP_K and MP_L and market prices by r and w respectively. If the input markets are perfectly competitive, the least-cost combination rule requires that

$$\frac{MP_K}{MP_L} = \frac{r}{w} \qquad ...Equation - 1$$

or,

$$\frac{MP_L}{r} = \frac{MP_K}{w} \qquad ...Equation - 2$$

This equation implies that marginal product per rupee spent on each input must be same. The reason for this is that marginal physical product represents the additional revenue and input prices are the additional cost of employment of the inputs. This holds for both competitive and monopolistic commodity market. Price changes as output changes in monopoly markets but the price change is the same whether output has increased by increasing the employment of capital or labour or both. If $MP_K/r > MP_L/L$, a rupee worth of capital contributes more to output than a rupee worth of labour at the constant capital labour ratio.

If the input markets are perfectly competitive, rates of employment can be changed without affecting input prices. Therefore, the entrepreneur will substitute capital for labour because he can obtain the same output for less cost. As he makes this substitution, the marginal product of capital declines and the marginal product of labour increases. With market determined r and w, the entrepreneur will continue the substitution until Equation 2 is established.

If the input markets are monopsonistic, changes in the volume of employment cause corresponding changes in the input prices. In this case, entrepreneur must consider marginal expense of input (MEI) rather than its market price when making employment decisions. An additional unit adds its marginal product to output but it does not add to total cost; instead, it adds its marginal expense MEI because input supply curve is positively sloped. Suppose the capital labour ration in production is such that

$$\frac{MP_K}{MEI_K} > \frac{MP_L}{MEI_L} \qquad ...Equation - 3$$

It implies that at the prevailing input combination, an entrepreneur can obtain a greater increase of output per additional Rupees of cost by employing capital rather than labour. Consequently, he can maintain the same output with the reduction of cost by substituting capital for labour. As the employment of capital expands and that of labour declines, the marginal product of capital declines and that of labour increases and the marginal expense of capital input rises and that of labour declines. Thus the entrepreneur can reduce cost so long as the inequality in Equation 3 prevails, he will substitute capital for labour until

$$\frac{MP_K}{MEI_K} = \frac{MP_L}{MEI_L} \qquad ...Equation - 4$$

It implies that the marginal rate of technical substitution equals the marginal expense of input ratio.

1.3 Monopsonistic exploitation

Monopsonistic exploitation is shown in Figure 3. If there is a perfect competition in both the commodity and input market, demand and supply curves of input intersect at point A. Each unit of input will receive the market value of its marginal product. If there is monopolistic competition in the commodity market but perfect competition in the input market, equilibrium will be attained at point B. The difference between wage rates corresponding to the points A and B (OR-OM=RM) is the monopolistic exploitation of the input. Because of monopolistic exploitation, fewer units of the input are employed and the unit price of each is less.

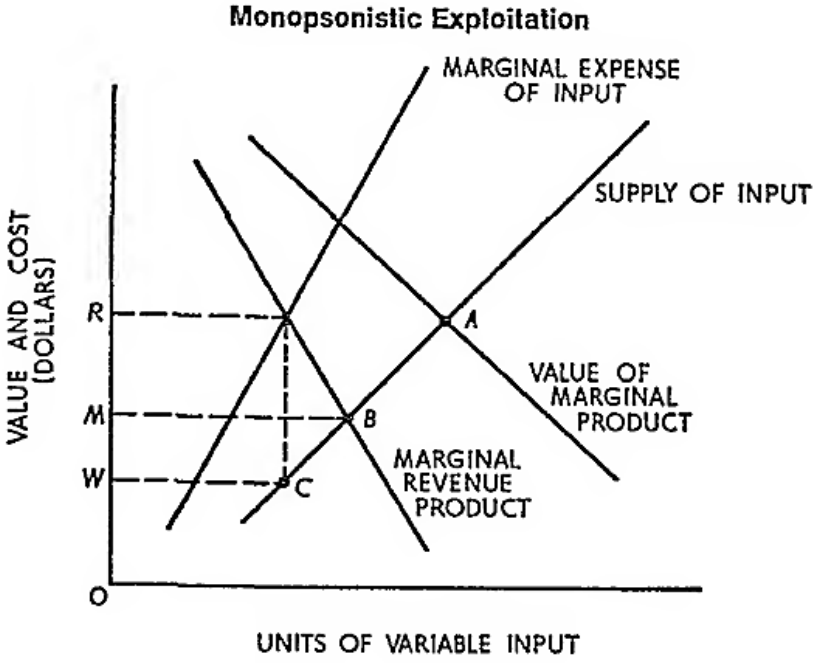

Figure 3

Assume that there is monopoly in the commodity market and monopsony in the input market, i.e. the case of **bilatera monopoly**, equilibrium will be at point C.

Monopsonistic exploitation is represented by the difference between points A and C, (OR-OW=RW). The portion RM is attributable to monopoly in the commodity market, it is not because of monopsony in the input market. The additional portion MW is because of monopsony. The existence of the differential MW is caused by the fact that each unit of input contributes OM to total receipts but receives only OW in return. Thus, the main feature of monopsonistic exploitation is that each unit of input does not receive an amount equal to its contribution to the total receipts.

1.4 Monopsony and the economic effects of labour union

The issue of monopsonistic exploitation brings the economic effects of labour union in the labour market. Consider a labour market where labour supply is positively sloped. If the workers in this market are unionised, the union bargaining representative can make the effective supply of labour curve a horizontal line at any wage rate until it reaches the existing supply curve. Thus, the marginal expense of input is same as the supply price of labour over the horizontal stretch of the union supply curve. It means the union representative can fix a wage rate which guarantee the availability of workers at this wage rate.

Assume that the labour market is perfectly competitive and unorganized. The situation is depicted in **PANEL a** of Figure 4, where D_L and S_L are the demand and supply curves of labour respectively. The market equilibrium wage rate is $O\bar{W}$ and $O\bar{Q}$ units of labour are employed. Each individual firm (**PANEL b** of Figure 4) accordingly $O\bar{q}$ units. Suppose the labour market is unionised. If the union does not attempt to raise wages the situation might remain as it is.

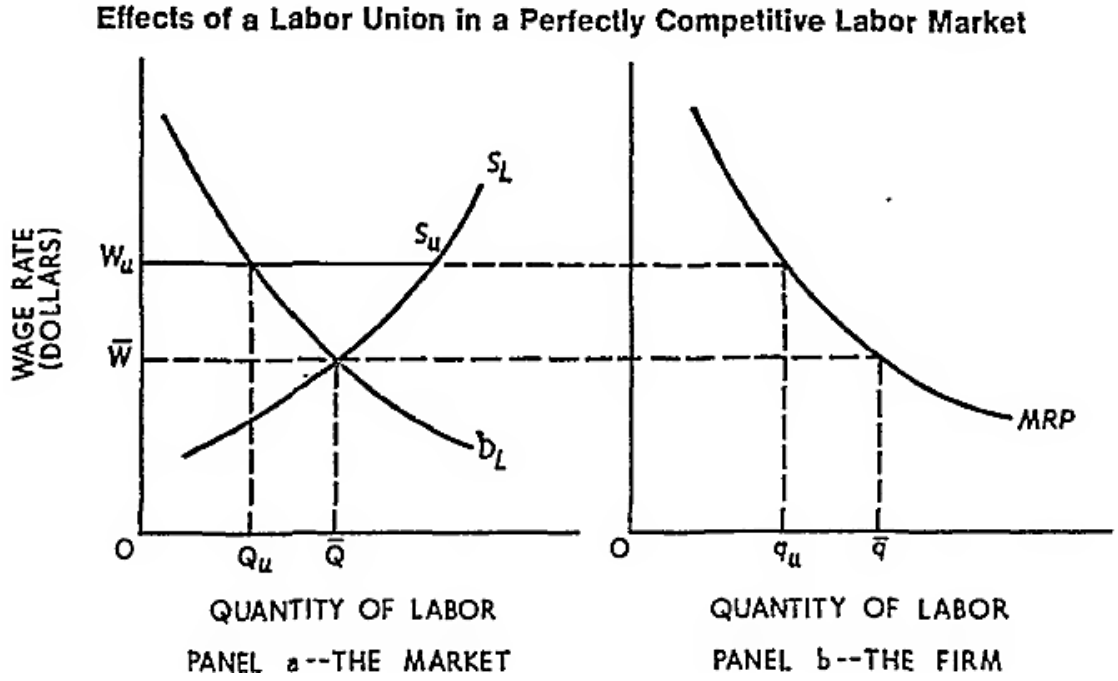

Figure 4

Suppose the union sets OW_u as the wage rate. It means the union supply of labour

curve becomes $W_u S_u S_L$. OQ_u units of labour are employed, each firm taking Oq_u units. The result is a rise in wage and a decline in employment. In perfectly competitive input markets, union can do this.

This does not mean that union cannot benefit its members. If the demand for labour is inelastic, an increase in the wage rate will result in an increase in total wages paid to the workers, even though the number of workers employed is less.

If the union can somehow equitably divide the proceeds of OQ_u employed workers among the $O\bar{Q}$ potential workers all will benefit. Such a division is easy to achieve. Suppose $OQ_u = \frac{1}{2}O\bar{Q}$ and that a 40-hour week characterises the market. Then OQ_u units of labour can be distributed by having $O\bar{Q}$ units work a 20 hour week. If the demand for labour is elastic, total wage receipts will decline and the union cannot compensate the $Q_u\bar{Q}$ workers who are employed because of the increase in wage rates. In monopsonistic markets, union must benefit their members if they employ rational policies. Consider the monopsony labour market represented by Figure 5.

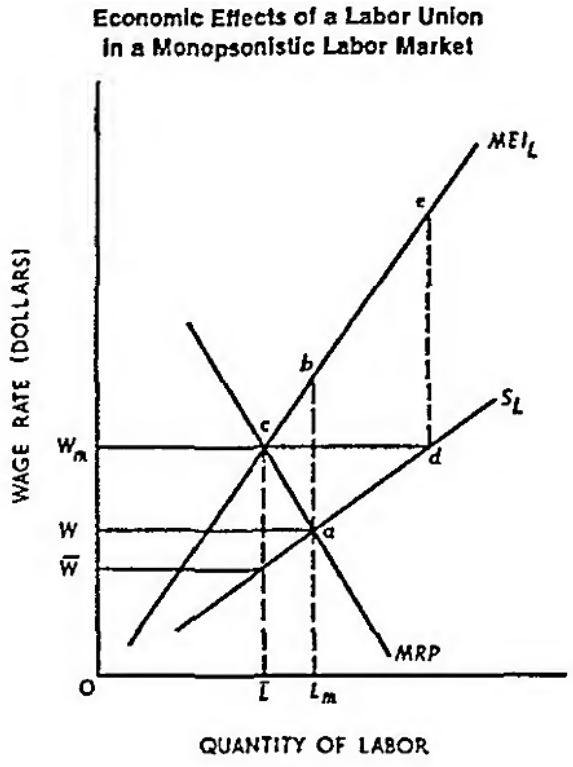

Figure 5

If the labour force is not organised, equilibrium is attained at point c, where marginal revenue product equals the marginal expense of input. The equilibrium wage is $O\bar{W}$, and the equilibrium employment is $O\bar{L}$. Now suppose the workers establish a union that bargains collectively with the monopsonist. If the union wants to achieve maximum employment for its members, it establishes the supply of labour curve $W_a S_L$. The associated marginal expense of input curve accordingly becomes $W_{ab}MEI_L$, Marginal revenue product equals the marginal expense of input at point a. OL_m units of labour are therefore, employed at the wage OW. Consequently, the union can achieve a small increase in wages

accompanied by an increase in the number of workers employed. Each unit of labour receives its contribution to the firms total receipts. The exploitation uniquely attributable to monopsony is eliminated.

Suppose the union decides to maintain the initial level of employment $O\bar{L}$. It accordingly establishes the supply curve $W_m dS_L$. The corresponding marginal expense of input curve is $W_m deMEI_L$. Marginal revenue product equals the marginal expense of input at point c, Hence equilibrium employment is $O\bar{L}$ and wage is OW_m. This wage rate is the maximum attainable without a reduction in employment below the pre-union level.At the wage OW_m, the union can achieve a substantial wage increase without affecting employment. Again the unique portion of monopsonistic exploitation is removed.

We have considered only two extreme cases. The union can select intermediate policies, lead to increase in both employment and the wage rate. The union can harm its member only if the demand for labour is elastic and it sets the supply of labour curve so that the equilibrium wage exceeds OW_m. But even then the unique portion of monopsonistic exploitation would be eliminated. Thus labour unions can eliminate the portion of total monopsonistic exploitation that is uniquely attributable to monopsony in the labour market, however, the portion attributable to monopoly can in no way be eliminated by trade union activity.