Quadrant II - Notes

Paper Code: ECC101

Module Name: Cost minimising equilibrium conditions

Module No: 43

Cost minimising equilibrium conditions

Assumptions:

1. The goal of the firm is profit maximisation- that is, the maximisation of the difference π = R - C where -

n =profits

R =revenue

C =cost

2. The price of output is given, P x.

3. The prices of factors are given: w is the given wage rate, r is the given price of capital services (rental price of machinery).

Cost minimising equilibrium

The problem facing the firm is that of a constrained profit maximisation i.e., maximise profit **π**, for a given level of output. For example, a contractor wants to build a bridge (X is given) with the maximum profit, then-

Max **π** = R-C

π = $\bar{P}_x\bar{X}$ - C

Therefore maximisation of **π** is achieved if cost C is minimised, given that X and Px are given constants by assumption.

The entrepreneur wants to produce a given output (for example, a bridge, a building, or X tons of a commodity) with the minimum cost outlay. Then the question is with which factor combination the entrepreneur will try to produce the given level of output. To produce a given level of output, the entrepreneur will choose the combination of factors which minimizes his cost of production, for only in this way he will be maximizing his profits. Thus a producer will try to produce a given level of output with least-cost combination of factors. This least-cost combination of factors will be optimum for him.

This can be explained the help of diagram.

An isoquant represents the various factor combinations which can yield specified levels of output Fig. 1. On the other hand, a iso-cost line represents the various combinations of labour and capital which can be purchased in given expenditure outlay, given the prices of two factors. The family of iso-cost line represents the various levels of total cost outlay, given the prices of two factors (fig 2).

We can find cost minimizing equilibrium by superimposing isoquant curve on iso-cost map, as shown in fig. 3.

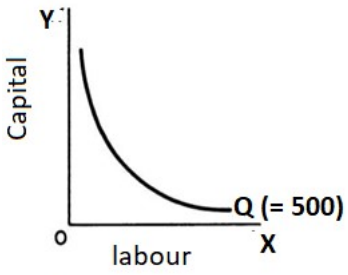


Fig. 1.Isoquant curve

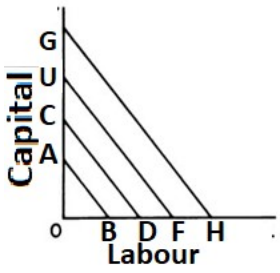


Fig. 2 Iso-cost map

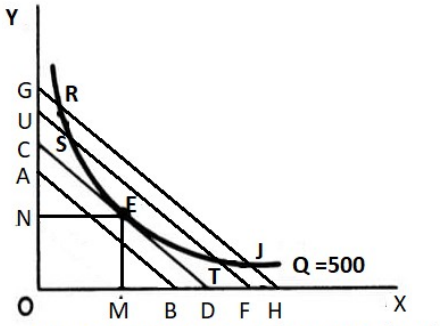


Fig. 3. Minimising cost for a given level of output

Which will be the least-cost combination of factors can be understood from considering Fig. 3. Suppose the entrepreneur has decided to produce 500 units of output which is represented by isoquant Q. The 500 units of output can be produced by any combination of labour and capital such as R., S., E., T. and J lying on the isoquant Q. Now, a glance at the figure will reveal that for producing the given level of output (500 units) the cost will be minimum at point E at which the iso-cost line CD is tangent to the given isoquant. At no other point such as R, S, T. and J, lying on the isoquant Q, the cost is minimum. It will be seen from Fig.3that all other points on isoquant Q, such as R, S, T, J lie on higher iso-cost lines than CD and which will therefore mean greater total cost-outlay for producing the given output. Therefore, the entrepreneur will not choose any of the combinations R, S, T and J. We thus see that factor combination E is the least-cost combination of labour and capital for producing a given output.

The conditions for equilibrium of the firm

The firm is in equilibrium when it minimises its cost for producing specified level of output given the prices of the factors, w and r.

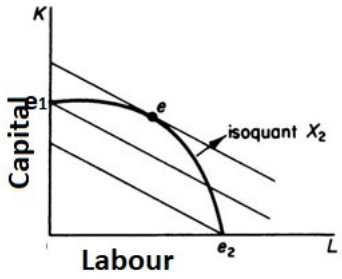
At the point of tangency (E) the slope of the iso-cost line (w/r) is equal to the slope of the isoquant (MPL/MPK). This constitutes the first condition for equilibrium. The second condition is that the

isoquants be convex to the origin. In short the conditions for equilibrium of the firm are:

(a) Slope of isoquant = Slope of iso-cost

$$\frac{w}{r} = \frac{MP_L}{MPk}$$

(b) The isoquants must be convex to the origin. If the isoquant is concave, the point of tangency of the iso-cost and the isoquant curves, does not define an equilibrium position. This is explained with the help of diagram given below -



Output X 2 (depicted by the concave isoquant) can be produced with lower cost at e_2 which lies on a lower isocost curve than e.