Laxmi Narain Dubey College, Motihari

(a constituent unit of B.R.A. Bihar University, Muz.)

NAAC Accredited 'B+'

Department of Economics

Topic: Producer Equilibrium

Paper-I: MICROECONOMICS

Part-I

B.A. (Hons.)

Instructor

Durgesh Mani Tewari

Assistant Professor

dmtewari@gmail.com

PRODUCER EQUILIBRIUM

- ✓ A producer is in equilibrium when he is using the optimum (least cost) combination of the factors, labour, and capital, to achieve a given level of output. There are two situations possible here.
  - ***i. Maximisation of output given the cost***
  - ***ii. Minimisation of cost given the output***

i) Maximisation of output given the cost

- ✓ Given the cost, the producer aims at maximising the output level.
- ✓ In the Figure, the cost or the total outlay is given by the isocost line AB while the isoquants are I_1, I_2, and I_3.
- ✓ The producer is in equilibrium at point E*, employing OL* units of labour and OK* units of capital, where he is able to achieve the maximum output, I_2 with the cost constraint represented by isocost line AB. Levels of output like I_3 are desirable but unattainable with the given outlay.
- ✓ At point E*, the isoquant I_2 is tangential to the isocost line AB. Thus, the slope of the isoquant I_2 is equal to the slope of the isocost line AB.

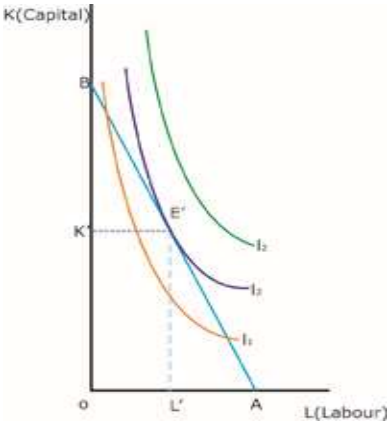
Hence, $$MRTS_{LK} = \frac{P_L}{P_K}$$

But, $$MRTS_{LK} = \frac{\Delta K}{\Delta L} = \frac{MP_L}{MP_K}$$

Thus, $$\frac{P_L}{P_K} = \frac{MP_L}{MP_K}$$

Or, $$\frac{MP_K}{P_K} = \frac{MP_L}{PL}$$

- ✓ The first-order condition for a producer to be in equilibrium is that he employs labour and capital such that the ratio of the marginal products of the factors of production is equal to the ratio of the factors prices.
- ✓ The second-order requires that the isoquant should be convex to the origin as in the figure since marginal rate of technical substitution is diminishing.



ii) Minimisation of cost given the output

- ✓ Given the output, the producer aims at minimising the cost.
- ✓ In the figure, the output is given by the isoquant Q while the isocost lines are AB, CD, UF and GH. They are parallel to each other as the slope of the line, P_L/P_K, the factor price ratio is constant.
- ✓ A lower isocost line implies a lower total outlay.
- ✓ The producer is in equilibrium at point E, employing OM units of labour and ON units of capital, where he is able to achieve the minimum cost represented by isocost line CD. It is the point of the least cost.
- ✓ At point E, the isoquant, Q is tangential to the isocost line, CD. Thus, the slope of the isoquant Q is equal to the slope of the isocost line, CD.

Hence, $$MRTS_{LK} = \frac{P_L}{P_K}$$

But, $$MRTS_{LK} = \frac{\Delta K}{\Delta L} = \frac{MP_L}{MP_K}$$

Thus, $$\frac{P_L}{P_K} = \frac{MP_L}{MP_K}$$

Or, $$\frac{MP_K}{P_K} = \frac{MP_L}{PL}$$

- ✓ The first-order condition for a producer to be in equilibrium is that he employs labour and capital in such a way that the ratio of the marginal products of the factors of production is found equal to the ratio of the factors prices.
- ✓ The second-order requires that the isoquant should be convex to the origin as in the figure since marginal rate of technical substitution is diminishing.

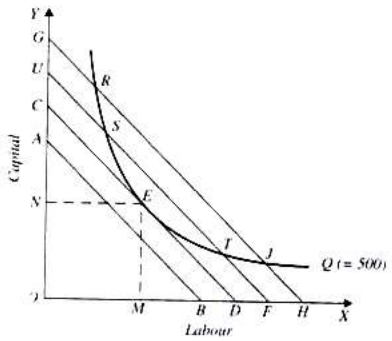


Fig. 18.5. *Minimising Cost for a Given Level of Output*