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Q: What do the slopes of an isoquant line and iso-cost line measure? Describe theoretically and graphically the conditions that are satisfied when a firm has chosen a least cost technique for producing a given output.

Ans:

Slope of an Isoquant..

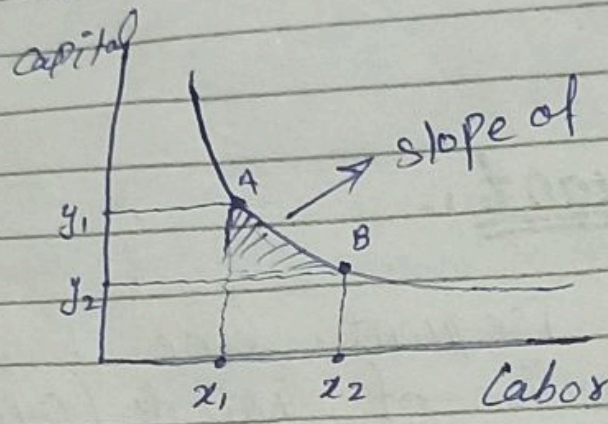
Isoquant line: An Isoquant line shows the different combination of inputs (capital and Labor) that gives the same level of output.

slope of the Isoquant called the Marginal rate of technical substitutions (MRTS). It measures the trade off between two inputs.

Suppose that we are operating at some point (x_1, x_2) and that we considers a giving up a little bit of factor 1 and using just enough of factor 2. They produce the same level of output y. for how much getting factor 2, factor 1 is giving is just the slope of the isoquant.

What MRTS Measure:

(MRTS) measures the trade off between the inputs in production. It measure the rate at which the firm will have a substitute one input for another in order to keep output constant.



$$MRTS = \frac{\Delta x_2}{\Delta x_1} = \frac{MP_L}{MP_K}$$

Slope of an Iso-Cost Line:

An Isocost line is a curve which shows various combinations of inputs that cost the same total amount. The Iso cost curve is a straight line.

Slope of Iso Cost:- It shows which combination of factors produces a given quantity at the lowest total cost.

$$\text{Slope of Isocost line} = \frac{\Delta K}{\Delta L} = -\frac{w}{r}$$

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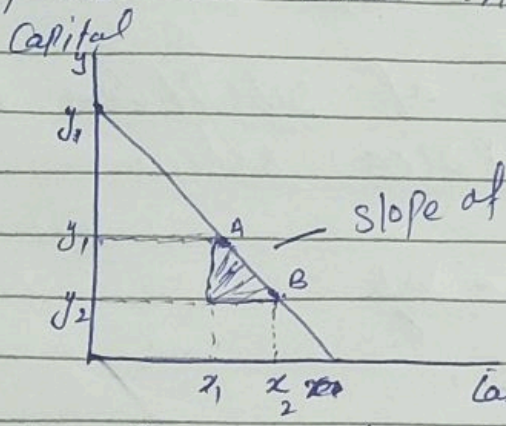
What does the slope of an Isocost measure

Slope of an Isocost line called factor price ratio. It measure the rate at which a firm can trade one input for another while keeping the total cost of production constant. in other words It measure the relative prices of two inputs.

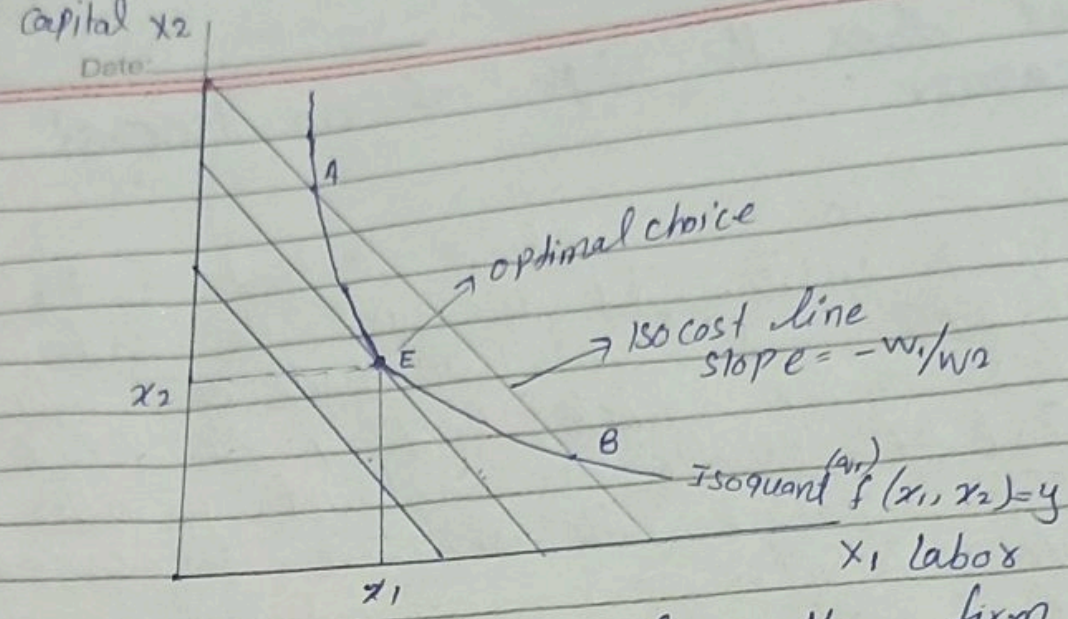
If the slope is steeper, it indicates that one input is relatively more expensive compared to other in terms of cost.



Theoretically and graphically explaination of condition of the firm satisfied at least cost technique.

At least cost technique the firm will find the point on the Isoquant that has the lowest possible Isocost line associated with it.

The satisfied condition for the firm will be where the slope of Isoquant is equal to the slope of Iso cost line.



The satisfied condition for the firm is

Slope of Isoquant = slope of Isocost line.

The technical rate of substitution must equal the factor price ratio.

$$\frac{MP_L}{MP_K} = -\frac{w}{r}$$

At equilibrium $= \frac{MP_L}{MP_K} = \frac{w}{r}$

or

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

When a firm has a chooses a least cost technique for producing a given output, it means they have optimize costs while maintaining the desired level of output.

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These are three iso cost lines. The firm wants to produce q_1 units The cost minimizing point is point E.

If moves to the higher cost line the total expenditure or cost of firm increases. Therefore the firm will stay at the 2nd cost line because it satisfied the ~~tan~~ condition of tangency.