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Topic: Isoquant curve and Properties
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Meaning of Isoquant curve

The term Iso-quant or Iso-product is composed of two words, Iso = equal, quant = quantity or product = output.

Thus it means equal quantity or equal product. Different factors are needed to produce a good. These factors may be substituted for one another.

A given quantity of output may be produced with different combinations of factors. Iso-quant curves are also known as Equal-product or Iso-product or Production Indifference curves. Since it is an extension of Indifference curve analysis from the theory of consumption to the theory of production.

Thus, an Iso-product or Iso-quant curve is that curve which shows the different combinations of two factors yielding the same total product. Like, indifference curves, Iso- quant curves also slope downward from left to right. The slope of an Iso-quant curve expresses the marginal rate of technical substitution (MRTS).

Definitions:

"The Iso-product curves show the different combinations of two resources with which a firm can produce equal amount of product." - **Bilas**

"Iso-product curve shows the different input combinations that will produce a given output." -**Samuelson**

Assumptions:

The main assumptions of Iso-quant curves are as follows:

1. Two Factors of Production:
Only two factors are used to produce a commodity**.**

2. Divisible Factor:
Factors of production can be divided into small parts**.**

3. Constant Technique:

Technique of production is constant or is known before hand.

4. Possibility of Technical Substitution:
The substitution between the two factors is technically possible. That is, production function is of 'variable proportion' type rather than fixed proportion.

5. Efficient Combinations:
Under the given technique, factors of production can be used with maximum efficiency.

The Properties of an Isoquant Curve:

Property 1: An isoquant curve slopes downward, or is negatively sloped. This means that the same level of production only occurs when increasing units of input are offset with lesser units of another input factor. This property falls in line with the principal of the Marginal Rate of Technical Substitution (MRTS). As an example, the same level of output could be achieved by a company when capital inputs increase, but labor inputs decrease.

Property 2: An isoquant curve, because of the MRTS effect, is convex to its origin. This indicates that factors of production may be substituted with one another. The increase in one factor, however, must still be used in conjunction with the decrease of another input factor.

Property 3: Isoquant curves cannot be tangent or intersect one another. Curves that intersect are incorrect and produce results that are invalid, as a common factor combination on each of the curves will reveal the same level of output, which is not possible.

Property 4: Isoquant curves in the upper portions of the chart yield higher outputs. This is because, at a higher curve, factors of production are more heavily employed. Either more capital or more labor input factors result in a greater level of production.

Property 5: An isoquant curve should not touch the X or Y axis on the graph. If it does, the rate of technical substitution is void, as it will indicate that one factor is responsible for producing the given level of output without the involvement of any other input factors.

Property 6: Isoquant curves do not have to be parallel to one another; the rate of technical substitution between factors may have variations.