

Name of the course :- MA <sup>ECONOMICS</sup> Part I & BA <sup>ECONOMICS</sup> Honours Part I  
Paper :- I

Topic :- Nature of costs

Cost functions are derived functions. They are derived from the production function, which describes the available efficient methods of production at any one time.

In what manner cost changes as output changes? A firm is interested in cost behaviour because it wants to choose that combination of inputs which is the cheapest.

What is "cost" in micro economics? An economist's view of cost is different from that of a business accountant. The two views are respectively called "Economic cost" and the "Accounting cost".

### ECONOMIC COST

How is economic cost different from the accounting cost? To know this first it is necessary to understand the difference between 'explicit cost' and 'implicit cost'.

Explicit cost is actual money expenditure incurred on the inputs. Actual purchase of raw materials, payment of wages & salaries, rent, interest, etc.

Implicit cost is estimated cost of inputs provided by the owners. These are not recorded in the business accounts because there is no monetary flow associated with these. Some examples are the estimated salary of the owners, estimated interest on the funds provided by the owners, estimated rental of the land, building, etc. of the owners used for production.

Accounting cost consists only of explicit cost. Economic cost consists both of explicit and implicit cost.  
Opportunity cost

Economic cost is also called "opportunity cost". It is defined as the cost associated with the opportunities that are foregone when a firm's resources are not put to their highest value use. It is called the opportunity cost because the firm foregoes the opportunities of earning in the next best alternative uses, when it chooses to incur its resources in the present use.

Implicit costs are straightway opportunity costs. Explicit costs are the opportunity costs because by putting the money in its present use, the producer foregoes the opportunity of putting the same in the next best use.

Economic cost is classified into fixed cost and variable cost. The cost that does not vary with output is 'Fixed cost (FC)'. The cost that varies with output is 'variable cost (VC)'.

Fixed cost must be incurred even if output is zero. A firm can avoid FC only by going out of business. VC are zero if the output is zero.

Short run vs. Long run: Economic theory distinguishes between short run costs and long run costs. The distinction between FC and VC is relevant only in the short run because the time constraint does not allow change in some inputs. In the long run all costs are variable and there is no fixed cost.

Symbolically we may write the long-run cost function as:-  
Short-run cost function as  $C = f(X, T, P_f)$  and the  
long-run cost function as  $C = f(X, T, P_f, \bar{K})$

where  $C$  = total cost,  $X$  = output,  $T$  = Technology  
 $P_f$  = prices of factors,  $K$  = fixed factors

### SHORT RUN COSTS

short-run total cost ~~is sum~~ <sup>(TC)</sup> is the sum of total fixed cost (TFC) and total variable cost (TVC).  
$$TC = TFC + TVC$$

The fixed costs include:

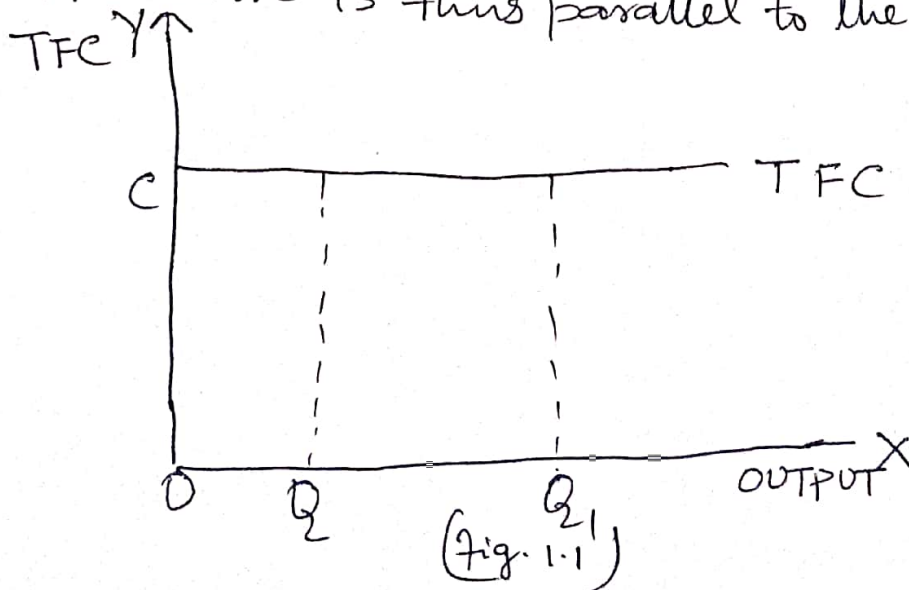
- (a) salaries of administrative staff
- (b) depreciation (wear and tear) of machinery
- (c) expenses for building depreciation & repair
- (d) expenses for land maintenance and depreciation (if any)
- (e) normal profit (lump sum including a percentage return on fixed capital and allowance for risk).

The variable costs include:

- (a) the raw materials
- (b) the cost of direct labour
- (c) the running expenses of fixed capital, such as fuel, ordinary repairs and routine maintenance.

### Total Fixed cost (TFC)

TFC remains the same at every level of output. TFC curve is thus parallel to the X-axis (fig. 1.1)



# Total variable cost (TVC)

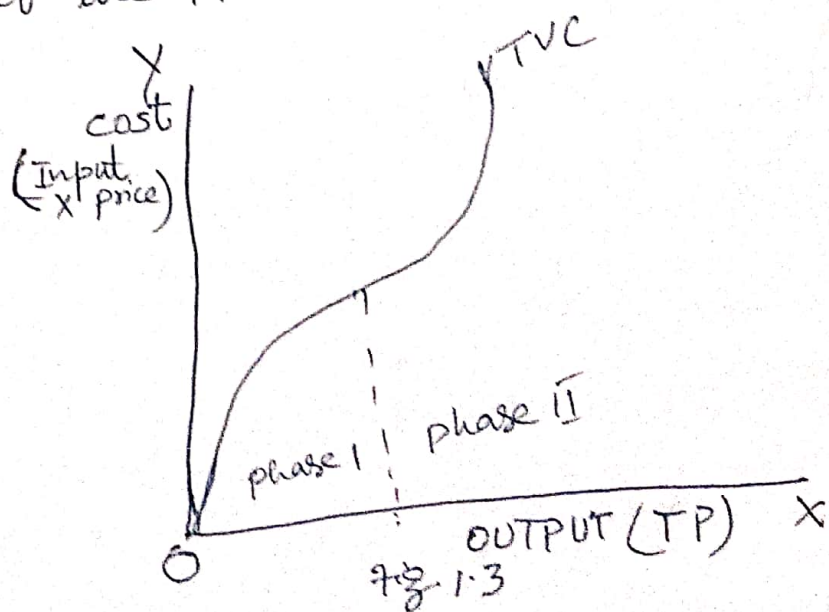
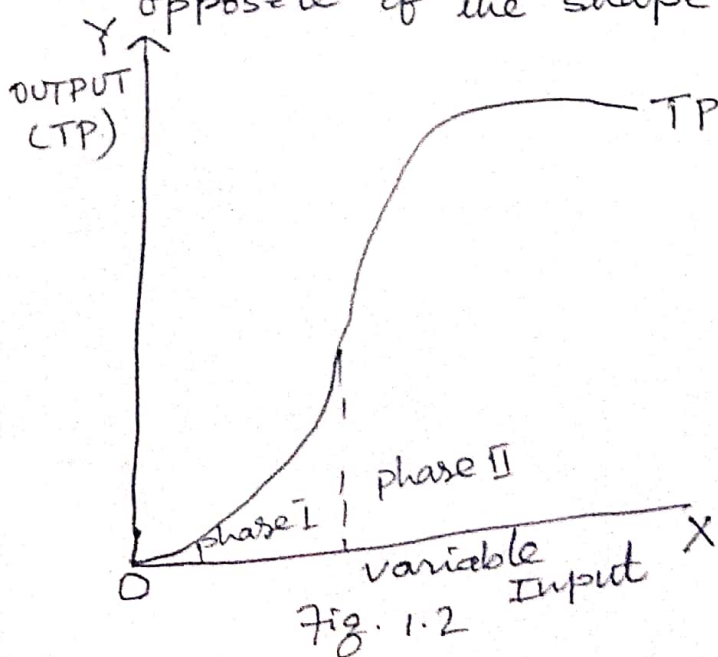
The behaviour of TVC is based on the behaviour of Total Product (TP) of the variable input as visualised in the law of variable proportions. The two phases that matter in the behaviour of TP are:

- ① TP increases at an increasing rate vis-a-vis increase in the variable input.
- ② TP increases at a decreasing rate vis-a-vis increase in the variable input.

The corresponding two phases in the behaviour of TVC are:

- (i) TVC (= Input  $\times$  price) increases at a decreasing rate vis-a-vis increase in total output.
- (ii) TVC increases at an increasing rate vis-a-vis increase in total output.

Graphically, the TP curve (fig. 1.2) is first convex and then concave, while the TVC curve (fig. 1.3) is first concave and then convex. In case of the TP curve, the input is shown on the X-axis and the output on the Y-axis. ~~This makes the shape.~~ In case of TVC curve, output is shown on the X-axis and the cost of inputs on the Y-axis. This makes the shape of the TVC curve opposite of the shape of the TP curve.



The total variable cost in the traditional theory of the firm has broadly an inverse-s shape which reflects the law of variable proportions. According to this law, at the initial stages of production with a given plant, as more of the variable factor(s) is employed, its productivity increases and the average variable cost falls. This continues till the optimal combination of the fixed and variable factors is reached. Beyond this point as increase quantities of the variable factors declines and the AVC rises. By adding the TFC and TVC we obtain the TC of the firm.

(fig 1.4).

From the total cost curves we obtain average-cost curves. The average fixed cost is found by dividing TFC by the level of output.

$$AFC = \frac{TFC}{X}$$

Graphically the AFC is a rectangular hyperbola, showing at all its points the same magnitude, that is the level of TFC (1.5).

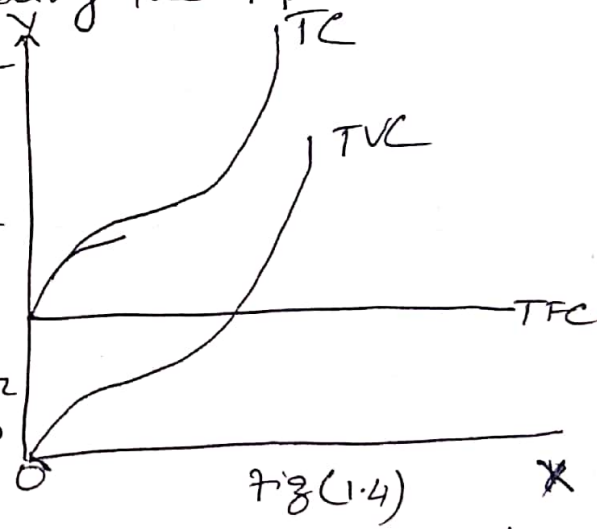


Fig (1.4)

The average variable cost is similarly obtained by dividing the TVC with the corresponding level of output

$$AVC = \frac{TVC}{X}$$

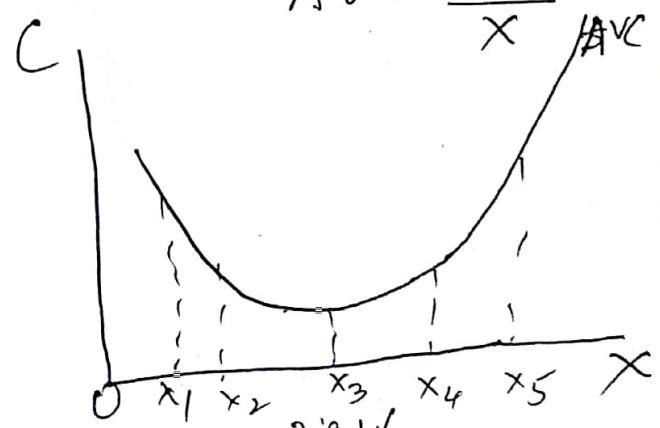


Fig 1.6

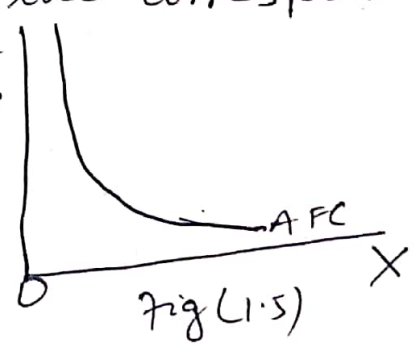


Fig (1.5)

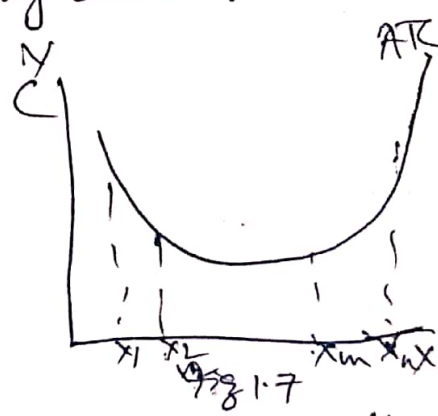


Fig 1.7

The ATC is obtained by dividing the TC by the corresponding level of output,  $ATC = \frac{TC}{X} = \frac{TFC + TVC}{X}$   
 $AC = AFC + AVC$

The Marginal cost (MC) is defined as the change in TC which results from a change in output. In other words, MC is the addition to the total cost from producing one more unit of output. It equals:

$$MC_n = TVC_n - TVC_{n-1}$$

$$MC_n = TC_n - TC_{n-1}$$

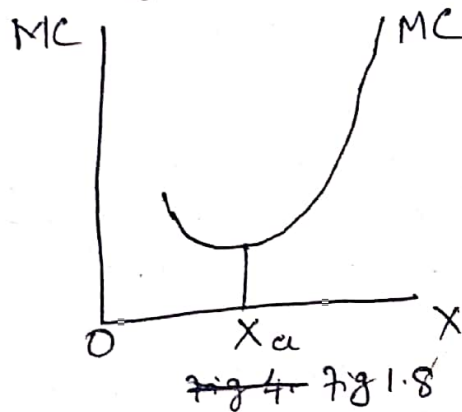
Mathematically the marginal cost is the first derivative of the TC function.


Denoting TC by C and output by X we have

$$C = f(X)$$

$$MC = \frac{\partial C}{\partial X}$$

Graphically MC is the slope of the TC curve



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