

21.02.2019 * Law of variable ^{proportion} / Returns to a factor

Short run pdtⁿ fu. :

It ^{measures} the change in o/p when 1 ^{more unit} of the variable factor is employed. (just 1 var. factor)

Possible only in short run.

Short run \rightarrow both fixed & var. factors are employed \Rightarrow for more pdtⁿ employ more of 1 var. factor.

• 3 concepts

- 1) TP - total ^{product} pdtⁿ / total physical product (TPP) ^{total pdt. produced when a var. factor is employed}
- 2) MP ^{change in} (addⁿ) to TP when 1 more unit of commodity is ^{produced}
- 3) AP - $\frac{TP}{\text{variable factor employed}}$ (per unit var. factor).

when $MP^+ \Rightarrow TP \uparrow$

$MP^0 \Rightarrow TP \text{ max.}$

$MP^- \Rightarrow TP \downarrow$

$TP_L = (K, L)$. $K \Rightarrow$ capital is constant.

TP_L : total pdt. produced by labours.

* 3 stages :

1) \uparrow return

$\rightarrow MP^+ \Rightarrow TP \uparrow$ (get more return / o/p than the factor employed)

2) \downarrow / diminishing return

$\rightarrow MP^0 \Rightarrow TP \text{ max.}$ (increase at a decreasing rate)

3) $-ve$ return

$\rightarrow MP^- \Rightarrow TP \downarrow$

(get less return than the factor employed)

(Focus only on some particular area. \Rightarrow pdt. / result)

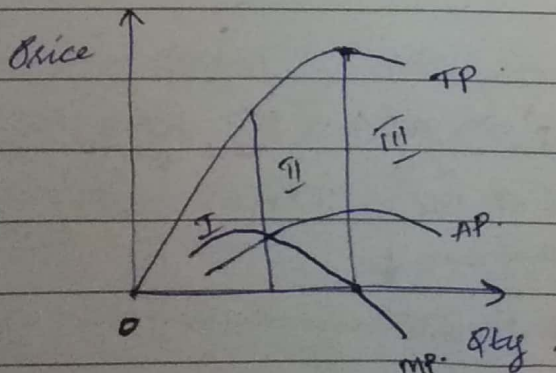
Specify formulae when doing numericals.

	No. of units of labourers	Total product (TP)	MP	AP
I ↑ return	1	8	8	8
	2	18	10	9
	3	30	12	10
	4	40	10	10
II ↓ return	5	45	5	9
	6	48	3	8
	7	49	1	7
	8	49 - max.	0	$\frac{49}{8} = 6.125$
III -ve return	9	45	-4	5
	10	40	-5	4

22.02.2019

* Assumptions:

- (i) All units of variable factors employed are equally efficient.
- (ii) Technology is constant.
- (iii) Proportion of i/p's can be varied.



Stage I : It is the stage of \uparrow ing return. During this stage, MP increases, TP increases at an increasing rate. First stage continues till $MP = AP$. Here AP is also increasing.

Stage II : This ^{is the} stage of diminishing return / decreasing return. During this stage, MP decreases & TP increases at a decreasing rate. 2nd stage ends when $MP = 0$. When $MP = 0$, TP is at its maximum.

Stage III : Stage of -ve return. Here MP becomes -ve, TP starts declining.

• Relation b/w MP & TP :

$$MP^+ \Rightarrow TP \uparrow$$

$$MP^0 \Rightarrow TP^{\text{max}}$$

$$MP^- \Rightarrow TP \downarrow$$

• MP, AP relation :

$$\text{When } MP > AP : AP \uparrow$$

$$MP = AP : AP^{\text{max}}$$

$$\text{When } MP < AP : AP \downarrow$$

Stage b/w 1st & 2nd is best when chosen rationally. ^{doesn't reach optimal level.}

IIIrd stage - decreasing TP, AP, MP \Rightarrow very poor productivity

e.g. promotional activity - more focus, lesser focus on building the product.

* Reasons for different returns:

When prodⁿ. process move towards optimal combination, efficiency of factors \uparrow & producer gets increasing return, \uparrow return operates because of 2 reasons:

- 1) In the beginning there'll be large qty. of fixed factors & less of variable factor. When more & more unit of variable factor is combined with fixed factor, efficiency of fixed factor \uparrow s.
- 2) When the no. of units of var. factor \uparrow s, there is a possibility of division of labour & specialization. This gives \uparrow ing return.

\downarrow ing return:

Once prodⁿ. attain max.^m efficiency with optimal combination of \uparrow p, further \uparrow in the variable factor will add less to the total prod. The main reason of diminishing return is that factors ~~there~~ are not perfect substitutes i.e. \uparrow in 1 var. factor alone cannot compensate for other factors.

-ve return:

-ve return / -ve MP is the result of employment of the var. factor to a meaningless extent that result in the \downarrow of TP. The stage of -ve return can also be ~~seen~~ viewed as a stage of \uparrow ing cost i.e. employment of variable factor leads to additional

PAGE NO: 25.

DATE:

cost without additional benefits.