

Classical production function and three stages of production

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What is Production Function?

- ◆ Refers to input – output relationship in the production process.
- ◆ The basic relationship between the factors of production and the output is referred to as a Production Function.
- ◆ The firm's production function for a particular good (q) shows the maximum amount of the good that can be produced using alternative combinations of capital (K) and labor (L)
- ◆ $Q=f(k,l)$

Important facts about production function

- ◊ A Production function is expressed with reference to a particular period of time.
- ◊ It expresses a physical relation because both inputs and outputs are expressed in physical terms.
- ◊ Production function describes a purely technological relation because what can be produced from a given amount of inputs depends upon the state of technology

TYPES OF PRODUCTION FUNCTION

- ◆ **Short run production function**- Time when one input (say, capital) remains constant and an addition to output can be obtained only by using more labour.
- ◆ **Long run production function**= Both inputs become variable

Short Run vs. Long Run

- ◊ Short Run = Plant size is fixed, labor is variable
- ◊ Short Run = To increase production firms increase Labor but can't expand their plant

Firms produce in the short run

Law of Variable Proportions

Law of Variable Proportions (Short run Law of Production)

Assumptions:

- ◊ One factor (say, L) is variable and the other factor (say, K) is constant
- ◊ Labour is homogeneous
- ◊ Technology remains constant
- ◊ Input prices are given

Total Product Function (TP)

- ◆ Represents the relationship between the number of workers (L) and the TOTAL number of units of output produced (Q) holding all other factors of production (the plant size) constant.
- ◆ For a coffee shop, output would be measured in “number of coffee cups a day”
- ◆ For a steel mill, output would be measured in “tons of steel produced a day”

Marginal Product (MP)

- ◆ The additional output that can be produced by adding one more worker while holding plant size constant.

Average Product (AP)

- ◆ Represents the amount of output produced by each worker on average.

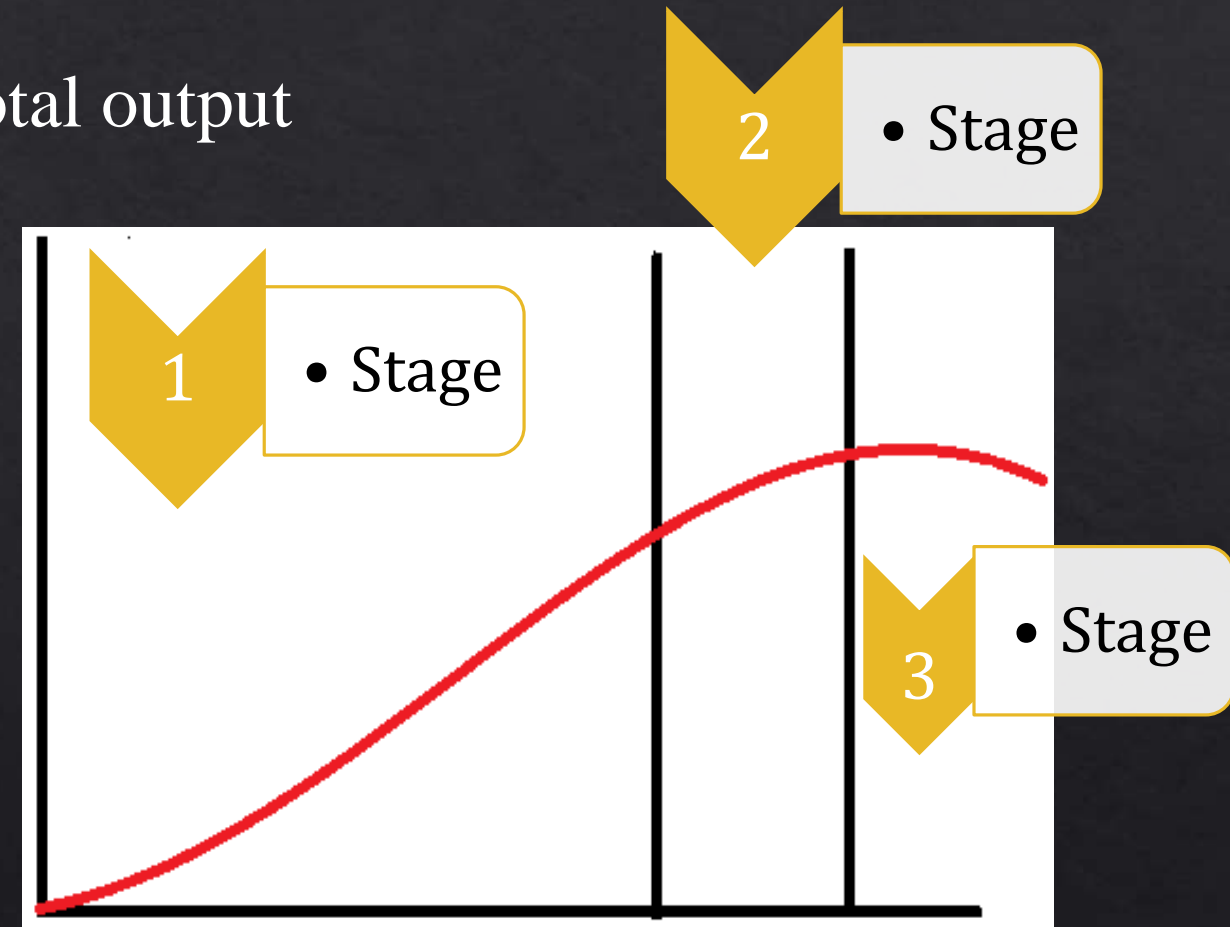
(Or)

- ◆ Output per worker .

Three stages of production

- ◆ Stage 1: average product rising.
- ◆ Stage 2: average product declining (but marginal product positive).
- ◆ Stage 3: marginal product is negative, or total product is declining.

Total output



RELATIONSHIP BETWEEN DIFFERENT PRODUCTS

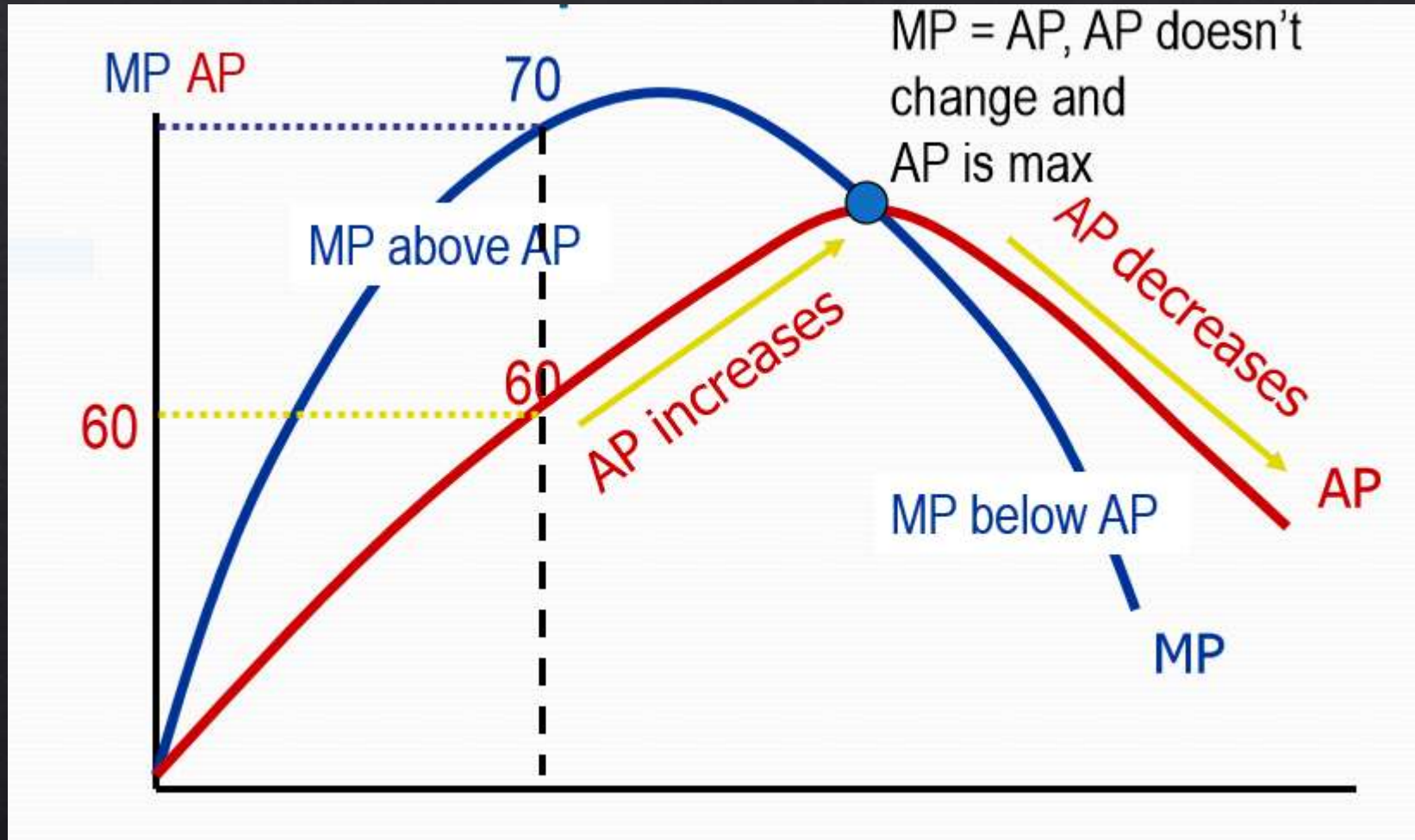
Between AP and MP

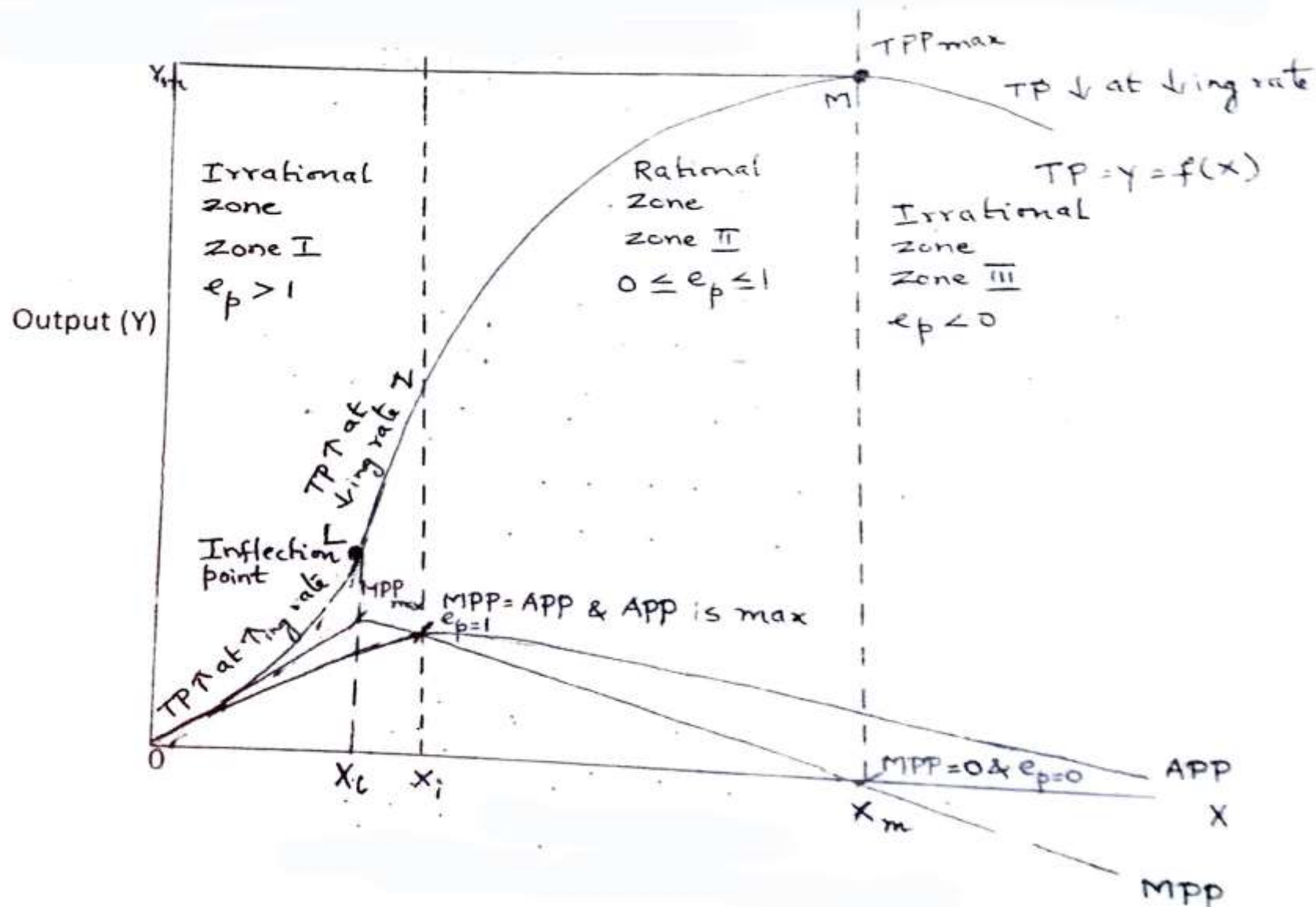
- ◇ WHEN $MP > AP$, AP INCREASES
- ◇ WHEN $MP < AP$, AP DECREASES
- ◇ WHEN $MP = AP$, AP IS MAXIMUM

Between TP and MP

- ◇ WHEN TP INCREASES AT INCREASING RATE, MP INCREASES
- ◇ WHEN TP INCREASES AT DECREASING RATE, MP DECREASES
- ◇ WHEN TP IS MAXIMUM, MP IS 0
- ◇ WHEN TP DECREASES, MP IS NEGATIVE

Relationship between MP and AP





Three Regions Of Production Function

Conclusion

- ◆ Production function is simply a catalogue of production possibilities.
- ◆ It is an engineering concept and since money prices do not appear in it, it merely depicts the physical relationship between the output and inputs.

Thanks...!