

# PRINCIPLES OF ECONOMICS

## Lecture 20 PRODUCTION THEORY

September, 2015



# TOPICS TO BE DISCUSSED

## 1. Production Theory:

- Production function- meaning
- Concepts of production: total, average and marginal product

# THEORY OF PRODUCTION

- Production is a process of converting inputs into outputs with an objective of maximizing profit
- **Production function:** Functional relationship between inputs and outputs
- Function showing the highest output that a firm can produce for every specified combination of inputs

## Production Function

**Production Function**

$$Q = f(L, K, N)$$

# PRODUCTION CONCEPTS

- **Total Production-** Total quantity/output produced with total inputs
- **Average product** Output per unit of an input
  - AP of labor = Output/labor unit =  $Q/L$
- **Marginal product** Addition to total output produced as one additional unit of input is used/employed
  - MP of labor = Change in output/change in labor units  
 $MP = \Delta Q / \Delta L$

# SHORT RUN VS LONG RUN PRODUCTION

- **Short run**    Period of time in which quantities of one or more production factors cannot be increased or decreased
  - **Fixed input:**    Production factor that cannot be varied
- **Long run**        Period of time sufficient to increase or decrease the supply of inputs

# PRODUCTION CONCEPTS IN SHORT RUN

Production with One Variable Input				
Amount of Labor ( $L$ )	Amount of Capital ( $K$ )	Total Output ( $Q$ )	Average Product ( $Q/L$ )	Marginal Product ( $\Delta Q/\Delta L$ )
0	10	0	—	—
1	10	10	10	10
2	10	30	15	20
3	10	60	20	30
4	10	80	20	20
5	10	95	19	15
6	10	108	18	13
7	10	112	16	4
8	10	112	14	0
9	10	108	12	-4
10	10	100	10	-8

# TP, MP & AP IN SHORT RUN

TP	MP	AP
Increases at an increasing rate, then at diminishing rate	Increases, reaches its maximum & then declines till $MR = AP$	Increases & reaches its maximum
Continues to increase at a diminishing rate till it reaches maximum	Is diminishing and becomes equal to zero	Starts diminishing
Starts declining	Becomes negative	Continues to decline, will never be zero

**Thank You 😊**