Introduction to Economics

Production and Business Organization

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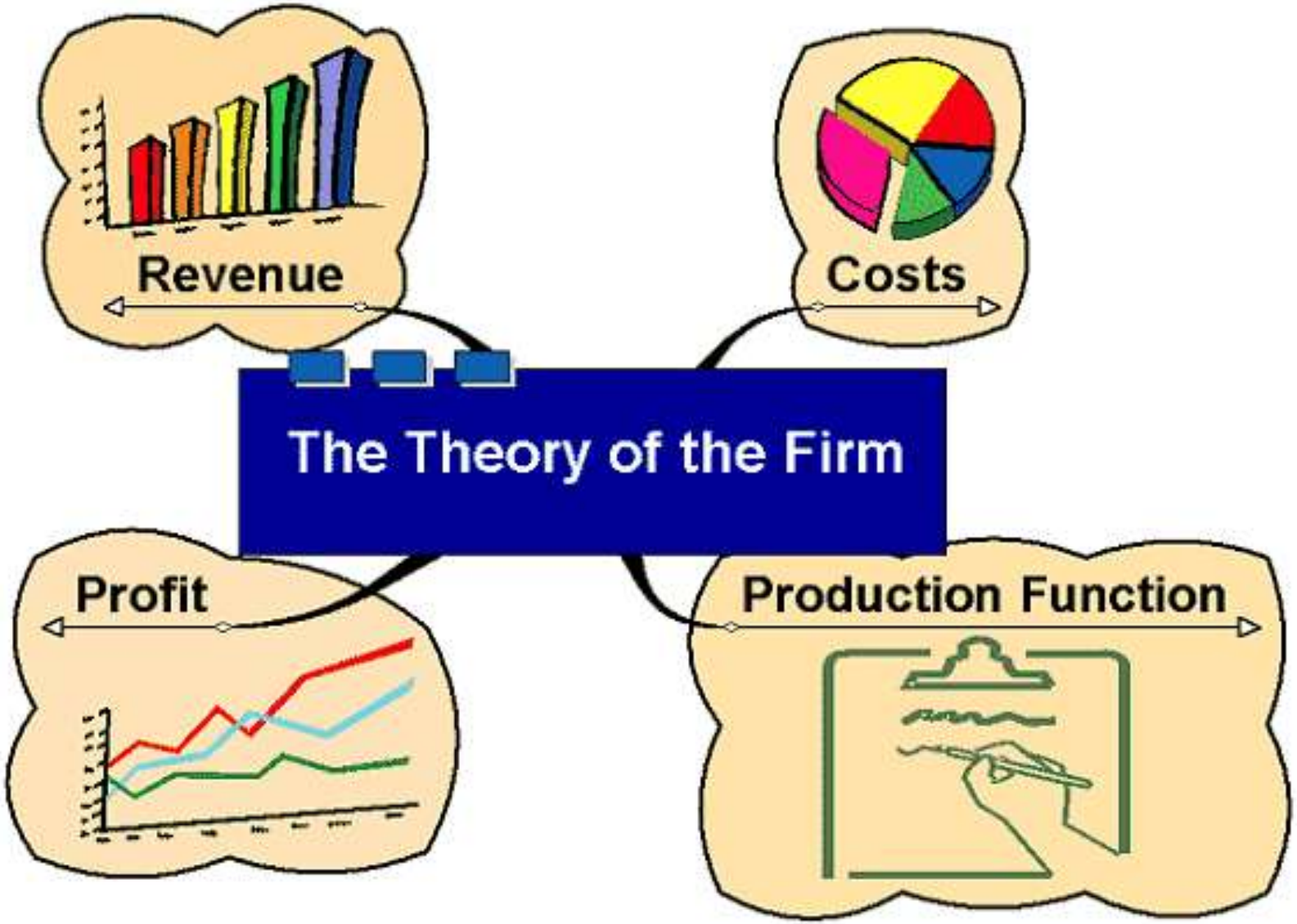
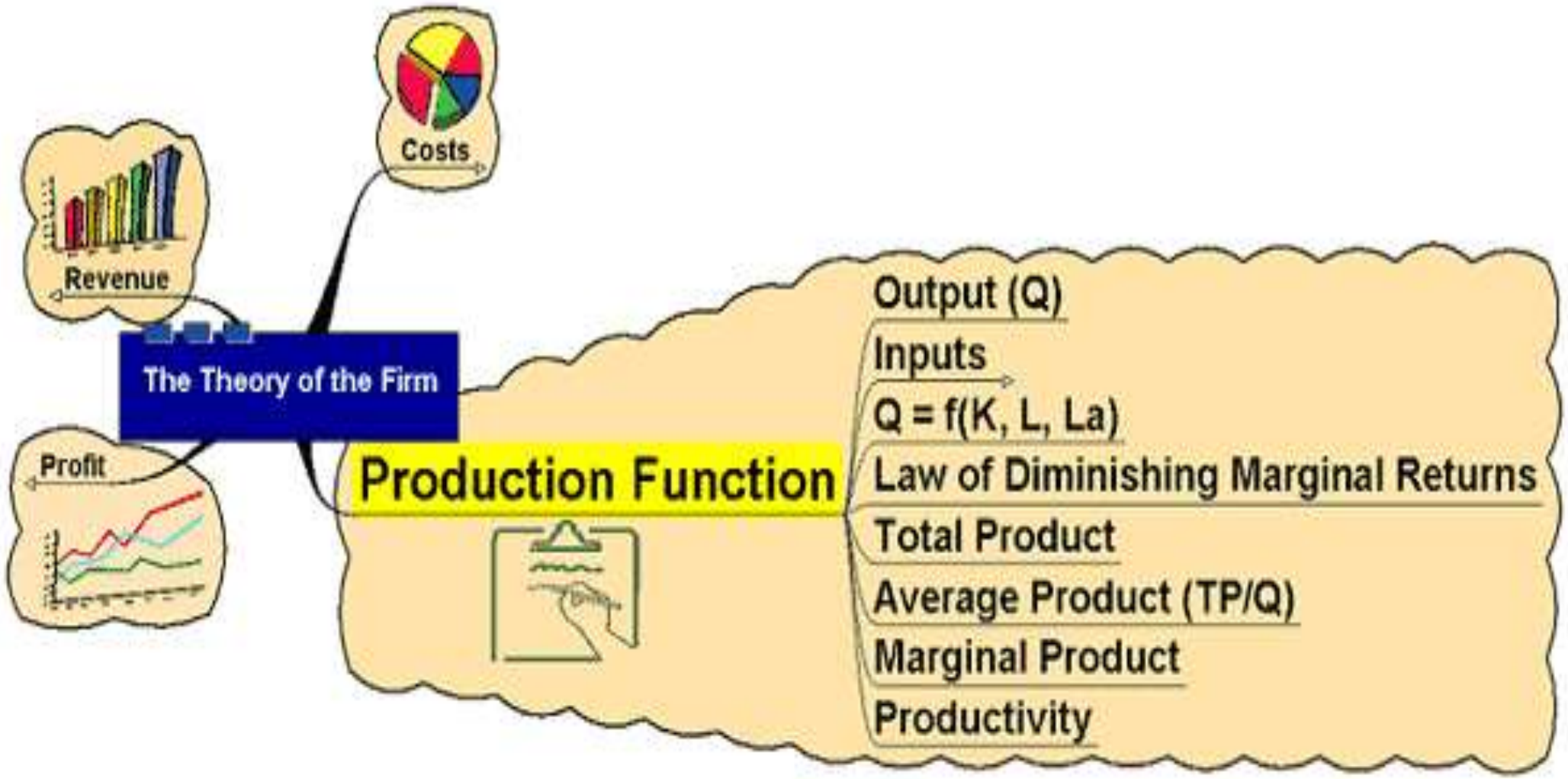

Revenue
Costs
The Theory of the Firm
Profit
Production Function


Costs
Revenue
The Theory of the Firm
Profit
Production Function
Output (Q)
Inputs
Q = f(K, L, La)
Law of Diminishing Marginal Returns
Total Product
Average Product (TP/Q)
Marginal Product
Productivity

The Production Function

- The **production function** specifies the maximum output that can be produced with a given quantity of inputs. It is defined for a given state of engineering and technical knowledge.

$$Q = f(\overline{K}, L)$$

- The **marginal product** of an input is the extra output produced by 1 additional unit of that input while other inputs are held constant.

$$MP = \frac{\Delta TP}{\Delta L}$$

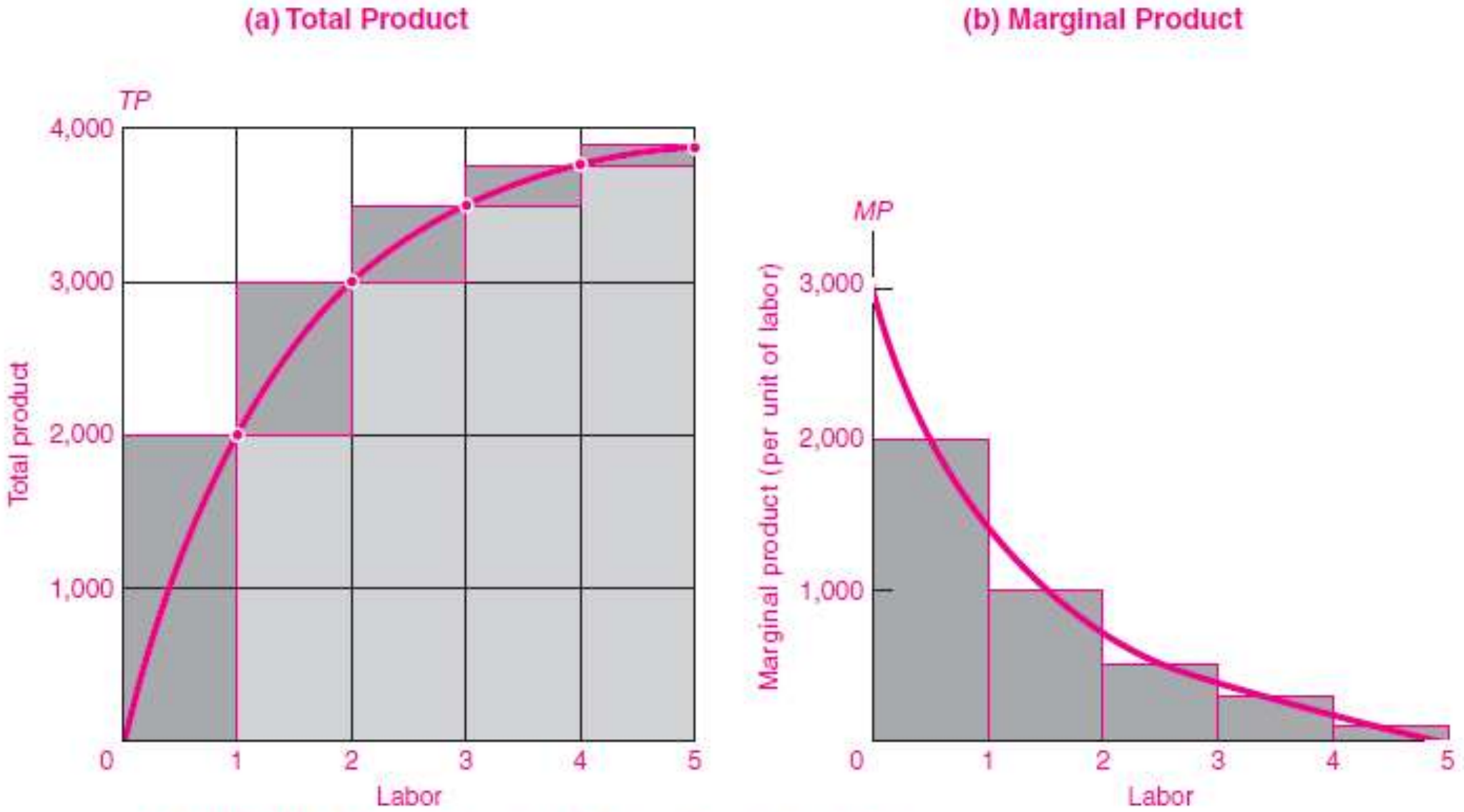


FIGURE 6-1. Marginal Product Is Derived from Total Product

The Law of Diminishing Returns

- Under the **law of diminishing returns,** a firm will get less and less extra output when it adds additional units of an input while holding other inputs fixed. In other words, the marginal product of each unit of input will decline as the amount of that input increases, holding all other inputs constant.

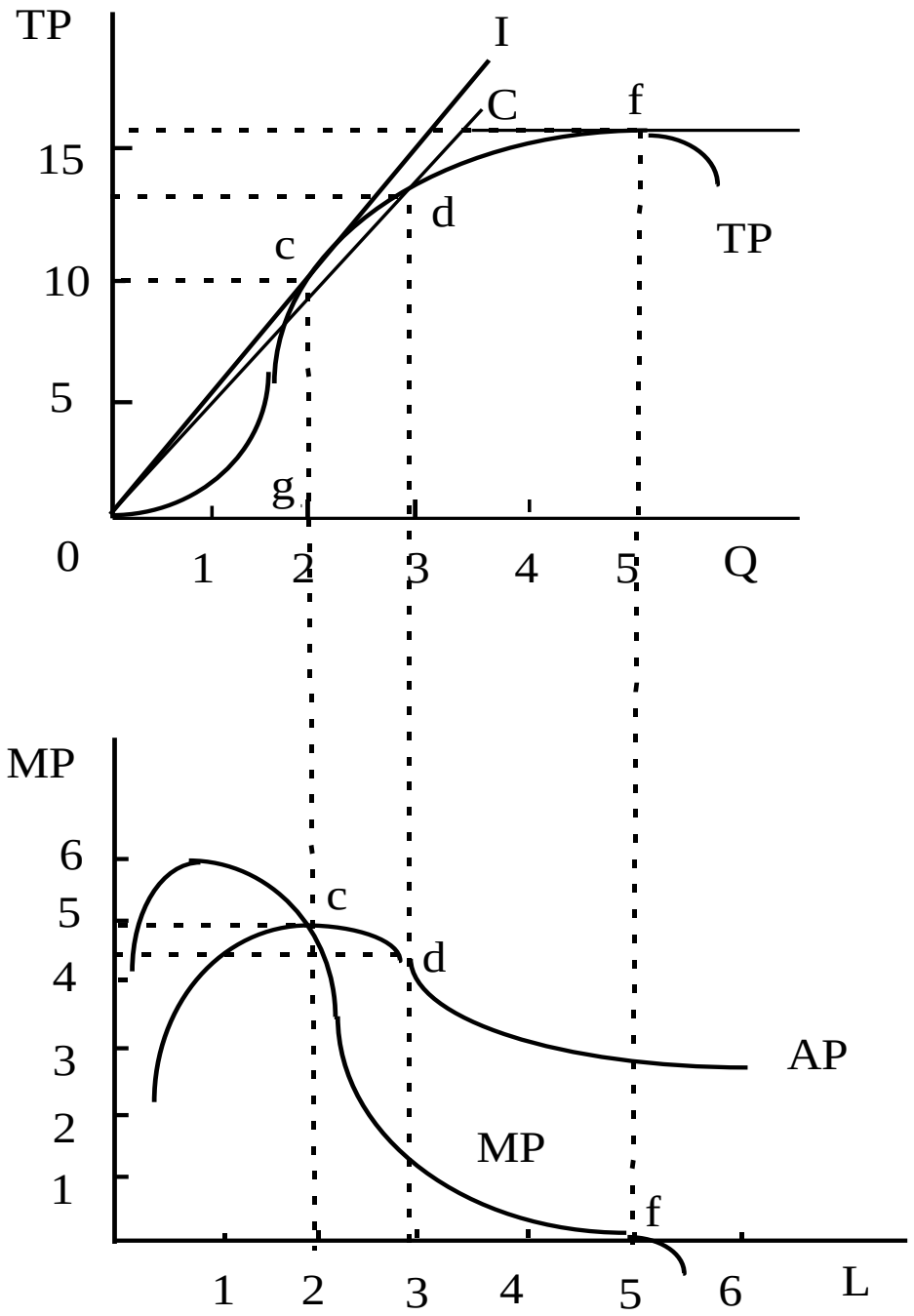
Analysis of Production Function: Short Run

- In the short run at least one factor fixed in supply but all other factors capable of being changed.
- Reflects ways in which firms respond to changes in output (demand)
- Can increase or decrease output using more or less of some factors but some likely to be easier to change than others.
- Increase in total capacity only possible in the long run.

Average Product

- The final concept is the **average product,** which equals total output divided by total units of input.

(1) Units of labor input	(2) Total product	(3) Marginal product	(4) Average product
0	0		
		2,000	
1	2,000		2,000
		1,000	
2	3,000		1,500
		500	
3	3,500		1,167
		300	
4	3,800		950
		100	
5	3,900		780


TP
I
C
f
15
d
c
TP
10
5
g
0
1
2
3
4
5
Q
MP
6
5
c
4
d
AP
3
2
MP
1
f
1
2
3
4
5
6
L

RETURNS TO SCALE

- What would happen to wheat production if land, labor, water, and other inputs were increased by the same proportion?
- Or what would happen to the production of tractors if the quantities of labor, computers, robots, steel, and factory space were all doubled?

- **Constant returns to scale** denote a case where a change in all inputs leads to a proportional change in output.
- **Increasing returns to scale** (also called **economies of scale**) arise when an increase in all inputs leads to a more-than-proportional increase in the level of output.
- **Decreasing returns to scale** occur when a balanced increase of all inputs leads to a less-than proportional increase in total output.

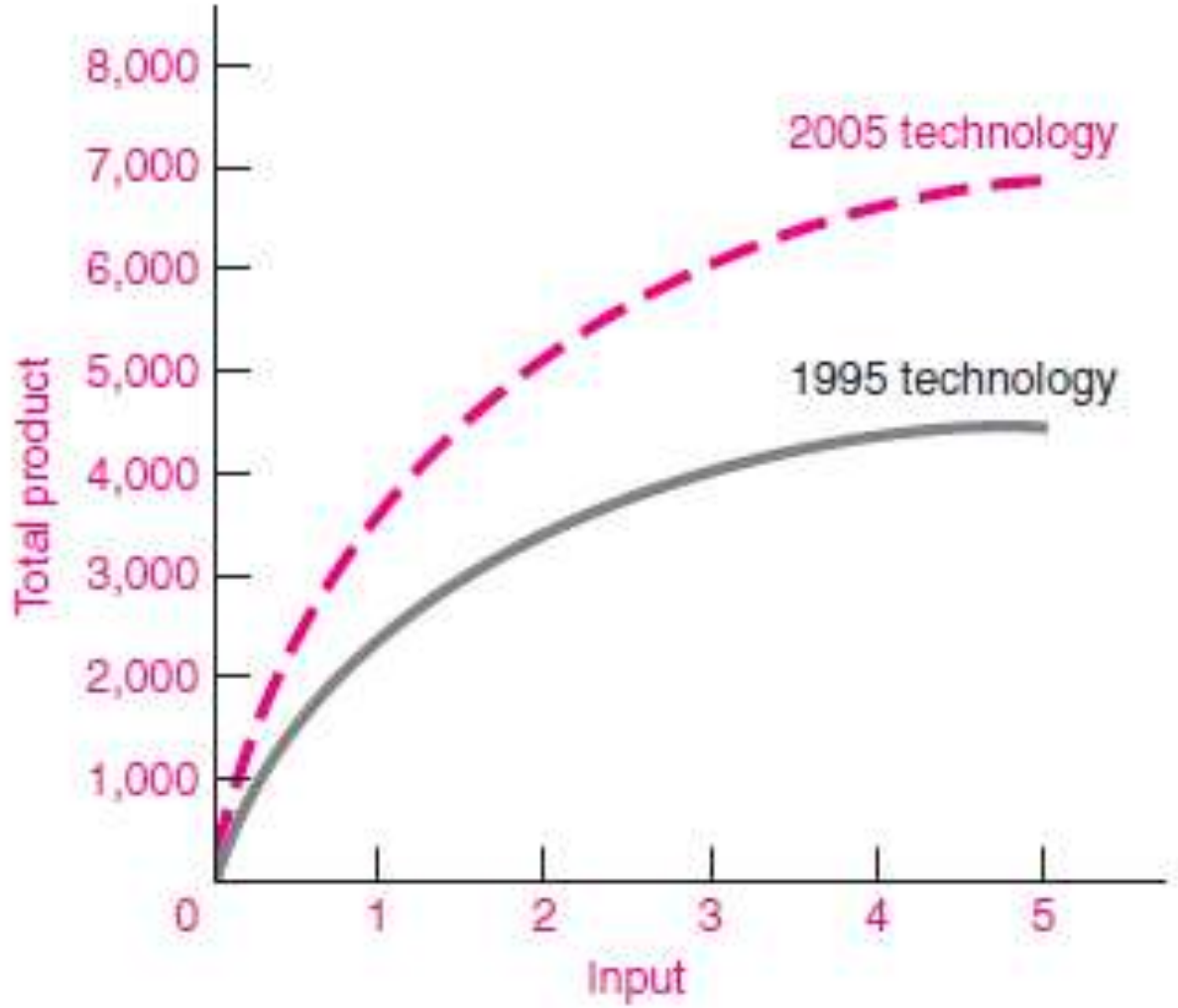
Analysing the Production Function: Long Run

- The long run is defined as the period of time taken to vary all factors of production
  - By doing this, the firm is able to increase its **total capacity** – not just short term capacity
  - Associated with a change in the **scale of production**
  - The period of time varies according to the firm and the industry
  - In electricity supply, the time taken to build new capacity could be many years; for a market stall holder, the 'long run' could be as little as a few weeks or months!

- *Efficient production requires time as well as conventional inputs like labor. We therefore distinguish between two different time periods in production and cost analysis. The short run is the period of time in which only some inputs, the variable inputs, can be adjusted. In the short run, fixed factors, such as plant and equipment, cannot be fully modified or adjusted. The long run is the period in which all factors employed by the firm, including capital, can be changed.*

TECHNOLOGICAL CHANGE

- We distinguish *process innovation,* which occurs when new engineering knowledge improves production techniques for existing products, from *product innovation,* whereby new or improved products are introduced in the marketplace. For example, a process innovation allows fi rms to produce more output with the same inputs or to produce the same output with fewer inputs. In other words, a process innovation is equivalent to a shift in the production function.



Technological Change Shifts Production Function Upward

BUSINESS ORGANIZATIONS

- *Business firms are specialized organizations devoted to managing the process of production.*

- ***Economies of specialization-*** Efficient production requires specialized labor and machinery, coordinated production, and the division of production into many small operations.
- ***Raising resources-*** most funds for production must come from company profits or from money borrowed in financial markets.
- ***Manage and coordinate the production process-*** The manager is the person who organizes production, introduces new ideas, products, or processes, makes the business decisions, and is held accountable for success or failure.

- *Business firms are specialized organizations devoted to managing the process of production. Production is organized in firms because efficiency generally requires large-scale production, the raising of significant financial resources, and careful management and coordination of ongoing activities.*

The three major forms of economic organization

- ***The Individual Proprietorship***
- The classic small businesses. A small store might do a few hundred dollars of business per day and barely provide a minimum wage for the owners' efforts.
- ***The Partnership***
- Any two or more people can get together and form a partnership. Each agrees to provide a fraction of the work and capital and to share a percentage of the profits and losses. Unlimited liabilities; partners are liable without limit for all debts contracted by the partnership.

- ***The Corporation***
- A **corporation** is a form of business organization owned by several individual stockholders. *Limited liability*, whereby each owner's investment and financial exposure in the corporation is strictly limited to a specified amount.
- The ownership of a corporation is determined by the ownership of the company's common stock.
- The shareholders collect dividends in proportion to the fraction of the shares they own, and they elect directors and vote on many important issues.
- The corporation's managers and directors have the legal power to make decisions for the corporation. They decide what to produce and how to produce it.

- *Efficient production often requires large-scale enterprises, which need billions of dollars of invested capital. Corporations, with limited liability and a convenient management structure, can attract large supplies of private capital, produce a variety of related products, and pool investor risks.*

Advantages and Disadvantages of Corporations????