Costs

Production Functions

Laugher Curve

A woman hears from her doctor that she has only half a year to live.

The doctor advises her to marry an economist and to move to South Dakota.

Laugher Curve

"Will this cure my illness?" she asked.

No, but the half year will seem pretty long."

Introduction

- In the supply process, people first offer their factors of production to the market.
- Then the factors are transformed by firms into goods that consumers want.
  - ***Production*** is the name given to that transformation of factors into goods.

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The Role of the Firm

- The ***firm*** is an economic institution that transforms factors of production into consumer goods – it:
  - Organizes factors of production.
  - Produces goods and services.
  - Sells produced goods and services.

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The Role of the Firm

- A ***virtual firm*** only organizes production.
  - Virtual firms subcontract out all work.
  - More and more of the organizational structure of business is being separated from the business.

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The Firm and the Market

- Firms operate within the market, while at the same time —
- Firms replace the market with command and control.

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The Firm and the Market

- How an economy operates depends on:
  - ***Transaction costs*** – costs of undertaking trades through the market, and
  - The rent or command over resources that organizers can appropriate to themselves by organizing the market in a certain way.

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The Firm and the Market

- Firms are the production organizations that translate factors of production into consumer goods.

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Firms Maximize Profit

- ***Profit*** is the difference between total revenue and total cost.

  Profit = total revenue – total cost

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Firms Maximize Profit

- Economists and accountants measure profit differently.
  - Accountants focus on explicit costs and revenue.
  - Economist focus on both explicit and implicit costs and revenue.

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Firms Maximize Profit

- For an economist, ***total cost*** is explicit payments to factors of production plus the opportunity cost of the factors provided by the owners of the firm.

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Firms Maximize Profit

- Economists define ***total revenue*** as the amount a firm receives for selling its good or service plus any increase in the value of the assets owned by firms.

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Firms Maximize Profit

- For economists:

Economic profit =
(explicit and implicit revenue)
– (explicit and implicit cost)

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The Production Process

- The production process can be divided into the long run and the short run.

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The Long Run and the Short Run

- A ***long-run decision*** is a decision in which the firm can choose among all possible production techniques.

The Long Run and the Short Run

- A ***short-run decision*** is one in which the firm is constrained in regard to what production decision it can make.

The Long Run and the Short Run

- The terms long run and short run **do not** necessarily refer to specific periods of time.
- They refer to the degree of flexibility the firm has in changing the level of output.

The Long Run and the Short Run

- In the long run, all inputs are variable.
- In the short run, some inputs are fixed.

Important point!

Production Tables and Production Functions

- A ***production table*** shows the output resulting from various combinations of factors of production or inputs.

Production Tables and Production Functions

- ***Marginal product*** is the additional output that will be forthcoming from an additional worker, other inputs remaining constant.

Production Tables and Production Functions

- ***Average product*** is calculated by dividing total output by the quantity of the output.

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Production Tables and Production Functions

- ***Production function*** – a curve that describes the relationship between the inputs (factors of production) and outputs.

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Production Tables and Production Functions

- The production function tells the maximum amount of output that can be derived from a given number of inputs.

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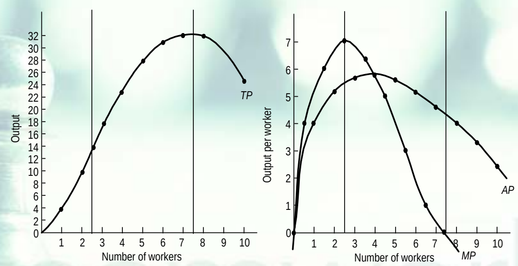
A Production Table

Number of workers	Total output	Marginal product	Average product
0	0		—
1	4	4	4
2	10	6	5
3	17	7	5.7
4	23	6	5.8
5	28	5	5.6
6	31	3	5.2
7	32	1	4.6
8	32	0	4.0
9	30	2	3.3
10	25	5	2.5

A Production Function



(a) Total product (b) Marginal and average product

The Law of Diminishing Marginal Productivity

- Both marginal and average productivities initially increase, but eventually they both decrease.

The Law of Diminishing Marginal Productivity

- This means that initially the production function exhibits increasing marginal productivity.
- Then it exhibits diminishing marginal productivity.
- Finally, it exhibits negative marginal productivity.

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The Law of Diminishing Marginal Productivity

- The most relevant part of the production function is that part exhibiting diminishing marginal productivity.

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The Law of Diminishing Marginal Productivity

- ***Law of diminishing marginal productivity*** – as more and more of a variable input is added to an existing fixed input, after some point the additional output one gets from the additional input will fall.

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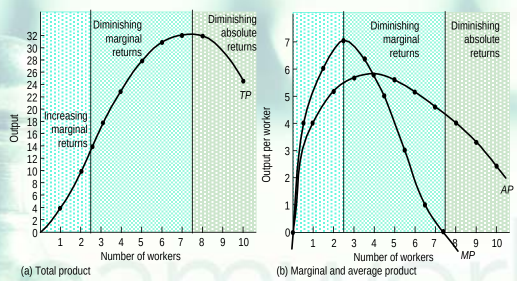
The Law of Diminishing Marginal Productivity

Number of workers	Total output	Marginal product	Average product	
0	0		—	Increasing marginal returns
1	4	4	4	
2	10	6	5	
3	17	7	5.7	Diminishing marginal returns
4	23	6	5.8	
5	28	5	5.6	
6	31	3	5.2	
7	32	1	4.6	
8	32	0	4.0	Diminishing absolute returns
9	30	2	3.3	
10	25	5	2.5	

The Law of Diminishing Marginal Productivity



The Law of Diminishing Marginal Productivity

- This law is also called the ***flower pot law.***
- If it did not hold true, the world's entire food supply could be grown in a single flower pot.