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Perfectly Competitive Markets

Perfect Competition Defined

The Profit Maximization Condition

Equilibrium

- *Supply Curve for the Firm*
- *Market Supply Curve*
- *Producer Surplus*

Perfectly Competitive Markets

A **perfectly competitive market** consists of firms that produce identical products that sell at the same price.

Each firm's volume of output is so small in comparison to the overall market demand that no single firm has an impact on the market price.

Perfectly Competitive Markets - Conditions

(A) Firms produce **undifferentiated products** in the sense that consumers perceive them to be identical

(B) Consumers have **perfect information** about the prices all sellers in the market charge

Perfectly Competitive Markets - Conditions

(C) Each buyer's purchases are so **small** that he/she has an imperceptible effect on market price.

(D) Each seller's sales are so **small** that he/she has an imperceptible effect on market price. Each seller's input purchases are so **small** that he/she perceives no effect on input prices

(E) All firms (*industry participants and new entrants*) have **equal access to resources** (*technology, inputs*).

Implications of Conditions

The Law of One Price: Conditions (A) and (B) imply that there is a single price at which transactions occur.

Price Takers: Conditions (C) and (D) imply that buyers and sellers take the price of the product as given when making their purchase and output decisions.

Free Entry: Condition (E) implies that all firms have identical long run cost functions

Profit Maximization Conditions

- Assuming the firm sells output Q , its economic profit is:

$$\pi(Q) = TR(Q) - TC(Q)$$

- Where
- $TR(Q)$ = Total revenue from selling the quantity $Q \quad \Rightarrow \quad TR(Q) = P \times Q$
- $TC(Q)$ = Total economic cost of producing the quantity Q

Profit Maximization Conditions

- Output Q is the firm's decision variable.
- Marginal Revenue: The rate which TR change with output.

$$MR = (TR(Q))' = (P \times Q)' = P$$

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- The last equality holds because the firm is a price taker and P is constant. Hence, the increase in TR resulting from one unit change in Q is equal to P

Profit Maximization Conditions

- The Marginal Profit satisfies:

$$\begin{aligned}\text{Marginal Profit} &= (TR(Q) - TC(Q))' \\ &= (TR(Q))' - (TC(Q))' \\ &= P - MC\end{aligned}$$

Profit Maximization Conditions

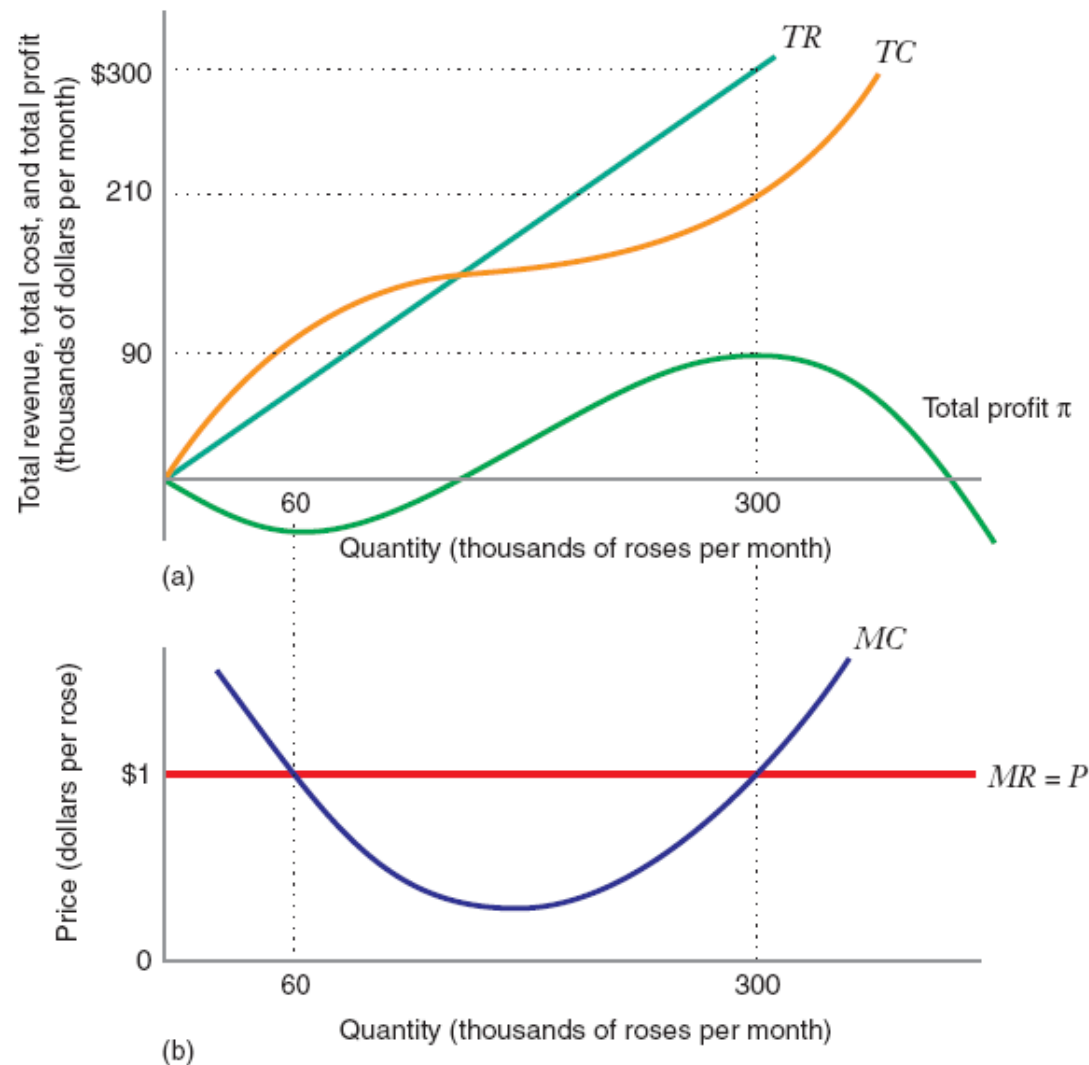
If $P > MC$ then profit rises if output is increased

If $P < MC$ then profit rises if output is decreased.

Therefore, a condition for profit maximization for a price-taking firm is $P = MC$

In addition, MC must be increasing

The Profit Maximization Condition



Positive Profits

The firm will choose to produce a positive output only if:

$$\pi(Q) > \pi(0) \quad \Leftrightarrow \quad P \times Q - TC(Q) > 0$$

Hence,

$$P = P \times Q / Q > TC(Q) / Q = AC(Q)$$

Denote $p_s = \text{Min } AC(Q)$

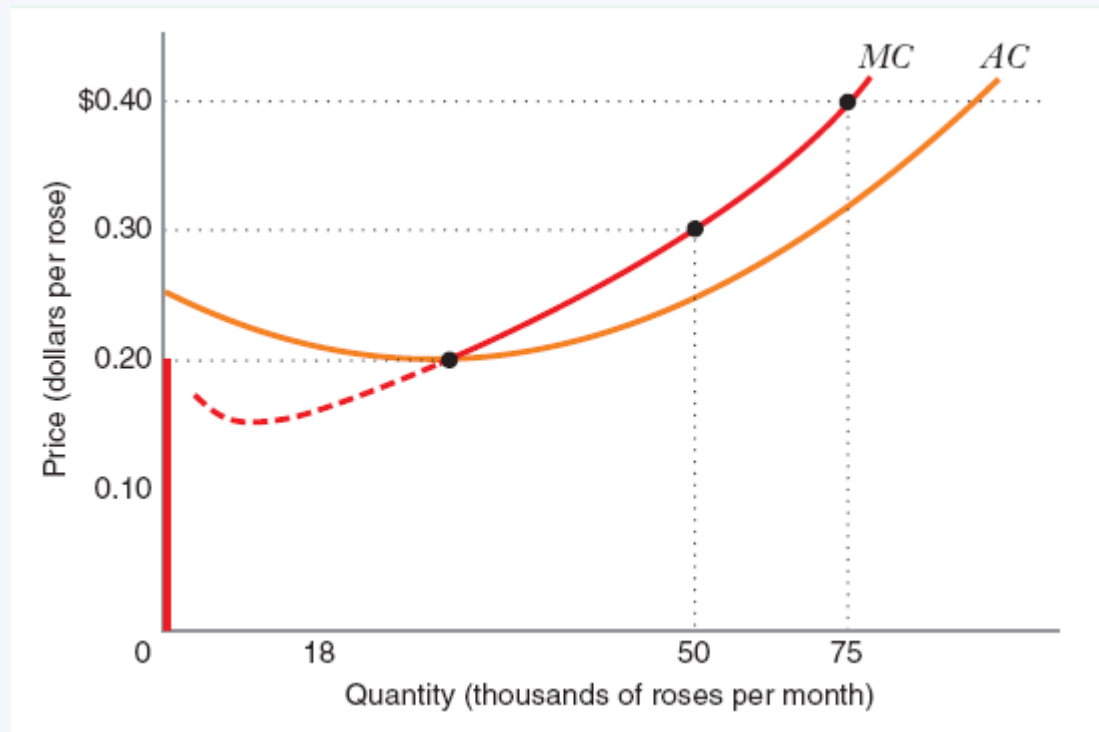
The Supply Function

Therefore, the firm's supply function is defined by:

1. $P=MC$, where MC slopes upward as long as $P \geq P_s$

2. 0, where $P < P_s$

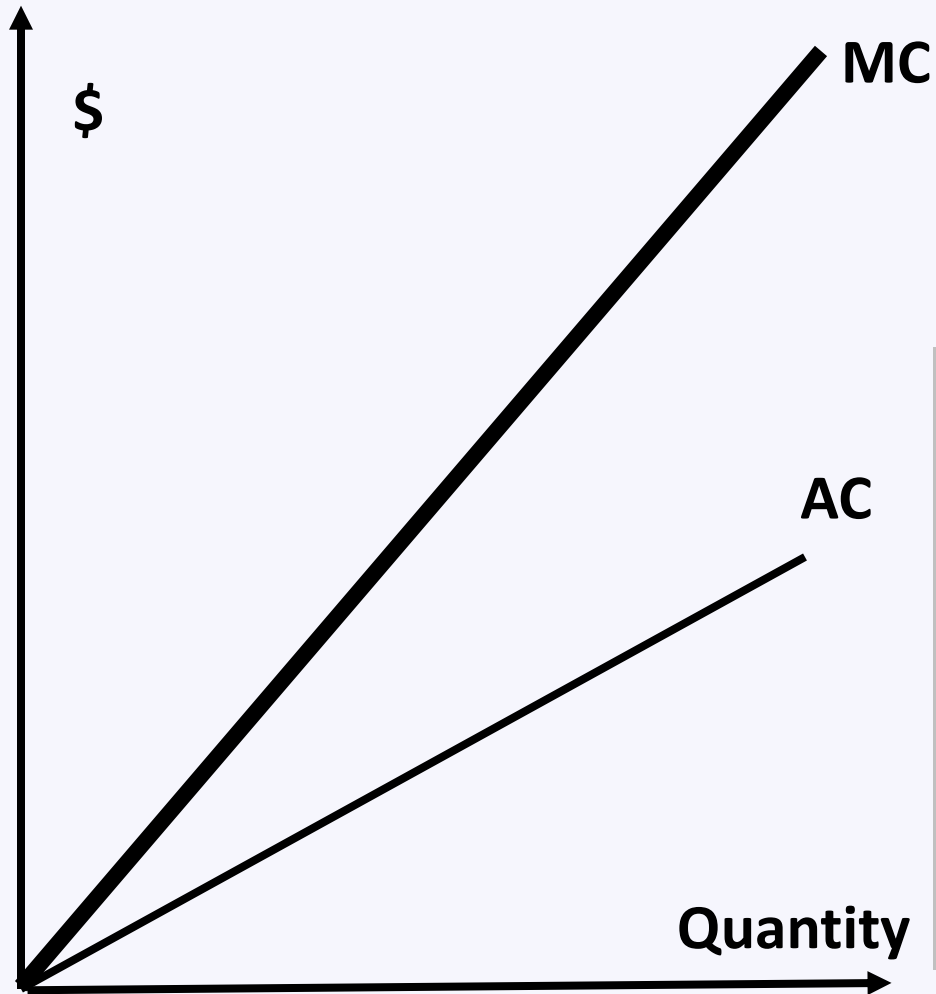
The Supply Function



Here $P_s = 0.20$

$$S(P) = \begin{cases} \text{determined by } MC(Q)=P & \text{when } P \geq 0.2 \\ 0 & \text{when } P < 0.2 \end{cases}$$

Example



$$\begin{aligned}TC(Q) &= Q^2 \\AC(Q) &= Q \\MC(Q) &= 2Q\end{aligned}$$

Here $P_s = 0$ Hence, for all P , the optimal Q must satisfy $P = 2Q$

Therefore, $Q = P/2$ and the supply curve is given by $S(P) = P/2$

Producer Surplus

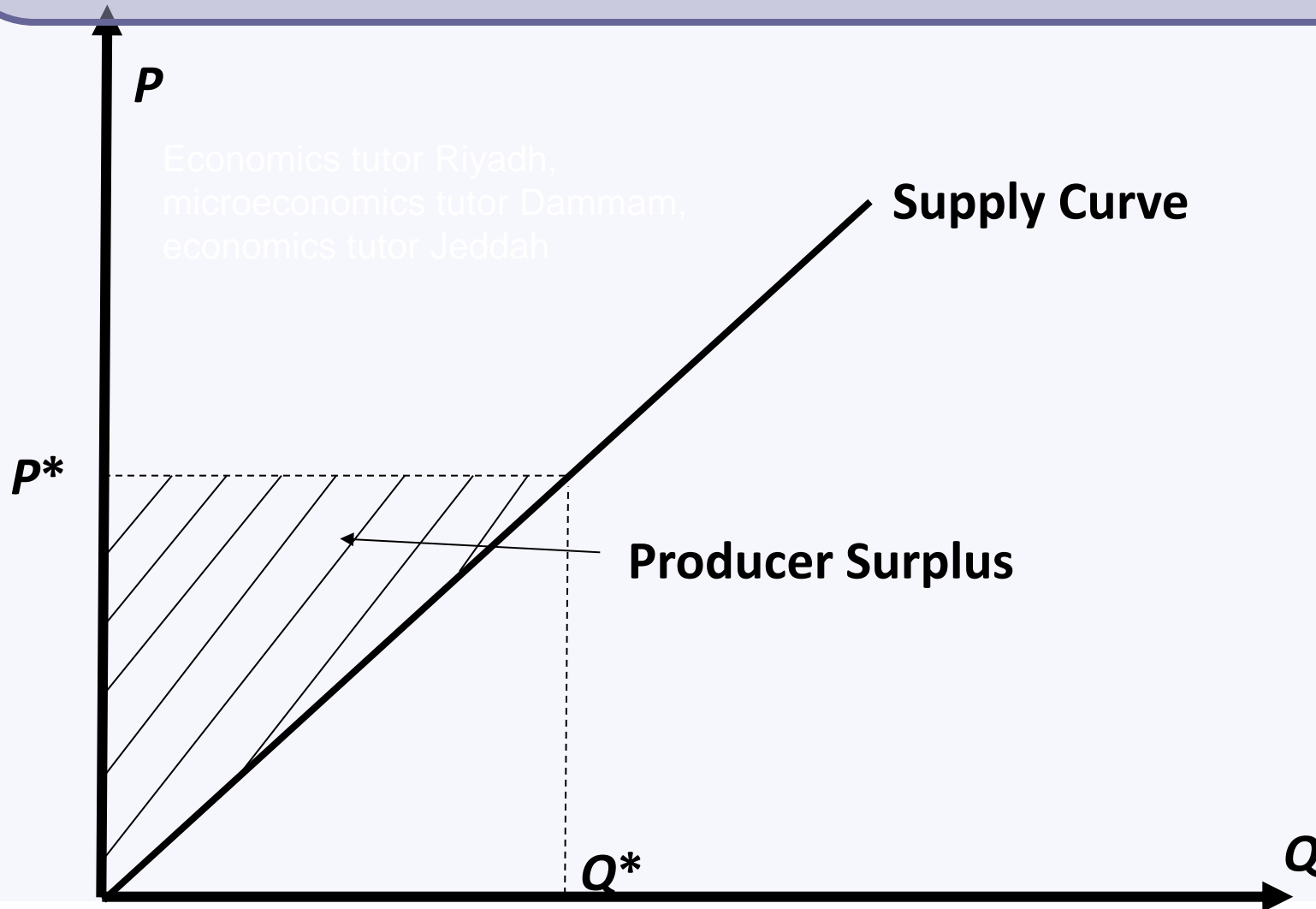
Definition: **Producer Surplus** is the area above the supply curve and below the market price. It is a monetary measure of the benefit that producers derive from producing a good at a particular price.

Note:

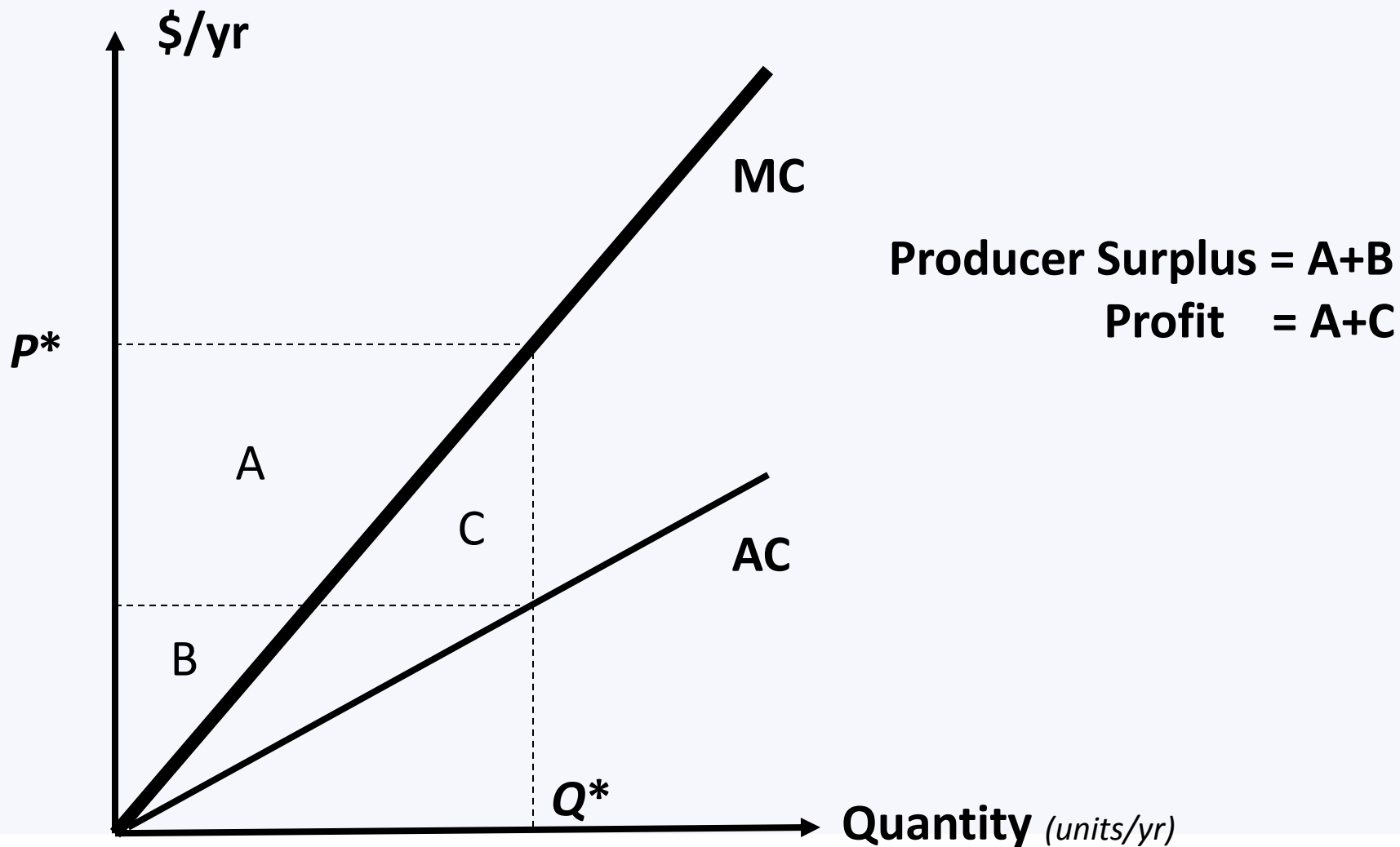
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...that the producer earns the price for every unit sold, but only incurs the MC for each unit. This is why the difference between the P and MC curve measures the total benefit derived from production.

Producer Surplus



Example



Market Supply and Equilibrium

Definition: The **market supply** at any price is the sum of the quantities each firm supplies at that price.

The market supply curve is the horizontal sum of the individual firm supply curves.

Perfectly Competitive Equilibrium

Definition: A (short run) perfectly competitive equilibrium occurs when the market quantity demanded equals the market quantity supplied.

$$\sum_{i=1}^n Q_s^i(P) = Q_s(P)$$

and $Q_s^i(P)$ is determined by the firm's individual profit maximization condition.