Microeconomics

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Market Structure: Perfect Competition

Profit Maximization

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$$\text{Profit} = \Pi = TR - TC$$

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- Normal profit – Accounting profit minus Economic profit = Opportunity cost

Conditions for Perfect Competition

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4. **Firms and Consumers have Perfect Information**
   - A consumer has no motive to switch from a high–priced product to a lower–priced one unless she knows about the existence of the latter.
   - A firm has no reason to leave its industry if it has no way of knowing about the existence of more profitable opportunities.

Short–Run Profit Maximization I

- Question: How does a firm choose its output level in the short run?
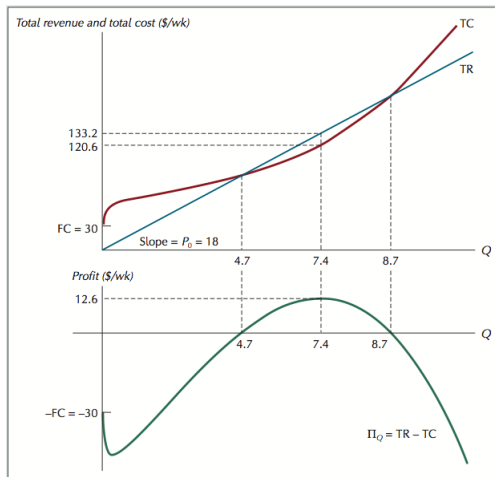
Short–Run Profit Maximization II

Definition

Marginal revenue – the change in total revenue that occurs as a result of a 1–unit change in sales:

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- F.O.C:

$$MR(Q) - MC(Q) = 0 \quad \rightarrow \quad \mathbf{MR(Q)} = \mathbf{MC(Q)}$$

Short–Run Profit Maximization III
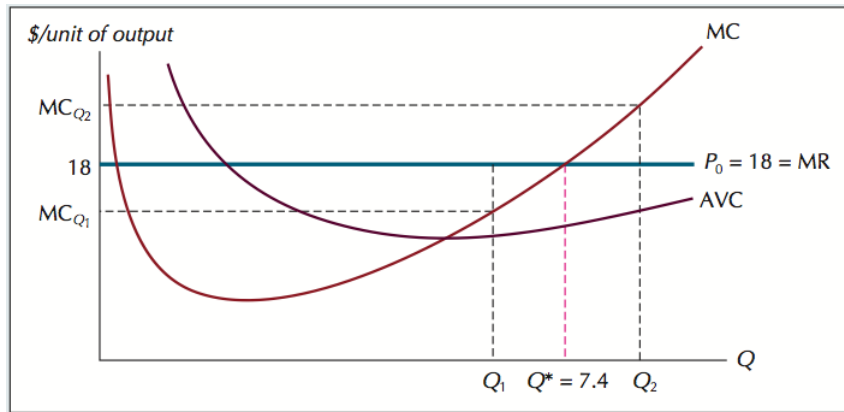
- Under perfect competition it holds that:

$$TR(Q) = P \cdot Q,$$

  thus

$$MR(Q) = P$$

- Thus, the condition for profit maximization is

$$\mathbf{P} = \mathbf{MC(Q)}$$

Short–Run Profit Maximization IV

$/unit of output

MC

MC_{Q_2}

18     $P_0 = 18 = MR$

AVC

MC_{Q_1}

Q

Q_1 $Q^* = 7.4$ Q_2

Shutdown Condition

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- When price falls to $P = AVC(Q)$ we have

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- Additionally notice the second–order condition for profit maximization:

$$\frac{d^2\Pi}{dQ^2} = \frac{-dMC_Q}{dQ} < 0 \quad \text{or} \quad \mathbf{\frac{dMC_Q}{dQ} > 0}$$

The Short–Run Supply Curve of a Perfectly Competitive Firm

- Two conditions:
  - Price above the minimum of the Average Variable Cost curve.
  - Rising portion of the Marginal Cost curve.

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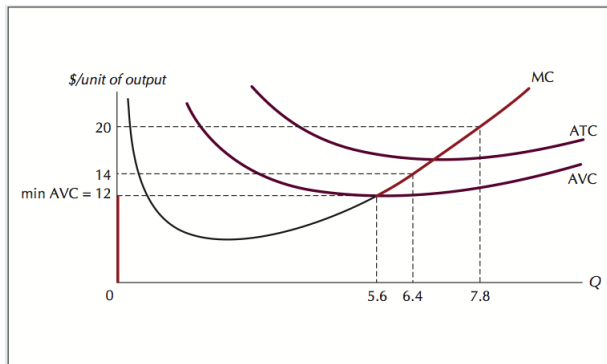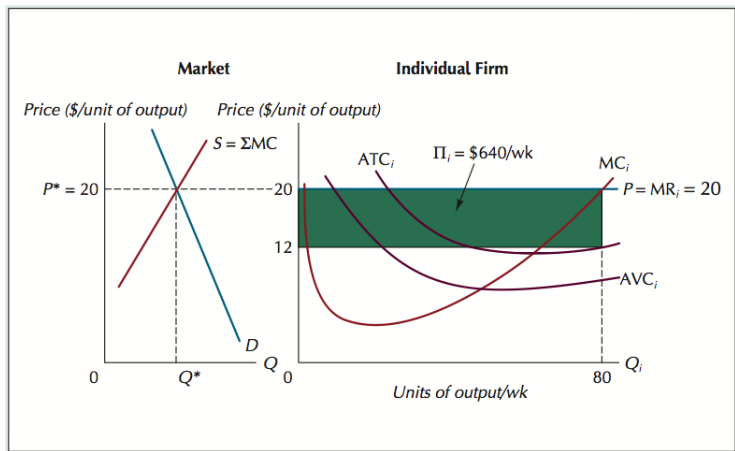
Short–Run Competitive Industry Supply
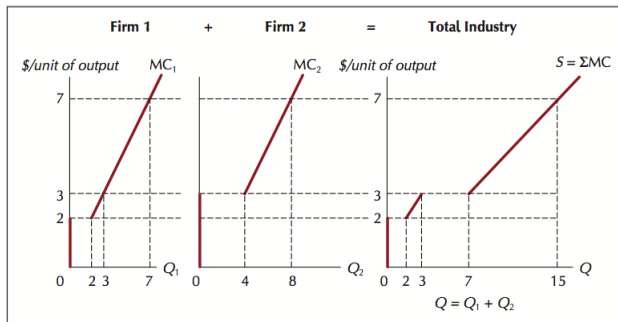
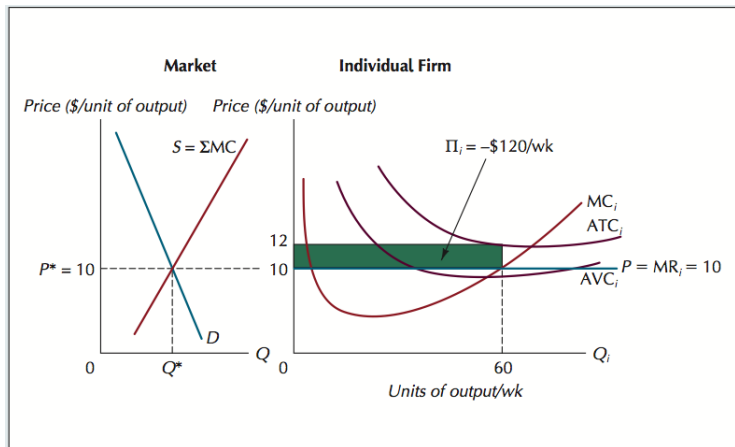- If firm has

$$P = c + dQ_i \quad \text{or} \quad Q_i = -(c/d) + (1/d)P$$

- With identical firms we have:

$$Q = nQ_i = n\left(-\frac{c}{d} + \frac{1}{d}P\right) = -\frac{nc}{d} + ndP \quad \text{or} \quad P = c + \frac{d}{n}Q$$

Short-Run Price and Output Determination I

Market   **Individual Firm**

Price ($/unit of output)   Price ($/unit of output)

$S = \Sigma MC$

ATC_i $\Pi_i = \$640/wk$ MC_i

$P^* = 20$ -20 $P = MR_i = 20$

12

AVC_i

D

Q Q_i

0 Q^* 0 80

Units of output/wk

Short-Run Price and Output Determination II

The Efficiency of Short–Run Equilibrium I
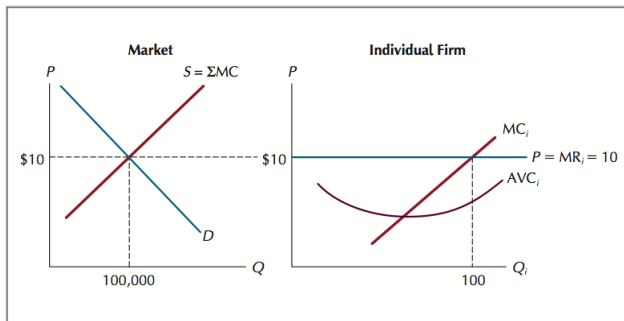
- Competitive markets result in **allocative efficiency**.

Definition

Allocative efficiency – a situation in which all possible gains from exchange are realized.
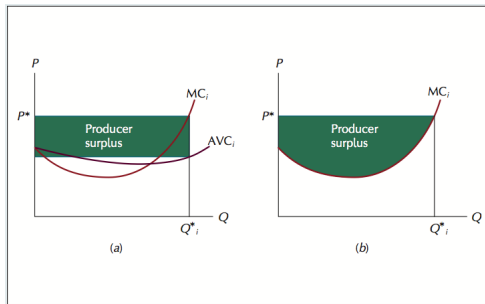
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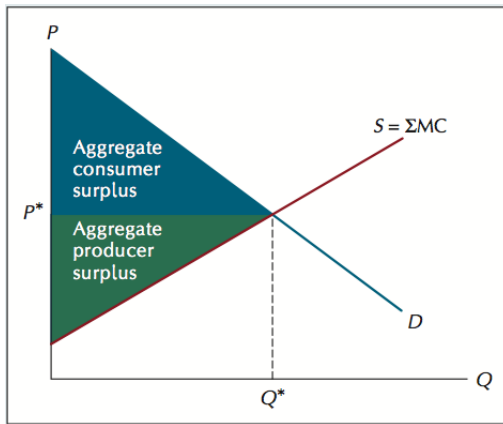
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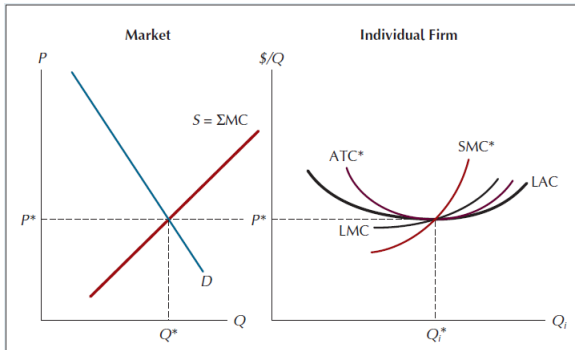**Producer surplus** – the amount by which a firm benefits by producing a profit–maximizing level of output.

- $PS = TR - VC = \Pi + FC$

The Efficiency of Short–Run Equilibrium II

Long–run Adjustments

The Elasticity of Supply I

Definition

Price elasticity of supply – the percentage change in quantity supplied that occurs in response to a 1 percent change in product price:
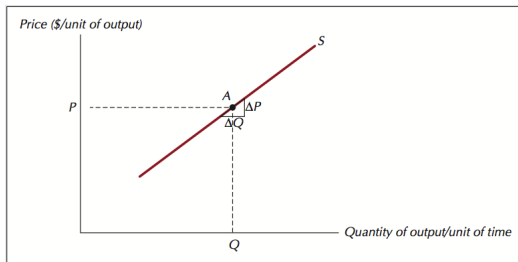
$$\varepsilon^S = \frac{\Delta Q}{\Delta P} \cdot \frac{P}{Q} = \frac{P}{Q} \cdot \frac{1}{\text{slope}}$$
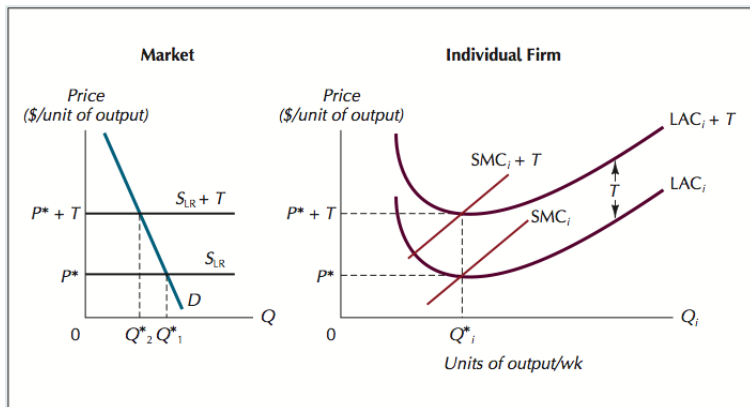
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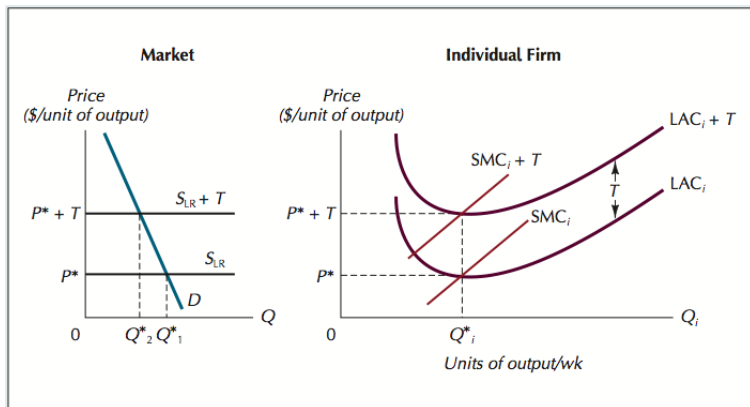
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The Effect of Taxes

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- Per unit tax enter the optimization problem of the firm:

$$\max_{Q}\{P \cdot Q - TC(Q) - t \cdot Q\}$$