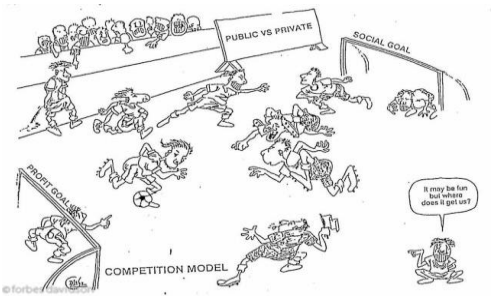
Chapter 10 - Perfect Competition

Chapter 10-Perfect Competition



Profits

- ***Economic profit:*** the difference between total revenue and total cost, where total cost includes all costs—both explicit and implicit—associated with resources used by the firm.
- ***Accounting profit*** is simply total revenue less all explicit costs incurred.
  - does not subtract the implicit costs.
- Economists assume that the goal of firms is to maximize economic profit

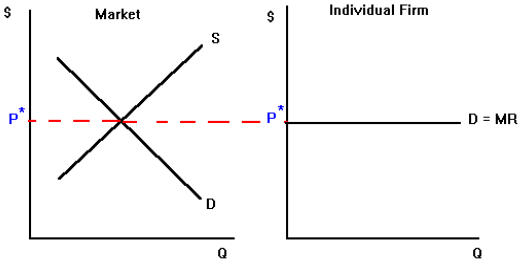
11-2

The Four Conditions For Perfect Competition

1. **Firms Sell a Standardized Product**
   - The product sold by one firm is assumed to be a perfect substitute for the product sold by any other.
2. **Firms Are Price Takers**
   - This means that the individual firm treats the market price of the product as given.
3. **Free Entry and Exit**
   - With Perfectly Mobile Factors of Production in the Long Run
4. **Firms and Consumers Have Perfect Information**

11-3

Demand Curve Facing the Firm



11-4

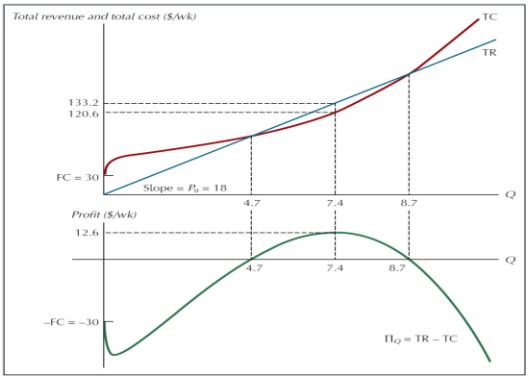
Chapter 10 - Perfect Competition

The Short-run Condition For Profit Maximization

- To maximize profit the firm will choose that level of output for which the difference between total revenue and total cost is largest.
- ***Marginal revenue:*** the change in total revenue that occurs as a result of a 1-unit change in sales.
- *To maximize profits the firm should produce a level of output for which marginal revenue is equal to marginal cost on the rising portion of the MC curve.*

11-5

Revenue, Costs, and Economic Profit



11-6

Profit Maximization

Note: We are looking at the behavior of one firm so we denote quantity = q. The goal of the firm is to find the level of output (q) which maximizes profit (π)

Max π(q) = Pq – TC(q)

π = TR – TC $\frac{d\pi}{dq} = \frac{dTR}{dq} - \frac{dTC}{dq} = 0$ $MR - MC = 0$ $or\ MR = MC$

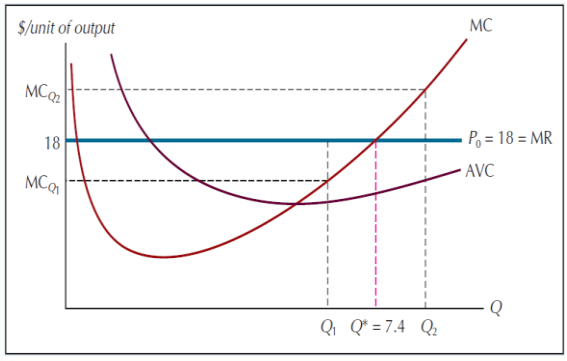
You can show that the second order conditions for maximization, $\frac{d^2\pi}{dq^2} < 0$ **holds. Show that** $\frac{dMC}{dq}$ $must\ be > 0$

If P > MC then profit rises if output is increased.
If P < MC then profit falls if output is increased.

Therefore, since we know P=MR, profit can only be maximized if P = MC

11-7

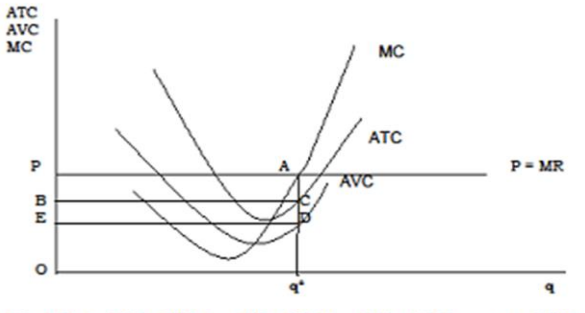
The Profit-Maximizing Output Level in the Short-Run



11-8

Chapter 10 - Perfect Competition

Diagram of Areas – Perfectly Competitive Firm.



Sample Problem

Suppose you are the manager of a watch making firm operating in a competitive market.

Your cost of production is given by TC = 100 + Q^2, where Q is the level of output and TC is total cost.

a) If the price of watches is $60, how many watches should you produce to maximize profit? What is profit?

$\pi = TR - TC$

$\pi = 60Q - 100 - Q^2$ $\qquad \pi = 60(30) - 100 - (30^2)$

$\frac{d\pi}{dQ} = 60 - 2Q = 0$ $\qquad \pi = 1800 - 100 - 900 = 800$

$Q = 30$

$\frac{d^2\pi}{dQ^2} = -2 < 0$ *Maximum*

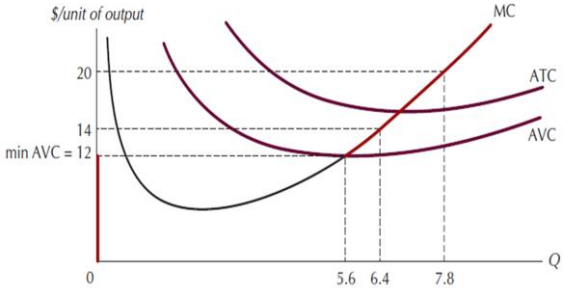
11-10

The Shutdown Condition

- ***Shutdown condition:*** if price falls below the minimum of average variable cost, the firm should shut down in the short run.
- The ***short-run supply curve*** of the perfectly competitive firm is the rising portion of the short-run marginal cost curve that lies above the minimum value of the average variable cost curve

11-11

The Short-Run Supply Curve of a Perfectly Competitive Firm



11-12

Chapter 10 - Perfect Competition

The Firm's Short-Run Supply Decision

In the short run, we should produce only if loss from producing is less than total fixed costs (TL < TFC)

TL < TFC or TC – TR < TFC

Dividing by Q: ATC - AR(or P) < AFC

Rearranging ATC – AFC < P or P > AVC

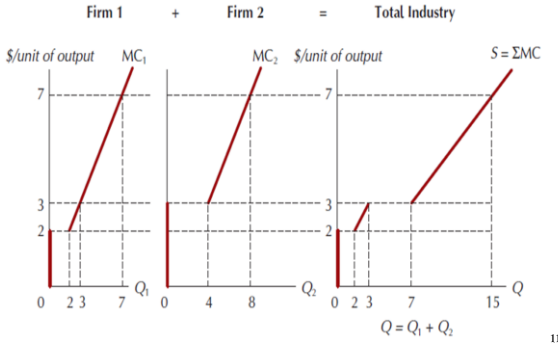
Three Profit Maximizing Conditions: P = MC

dMC/dQ > 0 (Marginal Costs are increasing) P > AVC

These conditions imply a firm's supply curve equals marginal costs above minimum average variable costs & 0 below minimum average variable costs!

11-13

The Short-Run Competitive Industry Supply Curve



11-14

Deriving the Industry Supply Curve

Each of 1000 identical firms in the competitive peanut butter industry has a short-run marginal cost curve given by

SRMC = 4 + Q.

If the demand curve for this industry is $P = 10 - \frac{2Q}{1000}$,

what is the equilibrium price and quantity in this industry and how much does each firm produce?

Solution:

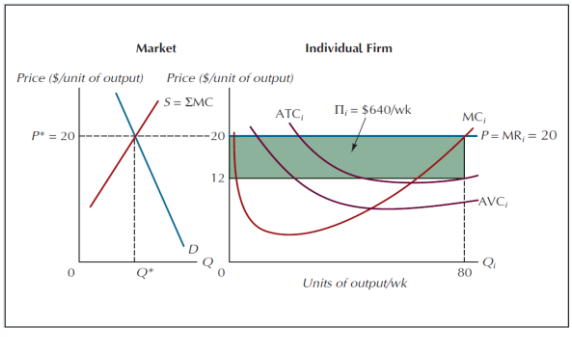
SR supply = ∑MCi = ∑(4 + Qi) Solve for Qi = MCi – 4
1000Qi = Q = 1000 MC – 4000

MC = P, so Q = 1000 P - 4000, which means that industry supply is given by
P = 4 + Q/1000.
SR equilibrium Q: 4 + Q/1000 = 10 - 2Q/1000

3Q/1000 = 6, Q = 2000, P = 6.

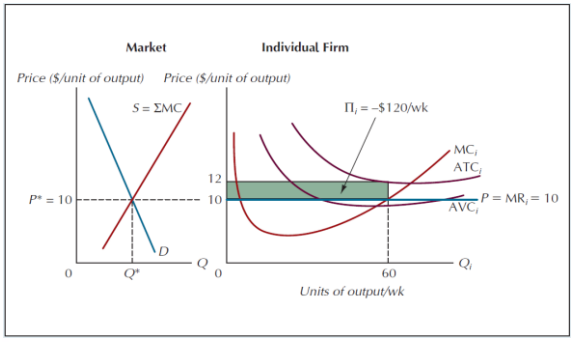
11-15

Short-Run Price and Output Determination under Pure Competition



11-16

A Short-Run Equilibrium Price that Results in Economic Losses



11-17

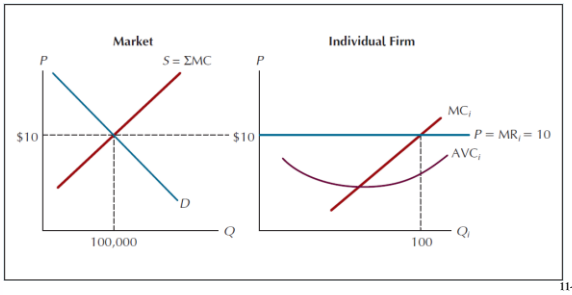
Short-run Competitive Equilibrium

- Even though the market demand curve is downward sloping, the demand curve facing the individual firm is perfectly elastic.
- ***Breakeven point:*** the point at which price equal to the minimum of average total cost.
  - The lowest price at which the firm will not suffer negative profits in the short run.

11-18

Short-run Competitive Equilibrium is Efficient

Allocative efficiency: a condition in which all possible gains from exchange are realized



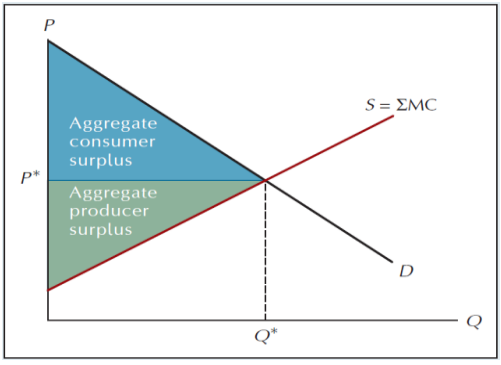
11-19

Producer Surplus

- A competitive market is efficient when it maximizes the net benefits to its participants.
- ***Producer surplus:*** the dollar amount by which a firm benefits by producing a profit-maximizing level of output.

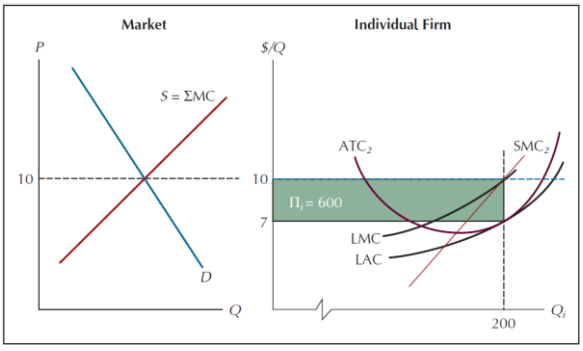
11-20

The Total Benefit from Exchange in a Market



11-21

A Price Level that Generates Economic Profit



11-22

Adjustments In The Long Run

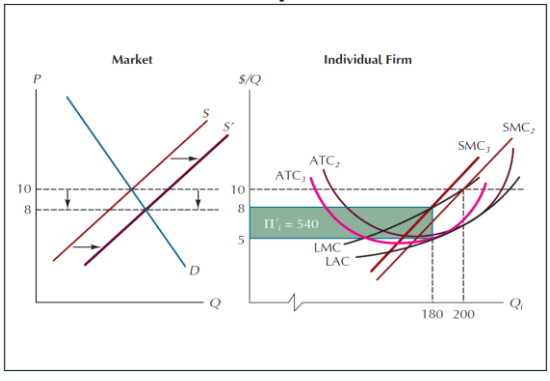
- Positive economic profit creates an incentive for outsiders to enter the industry.
- As additional firms enter the industry, the industry supply curve will shift to the right.
- This adjustment will continue until these two conditions are met:

  (1) Price reaches the minimum point on the LAC curve

  (2) All firms have moved to the capital stock size that gives rise to a short-run average total cost curve that is tangent to the LAC curve at its minimum point.

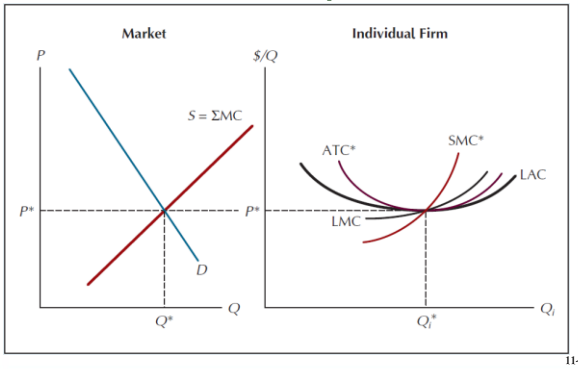
11-23

A Step along the Path Toward Long-Run Equilibrium



11-24

The Long-Run Equilibrium under Perfect Competition



11-25

The Invisible Hand

- Why are competitive markets attractive from the perspective of society as a whole?
  - Price is equal to Marginal Cost.
    - The last unit of output consumed is worth exactly the same to the buyer as the resources required to produce it.
  - Price is equal to the minimum point on the long-run average cost curve.
    - There is no less costly way of producing the product.
  - All producers earn only a normal rate of profit.
    - The public pays not a penny more than what it cost the firms to serve them.

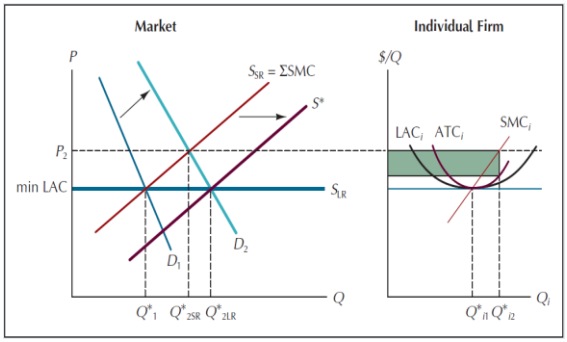
11-26

The Long-run Competitive Industry Supply Curve

- ***Constant cost Industries*:** long-run supply curve is a horizontal line at the minimum value of the LAC curve.
- ***Increasing cost industries*:** long-run supply curve is upward sloping.
- ***Decreasing cost industries*:** long-run supply curve is downward-sloping.

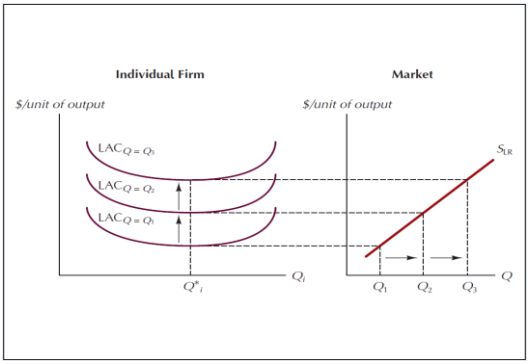
11-27

The Long-Run Competitive Industry Supply Curve



11-28

Long-Run Supply Curve for an Increasing Cost Industry



11-29

Profit Tax

***1. Profits tax* – tax is fixed proportion of profits**

$\pi = TR - TC - t(TR - TC)$ ***t* is the tax rate**

Solving for the profit maximizing level of q:

$$\frac{d\pi}{dq} = MR - MC - t(MR - MC) = 0$$

$$MR - MC - t(MR - MC) = 0$$

since $(1-t) \neq 0$ $MR - MC = 0$

Firms produce where $MR = MC$

11-30

Lump-Sum Tax

2. Lump-sum tax

$\pi = TR - TC - TAX$ **TAX is constant amount**

Solving for the profit maximizing level of q:

$$\frac{d\pi}{dq} = MR - MC - 0 = 0$$

Firms produce where $MR = MC$

Profits and Lump-sum tax shift average cost up (MC does not change)

11-31

Sales Tax

***3. Sales Tax* – tax per unit of output**

$$\pi = TR - TC - tq$$

$$\frac{d\pi}{dq} = MR - MC - t = 0$$

Firms produce where

$$MR = MC + t$$

Sales Tax shifts average cost and marginal cost up (higher price and lower quantity).

As an exercise you can draw the diagrams showing the effect of the different type of taxes.

11-32