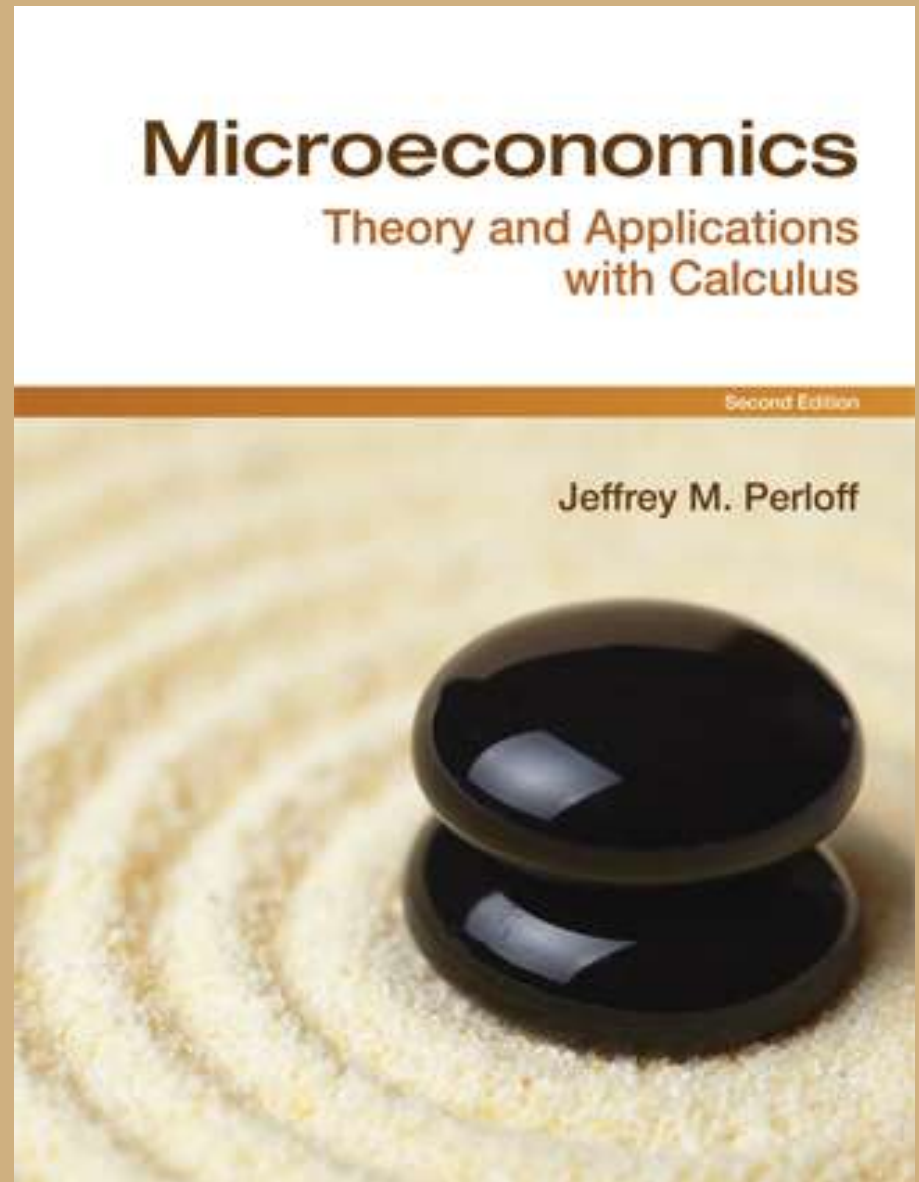


Chapter 8

Competitive Firms and Markets

*The love of money is the root of all
virtue.*

George Bernard Shaw



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Chapter 8 Outline

- 8.1 Perfect Competition
- 8.2 Profit Maximization
- 8.3 Competition in the Short Run
- 8.4 Competition in the Long Run

8.1 Perfect Competition

- **Market structure** provides information about how firms operating in the market will behave; it is a function of:
 - the number of firms in the market
 - the ease with which firms can enter and leave the market
 - the ability of firms to differentiate their products from those of their rivals
- **Perfect competition** is one type of market structure in which buyers and sellers are price takers.
 - Neither firms nor consumers can sell or buy except at the market price.
 - This is what most people mean when they talk about “competitive firms.”

8.1 Perfect Competition

- ***Perfect competition*** is a market structure in which:
 - there are a *large number of firms*
 - firms sell *identical products*
 - buyers and sellers have *full information* about prices charged by all firms
 - *transaction costs*, the expenses of finding a trading partner and completing the trade above and beyond the price, are low
 - firms can *freely enter and exit* the market
- Examples:
 - Agricultural/commodities markets like wheat and soybeans
 - Building and construction

8.1 Perfect Competition: Assumptions

1. Large number of firms
 - No single firm's actions can raise or lower the price.
 - Individual firm's demand curve is a horizontal line at market price.
2. Identical (homogeneous) products
 - If all firms are selling identical products, it is difficult for any firm to raise the price above the going market price charged by all firms.
3. Full information
 - Consumer knowledge of all firms' prices makes it easy for consumers to buy elsewhere if any one firm raised its price above market price.
4. Negligible transaction costs
 - Buyers and sellers waste little time or money finding each other.
5. Freely entry and exit
 - Leads to large number of firms and promotes price taking.

8.1 Competitive Firm's Demand

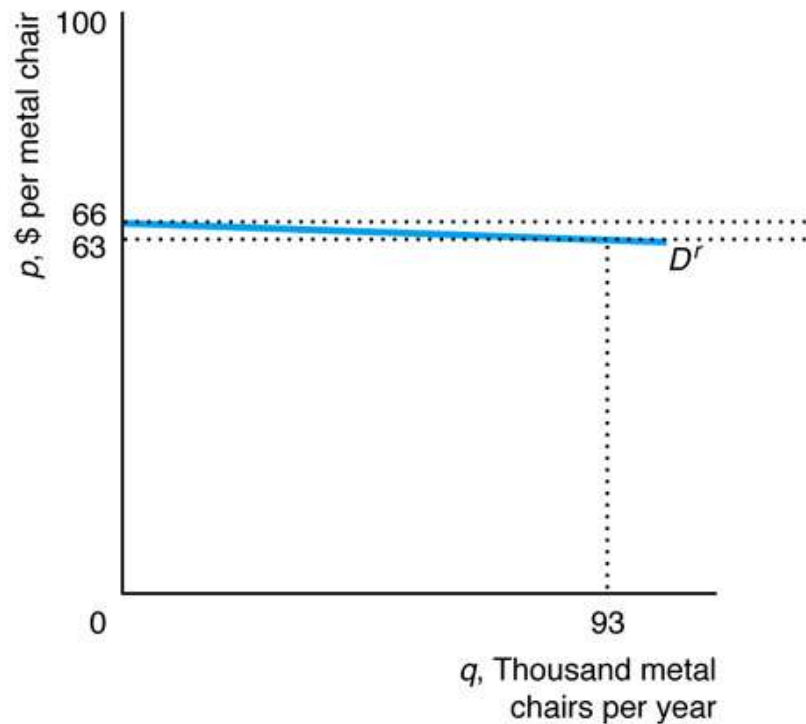
- Are perfectly competitive firms' demand curves really flat?
- A firm's **residual demand curve**, $D^r(p)$, is the portion of the market demand that is not met by other sellers at any given price.

$$D^r(p) = D(p) - S^o(p)$$

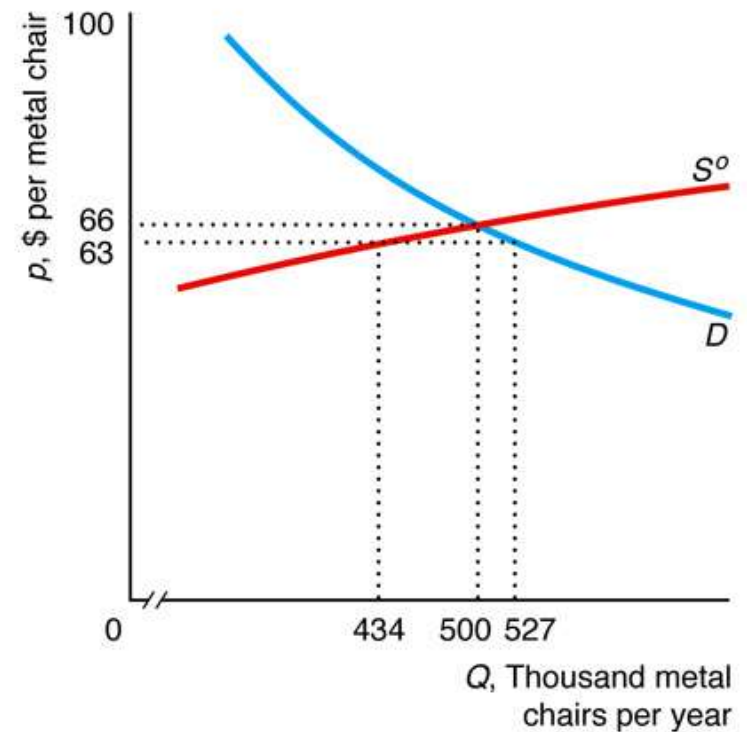
- $D(p)$ = market demand
- $S^o(p)$ = amount supplied by other firms
- If not perfectly horizontal, the residual demand curve of an individual firm is **much** flatter than market demand.

8.1 Competitive Firm's Demand

(a) Firm



(b) Market



8.2 Profit Maximization (in general)

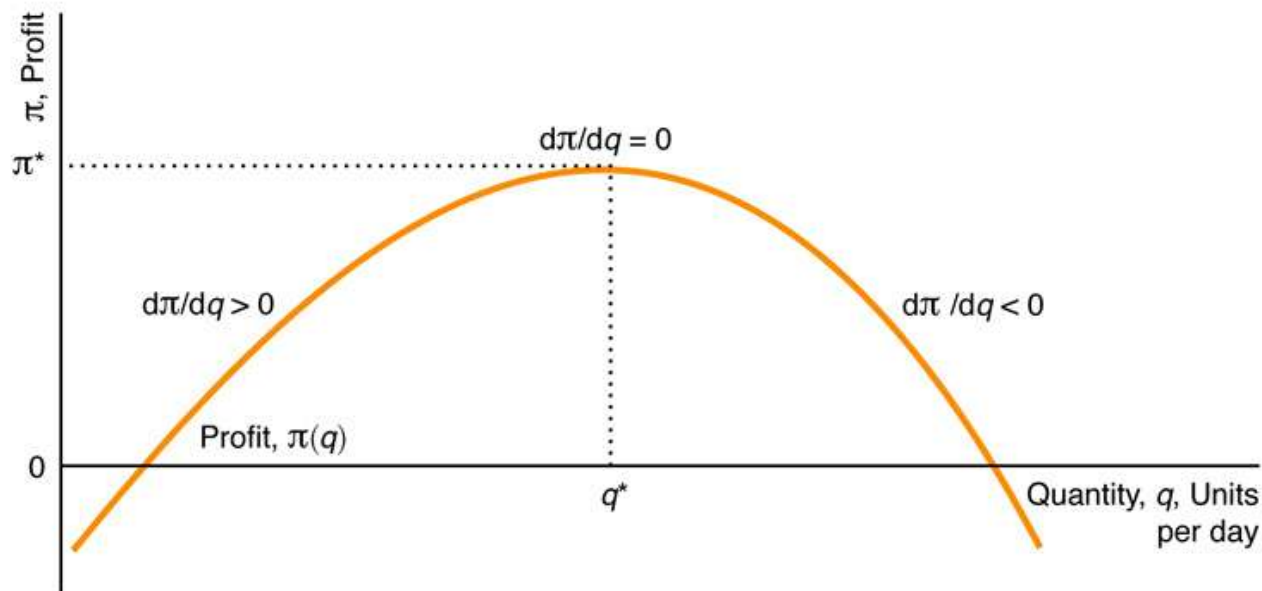
- Profit maximization in this class always refers to ***economic profit***, which is revenue minus opportunity cost.
 - Differs from business profit, which only subtracts off explicit costs from revenues.
- Maximizing profit involves two important questions:
 - 1. Output decision:** If the firm produces, what output level (q^*) maximizes its profit or minimizes its loss?
 - 2. Shutdown decision:** Is it more profitable to produce q^* or to shut down and produce no output?

8.2 Profit Maximization: Output Rules

- A firm can use one of three equivalent ***output rules*** to choose how much output to produce:
 1. A firm sets its output where its profit is maximized.
 2. A firm sets its output where its marginal profit is zero.
 3. A firm sets its output where its marginal revenue equals its marginal cost.
- Output rules #1 and #2 are easily depicted in a single graph.

8.2 Profit Maximization: Output Rules

- Output rules #1 (maximum profit) and #2 (zero marginal profit) both point to q^* .



8.2 Profit Maximization: Output Rules

- Output rule #3 (marginal revenue = marginal cost) is less obvious on the previous graph.
- Mathematically, if we take the derivative of $\pi(q) = R(q) - C(q)$ with respect to output and set it equal to zero (output rule #2), we find:

$$\frac{d\pi(q^*)}{dq} = \frac{dR(q^*)}{dq} - \frac{dC(q^*)}{dq} = MR(q^*) - MC(q^*) = 0$$

$$MR(q^*) = MC(q^*)$$

8.2 Profit Maximization: Shutdown Rule

- A firm shuts down only if it can reduce its loss by doing so.
 - **Shutting down** means that the firm stops producing (and thus stops receiving revenue) and stops paying avoidable costs.
 - Only fixed costs are unavoidable because they are sunk costs.
 - Firms compare revenue to variable cost when deciding whether to stop operating.
 - Shutting down may be temporary.
- The shut down decision is a short run decision because, in the long run, all costs are avoidable.

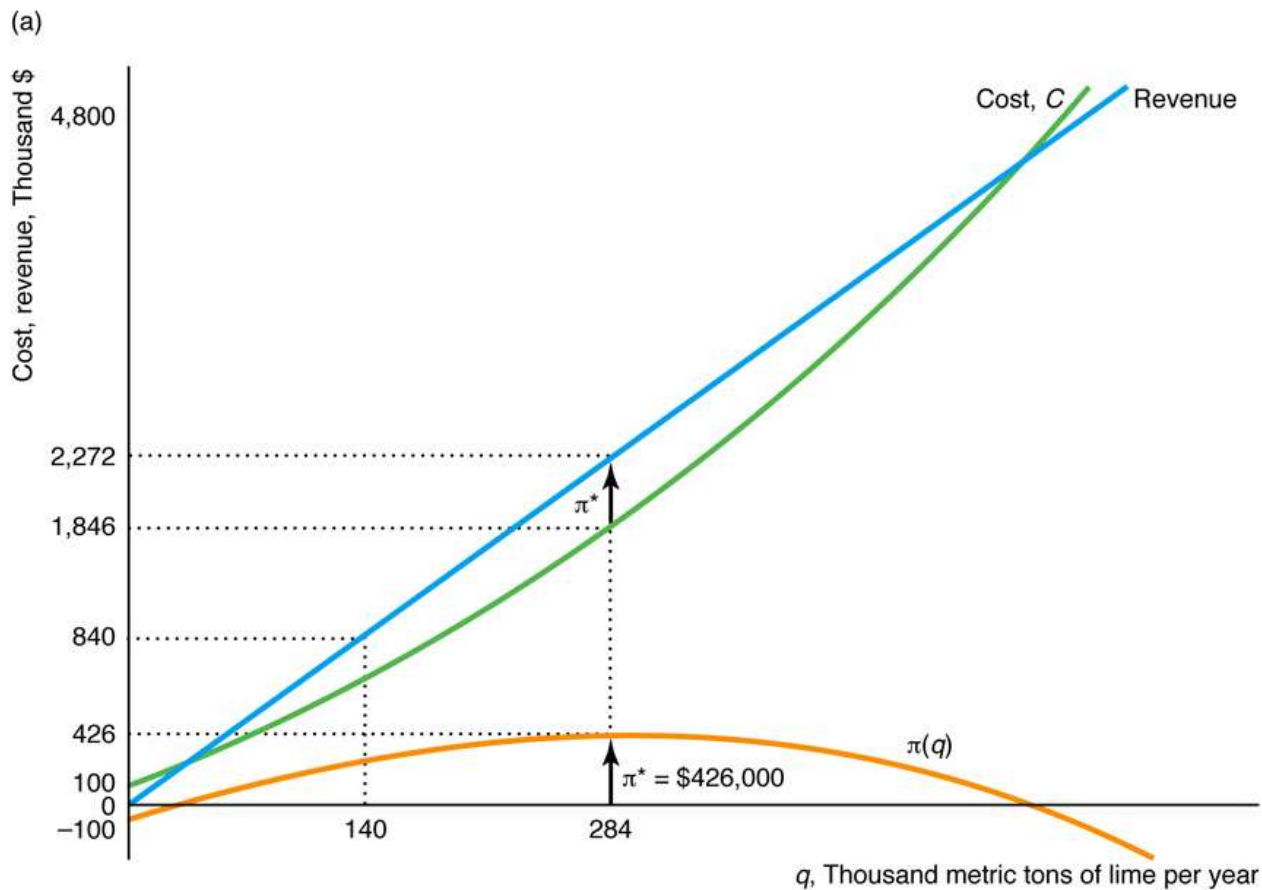
8.3 Competition in the Short Run

- Given this *general* description of firms' profit maximization decisions, how do perfectly competitive firms maximize profits in the SR?
- Because it faces a horizontal demand curve, a competitive firm can sell as many units of output as it wants at the market price, p .
- Revenue is $R(q) = pq$, thus, q^* satisfies:

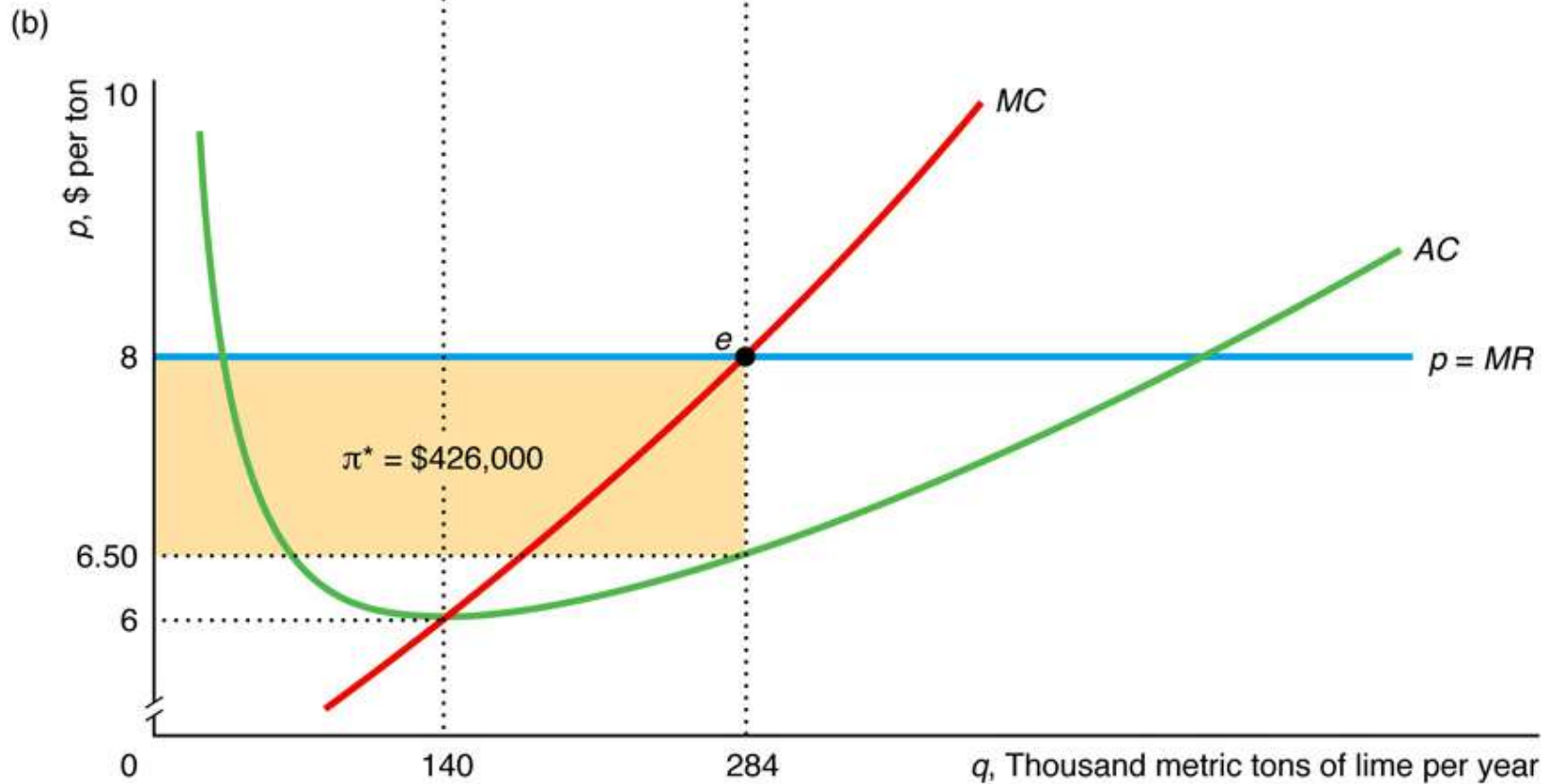
$$\frac{d\pi(q^*)}{dq} = \frac{dpq^*}{dq} - \frac{dC(q^*)}{dq} = p - MC(q^*) = 0$$

- Marginal cost equals the market price
- $MC = p$ is equivalent to $MC = MR$ because $MR = p$ in perfect competition.

8.3 Competition in the Short Run



8.3 Competition in the Short Run



8.3 Competition in the Short Run

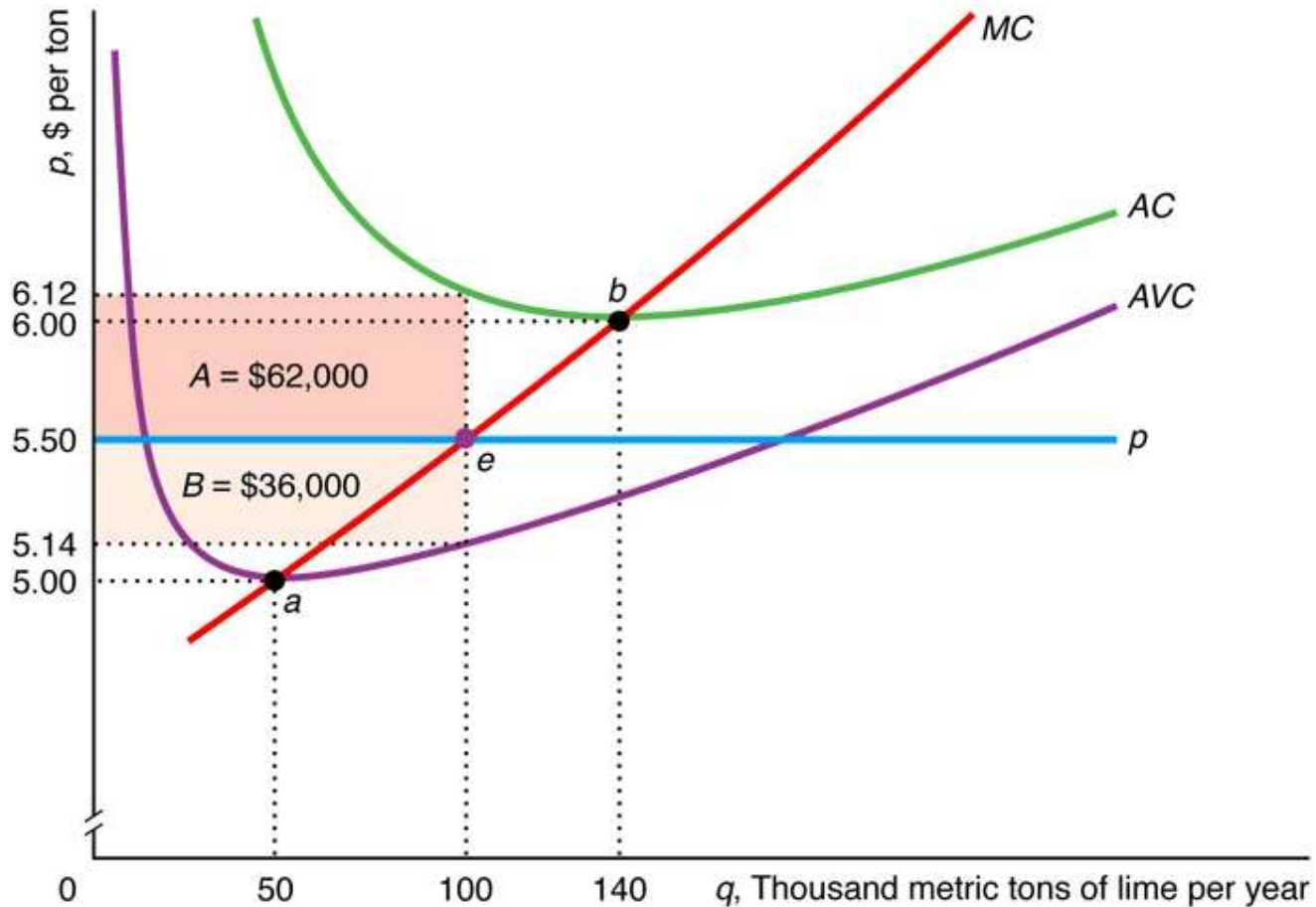
- The graph on the previous slide does not allow us to address the firm's shut down decision.
- Recall that firms compare revenues to variable costs to determine shutdown:

$$pq < VC(q)$$

$$p < \frac{VC(q)}{q} = AVC$$

- Shut down if market price is less than the minimum of its SR average variable cost curve.
- Thus, our graphical analysis of firm profit maximization decisions require an *AVC* curve to address the shut down decision.

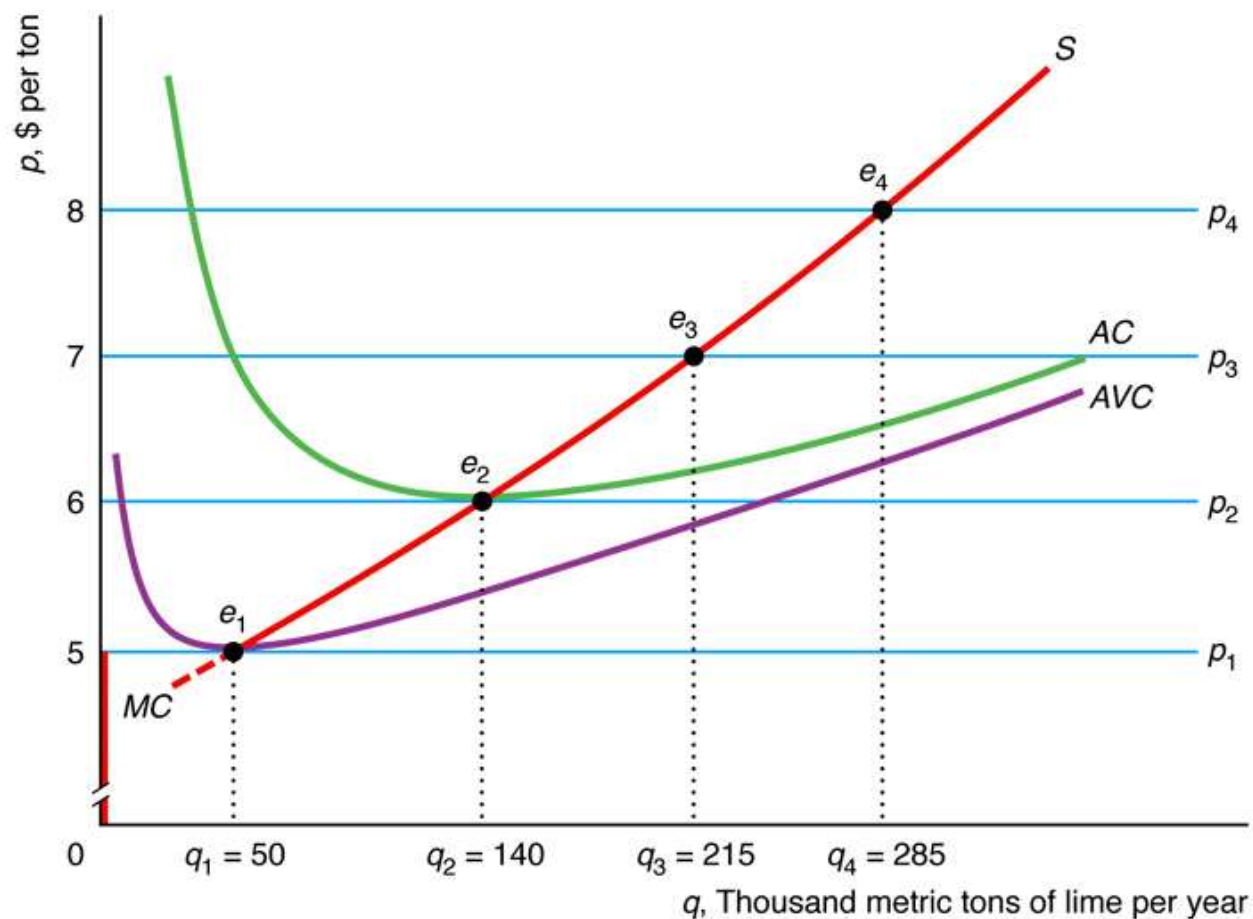
8.3 The Short-Run Shutdown Decision



8.3 Short-Run Firm Supply Curve

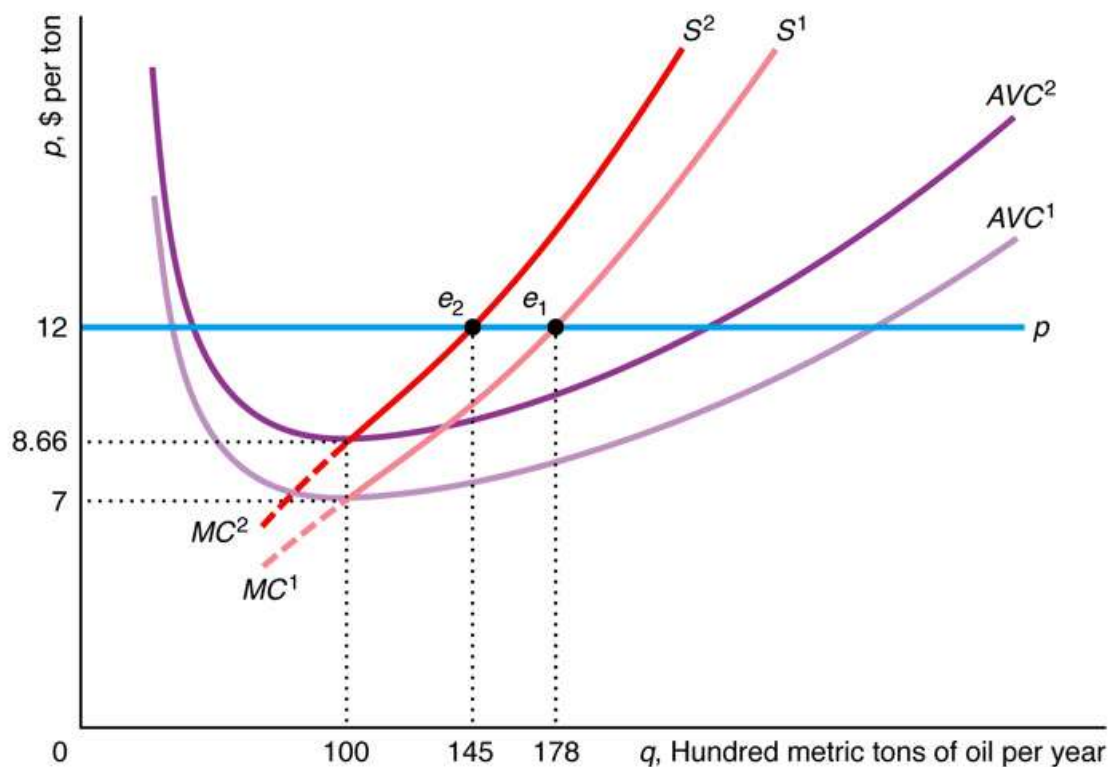
- Firms will choose to produce as long as market price is above the *AVC* minimum, so that is where a firm's supply curve begins.
- As we consider higher and higher market prices, the horizontal firm demand curve rises and intersects *MC* at higher and higher quantities.
 - In this fashion, the relationship between market price and profit-maximizing quantity is traced out.
 - This is the perfectly competitive firm's supply curve.

8.3 Short-Run Firm Supply Curve



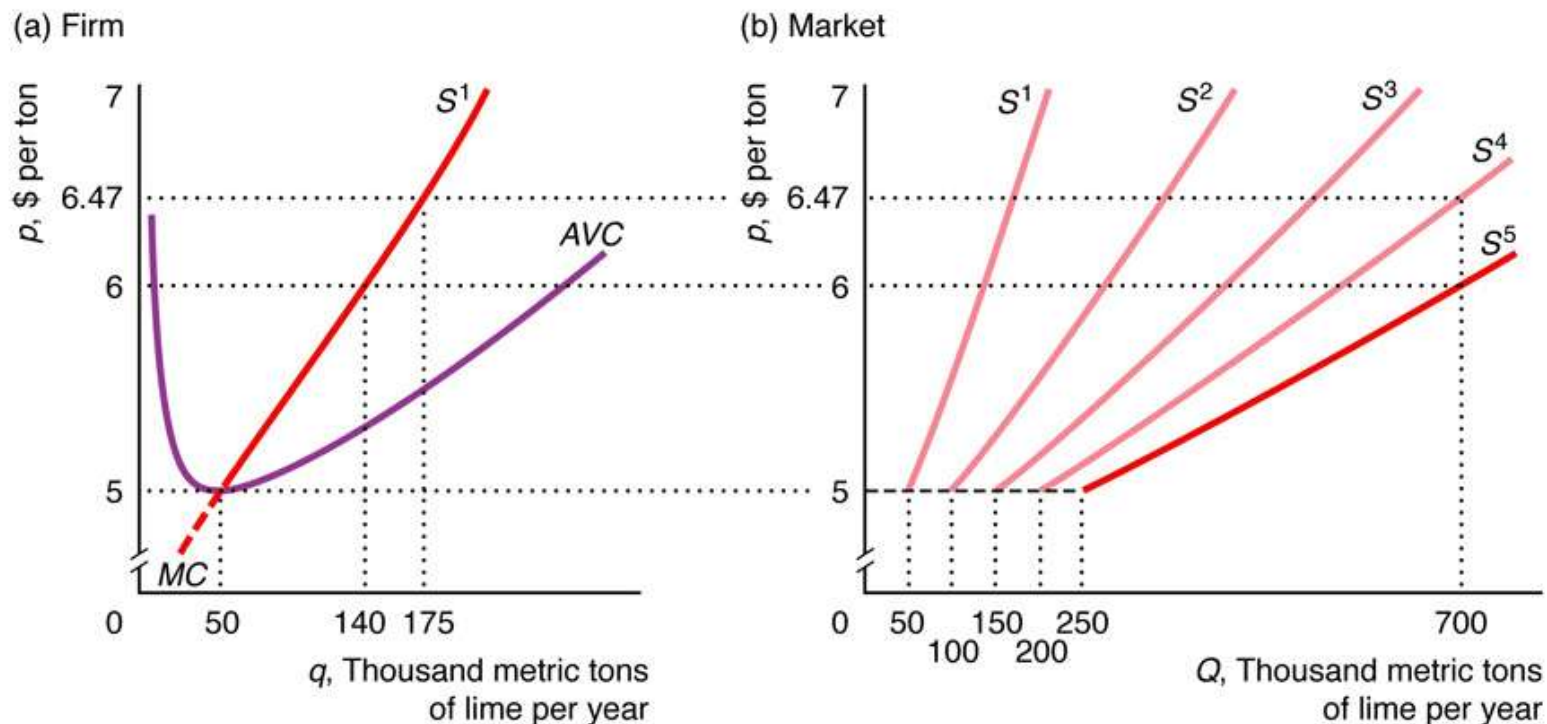
8.3 Short-Run Firm Supply Curve

- If the prices of inputs (factor prices) increase, a firm's production costs rise and its supply shifts left.



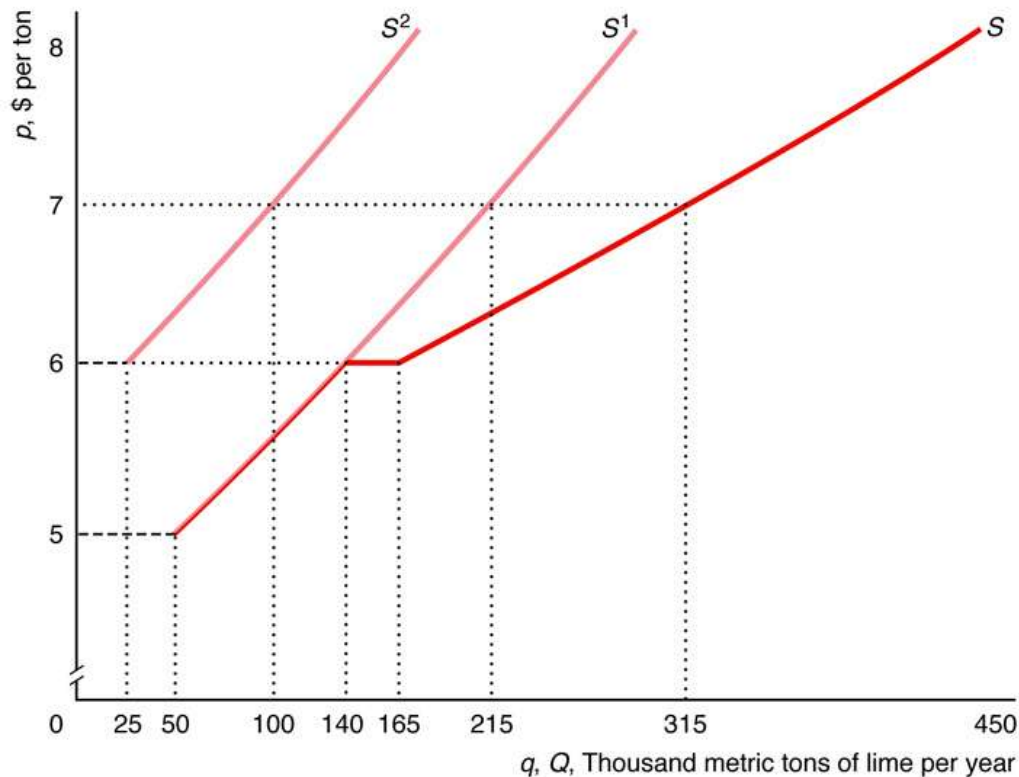
8.3 Short-Run Market Supply (Identical Firms)

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



8.3 Short-Run Market Supply (Different Firms)

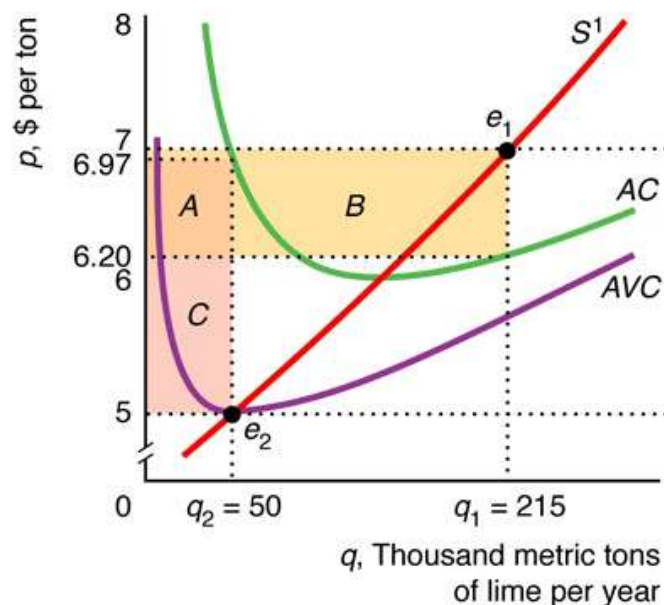
- The market supply curve is the horizontal sum of the firm supply curves.



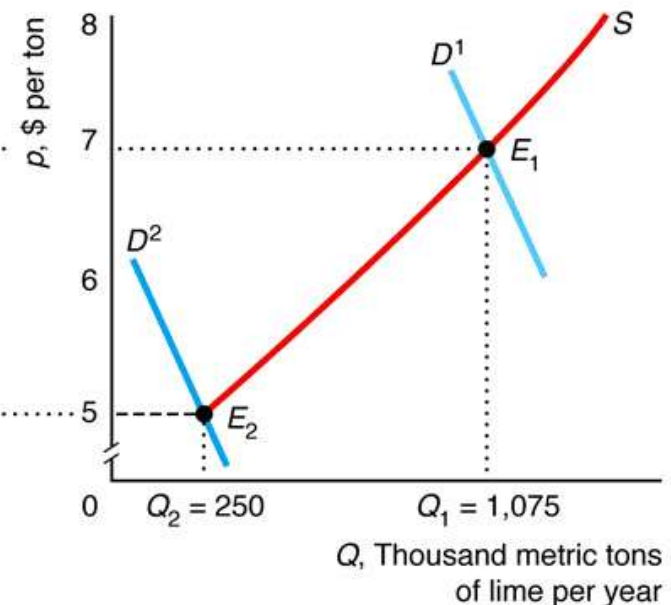
8.3 Short-Run Competitive Equilibrium

- Market equilibrium (point E_1) indicates price faced by individual firm, and therefore, profit-maximizing quantity, q_1 .

(a) Firm



(b) Market

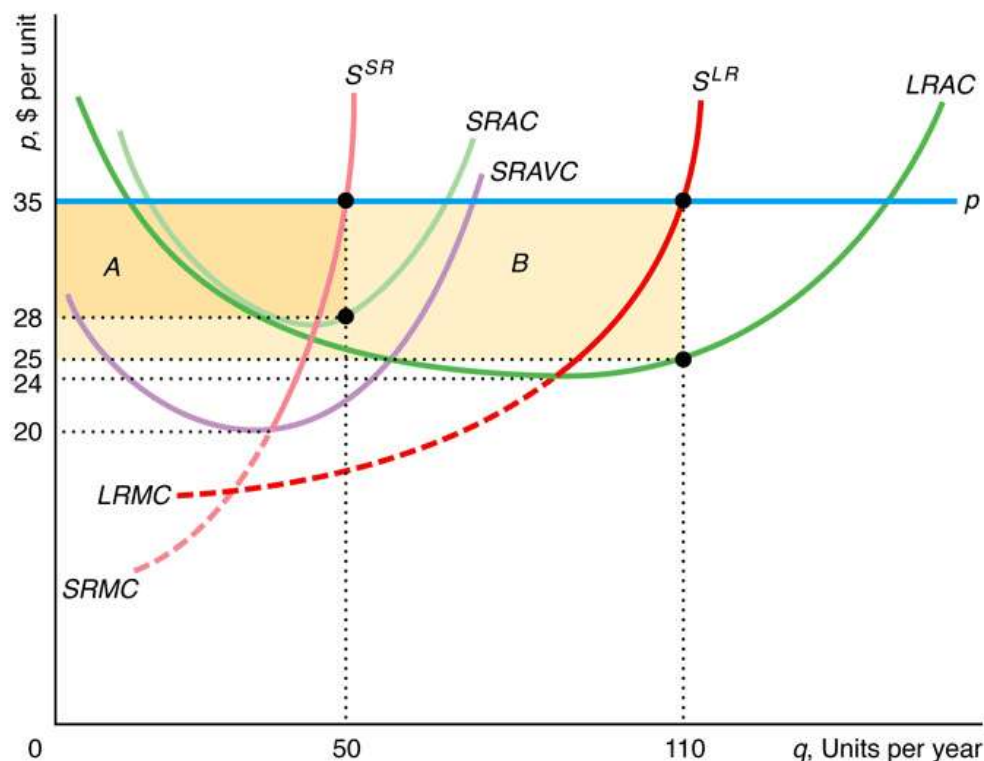


8.4 Competition in the Long Run

- Long-Run Output Decision
 - The firm chooses the quantity that maximizes profit using the same rule as in the SR: $MC = MR$.
- Long-Run Shutdown Decision
 - Because all costs are variable in the LR, the firm shuts down if it would suffer an economic loss by continuing to operate.
 - Graphically, relevant shutdown point is the minimum of the LR average cost curve.

8.4 Long-Run Firm Supply Curve

- Firm produces more in the LR than in the SR
 - 110 units instead of just 50 units
- Firm earns higher profit in the LR than in the SR.
 - $A+B$ instead of just A

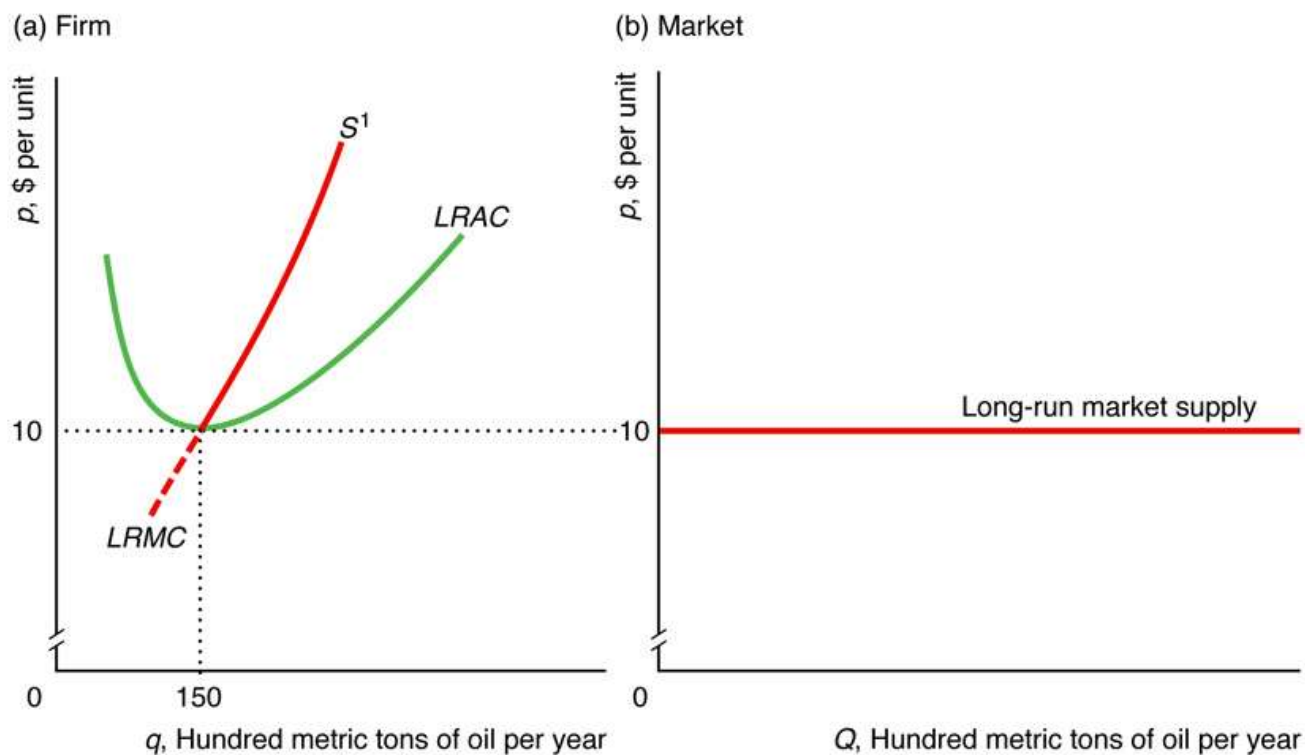


8.4 Long-Run Market Supply Curve

- As in the SR, the LR competitive market supply curve is the horizontal sum of individual firm supply curves.
- In the LR, firms can enter or exit the market, so the number of firms is not fixed as it is in the SR.
 - A firm enters the market if it can make a long-run profit.
 - A firm exits the market to avoid a long-run loss.
- With identical firms, free entry into the market, and constant input prices the LR market supply curve is flat at the minimum LRAC.

8.4 Long-Run Market Supply Curve

- Identical firms, free entry into the market, and constant input prices.

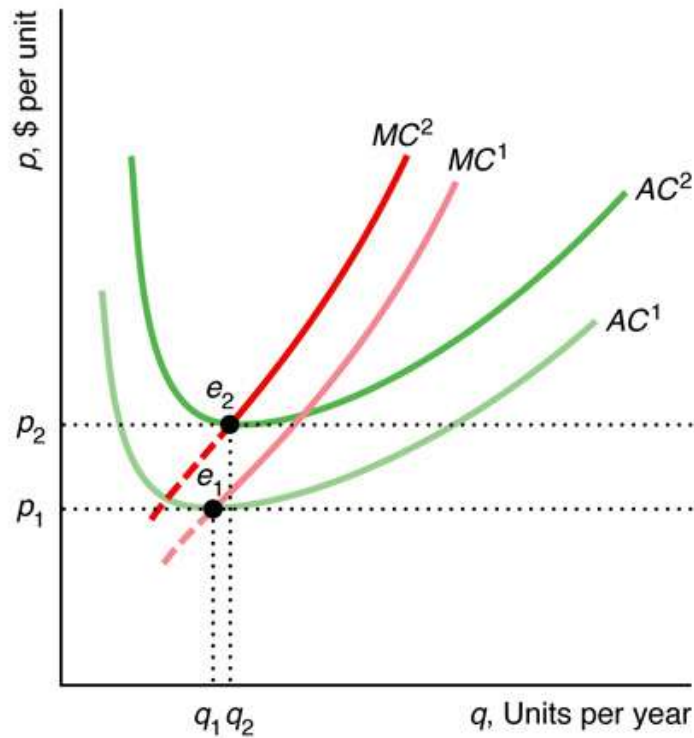


8.4 Long-Run Market Supply Curve

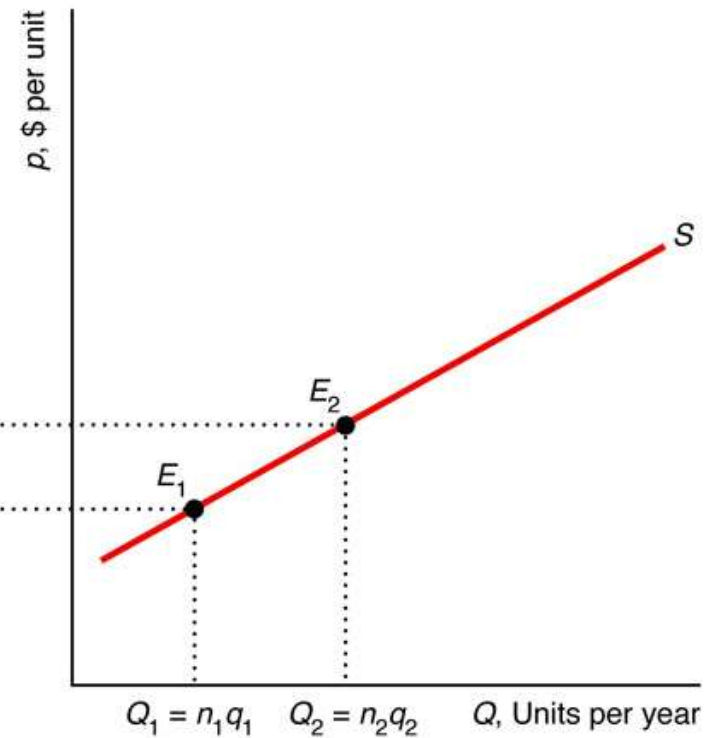
- Three scenarios in which LR market supply is not flat:
 1. LR market supply when entry is limited
 - Upward-sloping if government restricts number of firms, firms need a scarce resource, or if entry is costly
 2. LR market supply when firms differ
 - Upward-sloping if firms with relatively low minimum LRAC are willing to enter market at lower prices than others
 3. LR market supply when input prices vary with output
 - In an **increasing-cost market** input prices rise with output and LR market supply is upward-sloping
 - In a **decreasing-cost market** input prices fall with output and LR market supply is downward-sloping

8.4 Long-Run Market Supply Curve: Increasing-Cost Market

(a) Firm



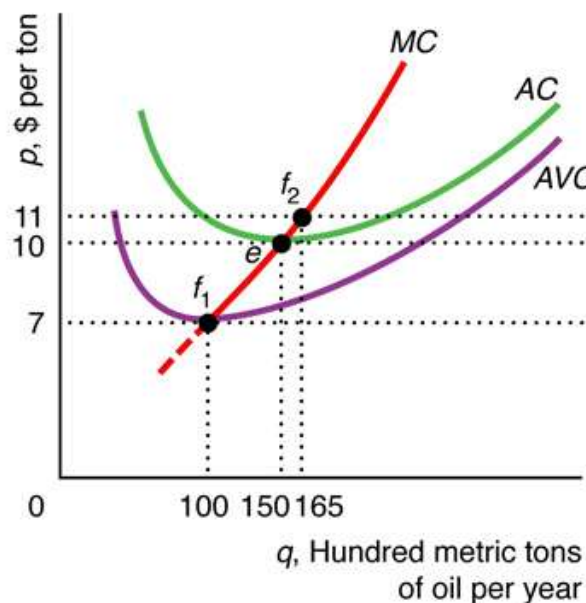
(b) Market



8.4 Long-Run Competitive Equilibrium

- Equilibrium occurs at the intersection of LR market demand and LR market supply, which is different from SR market supply.

(a) Firm



(b) Market

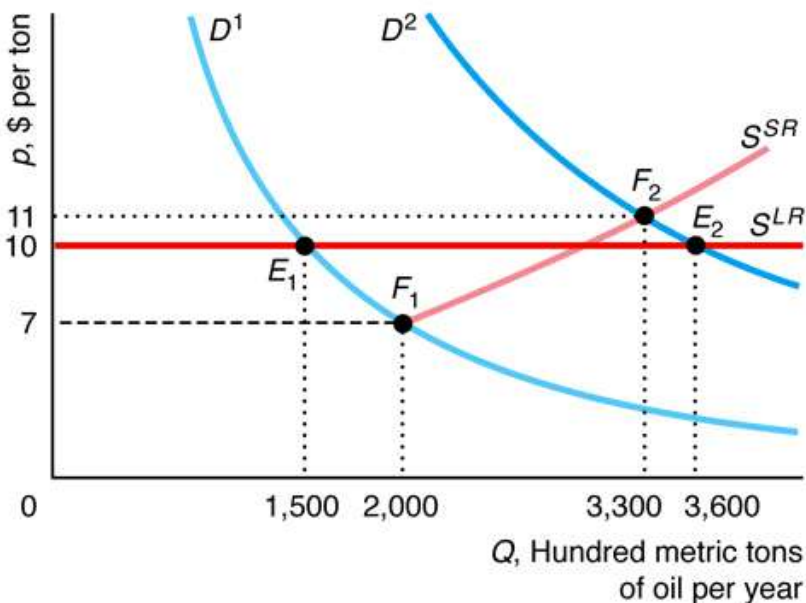
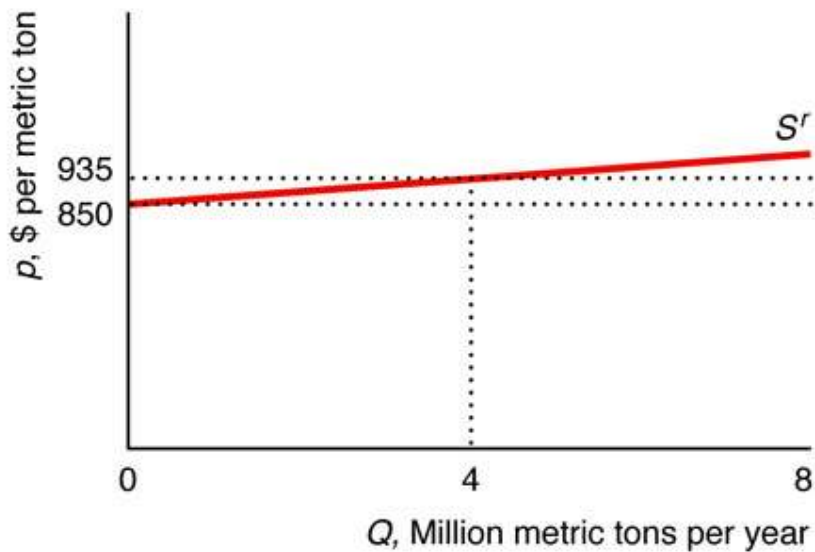


Figure 8.13 Excess of Residual Supply Curve

(a) Japan's Excess Supply Curve



(b) World Supply and Rest of World Demand

