Chapter 8

Competitive Firms and Markets

Framing the New Material

- So far we've been filling a toolbox with useful tools for understanding how consumers and producers make decisions

- Now we turn to the market itself to see how consumers and producers interact to determine prices and

Framing the New Material

- Many different types of markets exist — the way supply and demand interact can be very different

- The Competition Spectrum:

  1. Competitive

  2. Monopolistic Competition

  3. Oligopoly

  4. Monopoly

- We will begin with the two extremes and work inward

Defining Price Taking and Competition

- "Competing" firms vs. "competitive" markets

- Price Taking: a lack of power to control the price at which you can sell the product — no market power

- Firms don't choose to be price takers

- This implies the individualized demand curve faced by the firm is perfectly horizontal (elastic)

- An apple farmer selling crop to a food processing company

Why Would a Firm's Demand Be Horizontal?

1. Firms sell identical products

2. Each firm is small compared to the market

3. Firms freely enter and exit without significant costs

4. Perfect information for buyers and sellers

5. Transaction costs are low

● If all these conditions are met, we have a **perfectly competitive market**

Why Care About This Type of Market?

- 3 big reasons

  1. Many markets are perfectly competitive or close — natural resources and other commodities

  2. It has many desirable efficiency properties, so it's a good benchmark

  3. Analyzing how firms make decision from here is straightforward — we now have an "ideal" market to compare to

Profit Maximization Revisited

- Recall firms try to maximize profits:

$$\pi = TR - TC$$

- If the value above is negative, the firm is making a loss

- Economic Profit vs. Accounting Profit:

  - Total Revenue − economic cost: includes both explicit and implicit costs

  - Total Revenue − accounting cost: ignores implicit costs but is used for taxes and other purposes

2 Steps to Firm Decisions

- To maximize its profits a firm must always answer 2 Q's:

    1. What output level maximizes my (economic) profits or minimizes my economic losses? q^*

    2. Is it more profitable to produce q^* or to shut down and produce nothing?

- The way a firm answers these questions will depend on whether they are operating in the short-run or long-run

Maximizing Profit
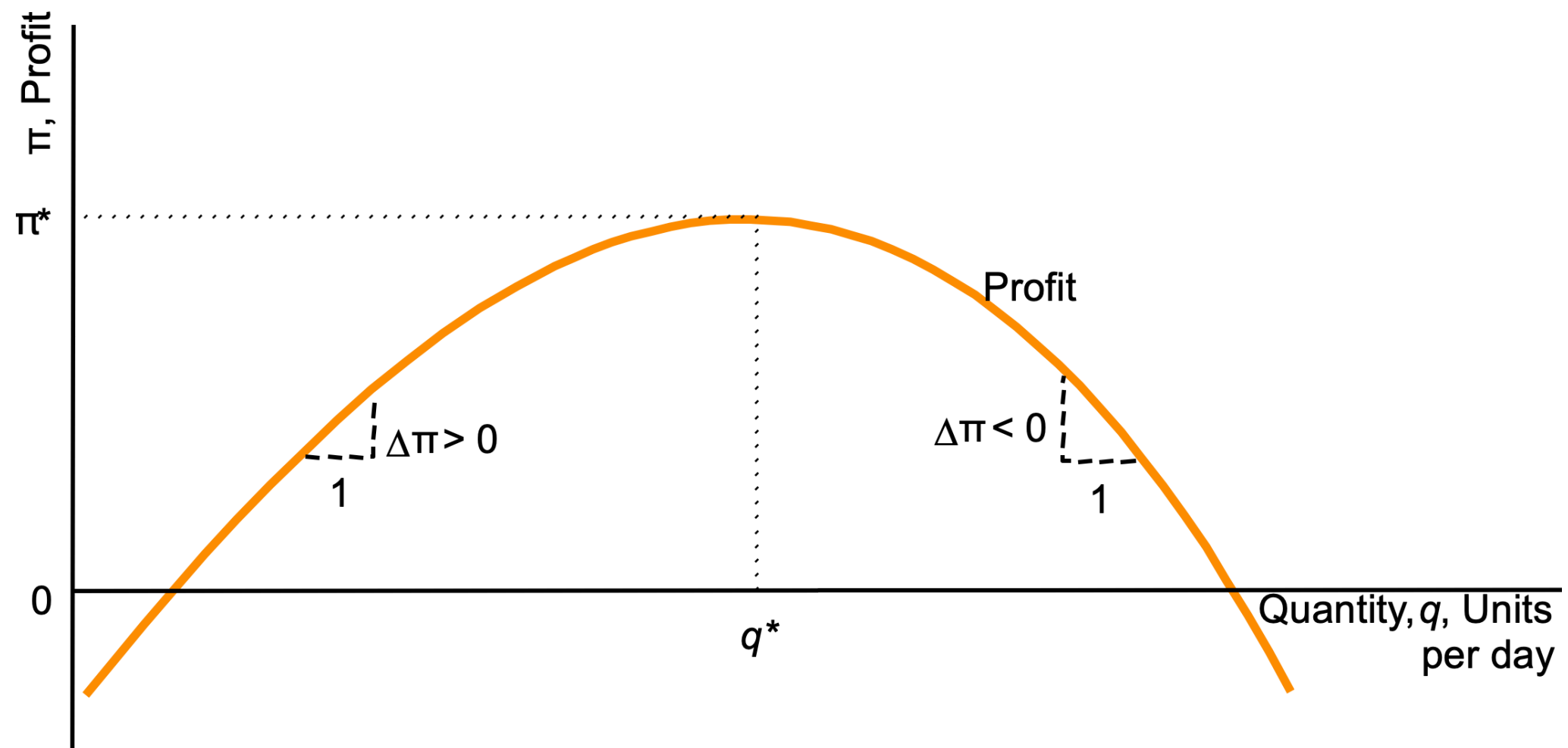
The Rate of Change in the Profit Function

- Known as marginal profit

- Marginal profit can be thought of as the change in profit that a firm gets from producing/selling an additional unit of output

The 3 Equivalent Output Rules

- The firm sets it output where profit is maximized — **derivative of the profit function with respect to Q is zero**

- The firm sets its output where marginal profit is zero

- **The firm sets its output where its marginal revenue MR equals its marginal cost MC**

Definitions

- Marginal Cost (MC): the change in costs from producing one more unit of output

- Marginal Revenue (MR): the change in revenue from selling one more unit of output

- Marginal Profit $= MR - MC$ or $= MR(q) - MC(q)$

Short Run Competition

- For any firm we know the output decision rule will be to produce up to the level where $MR = MC$

- But if a firm is a price taker, what other important variable should be equal to MR?

    - The market price p

    - So firms continue to produce up to the point where their short-run marginal costs is equal to the market price p

An Example

- Leslie operates a business in a competitive market where the price of the product she makes is \$50. Her cost function is: $C(q) = 80 + q + \frac{1}{3}q^3$

  - Solve for Leslie's marginal cost as a function of q

$$MC = \frac{\delta C}{\delta q} = 1 + q^2$$

  - Solve for Leslie's optimal level of output $q*$

    - Set $MC = p$, solve for q

$$MC = 1 + q^2 = 50$$

$$q^2 = 49$$

$$q* = 7$$

An Example

- Does Leslie choose to produce output?

  - Hint: Solve for Leslie's profit level if she decides to produce as well as if she shuts down (i.e. $q = 0$)

$$\pi(q = 7) = TR - TC$$

$$= p \times Q - C(q) = 7 * 50 - 80 - 7 - \frac{1}{2}7^2$$

$$= 350 - 48.5 = \$301.50$$

$$\pi(q = 0) = TR - TC = 0 - 48.5 = -\$48.50$$

Shutdown Rules

- 2 versions, again equivalent:

    1. The firm shuts down only if it can reduce its loss by doing so

    2. The firm shuts down only if its revenue is less than its avoidable (variable) cost

- These both hold in the short and the long run, but what differences should we expect between the short and long run cases?

Short-Run Shutdown

- Question: Could it be possible that producing in the short-run even if you are making losses is a better idea than shutting down?

- Answer: **YES** under some circumstances

- **Making an economic profit is not the rule for whether you should produce or shut down in the short-run**

The Firm's Short Run Supply Curve

- Recall that firms produce up to the point where MR (price p) equals MC

- Also, the only reason they would shut down in the short run is if they are not covering their variable costs at q^*

- This leads to an important result:

    - **A competitive firm's short run supply curve is the proportion of their marginal cost curve that lies above the minimum of their average variable costs**

How the Profit Maximizing Quantity Varies with Price
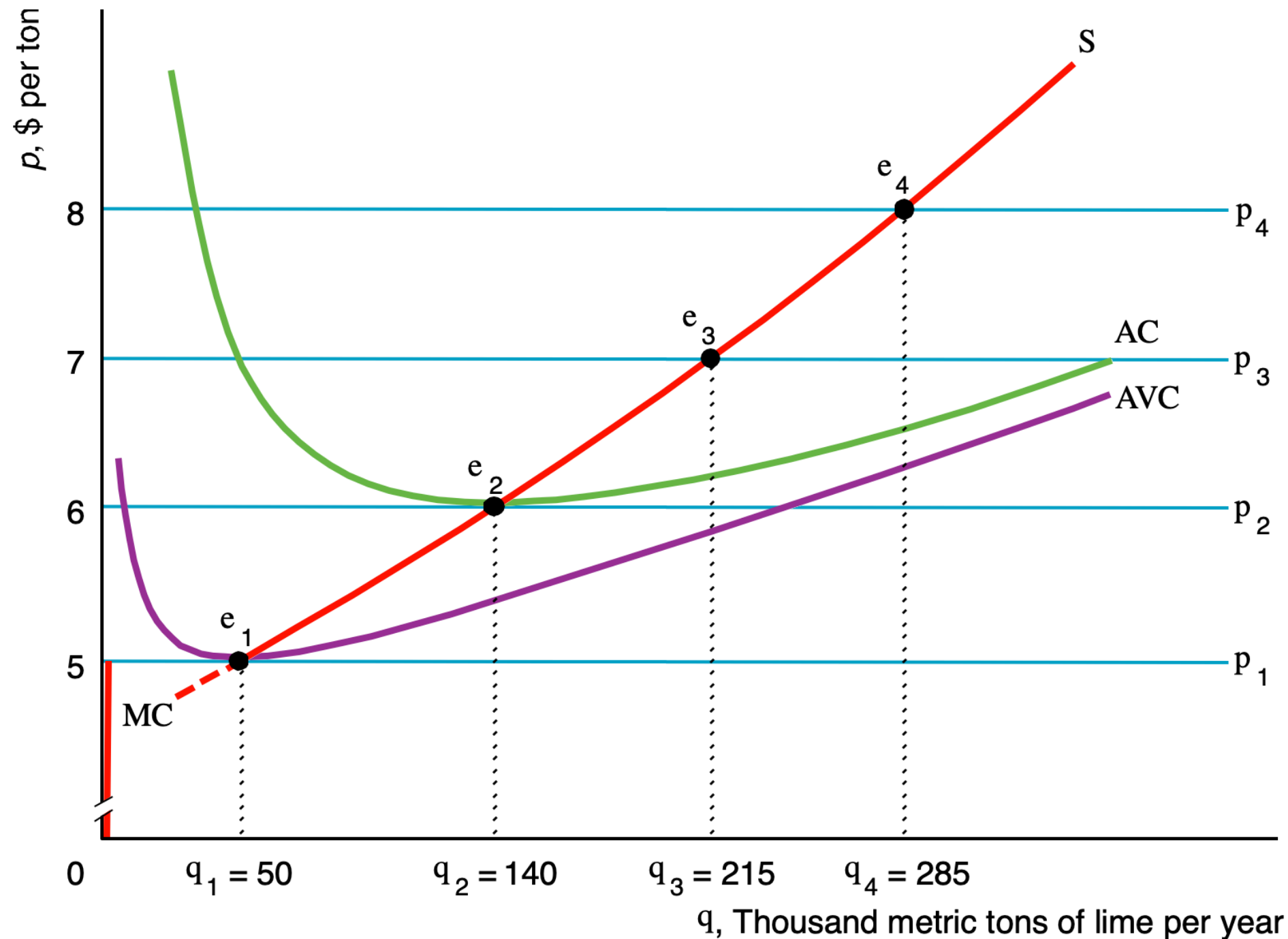
Competition in the Long Run

- In the LR, firms can changed their fixed inputs, so the decision making process is much easier!

- Anytime the profit maximizing output level ($q*$, still where $MC = LRMC$) leads to an economic profit, they produce

  - However, if it leads to an economic loss $-$ shut down

The Short and Long Run Firm Supply Curves
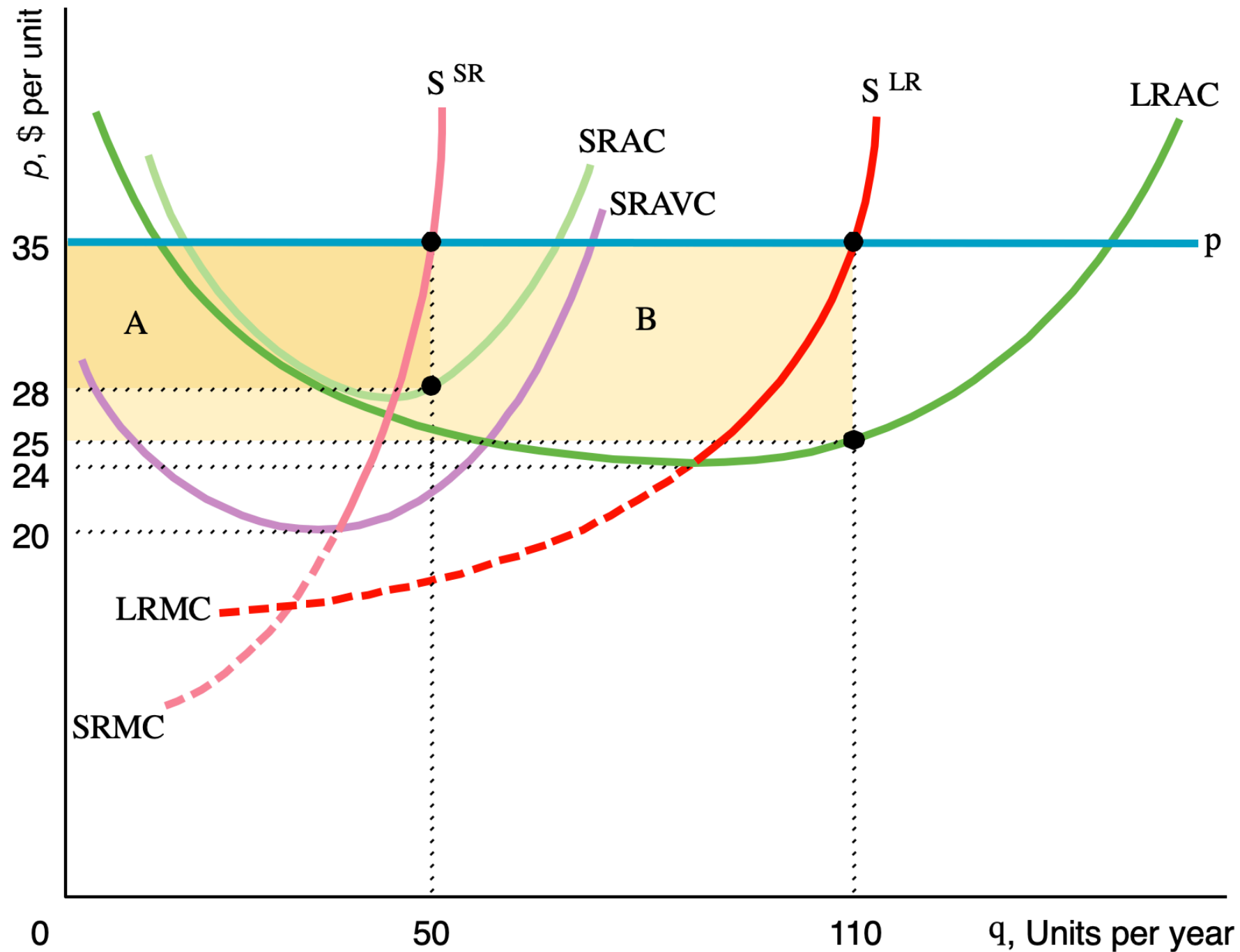
Market Entry and Exit

- Because there are no (low) barriers to entry/exit, it is easy for firms to exit if they're making losses

    - Alternatively, for other firms to enter if they observe firms in the market are making positive profits

- In the LR, firms follow a simple rule:

    - Enter a market if you can make a positive or zero LR profit, exit if you are making a negative LR profit

Average Annual Entry and Exit Rates in U.S. Industries, 1989-1996

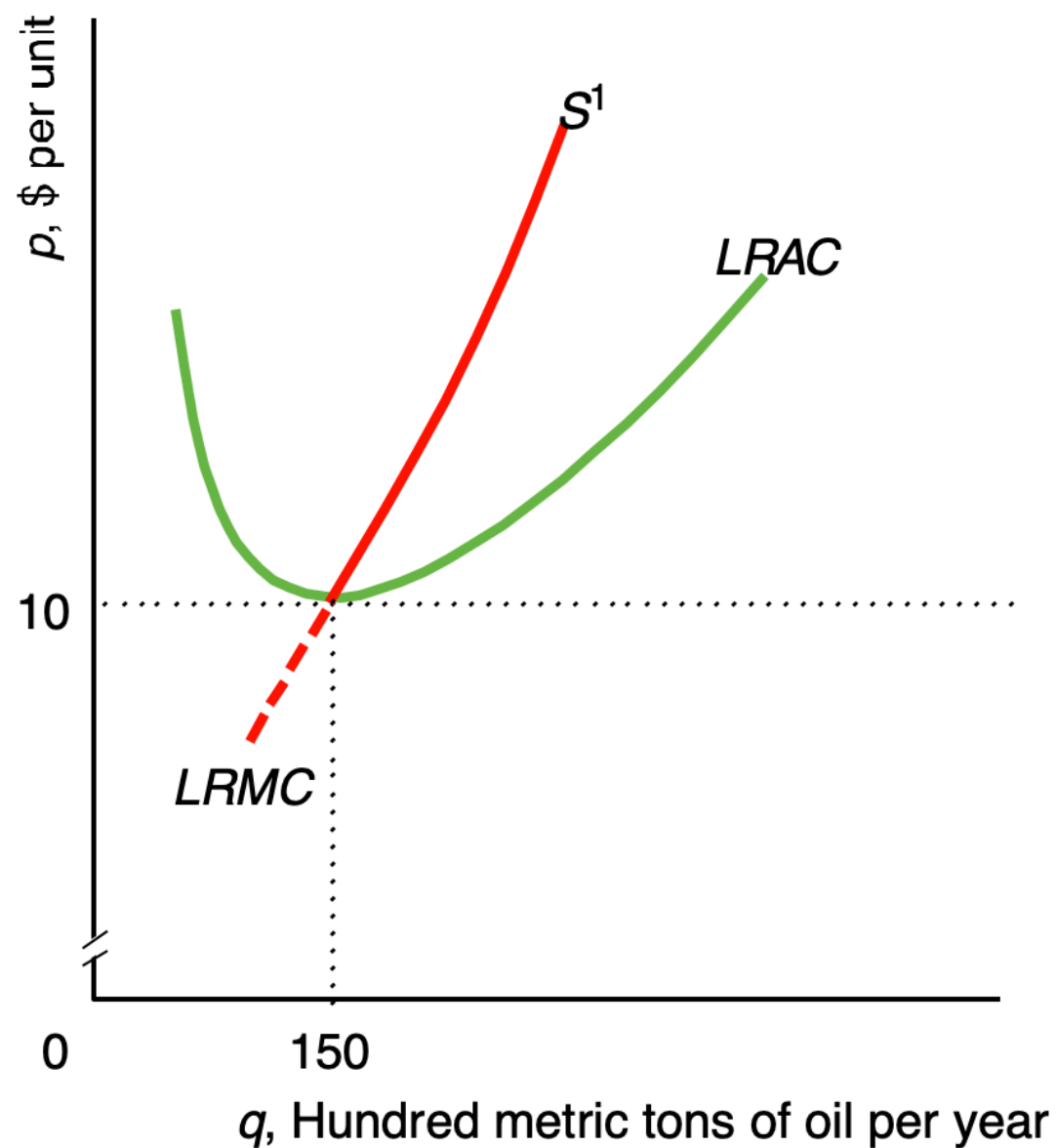| Industry	Entry Rate, %	Exit Rate, %
Total economy	10	8
Agriculture, hunting, forestry, and fishing	11	8
Construction	11	9
Services	10	8
Mining and quarrying	8	9
Total manufacturing	8	7
Textile products, leather, and footwear	12	12
Wood products	10	9
Paper products, printing, and publishing	8	8
Food products, beverages, and tobacco	8	7
Chemical, rubber, plastics, and fuel products	8	6
Electricity, gas, and water supply	4	3

Source: Calculations based on data from the OECD Firm-Level Data Project, **www.oecd.org,** as of 2005.

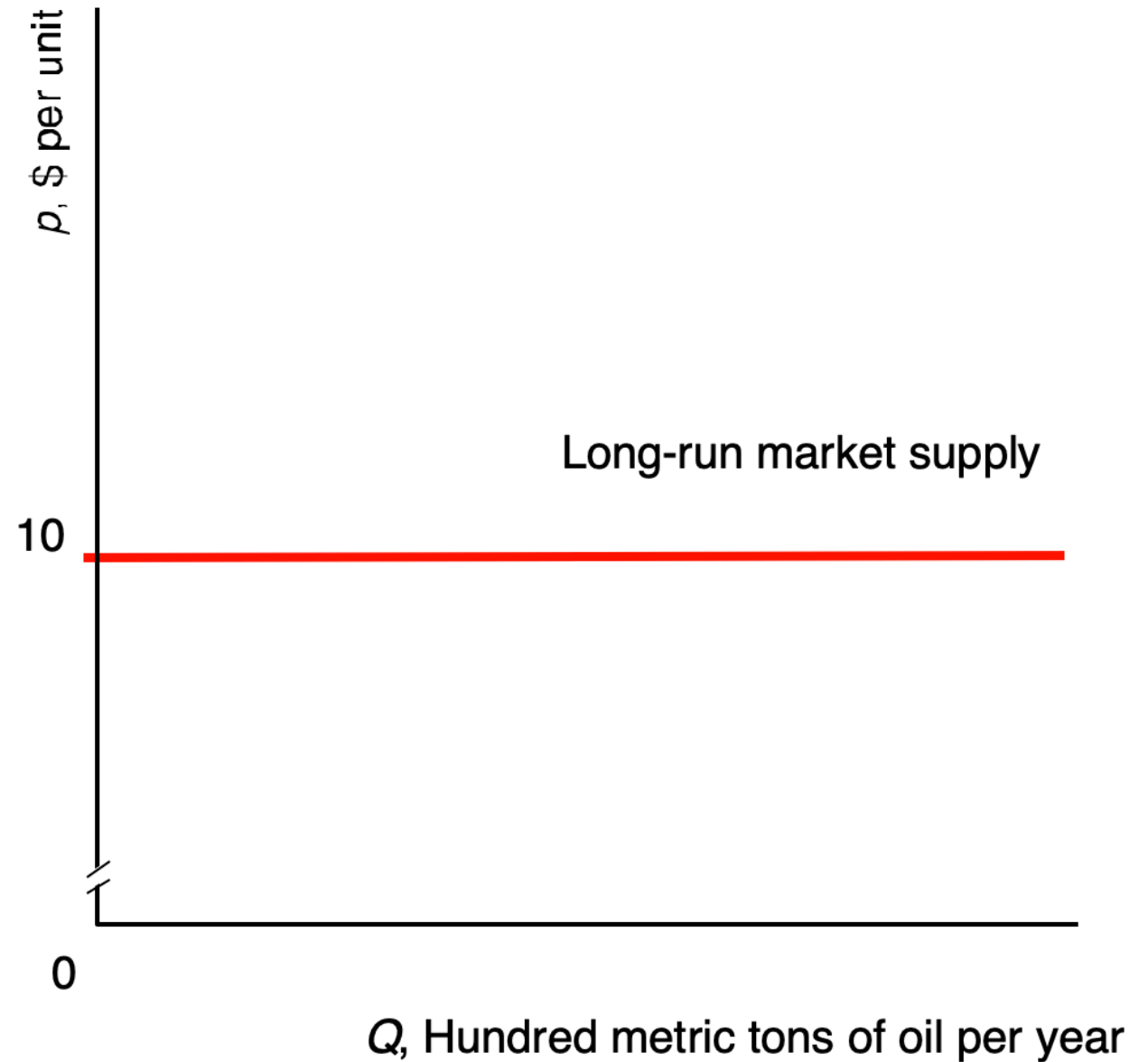# LR Supply with Identical Firms and Free Entry

- Question: if there are identical firms and entry is easy, what should end up being the LR price in the market?

  - Hint: it has to do with the firms' identical LRAC curves

LR Supply with Identical Firms

(a) Firm

p, \$ per unit

S^1

LRAC

10

LRMC

0   150

q, Hundred metric tons of oil per year

(b) Market

p, \$ per unit

Long-run market supply

10

0

Q, Hundred metric tons of oil per year

LR Supply Under Competition

- So when firms are identical and free entry exists, the market price should be equal to the minimum point on firms' LRAC curves