Market Structure I

Presented

By

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Reading List

- Read Chapter 8 of Jeffrey M. Perfloff (2012). Microeconomics (Sixth edition), Pearson Education Ltd.

- Read Chapter 23 and 24 of Hal R. Varian (2014). Intermediate Microeconomics, W. W. Norton and Company.

- Any other Economics textbook

Market Structure

Five common types of market structure:

- Perfect Competition

- Monopoly

- Monopolistic Competition

- Oligopoly

- Duopoly

Section Outline

- **Overview: Market Structure**

- **Competitive Markets**

- Non-competitive Markets

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 (**entry and exit**).
  - The ability of firms to differentiate their products from those of their rivals (**product differentiation**).

Lecture Outline

- **Defining competitive markets**.

- **Short-run behavior** of the competitive firm.

- Short-run **characteristics.**

Competitive Markets

Defining Competitive Markets

- This is based on **the theory of perfect competition**, or more broadly **the notion of free market**. There is **no external control of market forces and resources and can move in and out** of the market in response to changing incentives.

Competitive Markets

Conditions that define the competitive market:

- Standardized product.

- Firms are price takers.

- Firms and consumers have perfect information.

- Factors of production are perfectly mobile.

Perfectly Competitive Market

- Assumptions of Perfect Competition (Why demand curve is horizontal):

    1. Firms sell **homogenous or identical products**;
    2. **Large number** of sellers and buyers;
    3. **Free entry and exit**;
    4. Full information/Perfect knowledge;
    5. Negligible/low transaction costs;
    6. Perfect mobility of productive resources.

Note: The first two assumptions make competitive firms' price-takers. If price is increased customers will buy the same product from elsewhere. Hence, there is no incentive to lower the price of a good since the firm can sell as many goods as possible at that market price.

Priscilla T. Baffour

Competition in the Short-run (Demand Curve)

- **Demand Curve of the Firm**

$$TR = P \ x \ Q \ \rightarrow AR = \frac{TR}{Q} = \frac{P \ x \ Q}{Q} = P$$

$$\text{Also, } MR = \frac{\partial TR}{\partial Q} = P$$

$$\therefore P = AR = MR$$

- **Demand Curve of the Industry/Market**
  - The horizontal summation of all individual demand curves. Thus, downward sloping, depicting a negative relationship between price and quantity.
  - At higher prices, consumers will purchase a lesser quantity of the good
  - At lower prices, all things being equal, consumers will purchase more of the product.

Price

$D_{firm} = AR = MR = P$

D_{market}

Q   Quantity
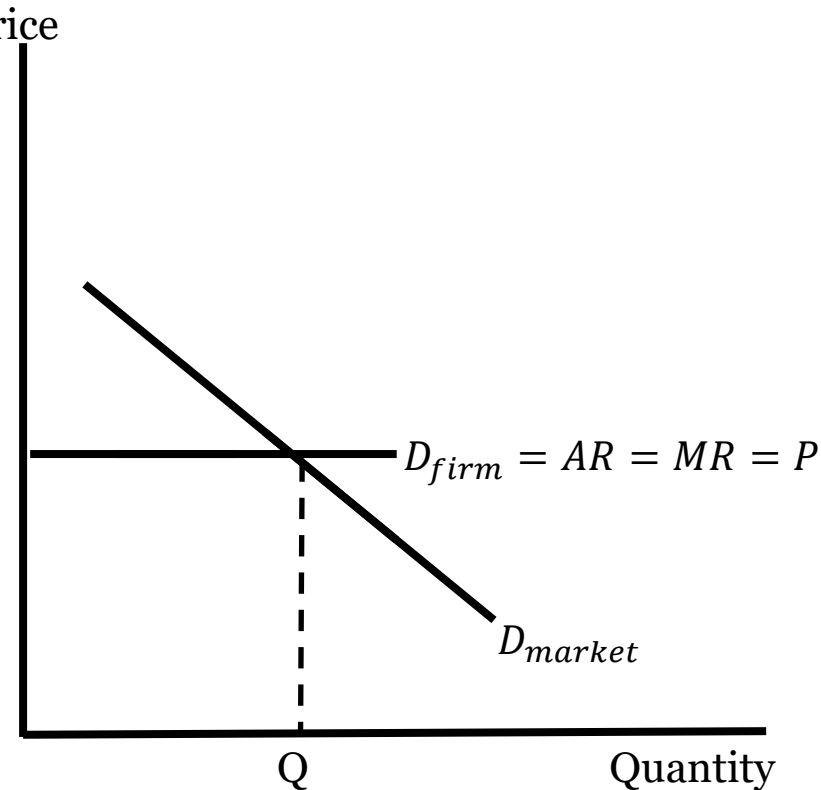
Competition in the Short-run (Profit Maximization)

- Economists usually assume that **the goal of all firms** (not only competitive firms) **is profit maximization**.

- A firm's profit (π) is defined by the difference between its total revenue *(TR)* and total cost *(TC)*. The *TC* considered is the economics cost. This constitutes both explicit and implicit costs. Profit is represented mathematically as;

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

$$\frac{\partial \pi}{\partial q} = \frac{\partial TR}{\partial q} - \frac{\partial TC}{\partial q} = 0$$

- Hence, the first-order condition (FOC) for profit maximization

- is, $MR(slope\ of\ TR\ curve)=MC\ (slope\ of\ TC\ curve)$. **Since** $MR = P$, **the FOC might be written as** $MC = P$.

Priscilla T. Baffour

Competition in the Short-run (Profit Maximization)

- The second-order condition (SOC) for profit maximization requires that the second derivative of the profit function be negative. This is given as:

$$\frac{\partial^2 \pi}{\partial q^2} = \frac{\partial^2 TR}{\partial q^2} - \frac{\partial^2 TC}{\partial q^2} < 0$$

- Thus, $\frac{\partial^2 TR}{\partial q^2}$ $(slope\ of\ MR\ curve) < \frac{\partial^2 TC}{\partial q^2}$ $(slope\ of\ MC\ curve)$. The SOC therefore requires that the slope of the MC curve to be steeper than that of the MR curve or the MC curve must cut the MR curve from below. In perfect competition, the slope of the MR curve is zero; resultantly, the SOC requires that the MC curve must have a positive/rising slope. This (SOC) is simplified as:

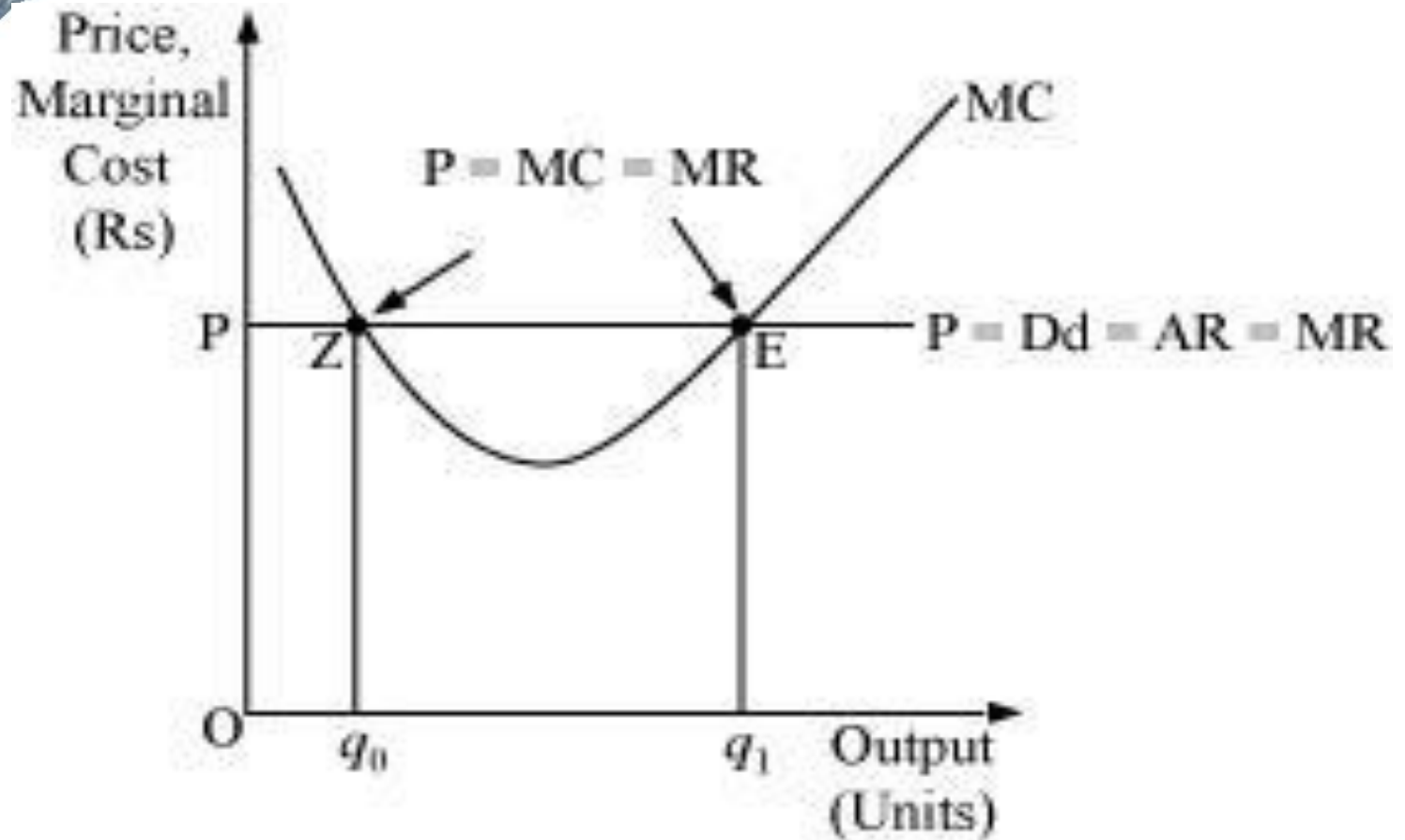$$0 < \frac{\partial^2 TC}{\partial q^2}$$

Competitive Markets

Short-run Maximizing Behaviour
- Remember, the competitive firm is **profit- maximizing**.

- **This condition means, firm equates MC and MR. But, MR = AR = P ➔ MC = P. Thus, the profit maximizing level of output can be determined.**

Competitive Markets

Competition in the Short-run (Profit Maximization)

Optimum output level (*TR/TC* versus *MR/MC*): In Figure 2(a), the optimum quantity is where *MR=MC*. This same optimum quantity in Figure 2(b) provides the largest profit (gap between TR and TC).
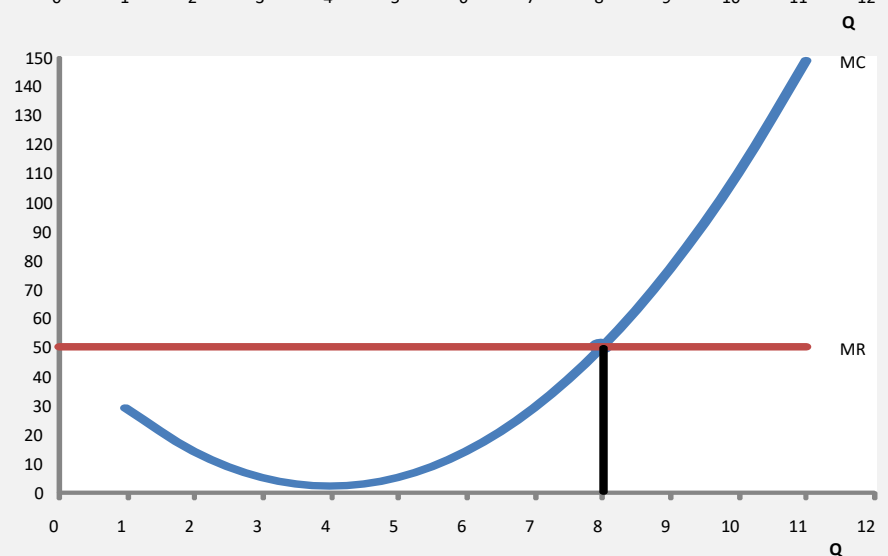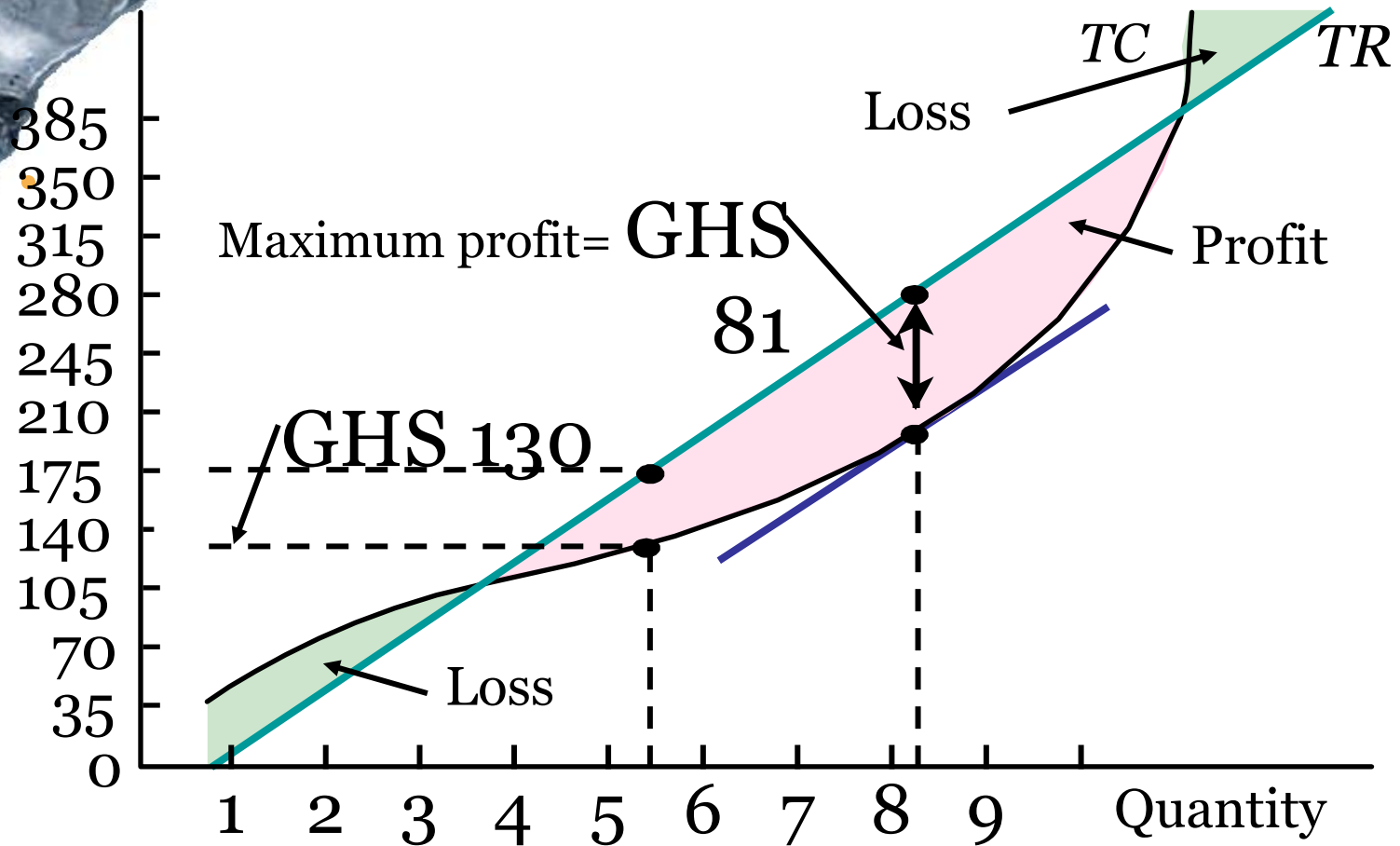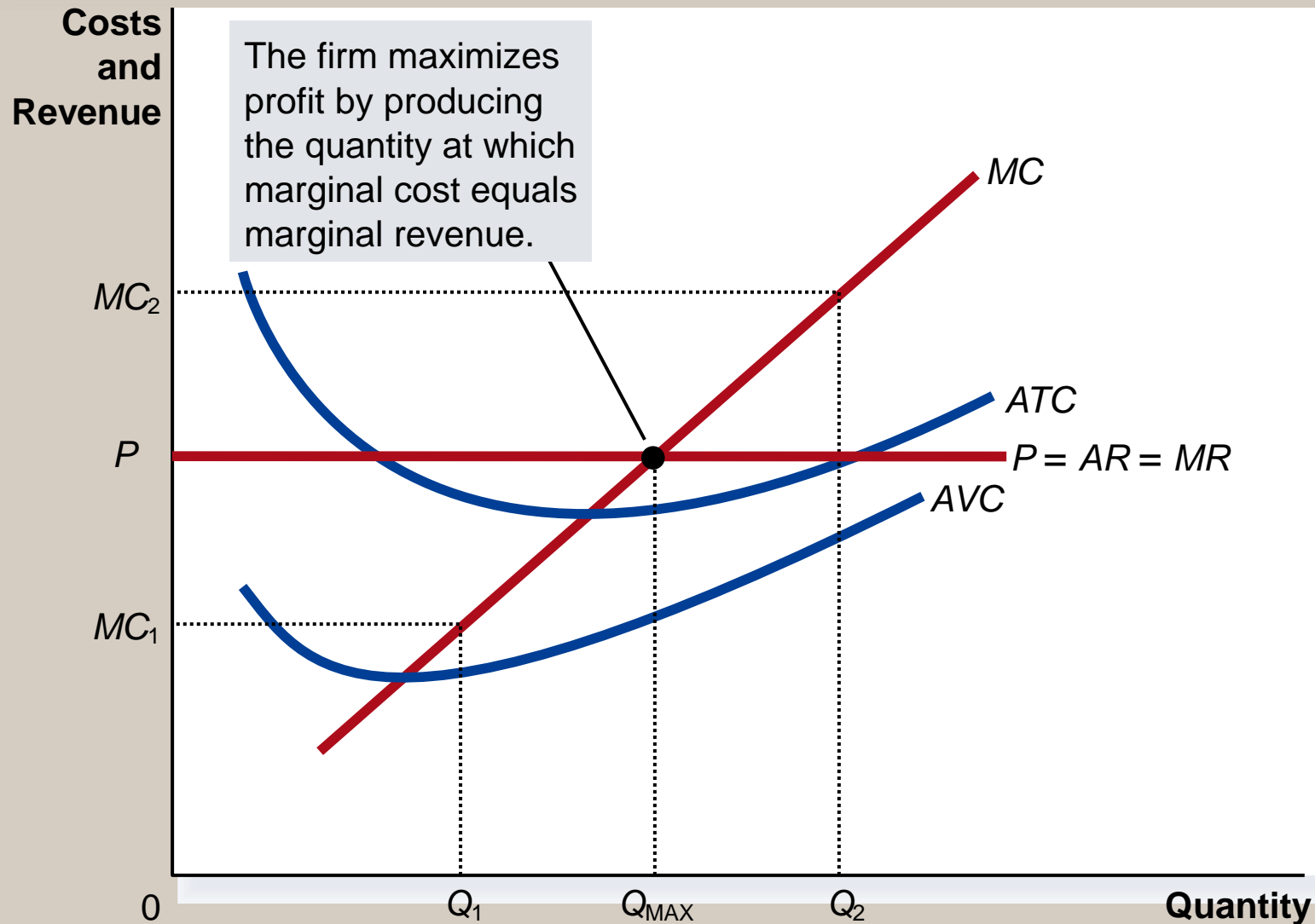

Figure 2(a): Total Cost and Total Revenue (GHS)
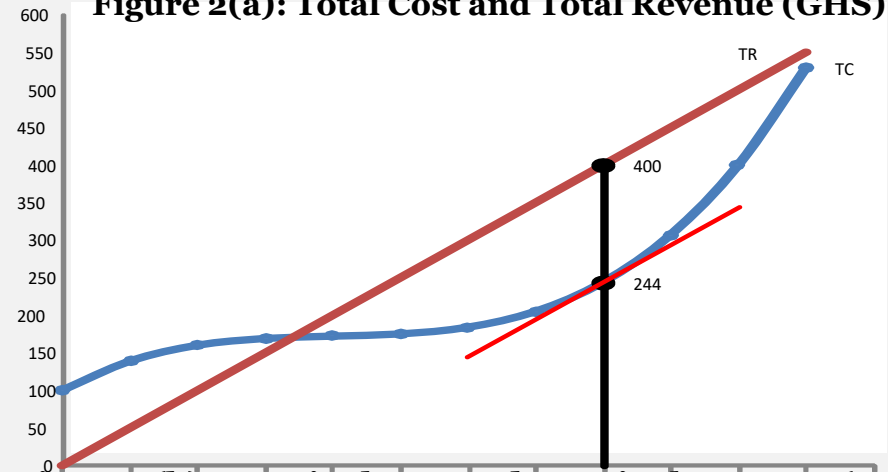
Figure 2(b): Marginal Cost and Marginal Revenue (GHS)

Competition in the Short-run (Profit Maximization)

TC *TR*

Loss

Maximum profit= GHS 81

GHS 130

Profit

Loss

Quantity

Profit Maximization for a Competitive Firm

Costs and Revenue

The firm maximizes profit by producing the quantity at which marginal cost equals marginal revenue.

MC

ATC

$P = AR = MR$

AVC

MC_2

P

MC_1

0 Q_1 Q_{MAX} Q_2 Quantity

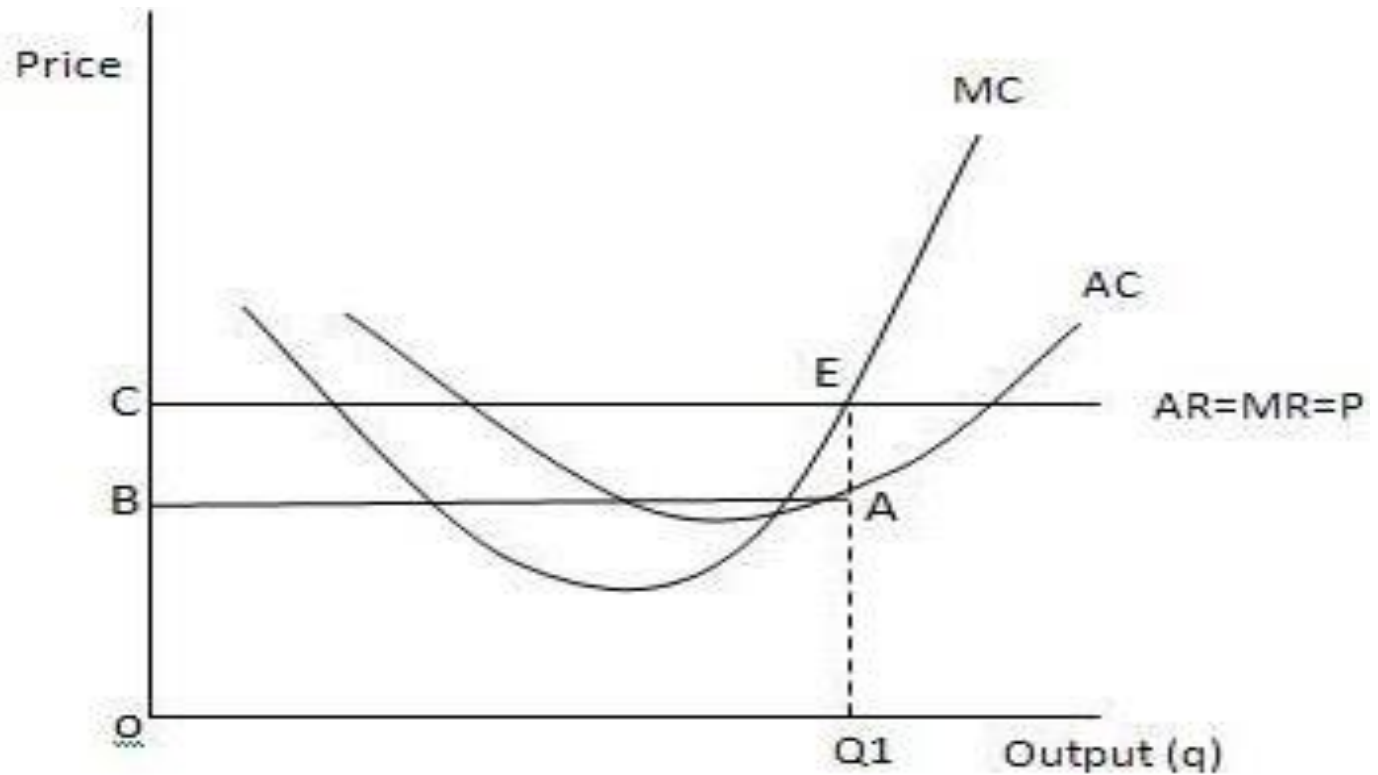# Competition in the Short-run (Profit Maximization)

Figure 4

Economic Profit (P > ATC): Here, the return on the existing allocation exceeds its opportunity cost.

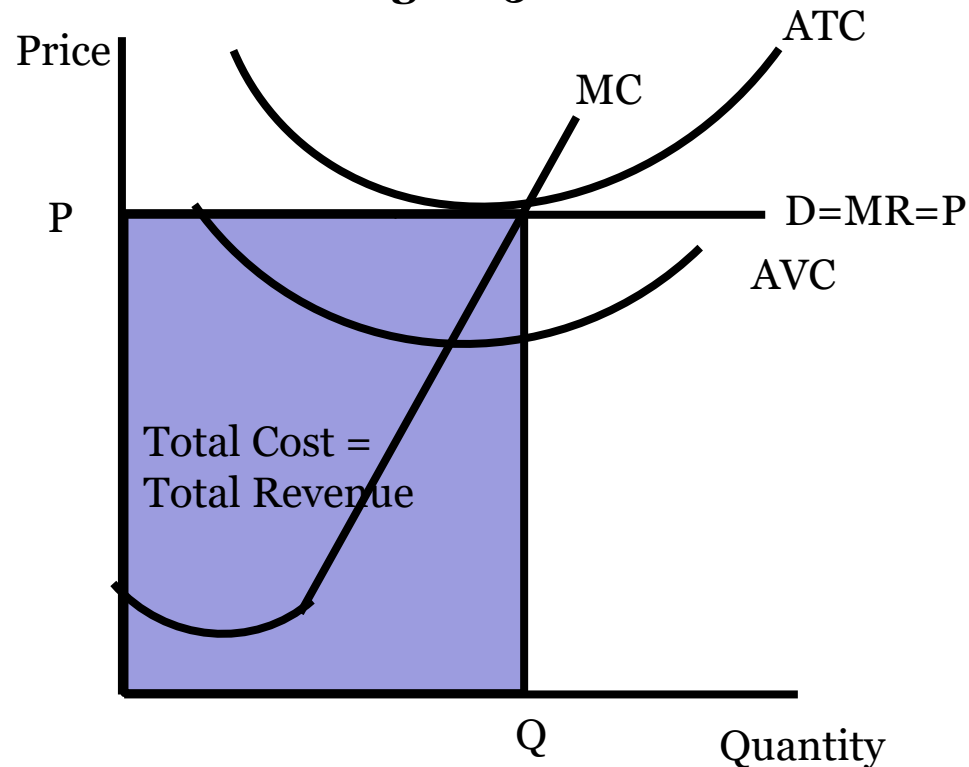# Competitive Markets

Economic Profit

Competitive Markets

Defining Economic Profits

- Economic profit per unit is the vertical distance E-A or AR − AC.

- Total profit is (AR − AC)Q1.

- Stated differently, profit = (P − AC)Q*.

# Competition in the Short-run (Profit Maximization)

Normal Profit (P = ATC): This is the breakeven profit where firms earn zero economic profit but normal profit. **Normal profit is where the firm earns fair profit, such that the returns from exiting allocation is not different from its opportunity cost.**

Figure 5

Figure 5 graph showing Price on the vertical axis and Quantity on the horizontal axis, with ATC, MC, AVC curves and D=MR=P line at price P, with shaded region labeled "Total Cost = Total Revenue" at quantity Q.

Competition in the Short-run (Profit Maximization)

- A firm encounters an **economic Loss (P < ATC)** when the return on the existing allocation is less than its opportunity cost.

- **The firm should continue to operate because it covers part of its fixed cost or long-term unavoidable obligations. Thus, if the firm shuts down, it will incur a higher loss than if it continues to operate.**

- A firm should only shut down if it cannot cover its variable costs.

Price

ATC

MC

AVC

Loss

P

D=MR=P

Total Cost

Q

Quantity
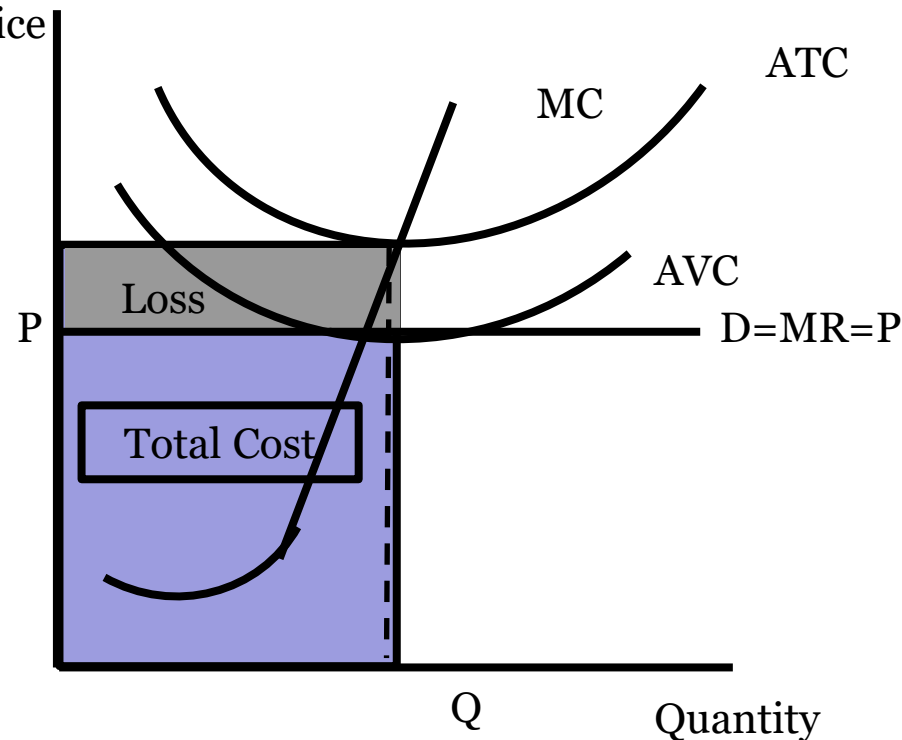
Competitive Markets

MC, AC and AVC: **A Few Points to Note**
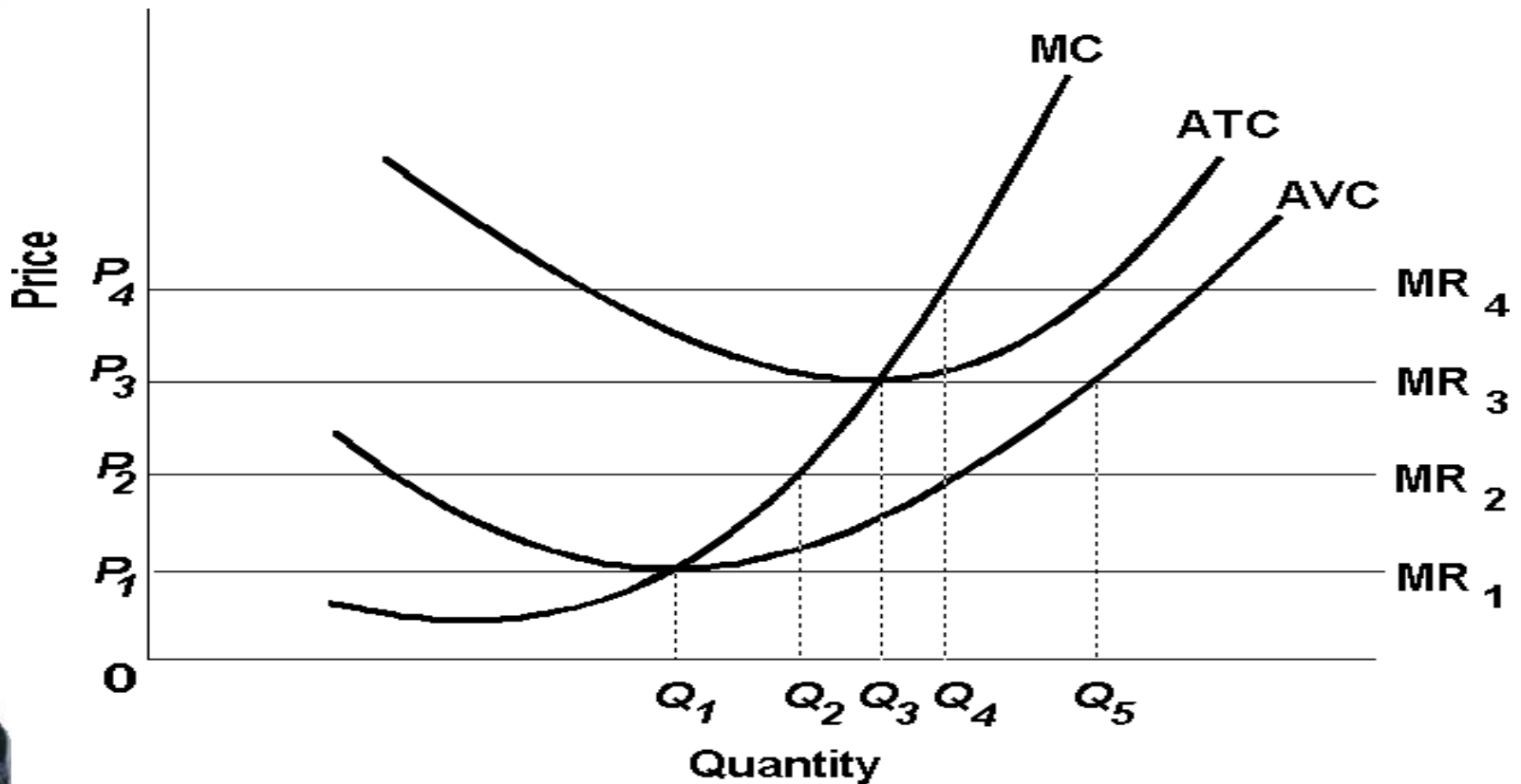
MC, AC and AVC: **A Few Points to Note**

- MC is related to AVC in the same way as it is to AC.

- AVC is minimized to the left of the minimum of AC.

Competitive Markets

- **A *shutdown* refers to a short-run** decision **not to produce anything during a specific period of time** because of current market conditions
- ***Exit* refers to a long-run decision to leave the market**

Competitive Markets

Operating Decisions: When to Shut Down?

- Remember, the profit maximizing condition is

$$MC=MR\equiv P$$

- This is valid even if the firm is losing money, provided the firm does not shut down instead.

- When should the firm choose to shut down?

Competitive Markets

Operating Decisions: When to Shut Down?

- There are two different shut down conditions: short-run and long-run.

- **In the short-run, a firm will continue to operate as long as TR ≥ TVC, or equivalently, P ≥ AVC.**

Competitive Markets

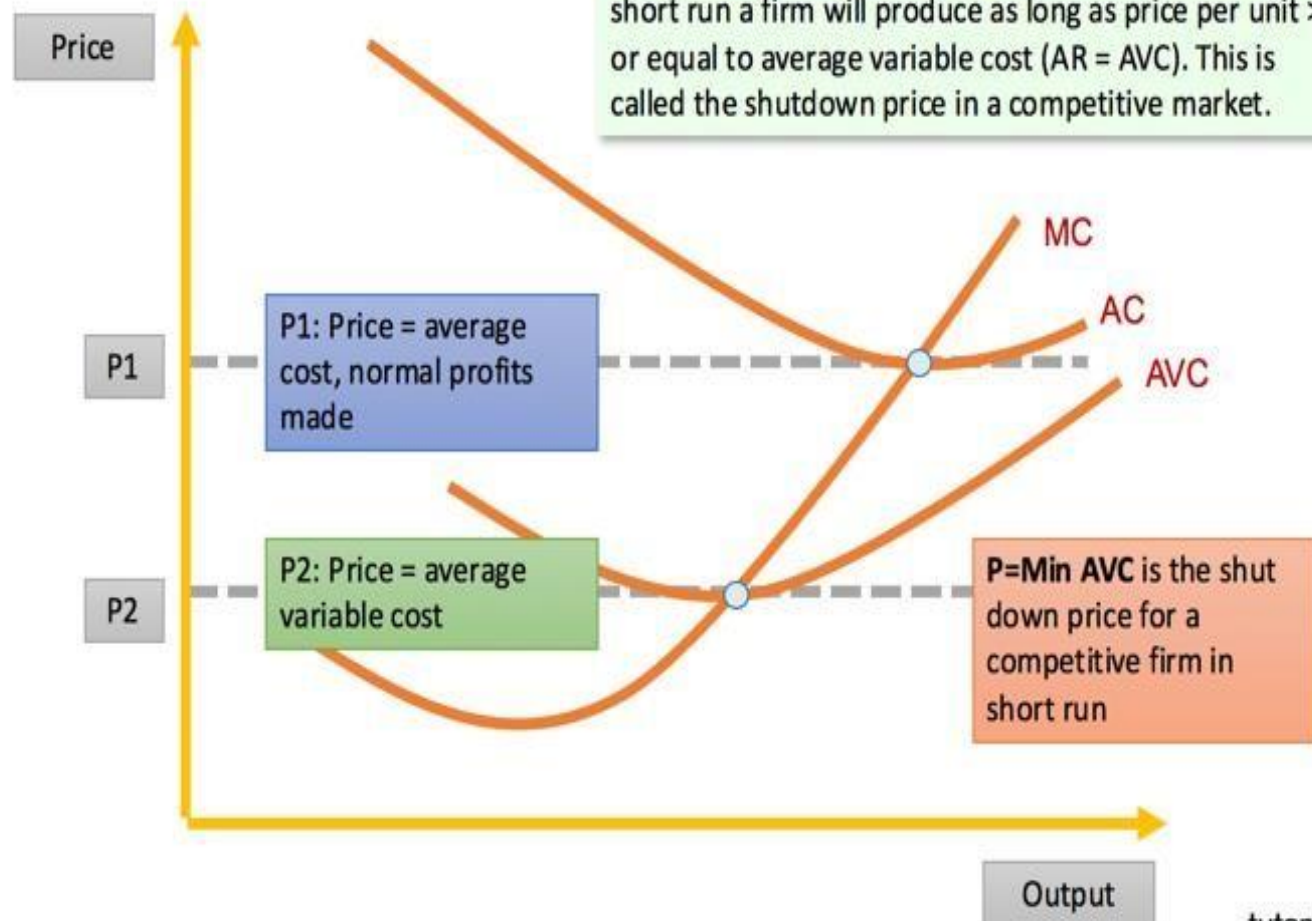**P = AVC (Does it make sense to operate in the short run?)**

Competitive Markets

P = AVC (Does it make sense to operate in the short run?)

Yes

- The firm may think that it is a short run condition.

- To maintain goodwill and confidence of customers.

- Not to lose the market share.

- Keep inputs like labour in employment.

Competitive Markets

A business needs to make **at least normal profit in the long run** to justify remaining in an industry but in the short run a firm will produce as long as price per unit > or equal to average variable cost (AR = AVC). This is called the shutdown price in a competitive market.
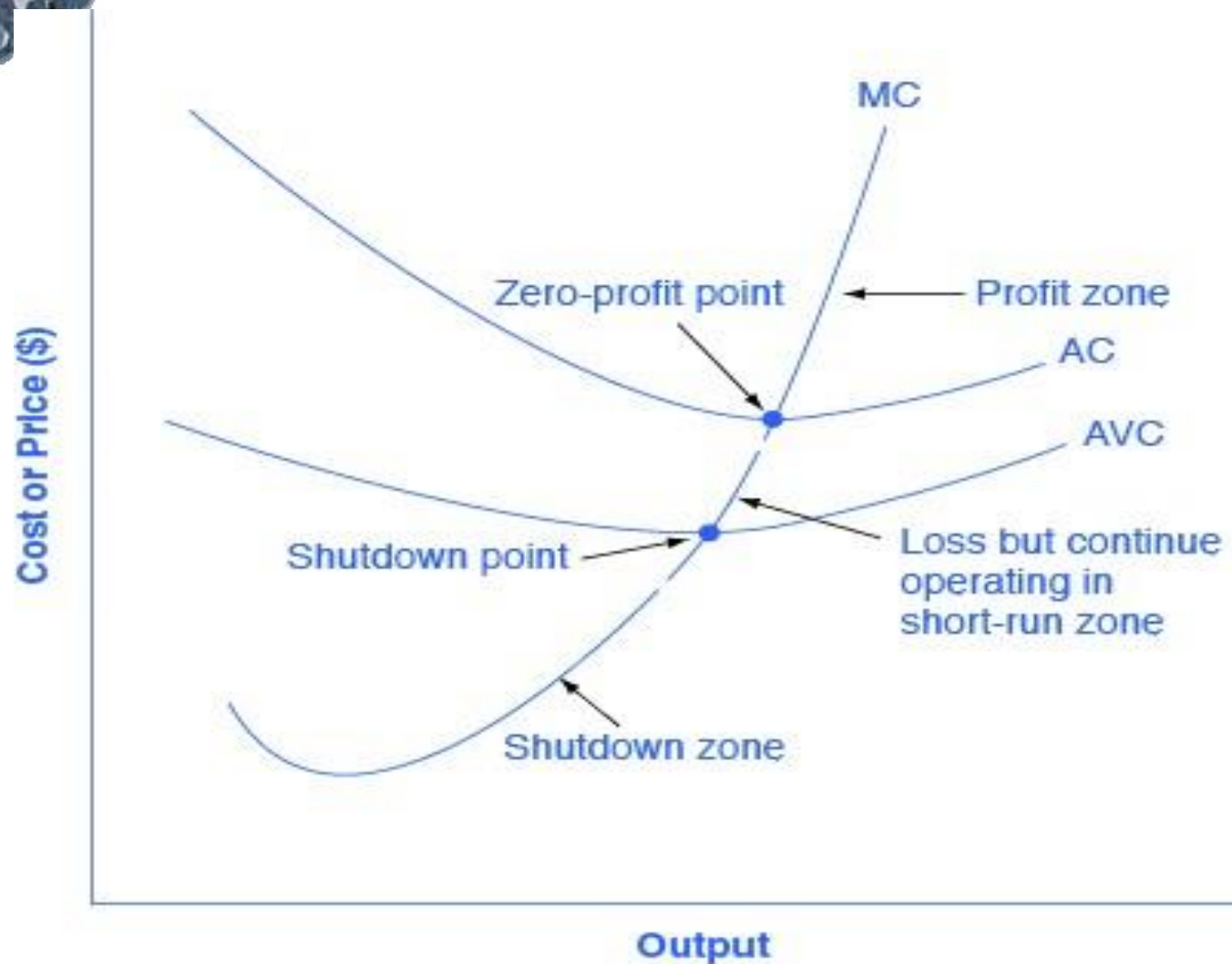
Price

MC

AC

AVC

P1: Price = average cost, normal profits made

P1

P2: Price = average variable cost

P2

P=Min AVC is the shut down price for a competitive firm in short run

Output

Competitive Markets

Operating Decisions: When to Shut Down?

- In the Long-run, a firm can only continue to operate if all its costs are covered. That is, TR ≥ TC or equivalently, P ≥ AC.
- **We can conclude that a competitive firm will maximize profit where MC=MR=P, provided that P≥ AVC in the S-R, and P ≥ AC in the L-R.**

Competitive Markets

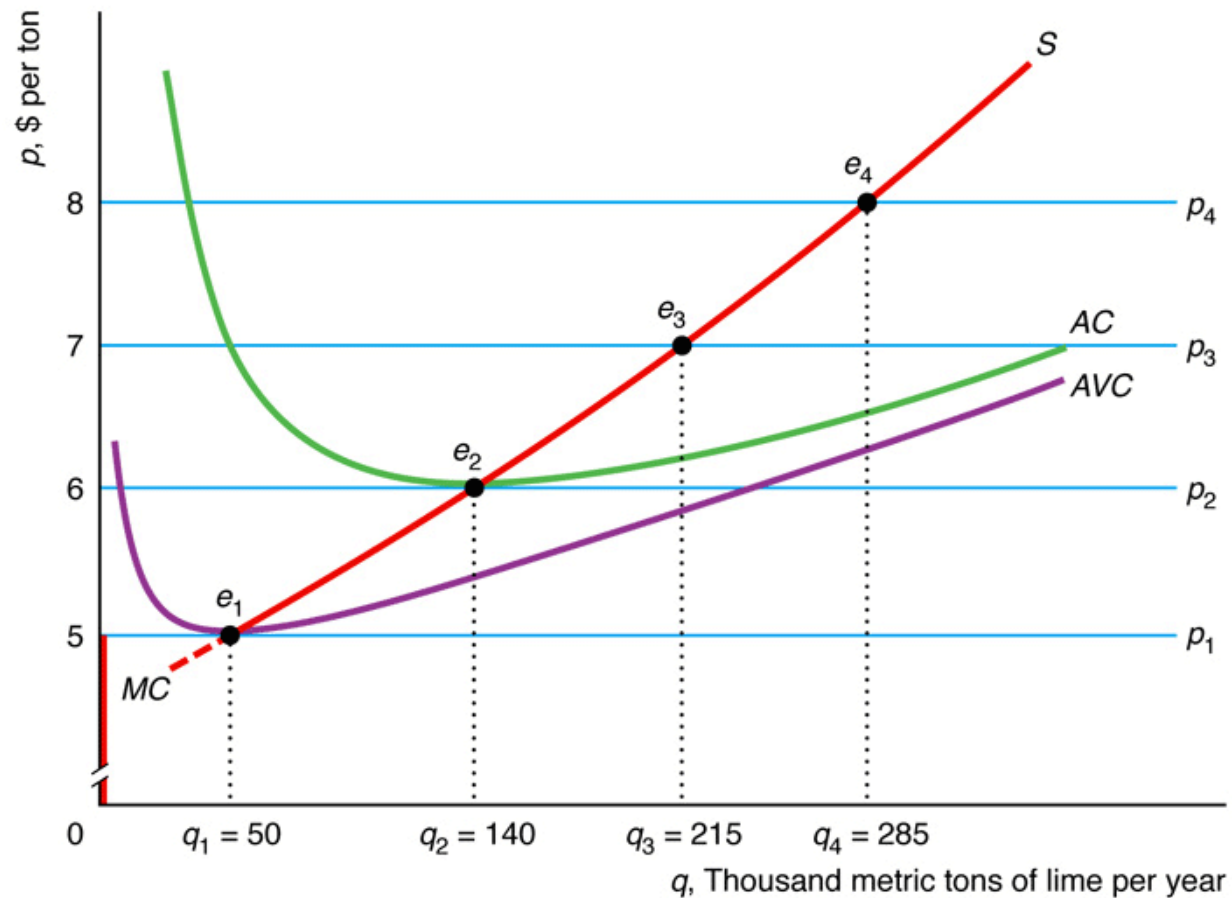# Short-Run Firm Supply Curve

- 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.

Competitive Market
Short-run Firm Supply Curve

Competitive Markets

Short-Run Firm Supply Curve

- The *Supply curve* is the section of *MC* above **min *AVC***.
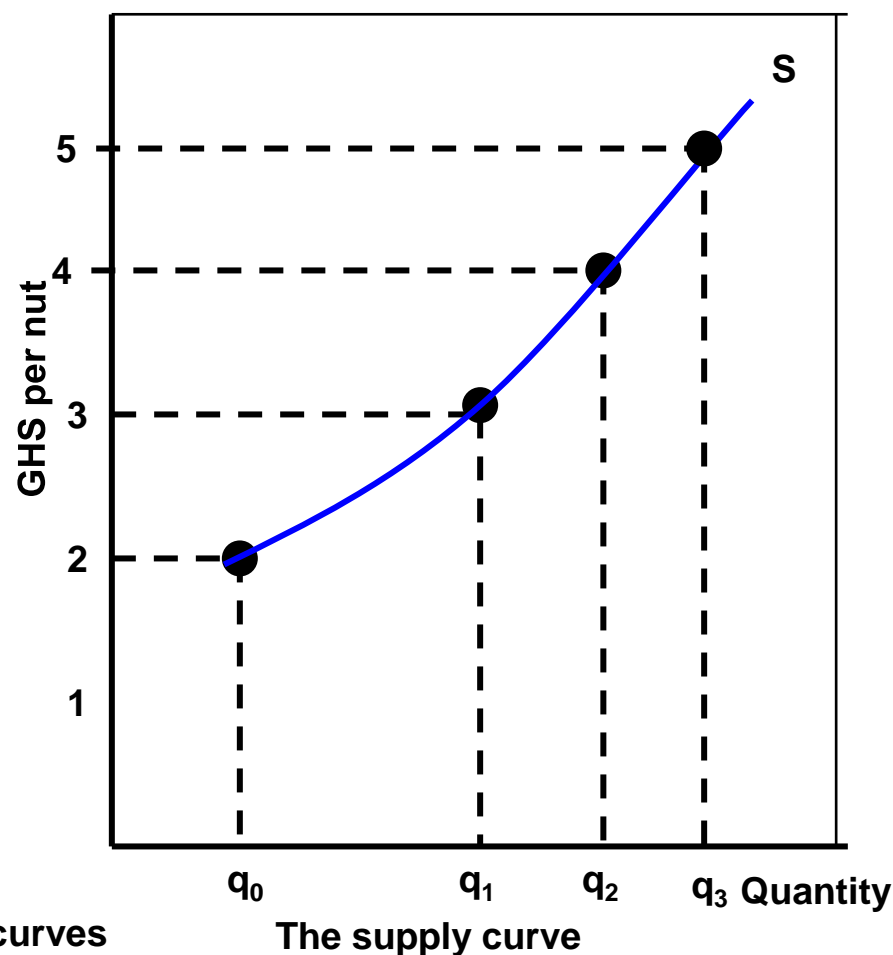
Competition in the Short-run (Supply Curve)
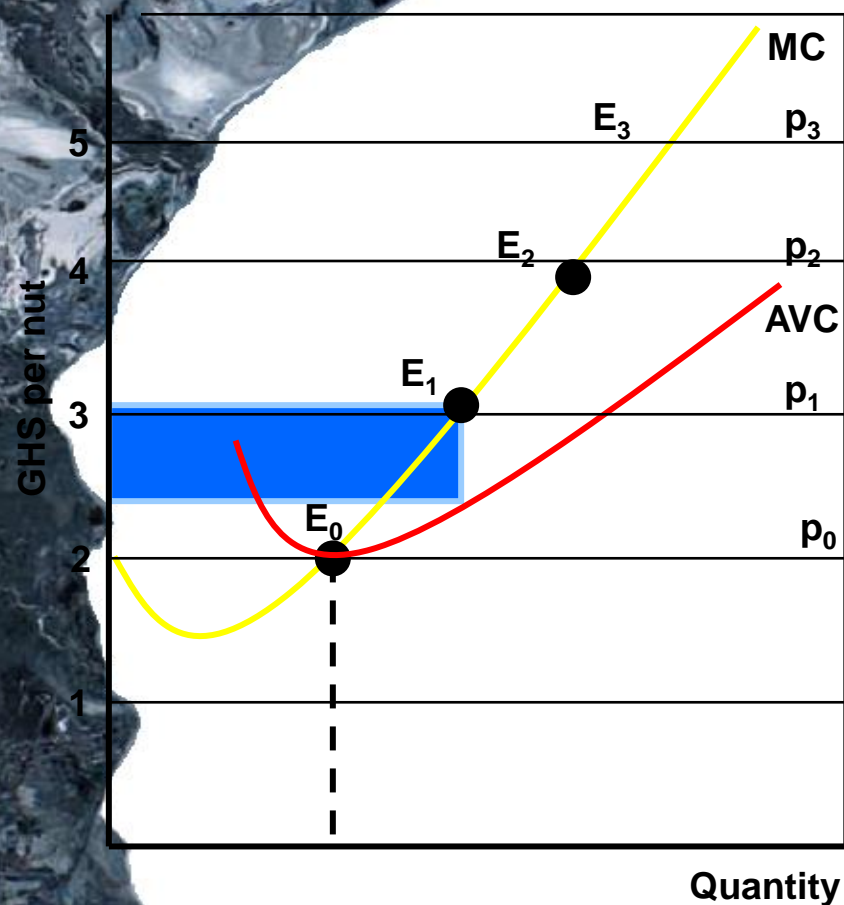
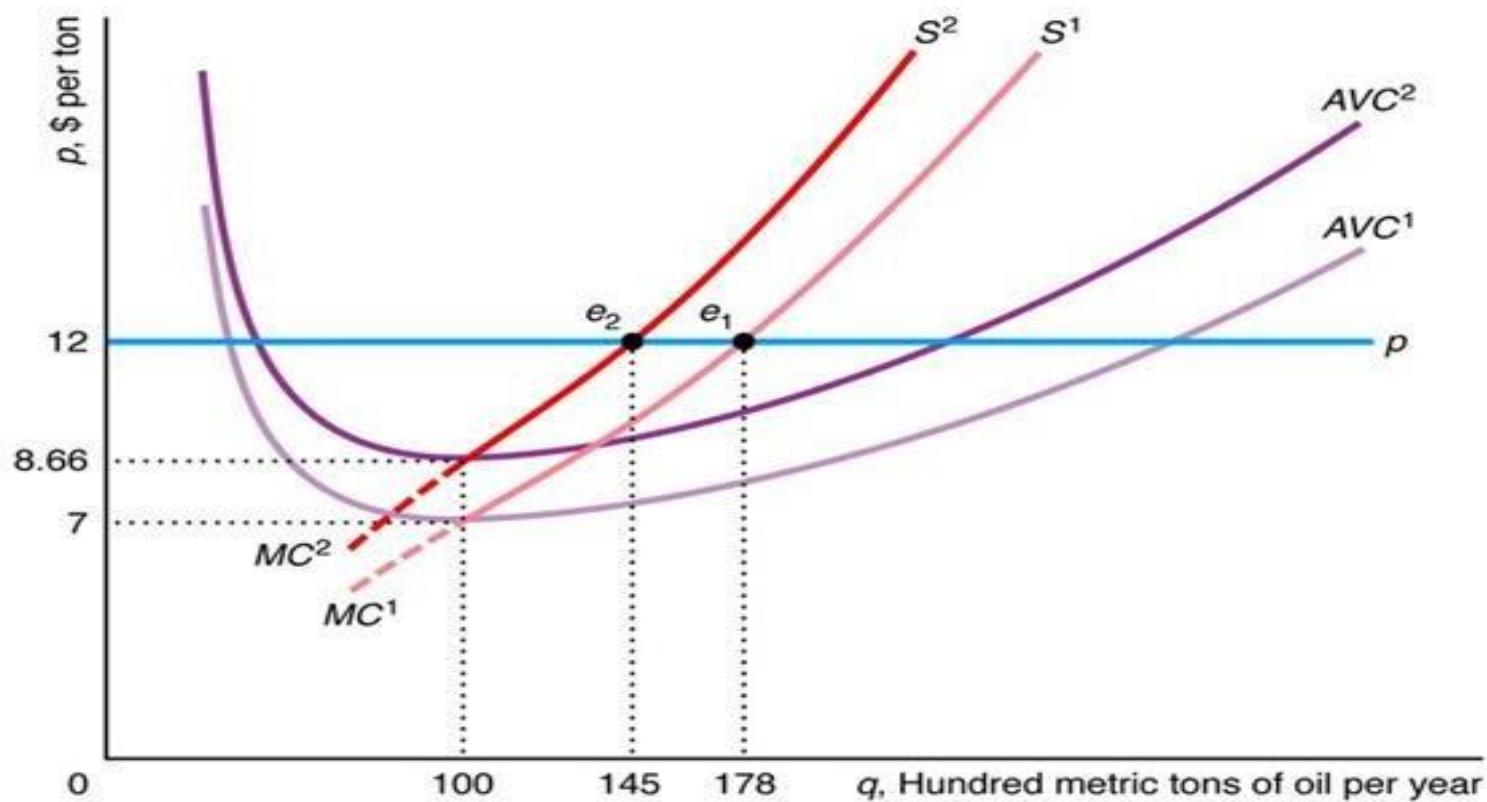**Figure 7. Marginal cost and average variable cost curves**

The supply curve

Competitive Markets

- What happens if the cost structure of the firm changes? This may be due to changes in factor prices.

Competitive Market
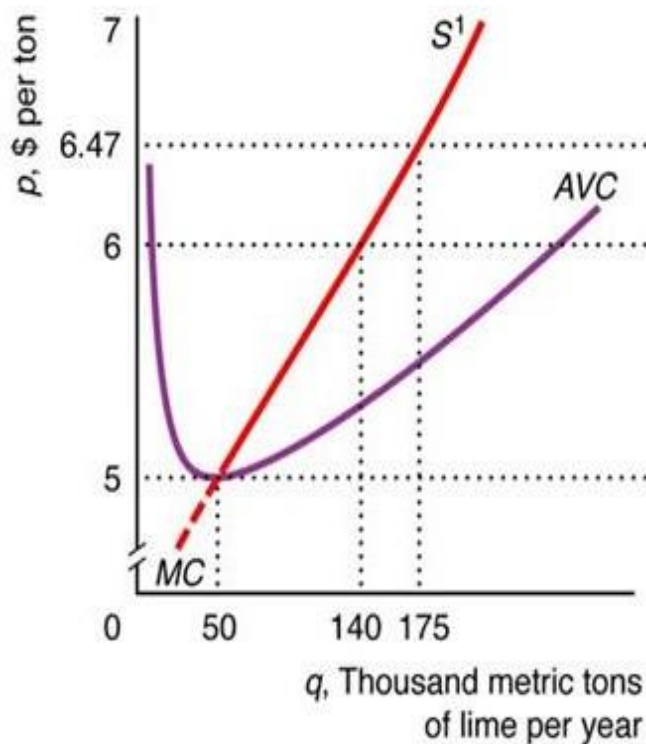# Short-run Firm Supply Curve

Competitive Markets

. **Short-Run Market Supply (Identical Firms)**

- **This is analogous to that used in the generation of market demand curve.**

- **Here, we announce a price and then add together the amounts each firm wishes to supply at that price.**

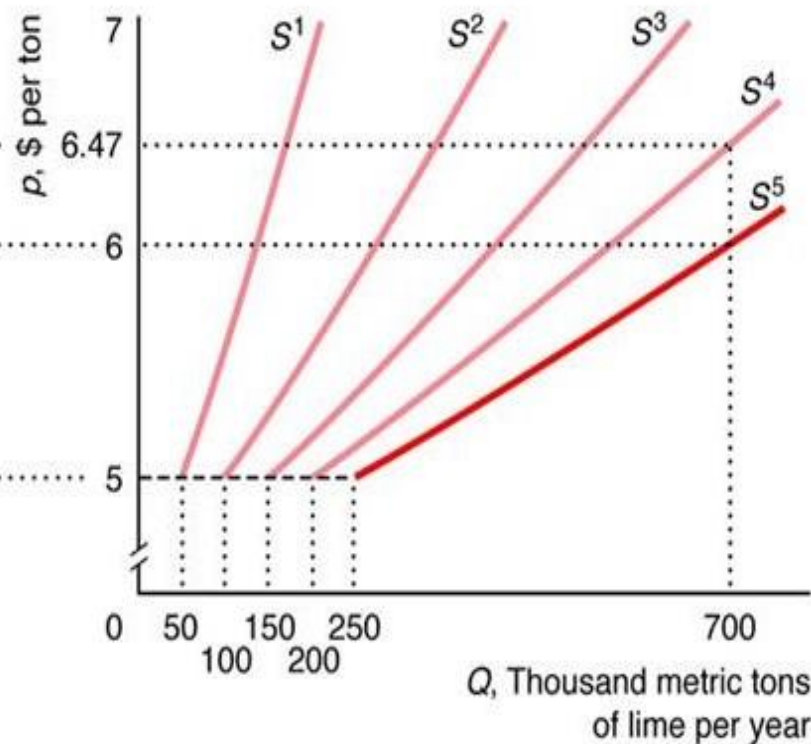- The resulting sum is the industry supply curve.

Competitive Markets

Short-run market supply of identical firms

Competition in the Short-run (Supply Curve)

- The competitive firm faces a supply curve which is same as the same shape of its *MC* curve above the level of *AVC*.

- **The supply curve of a firm in perfect competition is its MC curve above the minimum AVC.**

- **The supply curve of a perfectly competitive industry is the sum of the MC curves of individual firms.**

Competition in the Short-run (Supply Curve)

- **Thus the total market output at each price is the sum of the outputs supplied by all firms at the prevailing price**.

- **The shape of the market supply curve is dependent on:**
  - **Technology;**
  - **Factor prices** and
  - **Size distribution of firms in the market**. Note that the firms are not of the same sizes as there are different entrepreneurial efficiencies.

- These factors will determine the shape of the market supply because they determine the cost structure of the firms in the market and thus by extension determine the shape of the industry supply curve.

Competition in the Short-run (Industry/Market Equilibrium)

The short-run market price is determined by the intersection of the supply and demand curves.
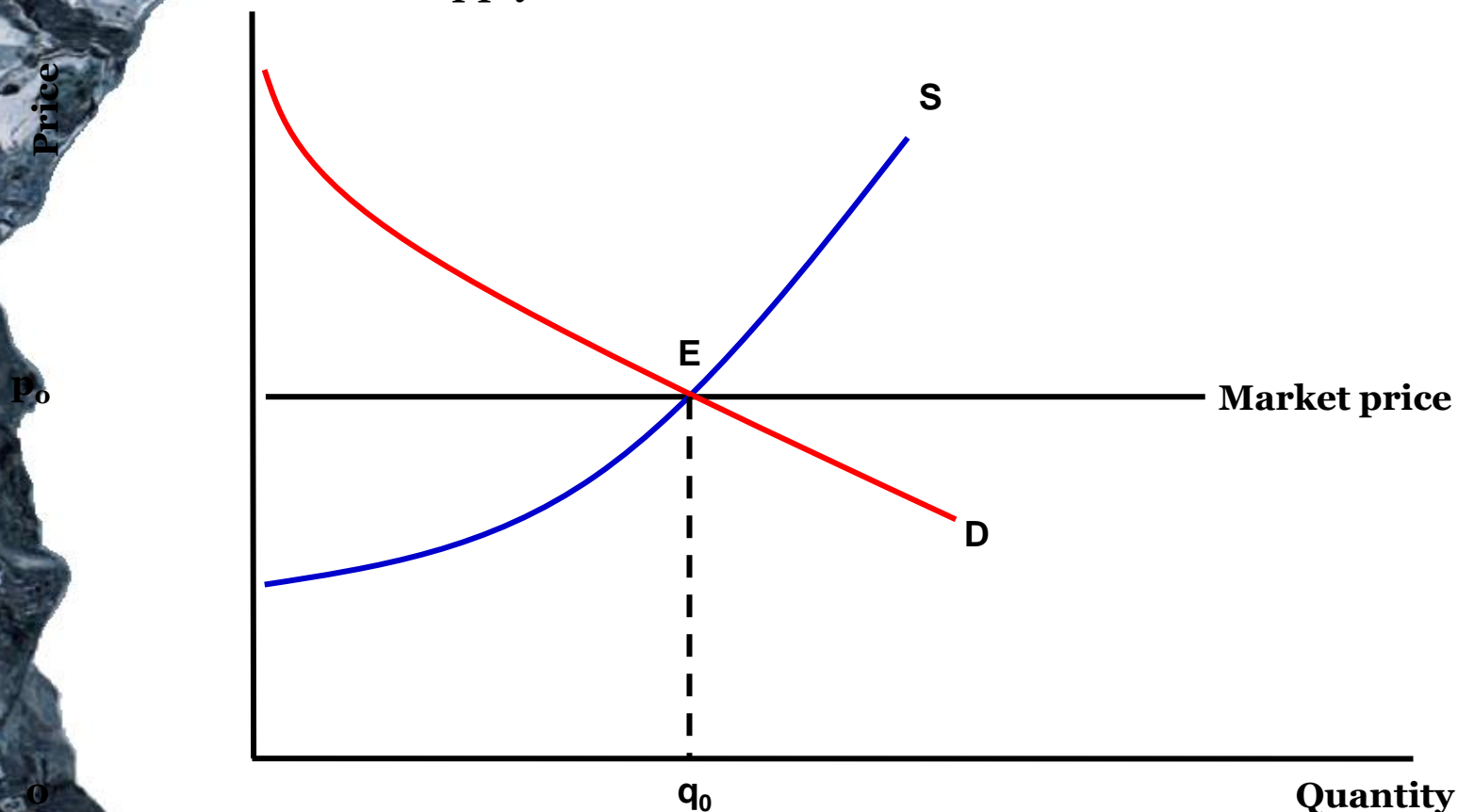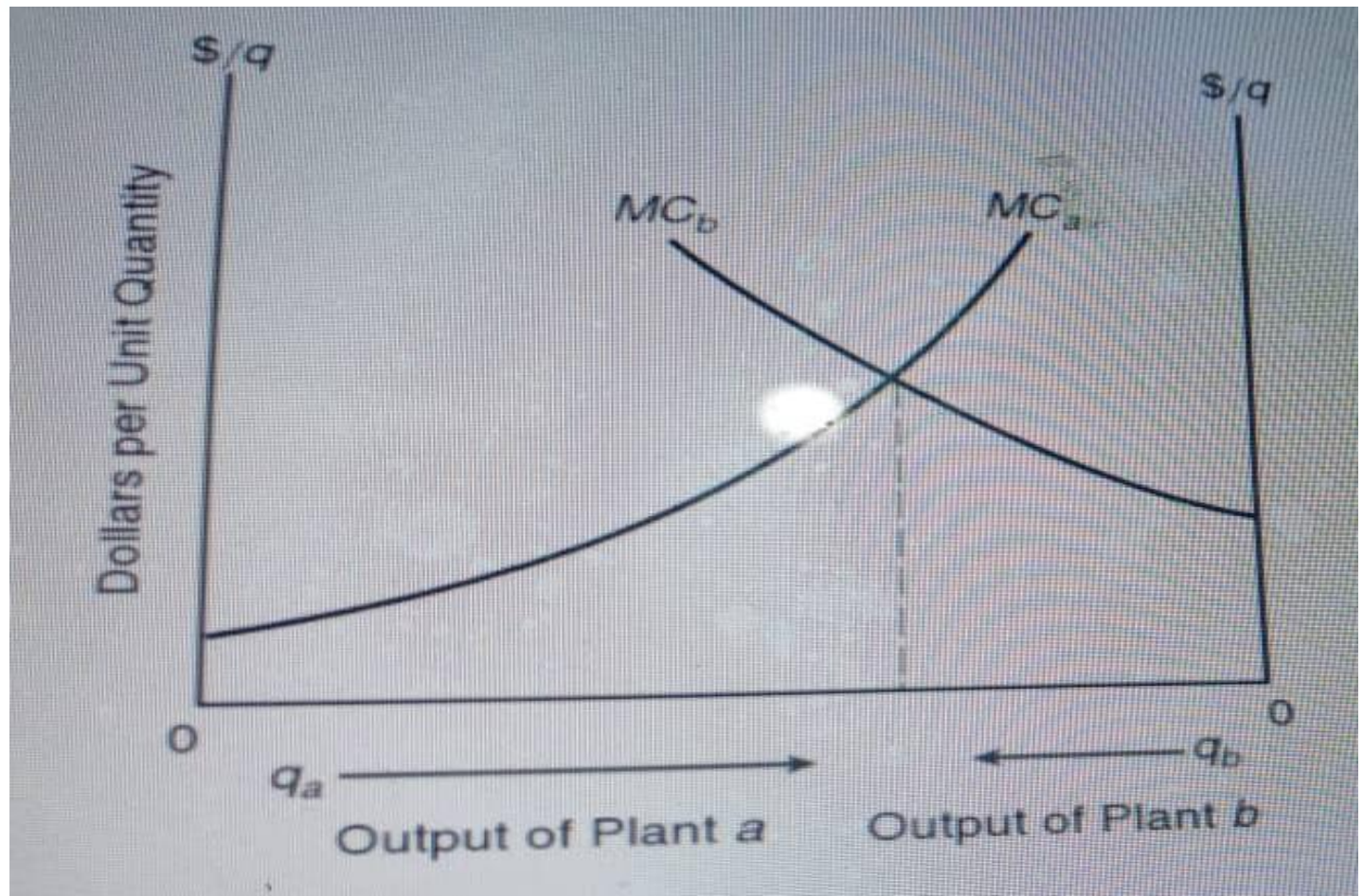
Competitive Markets

An Application: Division of Output among

Plants

- Sometimes a firm divides output between two or more plants.

- Suppose there are 2 plants: A & B.

- We extend the condition for π^{Max}, hence

$$MCA = MCB = MR = P$$

Competitive Markets

Competitive Markets

An Application: Division of Output among Plants

- Total output is given by
$$Q = Q_A + Q_B$$

Competitive Markets

What happens if in both plants, the MCs, each an increasing function of its own plant output, do not intersect?

An Application: Division of Output among Plants

Key: This means that for the specified total output, Q, one plant always produces less cheaply than the other. In that case, the plant with the higher MC should not operate at all.

An Application: Division of Output among Plants

Try Question?

Suppose the MC functions for two plants are $MCA = 5 + 2QA$, and $MCB = 40 + QB$.

- If total output is Q = 25, how should the firm's outputs be divided? What if the total output were Q = 15?

Other Review Questions

- What defines a perfectly competitive market?

- Graphically distinguish between economic profit, normal profit, and economic loss.

- Explain the competitive firm's profit maximizing condition.

- With graphs and examples, illustrate how to derive the supply curve.