4 market structures

- **Homogenous products oligopoly markets** = a small number of firms, homogenous product
- **Dominant firm markets** – one firm possesses a large share of the market but competes against numerous small firms, each offering identical products
- **Differentiated products oligopoly markets** - a small number of firms sell products that are substitutes for each other but also differ from each other in significant ways, including attributes, performance, packaging, and image.
- **Monopolistic competition** - a market in which many firms produce differentiated products that are sold to many buyers

Oligopoly

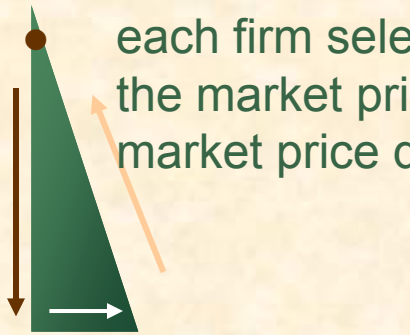
- Characteristics
  - Small number of firms
  - Product differentiation may or may not exist
  - Barriers to entry
- Examples: Automobiles, Steel, Aluminum, Petrochemicals, Electrical equipment, Computers

Oligopoly

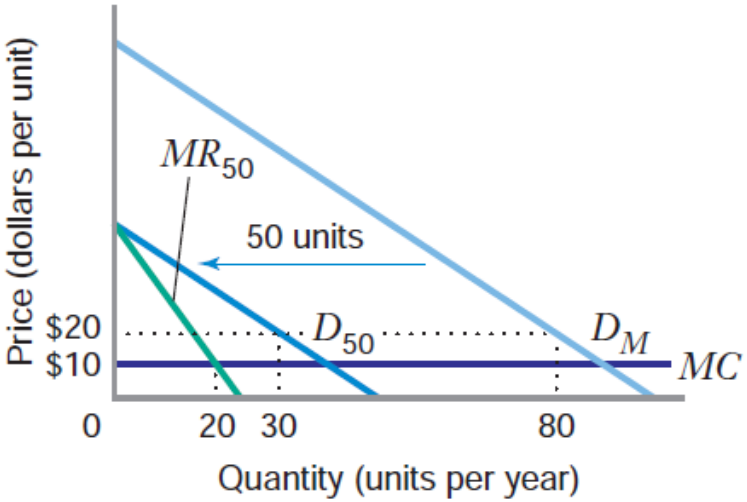
- Barriers to entry include:
  - Scale economies; Patents; Technology; Name recognition
  - Strategic action: Flooding the market; Controlling an essential input
- Management Challenges
  - Strategic actions
  - Rival behavior

THE COURNOT MODEL OF OLIGOPOLY

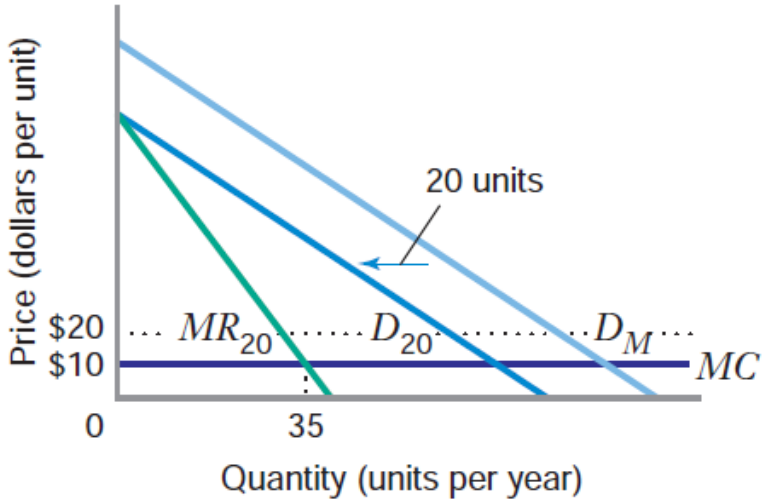
- First model created in 1838
- pertains to a homogeneous products oligopoly
- **duopoly market**: a market in which there are just two firms with identical marginal costs => firms charge the **same price**
- The firms select their output simultaneously, non-cooperatively (market is organized competitively) - The only decision each firm needs to make is how much to produce.
- Aim of maximazing the profit
- The output of other firm is fixed when decising => firms thus act as ***quantity takers***
- each firm selects a quantity to produce, and the resulting total output determines the market price (each firm's output choice depends on the market price, but the market price depends on the combined output of the two firms)



Price Determination and Profit Maximization in the Cournot Model



(a) Samsung's profit-maximization problem when LG produces 50

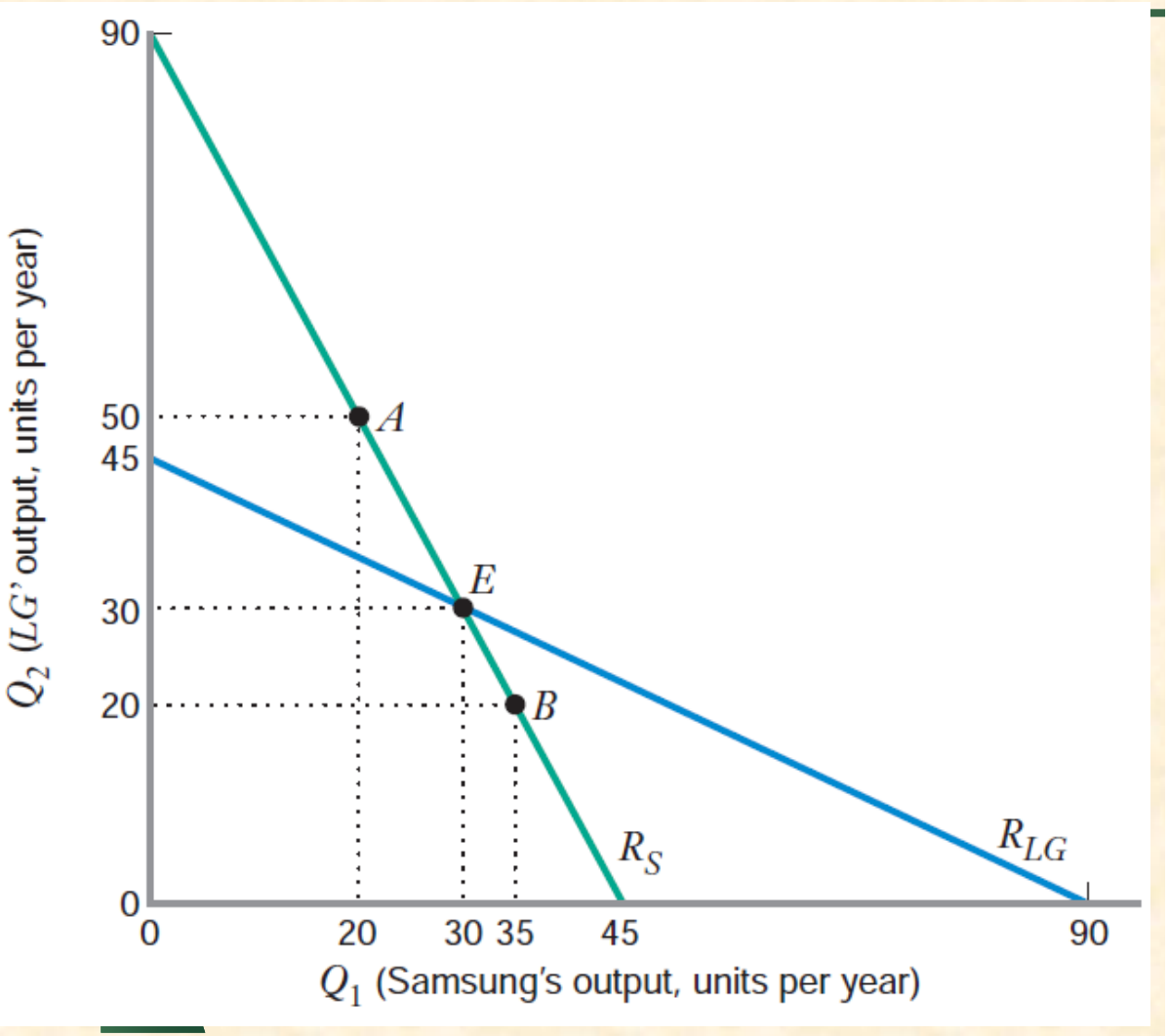


(b) Samsung's profit-maximization problem when LG produces 20

Samsung will choose the level of production that maximizes its profits, given what it thinks LG's output will be, and LG will choose the level of production that maximizes its profits, given what output it thinks Samsung will produce

residual demand curve – the curve that traces out the relationship between the market price and a firm's quantity when rival firms hold their outputs fixed.

Cournot Reaction Functions and Equilibrium



best response= A firm's profit-maximizing choice of output given the level of output by rival firms.

R_S is Samsung's reaction function. R_{LG} is LG's reaction function. Point E, where the two reaction functions intersect, is the Cournot equilibrium. Points A and B on R_S represent the best responses for Samsung if LG produces 20 units and 50 units, respectively;

each firm's profit-maximizing output choice becomes smaller as its rival produces more output

Equilibrium in a Cournot Market

= An equilibrium in an oligopoly market in which each firm chooses a profit-maximizing output given the output chosen by other firms

= neither firm has any regret about its output choice

- **REMEMBER** - The Cournot theory is a **static model** of oligopoly => It does not explain how the firms arrive at the output choices corresponding to the Cournot equilibrium

Equilibrium in a Cournot Market

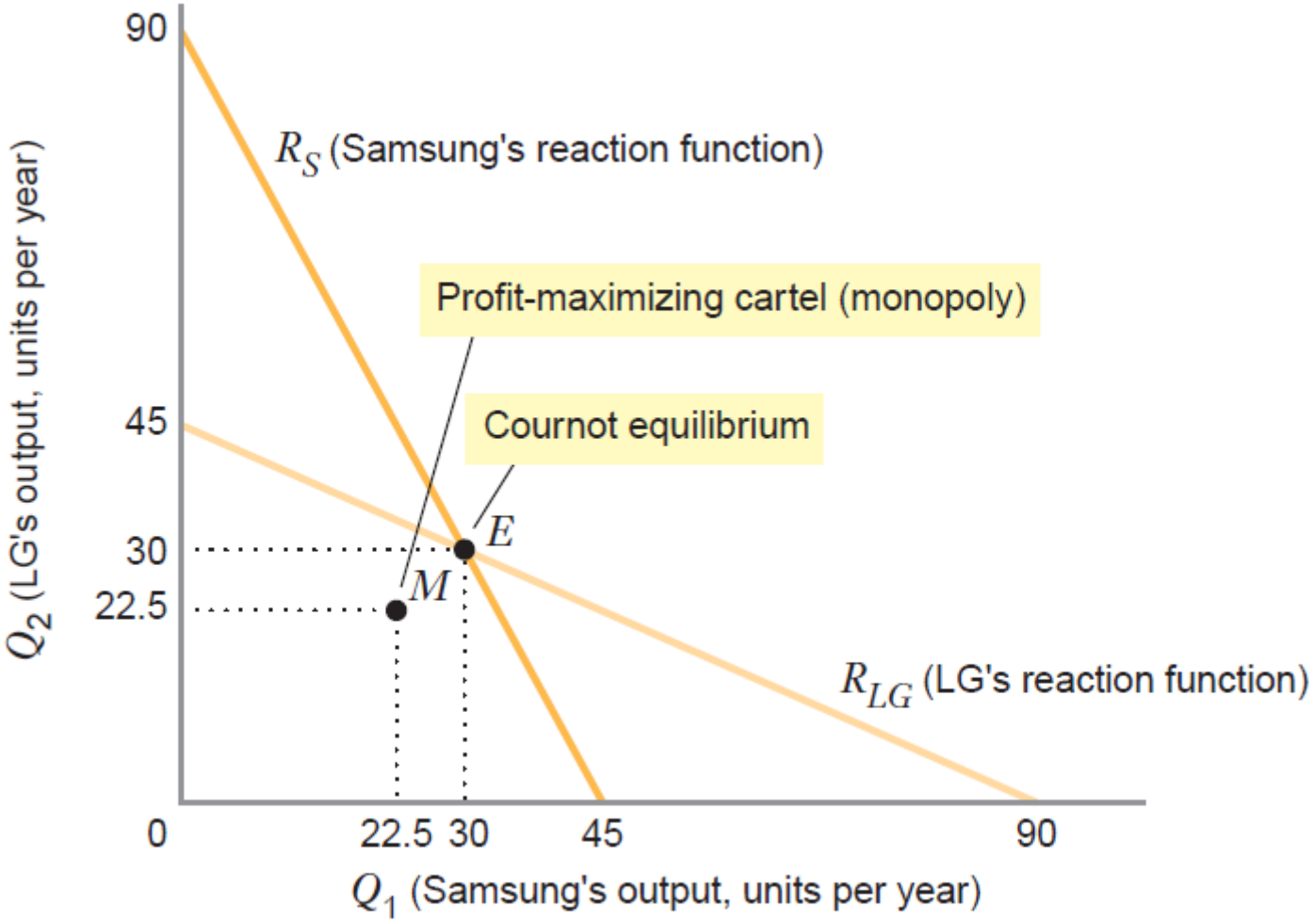
The market demand curve D_M is given by $P= 100 - Q_1 - Q_2$, where Q_1 is the amount of output Samsung produces and Q_2 is LG's level of output. The marginal cost of each firm is $10.

a) Given this market demand curve, what is Samsung's profit-maximizing quantity when LG produces 50 units?

b) What is Samsung's profit-maximizing output when LG produces an arbitrary output Q2 (i.e., what is the equation of Samsung's reaction function)?

c) Compute the Cournot equilibrium quantities and price in this market.

Cournot Equilibrium versus Monopoly Equilibrium

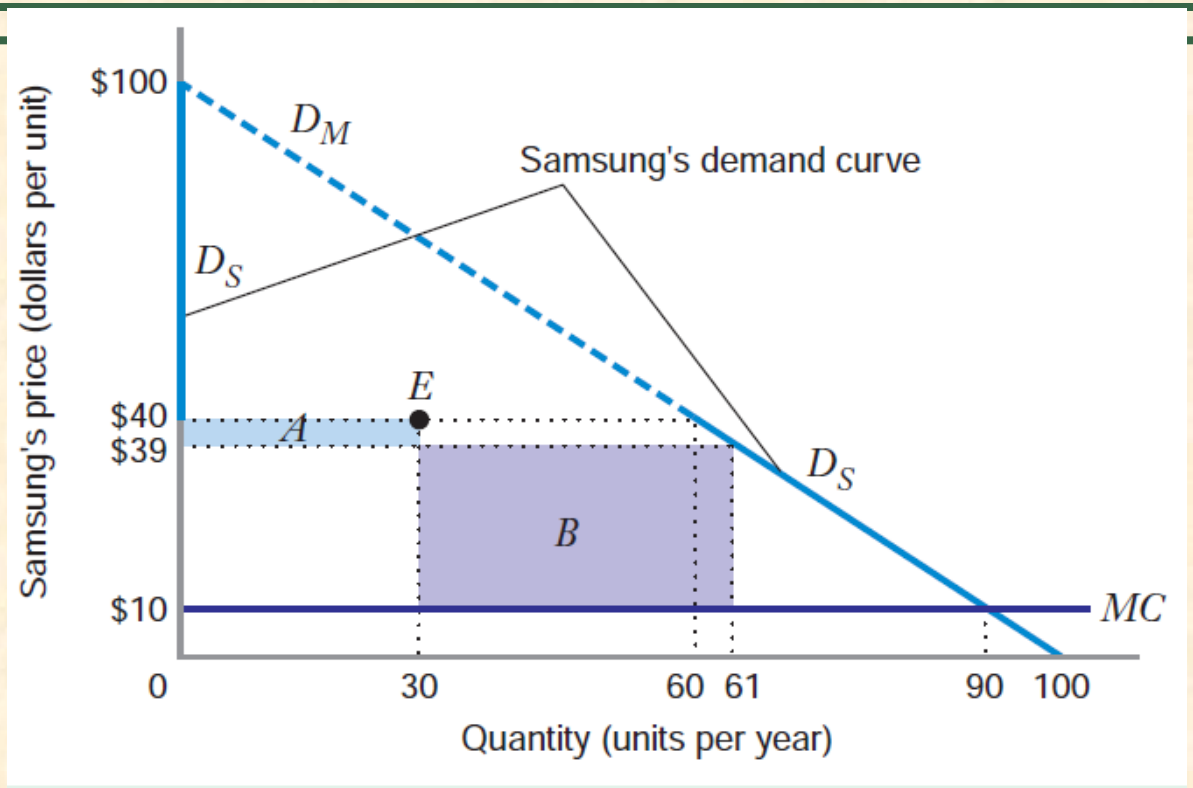


If Samsung and LG behave as a profit-maximizing cartel (monopoly) they will produce a total of 45 units. Splitting this equally gives each an output of 22.5. The cartel or monopoly quilibrium, point M, thus differs from the Cournot equilibrium, point E.

THE BERTRAND MODEL OF OLIGOPOLY

- **each firm selects a price** and stands ready to meet all the demand for its product (once firms choose their prices, they will then adjust their production to satisfy all of the demand that comes their way).
- If firms produce identical products***, the firm that sets the lowest price captures the entire market demand***, ***and the other firms sell nothing.***
- **Bertrand equilibrium=** An equilibrium in which each firm chooses a profit-maximizing price given the price set by other firms.
- as long as both firms set prices that exceed their common marginal cost, one firm can always increase its profits by slightly undercutting its competitor => This implies that the only possible equilibrium in the Bertrand model is achieved when each firm sets a price equal to its MC
- ***the Bertrand equilibrium with two firms results in the same outcome as a perfectly competitive market with a large number of firms***

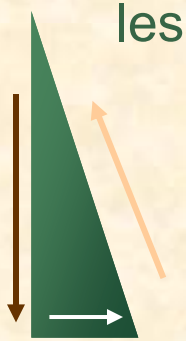
Bertrand Price Competition



If LG's price is $40, Samsung's demand curve is the broken line DS. By setting a price of $39, Samsung can increase its profit by area B minus area A. This tells us that each firm charging a price of $40, with each producing 30 units, **is not the Bertrand Equilibrium.**

Differences between CM and BM

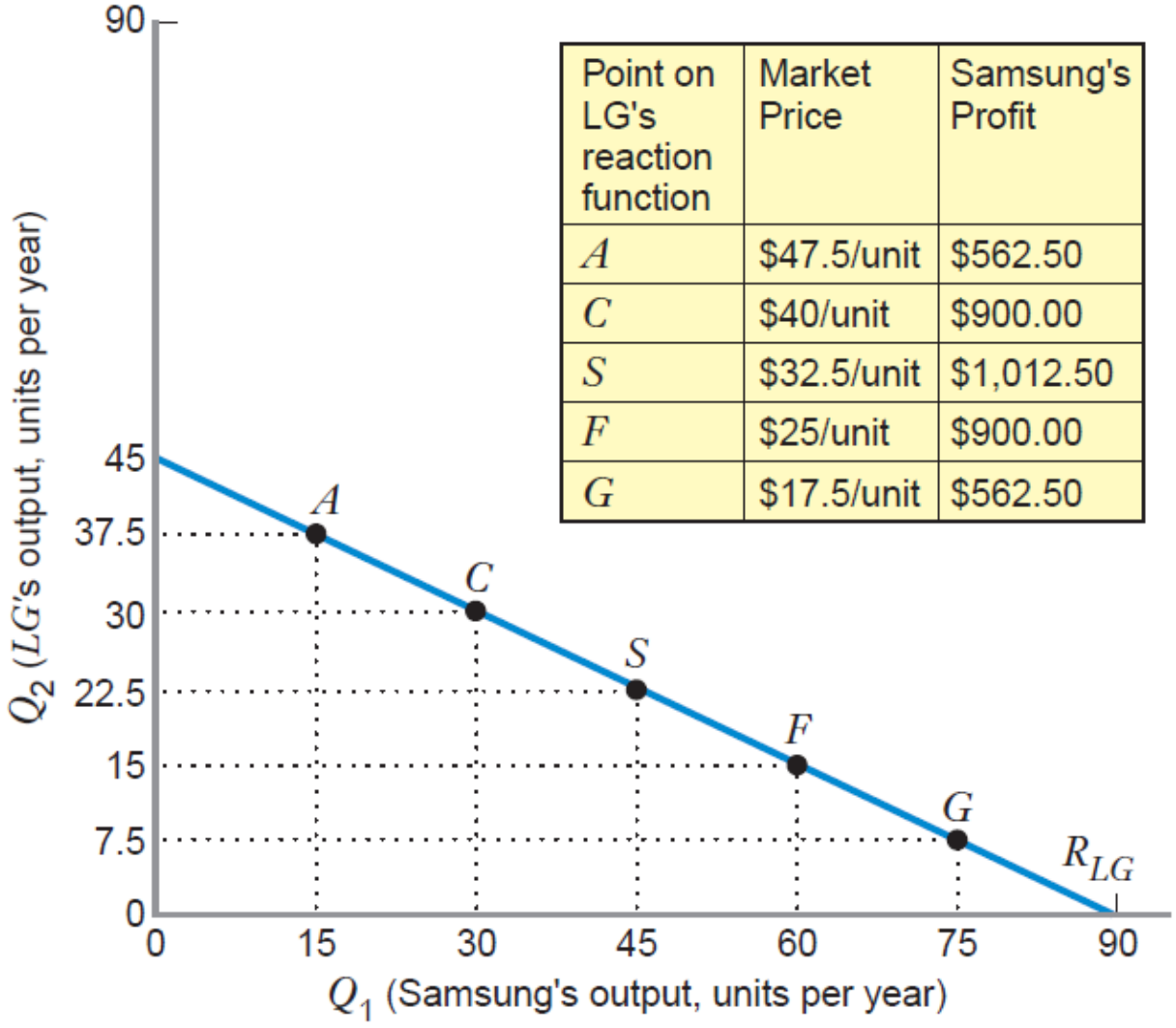
- In CM, the $P_E > MC$, and the Cournot equilibrium approaches the PC equilibrium only as the number of competitors in the market becomes large – in contrast in BM competition between even two firms is enough to replicate PC equilibrium
- CM as a **long-run** capacity competition vs. BM as a **short-run** price competition when both firms have more than enough capacity to satisfy market demand at any price greater than or equal to MC
- The Cournot firm takes its competitors' outputs as given and assumes that its competitors will instantly match any price change the firm makes so that they can keep their sales volumes constant (competitors behave less aggressively than Bertrand competitors).



THE STACKELBERG MODEL OF OLIGOPOLY

- in some situations, it might be more natural to assume that one firm chooses its quantity before the other firms make their choices.
- This model is a situation in which one firm acts as a quantity leader, choosing its quantity first, with all other firms acting as followers.
- The follower, observes the quantity Q_1 chosen by the leader and chooses a profit-maximizing response to this quantity. Follower profit-maximizing response to any Q_1 selected by leader is given by follower reaction function from the Cournot model.

The Stackelberg Model and the Follower's Profit Maximization



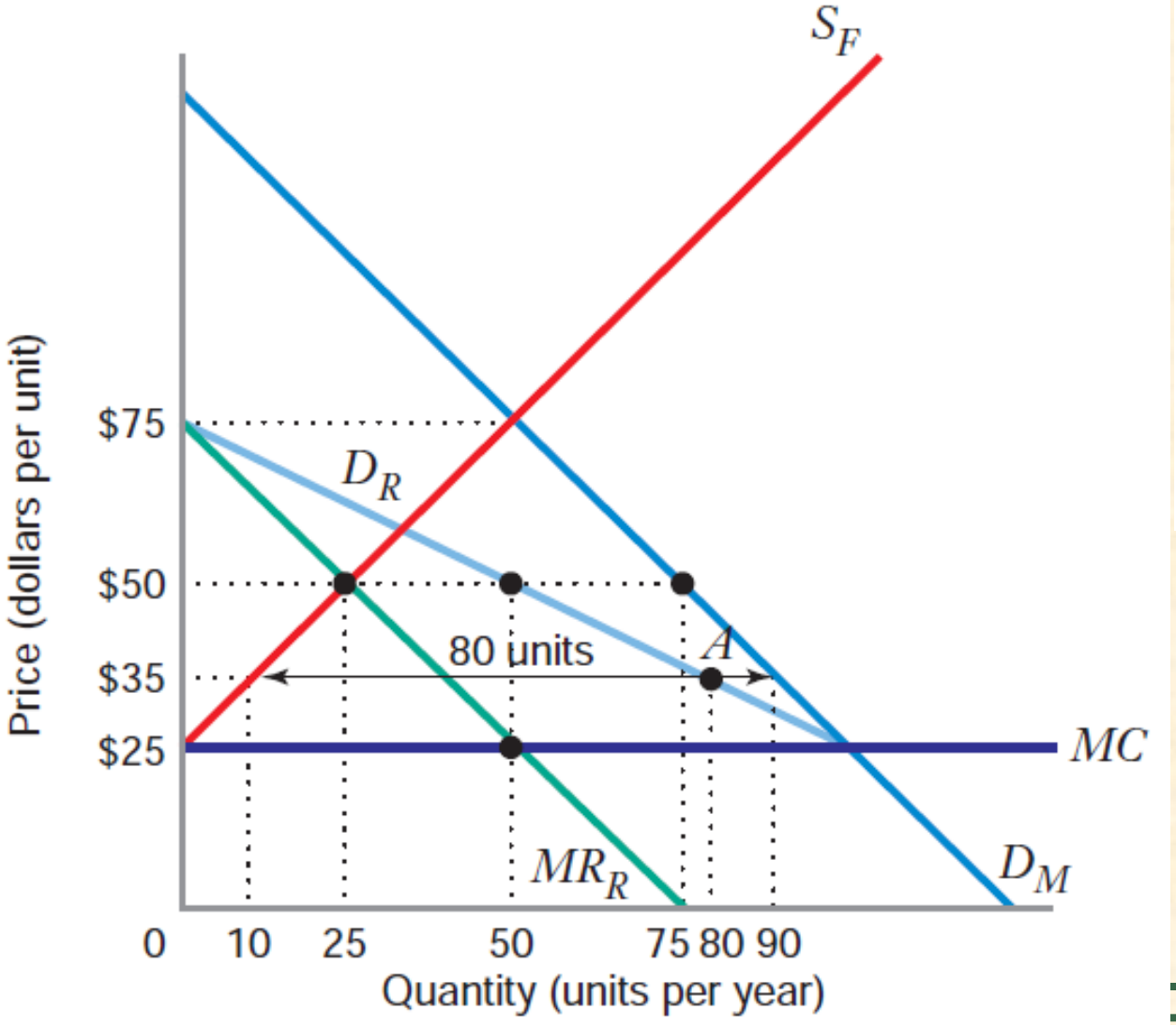
Point on LG's reaction function	Market Price	Samsung's Profit
A	$47.5/unit	$562.50
C	$40/unit	$900.00
S	$32.5/unit	$1,012.50
F	$25/unit	$900.00
G	$17.5/unit	$562.50

The line R_{LG} is LG's reaction function. The table in the upper right-hand corner shows the market price and Samsung's profits at various points along this reaction function. In the Stackelberg model, the leader (Samsung) chooses the point on the reaction function of the follower (LG) that makes the leader's profits as high as possible. This occurs at point S.

DOMINANT FIRM MARKETS

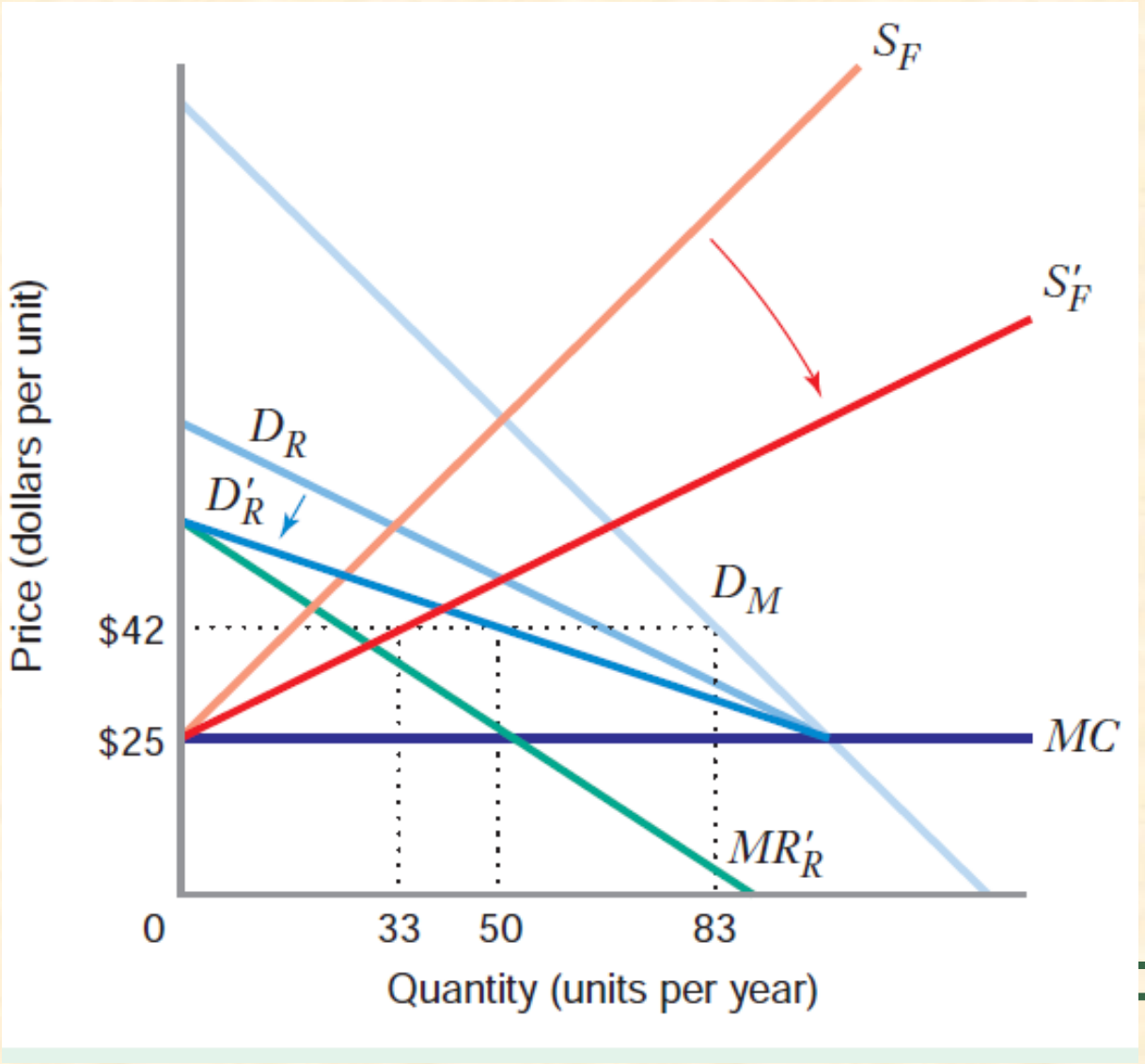
- single company with an overwhelming share of the market — what economists call a dominant firm— competes against many small producers, each of whom has a small market share
- A model of price setting by a dominant firm which sets the market price and splits the market demand with a group of small firms that constitute the industry's competitive fringe (fringe firms produce identical products and act as perfect competitors: each chooses a quantity of output, taking the market price as given)
- The dominant firm's problem is to find a price that maximizes its profits, taking into account how that price affects the competitive fringe's supply => dominant firm's residual demand curve D_R, which will tell us how much the dominant firm can sell at different prices
- The dominant firm finds its optimal quantity and P by equating the MR_R associated with the residual demand curve to its MC
- the dominant firm creates a price umbrella that allows some fringe firms to operate profitably

Dominant Firm Market



The dominant firm's residual demand curve D_R is the horizontal difference between the fringe's supply curve S_F and the market demand curve D_M. The dominant firm's profit-maximizing quantity is 50 units, and its profit-maximizing price is $50 per unit. At this price, the fringe supplies 25 units.

Dominant Firm Market When the Size of the Competitive Fringe Grows



When the size of the fringe grows, the fringe's supply curve rotates rightward to S'_F (**the fringe supplies more at a given price**). causing the residual demand curve to rotate leftward to D'_R. The new profit-maximizing quantity for the dominant firm is 50 units, and the profit-maximizing price is $42. At this price, the fringe supplies 33 units of the total market demand of 83 units.

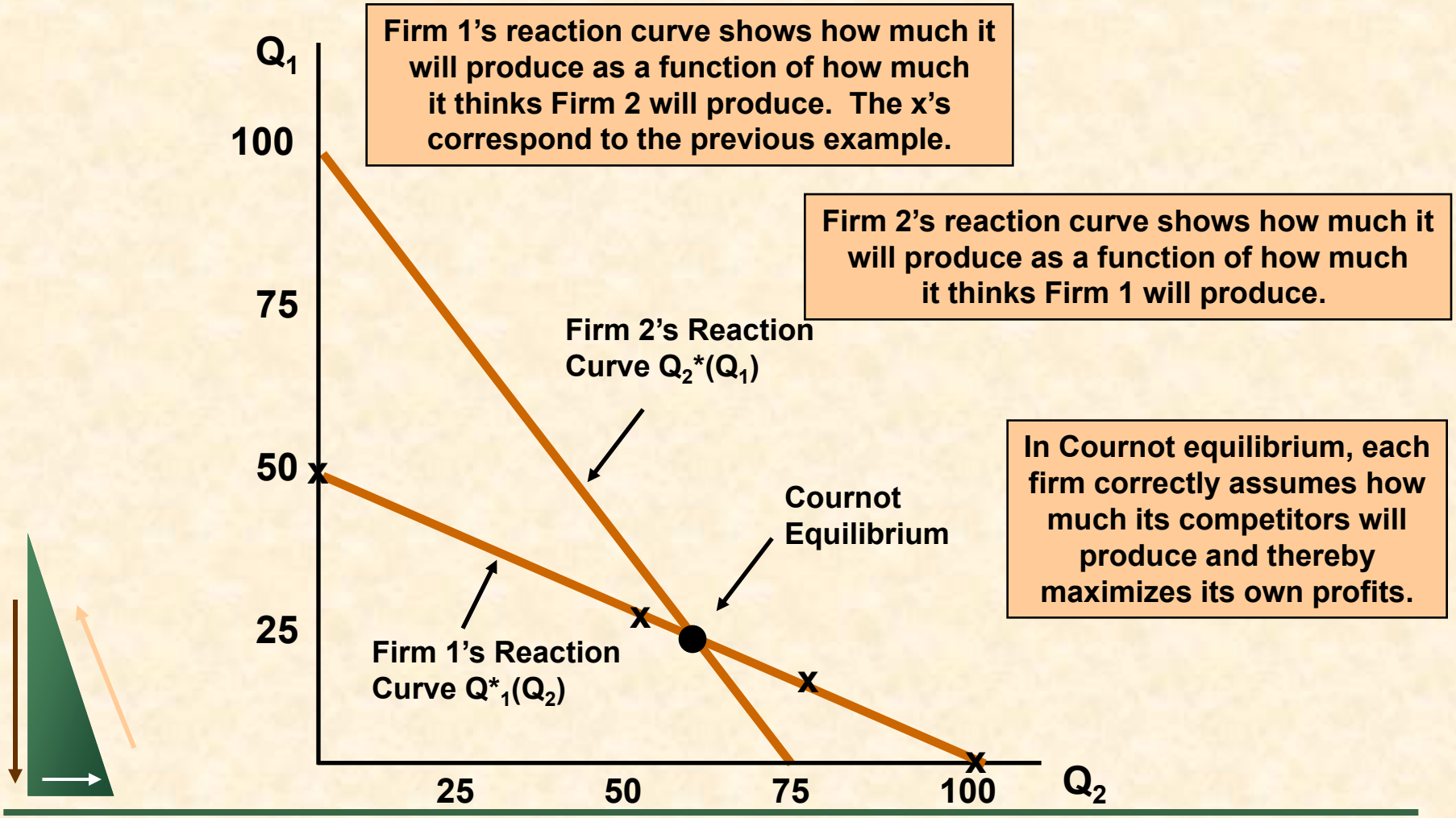
Oligopoly

- Equilibrium in an Oligopolistic Market
  - In perfect competition, monopoly, and monopolistic competition the producers did not have to consider a rival's response when choosing output and price.
  - In oligopoly the producers must consider the response of competitors when choosing output and price.

Oligopoly

- Equilibrium in an Oligopolistic Market
  - Defining Equilibrium
    - Firms do the best they can and have no incentive to change their output or price
    - All firms assume competitors are taking rival decisions into account.
- Nash Equilibrium
  - Each firm is doing the best it can given what its competitors are doing.

Reaction Curves and Cournot Equilibrium



Monopolistic Competition

- Characteristics

  1) Many firms

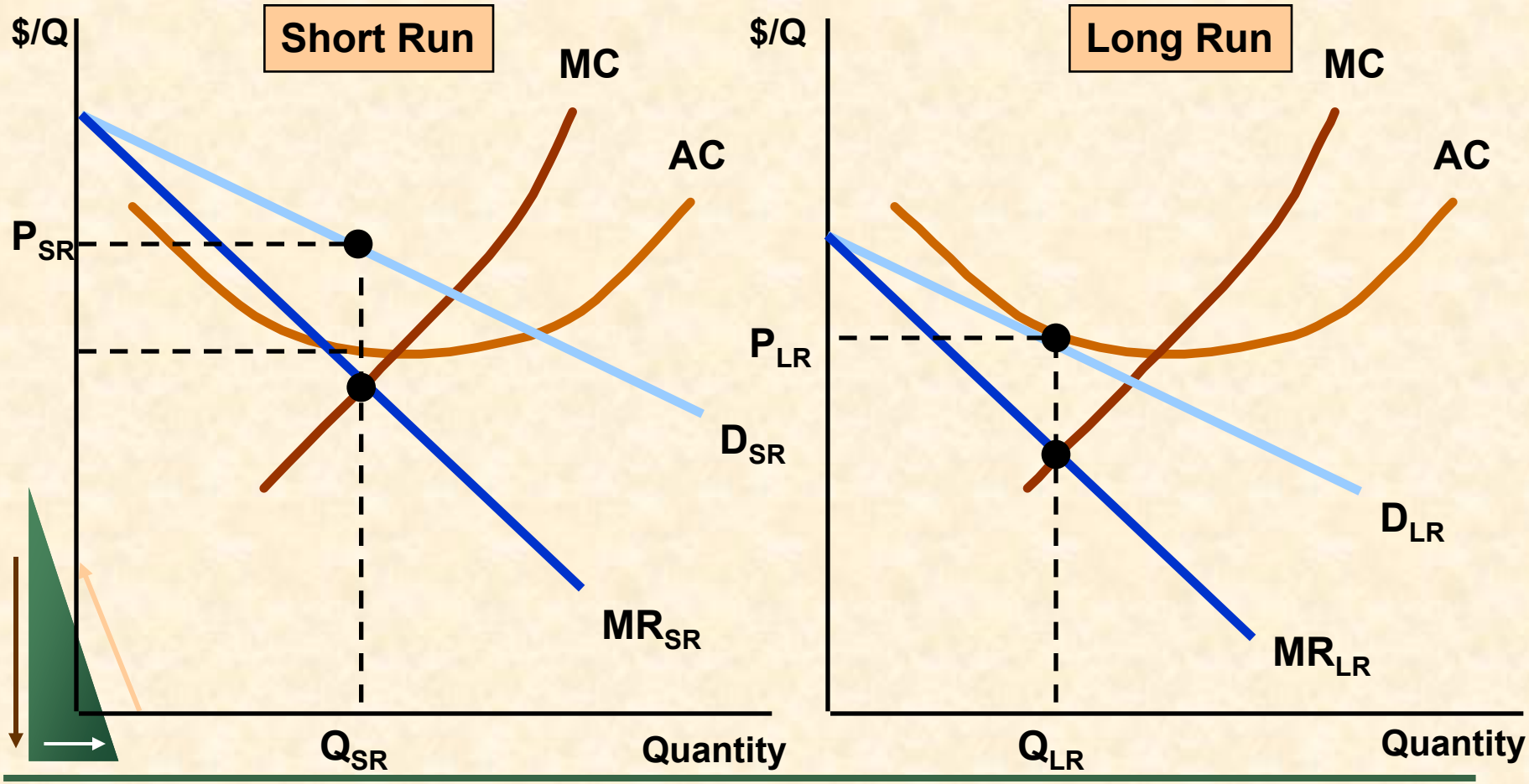
  2) Free entry and exit

  3) Differentiated product (but high degree of substitutability)

- The amount of monopoly power depends on the degree of differentiation.

- Examples of this common market structure include:
  - Toothpaste; Soap; Cold remedies; Soft Drinks; Coffee

A Monopolistically Competitive Firm in the Short and Long Run



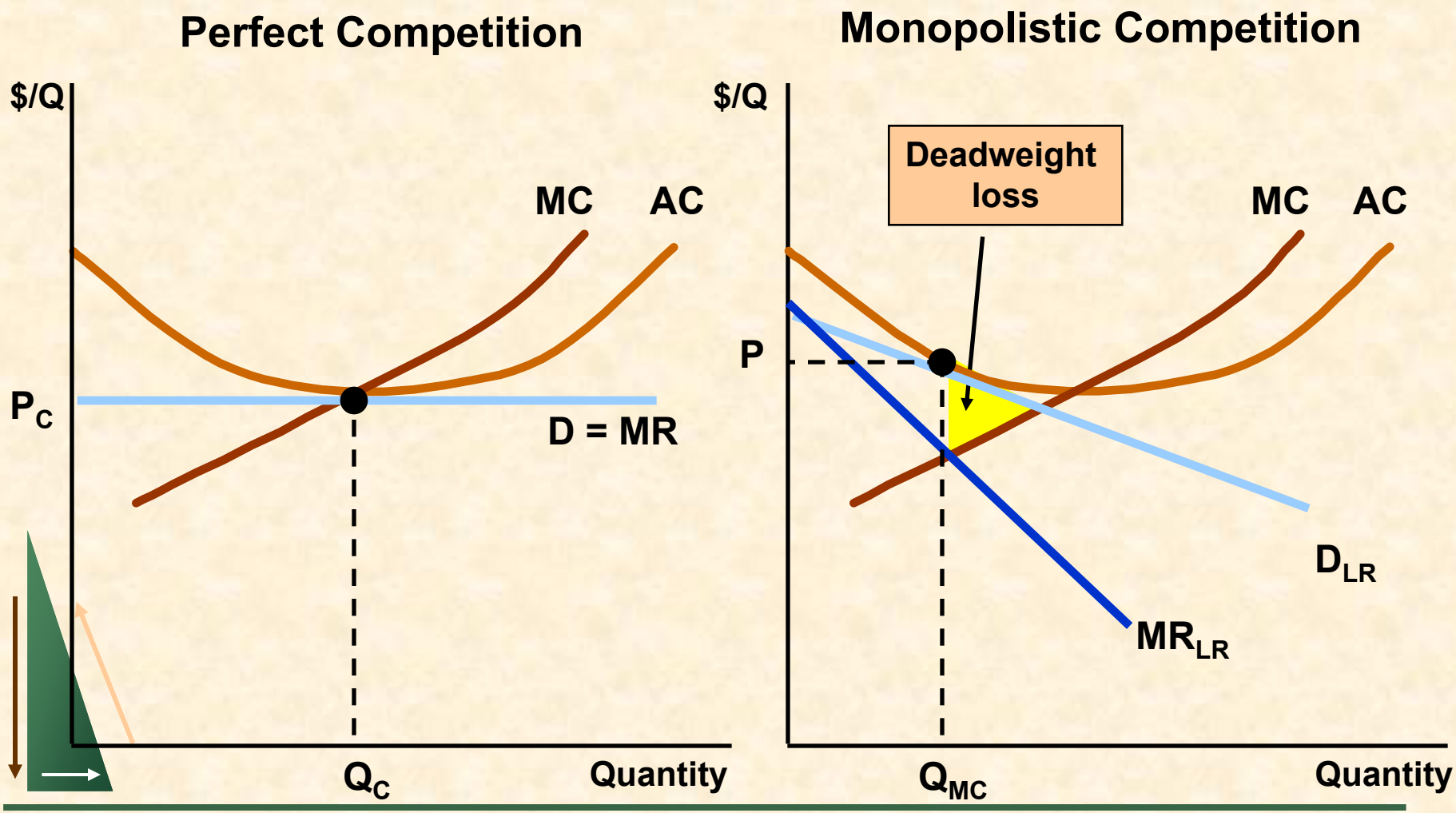
Monopolistic Competition in the SR

- Observations (short-run)
  - Downward sloping demand - differentiated product
  - Demand is relatively elastic - good substitutes
  - *MR* < *P*
  - Profits are maximized when *MR* = *MC*
  - This firm is making economic profits

Monopolistic Competition in the LR

- Observations (long-run)
  - Profits will attract new firms to the industry (no barriers to entry)
  - The old firm's demand will decrease to D_{LR}
  - Firm's output and price will fall
  - Industry output will rise
  - No economic profit ($P = AC$)

Comparison of Monopolistically Competitive Equilibrium and Perfectly Competitive Equilibrium



Monopolistic Competition

- Reduction in Economic Efficiency
  - The monopoly power (differentiation) yields a higher price than perfect competition. If price was lowered to the point where *MC* = *D*, total surplus would increase by the yellow triangle.
  - Although there are no economic profits in the long run, the firm is still not producing at minimum AC and excess capacity exists.