

BasicMicro. Economics: An Outline

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Part II Chapter thirteen

Firms With "Market Power"

Pure competition results in an optimal allocation of resources given the objective of an economic system to allocate resources to their highest valued uses or to allocate scarce resources to maximize the satisfaction of (unlimited) wants in a cultural context. Pure competition is the ideal that is benchmark to evaluate the performance of markets. The economic theory of monopolistic competitive markets, oligopoly and monopoly is used to suggest the nature of problems that may exist when firms or agents have market power and are able to distort prices away from the purely competitive optimum.

The existence of market power is tied to the demand conditions the firm faces. If their product is (or can be differentiated), consumers may have a preference for one firm's output relative to others. A negatively sloped demand function (less than perfectly elastic) allows the firm to raise its price and not have its sales fall to zero. In pure competition, the firms may all try to influence market demand (eat Colorado Beef, Eat Black Angus Beef, Drink Florida orange juice, etc) but individual producers do not advertise their own product (Eat Rancher Jones's Beef). Many agricultural markets are close to pure competition. In many cases some producers try to differentiate their products. Organic produce is one example.

In pure competition, the firms' outputs are homogeneous. If the firm has no opportunity to differentiate their product they have no incentive to advertise and to try to influence the demand for their product. If a product can be differentiated by altering the characteristics of the good or simply by convincing the consumers that the product is different, the firm achieves market power. Market power is the ability to have some control over the price of the good offered for sale. Advertising can be used to differentiate a product or increase the demand for a product. The crucial factor is the demand for the firm's output must be negatively sloped: the firm becomes a "**price maker.**" The extent to which a firm is a price maker (i.e. has market power) is partially determined by the price elasticity of demand in the relevant price range. Note that when the seller selects a price (price maker) the demand function determines the quantity that will be purchased.

The conditions of entry or barriers to entry (BTE) are also important determinants of market power. If there are significant BTE, a firm or firms may be able to sustain above normal profits over time because other firms are prevented from entry to capture the above normal profits.

Monopoly is the market structure that is usually associated with the greatest market power. The monopolist produces a good with no close substitutes

(increased probability the demand is relatively inelastic) and there are barriers to entry. Firms in monopolistic competition or imperfectly competitive markets are more likely to have limited market power because there are many firms with differentiated products (there are substitutes) and there is relative ease of entry and exit into the market.

A. Monopoly

A monopoly is a market characterized by a single seller of a good with no close substitutes and barriers to entry. Monopolies rarely occur in a pure form. There are almost always substitutes or methods of possible entry into a market. When the term "monopoly" is used it is usually referring to a degree of monopoly or market power. In many cases the existence of a monopoly results in regulation or the enforcement of antitrust laws that attempt to introduce competition to reduce market power.

The definition of monopoly requires a judgment about the phrase "no close substitutes" and what "barriers to entry" mean. I might be the only producer of mink lined, titanium trash cans. This is not relevant as a monopoly since there are many good substitutes; plastic or steel containers or even brown paper bags will serve as trash containers. There are substitutes for the electricity (KWH) produced by a public utility. It is possible to purchase a portable generator powered by an internal combustion engine or use candles for use in your home. However, neither of these can be regarded as a close substitute. The concept of cross elasticity of demand can be used to identify whether two goods are substitutes or not.

$$\text{(Cross price elasticity of demand) } E_{XY} \equiv \frac{\% \Delta Q_X}{\% \Delta P_Y}$$

[a % change in the quantity of good X, caused by a % change in the price of good Y]

Barriers to entry are another important characteristic of monopoly. Complete barriers to entry (BTE) make it impossible for competing firms to enter a market. However, in most cases, BTE are not complete but are relative. Firms' entry into a market can be restricted by a variety of factors. BTE's can be due to:

- **The ownership of a key resource or location maybe important.** ALCOA's monopoly in aluminum was at first due to a patent on a low cost process to reduce bauxite into aluminum. After the patent expired, their ownership of bauxite reserves allowed them to maintain their monopoly position. In earlier times there may have been only one location on a river where a dam could be built to power a gristmill. A movie theatre gains monopoly power over its sale of popcorn by prohibiting customers bringing their own food into the theatre.
- **Information or knowledge not available to others.** (Industrial secrets). Knowledge about a process may kept secret (rather than using a patent since patent information is publicly available).
- **Legal barriers such as license, franchise, patent, copyright, etc.** ALCOA's monopoly began when the government gave them a patent on a low cost method of reducing bauxite to aluminum. Other methods of making aluminum are possible but cannot compete with the method pioneered and patented by ALCOA. A State park might license a firm to provide prepared foods within the boundary of the park. This would confer market power on the firm unless their price was regulated. A city that licenses a taxi company gives them market power. They may license several taxi companies so that there is some competition and or they may regulate the services and rates. Public utilities often have a license to operate in a specific area. In return for this monopoly power, they are subject to regulation. In fact, the British colonies that became the United States and

Canada were the result of grants from the British government. Hudson Bay Company and the East India Companies were firms that were granted rights to operate in specific areas.

- Natural monopoly caused by economies of scale usually associated with a cost structure with a high fixed cost relative to variable costs. A natural monopoly is the result of significant economies of scale due to a high fixed cost. As the output increases the LRAC falls. If the market demand intersects the LRAC as it falls (or at its minimum), a natural monopoly exists.

Profit Maximization In a Monopoly

Since a monopoly is characterized by a single seller, the market demand and the demand faced by the firm are the same. The demand will tend to be negatively Figure VIII.1 represents profit maximization by a firm in a monopoly market.

The TR function increases up to an output level of Q_T then it declines. Remember that any negatively sloped demand function is elastic at high prices (top half of demand where price increases reduce TR) and inelastic at low prices (bottom half of demand

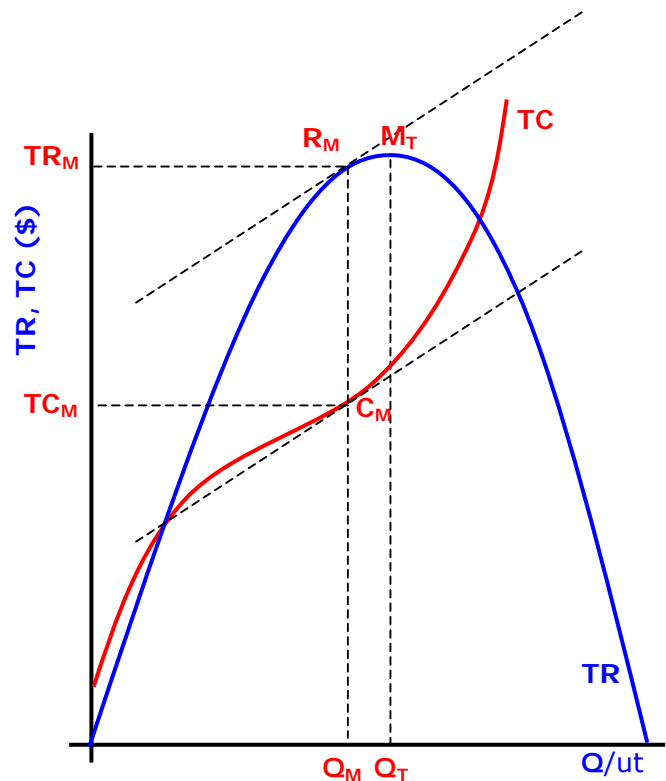


Figure VIII.1

where price increases increase TR). The TC increases at a decreasing rate, passes an inflection point and then increases at an increasing rate. Maximum profits is occurs at the output level where $TR > TC$ by the greatest vertical distance. This occurs at output Q_M . Profits are reflected by the vertical distance, $C_M R_M$, or $TR_M - TC_M$. At point C_M the slope of the TC (MC) is the same as the slope of the TR at point R_M (MR). The maximum TR occurs at point M_T at output level Q_T . If the firm increases output from Q_M to Q_T profits will decrease because the costs of the additional units ($Q_T - Q_M$) is greater than the additional revenue produced by those units of output.

Unit cost and revenue functions can also be used to show the output and price decisions of a monopolist. In Figure VIII.2 the demand, AR, MR, MC and AC cost functions are shown.

In Figure VIII.2, revenue and cost functions for a monopolist are shown. The demand and AR are negatively sloped, so the MR falls at twice the rate and intersects the Q-axis half way between the origin and AR (or demand) intercept. The firm will maximize profits where $MC = MR$ (at point Z) producing Q_H output. Buyers are willing and able to pay a price of P_H for the Q_H^{th} unit produced (they would be willing to pay more for units from 0 to Q_H , but don't if there is no price discrimination). The cost per unit is C_F , so profits are area $C_F H P_H$ or $(P_H - C_F) Q_H$. Profits are above normal but BTE prevent others from entering the market to capture the above normal profits.

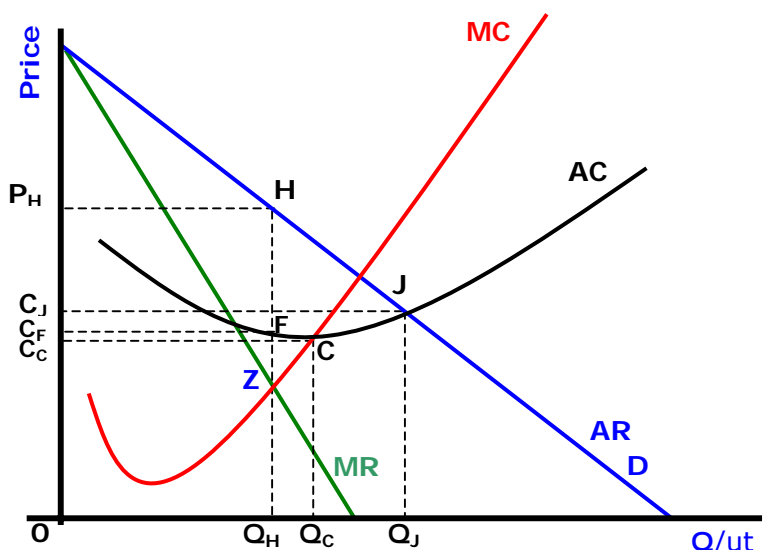


Figure VIII.2

Figure VIII.2 represents a monopolist. In the long run the monopolist might adjust the scale of plant, but BTE prevents other firms from entering and driving profits to normal. Monopoly or market power is suggested by two things. First, the price is greater than the marginal cost ($P > MC$). Secondly, above normal profits will persist over time.

B. Imperfect Competition and Monopolistic Competition

During in 1933 Edward H. Chamberlin [1899-1967] and Joan Robinson [1903-1983] independently published similar theories on "monopolistic" and "imperfect" competition. The terms "monopolistic competition" and "imperfect competition" originally were basically the same even though there were subtle differences. Currently, the use of "imperfect competition" is more generic, it refers to all market structures that lie between pure competition and monopoly. In this usage monopolistically competitive and oligopolistic markets are considered imperfect.

Monopolistically competitive markets are characterized by;

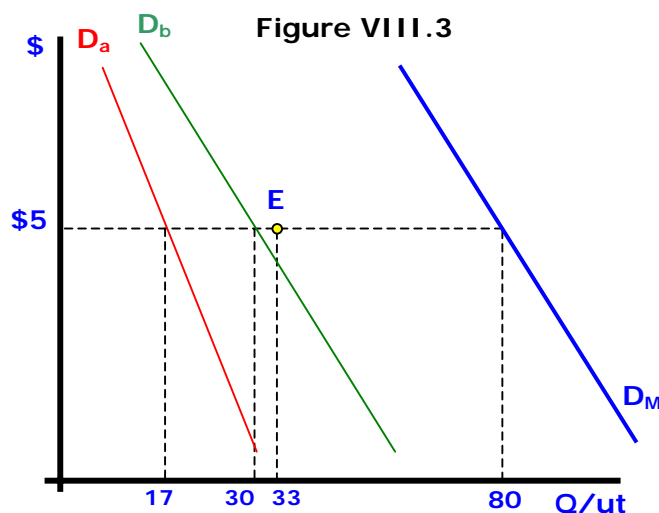
- a large number of sellers, no one of which can influence the market,
- differentiated products,
- relative free entry and exit from the market.

Relaxing the characteristic of outputs from homogeneous to "differentiated products" was the basic change from the purely competitive market model. The differentiation of output results in the demand faced by each seller being less than perfectly elastic. Since there are "many sellers," many substitutes for each seller's output is implied. This suggests that the demand faced by a firm in a monopolistically competitive market is likely more elastic than in a monopoly. The elasticity obviously depends on the preferences and behavior of the buyers. The negative slope of a firm's demand function in imperfect competition results in a different result than in pure competition.

The conditions of entry and exit to and from a monopolistically competitive market are similar to the purely competitive market; there are no major BTE. Entry and exit are relatively easy. The relative ease of entry/exit makes the long run results of an imperfectly competitive market different from a monopoly.

Demand Faced by Monopolistically (Imperfectly) Competitive Firm

The market demand is the result of a horizontal summation of the individual buyer's demand functions. The market demand function can be divided among the sellers in the market. A simplified example is shown in Figure VIII.3. If 80 units are demanded in the market at a price of \$5, a sum of 80 units is demanded from the sellers in the market. To simplify, assume 3 firms in the market. The demand for firm A's product at \$5 is 17 units. The demand for firm B's output is 30 units. Therefore, 33 units of output from firm C must be demanded. If a fourth firm entered the market, there is no reason to believe that the buyers



would desire more at a price of \$5. The demand for one or all firms' products would necessarily shift to the left (decrease in demand) by the same number of units that the entrant (firm C) would sell at that price.

The entry of firms will mean each existing firm will have a smaller share of the market and are faced by more substitutes. Entry implies that the demand each firm faces for its product will decrease (shift to the left) and become relatively more elastic at each price.

Each firm would like to capture a larger share of the market and make the demand for its product more inelastic. Advertising is an attempt to alter buyers' perceptions and increase the demand. Economists identify two types of advertising: informative and persuasive. Informative advertising provides buyers with information about availability, features and relative prices. It helps the market to perform allocation processes. A grocery who advertises milk at \$1.39 per gallon in its store (plant) at the corner of High Street and Broadway, has helped the market to perform. Persuasive advertising is an attempt to alter preference functions. Driving a new SUV makes one a member of the right social group. Smoking a (given brand) makes one sexier or more macho, independent or whatever. It is not clear that persuasive advertising improves the ability of the market to allocate resources.

It must also be noted that advertising increases the costs of the firm and alters the output decisions and profits.

Profit Maximization in Imperfect or Monopolistic Competition

If the firm in an imperfectly competitive market has profit maximization as an objective, they will produce the output where marginal cost is equal to the marginal revenue. Short run profit maximization is shown in Figure VIII.4.

Short run profit maximization for a firm in imperfect competition occurs at the output Q_J . This output level is found at point J where $MR=MC$. At this level of output, the vertical intersects AC at R. The firm is producing Q_J units at a cost of C^* per unit. Total cost (TC) would be C^*Q_J or area $0Q_JRC^*$ (the area in yellow). The firm can sell Q_J units at a price of P^* . Total Revenue (TR) is P^*Q_J or area $0Q_JHP^*$. Profits ($\Pi=TR-TC$) are shown by area C^*RHP^* or $(P^*-C^*)Q_J$. Short run equilibrium in monopolistic competition resembles the equilibrium conditions in a monopoly. However, entry in monopolistic competition will drive profits to normal in the long run.

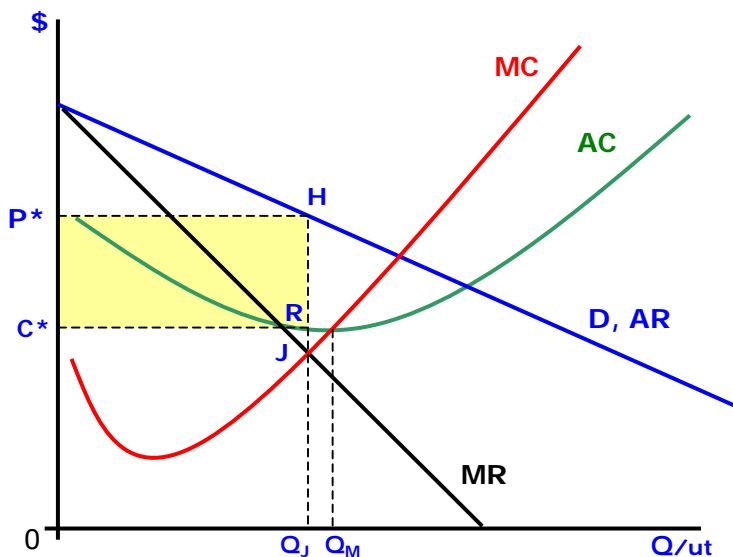


Figure VIII.4

In the long run, above normal profits will attract the entry of firms into monopolistic competition. Below normal profits will encourage firms to exit. As firms enter the market demand is split among a larger number of firms which will shift the demand for each firm to the left (decrease) and probably make it more inelastic. There are more substitutes. Exit of firms will shift the demand for each firm's output to the right (increase). Entry to and exit from the industry occur until the profits for each firm are normal, i.e. the $AR = AC$. The results of long run equilibrium in a monopolistically competitive market are shown in Figure VIII.5.

The logical result of profit maximizing monopolistically competitive markets is to encourage firms to build plants that are smaller than optimal, i.e. a larger plant can produce with fewer inputs per unit of output (or costs per unit of output). Further inefficiency is expected since the inefficient plant is operated at an output level that is less than the minimum point on the SRAC. This result is due to the fact that the MR must be lower than AR when AR is negatively sloped. Therefore $MR=MC$ at less than the price which lies on the demand (or AR) function. Since the demand is negatively sloped and AC is usually U-shaped, the point of tangency between AR and LRAC (normal profits) will lie to the left of the minimum cost per unit of output. This is sometimes called the "excess capacity theorem;" firms build plants that are too small and operate them at less than full capacity.

Above normal profits attract firms to enter the market. The demand for each firm's output is reduced and becomes more elastic (shifts to the left and is flatter at each price). If AR is less than LRAC firms leave and demand faced by each firm increases. Equilibrium is attained when $AR = AC$ and firms cannot make adjustments to increase profits above normal. Where $MR = MC$, at point J, the firm produces Q_J output that is sold at a price of P^* . At Q_J output, the cost per unit of output is also P^* . Firms are earning a normal profit. Note that P^* is necessarily above MC and the firm has a plant size that is less than optimal and operates at less than the minimum cost per unit.

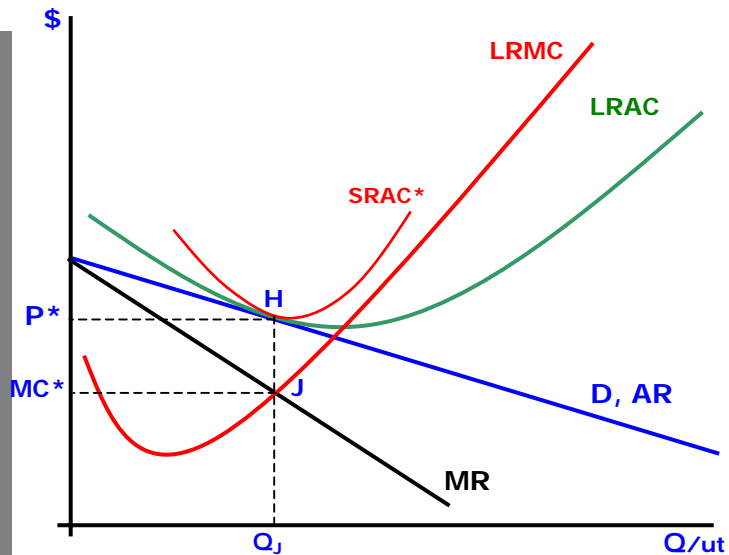


Figure VIII.5

A. Oligopoly

An oligopoly is a market that is characterized by the interdependence of firms.

The outcomes that follow from the decisions of one firm are dependent on what the other firms do. Augustin Cournot (1801-1877), a French mathematician/economist developed the theory of monopoly and then considered the effects of two interdependent competitors (sellers) in a **duopoly**. Cournot's analysis of two sellers of spring water clearly established that the price and output of one seller was a reaction to the price and output of the other seller. If the two collude they can act as a single monopolist and divide monopoly profits. If they compete, Cournot concluded that the output

would be $\left[\frac{N1}{(N+1)} \right]$ times the competitive output. As the number of competitors

(N) increases, the result approaches the purely competitive result.

Cournot's recognition of the interdependence of sellers provided the foundation for a variety of approaches to explain the interdependent behavior of oligopolists. In the 1930's the "kinked demand" model [published by Paul Sweezy in August 1939 and by R.L. Hall and C.J. Hitch in May 1939] and the "administered price hypothesis" [Gardner C. Means in 1935] were developed as an attempt to explain price rigidities in some markets during the great depression. In 1943 John von Neumann and Oskar Morgenstern published a path breaking work on game theory. Game theory has been used to try to explain the behavior of independent competitors. There have been a variety of other models that attempted to explain the interdependent behavior in oligopolies. The number of models is evidence that it is a difficult task and there are problems with most approaches. The kinked demand model is used here to emphasize the interdependence of oligopolistic behavior rather than to explain the determination of price.

Kinked Demand Model

The kinked demand model begins with an oligopoly that has two sellers of a homogeneous good. The typical characteristics that constitute an oligopoly are;

- A "few" firms; the concept of "few" means that there are few enough sellers that they recognize their

interdependence.

- The output may be homogeneous or differentiated. Primary metals industries are examples of oligopolies with homogeneous goods. Instant breakfast drink mixes are an example of an oligopoly with differentiated products.
- In an oligopoly there are usually significant barriers to entry.

Figure VIII.6 is a graphical representation of the demand and revenue

A single firm in a two firm duopoly is represented. The current price is P and output is Q . Point H must lie on "the" demand function. The nature of the perceived demand depends on what the firm believes its competitor will do. There are two possibilities with respect to price. DD assumes the competition will follow every price change; D^*D^* assumes that price changes are ignored. MR^* is associated with D^*D^* and MR is associated with DD . If there is "excess capacity" the firm may realistically expect that their price cuts will be followed and price increases will be ignored. The demand for price increases is D^*H and for price cuts is HD . The total demand is D^*HD . The sections of the MR associated with the demand D^*HD is D^*J , then a gap from JF and then the remainder of MR .

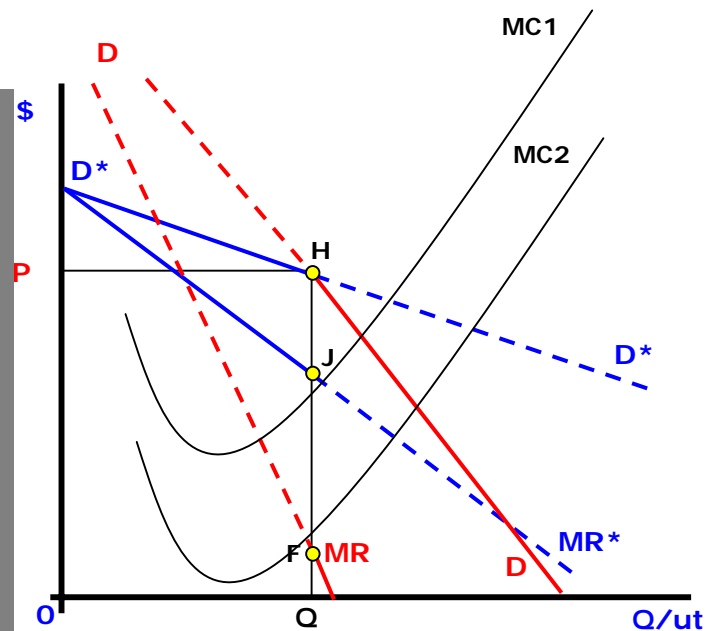


Figure VIII.6

functions of a firm in an oligopoly that is modeled as a kinked demand.

The kinked demand model is dependent on the firm believing that the competitor will follow price cuts but not price increases. If there is additional capacity available (firms can increase output without increasing plant size), a price cut will be followed. The reasoning is that if the competitor does not follow the price cut, the firm will entice customers away from the competitor. Therefore, the competition must follow price cuts or lose customers and sales. The demand function relative to price cuts is inelastic; cut price and TR falls. The perception is that the competition will not follow a firm's price increases. If they do not follow, they will get the firm's customers and sales. The demand above the prevailing price is relatively elastic; raise price and TR falls. At the prevailing price, there is a kink in the demand function and an associated gap or discontinuity in the MR (shown as the gap from J to F in Figure VIII.6). The marginal cost function can rise to $MC1$ or fall to $MC2$ with no change in output or price. The kinked demand model of the Great Depression was used as evidence that concentrated markets were rigid and failed to respond to changing conditions. Pro market advocates obviously attached the model and its conclusions.

All models of market structure must be considered as examples. When analyzing a market, it is not a matter of selecting and applying one of the market models presented in principles of microeconomics. You must consider all the relevant characteristics of the firms and the market and then construct a workable model to explain the question

you have asked.

B. Performance

The function of a market system is to provide the information and incentives that will result in the allocation of relatively scarce resources and goods to their highest valued use within a social system. From an equity perspective we tend to believe that anyone who uses or consumes a good should bear the opportunity costs that result from that use. The price should equal the marginal cost. Rational consumers will buy goods so long as their marginal benefits are greater than or equal to the price they pay. Sellers will produce and offer goods for sale so long as the marginal cost of producing the goods is less than the price they can get. The optimal allocation of resources is characterized by the simple equation:

$$\mathbf{MB = P = MC}$$

Long run equilibrium in purely competitive markets is the ideal and provides the benchmark for market performance. As market power is increased the price tends to rise above the MC suggesting less than an optimal allocation. When price is greater than MC, it should be considered as evidence that something may be amiss. It does not mean that it must be corrected. Just as a body temperature of 99.8° suggests a problem it does not mean you should be taking an antibiotic or undergoing surgery. In a market the price may exceed the MC but the cost of correcting the problem may exceed the benefits of the correction.

C. Antitrust and Regulation

To be added!