I. Introduction
Section 2 of the Sherman Act condemns monopolizing conduct, stating that ‘[e]very person who shall monopolize . . . any part of the trade or commerce among the several states, or with foreign nations, shall be deemed guilty of a felony . . . ’.1 This language suggests, and the judicial interpretation confirms, that not all monopolies are unlawful. This, of course, is sensible antitrust policy since we do not want to punish success achieved through honest means.2 In order to avoid creating perverse incentives, it is only unreasonable monopolies that are condemned by the Sherman Act. This is recognized in the Supreme Court’s two-pronged Grinnell test for unlawful monopoly. The test involves both structure and conduct:

The offense of monopolization under §2 of the Sherman Act has two elements: (1) the possession of monopoly power in the relevant market and (2) the willful acquisition or maintenance of that power as distinguished from growth or development as a consequence of a superior product, business acumen, or historic accident.3

Thus, an essential element of unlawful monopolization is proof of monopoly power in the relevant market. But it is not just §2 cases that require proof of monopoly power. In fact, there can be no doubt that monopoly power is a critical element in all areas of antitrust except for horizontal conspiracies under §1 of the Sherman Act.4

In its recent Leegin5 decision, the Court explained that vertical restraints are subject to rule of reason treatment. Under the rule of reason, one important factor to consider is market power.6 Merger enforcement under §7 of the Clayton Act is also influenced – if not determined – by considerations of monopoly power that may result from a merger.7

In this chapter, we explore monopoly power from an economic perspective. We also try to demonstrate the extent to which the law and economics are aligned with respect to monopoly power. The chapter is organized as follows. In Section II, we outline the economics of single-firm monopolies and present measures that capture the economic consequences of monopoly power. Section III illustrates monopoly power in the case of
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II. Monopoly power in economics
Before illustrating a stylized model of monopoly, it will be useful to review a benchmark case of what monopoly is not: perfect competition. In a perfectly competitive industry, there are many relatively small firms and many relatively small buyers of a homogeneous product. Competitive firms are price takers, meaning that they have no control over the market price; they take the market price as given in their profit-maximizing calculus. A profit maximizing firm will produce a quantity of goods (call it $q^*$) such that the marginal cost of producing the last unit is exactly equal to the marginal revenue, or in this case, price. Anything less than $q^*$ would leave profit on the table, and anything more would cut into profit (assuming that marginal cost is increasing in $q$, as would typically be the case in a competitive industry).

Perfectly competitive firms can easily enter and exit the market. If there are economic (as opposed to accounting) profits to be had in a particular market, firms will enter and drive the price down until each firm earns zero economic profit. If there are losses, some firms will exit and drive the market price up until the remaining firms earn zero economic profit.

There are three major results in a model of perfect competition, and the zero profit condition is one of them. The other two are market equilibrium and social welfare maximization. Competitive markets tend toward equilibrium, where the quantity supplied equals the quantity demanded. This is Adam Smith’s ‘invisible hand’ at work. Competitive markets are characterized by economic efficiency, or social welfare maximization. Social welfare, in the economic context, quantifies the total surplus that consumers and producers enjoy when the market price is different from their reservation prices. For most consumers, the market price for a good is less than their perception of the product’s inherent value. A good quantification of that value is consumers’ maximum willingness to pay, as described by the demand curve. Consumer surplus is the difference between the total value that consumers receive from a good and the price they pay. Similarly, producer surplus is the aggregate difference between market price and the minimum price at which a given quantity would be produced. Social welfare is the sum of consumer and producer surplus, and it is maximized under perfect competition. This is a consequence of the assumptions that led to market equilibrium: price-taking sellers and buyers, free entry and free exit, homogenous goods, and full information.

Figure 4.1 illustrates a perfectly competitive market, where $D$ represents a dominant firm. Section IV discusses some complications and practical problems with the identification of monopoly power, and Section V concludes.
market demand and $S$ represents market supply. At a price of $P_1$ and a quantity of $Q_1$, the market is in equilibrium. At a price of $P_1$, the quantity demanded is precisely equal to the quantity supplied. As a result, there will be no market forces pushing price above or below $P_1$. Consumer surplus, the value of $Q_1$ to consumers net of what they have to pay, is represented by the triangular area $abP_1$. Producer surplus, the difference between the price received and the sellers’ reservation prices, is measured by the triangular area $P_1bc$. Social welfare – the sum of consumer and producer surplus – is the triangular area $abc$. Given the demand and supply curves shown, social welfare is maximized at the competitive equilibrium. Any deviation will reduce social welfare.

A monopolized industry is at the opposite end of the competitive spectrum from a perfectly competitive industry. Instead of many small sellers, a pure monopoly exists when there is only one seller. Monopolies may or may not earn positive profits, but their efforts to maximize profit lead to output decisions that are inconsistent with welfare maximization. A pure monopolist is not a price-taker. The firm can choose to produce any

![Figure 4.1  Social welfare under perfect competition](image-url)
quantity along the market demand curve and charge the corresponding price. Much like a competitive firm, a monopolist will seek to maximize profits by expanding production until marginal cost equals marginal revenue. But since a monopolist is not a price taker, marginal revenue is not a fixed market price. Formally, marginal revenue is the change in total revenue resulting from a small increase in output. The monopolist aims to maximize profit. Consider the following profit function:

$$\Pi = P(Q)Q - C(Q)$$

$P(Q)$ is the price at which a given quantity $Q$ is demanded, $C(Q)$ is the monopolist’s total cost of producing that quantity, and $\Pi$ is monopolist’s profit. The monopolist will expand output until the incremental profit from expansion goes to zero:

$$\frac{d\Pi}{dQ} = P + Q \frac{dP}{dQ} - \frac{dC}{dQ} = 0$$

The term $P + Q(dP/dQ)$ is marginal revenue ($MR$) and $dC/dQ$ is marginal cost ($MC$). Then the monopolist’s profit maximizing rule is to produce such that:

$$MR = MC$$

Figure 4.2 illustrates a monopolist’s profit-maximizing price and output. Graphically, $MR$ has the same intercept as demand, but a steeper, more negative slope. Profit is maximized by producing $Q_2$, corresponding to the intersection of $MR$ and $MC$. The monopoly price is $P_2$, which is the maximum price that the monopolist can charge for an output of $Q_2$. As long as average cost is less than $P_2$, the monopolist will earn a positive economic profit. In this illustration, the profit is indicated by the rectangular shaded area in Figure 4.2. Note that the monopolist’s price is higher than $P_1$, which is the competitive price. Moreover, the monopolist’s output is lower than the economically efficient output $Q_1$. These are the economic symptoms of monopoly. A monopolist will produce less than the socially efficient quantity of output and charge a supra-competitive price. As a consequence, society incurs a deadweight social welfare loss in the form of forgone surplus. Graphically, this forgone surplus is the triangular area $abc$. Inefficiency, illustrated in Figure 4.2 by the area of deadweight loss, is the major economic case against monopolization. The monopolist will forfeit economic efficiency and social welfare in its pursuit of greater profit for itself. This is not sinister; it is simply the natural result of profit maximization in the absence of any competition.
In practice, firms which are accused of exploiting monopoly power look very different from the firm in Figure 4.2. But even in more complex industrial settings, the exercise of monopoly power typically results in supra-competitive prices and suboptimal output. The ability to exercise monopoly power relies on high barriers to entry and a well-defined product (one with few close substitutes). These market features were taken for granted in Figure 4.2, but monopoly power is considerably weakened in their absence. Section IV describes briefly the importance of entry barriers and market definition in assessing the viability of antitrust claims.

**Measuring monopoly power: the Lerner Index**

A monopolist differs from a perfectly competitive firm in its ability to raise price above marginal cost by restricting output. This is the essence of monopoly power: the ability to deviate from the competitive price (i.e., marginal cost) by restricting the quantity produced. Abba Lerner proposed...
a measure of monopoly power, which now bears his name – the Lerner Index. For Lerner, the degree of monopoly power is the margin by which a monopolist’s price exceeds marginal cost, which is the competitive price. The Lerner Index is then defined as:

\[ \lambda = \frac{P - MC}{P} \]

where \( P \) is price and \( MC \) is marginal cost, evaluated at the monopolist’s profit-maximizing price and output. It is easily shown that the Lerner Index is closely related to another economic concept: the elasticity of demand (\( \eta \)).

For a pure profit maximizing monopoly, the Lerner Index is equal to the inverse of the absolute value of \( \eta \):

\[ \lambda = \frac{1}{|\eta|} \]

The price-cost margin will be smaller if demand is more elastic. This makes sense because a high elasticity of demand indicates that consumers are very sensitive to price changes. As a result, a monopolist will not find it profitable to impose a high markup when demand is relatively elastic. In contrast, when demand is less elastic, consumers are less responsive to price changes, and the monopolist’s markup will be larger, as seen in Figure 4.3. Demand functions \( D_1 \) and \( D_2 \) equal marginal cost at the same output, \( Q_1 \). The corresponding marginal revenues \( (MR_1, MR_2) \) equal marginal cost at a quantity of \( Q_2 \). The profit maximizing prices, however, are quite different: \( P_1 \) is considerably higher than \( P_2 \). This is because \( D_1 \) is less elastic than \( D_2 \) at \( Q_2 \).

The Lerner Index is a misnomer, in that it fails as a monotonic measure of monopoly power. The value of \( \lambda \) depends on underlying costs and consumer preferences, not the degree to which one firm can exclude others from competing. An ideal index of monopoly power would have a ceiling, equal to some unique value for any pure monopoly. By contrast, the Lerner Index will vary even among pure monopolies. For example, a pure monopolist facing a relatively flat demand may find it optimal to operate where \( \eta = -5 \) while another may find it optimal to produce where \( \eta = -2 \). Even though both firms produce 100 per cent of the output in their respective markets, and therefore, are pure monopolists, the Lerner Index for the first firm is 0.2 while it is 0.5 for the second. This can lead to some confusion.

A related source of confusion stems from the fact that monopolists with very different price-cost margins may have the same Lerner Index. This can be shown with a simple example. Suppose that the profit
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maximizing price of a souvenir t-shirt is $15 while the marginal cost is $5. Then the price-cost margin is $10. Suppose a monopolist of marble bookends finds the optimal price to be $90 while the marginal cost is $30. The price-cost margin is $60. Both monopolists have the same Lerner Index since:

\[
\lambda = \frac{15 - 5}{15} = \frac{90 - 30}{90} = 0.67
\]

Despite its shortcomings, the Lerner Index is a useful tool for showing the existence of monopoly power, if not the degree. In this sense, the Lerner Index can be used to complement other types of antitrust evidence, like evidence of entry barriers. But one must recognize the ambiguities associated with measuring the magnitude of monopoly power once existence per se has been established.

Figure 4.3  Monopoly pricing, by elasticity of demand

Note: The monopolist produces \( Q_2 \), where \( MR = MC \), and sets price \( (P_2) \) according to the maximum willingness to pay. There is a social welfare loss equal to the triangular area \( abc \).
III. Dominant firms

A well-defined industry with only one unregulated firm is rare. There are, however, situations that are near monopolies. These usually involve a dominant firm that has the lion’s share of the market and a so-called competitive fringe, which comprises small firms that respond to price announcements of the dominant firm just as competitive firms respond to market-determined prices. A dominant firm will act like a monopolist, choosing output such that marginal cost equals marginal revenue, but with respect to residual demand rather than market demand. Residual demand is the difference between the market demand and the competitive fringe supply at any given price. This can be seen with the help of Figure 4.4.

In Figure 4.4, the market demand curve is represented by $D$ and the supply curve of the competitive fringe is denoted $SCF$. Note that $SCF$ is the horizontal sum of the marginal cost curves of all fringe firms. Absent the competitive fringe, the dominant firm would be a pure monopolist and would therefore face the market demand ($D$) and be able to determine the optimal quantity it would produce and the corresponding price it would charge. Given the presence of the competitive fringe, however, the dominant firm must consider how the fringe producers will respond to its price announcement. Thus, the demand that a dominant firm faces is not the market demand, but the residual demand ($d$), which is the difference between the market demand and the supply of the competitive fringe. In short:

$$d = D - SCF$$

The marginal revenue associated with the residual demand is denoted as $mr$ in Figure 4.4. Now, the dominant firm proceeds to maximize its profits in the usual way; it produces that output where its marginal cost ($MC$) equals residual marginal revenue ($mr$) and sells it for the market clearing price, which is found on the residual demand curve. This output and price are shown in Figure 4.4 as $Q_{df}$ and $P$, respectively. The competitive fringe will respond to this price in a predictable way – by producing $Q_{cf}$, which is the quantity on $SCF$ that corresponds to a price of $P$. Together, the dominant firm and the competitive fringe supply $Q$, which is precisely the amount that the market demands at a price of $P$, i.e., $Q = Q_{df} + Q_{cf}$.

A dominant firm sets a lower price than a pure monopolist would have set, and accordingly, the Lerner Index will be lower for a dominant firm than it would have been absent the competitive fringe. This makes sense, since we would expect the residual demand to be more elastic than the market demand. Let $\eta_r$ represent the elasticity of residual demand, $\eta_m$ the elasticity of market demand, and $\varepsilon$ the elasticity of fringe supply. Let $S$ and $(1 - S)$ represent the market shares for the dominant firm and fringe
firms, respectively. In the context of the dominant firm model, the Lerner Index becomes:

\[ \lambda = \frac{P - MC}{P} = -\frac{1}{\eta_r} \]

The elasticity of residual demand (\( \eta_r \)) is a function of the elasticity of the market demand (\( \eta_m \)), the elasticity of the fringe supply (\( \varepsilon \)), and the share of the market controlled by the dominant firm. It can be shown algebraically that \( \eta_r \) is related to \( \eta_m \), \( \varepsilon \), and \( S \) as follows:\(^{19}\)

\[ \eta_r = \frac{\eta_m - (1 - S)\varepsilon}{S} \]

Substitute \( \eta_r \) into the dominant firm’s Lerner Index to get,

\[ \lambda = \frac{S}{|\eta_m| + (1 - S)\varepsilon}. \]
The Lerner Index for a dominant firm facing a competitive fringe is decreasing with $\epsilon$ and the absolute value of $\eta_m$. That is, for more elastic fringe supply or market demand, the Index is smaller. The Index is increasing with the market share of the dominant firm. As $S$ increases, so does $\lambda$. As the above equation illustrates, however, market share is not the only determinant of market power. As in a model of pure monopoly, the Lerner Index will not measure the degree of power that a dominant firm exerts over the consumers and the fringe firms. Instead, it measures the monopolist’s relative markup taking into account the presence of the fringe. The next section examines how the courts have tried to resolve this and other discrepancies between theoretical and practical understandings of monopoly power.

IV. Monopoly power in antitrust law

The Supreme Court held in *du Pont* (the *Cellophane* case) that ‘[m]onopoly power is the power to control prices or exclude competition’. The Court’s use of ‘or’ rather than ‘and’ has caused some confusion in practice. Based on this single sentence, which is taken out of context, some may believe that one can establish the fact of monopoly power by simply showing that a dominant firm can exclude some competition or exert some control over price. This belief is misguided. Over the last half century, the courts have become increasingly sophisticated in their understanding of what constitutes monopoly power.

From an economic perspective, monopoly power refers to the ability of a firm to raise prices above the competitive level and thereby earn more profit. For antitrust purposes, however, a successful plaintiff will have to prove that monopoly power exists. This, of course, can be accomplished with direct or circumstantial evidence.

**Direct evidence**

A plaintiff can prove the existence of monopoly power by showing that the defendant raised price substantially above the competitive level or actually excluded some of its competitors. This is often hard to do. For example, showing that price is above the competitive level may be ambiguous. A perfectly competitive market that is in disequilibrium will have prices that exceed the long-run competitive equilibrium price. Prices will equal short-run marginal cost, but may far exceed average cost. Even in equilibrium, infra-marginal firms will enjoy excess profits due to their superior efficiency, better location, or more astute management.

The exclusion of rivals as evidence of monopoly power is often problematic as well. Some rivals exclude themselves because they are less efficient or otherwise poorly managed. As a policy matter, we are concerned with
the exclusion of equally efficient firms. Inefficient firms should be on their own.

Circumstantial evidence
Over the years, the most prominent piece of circumstantial evidence has been market share. In *Alcoa*, the Court found that a share of 90 per cent was conclusive proof of monopoly. Although market share may not be dispositive, it has been relied upon by many courts and endorsed by the Supreme Court. In *Grinnell*, for example, the Court found it reasonable to infer monopoly power from a predominant share of the market. In the *Cellophane* case, the Court noted that a market share of 75 per cent constituted monopoly. Somewhat more recently, the Supreme Court found that an 80 per cent market share provided an adequate foundation for an inference of monopoly power. This, of course, raises the question of thresholds. As a general proposition, a market share above 70 per cent creates a rebuttable presumption of monopoly power, while a market share below 50 per cent usually precludes an inference of monopoly power. For cases involving a dominant firm with market share between 50 and 70 per cent, there have been varying judicial decisions.

The problem with relying solely on market share is easy to show. Suppose a firm has a market share of 70 per cent and, therefore, is presumed to have monopoly power. At first blush, this does not seem unreasonable. After all, a firm wields monopoly power by reducing output and thereby increasing price. But suppose that the absolute value of the elasticity of demand (|\(\eta^m|\)) equals 2 and the elasticity of fringe supply (|\(e'|\)) is also equal to 2. In that event, the Lerner Index will be:

\[
\lambda = \frac{0.70}{2 + 2(0.30)} = 0.27
\]

In other words, by unilaterally reducing output, the dominant firm will be able to elevate price until marginal cost is 27 per cent below price.

Suppose another firm has a market share of 40 per cent and, therefore, is presumed to have no monopoly power. If the absolute value of the demand elasticity is 1.25 and the fringe supply elasticity is 0.25, the Lerner Index will be:

\[
\lambda = \frac{0.40}{1.25 + 0.25(0.60)} = 0.29
\]

In this case, the firm with a 40 per cent market share has more monopoly power than the firm with a 70 per cent market share.
The problem of product differentiation
According to the Department of Justice and Federal Trade Commission Merger Guidelines, if a firm can profitably raise its price by 5 per cent above the competitive level, that product constitutes a relevant antitrust market. If it is the only producer, presumably that firm would be a monopolist. The problem is that this may characterize a wide array of firms in industries marked by product differentiation and substantial rivalry. In monopolistically competitive industries, equilibrium market prices may be equal to average cost, but they will be above marginal cost. Since competitive prices are equal to marginal cost, equilibrium involves supra-competitive pricing. Generally, however, this is of no antitrust significance. Restructuring such markets would be futile because these results are the natural consequences of product differentiation, which provides choice to consumers.

Importance of entry barriers
Responsible managers act in the interest of the shareholders who own the company. In doing so, they will maximize the firm’s profits on behalf of those shareholders who will benefit from higher dividends and appreciation in the market value of their shares. In order to maximize profit, the manager must exercise the market power that the firm possesses. The economic profit that the firm earns will attract the interest of those outside the industry as they would like to dip into that pot of gold. Entry by those firms will lead to competition and an erosion of monopoly power. Consequently, for monopoly power to be more than a temporary bump in an otherwise competitive road, there must be some barriers to entry.

As a general proposition, an entry barrier can be defined as a cost that new entrants must bear that the incumbent did not (or does not) have to bear. Alternatively, we may define an entry barrier as an advantage that an incumbent enjoys over potential entrants. There is some disagreement among economists about which definition is most useful. For our purposes, we only want to point out that low entry barriers, however defined, will shorten a monopolist’s tenure. In contrast, high entry barriers mean that monopoly (or market) power will persist, as will its exercise and its effect on social welfare.

Courts consider evidence of barriers to entry in determining the existence of monopoly power. If there are no substantial barriers to entry, courts are apt to find no monopoly power. This, of course, is suitable from an economic perspective; prices and profits above the competitive level will attract entry, and the resulting competition will reduce both. Conversely, substantial entry barriers support an inference of monopoly power based on market share because they will insulate the firm from competition.
Many things have been characterized as entry barriers. These include high capital costs, limited supplies of critical inputs, long-term supply contracts, legal licenses, network effects, intellectual property, and brand names, among others. The problem with some of these so-called entry barriers is that they were earned by the incumbent. For example, any consumer preference for computers with ‘Intel Inside’ was earned by Intel through years of producing high-quality microprocessors. Rivals can compete with an established brand by offering high quality products, pricing aggressively, and being a reliable source of supply. Similarly, high capital costs are not unique to the entrant. The incumbent also incurred high capital costs along with the associated risks of its investments. Capital costs are only an entry barrier if potential entrants cannot get access to the necessary capital due to some form of market imperfection. Otherwise, entrants must incur those costs just as the incumbent did. In some industries, network effects may be pronounced. Entry may be difficult if an incumbent has substantial market penetration; in that case, an entrant’s product will not have much value until it has been accepted by a critical mass of consumers. This creates a chicken-and-egg situation. A firm will not find entry attractive unless it expects a large customer base, but potential customers will not purchase the entrant’s product unless it has a large customer base.

In some instances, courts have considered the presence of supra-competitive prices and profits as proof of monopoly power. The most prominent problem with this inference is that price and profit data come from accounting records, which do not reflect the economic concept of cost. The accounting costs found in financial statements only tell part of the story, leaving out the implicit opportunity costs of a firm’s assets and investments.

Importance of market definition
Monopoly power does not exist in a vacuum. Rather, it exists in a sensibly defined relevant market. If a market is defined too narrowly, a firm without a meaningful monopoly will be seen as a monopolist. For example, if one examined the ‘market’ for Burger King’s Whopper sandwiches, Burger King would appear to be a monopolist since no one else sells Whoppers. But such a market makes no economic sense because it ignores reasonably close substitutes that are supplied by McDonald’s, Wendy’s, Hardee’s, What-a-Burger, and others. On the other hand, if a market is defined too broadly, a firm with substantial monopoly power will be seen to have none. For example, if ready-to-eat breakfast cereal, which has been defined as a relevant market, were produced by a single firm, that firm would be a monopolist. If the relevant market were defined
as all foods that people eat for breakfast, the breakfast cereal monopolist would be seen as competing with the producers of hot cereals, donuts and other pastries, eggs and various breakfast meats, potatoes, pancakes, French toast, cold pizza, apple pie, and a host of other products.

For antitrust purposes, the courts have recognized that market definition is critical in proving monopoly power. In *Walker Process*, for example, the Supreme Court observed that ‘[w]ithout a definition of [the relevant] market, there is no way to measure [a firm’s] ability to lessen or destroy competition’. The Supreme Court’s *Grinnell* standard clearly requires proof of the relevant market. The Supreme Court’s ruling in *Spectrum Sports* also makes it very clear that market definition is an essential element in § 2 cases.

V. Concluding remarks

The power a monopolist wields resides in its ability to raise price above the competitive level, which it accomplishes by producing a suboptimal quantity of output. A natural signal of monopoly power, then, is the Lerner Index. The Lerner Index demonstrates the extent to which a monopolist can increase price above the competitive level and thereby earn greater profit. The Lerner Index alone, however, cannot communicate the degree of monopoly power enjoyed by a firm. Monopoly power will be influenced by the existence of reasonable substitutes, which is why market definition is important. Another important consideration is the height of entry barriers, since the durability of a monopolist’s power critically depends on the likelihood that new rivals will enter the market. A rigorous economic analysis of monopoly power will look for factors that maintain monopoly power, like thinly distributed substitutes and high entry barriers, in addition to symptoms of monopoly power, like supra-competitive prices.

Notes

* Blair: Department of Economics, University of Florida; Carruthers: Department of Economics, University of Tennessee. We appreciate the financial support of the Warrington College of Business Administration. We also appreciate Keith Hylton's invitation to participate in this venture. For past collaboration, we thank Amanda Esquibel.


2. If a firm's product is so superior to that of its rivals, for example, it would not make much sense to punish the resulting monopolist even though it 'monopolized' that part of the trade or commerce.


4. 15 U.S.C. §1: ‘Every contract, combination . . . or conspiracy, in restraint of trade or commerce . . . is declared to be illegal.’ Horizontal conspiracies, i.e., those among competitors, that fix prices, rig bids, allocate markets, withdraw credit, or otherwise tamper with the price mechanism have been deemed illegal per se. Since the act is illegal, there is no need to show monopoly power.
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6. Id. at 2712 ('...market power is a further, significant consideration.') From an economic perspective, monopoly power and market power are the same thing; see, Thomas G. Krattenmaker, Robert H. Lande & Steven C. Salop, Monopoly Power and Market Power in Antitrust Law, 76 Georgetown Law Journal 241 (1987).
7. See §0.1 of the 1992 Department of Justice and Federal Trade Commission Horizontal Merger Guidelines.
8. Profit can be written as:

\[ \Pi = Pq - C(q) \]

where \( P \) is the market-determined price, \( q \) is the quantity of output, and \( C(q) \) is the firm’s cost function. Profit maximization requires producing the quantity where:

\[ \frac{d\Pi}{dq} = P - \frac{dC(q)}{dq} = 0 \]

Since \( dC/dq \) is marginal cost, we have the result that \( P = MC \).
10. Economic profits are not the same as accounting profits. The former account for all opportunity costs, which represent the value of the next-best venture that a firm’s resources could be pursuing. When a firm earns zero economic profits, its accounting profits may be positive, but this will not induce entry.
12. Since price declines as quantity increases along the demand curve, total revenue is:

\[ TR = P(Q)Q \]

and marginal revenue is by definition given by

\[ \frac{dTR}{dQ} = P + Q \frac{dP}{dQ} \]

Since \( dP/dQ \) is negative (i.e., demand curves are negatively sloped), marginal revenue is less than price: \( MR < P \).
13. For a linear demand, \( P = a - bQ \), total revenue is \( PQ = aQ - bQ^2 \), and marginal revenue is \( dPQ/dQ = a - 2bQ \). Thus, the marginal revenue curve is twice as steep as the demand curve, with the same intercept.
14. Richard A. Posner, The Social Cost of Monopoly and Regulation, 83 Journal of Political Economy 807 (1975), warns us that the pursuit of monopoly may involve rent seeking activity that is not socially productive. The resources used in this pursuit are wasted as they could have been used to produce something of value to society.
16. Elasticity (\( \eta \)) is a unit-free metric that describes the per cent by which the quantity demanded will change for a given per cent change in price:

\[ \eta = \frac{\%\Delta Q}{\%\Delta P} \]

where \( \Delta \) denotes an arbitrarily small change. More precisely, the elasticity of demand at any point on the demand curve is given by:

\[ \eta = \frac{dQ}{dP} \frac{P}{Q} \]
where the specific values of $P$ and $Q$ are the coordinates of a point on the demand curve.

For some price and quantity, an elasticity less than minus one ($\eta < -1$) means that in response to an $x$ percentage decrease in price, the quantity demanded will increase by a percentage greater than $x$. Conversely, when $\eta$ is between $-1$ and $0$, an $x$ percentage decrease in price yields an increase in the quantity demanded by a percentage less than $x$. The elasticity of demand is negative for all goods except Giffen goods, which are a theoretical exception rarely (if ever) encountered in practice.

17. The profit a maximizing monopolist will produce where:

\[ P + Q \frac{dP}{dQ} - MC = 0 \]

or

\[ P - MC = -Q \frac{dP}{dQ} \]

Dividing both sides by $P$ yields the Lerner Index:

\[ \lambda = \frac{P - MC}{P} = -\frac{1}{\eta} \]

Since $\eta = (dQ)/(dP)(P)/(Q)$ by definition.

18. Marginal revenue is $P + Q(dP/dQ)$ and can be written as $P[1 + (Q(P)/(dP/dQ))]$. By definition of the elasticity of demand, this can be written as $P[1 + (1/\eta)]$. In Figure 3, $MR_1 = MR_2$ at $Q_2$ and, therefore, $P_1[1 + (1/\eta_1)] = P_2[1 + (1/\eta_2)]$. Since $P_1 > P_2$, $\eta_1$ must be less than $\eta_2$.


22. Grinnell, supra n. 3.


26. Id.


28. See Parkin, supra n. 9, at Chapter 13.

29. See, e.g., Richard A. Posner, Antitrust Law 22 (2nd edn, 2001): ‘... to infer that every seller who faces a downward-sloping demand curve has market power in a sense interesting to antitrust law would be a profound mistake.’

30. The managers are rewarded for maximizing profit in the form of bonuses, promotions, stock option plans, and so on.

31. In American Tobacco Co. v. United States, 328 U.S. 781, 811 (1946), the Court held that monopoly power could be found even if it were unexercised. But a plaintiff should have to explain why a for-profit firm would not exercise monopoly power.

32. Barriers to entry is used in several ways, which does not aid our understanding. See Dennis W. Carlton & Jeffrey M. Perloff, Modern Industrial Organization 76–7 (4th edn, 2005).

33. This definition can be traced to George J. Stigler, The Organization of Industry 67 (1968).

34. This advantage may be in the form of ‘absolute capital requirements’ which have
already been paid by the incumbent. See Joe S. Bain, *Barriers to New Competition* 55 (1956).


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