

# **BARRIERS TO ENTRY & MOBILITY**

Jon P. Nelson

Professor Emeritus of Economics

Pennsylvania State University

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Penn State World Campus

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# 6

## Barriers to Entry

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### *Reading Assignment*

See Course Schedule.

### *Learning Objectives*

After completing the textbook reading assignments and the Study Guide lesson, you should be able to achieve the following objectives:

- Define *entry barriers* and explain the importance of alternative definitions; distinguish between structural barriers and strategic barriers.
- Compare and contrast economies of scale, economies of scope, and absolute cost advantages as possible barriers to entry.
- Present a simple model of entry deterrence; analyze a market using the contestable market hypothesis.

### *Commentary*

#### *The Entrant's Decision*

Firms enter markets when they can observe that other firms are making economic profits during the pre-entry time period *and* they believe that an entrant can earn an economic profit in the post-entry time period. In a perfectly competitive market, post-entry conditions are unimportant, but that is not the case if the market is imperfectly competitive:



First, the potential entrant has to be concerned that its entry will affect the market price (and other terms of sale) due to its added output and possible reactions by existing firms. If existing firms reduce prices in response to entry, the possibility of post-entry profits for the entrant is reduced.

Second, an entrant has to be concerned with the cost and non-cost advantages possessed by existing firms, which are **structural barriers to entry**. As an example of a non-cost advantage, brand loyalty on the part of consumers can mean that the products of existing firms sell at a premium compared to the relatively unknown product offered by an entrant.

Third, the entrant also has to be concerned with exit costs; that is, the sunk costs associated with attempting to successfully enter the market. The existence of highly-specialized assets is often a clue that entering an industry is risky due to sunk costs and **barriers to exit**.

Furthermore, the **existing firms—the incumbents**—may have control of the pre- and post-entry conditions faced by a potential entrant. The entry-detering conduct of the incumbent firms constitutes a **strategic barrier to entry**. Existing firms might respond to entry by sharp reductions in price in those segments of the market where competition has increased, and they might maintain excess production capacity to better facilitate price cuts and output increases. They might try to increase the advantages of incumbency by investing in cost-reducing technologies or improving the image of existing brands. Existing firms can increase sunk costs by increased advertising, which also enhances brand loyalty, or by legal (and illegal) countermoves.

Note that the welfare effects of some of these behaviors are uncertain and the removal of an entry barrier does not always produce a welfare gain. If the existing firm is more efficient than a potential entrant, its advantage can be a “filter” rather than a “barrier,” and the incumbent’s profit is an efficiency rent rather than an economic profit. This important distinction is often lost in public debates about the importance of entry barriers. Hence, it is important to be very clear about the definition of entry barriers.

### *Defining Barriers to Entry*

Barriers to entry are a key element of market structure and this term has entered into everyday lexicons. Broadly speaking, *entry barriers* are the advantages that accrue to a firm from being established in a market or the “value of incumbency.” However, for some purposes this definition is too broad. Here are several alternative definitions of a “barrier to entry.”

**Bain** – A barrier to entry is “the extent to which, in the long run, established firms can elevate their selling prices above minimal average costs of production and distribution ... without inducing potential entrants to enter the industry” (*Industrial Organization*, 2<sup>nd</sup> ed., 1968, p. 252).

**Stigler** – “A barrier to entry may be defined as a cost of producing (at some or every rate of output) which must be borne by a firm which seeks to enter an industry but is not borne by firms already in the industry” (*The Organization of Industry*, 1968, p. 67).

**von Weizsacker** – “Barriers to entry into a market ... can be defined to be socially undesirable limitations to entry of resources due to protection of resource owners already in the market” (*Barriers to Entry*, 1980, p. 13).

**Baumol and Willig** – A barrier to entry is “anything that requires an expenditure by a new entrant into an industry, but that imposes no equivalent cost upon an incumbent ... entry can be expected to be profitable only if the profits expected in the event of success outweigh the unrecoverable entry costs that will be lost in the case of failure” (*Quarterly Journal of Economics*, 1981, p. 408 and p. 418).

**Gilbert** – “A barrier to entry is a rent that is derived from incumbency. It is the additional profit that a firm can earn as a sole consequence of being established in an industry” (*Handbook of Industrial Organization*, vol. 1, 1989, p. 478).

These five definitions differ in several important ways:

First, Bain and Gilbert define barriers in terms of outcomes or market performance. In order to see better what they have in mind, we need to look at what they consider to be an entry barrier (more on this below).

Second, according to Bain and Gilbert, removal of a barrier to entry need not imply that social welfare is increased. Changes in resource use that do not improve social welfare are *transfers* of economic surpluses.

Third, the emphasis in Stigler’s definition is on differential costs between incumbents and potential entrants to an industry. As we will see, some things that are barriers according to Bain’s definition are excluded by Stigler’s definition, including scale economies and fixed costs of entry.

Fourth, von Weizsacker’s definition stresses the welfare effects of entry barriers (and their removal), which is not explicit in the other four definitions.

Fifth, Baumol and Willig’s definition stresses the importance of “sunk costs” as an entry (and exit) barrier. Again, this is not explicit in the other definitions.

Consider the following example:

Firm A is an established firm in a given market and currently is earning an above-normal profit for two reasons. First, it has a loyal group of customers who have learned from experience that its product is reliable. These customers would never switch to Firm B—the potential entrant—if prices were the same, but would switch if the price differential was on the order of 30 percent or more. Second, Firm A has invested heavily in R&D, and always

has a steady stream of product improvements that it can (and sometimes does) introduce to the marketplace.

Firm B has an alternative product for which it has had to incur development costs, but it also has been able to copy some of the features of Firm A's product (without violating patent or trademark laws). Nevertheless, Firm A has a net advantage due to trade secrets in its R&D portfolio, and it can allege that Firm B has infringed on its patents. Are either of Firm A's advantages entry barriers? Surprisingly, most of the economists would agree that brand loyalty is an entry barrier—it reflects sunk costs incurred by the customers—although there would be considerable doubt about the welfare implications of this barrier or whether public policy could improve on the existing situation. Hence, brand loyalty as a barrier would probably fail the test proposed by von Weizsacker.

The R&D barrier is trickier. Both firms have had to incur costs of developing their product, and Firm B's costs are somewhat lower as it was able to copy some of the features of Firm A's product without, it believes, violating the law. On the other hand, Firm A may have incurred sunk costs associated with durable investments in R&D, which have little or no salvage value. Clearly, this is a case where circumstances matter, and public policy might improve economic welfare, but the outcome is far from clear.

When an issue gets confusing, breaking it into parts or stages often helps clarify the matter. Viscusi, Vernon, and Harrington (*Economics of Regulation and Antitrust*, 3<sup>rd</sup> ed., 2000, p. 160) propose the following two-stage analysis of entry barriers. First, examine the assumptions that underlie the particular argument that something is a barrier—is there a differential cost and can existing firms maintain prices above *their* costs? Second, examine the policy implications of the entry barrier—is there a cost-effective policy that could remove the barrier and improve welfare? Note that the anticipated speed of entry may be important for policy. Because legal issues are complex, courts often analyze issues in a series of stages or prongs. Hence, attorneys and judges can pose a series of questions, any of which might be answered in the negative. The danger in this approach is that the terminology of economics is used to classify, rather than analyze, the issues, which can lead to simple rules and possibly incorrect outcomes (see Exhibit 6.1).



**Exhibit 6.1. Is Brand Loyalty an Entry Barrier?: *Borden, Inc. v. FTC* (1982)**

In 1978, the Federal Trade Commission (FTC) ruled that Borden used unfair methods of competition in the sale of its reconstituted lemon juice product known as ReaLemon. A highly-successful brand, ReaLemon sold at a premium retail price compared to its smaller rivals, and the premium largely reflected its brand name recognition. Beginning in the late 1960s, Borden faced increased competition from an entrant, Golden Crown Citrus Corporation. In a documented move, Borden responded by using price reductions, increased promotional allowances, and increased advertising on a selective basis, i.e., only in those geographic areas where Golden Crown was making inroads into ReaLemon's market share. The FTC found Borden guilty of antitrust violations. It ordered Borden to cease and desist from selling "below its cost or at *unreasonably* low prices," 92 FTC 833 (1978, emphasis added), but it stopped short of requiring Borden to license its brand name to competitors.

In 1981, Borden appealed the FTC's decision, 674 F.2d 498 (1982). The issues addressed by the appeals court were: (1) the definition of the relevant market; (2) whether Borden possessed monopoly power in the relevant market; (3) whether Borden's acts and practices constituted illegal maintenance of its monopoly power; and (4) whether the FTC's remedy was related reasonably to the alleged practices.

On the first issue, the FTC defined the relevant market narrowly as "processed lemon juice," and excluded fresh lemons, which the appeals court sustained. Within this market, ReaLemon had a 90 percent national market share and was the only nationally-advertised processed lemon juice. However, it faced competition from 20 firms, including Sunkist, MinuteMaid, and Golden Crown. The rivals were at no obvious cost disadvantage. Given its brand name cache, Borden was able to charge a premium price of 30 percent or more for ReaLemon, despite the lack of obvious objective quality differences. However, Borden did introduce some evidence before the FTC that Golden Crown sold an inferior, adulterated product.

Examining the issue of entry barriers, the appeals court found that "the evidence indicated ReaLemon's successfully differentiated brand name, extensive advertising, and ability to command a premium price acted as an entry barrier into the processed lemon juice market," 674 F.2d 512. The court also found that "Borden's conduct had the effect of deterring entry and restricting the ability of competitors to expand into other geographic areas," 674 F.2d 514. Against this backdrop, a majority of the court found Borden guilty of violation of Section 2 of the Sherman Act (monopolization) and Section 5 of the FTC Act (unfair competition).

In a sharply worded dissenting opinion, Judge Kennedy addressed whether Borden's success was a violation of the antitrust laws on monopolization.



She asserted that "Borden surely meant to obtain as much of the ... market as it could, but that is the very essence of normal competition," 674 F.2d 518. She argued that lowering prices to meet competition is "simply good business practice," and "advertising is not use of monopoly power." Judge Kennedy also chided the court's majority and the FTC for incorrect application of the economic model of predatory pricing. With respect to brand loyalty as an entry barrier, she argued that "the FTC disapproved of the consumer preference for ReaLemon because it resulted from 'spurious' product differentiation based on the strength of the ReaLemon trademark ... [but] the primary function of a brand name is to provide consumers an assurance of quality ... [and] there is nothing unreasonable about a monopolist's using its image advantage to its benefit," 674 F.2d 520. (Do you agree with the majority of the court in this case? Why or why not?)

Economists (and attorneys) have proposed a long list of entry barriers. With the above definitions and analysis in mind, a partial list of possible entry barriers is as follows:

### 1. Scale- or Technology-Related Barriers

- economies of scale: Plant
- economies of scale: Multi-plant and network (firm-level unit costs)
- economies of scope (multi-product or multi-geographic market)
- vertical integration
- absolute cost advantages
- capital requirements (fixed investment costs of entry)
- excess capacity
- learning-curve effects (cost reductions due to accumulated production experience)

### 2. Product- or Demand-Related Barriers

- product differentiation (brand loyalty due to, say, advertising and switching costs)
- brand proliferation and style changes
- pioneering brand advantage (first-mover advantage)
- economies of scale: Advertising and marketing
- predatory research and development investments (R&D portfolio)

### 3. Other Barriers

- patents and trademarks
- tariffs and quotas
- licensing requirements and other regulatory barriers
- control of low-cost raw materials or other inputs such as distribution channels
- long-term contracts (precommitment contracts)
- specific assets (sunk costs)
- reputational effects (tough competitor reputation)
- informational costs

Consider the issue of “capital requirements” as an entry barrier. Certain markets can be entered for a small initial outlay. For example, start-up investment for a McDonald’s franchise costs \$220,000, and some of this can be borrowed (see McDonald’s Web site). Other industries require millions of dollars of start-up costs, but both incumbent firms and entrants have to incur these costs. Using the Stigler and Baumol-Willig definitions, capital requirements (fixed costs) are not an entry barrier so long as these inputs are available on equal terms to all who want to use them and the costs are not sunk. However, Bain and others would point out that only a few firms or individuals can obtain the capital needed for entry in many markets, and the existence of successful, entrenched incumbents raises the risk premium portion of capital costs. Hence, capital requirements discourage entry. They also would point out that large capital requirements are correlated with high profit rates. Stigler would respond that if both the incumbent firm and the entrant are equally efficient, the real barrier is informational costs and the creation of a reputable history by the incumbent (Demsetz, *American Economic Review*, 1982, p. 50). Baumol and Willig would respond that capital requirements are only an entry barrier to the extent that fixed costs are sunk, which is a bygone to the incumbent. Sunk costs make entry more risky.

**Exercise 6.1.** How would you define an entry barrier? How would you define an exit barrier? How might economies of scale act as an entry barrier? Describe several possible situations or scenarios where a scale-related barrier is present.

### *Economies of Scale*

A good deal of the empirical analysis of entry barriers has focused on the measurement of economies of scale in manufacturing industries at the level of the plant. There are several reasons for this focus.

First, if economies of scale are unimportant relative to the size of the market, then observed levels of market concentration are not “technological imperatives.” For example, if all scale-related economies in the lemon juice industry are attained at 10 percent of the market output, there is room for 10 efficient-sized firms (assuming there are no economies of multi-plant operation).

Second, if entry is associated with sunk costs, the associated entry barrier will be higher, the greater are economies of scale (Baumol and Willig, *Quarterly Journal of Economics*, 1981, p. 419). Much of the theoretical analysis of entry barriers and entry deterrence implicitly assumes that there are substantial sunk costs of entry.

Third, relatively simple models of entry deterrence can be developed using scale economies, which means the empirical analysis has a theoretical link with market conduct and performance. A simple strategic model—the **limit pricing model**—is presented below (W & J’s textbook takes up this model in Chapter 10, but we have already covered some parts of the limit pricing model in Lesson 4).

Long-run average total cost (LRAC) schedules are characterized by two parameters, which are the objects of empirical measurements. First, the smallest output level at which LRAC attains a minimum, which is referred to as **minimum efficient scale (MES)**. A post-entry price at least equal to MES is required for profitable entry. The second parameter is the steepness of the LRAC schedule at outputs smaller than MES, which determines the unit-cost penalty if entry takes place at a smaller-than-MES output. This is referred to as the **cost-scale penalty**. There are several reasons why new firms might choose to enter a market at a sub-optimal scale, including the possibility that the cost-scale penalty is small.

Several different measurement techniques are available for analysis of economies of scale. For regulated industries, it often is possible to estimate a **statistical cost function**, but data availability usually means that this method cannot be applied to unregulated industries.

A second empirical method is the so-called **survivor test**, which analyzes the size distribution of plants over time. The logic behind this test is that plants producing at or near to MES will survive, and this will be reflected in a growing portion of industry output. Plants that are either too small or too large will exhibit a decreasing share of industry output. This test is very appealing, but it is not without difficulties. It is not clear that survival reflects only an efficient plant size, but rather is the sum total of all the economic and other forces that impinge on the plant and firm. Nevertheless, applications of this test suggest that survival is consistent with a broad range of plant sizes, suggesting that the LRAC schedules are relatively flat within this range.

The third method is a survey approach based on interviews with senior plant engineers and use of related technical data. The **engineering study** is the most direct approach and probably the most reliable method, although such studies are quickly dated if technological change is important. The definition of cost efficiency is also narrowly confined to technical aspects of the production process, although recent studies have tried to overcome this problem by investigating marketing economies as well as production costs.

Additionally, the engineering method has been applied at the level of the firm, where the objective is to account for the cost advantages of multi-plant operation. For example, a firm might reduce shipping costs by operating four regional plants or it might use different plants for each segment of the broader product line, thereby obtaining the advantage of longer, cost-reducing production runs. Hence, **multi-plant economies of scale** occur for several reasons, including transportation, inventory, lot size, investment planning, administrative, and labor market savings. Empirical evidence on these points, however, is limited. (I don't mean that such economies don't exist, but rather that few studies examine the importance of these savings.) Balanced against these savings, the firm must consider the possibility of managerial diseconomies of scale, which is the traditional reason offered for a rising LRAC schedule.

Table 6.1 summarizes information for six of the twelve industries studied by Scherer and associates (*The Economics of Multi-Plant Operation*, 1975), which is one of the few studies to examine both plant-level and multi-plant economies of scale. The study covers technologies that were in use in the mid-1960s, but the "old-economy"



industries in question are those for which technological change is not very important. However, the importance of technological change for dynamic economic performance is not captured by static measurement of scale economies.

Industry	Minimum Efficient Plant Scale (output per year)	MES as % of 1967 demand (national)	Cost-penalty at one-third MES (percent inc.)	Ave. No. MES plants per firm (1970 actual)
Beer brewing	4.5 million barrels	3.4	5.0	6
Cigarettes	36 billion cigarettes	6.6	2.2	2
Paints	10 million gallons	1.4	4.4	10
Petroleum refining	200,000 barrels per day of crude oil capacity	1.9	4.8	8
Portland cement	7 million barrels	1.7	26.0	13
Refrigerators	800,000 units	14.1	6.5	2

**Table 6.1**  
**Estimates of Economies of Scale**

Source: F.M. Scherer, et al., *The Economics of Multi-Plant Operation* (Cambridge, MA: Harvard University Press, 1975, p. 80, 208, and 334–36. The required number of plants per firm for efficiency is beer, 3–4; cigarettes, 1–2; paints, 1; petroleum, 2–3; cement, 1; and refrigerators, 4–8.

Several things stand out in this table (and in other similar studies). First, MES is usually not large compared to the overall market, which implies that market concentration is not a technological imperative at the plant level. Refrigerators are an exception in the table. Second, the cost-scale penalty is not large. Portland cement is the exception in the table. Third, observed levels of concentration usually result from the operation of multiple plants by industry leaders. For example, if each of the top four petroleum firms operated eight efficient plants, the four-firm concentration ratio is  $2 \times 8 \times 4 = 64$  percent. Although this issue is complex, Scherer and associates concluded that national market concentration cannot be justified by multi-plant economies of scale (*The Economics of Multi-Plant Operation*, 1975, p. 393).

In industries where transportation costs are unimportant, multi-plant operation is associated with the marketing advantages of being a broad-line supplier. To some extent, this advantage is related to real cost savings obtained by producing two or more products together (joint production), which is labeled **economies of scope**. For example, many restaurants serve breakfast, lunch, and dinner, although there are a few that specialize in one (or two) meal service. Producing several products allows the restaurant to use common inputs—its overhead costs—in a more efficient manner. If the cost gains from specialization are large, specialization will be common. Conversely, the marketing advantages of multi-product operations may justify more than one plant per firm, where each plant specializes in a particular product. Perhaps it is obvious by now that some economists would *not* consider these marketing advantages to be a barrier to entry (Bain or Stigler? Is this advantage available to all firms?).



**Exercise 6.2.** Suppose that the *stand-alone* total cost of preparing lunches is  $TC(L) = 300 + 5Q_L$  and the stand-alone total cost of preparing dinners is  $TC(D) = 500 + 7Q_D$ , where the marginal costs are \$5 and \$7, respectively. Both cost functions demonstrate economies of scale since average stand-alone costs are everywhere declining. When lunches and dinners are produced jointly, total costs are  $TC(L, D) = 600 + 5Q_L + 7Q_D$ . Calculate  $TC(L)$ ,  $TC(D)$ , and  $TC(L, D)$  for  $Q_L = Q_D = 100$ . What is the total cost savings due to joint production? Calculate  $TC(L, D)$  for  $Q_L = 100$  and  $Q_D = 0$ . Calculate the *average incremental cost of dinners* as  $[TC(100, 100) - TC(100, 0)]/100$ . Compare the average stand-alone cost of dinners to the average incremental cost of dinners at  $Q_D = 100$ . If the price of dinners is \$10, will entry in the dinner market be profitable on a stand-alone basis? On a multi-product basis?

### *Absolute Cost Advantages and Other Barriers*

An **absolute cost advantage** occurs when the LRAC schedule of the incumbent lies everywhere below the LRAC schedule of the entrant for all possible output levels. Indeed, there might be an ascending order of LRAC schedules for the entrants, ranging from the lowest unit cost schedule for the **most-favored entrant** to the highest cost schedule for the least-favored entrant (i.e., the firm that could enter only if the monopoly price was charged by the incumbent). There are several possible sources of absolute cost advantages:

- **Real cost (efficiency) savings** – The incumbent firm has assembled a better team of resources that leads to greater productivity and lower unit costs; that is, fewer real resources are required per unit of output.
- **Pecuniary cost saving** – The size of the incumbent firm allows it to bargain for lower prices for inputs, which is a transfer gain for the firm; that is, lower costs to the firm are matched dollar-for-dollar by lower payments to the input suppliers.
- **Strategic cost advantages** – The incumbent recognizes that entry will be more costly if it controls critical inputs, favorable locations, technological information, key customers, or it simply has a reputation for lower costs.

I'm now going to do something for pedagogical reasons, but the analytical implications are not that crucial. Except for economies of scale, I'm going to express all other entry barriers, including product differentiation, as an absolute cost advantage. By this I mean that if something is an entry barrier, it can be expressed as an equivalent absolute cost advantage for the incumbent at a given level of output. Hence, the poorer skills and inputs available to the entrant relative to the incumbent are expressed as an excess of the entrant's LRAC compared to the incumbent's LRAC (Baumol and Willig, *Quarterly Journal of Economics*, 1981, p. 409). Similarly, brand loyalty can be expressed as an absolute cost advantage. Overall, this cost difference is a measure of the "value of incumbency," although for public policy, we are interested in that portion of the advantage which, if removed, would increase social welfare.

Figure 6.1 shows three possible cost schedules for the incumbent and an entrant. In panel (a), there is an absolute cost advantage. In panel (b), there is a scale-related entry barrier (recall that Stigler would not count scale economies as an entry barrier). In panel (c), both types of barriers are present, and the value of incumbency varies with the level of output.

### **Barriers to Mobility**

In most industries, there are firms that do not produce a full line of products or operate in every geographic market. The industry leaders occupy all product and geographic segments. Hence, there are well-defined groups of firms *within* an industry, referred to as **strategic groups**.

In the lemon juice industry, there were about 20 firms, but only six of them, including Borden, produced a full range of bottle sizes of juice. If entry and other conditions differ significantly among groups of firms, average risk-adjusted profitability might be expected to vary by group. Suppose the leading firm was the first firm to enter the market. It has a “first-mover advantage” and its brand name might be considered the “premier” name in the market. Indeed, ReaLemon is a generic term for reconstituted lemon juice. Further, learning-curve effects reduce costs—the cost schedule is shifted downward—as accumulated production experience leads to subtle forms of productivity gains.

How easy is it for a small *established* firm to change its business plan and challenge the industry leaders? If two groups of firms have the same risk-adjusted profitability, the market is efficient (although not necessarily competitive). If the average returns differ, there are **barriers to mobility** within the industry. Note that this adds another layer of analysis—strategic group analysis—that lies between the firm and the industry.

### **Limit Pricing: A Simple Model of Strategic Entry Deterrence**

Firm B desires to enter the widget industry, but it faces an absolute cost barrier of \$5 per widget. Firm B’s unit costs are \$15 per unit. Firm A is the sole incumbent, and it has unit costs of \$10. Both firms can produce identical products. Each firm knows its own cost schedule, but there is imperfect information about the rival’s cost schedule. Firm A has as good knowledge of the market demand schedule as does Firm B. Firm B can observe the price and current output of Firm A. Hence, information about demand is **common knowledge**. What types of market structure, conduct, and performance will this information set produce? The answer to this question depends critically on firms’ beliefs and reactions (and on the uncertain parts of the information set).

Suppose the market demand is given by  $P = 90 - Q$  and the marginal revenue is  $MR = 90 - 2Q$ . If Firm A acts like a monopolist, it will produce 40 widgets and charge a price of \$50 per widget (confirm these values). Suppose also that Firm B believes that Firm A will not alter its output in response to entry. In Figure 6.2(a), the portion of the market that is leftover for Firm B—given this particular belief—is that portion of the demand schedule that lies to the right of point M, where  $(P_A = \$50, Q_A = 40)$ . This

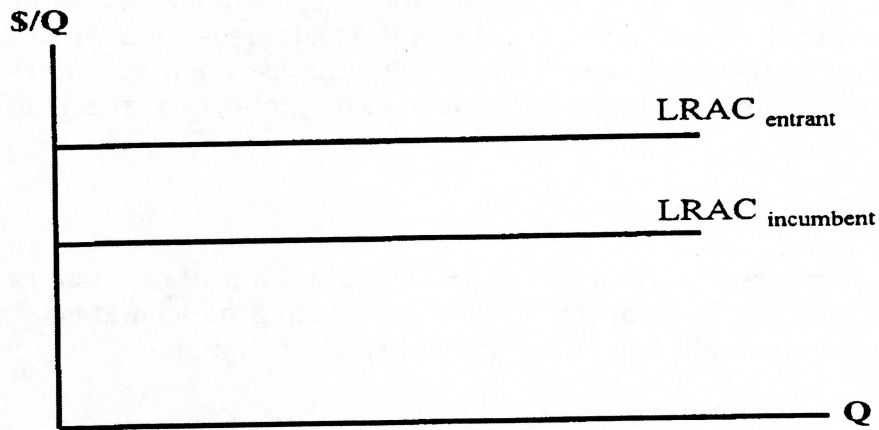


Fig. 6.1(a) Absolute Cost Advantage

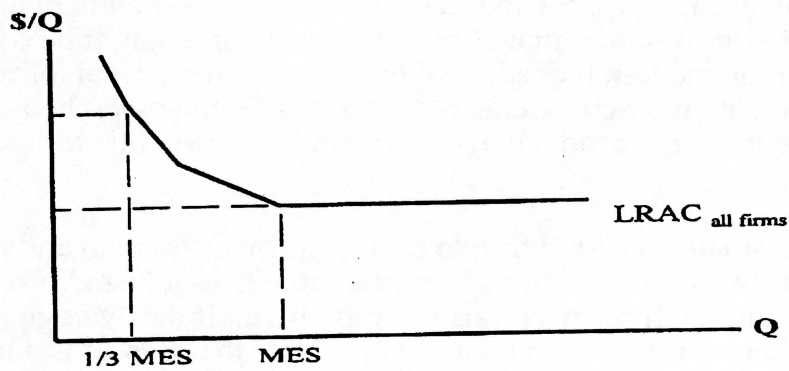


Fig. 6.1(b) Economies of Scale

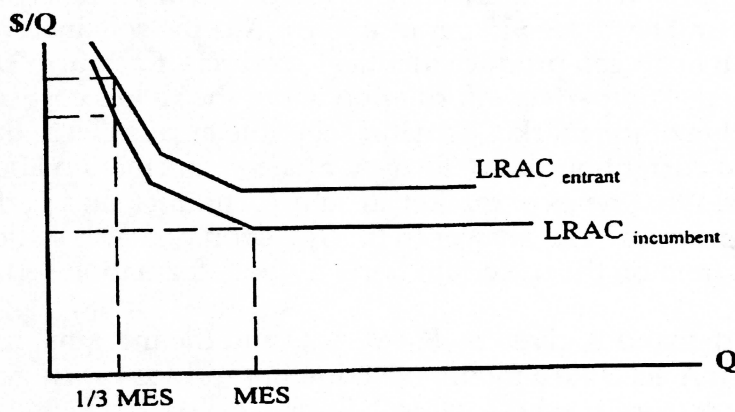


Fig. 6.1(c) Both Cost Effects

Figure 6.1  
Cost Advantages



leftover portion of the market is called the **residual demand function**. It is the portion of the demand schedule that Firm B believes it will face if it enters and the incumbent keeps its output constant at 40 widgets. Under these conditions, Firm B can determine its **residual marginal revenue** and calculate its optimal entry output and the expected post-entry price. If the entry price exceeds \$15, Firm B will enter the widget market. Its business plan is as follows:

1. Residual demand:  $P_B = \text{market demand} - \text{Firm A's output}$

$$P_B = 90 - Q - Q_A = 50 - Q_B$$

2. Residual marginal revenue:  $MR_B = 50 - 2Q_B$

3. Profit-maximizing output:  $MR_B = 50 - 2Q_B = MC_B - \$15 \Rightarrow \boxed{Q_B = 17.50}$

4. Post-entry price:  $P_B = 50 - 17.5 = \$32.50 > \$15 \Rightarrow \boxed{\text{Enter}}$

Figure 6.2(a) illustrates the graphic details of this plan. The portion of the demand schedule labeled ME is the residual demand at ( $P_A = \$50, Q_A = 40$ ). Slide the residual demand schedule to the left in a parallel fashion, and anchor it on the vertical axis at \$50. The entrant's optimal output is found by equating its residual marginal revenue and marginal cost. The post entry price can be read off the residual demand schedule (draw in the output and price). The price also can be found by adding up the quantities and substituting in the market demand, i.e.,  $P = 90 - (40 + 17.5) = \$17.50$ . Since the product is homogeneous, it is unlikely that a price difference between A and B can be sustained for very long, although brand loyalty might get in the way. (Although this story is about entry, consumers still matter.) Market concentration has fallen and market performance has improved as measured by the market price relative to Firm A's marginal cost. Entry reduces the market price for both firms, and Firm A's profit also is smaller.

However, suppose that Firm A knows about B's beliefs about its entry reaction. Under these informational conditions, the incumbent firm faces an interesting set of possible reactions to entry threats. If it knows B's costs, Firm A can calculate an anticipatory entry-detering price—the **limit price**—which is the highest possible price (and smallest output) that will thwart entry by Firm B. This price is \$15, and requires that Firm A increase its pre-entry output to 75 units (confirm this). In Figure 6.2(b), Firm B's residual demand is LE, and entry is no longer profitable. Firm A will still earn a profit because  $\$15 > \$10$ , and it can earn this profit indefinitely. Hence, Firm A can charge either the monopoly price and encourage entry or it can charge the limit price and keep Firm B on the sidelines. Which strategy is better? I'm not going to answer this question at this point as the answer is complicated (and this is a simple model!).



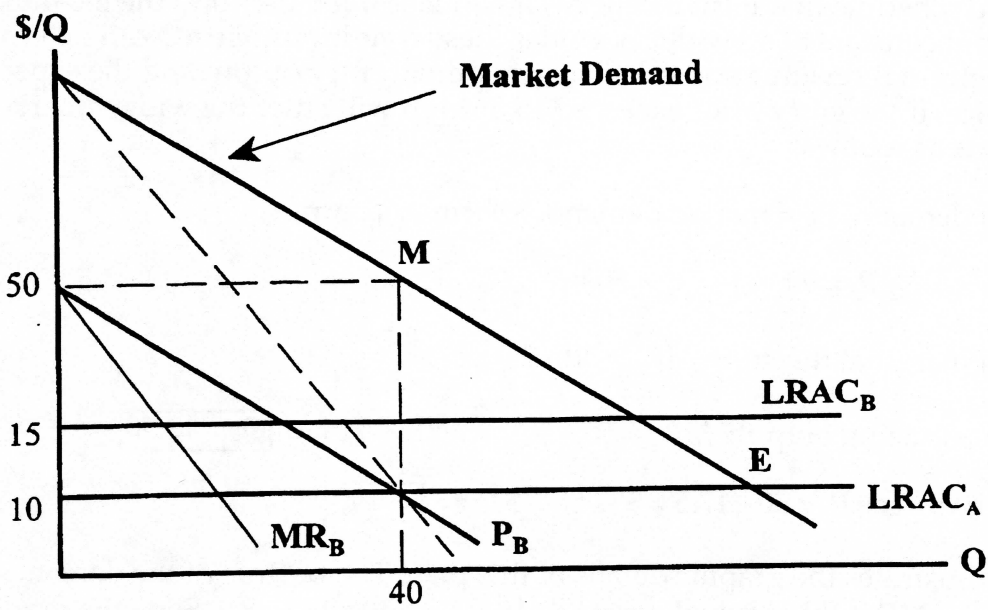


Figure 6.2(a) Entry at  $P_A = \$50$

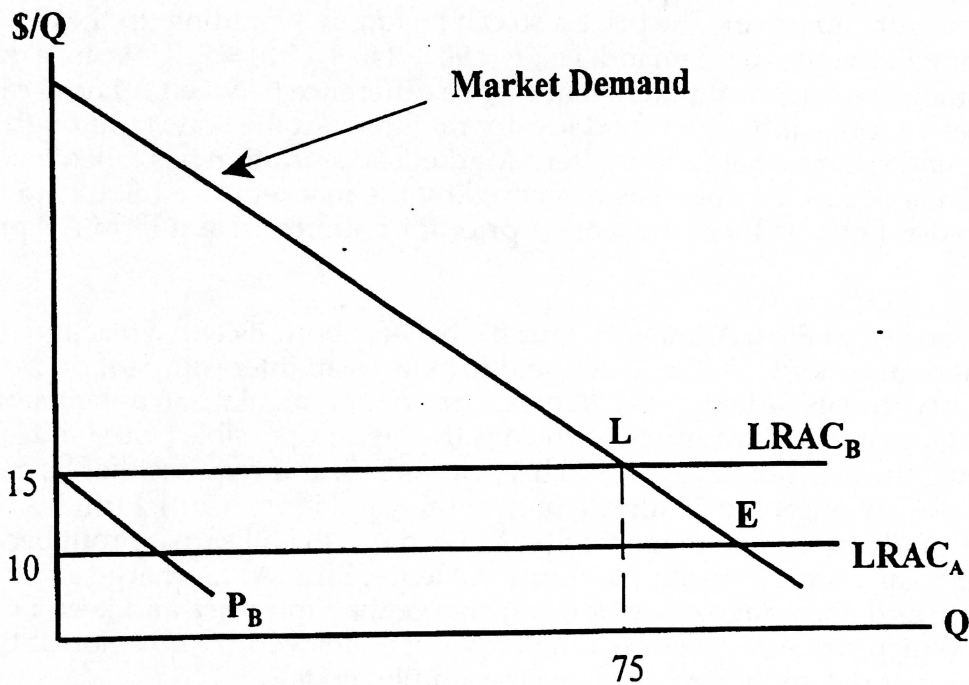


Figure 6.2(b) Limit Pricing:  $P_A = \$15$

Figure 6.2  
 Limit Pricing Model

Even this pair of strategies does not exhaust the possibilities for entry deterrence. Firm A might choose the monopoly output, and then cut its price only if entry occasionally materializes. Indeed, in a very uncertain environment, this reaction is the only possible reaction. This conduct might characterize the behavior of Borden in the RealLemon case. Alternatively, Firm A might accommodate Firm B's entry by reducing its post-entry output, so that the price does not decline or declines by less. Finally, Firm A might engage in threats to cut prices or threaten legal (cost increasing) actions against Firm B. Firm B might respond with its own law suits and other counter threats. Firm A also has an incentive to keep its costs secret and strategically to try to convince potential entrants that its costs are lower than \$10.

**Exercise 6.3.** For an incumbent, the cost of an entry strategy is the profit foregone due to the limit-price compared to the monopoly price. The lost profit is greater, the lower are Firm B's unit costs and the longer that Firm B hangs around on the sideline waiting for an opportunity to enter. Calculate the lost profit for Firm A due to a limit pricing strategy. If Firm B's unit cost was much lower (say, \$10.50), would Firm A be more or less likely to use limit pricing? Why or why not? Explain.

### *Contestable Market Model*

Baumol and Willig argued that sunk costs are an entry barrier because of the risk these costs impose on the entrant. Suppose that there are no sunk costs associated with entry to the widget industry. In virtually any informational situation that can be imagined, Firm B can enter the industry and withdraw "costlessly" if Firm A reacts unfavorably or if economic conditions otherwise prove unprofitable. Society gains from the entry in the short run, and loses nothing in the long run, given that the resources used by Firm B can be costlessly transferred to other uses. Things get even better if entry is free and absolute—meaning that entrants and incumbents have the same LRAC schedule and consumers always buy from the firm that charges the lower price. As pointed out by W & J (p. 153), the implications of this model are very strong because all that is required for a zero-profit outcome is one potential entrant and one incumbent. Baumol and Willig characterized the contestable market model as "capital on wheels (or wings)," meaning that the market is subject to costless reversible entry, even if the market is currently occupied by monopoly. In other words, if anyone (or everyone) can do it, you can't make money at it. Exhibit 6.2 discusses the possible entry barriers in "new economy" industries, including sunk costs.

### Exhibit 6.2. Some Aspects of Entry and Exit in the New Economy

By and large, the study of entry barriers has focused on old-economy industries, such as beer, cigarettes, steel, petroleum, farm machinery, meat packing, cement, and typewriters. Do the existing standards for judging competitive structure and conduct apply to the dynamically competitive industries that make up the new economy? What are the special features of the computer software, computer hardware, telecommunications, Internet-based businesses, and pharmaceutical industries? However, this issue is not altogether new. In 1942, Joseph Schumpeter argued that what counts for economic progress is “the competition from the new commodity, the new technology, the new source of supply, the new type of organization ... [competition] which strikes not at the margin of the profits and the outputs of the existing firms but at their foundations and their very lives” (*Capitalism, Socialism, and Democracy*, 1942, p. 84). Schumpeter labeled this evolutionary process, “**creative destruction**,” and argued that short-run monopoly (or oligopoly) might be a result. Moreover, anticipating the contestable market model, Schumpeter notes that “the businessman feels himself to be in competitive situation even if he is alone in his field” (p. 85).

Building on this insight, Evans and Schmalensee believe that new economy industries have several important characteristics.

First, fixed costs are high and marginal production costs are low. It does not cost much to produce another copy of Microsoft’s Word or Excel, but the fixed development costs are very significant. This means that new-economy firms exhibit sharply increasing returns to scale. Further, the floor under price reductions is low, given low marginal costs.

Second, new economy firms have significant investments in intellectual capital, which is largely intangible and sunk. Surprisingly, labor costs are a larger portion of total costs for new-economy firms compared to old-economy firms, reflecting the importance of product development and the use of a highly-educated workforce. Reflecting the role of intellectual capital, new products can appear quite suddenly, suggesting that the Schumpeterian risks are high for incumbent firms—they can be made obsolete overnight.

Third, high-technology products exhibit a special type of scale economies referred to as network economies, which arise because the consumption value of the network depends on the number of connected users. One result of network economies is that “winner-take all” outcomes occur as consumers gravitate toward one or a few standard technologies. The winner enjoys a short-run monopoly position. Evans and Schmalensee point out that “in some high technology industries, especially those based on the Internet, network effects, and scale economies are so pronounced that many firms give away their products for extended periods of time, both to gain market penetration and to affect the evolution of technical standards” (p. 13). When a bet-the-company strategy works, the rewards



can be spectacular as illustrated by Microsoft's development of Windows in 1992.

None of these characteristics are handled easily by conventional models of competition, which focus on competition in the market, rather than competition for the market. New-economy winners tend to have significant market shares and are able to charge prices above marginal costs. High profits are the norm, but this does not mean that "industry profits" are high on a risk-adjusted basis. Present market structure is likely to be a poor basis for judging future competition, given the high rate of technological change and the fragility of market positions. Judging market power in a new economy industry based on narrowly-defined markets and concentration indexes—market share tests—seems especially problematic. Further, the analysis of entry barriers must recognize the vulnerability of leading firms to drastic innovations, and not just entry of firms producing known products or "knock-offs" of the leader's product. This exhibit suggested by "Some economic aspects of antitrust analysis in dynamically competitive industries," NBER Working Paper 8268, (©May 2001 by David S. Evans and Richard Schmalensee).

### *Study Tips and Comments*

The reading assignments and Study Guide lesson introduce some of the ideas that will be developed more fully in materials that follow. In particular, we will be concerned with the actions and reactions of firms that recognize that they operate or produce in an environment characterized by interdependence or rivalry.

**Comment 1.** For more on the entry debate, see H. Demsetz, "Barriers to entry," *American Economic Review*, 1982, pp. 47–57 (on legal barriers); and F.M. Fisher, "Diagnosing monopoly," *Quarterly Review of Economics and Business*, 1979, pp. 7–33.

**Comment 2.** Despite the small size of the market involved, *Borden* was a major antitrust case. The FTC's complaint was issued in July 1974 and its decision was handed down in November 1978. The hearing before an administrative law judge (ALJ) amounted to 6,189 pages of transcript and twelve binders of exhibits covering several thousand pages. In all 74 witnesses testified before the ALJ. The FTC summary of its decision covers 165 pages, 92 FTC 669–883 (1978). In 1983, *Borden* appealed the lower court decision to the U.S. Supreme Court, which remanded the case to the FTC. For more analysis of the case, see R. Schmalensee, "On the use of economic models in antitrust: The *ReaLemon* case," *University of Pennsylvania Law Review*, 1979, pp. 994–1050.

**Comment 3.** Certain brand names, such as *ReaLemon*, are synonymous with the generic product (*Kleenex*, *Frisbee*, *Scotch Tape*, *Frigidaire*, *Formica*, and so on). During the mid-1970s, the FTC pursued its so-called Generic Trademark Project, which would have allowed competing businesses to legitimately use these brand names. Congress ultimately ruled that the project could not be funded.



**Comment 4.** The judicial process of the FTC is as follows: First, based on a staff recommendation, the five-member Commission votes whether to issue a complaint. Second, if a complaint is issued, an FTC administrative law judge (ALJ) holds a hearing where documents and testimony are received from the FTC's complaint counsel and the defendants, and the ALJ issues an initial decision. Third, the matter is returned to the Commission, which can either dismiss the complaint or issue a final order (including remedies in the form of prohibitions on future conduct). Fourth, if the Commission's decision is unfavorable, the defendant may appeal to a U.S. Circuit Court of Appeals. Either party may appeal a decision of the appeals court to the U.S. Supreme Court, which of course accepts only a small percentage of the petitions it receives. See also "How the FTC Brings an Action. . .," (see FTC Web site).

**Comment 5.** According to Stigler, economies of scale (or scope) are not an entry barrier if all firms have access to the same LRAC schedule. The real barrier in this case is consumer preferences for the incumbent's product due, perhaps, to switching costs.

**Comment 6.** Analysis of strategic groups is largely due to Michael E. Porter, a Harvard Business School economist; see *Competitive Strategy*, 1980. See also R. Caves and M. Porter, "From entry barriers to mobility to mobility barriers," *Quarterly Journal of Economics*, 1977, pp. 241–261; and M.E. Porter, "The structure within industries and companies' performance," *Review of Economics and Statistics*, 1979, pp. 214–227. Strategic group analysis has not made heavy inroads into economics, but it is a popular topic in business schools; see, for example, S. Oster, *Modern Competitive Analysis*, 3rd ed., 1999.

### *Answers to Exercises*

- 6.1 Following Bain or Gilbert (or W & J) is satisfactory, provided public policy issues are not paramount. However, for policy analysis, my preferences are the definitions proposed by Stigler and von Weizsacker. Barriers to exit are cost outlays that cannot be recovered if the firm's entry is unsuccessful. Sunk costs increase the risks associated with entry; hence, exit barriers are entry barriers. Economies of scale impose a cost penalty on the entrant if entry takes place at a scale less than MES. This penalty will be greater, the more sharply the unit costs decline. If the firm enters at MES, its incremental output will cause a greater decline in the market price, which might make entry unprofitable. (Recall, however, that MES and the cost-scale penalty are small in most markets.)
- 6.2  $TC(L) = \$800$ ;  $TC(D) = \$1200$ ;  $TC(L, D) = \$1800$ . The cost savings from joint production is \$200, which is the difference in total fixed costs or  $\$800 - \$600$ . For  $TC(100, 0) = \$1100$ , the average incremental cost =  $(\$1800 - \$1100)/100 = \$7$  per dinner; the stand-alone average cost is  $AC = (500 \div 100) + 7 = \$12$  per dinner. At a price of \$10, entry is not profitable on a stand-alone basis ( $\$10 < \$12$ ), but it is profitable on a multi-product basis ( $\$10 > \$7$ ).
- 6.3 At the monopoly output, Firm A's profit is  $(50 - 10) \cdot 40 = \$1600$ . At the limit price output, its profit is  $(15 - 10) \cdot 75 = \$375$ , so the profit loss is \$1225 per year. The problem is that the monopoly profit might only last for a few years, whereas the limit price profit will last indefinitely (or until conditions change). Several factors affect the long-term profitability of limit pricing including the speed and frequency of entry (one firm? ten firms?); rate of discount on future profits; and cost

differences. If Firm B has very low costs, it can be more profitable to take whatever profits are available today ("cream-skimming") because the long-term profit sacrifice is too large. On the other hand, limit pricing can be a way to attempt to convince the entrant that the cost difference is larger than it really is. Under strategic behavior, definitive conclusions are difficult to obtain due to asymmetric information.

## Lesson Assignment #6

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Review the procedures for lesson assignments and submission. These appear in the Introduction to this Study Guide.

Read the assignment in Adams and Brock on the **computer industry**.

**Point Total for this Assignment: 20 Points.**

- 6.1 Submit a complete and concise answer to W & J, Discussion Question No. 1. (three to four paragraphs; hint: lay out the definitions first, and then apply them to the factors)
- 6.2 Submit a complete and concise answer to W & J, Discussion Question No. 10. (four to five paragraphs)
- 6.3 Suppose that Firm B has total cost schedule of  $TC_B = 300 + 15Q_B$ . Market demand is  $P = 90 - Q$ . Is entry profitable if Firm A produces 40 units? If Firm A produces 45 units? Show your work. Can you suggest a successful entry strategy for Firm B in the second case?
- 6.4 **Computers** – What types of strategic entry-deterring conduct did IBM use during the 1960s and 1970s? What types of entry-deterring conduct did Microsoft use during the 1980s and 1990s? (One or two pages of single-spaced typed or word-processed text is sufficient.)

If you are using the Web or e-mail option, follow the directions in the Introduction of this Study Guide. If you are using the surface-mail option, attach LIF #6 when you submit this assignment to your instructor for evaluation.

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