

Economic and Antitrust Barriers to Entry

R. Preston McAfee, Hugo M. Mialon, and Michael A. Williams¹

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Abstract

We review the extensive literature on barriers to entry in law and economics; we introduce four concepts, namely economic, antitrust, primary, and ancillary barriers to entry; we employ these concepts to classify a set of well-known structural characteristics of markets and competitive tactics by incumbents; and we apply the resulting insights to evaluate the verdicts that were reached in a set of landmark antitrust court cases in the US.

Bain (1956) defined an entry barrier as anything that allows incumbent firms to earn above-normal profits without the threat of entry. To defend his contention that large scale economies are an entry barrier, Bain argued that if incumbents act in concert and potential entrants expect incumbents to maintain their pre-entry output levels after entry has occurred, the necessity for firms to be large relative to the market in order to attain productive efficiency allows incumbents to earn above-normal profits without the threat of entry. However, incumbents may find that their interests are best served by reducing their output levels once large scale entry has occurred, so that Bain's assumption that potential entrants expect incumbents to maintain their pre-entry output levels may not be realistic.

Moreover, Stigler (1968) rejected the basic notion that scale economies can create an entry barrier. He defined entry barriers as costs that must be borne by a firm that seeks to enter an industry but is not borne by firms already in the industry. In any given industry, entrants and incumbents alike enjoy the same scale economies as they expand their output. Therefore, according to Stigler's definition, scale economies are not an entry barrier. With respect to scale economies, and other market characteristics, the definitions of Bain and Stigler are at variance, which has resulted in much controversy among economists and antitrust lawyers over the definition of an entry barrier.

The purpose of this article is to clear up this confusion by providing a thorough classification of entry barriers. In section 1, we trace the historical development, in economics and law, of the existing disarray of definitions of a barrier to entry. In section

¹ Preston McAfee and Hugo Mialon, Department of Economics, University of Texas at Austin, Austin, Texas, 78712 (mcafee@eco.utexas.edu and mialon@eco.utexas.edu), Michael Williams, Analysis Group, Inc., PM KeyPoint LLC, 2200 Powell Street, Suite 1080, Emeryville, CA 94608 (mwilliams@pmkeypoint.com).

2, we introduce four concepts, namely economic, antitrust, primary, and ancillary barriers to entry, and classify a group of well-known structural characteristics of markets and competitive tactics by incumbents accordingly. This classification is original, and clears up most of the confusion highlighted in section 1. In section 3, we consider a set of antitrust court cases for which the new classification can be employed to evaluate the verdicts that were reached. Section 4 summarizes and proposes avenues for further research.

I. HISTORY OF THE CONCEPT

Many economists and legal scholars have attempted to define the concept of a barrier to entry, and this has produced a medley of definitions, several of which address different issues, and several of which clash. We begin by presenting, in chronological order, the definitions that have been proposed in the economics literature.

I.A. ECONOMICS

Historically, the most common impediments to free entry into markets have been government monopoly grants and patents. Many governments have granted monopolies for the exclusive purpose of collecting government revenue. An example is the salt gabelle in China. At the turn of the century, the right to manufacture, transport, and sell salt was under strict governmental control; the salt gabelle was levied at every stage from production to consumption. Only licensed merchants could deal in salt, and then only within limited prescribed areas. The salt merchants of the country were monopolists for the benefit of the government, which derived a very large revenue from this source (Muhse, 1916).

Governments have also granted monopolies to encourage socially beneficial invention. The earliest known English patent for invention was granted by Henry VI to Flemish-born John of Utynam in 1449. The patent gave John a 20-year monopoly for a method of making stained glass, required for the windows of Eton College, which had not been previously known in England. In the time of the Tudors, the Crown commonly granted monopolies to traders and manufacturers, including patents for invention, sometimes to royal favorites or for the purpose of replenishing royal coffers (US Patent Office, 2003).

However, the use of the term "barrier," in relation to entry into a marketplace, originated in discussions of transit taxes, not government monopoly grants. In the Chinese Empire, for example, "liken" stations were physical barriers, guarded by local officials, where duties were collected on particular merchandise in transit from one part of the empire to another. In 1911, five liken stations barred the water route between Shanghai and Soochow, a distance of no more than eighty miles (Williams, 1912). The Imperial Maritime Customs managed similar stations at all the major ports in the empire, which barred foreigners from entering the country with foreign goods without paying trade tariffs. Unlike liken stations, customs stations collected tariffs at rates that were set by international treaties with Britain, France, and the United States.

While government patents and monopoly grants are barriers to the creation of new enterprises, transit and trade tariffs are barriers to the expansion of existing enterprises into new markets. Economists would eventually come to refer to both types of barriers jointly under one heading, "barriers to entry," and include many impediments to competition other than government monopoly grants and trade tariffs under this heading. Donald H. Wallace has the distinction of being the first economist to use the term in an article published in an academic journal. In the Papers and Proceedings of the Forty-eighth Annual Meeting of the American Economic Association, published in March 1936, he explains that the key principles of public policy that emerged from the literature on monopolistic competition, initiated by Chamberlin (1935), are that "Competitive measures which did not truly measure efficiency should be eliminated; and, by implication at least, any other barriers to free entry except those inherent in differing personal qualities or ability to obtain capital should be removed" (p. 79).

Wallace goes on to lament the neglect in the existing literature of other important barriers to entry: "Public policy seems to have overlooked such important barriers to free entry as control of scarce resources of raw materials, ... and the impressive formidability of size and length of purse supplemented by industrial and financial affiliations" (p.80). He expresses his belief, which would be shared by many economists after him, that large capital requirements are also an important barrier to entry that warrants the scrutiny of antitrust authorities. Wallace concludes his article with a research program that would prove to be visionary: "The nature and extent of barriers to free entry needs thorough study" (p.83). Fifteen years later, Joe S. Bain would publish a series of articles culminating in a book that would constitute the first thorough study of barriers to entry.

Bain (1949), seeking to explain the empirically observed tendency in some collusive oligopolistic industries (such as those for cigarettes and steel) to hold price below the level that would maximize short run profits in the industry, introduced the limit-price model of entry deterrence. The limit price is the highest price that incumbent firms can charge without inducing at least one other firm to enter the market. Incumbents estimate the market share they would lose to an entrant, and also the conditions of competition that they would face after entry. They compare these estimates to the profits they would lose by setting the limit price rather than the short run profit maximizing price. Bain explains that incumbents might want to set each short run price (and hence long run average price) at a lower level than the one that maximizes industry profit, in order to discourage entry, and keep the smaller (and non-maximized) profits all for themselves.

These insights lead Bain (1950) to look for market conditions under which firms would want to sacrifice short-run profits by limit pricing. The author noted that a crucial determinant of market conditions is freedom of entry. He hypothesized that if new firms cannot easily enter the market, incumbents maximize short run profits, while if firms can easily enter the market, incumbents sacrifice short run profits to deter entry. He then identified three broad structural market characteristics that might restrict freedom of entry. Entry into the market might be difficult because (1) incumbents have patents on production processes or control of crucial resources, (2) incumbents enjoy substantial cost advantages over potential entrants, which include advantages in production costs as

well as established product preferences for going firms, or (3) the scale of an optimum firm is very large relative to the market and the economies of scale are great.

Four years later, Bain (1954) published a paper in which he elucidated the logic by which he came to believe that large scale economies are a barrier to entry. Suppose a firm must add significantly to industry output in order to be efficient, and incumbent firms are committed to maintain their output levels in the event of entry. If a firm enters this market at less than the efficient scale, it enters at a significant cost disadvantage relative to incumbent firms. If the firm enters at or above the efficient scale, then the combined industry output would exceed industry demand causing the industry selling price to fall and dissipating all profits for the entrant. Therefore, firms in industries where the efficient scale is large relative to the market may be able to earn considerable profits without inducing entry.

Bain called this effect of scale economies on barriers to entry the "percentage effect," because it reflects the importance of the proportion of industry output supplied by a firm of efficient scale. He suggested that this is only one of two effects of scale economies on barriers to entry. Scale economies may be important to entry also because large absolute amounts of capital are required for efficiency. That is, absolute capital requirements may be so large that relatively few entrepreneurs could secure the required capital, or that entrants could secure it only at interest rates that placed them at an important cost disadvantage to incumbents.

In the process of defending his view that scale economies and capital requirements pose important barriers to entry, Bain formulated the first general definition of a barrier to entry, which he offered in the introductory chapter of his 1956 book, "Barriers to New Competition."

Definition 1 (Bain, 1956, p. 3). A barrier to entry is an advantage of established sellers in an industry over potential entrant sellers, which is reflected in the extent to which established sellers can persistently raise their prices above competitive levels without attracting new firms to enter the industry.

Prices would settle down to their competitive levels if new firms were free to enter the industry. At their competitive levels, prices are equal to marginal cost. According to Bain, a barrier to entry is anything that allows incumbents to raise prices above marginal cost, which usually entails above-normal profits, without inducing entry of new firms. As Viscusi et al (1992) point out, a problem with this definition is that it is tautological. Bain defines a barrier to entry in terms of its outcome, the extent to which incumbents price above marginal cost or earn above-normal profits without inducing entry, which he called the "condition of entry." The definition is true by virtue of the meaning of the condition of entry alone, without reference to external fact, and its denial results in self-contradiction.

Although not theoretically sound, this definition might have been fashioned for the purpose of identifying barriers to entry empirically. If the condition of entry were

observable, then Bain might have been able to identify the extent of barriers to entry across industries. However, Bain could find no immediate observable proxy for the condition of entry. So he simply measured, for a cross-section of twenty industries, the size and importance of the market characteristics that he believed to have an important effect on the condition of entry: economies of scale, capital requirements, absolute cost advantages, and differentiation advantages.

For example, to measure the percentage effect of economies of scale, he used Census data on the percentage of national industry capacity contained in one plant of minimum efficient size. He found, for example, that this statistic was 5 to 6 percent in the cigarette industry and 1 to 2.5 percent in the steel industry (Table 3, p. 72). He also measured absolute cost requirements by asking executives of various firms in the twenty industries questions related to the probable investment necessary to establish one plant of minimum efficient scale in each of the twenty industries. He found that the absolute capital requirement for establishing one plant of minimum efficient size was 125 to 150 million dollars in the cigarette industry, and 265 to 665 million dollars in the steel industry (Table 13, p.158).

Relative to other industries, Bain found that capital requirements were high in the steel and cigarette industries, and economies of scale were average in the steel industry, and low in the cigarette industry (Table 14, p. 169). Whether scale economies and capital requirements actually had an effect on the condition of entry in the cigarette, steel, and other industries, and hence whether they actually were barriers to entry, Bain answered only in theory.

While admiring Bain's important empirical contributions, Nobel laureate George S. Stigler rejected Bain's basic contention that scale economies and capital requirements are barriers to entry, and developed a more useful definition in defending his point of view.

Definition 2 (Stigler, 1968, p. 67). A barrier to entry is a cost of producing (at some or every rate of output) which must be borne by firms which seek to enter an industry but is not borne by firms already in the industry.

Stigler's definition avoids tautology by identifying an entry barrier in terms of its fundamental characteristics, emphasizing the differential costs between incumbents and entrants. However, the present tense "is" in the definition is cause for confusion. Suppose entrants have to bear a cost that incumbents do not have to bear today, but had to bear in the past (when they entered). Is this cost a barrier to entry? Stigler most likely would have answered in the affirmative, and one can safely assume that Stigler meant to define a barrier to entry as a cost that entrants have to bear, but incumbents do not, or have not had to, bear.

According to Stigler's definition, a barrier to entry exists only if the potential entrant's long-run costs after entry are greater than those of the incumbent. Stigler's definition is narrower than Bain's definition, that is, some things are barriers to entry according to Bain, and not according to Stigler; but nothing is a barrier to entry according to Stigler,

and not according to Bain. In any given industry, entrants and incumbents enjoy the same scale economies as they expand their output. With equal access to technology, economies of scale are not a barrier to entry according to Stigler; but they are a barrier to entry according to Bain (via their percentage effects). Absolute capital requirements are not a barrier to entry either, according to Stigler, unless the incumbent never paid them; but they are a barrier to entry according to Bain, for they seem to be positively correlated with high profits.

The spirit of Bain's definition did not fade after Stigler proposed an alternative definition. Ferguson (1974), who was mainly concerned with the question of whether advertising is a barrier to entry, proposed a definition that follows Bain's, but with the additional requirement that incumbents earn monopoly profits.

Definition 3 (Ferguson, 1974, p.10). A barrier to entry is a factor that makes entry unprofitable while permitting established firms to set prices above marginal cost, and to persistently earn monopoly return.

Ferguson pointed out that pricing above marginal cost in the long run is not sufficient for incumbent firms to persistently earn above-normal profits. Incumbents only earn above-normal profits if prices exceeds average cost. Prices may not exceed average cost even though they exceed marginal cost because of price or non-price competition among existing firms.

For example, existing firms might compete through advertising. Then potential entrants might be required to pay large fixed advertising costs to enter the industry. However, incumbents also pay these fixed advertising costs to compete in the industry. These costs increase the average cost curves of incumbents, as well as entrants (without affecting their marginal cost curves). As long as they are not a source of scale economies, even if they allow incumbents to set prices above marginal cost, they are not a barrier to entry according to Ferguson's definition, because they increase incumbents' average cost, thereby dissipating their above-normal profits, and hence reducing the incentives of potential entrants to enter the industry. In contrast, they are a barrier to entry according to Bain simply because they allow incumbents to price above marginal cost without inducing entry.

The definitions of Bain, Stigler, and Ferguson all focus attention on the different opportunities facing insiders and outsiders. According to Baumol (1982), these definitions divert attention away from other important barriers to entry, such as legal restrictions. For example, Baumol argues that the legal restriction that drivers must own an official medallion before supplying taxi services is a barrier to entry into the taxi industry if the medallion is costly, because it reduces the supply of taxi services.² However, both incumbent and entrant had to bear the cost of the medallion, so Stigler's

² Here, Baumol is using a more literal definition of a barrier to entry: a barrier to entry is anything that reduces entry.

definition fails to identify the barrier to entry. Moreover, since the price of the medallion reduces profits, the definitions of Bain and Ferguson also fail to identify the barrier.

Moreover, a barrier to entry in the taxi industry could even increase social welfare insofar as it reduces excessive traffic. Baumol's main point of contention with existing definitions is that they do not explicitly account for the possibility that a barrier to entry may enhance social welfare, and hence, given the negative connotation generally attached to the term "barrier to entry," tacitly support the presumption that a barrier to entry necessarily reduces welfare. By preserving monopoly profits, patents encourage research and development of new products and processes, which could be socially beneficial. That firms in an industry with barriers to entry are earning high profits, or these firms have lower costs than outsiders, is not necessarily an indication that social welfare would be higher if the barriers to entry were absent.

Fisher (1979), dissatisfied with existing definitions for much the same reasons that Baumol was dissatisfied with them, proposed another definition, which is in the spirit of Bain's and Ferguson's definition, but is normative rather than positive.

Definition 4 (Fisher, 1979, p. 23) A barrier to entry is anything that prevents entry when entry is socially beneficial.

According to Fisher, a barrier to entry exists if incumbents earn profits that are unnecessarily high, in the sense that society would be better off if they were competed away, but firms do not enter to do this. To determine whether a potential barrier to entry causes profits to be unnecessarily high, Fisher asks whether potential entrants make a calculation that is any different from the one that society would want them to make in order to decide whether to enter a market, given this barrier to entry.

Consider, for example, an industry that firms can only enter if they make a large capital expenditure. A firm will not enter if the profits that it anticipates in the long run will not be sufficient to justify the initial capital requirement. But this is exactly the calculation that society would want the potential entrant to make. The capital expenditure would be socially wasteful if it did not guarantee a rate of return that exceeded the rate of return that it could earn if it were invested elsewhere. Therefore, according to Fisher's definition, an initial capital requirement, no matter how large, is not a barrier to entry. It is not a barrier to entry according to Stigler's definition either, but only because incumbent and entrant both had to pay it in the same amount. which is an entirely different reason.

Von Weizsacker (1980, 1) proposed a second normative definition, which is based on Stigler's rather than Bain's definition, in that it focuses on the differential costs between incumbents and entrants, rather than on the profits of incumbents.

Definition 5 (Von Weizsacker, 1980, p. 400). A barrier to entry is a cost of producing that must be borne by a firm which seeks to enter an industry but is not borne by firms

already in the industry and that implies a distortion in the allocation of resources from the social point of view.

Von Weizsacker argues that a cost differential is a barrier to entry only if it results in a decrease in welfare. His point is that the number of firms in a Cournot industry can be greater than the socially optimal number of firms. To prove his point, he develops a model of an industry with economies of scale, and shows that the number of active firms in the Cournot equilibrium with free entry, defined as the largest number of firms such that the Cournot equilibrium is still profitable, exceeds the number of active firms that would maximize social surplus, defined as the sum of consumer surplus and market profit at the level of total industry output that arises when all firms set price equal to marginal cost. In this model, economies of scale are not a sufficient barrier to entry. Welfare would increase if the number of firms were limited to less than the free entry number. The cost savings that arise with fewer firms from taking advantage of economies of scale more than compensate for the reduction in total output from having fewer firms. In such an industry, additional barriers to entry could enhance welfare, by reducing the number of firms to their socially optimal level. However, industries where the number of firms is greater than the socially optimal number of firms are generally difficult to identify.³

The definitions of Stigler and von Weizsacker focus on the cost disadvantages of entrants relative to incumbents. Gilbert (1989) argues that such definitions are unnecessarily confining, and proposes a new definition that focuses on the advantages of incumbents rather than the disadvantages of entrants.

Definition 6 (Gilbert, 1989, p. 478). An entry barrier is a rent that is derived from incumbency.

³ The real-estate industry might be one example. According to Hsieh and Moretti (2003), this industry has few barriers to entry and the brokerage commission paid to real-estate agents is always a fixed 6 percent of the selling price of the house. The price of a typical house in Boston has long been much higher than the price of a typical house in Minneapolis. Since the commission rate is fixed, this implies that the brokerage fee from selling a typical house in Boston is much higher than that in Minneapolis. However, because the industry has few barriers to entry, there are more real-estate agents in Boston, even though the total number of homes sold each year is higher in Minneapolis. Therefore, the average real-estate broker in Minneapolis is much more productive than the average broker in Boston. Even though the price of a typical house is much higher in Boston, real-estate agents are no better off in Boston than in Minneapolis. The higher commissions in Boston are simply wasted through entry of real-estate agents seeking to earn higher commissions, agents who could be engaged in other profitable activities. A larger number of agents in Boston, higher agent productivity in Minneapolis, and real wages of agents that are no higher in Boston than in Minneapolis, may all be indications that there are more than the socially optimal number of agents in the Boston real-estate industry.

According to Gilbert, a barrier to entry is the additional profit that a firm can earn as a sole consequence of being established in the industry. An incumbent may be able to earn profit and exclude entry not only because of cost advantages over entrants. Suppose the incumbent can commit itself to producing the monopoly output, and this being the case, no other firm can enter at a profit.⁴ Then entry is excluded in this market even though the incumbent has no cost advantage over a new entrant, since both had to pay the sunk costs. Sunk costs are a barrier to exit for the incumbent, which allows it to commit to a level of output, which in turn deters entry, earning the incumbent a rent. Thus, exit barriers for incumbents create entry barriers for entrants.

Moreover, Gilbert argues that incumbents can use strategic behavior to exploit sunk costs to their advantage. Sunk costs increase the entrant's loss in the event that entry fails, which makes the incumbent's threats of strategic entry deterrence more effective. Thus, exit barriers for entrants create entry barriers for entrants. In these ways, sunk costs provide a rent to incumbents, and hence are a barrier to entry according to Gilbert's definition. The legal restriction that drivers must buy an official medallion from city authorities before supplying taxi services may be a barrier to entry according to Gilbert's definition for the same reason, while it is not a barrier to entry according to the definitions of Bain, Stigler, Ferguson, Fisher, or von Weizsacker.

Disagreement over the definition of a barrier to entry has persisted. Authors of modern textbooks in industrial organization openly document the lack of consensus (see for example, Viscusi et al, 2000, p. 159-163, and Church and Ware, 1999, p. 513-518). In a popular textbook, Carlton and Perloff (1994) propose a literal definition of a barrier to entry.

Definition 7 (Carlton and Perloff, 1994, p. 110). A barrier to entry is anything that prevents an entrepreneur from instantaneously creating a new firm in a market. A long-run barrier to entry is a cost that must be incurred by a new entrant that incumbents do not (or have not had to) bear.

The authors argue that the first definition is rarely useful in practice, for it implies that any capital requirement is a barrier to entry and that any industry in which entry takes time has a barrier to entry. They note that the term "barrier to entry" is often used to refer to both costs of entering and the time required to enter. However, to our knowledge, they are the first to propose a definition that explicitly includes a time dimension.⁵ Unfortunately, they avoid the timing issue thereafter by considering only barriers to entry in the long run. Entry erodes profits in the long run. Therefore, if a firm earns profits in the long run, the industry must have long run barriers to entry. The authors argue that a firm can only earn profits in the long run if they have an advantage over potential entrants, which leads them to adopt a modern version of Stigler's definition. Notice that

⁴ In this case, Bain's assumption that entrants expect incumbents to maintain their pre-entry output levels even after entry has occurred is valid.

⁵ Shephard (1997) also distinguishes between the extent and speed of entry (p. 209), but does not explicitly incorporate speed into a definition of an entry barrier.

their version clears up the confusion about the present tense "is" in Stigler's original definition.

In another popular textbook, Church and Ware (1999) distinguish between structural and strategic barriers to entry, reserving the term "barrier to entry" only for the former.

Definition 8 (Church and Ware, 1999, p. 487). An entry barrier is a structural characteristic of a market that protects the market power of incumbents by making entry unprofitable.

Most definitions before this one were implicitly intended to apply mainly to structural market characteristics anyway. That is not to say that these definitions could not, in principle, be applied to strategic behavior also. However, most strategic behavior involves sacrifice by incumbents in order to inflict losses on entrants. Thus strategic behavior is never a barrier to entry according to any definition that is inspired from Stigler's.

To justify his focus on structural barriers to entry, Von Weizsacker (1980, 2) conjectures that entry deterrence strategies are not even available to incumbents without structural barriers to entry. This view is extreme. The music animation industry has no significant structural barriers to entry, yet Disney has successfully and persistently deterred entry into the industry through a host of competitive tactics (need citation). More likely, competitive tactics by incumbents intertwine with the structural characteristics of the industry to create barriers to entry.

We have seen that the concept of a barrier to entry has a rich and confused heritage in economics. In attempting to define the term, economists have made at least eight fruitful distinctions: (1) barriers to the expansion of existing firms versus barriers to the creation of new firms, (2) incumbents earning high profits versus entrants having greater costs than incumbents, (3) incumbents pricing above marginal cost versus incumbents earning profits that are above normal, (4) entry being deterred versus social welfare being reduced, (5) advantages of incumbents versus disadvantages of entrants, (6) barriers to entry versus barriers to exit, (7) speed of entry versus extent of entry, and (8) structural versus strategic barriers to entry.

I.B. LAW

The most basic antitrust laws were laid out in the Sherman Act of 1890 and the Clayton Act of 1914. By section 1 of the Sherman Act, *collusive actions* such as price-fixing, market rigging, and sales-allocating schemes, and other practices in restraint of trade are illegal:

Sherman Act, Section 1. Every contract, combination in the form of trust or otherwise, or conspiracy, in restraint of trade or commerce among the several States, or with foreign nations, is declared illegal.

By section 2 of the Sherman Act, *monopolization* or attempt to monopolize is illegal:

Sherman Act, Section 2. Every person who shall monopolize, or attempt to monopolize, or combine or conspire with any other person or persons, to monopolize any part of the trade or commerce among the several States, or with foreign nations, shall be deemed guilty of a felony.

By section 7 of the Clayton Act, *mergers* that substantially reduce competition are illegal:

Clayton Act, Section 7. No person engaged in commerce or in any activity affecting commerce shall acquire, directly or indirectly, the whole or any part of the stock or other share capital and no person subject to the jurisdiction of the Federal Trade Commission shall acquire the whole or any part of the assets of another person engaged also in commerce or in any activity affecting commerce, where in any line of commerce or in any activity affecting commerce in any section of the country, the effect of such acquisition may be substantially to lessen competition, or to tend to create a monopoly.

II. ECONOMIC ANALYSIS

As we have seen, the concept of an entry barrier has a rich and confused heritage in economics. To clear up the confusion, we offer a new classification of entry barriers:

Definition 8. An economic barrier to entry is a cost that must be incurred by a new entrant and that incumbents do not or have not had to incur.

Definition 9. An antitrust barrier to entry is a cost that delays entry, and thereby reduces social welfare relative to immediate but equally costly entry.

Most economic entry barriers are antitrust entry barriers. However, many antitrust entry barriers are not economic. Indeed, the economic definition derives from Stigler's work, which served to complete the edifice of Chicago antitrust thought. The Chicago School has consistently argued against the need for "draconian" measures against monopoly and collusion, such as those in the Sherman and Clayton Acts (see Posner, 1979). No surprise, then, that their definition of a barrier to entry is stricter than those that the legal authorities had in mind when they enacted the draconian measures.

When free entry leads to the efficient number of firms, if a market has no antitrust entry barriers, then it is efficient. If it has no economic entry barriers, then it is eventually efficient. An antitrust entry barrier in a market that is otherwise efficient reduces welfare relative to what it would have been in the absence of that barrier.

The presence of an antitrust entry barrier does not necessarily mean that a merger should be disallowed. The net change in welfare resulting from the merger could still be positive. Rather, the presence of the antitrust barrier means that welfare would be higher if that barrier did not exist.

In our analysis, we also find it useful to distinguish between direct and reinforcing barriers:

Definition 10. A primary barrier to entry is a cost that constitutes a barrier to entry on its own.

Definition 11. An ancillary barrier to entry is a cost that does not constitute a barrier to entry by itself, but reinforces other barriers to entry if they are present.

A group of small primary barriers may constitute a significant entry barrier. A group of small ancillary barriers do not commonly constitute a significant entry barrier unless other primary barriers are also present. However, in some cases, large ancillary barriers can combine, and reinforce each other, to form a large primary entry barrier.

A particular ancillary barrier may produce a primary entry barrier only when combined with a restricted class of other ancillary barriers, or reinforce only a restricted class of other primary entry barriers. If a market possesses no entry barrier from either class, the ancillary barrier in question does not deter entry.

We now employ the concepts introduced in this and the previous section to assess the nature of the barriers to entry posed by scale economies, capital requirements, and several of the other usual suspects.

III. THE USUAL SUSPECTS

In this section, we provide a catalogue of industry characteristics and competitive tactics that inhibit or encourage the entry of new firms into the industry.

III.A. SCALE ECONOMIES

With access to credit, an entrant could easily build a plant of minimum efficient scale. The problem is that incumbents have already built plants of minimum efficient scale. If the added output of the entrant's plant of minimum efficient scale is large relative to industry demand and existing output, the product price would fall below the entrant's per unit cost, so that entry would be unprofitable.

However, this argument assumes that the new firm expects the incumbent to maintain its pre-entry output level even after entry has occurred. Once the new firm has entered, the incumbent may want to reduce its output from its pre-entry level, to prevent its profits from falling to zero. But then the entrant's profits might also be prevented from falling to zero, so that entry might be *ex ante* profitable. However, this requires some buyers to switch from the incumbent firm to the new entrant. Switching from an IBM computer system to that of a new rival may cause the business buyer to incur added costs for new software or for employee retraining. If such switching costs are high, then entry will not be profitable.

On the other hand, the new firm could enter and slightly undercut the incumbent's price. It would then get all of market demand, and entry would be profitable, provided the new firm induced all consumers to switch to buying its product by setting a slightly lower price. Consumers may be loyal to existing brands, and for good reason. Rational consumers who have had experience with the existing brand may decide not even to try a new brand introduced at the same price and of equal *ex ante* attractiveness, for once the brand has been used, continuing to buy it involves less risk than trying the new brand. In order to offset brand loyalty, a new firm would have to offer a considerable price discount to lure consumers away. But at this discount, entry might no longer be profitable.

Therefore, scale economies are ancillary barriers to entry that reinforce other barriers to entry, such as customer switching costs and brand loyalty. Whether scale economies are economic barriers to entry depends on whether switching costs and brand loyalty are economic barriers to entry. The switching costs borne by entrants today are usually comparable to those that were borne by incumbents back when they entered the market, unless these incumbents were the pioneers. Thus, customer switching costs are not usually economic barriers to entry.⁶

On the other hand, brand loyalty seems to confer a definite advantage to an incumbent over potential entrants, which may lead one to conclude that it is an economic barrier to entry. However, this advantage may have been costly for the incumbent to acquire, or it

⁶ Indeed, if scale economies are low, switching costs may even be entry boosters rather than barriers. Farrell and Shapiro (1988) analyze an overlapping generations model, in which two infinitely lived firms compete over price in the presence of buyer switching costs, and buyers live for two periods. If switching costs are greater than scale economies, the incumbent exploits his locked-in buyers and concedes the new buyers to the entrant (a Fat-Cat Effect). Although switching costs make it harder for entrants to attract attached buyers, they actually encourage entry to serve unattached ones. However, if scale economies are greater than switching costs, the incumbent firm keeps the potential entrant out in equilibrium. The switching costs protect the incumbent from the entrant's competition for attached buyers, while the economies of scale make it unattractive for the entrant to enter and serve only the unattached buyers. This suggests that scale economies and switching costs might both be ancillary barriers to entry that reinforce each other, as well as other primary barriers to entry.

may be relatively easy for potential entrants to overcome. Brand loyalty is an economic barrier to entry only if it provides the incumbent with an advantage that is more expensive for potential entrants to overcome than it was for the incumbent to acquire. This test is more stringent. Consumers may view purchases of baby food as particularly risky, so that brand loyalty in baby food may be particularly difficult for entrants to overcome; but firms' expenditures on advertising may also have to be particularly large in order to acquire brand loyalty in the market for baby food, so that, on the whole, brand loyalty in this market may not be an economic barrier to entry.

Even if brand loyalty is not more expensive for the incumbent to acquire than for potential entrants to overcome, one might nevertheless argue that brand loyalty is an antitrust barrier to entry if it reduces welfare by delaying entry. Consumer loyalty can reduce consumer welfare only if consumers are ignorant of some underlying bio-equivalence of the various brands in the market. Possibly, buyers may refuse to buy from a new entrant even though its brand is bio-equivalent to the incumbent's brand because they are not informed of this bio-equivalence, which is a market failure that might require intervention by the courts. One way for the courts to inform consumers about the homogeneity of brands is mandatory trademark licensing, since trademarks provide a good deal of information quickly to one who has experience with it. With mandatory trademark licensing, the courts can quickly inform consumers without their knowing it.

We now argue more formally that scale economies are ancillary, antitrust barriers to entry. To do so, we present a simple model in which (1) scale economies do not delay entry on their own, (2) brand loyalty delays entry on its own, and (3) brand loyalty delays entry even longer in the presence of scale economies.

Consider a one-shot entry game. A potential entrant first chooses whether or not to enter a market. If it chooses not to enter, the sole incumbent acts as a monopolist. If it chooses to enter, the entrant and incumbent play a Cournot duopoly game. The entrant and incumbent both have the same cost function $C(q) = cq + f$, where c is marginal cost, and f is fixed cost (the simplest expression of scale economies). Note that incumbent and entrant both have to bear the fixed cost f . Therefore, f is certainly not an economic barrier to entry in this model. The incumbent's inverse demand function is given by $P(q) = 1 - Q$, where Q is the total quantity produced by the industry, that is, $Q = q_I + q_E$ if the potential entrant chooses to enter the market, and $Q = q_I$ otherwise, where q_I and q_E are the incumbent's and entrant's quantity choices, respectively. The potential entrant's inverse demand function, if it chooses to enter the market, is given by $P(q) = 1 - Q - \lambda$, where λ is a measure of consumers' loyalty to the incumbent's brand. Note that if λ deters entry, then it is an economic barrier to entry, since in this model it is a cost to the entrant but not to the incumbent.

Case 1. $\lambda = 0$ and $f > 0$

In the subgame that follows entry, the incumbent and entrant's maximization problem is

$$(1) \quad \max_{q_i} (1-Q)q_i - cq_i - f$$

The equilibrium quantity choices of the incumbent and entrant are

$$(2) \quad q_I = q_E = \frac{1-c}{3}$$

Therefore, the incumbent and entrant's equilibrium profits are given by

$$(3) \quad \pi_I = \pi_E = \frac{(1-c)^2}{9} - f$$

Hence, the potential entrant chooses to enter if and only if

$$(4) \quad f \leq \frac{(1-c)^2}{9}$$

Note that if the marginal and fixed costs are small enough, inequality (4) is satisfied, so that the fixed cost never deters entry, in the absence of brand loyalty. In other words, for the parameter ranges defined by (4), scale economies are not primary barriers to entry. \square

Case 2. $\lambda > 0$ and $f = 0$

In this case, the entrant's maximization problem is

$$(5) \quad \max_{q_E} (1-Q-\lambda)q_E - cq_E$$

The first order condition yields

$$(6) \quad q_E = \frac{1-q_I - c - \lambda}{2}$$

The incumbent's maximization problem is

$$(7) \quad \max_{q_I} (1-Q)q_I - cq_I$$

Here, the first order condition yields

$$(8) \quad q_I = \frac{1-q_E - c}{2}$$

Solving (7) and (8) simultaneously yields

$$(9) \quad q_I = \frac{1-c+\lambda}{3} \text{ and } q_E = \frac{1-c-2\lambda}{3}$$

Therefore, the potential entrant's profits, if it chooses to enter the market, are given by

$$(10) \quad \pi_E = \frac{(1-c-2\lambda)^2}{9}$$

The equation $\pi_E = 0$ has the following root:

$$(11) \quad \lambda_1 = \frac{1-c}{2}$$

Therefore, the potential entrant chooses to enter if and only if

$$(12) \quad \lambda < \frac{1-c}{2}$$

where the quantity on the right hand side is the monopoly output. When brand loyalty is large enough, inequality (12) is not satisfied, and so entry is deterred, even in the absence of scale economies. In this case, brand loyalty is a primary, economic barrier to entry. \square

Case 3. $\lambda > 0$ and $f > 0$

In this case, the entrant's maximization problem is

$$(13) \quad \max_{q_E} (1-Q-\lambda)q_E - cq_E - f$$

And the incumbent's maximization problem is

$$(14) \quad \max_{q_E} (1-Q)q_E - cq_E - f$$

The solutions to (13) and (14) are the same as the solutions to (5) and (7):

$$(15) \quad q_I = \frac{1-c+\lambda}{3} \text{ and } q_E = \frac{1-c-2\lambda}{3}$$

Therefore, the potential entrant's profits, if it chooses to enter the market, are given by

$$(16) \quad \pi_E = \frac{(1-c-2\lambda)^2}{9} - f$$

The equation $\pi_E = 0$ now has the following two roots:

$$(17) \quad \tilde{\lambda}_{1,2} = \frac{1-c \pm 3\sqrt{f}}{2}$$

Therefore, the potential entrant chooses to enter if and only if

$$(18) \quad \lambda < \frac{1-c-3\sqrt{f}}{2} < \frac{1-c}{2}$$

Hence brand loyalty deters entry for a larger range of parameters with scale economies than without them.

Can this imply that brand loyalty delays entry longer with scale economies than without them? The model does not have an explicit time dimension, but we can nevertheless address the issue of entry delay indirectly by considering how the model's parameters might change over time. Suppose that technological innovation in input markets will continuously reduce the industry's marginal cost c for all of its participants. Then, entry would eventually take place, all else approximately constant, for as c decreases, the inequalities in (18) are more likely to be satisfied. But entry would take place later with scale economies than without them, since the first inequality in (18) is stricter than the second.

Does the additional delay in entry occasioned by scale economies necessarily reduce social welfare? For an important class of demand functions (including linear demand), social welfare under Cournot competition is higher than social welfare under monopoly, because the profit loss incurred by the incumbent is not large enough to offset the price reduction that benefits consumers. In these cases, scale economies are ancillary, antitrust barriers to entry, since they delay entry by reinforcing the entry deterrent effects of brand loyalty, and thereby reduce social welfare. \square

III.B. SUNK COSTS

The necessity for firms to be large relative to the market in order to attain productive efficiency reinforces barriers to entry such as brand loyalty and customer switching costs. This is the percentage effects of scale economies on barriers to entry. Scale economies may also affect entry because the absolute amount of capital required for efficiency may be so large that relatively few entrepreneurs could secure the required capital, or that entrants could secure it only at interest rates that placed them at an important cost disadvantage relative to incumbents.

However, many firms are capable of paying large capital costs, if the entry is worthwhile. Raising money for large projects is not necessarily more difficult than raising money for small projects. If capital markets work properly, raising capital should

be no more difficult for a profitable large-scale project than for a profitable small-scale project. Profitable projects should attract many investors.

If capital markets do not work properly, prospective entrants may not be able to pay the large capital costs associated with entry even if entry is worthwhile, but incumbents may not be able to pay the large costs associated with replacing existing, depreciated capital either. Capital market imperfections favor wealthier and more experienced firms over entrepreneurs without track records, but the former are not necessarily the incumbents. Some entrants are large, diversified firms that build new plants in a new industry.⁷ Microsoft entering the internet browser business and Sony entering the videogame business are instances where the entrant was larger than the largest incumbent. Large capital requirements may be entry boosters rather than barriers for large diversifying firms, because they can enter knowing that they won't be bothered by pesky smaller competition.

Nevertheless, large capital requirements can indirectly discourage entry. Instead of being barriers to entry in their own right, capital requirements often reinforce other barriers to entry, by making the risks larger. Thus, when a solid reputation is necessary to enter an industry, large costs make it difficult or impossible to test the market; instead, the entrant must commit large resources to enter. If large sunk costs are associated with entry and entry is unsuccessful, the entrant's losses are large. In such a setting, the threat of aggressive behavior by the incumbent may deter entry. The greater the potential loss, the more potent is the threat of aggressive behavior. By magnifying risks, capital requirements reinforce other barriers to entry. Therefore, capital requirements are ancillary barriers to entry, especially if a significant proportion of them are sunk.

Capital costs are not ancillary, economic barriers to entry, since incumbents had to bear capital costs in the past similar in size to those that entrants have to bear today. Capital costs are analogous to an admission fee, which must be borne by any firm that enters the industry. Although capital costs are not economic barriers to entry, they may nevertheless be antitrust barriers to entry. Sunk costs cause firms to delay entry because of their option value. The option of entering is lost once the firm enters. With uncertainty about market conditions, this option has value. Thus, dynamic entry is delayed relative to a static world.

We now argue more formally that sunk costs are ancillary, antitrust barriers to entry. To do so, we present a simple model in which (1) sunk costs do not delay entry in the absence of uncertainty, (2) uncertainty does not delay entry in the absence of sunk costs, but (3) uncertainty and sunk costs combine to delay entry.

⁷ Although in most industries usually no more than 4 percent of entrants are large diversifying firms, these large entrants are typically the primary engines of industry growth. Baldwin and Gu (2003) find that in Canada almost all the contribution of plant turnover to productivity growth is due to more productive new plants of multi-plant firms displacing existing plants of multiplant firms, suggesting that small independent single-plant firms have had little impact on aggregate productivity.

Consider a two-period entry deterrence model in which a prospective entrant is uncertain about the incumbent's type. The incumbent is either aggressive, with probability α , or weak, with probability $1-\alpha$. The aggressive incumbent never accommodates. In period 1, the potential entrant chooses whether or not to enter, not knowing the incumbent's type. If the potential entrant enters, the weak incumbent chooses whether or not to accommodate. If the incumbent does not accommodate, its payoff is $0 + \delta\pi^m$, where δ is the discount factor, and the entrant's payoff is $-\sigma$, where σ is a measure of the extent to which the capital costs of entering the industry are sunk. If the weak incumbent accommodates, the weak incumbent and entrant both get the Cournot payoff, π^c , in each of the two periods, for a total payoff of $(1 + \delta)\pi^c$.

If the potential entrant does not enter in period 1, it chooses whether or not to enter in period 2. At the end of period 1, just before period 2, the entrant learns the incumbent's type (perhaps because it has had time to observe the incumbent's reaction to other entrants). If the potential entrant does not enter in either period, its payoff is 0, and the incumbent's payoff is $\pi^m(1 + \delta)$, where π^m is the monopoly profit. If the incumbent does not accommodate in period 2, then its payoff is π^m and the entrant's payoff is $-\delta\sigma$. If the weak incumbent accommodates in period 2, then its payoff is $\pi^m + \pi^c\delta$ and the entrant's payoff is $\pi^c\delta$. Notice that if $\delta\pi^m < (1 + \delta)\pi^c$, the incumbent never accommodates, and hence the potential entrant never enters if it has to incur any positive sunk entry cost. Henceforth, we assume that $\delta\pi^m < (1 + \delta)\pi^c$.

Case 1. $\alpha \in \{0,1\}$ and $\sigma > 0$

Suppose $\alpha = 0$. By backwards induction, the incumbent accommodates in both periods, and hence the entrant enters in period 1, regardless of σ . Now suppose $\alpha = 1$. In this case, the entrant knows that the incumbent never accommodates, and therefore it never enters, whether σ is small or large. Thus, large sunk costs do not delay entry, or do not cause additional entry delay, in the absence of uncertainty. In other words, sunk costs are not primary barriers to entry. \square

Case 2. $\alpha \in (0,1)$ and $\sigma = 0$

By backwards induction, the weak incumbent accommodates in both periods. Therefore, the potential entrant enters in period 2 if it has learned at the end of period 1 that the incumbent is weak, but does not enter if it has learned that the incumbent is aggressive. Now, the potential entrant's expected payoff from not entering in period 1 is $(1 - \alpha)\delta\pi^c$ (which is a measure of the lost option value of entering), while its expected payoff from entering in period 1 is $(1 - \alpha)(1 + \delta)\pi^c$. Thus, the potential entrant always enters in period 1. Thus, uncertainty never deters entry, in the absence of sunk entry costs. In other words, uncertainty is not a primary barrier to entry either. \square

Case 3. $\alpha \in (0,1)$ and $\sigma > 0$

By backward induction, we find, once again, that the weak incumbent accommodates in both periods, and therefore, the potential entrant enters in period 2 if it learns that the incumbent is weak, but does not enter if it learns that the incumbent is aggressive. The potential entrant's expected payoff from not entering in period 1 is still $(1-\alpha)\delta\pi^c$, but now its expected payoff from entering in period 1 is $\alpha(-\sigma) + (1-\alpha)(1+\delta)\pi^c$. Therefore, the potential entrant does not enter in period 1 if and only if

$$(19) \quad \sigma > \frac{1-\alpha}{\alpha} \pi^c$$

Thus, large sunk costs (high σ) and uncertainty (α not too small) can combine to delay entry until the realization of uncertainty. For an important class of demand functions, efficient entry is in advance of the realization of uncertainty. Hence, sunk costs and uncertainty are ancillary, antitrust barriers to entry that combine, and reinforce each other, to produce a primary, antitrust barrier to entry. \square

III.C. ABSOLUTE COST ADVANTAGES

Incumbents may have patents on superior production techniques, learned through research and development. And incumbents may have already established their operations in the most favorable locations, so that entrants may have to pay more for scarce raw materials and other crucial inputs, and ship them a greater distance than incumbents. Patents and locational disadvantages directly raise the average cost of entrants above those of incumbents at any common output level. Moreover, no entrant is capable of directly overcoming this cost. In the United States, patents are valid for twenty years, and firms that overtly breach other firms' patents are usually successfully prosecuted. These are costs that entrants have to bear but that incumbents have not had to bear. Therefore, they are direct economic (and hence antitrust) entry barriers.

Do direct antitrust entry barriers, such as absolute cost advantages, necessarily reduce welfare? What about the social benefits of entry barriers, such as their tendency to encourage innovation? To the extent that absolute cost advantages create entry barriers and preserve monopoly profits, they supplement the incentives provided for development of new products by patents, trademark, and copyright law. If imitation is easy, then firms will have less incentive to incur the fixed costs of new product development since competitors that imitate will price to cover only their production costs and the innovative firm will have trouble recovering its development costs. This obviously reduces the incentives of firms to engage in the development of new products and as a result social welfare may be reduced. Dempsetz (1982) observes that entry barriers into production reduce entry barriers into innovation, and vice versa. Theorem: An increase in direct antitrust entry barriers in markets that are otherwise efficient reduces welfare.

Capital market imperfections seem to be another source of absolute cost advantages for incumbents. Entrants may not be able to pay large capital costs even if entry is

worthwhile, because they may have trouble finding financing for their investments. Banks may be less eager to lend to entrants because they are less well known than incumbents. Another argument is that entrants may be prevented from growing as incumbents inflict losses on them in the product market in order to reduce their ability to find financing for new investments. For these reasons, entrants may have to pay higher interest rates on borrowed capital than incumbents (thus, its direct).

A new entrant may have difficulty raising the necessary capital required to enter, either because of capital market imperfections or because of the risk associated with non-recovery of investment. The risk of nonrecovery of sunk capital required to enter will raise the cost of capital of entrants above those of incumbents. The incumbent's track record in the market allows for a more accurate evaluation of its ability to recoup sunk expenditures. A similar record may not be available for entrants, thus making it difficult to distinguish between entrants who are likely to succeed and entrants who are likely to fail. This adverse selection problem raises the average cost of capital for all entrants. See paper: Adverse selection as a barrier to entry.

However, capital market imperfections do not necessarily favor wealthier firms. Capital market imperfections favor wealthy firms. Not automatic that the incumbent has access to more capital, or is wealthier. Palm pilot: entrant was Microsoft. On average entrants are wealthier. Therefore, capital market imperfections could be entry boosters as opposed to entry barriers.

An entrant may face no absolute cost disadvantages, no economies of scale, and no capital cost barriers, but still find the going tough if the industry has a highly differentiated product. Successful entry would then depend on more than passing tests in production. It would also require mastery of marketing problems, for the entrant would then have to woo customers away from established firms with more than just satisfactory prices. Marketing a differentiated product entails substantial costs--costs of advertising, packaging, style, and so on. And these marketing costs may pose problems for an entrant if they have characteristics similar to those displayed by production cost. That is, there may be absolute unit cost disadvantages, economies of scale, or high initial capital costs associated with an entrant's differentiation effort.

III.D. PRODUCT DIFFERENTIATION

Product differentiation refers to the situation in which some differences in the products of rival sellers are perceived by the buyers. The differences may be real differences, such as differences in size, styling, horsepower, reliability, and so on, between Fords and Chevrolets, or they may be primarily the result of image differences conveyed through advertising. The main requirement is that consumers regard the differentiation sufficiently important that they willingly pay a somewhat higher price for their preferred brand. Viscusi et al.

Product differentiation can increase entry barriers by reducing market size and thereby enhancing the effects of scale economies. Thus product differentiation is an indirect entry

barrier that reinforces scale economies, which are indirect entry barriers that reinforce switching costs and consumer loyalty.

Customer switching costs are one-time costs buyers must bear when they switch from one supplier to another (from an incumbent to an entrant in particular). For business buyers, there might be employee restraining costs, the cost of complementary equipment, and the cost of removing the old and installing the new. For example, switching from an IBM computer system to that of a new rival may cause the buyer to incur added costs for new software or for employee retraining. The switching costs that the entrant must bear might be larger than those that the incumbent had to bear when it entered the market, because the market might have been occupied by fewer existing firms back then. If so, then switching costs are direct economic, and hence antitrust, entry barriers. Otherwise, they are only direct antitrust entry barriers.

Consumer loyalty, on the other hand, is always a direct economic entry barrier. Incumbents derive absolute advantages from having been the first to differentiate their product and cater to a particular market. MORE. Since product differentiation is an indirect entry barrier that reinforces scale economies, which are indirect entry barriers that reinforce switching costs, which are direct antitrust entry barriers, product differentiation is itself an indirect antitrust entry barrier.

III.E. INFORMATIONAL ADVANTAGES

In the repeated predation model, uncertainty is the principle entry barrier. When the entrant does not know the incumbent's payoffs, predation is a sensible strategy for both the "weak" and the "aggressive" incumbent. The inability of entrants to distinguish the different incumbents deters entry. In other words, one barrier to entry is the entrant's uncertainty about the incumbent's type.

The story works only if there is an incumbent (the "aggressive" one) who, when called upon to carry out a threat, finds it in its self-interest to do so. Incumbents may be able to make sunk investments that change their payoffs in the one-shot game in a way that makes them willing to carry out a threat in a future period. The owners of a firm might, for example, take advantage of the separation of ownership and control. Giving golden parachutes to managers may make them more willing to carry out a threat. The profits of the firm would fall if the threat ever had to be carried out, but the golden parachute may make the manager less concerned about profits, and more concerned about preserving market share. Once it is in the interest of a few managers to predate even when it is not in the interests of owners, it becomes in the interest of other managers to mimic them (at least in early periods), even if their own concern is profits. Therefore, sunk costs and uncertainty combine to form indirect entry barriers that reinforce entry deterrence tactics, which are themselves direct antitrust, but not economic, entry barriers.

Disclosure laws about the relationship between managers and firms might make it easier for entrants to identify the incumbent's payoffs, and thus make it harder for weak

incumbents to be confused with aggressive incumbents. Such disclosure laws might therefore reduce indirect antitrust entry barriers.

If the entrant knows the incumbent's type, but buyers do not, entry may still be deterred. Assuming that the entrant knows the incumbent's cost but buyers do not, Aghion and Bolton show that (1) contracts can be used for entry deterrence purposes but that it is not profitable to deter entry completely, and (2) contract duration acts as a signal to buyers of the incumbent's cost. Poitevin (2000) shows that if the entrant does not know the incumbent's cost either, then the incumbent always signs the contract, entry may be deterred completely, and the nominal length of the contract (i.e., the 0-1 decision to sign the contract) cannot signal the incumbent's cost. Thus, in this situation, uncertainty about the incumbent's type is an indirect entry barrier that reinforces the entry deterrence effectiveness of exclusive contracts. Moreover, it reduces welfare, since in many cases the equilibrium contract is such that entry is completely deterred.

But is it an indirect economic entry barrier? The uncertainty about market conditions that the incumbent had to bear in the past might have been similar to the uncertainty that the entrant has to bear today. Moreover, any informational advantage that the incumbent enjoys over the entrant eventually disappears as the entrant spends more time on the market. This may imply a hard patch for the entrant, but if the entrant can hold its ground, it will eventually be no more uncertain about market conditions than the incumbent. Therefore, informational advantages are best classified as indirect antitrust, but not economic, entry barriers.

III.F. ORGANIZATIONAL FORMS

Suppose that to be competitive in a particular industry requires highly motivated managers. If a firm's organization is highly structured, it is hard for managers to be highly motivated. To play the game of exclusive patent cross-licensing, a firm needs a lot of patents. But if a firm has a flat organization, it is difficult for it to produce a lot of patents.

Talk about vertical integration and diversification. Suppose you want to make paper. Then you need a saw-mill next to the paper plant. But if you run under the same organization, you need the skills both to cut the wood and to make the paper. That making paper requires two skills (diversification) is an indirect entry barrier.

Can we classify vertical integration as a capital cost / exit barrier? If it is efficient for firms in the industry to be vertically integrated, then an entrant must enter on two or more levels in order to match the existing firm's costs. That requires assembling more capital, R&D, and staff talent, and that larger commitment raises the degree of risk in case of failure.

But vertical integration is not just about capital, it's also about skills.

Diversification by the incumbent and flexible accounting methods are not capital costs to the entrant, but they are nevertheless indirect, economic entry barriers, just like capital

costs. Diversified firms may be able to deploy their massed resources at any one branch where needed to prevent entry. In some industries, members are educated in standardized book-keeping methods that lead them to always make their prices cover full costs, which are calculated in a pre-established manner. In other industries, members maintain flexible book-keeping methods that allow them to cut prices when competitive threats are imminent. Diversification and flexibility make strategic entry deterrence possible. Capital costs increase the effectiveness of strategic entry deterrence. In this sense, diversification and flexibility are less indirect entry barriers than capital costs, but are indirect entry barriers nonetheless.

III.G. ASSET SPECIFICITY

The various assets used by a firm will usually have some degree of specificity for this purpose. They may not be adaptable to other uses, and therefore they cannot be sold or converted. Asset specificity imposes high losses if the entry fails. Therefore, asset specificity is an indirect economic entry barrier because twenty years from now the investment will be worthless. But it is also a direct antitrust entry barrier because it takes twenty years for the investment to be worthless.

| Structural Barriers to Entry | Economic | | Antitrust | |
|------------------------------|------------|-----------|------------|-----------|
| | Standalone | Ancillary | Standalone | Ancillary |
| Economies of Scale | | | | + |
| Switching Costs | | | + | |
| Brand Loyalty | + | | + | |
| Capital Costs | | | | + |
| Absolute Cost Advantages | + | | + | |
| Informational Advantages | | | | + |
| Organizational Advantages | | + | | + |
| Asset Specificity | | + | + | |

| Strategic Barriers to Entry | Economic | | Antitrust | |
|----------------------------------|------------|-----------|------------|-----------|
| | Standalone | Ancillary | Standalone | Ancillary |
| Intense advertising | | | + | |
| Contracts to block distribution | | | + | |
| Excess capacity | | + | + | |
| Price discrimination | + | | + | |
| Lease-only marketing | | + | + | |
| Tying | + | | + | |
| Collective product proliferation | | | | + |
| Lobbying to raise entrant's cost | + | | + | |

| | | | | |
|----------------------------------|--|---|---|--|
| Exclusive patent cross-licensing | | + | + | |
|----------------------------------|--|---|---|--|

APPLICATIONS TO ANTITRUST COURT CASES

We need a modern version of the table in Bain's book, p.169, e.g., like Table 2. Then we can cross-reference with Table 1 and perhaps tell if the wrong verdict was reached in an important court case concerning a given industry, say telecommunications.

Table 2: Height of Structural Entry Barriers in Selected Industries

| Industry | Tobacco | Video Rental | Telecom | Health Insurance | Grocery Retail |
|----------------|---------|--------------|---------|------------------|----------------|
| Cap. Req. | H | L | M | M | H |
| Abs. Cost Adv. | H | H | L | M | M |
| Prod. Diff. | L | L | H | H | L |
| Info. Asym. | M | M | M | M | M |
| Org. Inc. | M | L | H | M | H |
| Ass. Spec. | L | M | H | H | L |

CONCLUSION

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