

ECONOMIC ANALYSIS AND “BRIGHT-LINE” TESTS

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1. Introduction

Although it is now difficult to believe, there was once a time when it was rare for economists to participate as expert witnesses (or even as consultants) in antitrust cases. Indeed, when I began so to participate some 36 years ago, I was surely one of the first.¹ Nowadays, of course, such participation is common, and it is the absence, rather than the presence, of an economist that is thought to be somewhat remarkable.

That is as it should be. As has come to be recognized under the influence of the somewhat misnamed “Chicago School”², economics provides a principal motivation for a pro-competition policy, and economic analysis, *properly performed and understood*, has a good deal to contribute to antitrust litigation and decisions.

But, I emphasize the words “properly performed and understood” because it is too often the case that economic testimony is mishandled and economic analysis misapplied. This is partly the fault of the economists who testify and partly due to the fact that attorneys and judges tend to favor simple “bright-line” tests. Emphasis on such tests has a tendency to cripple the role of economists and limit the usefulness of their discipline. That is a major theme of the present paper.

For simplicity in what follows, I shall generally focus on single-firm monopoly or dominant firm cases, although much of what I have to say applies more generally.

* I am indebted to Daniel Jonas for assistance and to him, Evan S. Schouten, and Maarten Pieter Schinkel for comments and criticism. I retain responsibility for error.

¹ My first participation was as a consultant and witness for IBM in the great IBM antitrust suit of the 1970's (*United States v. International Business Machines Corporation*, Docket Number 69 Civ. (DNE) Southern District of New York) and the many private suits associated with that great fiasco. See Fisher, McGowan, and Greenwood (1983) for an extensive discussion of the case and the economics involved.

² I say “somewhat misnamed” because the doctrines promulgated at the University of Chicago are only the extreme – sometimes too extreme – example of basic propositions of microeconomics that are everywhere taught. Indeed, some 20 years ago, I was quite surprised when a Columbia University student was sent to interview me as a representative of the “Chicago School”. Although I was on the Chicago faculty for a year in 1959-60, my views on how one should do industrial organization and analyze antitrust issues were and are rather closer to what one might call the “Harvard School” founded by Edward S. Mason and followed by my mentor, Carl Kaysen, than to the version promulgated at Chicago.

2. Market Definition

The first thing (sometimes the only thing) that attorneys want economists to do is to define “the relevant market”. Whenever I get a call from an attorney who defines that as my role – particularly if he or she tells me what the answer is to be – I know that there is trouble ahead. I have written elsewhere a paper devoted to the problems and potential pitfalls associated with market definition (Fisher, 2001), and I repeat some of that discussion here.

a. The Purpose of Market Definition

Market definition has become a necessary part of every antitrust case, and there is no avoiding discussing it. Market definition can be a useful tool, a way to begin organizing the material that must be studied. Unfortunately, too often market definition becomes an end in itself -- the principal, indeed, sometimes almost the only matter to be analyzed. When that happens, market definition stops being a useful organizing device and becomes a shibboleth of antitrust analysis.

To understand why it is important to avoid this and how to handle market definition requires an examination not so much of rules for market definition as of the purposes of the market definition exercise, its uses and its limitations.

The first thing to understand about market definition is that how it is done depends on the purpose for which it is used. Thus, where the issue to be investigated is that of the market power and behavior of a seller, the market will often be defined differently than where what is in question is the market power and behavior of a buyer.³ To facilitate exposition, I shall usually assume that we are talking of sellers.

Begin by considering an allegation of single-firm monopoly. Why do we undertake the market definition exercise? We do so because we wish to measure the market share of the alleged monopolist and draw conclusions therefrom. Similarly, in a case with an allegation of collusion or in the case of a proposed merger, we are interested in market definition so that we can calculate some measure of concentration -- these days, generally the Hirschman-Herfindahl Index (HHI) -- and draw some conclusions from that measurement.

To be sure, such measurements are not the end of the investigation. Ease of entry must also be considered, and one might reasonably say that such a consideration requires one to know what it is that is being entered. That is fair enough, and proper analysis will consider all the facts involved in both market share or concentration and ease of (or barriers to) entry. But, while careful procedure will come up with the same ultimate conclusion regardless of market definition, the use of share or concentration measures loses meaning if market definition is not done carefully.

³ See the discussion below of the case of the St. Louis Rams for an example.

An example will help here. Boats that are kept in seawater must have their bottoms painted periodically with copper-based paint to avoid barnacles. Suppose that there is only a single manufacturer of such anti-fouling paint, but that any manufacturer of ordinary paint (of which there are many at least as large as the maker of anti-fouling paint) could easily produce anti-fouling paint by adding some readily available copper compound to its process.

Suppose that the issue to be investigated is that of whether the single current producer of anti-fouling paint has monopoly power, and the question now arises of what is the appropriate market definition: anti-fouling paint or all paints.

One way to proceed is to observe that boat owners -- the customers of the alleged monopolist -- have no substitute to which to turn in the event of an attempt by that firm to raise prices above competitive levels and earn supra-normal profits. Technically, there is no demand substitutability. That might lead us to define the market as anti-fouling paint only.

The other way is to take into account the fact that other paint manufacturers can enter so easily as to provide demand substitutable paint very quickly. If such supply substitutability is fast enough, then we might define those other manufacturers as in the market already.

The first important thing to notice about this example is that one can and should reach the same result as to monopoly power whichever market definition one uses. If the market is defined as anti-fouling paint only, then the fact that entry is so easy should lead to the conclusion that there is no monopoly power even though the share of the alleged monopolist is one-hundred per cent. If, on the other hand, the market is defined as including all paints, then the same conclusion follows from an examination of the very small market share of the alleged monopolist.

Notice, however, that if market definition is to be a help and not a hindrance, one of these definitions is superior to the other -- even though consistent treatment will lead to the same result either way. If any conclusion is to be drawn from market share, then the second definition, the one that includes all paints, must be used. The first definition, the one that includes only anti-fouling paint, merely gets in the way of the analysis, making market share meaningless.⁴

Note that it does not matter here whether businesses or industry observers keep separate statistics on anti-fouling paint or refer to "the anti-fouling paint market". While economists should always be aware of how businesspeople regard their own business, that fact is not a controlling factor. The term "market" is a term of art in antitrust cases and businesspeople usually do not use it in that way.

⁴ Warning: It should *not* be concluded from this example that I believe that markets should always be defined as broadly as possible.

b. The Constraints Approach

What, then, does economic analysis have to say about market definition? In one sense, the answer is "Nothing at all." The question of what is "the" relevant market never arises in economics outside of antitrust. Moreover, as the example above suggests, it is not a question that has a precise, well-defined answer.

Consider the classic United States case on market definition, the *Cellophane* case.⁵ Here the market definition issue was whether all flexible wrapping papers were in the same market as cellophane, a transparent flexible wrapping paper. The Supreme Court considered evidence that customers substituted other flexible wrapping papers for cellophane and concluded that they were in the same market. This, in turn, caused them to find in favor of DuPont, the alleged monopolist.

That finding was (and still is) strongly criticized by economists and others.⁶ They pointed out that cellophane was profitable at lower prices than those charged by DuPont and that DuPont would naturally raise its price to the point at which substitution began to take place. They concluded that other flexible wrapping papers were *not* in the same market as cellophane and that the Court should have found against DuPont. Indeed, the view was that the Court, in its market definition exercise had fallen into what is now known as "the *Cellophane* trap".

I agree that the case was wrongly decided, but I do not agree that the Court should have found that other flexible wrapping papers were not in the same market as cellophane. Neither do I believe that it was correct to find that such papers *were* in the same market. Indeed, the *Cellophane* case points up some of the dangers of the entire market-definition exercise.

The relevant facts of *Cellophane* are undisputed. At a high enough price for cellophane, there was substitution of other flexible wrapping papers. At lower, still profitable prices, there was not. Once one has stated that (and specified the prices), one has said all there is to say. Nothing is to be gained, and much information may be lost by an attempt to force these facts into the Procrustean bed of market definition, insisting on an answer that other flexible wrapping papers are either in or out of the market. If one insists on expressing the facts in such language, then the correct answer is that such papers are "in" at high prices for cellophane and "out" at low ones. Evidently, this is not a very useful way to proceed.

How then should market definition be handled? I have maintained for many years⁷ that market definition should be considered an organizational first step in antitrust analysis. In particular, a useful market definition should include in the market all the firms and products or services that constrain the exploitation of monopoly power by the

⁵ *United States v. E.I. duPont de Nemours and Company*, 351 U.S. 377 (1956).

⁶ Stocking and Mueller (1955); Kaysen and Turner (1959, p. 102); Posner (1976), p. 127.

⁷ My statements on this topic go back to my work in the *IBM* case (see n. 1, above). They first appeared in published form in Fisher (1979) and in Fisher, McGowan, and Greenwood (1983). See also Fisher (1993).

firm (or group of firms) under consideration.⁸ Of course, one must always remember that not all things that are included need constrain power to the same degree. Similarly, one must also remember that not all things excluded thereby become irrelevant as providing no constraint at all. But the constraints on power are what are to be examined, and market definition should be a summary of what one has to understand to analyze what is going on.

For more than two decades, that approach has been accepted by the United States Department of Justice in its *Merger Guidelines*.⁹ There a market is defined as the smallest set of firms (including the merger participants) that could, if they colluded, profitably maintain a significant price increase for a significant period of time – the SSNIP test. The exact standard as to what is "significant" does not matter; this is a "constraints" approach to market definition. The only difference is that the *Guidelines* are designed to assist with the question of whether a merger will make things worse than they already are; hence they look at price increases relative to the existing level. A more general application of the principle would look at price increases above the competitive level. If that is properly done, it is the proper way to start.

In other words, a "market" is something that can be monopolized. If you have left out significant constraints on power, the "market" is too small. If you have kept in firms and products or services that are not significant constraints, the "market" is too large.

How then should one analyze the constraints involved? The answer was implicitly given in considering the anti-fouling paint example above. Constraints on market power are of two types, stemming from demand substitutability and supply substitutability.

Demand substitutability refers to those products and services to which customers of the alleged monopolist (or non-competitive group of firms) can readily turn in the event of an attempt to raise prices above the competitive level and earn supra-normal profits.

Supply substitutability involves firms that do not currently produce demand-substitutable products but could readily do so in the event of such an attempt to exercise power. Clearly, the distinction between supply substitutability and ease of entry is one of degree, rather than of kind. As the anti-fouling-paint example shows, however, there are times when entry is so easy (supply substitutability so great) that defining the market to exclude such potential suppliers of demand-substitutable goods makes market definition a fairly useless exercise even if it need not lead to the wrong conclusion.

Notice that the analysis of market definition in this way consists of the steps that one needs to take anyway in analyzing monopoly power. This reflects the fact that

⁸ My discussion and the examples below focus on what products should be included in the market. The same principles apply to geographic market definition, however.

⁹ United States Department of Justice and Federal Trade Commission, *Horizontal Merger Guidelines* (revised April 8, 1997).

market definition must be attuned to the question to be asked and not merely an arbitrary matter of how words are used. That maxim has been and, unfortunately, still is often forgotten as the following examples illustrate.

c. Examples: How Not to Define Markets

(i) Nestle's and Stouffer's. In the early 1970's, the Nestle's corporation acquired Stouffer's which, among other things, produced frozen foods. The United States Federal Trade Commission (FTC) opposed the acquisition, contending that the "market" consisted of "high-priced, non-ethnic, frozen entrées".¹⁰ One does not have to know much about the case to recognize that this definition was engineered ("gerrymandered", to use the American expression) to obtain the desired result. Apparently, no constraint would be placed on the merged firm by fresh food, by entire frozen dinners, by such items as chicken pot pie (low-priced) or by Mexican, Chinese, or Italian frozen dishes.¹¹ The point of market definition was lost here in an attempt to secure a high market share measurement. Of course, that made market share measurement meaningless.

(ii) U.S. v. IBM. The situation in the eons-long *IBM* case of the 1970's was even more bizarre. The U.S. Department of Justice's (DOJ's) complaint defined the market as "general purpose, electronic, digital computer systems, optimized for commercial purposes". In the first place, this too was gerrymandered to exclude competition by scientifically oriented computers, an area in which IBM was less successful than it was in obtaining business customers. In so doing, the government overlooked the fact that IBM's System/360 family of computers had effectively erased the distinction between scientifically-oriented and business-oriented computers. It also produced the peculiarity that much of the actions complained of took place off-stage, so to speak, having precisely to do with competition for scientific customers. The definition was also imprecise, at best, in its use of the term "general purpose", which ended up defined in such a way as to exclude nearly all of IBM's competitors and, quite possibly, even IBM itself.

But, for our present purposes, the major defect in the definition lay in the use of the term "systems". The government insisted that no company that made only part of a "system" could be in the market. It thus excluded companies such as Telex or Memorex or (later) Amdahl that made plug-compatible copies of IBM disk drives, tape drives, or even central processing units. Yet these were the companies privately suing IBM under the antitrust laws and the subject of a great deal of the government case involving IBM's reaction to such competition.

In the end, the DOJ went even further. It insisted that, although such companies were, by definition, not in the "market", their products were, and that, since their products were attached to IBM systems, they should be counted in IBM's market share! This was part of a tortured treatment of market share which was to be measured as IBM's share, not

¹⁰ In the U.S., an "entrée" means a main course.

¹¹ It is amusing that, while the case was pending, Stouffer's ran a series of television commercials featuring someone biting into a Stouffer's product and saying "What is it? It tastes like lasagna, but it isn't lasagna". I have always wondered whether the legal department had a hand in that campaign.

of revenues or shipments, but of all computers ever built and still in existence (often at greater than original prices).¹²

Obviously, this robbed market share and market definition of any meaning whatever. By the DOJ's standard, IBM could have gone out of business years earlier and still had monopoly power.

This sort of thing is what happens when market definition is undertaken with no understanding of its purpose or limitations. Other cases, while not as bizarre, also exhibit a lack of understanding.

One fairly common phenomenon occurs in private antitrust cases. Here, the plaintiff sometimes defines the market in terms of how it does business itself rather than in terms of the way the defendant operates. This has occurred both when the plaintiff and defendant are competitors and when one is a customer of the other.

(iii). The Salvino Cases. The Salvino Corporation sued three major U.S. sports leagues (football, basketball, and baseball) on essentially the same grounds. I was involved for the leagues in the basketball and baseball cases, and here discuss the basketball case.¹³ Salvino applied to National Basketball Association Properties (NBAP) for a license to manufacture little plush bears using NBA team colors, logos, etc. That application was refused, and NBAP sued Salvino for going ahead anyway. Salvino counter-sued under the antitrust laws, asserting that NBAP is nothing but a cartel.

For our purposes here, the interesting issue is that of market definition. Salvino's expert believed it obvious that the market was that for little plush bears (or possibly other plush objects) with NBA-licensed colors, logos, etc.. That, of course, is what Salvino wished to sell. But NBAP does not produce little plush bears.¹⁴ NBAP is in the business of offering licenses to manufacturers of all sorts. Those manufacturers have no special interest in taking an NBAP license and selling to basketball fans; rather, they wish to sell their wares profitably, and such a license is one way to do it. Hence, the NBAP competes (as Salvino does not) with other licensors that can make properties specially attractive.

(iv). The Move of the Los Angeles Rams. To take a different example, also drawn from sports, some years ago, the Rams football team of the National Football League (NFL) moved from Los Angeles to St. Louis.¹⁵ They did so after considerable negotiation with the NFL, eventually paying a sizeable relocation fee. The St. Louis Convention Center (to whom the fee was passed on, by agreement) sued the NFL under

¹² This prompted the remark from my colleague on the case, James McKie, that "The government has adopted a measurement principle which, from the fact that Stonehenge still stands on Salisbury Plain concludes that the Druidic Construction Company is a force in the British housing market." Putting aside the fact that the Druids did not build Stonehenge, I really wish I had said that first.

¹³ *NBA Properties v. Salvino, Inc.* Civil Action No. 99-CIV-11799(LTS). That case settled, as did the earlier football case. The baseball case (*Salvino, Inc. v. Major League Baseball Enterprises, Inc. and Major League Baseball Properties, Inc.* 00 Civ. 4153 (RCC)) was dismissed on summary judgment.

¹⁴ NBAP does sell such bears at retail, but here it acts only as another retailer.

¹⁵ Of course, the sport involved here was American football.

the antitrust laws. I need not here discuss the entire case, which was dismissed during trial.¹⁶ Instead, I consider only the market definition question involved – in this case, with respect to the alleged market power and behavior of a buyer.

The plaintiff defined the market as the market for football stadiums built to NFL standards, and claimed that the NFL (or its teams) had monopsony power in that market. Of course, this was the product that the plaintiff had produced and was selling (or leasing). There were only a limited number of such stadia, and, had the issue been one of whether the *plaintiff* had market power as a *seller*, such a market definition might have made some sense as defining the set of alternatives to which the NFL could turn – the constraints on the *seller's* power. As a market definition for the actual case, of course, it made no sense whatsoever. The issue there was the constraints on the NFL, the *buyer*, and that had to do with the alternatives the St. Louis Convention Center had to building such a stadium.¹⁷ It was as though a maker of address labels had, without being asked, made them with my name on them and then claimed that I had monopsony power over address labels with the name “Franklin Fisher” printed thereon.

Again, market definition must be done with full account taken of its purpose.

3. Market Share

I have already suggested that a principal purpose of market definition is to summarize the field of action, as it were, by including the constraints on the defendants (or the sellers in a merger case). that one must understand to know what is really happening. But, of course, in practice, the principal reason for market definition is that such a definition makes it possible to measure market shares.

In single-firm monopoly cases, market definition is generally undertaken primarily to obtain a measurement of market share. That measurement, in turn, is supposed to tell one something about the presence or absence of monopoly power or, in the EU, about “dominance”.

In thinking about this, it is important to recognize that a large market share does not itself equate with monopoly power, even though judicial practice has tended in that direction. Monopoly power is the power profitably to raise prices above (or reduce quality below) the competitive level for a significant period of time. In other words, it is the power to raise prices above (or reduce quality below) the competitive level for a significant period of time without having business bid away by competitors, including new entrants. Market share is, at best, a very rough indicator of this. A small market share suggests that competitors would not have to do much to bid away business; a large

¹⁶ *St. Louis Convention & Visitors Comm'n v. National Football League*, 46 F. Supp. 1058 (E.D. Mo. 1997), *aff'd*. 154 F. 3d 851 (8th Cir. 1998). I was a witness for the league. For a discussion of the case, see Fisher, Maxwell, and Schouten (2000, 2003).

¹⁷ Those alternatives included both the building of a different kind of stadium and, since what St. Louis wanted was prestige and attractiveness for their city, devoting the funds to other municipal purposes such as schools, hospitals, roads, etc..

market share suggests the opposite. Yet neither suggestion need be true, even in a properly defined market. A small share can be consistent with power if there are reasons that competitors cannot expand; more important, a large share can simply represent greater efficiency or product quality on the part of the alleged monopolist.

Unfortunately, courts have typically not recognized this directly. The classic locus for dicta on market share is Judge Learned Hand's opinion in the *ALCOA* case¹⁸ where three different levels of market share are characterized as "not enough", "doubtful", and "certain" to signal monopoly power, respectively. Judge Hand then went on to carve out an exception for the case of share attained by "superior skill, foresight, and industry", saying "The successful competitor, having been urged to compete, is not to be turned on when he wins," but the damage was done. Ever afterwards, cases have revolved around market definition with the two sides attempting to define the market in such a way as to meet or fall short of Judge Hand's standards on market share.¹⁹

What else could have been done? I believe it would have been better to continue to define monopoly power as above, to leave market share as a rough indicator thereof, and to combine the two prongs of Hand's test so that a position attained or maintained solely by "superior skill, foresight, and industry", is not considered a monopoly. Indeed, the presence of power can sometimes be detected without share measurement. For example, in the U.S. case against Microsoft²⁰, which I discuss below, Microsoft's power was evident from the testimony of customers as to their lack of choice and from an analysis of barriers to entry showing the source of the power.²¹ Further, as we have seen, the market definition exercise frequently has no clear answer, and attempting it can suppress necessary information (as in *Cellophane*).

The problem may be even more severe in Europe (and elsewhere) where an offense is described in terms of "abuse of a dominant position" and "a dominant position" is characterized in terms of market share (usually a smaller one than would raise a conclusive presumption of monopoly under the *ALCOA* standards). The danger here is twofold: First, such a standard assumes that market definition can be easily and unambiguously performed; as discussed, this is not the general case. Second, that standard can have perverse incentive effects on firms that are approaching the crucial share as a result of competing on the merits.²²

So far, I have been discussing single-firm monopoly cases. When we come to merger (or other multi-firm) cases, similar problems arise. In the United States, it is customary to define the market and then compute the HHI concentration measure, drawing conclusions therefrom as to the likelihood of successful coordination among the

¹⁸ *United States v. Aluminum Company of America, et al.*, 148 F. 2d 416 (1945). For a more detailed discussion of the issues involved here, see Fisher, McGowan, and Greenwood (1983, pp. 2-4).

¹⁹ So far as I know, however, the bizarre behavior of the Antitrust Division in the way in which it chose to measure market share in *U.S. v. IBM* (see above) was mercifully *sui generis*.

²⁰ *United States of America v. Microsoft Corporation*, Civil Action No. 98-1232 TPJ (D.C.). I was the principal economics witness for the United States.

²¹ See Fisher and Rubinfeld (2001) for a detailed discussion.

²² On this effect, see Levin (1982).

(remaining) firms in the market. As I have elsewhere pointed out, however²³, economic theory gives us no really sound basis for mapping the HHI (or any other concentration measure) into the likelihood of successful coordination. Oligopoly theory is simply not so well-developed as that, and the likelihood of successful coordination depends on the facts of the particular industry involved. The best one can say for the employment of the HHI is that it may be a useful device for "triage", assisting the antitrust authorities in deciding where to put their scarce resources. That is no small gain, but it would be very undesirable were judicial standards to be formulated in HHI terms. That is especially so because market definition, with all its attendant difficulties, is a necessary prerequisite for HHI calculation.

In short, it is a mistake – and sometimes a major error – to concentrate only on market share in an analysis of monopoly or market power. Market share measures, even when properly done, provide only a crude guide. They ought not to be treated as a “bright-line” test.

4. The Use of Evidence on Profits

Is there any “bright-line” test for power? I think not. The other measure that is sometimes used is that of profits. But, as I now explain, that is based on major misconceptions.

The most important of such misconceptions is to believe the following argument: Economic analysis shows that economic profits (with costs defined to include a necessary return on capital) are zero under competition. Hence, a profitable firm must have market power.

This is a fundamental misunderstanding of basic economic principles. Economic analysis does not show that economic profits are zero in competition. The theorem in question states that economic profits are zero in *perfect* competition *in long-run equilibrium*. While there are members of the Chicago school – the “rational expectations” economists – who believe that every market is always in equilibrium or, equivalently, that opportunities thrown up by disequilibrium disappear instantly, there is no sound basis for this. Not only does the theory of disequilibrium and stability not establish such a proposition²⁴, but also profits and losses are a crucial part of the mechanism through which the “Invisible Hand” operates. Among other bizarre features of *U.S. v. IBM* was the (at least implicit) contention that the computer industry of 1945-1980 could be analyzed as usually in long-run equilibrium, ignoring the waves of technological change that characterized it.

A less fundamental, but still fatal misconception is that accounting rates of return can be used to measure economic rates of return, so that a persistently high accounting rate of return indicates a high economic rate (and hence non-competitive profits). That

²³ Fisher (1987a).

²⁴ See Fisher (1983) for extended discussion.

literature was based on a false premise. Except in cases such as trucks where the capital equipment involved can be bought and sold on a thick second-hand market, accounting rates of return bear almost no necessary relation to true economic rates of return. This has been known for more than 20 years²⁵.

Alas, beloved fairy-tales that seem to justify “bright-line” tests die hard. In *Microsoft*, Frederick Warren-Boulton, the other economics witness for the plaintiffs, used Microsoft’s profits as a strong indicator of monopoly power, and I was cross-examined on that point at the beginning of every day of my extensive cross-examination in the government’s case-in-chief. More troubling is the fact that, although I have reason to believe that the U.S. Antitrust Division now understands the issues correctly, that appears to me not to be true in other countries, particularly in the United Kingdom, where the appropriate authorities keep on trying to rely on profit evidence.

The fact is that there is no “bright-line” test for diagnosing monopoly or even market power. Attempts to do so are misguided, even if they sometimes come to the appropriate results. By insisting on such things as market definition and share or allowing the use of profits evidence, courts and competition authorities are using overly simplified economics, often resulting in mistaken conclusions.

Of course, I do not mean to suggest that there are no correct ways to analyze the presence or absence of market power. But doing so will usually require at least a moderately detailed inquiry as to the facts and behavior of the industry under investigation. That inquiry must focus directly on the alternatives available to customers and the ability of rival firms or potential new entrants to expand and limit the exercise of any such power. As suggested earlier, the *Microsoft* case is an example of how that can be done.

5. Anticompetitive Behavior

The detection of power, however, is not the only area in which “bright-line” tests can lead to confusion. Another is the analysis of whether the defendant has acted anticompetitively.

a. The Areeda-Turner Test

Here, the principal example is in the area of predatory pricing. The standard here, used and sometimes fully adopted by U.S. courts, is the well-known Areeda-Turner test (Areeda and Turner, 1975). Areeda and Turner’s well-reasoned and highly useful article reaches the position that (deliberate) pricing below average variable cost should be considered predatory, both because no profit-maximizing firm would ever do such a thing and because average variable cost can be taken as a proxy for the hard-to-measure marginal cost which the authors would prefer to use.

²⁵ See Fisher, McGowan and Greenwood (1983, Ch. 7), Fisher and McGowan (1983), Fisher (1984, 1987b).

The Areeda-Turner test is fine, so long as one understands it correctly, and so long as one is dealing with the simple example of a single-product manufacturing firm (the example used by Areeda and Turner). But there are pitfalls in relying on it blindly, as courts and attorneys sometimes do.

Some of those pitfalls follow from the simplicity of the single-product example. When several products are produced together, what is the meaning of “average variable cost”? Under some circumstances, there is a straightforward, if sophisticated answer. Suppose that products A and B are produced together and that the same collection of inputs can be used to produce either product. Suppose further, that the production process can be used to produce different combinations of A and B. In that case, taking A to be the product whose pricing is in question, producing less of B enables greater production of A. Hence negative B can be considered as an input to A. The cost of that input is an opportunity cost – the amount for which additional units of B could be sold. With this treatment, the validity of the Areeda-Turner test is restored, and this analysis can obviously be generalized to the case of n products.

Sometimes, however, the problem is not so simple. Suppose now that A and B are always produced in fixed proportions. What then is the average variable cost of one of them? This problem may be unlikely to arise, however, if everyone has the same production technology, for then the issue must be the pricing of the A-B package rather than the pricing of A alone.

But one need not go so far as the fixed-proportions case. Consider an airline selling seats. Typically, it will sell groups of seats at different prices, charging a higher price for seats bought at the last minute and a lower one for seats bought early and with some restrictions. These are actually different products because of the surrounding terms, and I shall – somewhat erroneously – refer to them as “business seats” and “leisure seats”, respectively.

I was an expert witness for Northwest Airlines in a case in which a provider of charter flights for vacationers claimed that Northwest predatorily priced its leisure seats.²⁶ The plaintiff’s claim was that average variable cost should be calculated by dividing the entire cost of flying the plane in question by the number of seats (or perhaps the number of seats sold). But of course, this is an example in which average variable cost, so calculated, is a terrible proxy for marginal cost. If the plane will fly anyway, the marginal cost of selling an additional leisure seat is trivial so long as there are empty seats. The only relevant costs are peanuts (pun intended), and the costs that would be incurred anyway should be regarded as fixed or unavoidable relative to the number of leisure seats sold. It is not that the Areeda-Turner test is wrong in such a case, but rather that blind application would make it so.

If the question is whether to fly the plane at all, however, it is not the case that the only relevant costs are “peanuts,” as many of the larger, up-front costs would be

²⁶ *International Travel Arrangers v. NWA, Inc.*, No. 86-00391 (D. Minnesota, 1986), 991 F.2d 1389, (8th Cir. 1993);

“avoidable.” In another airline case, Continental Airlines sued American Airlines claiming that American had priced below cost.²⁷ I was a witness for the plaintiff. Other economic witnesses battled strongly over the appropriate measure of average variable cost in a circumstance when seats were sold at different prices and the decision as to whether to fly a route at all could be involved. The arguments on that point were largely unintelligible – at least to the jury. On the other hand, as I discuss below, there was a strong argument that American could be seen to have behaved predatorily by looking at its own analyses. But the Areeda-Turner test did not help a great deal.

That test runs into difficulties in other types of cases as well if not properly understood. Suppose that the allegation is that a firm has predatorily priced a piece of intellectual property, say an important software program. Most of the cost is in the original writing and debugging of the program, whereas the cost of producing additional copies is trivial. Does this mean that any price above that trivial cost is non-predatory even if the returns from licensing at that price can never recover the initial expenses?

To take a real example, consider the case of *Information Resources, Inc. v. The Dun & Bradstreet Corp., et al.*²⁸ in which I was a consultant and potential witness for the plaintiff and which is now on appeal from a summary judgment ruling for the defendants. Both the plaintiff (IRI) and the defendants (effectively the A.C. Nielsen Co.) are in the business of providing manufacturers with retail tracking data (i.e., information as to sales made in various retail outlets). That information, which used to be obtained by Nielsen from auditing retail sales, is now obtained far more quickly and reliably from data provided by scanners used in stores, a technology first introduced by IRI.

For present purposes, I omit most of the details and concentrate on the Areeda-Turner test. IRI contended that, among other things, Nielsen had deliberately lost money on a large number of contracts with major manufacturers, and had done so to hamper IRI’s competition. Although both the EU and Canadian competition authorities favored IRI’s case, that particular claim ran into trouble in U.S. district court.

The difficulty was as follows. To set up the retail tracking business in a particular country, one must amass a “library” of information from retailers together with other information, keeping that library up-to-date as time progresses. (Doing this in one country does not reduce the cost of doing it elsewhere.) But, once that library is amassed, the costs of providing information to additional buyers is relatively low. The defendants argued that this means that the costs of library formation are fixed costs and should be ruled out of consideration by the Areeda-Turner test.

The problem with this argument is that it relies on a narrow construction of “variable costs”. The costs of library creation do remain essentially constant when sales of information are made to additional customers – (the marginal cost of filling empty seats is low) – but unlike true fixed costs, those costs disappear if there are no customers

²⁷ *Continental Airlines v. American Airlines*, 824 F. Supp. 689, 701 (S.D. Tex. 1993).

²⁸ Southern District of New York, No. 96 CIV. 5716.

at all – (the airplane does not fly). Hence, those costs are avoidable except over very short time periods and should be counted in applying the test.

In this connection, the standard treatise (Areeda and Hovenkamp, 2002) states (Vol. III, ¶ 740d1):

”Which costs are to be considered variable and fixed is a function of the time period.... Inasmuch as the purpose of any predatory pricing rule is to prevent anticompetitive behavior, the cost-based rules must focus on the *costs that the defendant should have considered when setting the allegedly predatory price*. Theoretically, therefore, a predatory pricing rule depending on variable cost should focus on those costs that are variable in the same time span as the challenged price.” (Emphasis added.)

And (¶740d3):

”In considering which costs are variable, the economically correct approach is to identify those costs that can be *avoided* if the predator reduces its output or ceases production.”

As well as (¶735c2):

“[V]ariable costs include both those that would be saved if the firm shut down and those that vary with output.”

To sum up, I believe the Areeda-Turner test to be a useful one. But, like other “bright-line” tests, it requires serious understanding of its nature and purposes rather than blind use.

b. What is a Predatory Act?

One way of looking at the matter is to realize that the Areeda-Turner test is just that – a test. It is not a definition of a predatory act or even of a predatory price, but rather a way of testing for one. Sometimes, it is better to think about what it is that is being tested for and to look at it directly.

Consider then what one means – or ought to mean – by a “predatory act” or an “anticompetitive act”. I continue to consider acts by a single firm, in which case, the two seem to me to coincide.²⁹

In the first place, one must distinguish an anticompetitive act from one that represents competition on the merits and simple profit maximization. That implies the following:

²⁹ With more than one firm, an agreement to fix prices would be anticompetitive but not predatory. I cannot think of a similar example in the single-firm case.

An anticompetitive act is one that does not maximize long-run profits without regard for the monopoly rents which it brings or protects. But an anticompetitive act is long-run profit-maximizing when taking account of such rents.

In other words, an anticompetitive act is conduct that makes sense only because of the monopoly rents that it brings or protects.³⁰ This is surely a *necessary* condition for an act to be anticompetitive. An act that does not have that property is indistinguishable from a straight-forward profit-maximizing act that would be seen under competition.

Note that the case of an act that is more restrictive than necessary is covered here. If a firm takes such an act, then the excessive restrictiveness would not maximize profits except for the monopoly rents involved.³¹

But is satisfaction of the italicized condition also *sufficient* to deem an act anticompetitive? I believe that it is, but to treat it as such requires some care and understanding.

David Evans and Richard Schmalensee (2002, pp. 26-28) have challenged this view. They cite as counter-examples the case of an innovation and the case of limit pricing. I believe they are incorrect.

Consider first the case of an innovation. As discussed above, I believe that the correct view of monopoly power (and therefore of monopoly rents) is the power to control price and exclude competitors by means *other than* “superior skill, foresight, and industry”, combining the two prongs of Hand’s test in *ALCOA*. If one does this, then the rents produced solely through innovation are the rewards to the innovative effort rather than monopoly rents for antitrust purposes.³²

The case of limit pricing is similar. Suppose that a firm with a monopoly position is faced with a potential entrant that has higher costs. The incumbent lowers its price to be just below the potential entrant’s costs and thus succeeds in preventing actual entry – “limit pricing” Then the remaining rents are not those of monopoly but those resulting from superior efficiency.

If one is careful in this way, then the italicized condition above can be taken as both necessary and sufficient for an act to be anticompetitive or predatory and hence as a definition of that property. Briefly:

³⁰ I use the term “monopoly rents” somewhat broadly here to mean rents brought about by market power.

³¹ In principle, there may be acts (or extra restrictions) that are costless to undertake, although it is not easy to think of realistic examples in which this is literally so. If there are, and they increase profits through the earning or maintaining of monopoly rents, then I mean to include such acts as anticompetitive.

³² Of course, innovations are often pursued in order to gain a patent. The resulting patent may confer market power on the innovator in excess of some suitable measure of the rewards to innovation. But the monopoly rents gained through a legitimate patent are given antitrust exemption, and patent pursuit (if not misused) should therefore not be condemned under the definition proposed.

A predatory act by a single firm is one that involves a deliberate sacrifice of profits in order to hamper competition and thereby obtain or maintain monopoly rents.

c. Using the Definition

The point of all this is that it is sometimes possible and useful to step back from a simple test and look directly to the definition to obtain the appropriate result. I give two examples:

(i) *Continental Airlines v. American Airlines*. The first of these is *Continental Airlines v. American Airlines* (cited and discussed above). There, American's own documents and analyses done by its staff showed repeatedly that American would lose substantial amounts of money if it priced as it eventually did. Demands for re-analysis kept coming down from senior management until the relatively young and inexperienced analysts came up with a finding that the plan would be profitable. That finding, however, quite literally rested on a methodology that implied American would make profits on routes it had no intention of flying. Never mind the endless disagreement over the nature of variable costs; that the action was predatory seems beyond dispute.³³

(ii) *United States v. Microsoft*. I turn now to the U.S. case against Microsoft, which I have already briefly mentioned in connection with my discussion of market share measurements and market power.³⁴ I discuss this at some length, beginning with a few words that are in order about the economics of computer operating systems.

1. For the most part, software applications written for one operating system will not run on other operating systems. To make them do so means essentially rewriting them, and this is quite expensive.
2. The writing of software applications has large economies of scale. Almost all the costs are in the writing, debugging, and documenting, while the production of additional copies costs practically nothing.
3. As a result, software-application writers have a great incentive to write applications (or at least to write them first) for the operating system that has the largest number of users.
4. But users want to have operating systems for which large numbers of applications written and for which one can be sure future applications will also be written.

³³ Apparently not to the Texas jury, however. This may have been due to the judge's ruling excluding the argument that American was trying to discipline the airline oligopoly, leaving it questionable what was to be monopolized by American on its own.

³⁴ See Fisher and Rubinfeld (2001) for a far more detailed analysis.

5. As a result, when one operating system gets ahead of its rivals (perhaps because it is better) and acquires more users, application writers will tend to write for it. This will make it more attractive to users which will, in turn, make it even more attractive to applications writers, and so forth.

This is what happened to Microsoft with Windows 95 (followed by Windows 98). It achieved monopoly power in operating systems for personal computers through this entirely natural phenomenon – the “applications barrier to entry” – in which rival operating systems and potential entrants were at a great disadvantage in their ability to attract software-application writers. Had Microsoft remained content with that and not taken further actions to maintain its monopoly power by preventing the weakening of the applications barrier to entry, there would probably have been no antitrust case.

Microsoft, however, did not remain so content. There arose two innovations that threatened the applications barrier to entry and hence Microsoft’s power in operating systems for PCs. The better known of these was the innovation and commercialization of the browser, principally by Netscape, and it is the actions concerning browsers that I shall discuss here.

Microsoft – having been slow to develop its own browser, Internet Explorer (“IE”) – was seriously worried about Netscape’s browser, Navigator. Navigator and other browsers which could be used by various operating systems, exposed application programming interfaces (“APIs”) as did operating systems themselves. These are software “hooks”, that permit applications writers to attach their software programs. In particular, browsers expose APIs for the running of Java “applets” that are involved in viewing websites.

Microsoft was concerned that as Netscape’s Navigator became more popular with PC-users desiring to browse the Internet, it would also become increasingly attractive to software writers. In time, this might mean that software applications would be written to run on Navigator rather than on the underlying operating system. This would weaken or destroy the applications barrier to entry by making computer users relatively indifferent to what operating system was being used by the browser. In Microsoft’s terminology, this would “commoditize” the operating system and weaken or destroy the source of Microsoft’s power.³⁵

Accordingly, after Netscape refused to accept a market-division arrangement proposed by Microsoft, Microsoft undertook a series of acts directed at “cutting off Netscape’s air supply”, as one Microsoft executive put it. These began by offering IE without charge and then putting considerable pressure on the distributors of browsers to offer it rather than Navigator. I focus on three acts.

³⁵ Microsoft was also concerned because Netscape promised to become a major carrier of Java – a development by Sun Microsystems that directly attacked the applications barrier by approaching a direct solution of the “porting” problem preventing applications that ran on one operating system from running on others. Microsoft also took anticompetitive actions against Java, but I shall not discuss those here.

1. The most important channel for the distribution of browsers consisted of the PC-manufacturers themselves. They placed both operating systems and browsers on the hard disk drives that came with their computers. Through its licensing conditions for Windows, Microsoft prevented such manufacturers from promoting any browsers other than IE³⁶, and required them to have IE on their disks. When IE reached technical parity with Navigator, this made it pointless and somewhat costly for PC-manufacturers to place Navigator on their disks.
2. The second most important channel of browser distribution was through Internet Service Providers (“ISPs”), including services such as America On Line (AOL). Such companies often shipped browsers to those of their subscribers who did not already have one. It was also the case that ISP’s often acquired subscribers through the latter signing up by using the Microsoft Desktop. When this happened, the ISP would pay a bounty to Microsoft. Microsoft now signed contracts with the ISP foregoing or reducing the bounty and being given valuable space on the Windows desktop provided that no more than 15% of the browsers shipped to subscribers by the ISP were other than Microsoft’s IE. (Note that this was 15% of *all* browsers shipped, not just 15% of browsers shipped to subscribers who signed up through Windows.)
3. Another very revealing action involved Microsoft’s agreements with Internet Content Providers (“ICPs”) such as The Walt Disney Company. For a time, Microsoft offered a “channel bar”, featuring certain ICPs, whose websites could then easily be reached by the computer user. (Microsoft mistakenly expected this to be very attractive to users.) Its contract with Disney (others had similar clauses) provided the following provision in exchange for being so featured: Disney, while it could also be featured on sites such as Navigator’s opening (“portal”) site, could not use its company logo or the Disney characters there, *and could not pay in money or kind to be so featured.*

At trial, Microsoft’s explanation for these acts as regarded ISPs and ICPs was that it was effectively advertising such companies and hence expected its product (IE) to be advertised by them. The trouble with that explanation was that Microsoft gave away IE free. Said one Microsoft email³⁷, “The browser is a no-revenue product”, but if we lose the browser wars we lose everything. Indeed, Microsoft not only gave away IE for free, it actually paid ISPs in kind (space on the desktop) or money (reduced bounties) to take it. When one realizes that IE costs millions of dollars to create, improve, and maintain, it is clear that something else other than advertising was going on here.

³⁶ Or other browsers – typically for children – that used the IE technology within a different “shell”. These, of course, did not threaten Microsoft’s position.

³⁷ Government Exhibit 39.

The most revealing of the actions (if not the most important), however, was that involving Internet Content Providers. Microsoft permitted Disney to be featured by Netscape, but it required that Netscape not be paid for so doing. That was an act in which Microsoft had no possible pro-competitive interest. Like the other acts, its only purpose was the hampering of competition in browsers and the preservation of the barrier to entry that protected Microsoft's power in operating systems. These were not acts that were profit-maximizing except for that effect.

d. Profitability and Profit Maximization. Moving away from the discussion of *Microsoft*, there remains one important point that requires discussion.

A predatory act requires a deliberate sacrifice of profits, justified only by recoupment from the resulting monopoly rents. In predatory pricing cases, using the Areeda-Turner test, this invariably is taken to mean a deliberate loss involving pricing below costs. But I strongly believe that, unless this is understood in the terms about to be discussed, such an interpretation is too narrow. This is because a "deliberate sacrifice of profits" can mean a deliberate voluntary departure from profit-maximizing behavior and pricing, *even if the firm and product remains profitable in an ordinary accounting sense.*

This is not, in fact, a different standard. Consider the example, discussed above, of a firm producing two products, A and B, whose proportions can be continuously varied. We saw that, in considering the variable cost of A, one should count reduction in the output of B as an input to the production of A with its cost measured by the opportunity cost incurred by not selling the foregone output of B. If we generalize from that example, then departure from profit-maximizing behavior incurs an opportunity cost. But opportunity costs are very real. When that cost is counted as such, then the firm will be seen to have engaged in unprofitable behavior.

This ought to count in deciding whether a firm has behaved anticompetitively, and should be so counted when applying the Areeda-Turner test. But, so far as I know, courts have so far not understood this proposition, making the application of that "bright-line" test at variance with sound economic analysis.

Alas, this is too often true of "bright-line" tests in general.

6. How Should Economic Witnesses Handle "Bright-Line" Tests

All this is well and good in theory. But economic expert witnesses live in a world in which "bright-line" tests are applied by courts and testimony that relates to such tests desired by attorneys. How should economists behave in such situations?

In general, I do not take a totally uncompromising position on this. What I favor doing differs depending on the test in question:

1. Market Definition. When asked to define a “relevant market”, I try to set out the principles discussed above. I then point out that the answer can generally only be approximate at best and is often not unique. However, the resolution of the ultimate question of power should be the same for any reasonably defined market. Moreover, the question of anticompetitive acts often does not turn on the market definition involved.
2. Market Share. Here, I am less willing to compromise. I take the position that share measurement can be suggestive of the presence or absence of power but that is as far as I am willing to go. Such evidence is therefore not irrelevant, but it should not be treated as dispositive, either.
3. Profits. In this case, I do take a totally uncompromising position and attempt to explain why profits evidence as generally used is wholly unreliable.
4. Anticompetitive Behavior. The Areeda-Turner test is a useful one and should not be ignored. The really hard job is to convince courts that it is not the end of all analysis. I continue to put forward the positions taken in this paper, but success is less than frequent.

In general, then, except in the case of profits evidence, the “bright-line” tests I have discussed are not wholly irrelevant. The economic expert witness should provide testimony as to their applicability in the case being tried while trying to see that they are applied with understanding. Beyond that, the expert should explain where the tests are not wholly satisfactory and what analysis should be applied. This is particularly important in the case of anticompetitive acts.

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