Antitrust and Information Technologies

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Introduction .................................................................................................................................... 1
Digital Technology and Market Power ......................................................................................... 4
Digital Technologies and Consumer Choice: Google Search .................................................. 15
Digitization, Cost Structure, and Collusion: the eBooks Antitrust Case ................................ 18
Net Neutrality ............................................................................................................................ 24
Antitrust and Patents in Information Technologies ................................................................. 27
  Standard Setting and FRAND Encumbered Patents ...................................................... 31
  Patent Pooling and Related Technology Sharing .......................................................... 33
Conclusion ................................................................................................................................. 38

Introduction

The relationship between antitrust policy and information was traditionally concerned with oral or written communications that had anticompetitive potential, mainly because they furthered collusion or market exclusion. Among the most difficult problems was interpreting the significance of communications that could be construed as either threats or offers to collude, or as facilitators of collusion. On the one hand, markets profit greatly from the free flow of information. On the other, particular uses of information threaten competition when they enable firms to coordinate price, output, or innovation.¹

Of course, explicit price fixing is a use of information, but so are various cartel facilitating practices that depend on publicizing one's price or output. As a result, the way information is communicated has been a factor in merger analysis, particularly when the fear is that the merger might

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facilitate collusion. Another recent example of this concern is the Libor antitrust litigation, which includes claims that banks used misreporting about interest rates as a device for manipulating them. United States courts have also confronted complaints that exchanges of wage and salary information were devices for either suppressing wages or else fixing them at an artificially high level. Such claims have arisen in numerous industries, ranging from petroleum geologists, to high technology Silicon Valley employees, to law professors.

Prior to the 1980s “information” in antitrust enforcement meant mainly the print media, radio, television, film, and audio recording. All were involved in antitrust disputes at one time or another, and the nature of the challenged practices ran the entire gamut of United States antitrust law—from vertical integration and exclusion in the 1948 Paramount Pictures case, to unilateral refusal to deal in Lorain Journal, to a series of newspaper mergers and the passage of the Newspaper Preservation Act in 1970 to protect newspaper production joint ventures. In the Times-Picayune decision the Supreme Court refused to condemn a government-challenged tying arrangement in the newspaper publishing industry, exonerating a New Orleans' newspaper' practice of requiring that the same classified advertisements be run in its morning and evening editions. Finally, the Broadcast Music decision rejected an antitrust challenge and in

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3 E.g., In re LIBOR-Based Financial Instruments Antitrust Litigation, 935 F.Supp.2d 666 (S.D.N.Y. 2013).
the process acknowledged the value of blanket copyright licenses for recorded music.\(^9\)

Information also has an important role to play in competition policy in the regulated industries, mainly because agencies depend on accurate information that is most typically supplied by the regulated firms. As a result, misreporting of one's own market position can serve to exclude a rival, or itself become a device for collusion.\(^10\) Or, in patent law, exaggerated claims about the validity or strength of one's own patents can become a potent exclusion device.\(^11\)

All of these issues concerning the relationship between competition policy and information remain very much with us today. Many are more important than ever, given the ubiquity of information and the speed at which it travels.

This article considers the relationship between competition policy and information technologies. Technological change can both facilitate and undermine the use of information to facilitate anticompetitive practices. The effects are heavily, although not exclusively, a result of digitization and the many products and processes that it enables. Further, the technologies of information account for a significant portion of the difficulties that antitrust law encounters when its addresses intellectual property rights. In addition, changes in the technologies of information affect the structures of certain products, in the process either increasing or decreasing the potential for competitive harm.\(^12\)

\(^10\) Kottle v. Northwest Kidney Centers, 146 F.3d 1056 (9th Cir. 1998) (\textit{Noerr-Pennington} immunity for health care provider that allegedly provided false information to authority in order to induce its refusal to permit another firm to enter the market).
Digital Technology and Market Power

The principal feature distinguishing antitrust from other legal controls of improper business conduct is that antitrust is concerned with practices that threaten the exercise of "market power," or the power to profit by reducing output below the competitive level, thereby increasing the price. If a firm without power reduces its output others will quickly make up the output loss and price will be unaffected. So in order to have market power a firm, of group of firms acting in concert, must generally be large enough to remove a sizeable share of output from the market.\(^\text{13}\) In addition, something must restrain rivals or potential rivals from either entering the market or increasing their own output.\(^\text{14}\) Fraud, consumer deception, and hard contract bargaining can all affect the price of a product, but they are not antitrust violations unless they threaten to increase or prolong market power. This market power requirement is essential to most antitrust analysis because so many practices such as technology sharing, tying arrangements, agreements to deal exclusively with a single firm, refusals to deal, or mergers, are socially benign or beneficial in competitive markets. For these practices market power is a necessary, although usually not a sufficient, condition for competitive harm.

Digital technology affects the way firms exercise market power, and it also imposes serious measurement difficulties. The digital revolution in product development and distribution has occurred in stages. The most extreme is "complete" digital distribution, where all of the content being shipped to the consumer is digital. Prior to that and continuing to this day,

\(^\text{13}\) See 2B Phillip E. AREEDA, & HERBERT HOVENKAMP, ANTITRUST LAW, Ch. 5 (4th ed. 2014).

\(^\text{14}\) Id., Ch. 4C (barriers to entry or competitor mobility).
music and some books and other media are distributed in formats such as digital compact disc (CD) or digital video disc (DVD). Although most of the direct user content in such formats is digital, it is still placed on a physical object, which is then packaged and distributed to consumers through traditional channels, including brick-and-mortar retailers and the mails. By contrast, complete digital distribution refers to markets such as downloaded songs and downloaded or streamed video content, including movies, games, and software, as well as electronic books. The entire consumer "package" is distributed purely electronically. Of course, taking advantage of digital content requires a device capable of reading and processing it, and a fair amount of litigation involves the devices as well, or restraints that tie the digital content to the devices.\(^{15}\)

One important consequence of complete product digitization is to affect the opportunities that firms have to exercise market power. Another is to change the size or shape of the markets in which firms operate. For example, the production and distribution of digital books or other media is so different from traditional production and distribution in these markets that most historical analogies fail us. eBooks compete everywhere that electronic transmission is available. Further, they can be transmitted anywhere at nearly no cost, and costs typically do not vary with transmission distance. This means that the "relevant antitrust market" in which competition occurs is at least nationwide and perhaps worldwide.\(^{16}\) As a result local retailers such as bookstores, who might have a certain amount of power in smaller communities, face increased competition even though no additional local retailers have entered.

These facts do not necessarily mean that traditional book sellers and ebook sellers operate in the same antitrust market, however. An antitrust market, or "relevant market," is one in which goods are not only substitutes for one another, but the competition of other sellers is sufficient that no single firm can increase its price significantly by reducing output.\(^{17}\) Each firm’s prices will then be held close to its costs. Determining this is


\(^{16}\)See, e.g., Lavoho, LLC v. Apple, Inc., ___ F.Supp.3d ___, 2014 WL 6791612 (S.D.N.Y. Dec. 3, 2014), in which the plaintiffs were small domestic sellers of eBooks who claimed injury by an Apple-orchestrated price fixing agreement and most-favored-nation (MFN) clause. The customers were foreign purchasers.

\(^{17}\)See 2B Areeda & Hovenkamp, Antitrust Law, *supra* note 13, ¶539.
particularly difficult when the two sellers have very different technologies of distribution, as is the case with traditional products and completely digital alternatives, even for the same title. For example, a traditional CD store may be able to compete effectively with downloaded music only when the latter is priced at a significant markup above its costs. If that is the case, then the completely digital music seller may have significant market power even when competing traditional sellers are present. The same thing is true of movies, which can be distributed through brick-and-mortar theaters, physical DVDs (either purchased in a store or rented through the mail), cable television, or internet streaming. A casual observer might see the very same consumers obtaining movies by all of these means, switching back and forth among them. But it would be premature to include that they are meaningful antitrust competitors unless the presence of one of them is sufficient to hold the prices of another reasonably close to cost. A few decisions have made this error.¹⁸

Competition generally drives prices toward short run marginal cost, which is the incremental cost of producing one additional unit. A pervasive problem in analyzing power in digital markets is that sellers typically have a very high ratio of fixed to variable costs. This entails that prices must be considerably above short run marginal cost in order to be profitable. Otherwise the firm will be unable to recover its fixed costs. For example, it might cost $10,000,000 to develop the code for Microsoft Office, but only $5.00 per disc to manufacture and distribute physical copies on a DVD. If Microsoft competed head to head with several makers of indistinguishable copies the price would be driven toward $5.00 and the firms would be unable to recover their large investment. If Microsoft streamed the program to users over broadband, distribution costs would fall to nearly zero.

As a result of these facts, many traditional measures of market power produce unacceptable false positives. One of these measures is the Lerner Index and other tools derived from it. Beginning with the observation that competition drives prices toward marginal cost, the Lerner Index assesses power by the ratio \((P-MC)/P\), where \(P\) equals the observed price and \(MC\) is the firm's short run marginal cost at that price. At a competitive price, which is equal to marginal cost, the index reads zero. As

¹⁸ See Cable Holdings of Ga., Inc., v. Home Video, Inc., 825 F.2d 1559, 1563 (11th Cir. 1987) (erroneously grouping into a single relevant market all movies: theatrical first- or subsequent-run, video rentals, and cable television); United States v. Syufy Enters., 712 F. Supp. 1386 (N.D. Cal. 1989), aff’d, 903 F.2d 659, 665 & n.9 (9th Cir. 1990) (similar).
market power increases the index value approaches one.\textsuperscript{19} Readings that approach one on the index indicate a high degree of market power. Significantly, however, the Lerner Index is completely indifferent to fixed costs. As a result, an all digital firm could be charging a price much higher than its marginal cost, thus showing significant power, but still be going bankrupt because it cannot recover its fixed costs.

The short-run marginal cost of digital delivery is typically very low, including any per use royalties that must be paid, as well as the trivial marginal cost of electronic transmission. For example, once the ebook or digital music file is in place, the cost of selling or streaming an additional copy is only a little above zero. So in complete digital distribution, where only the digital content passes from the seller to the buyer, the Lerner Index reading can create a false impression of substantial market power.

That naturally invites the question, if digital media are sold in competition with one another, then why is the price not zero or something very close? That answer lies in the twin effects of intellectual property protection—namely, per use royalties and product differentiation. A per use royalty is a variable cost that the seller incurs each time it sells a unit. As a result it is part of marginal cost. For example, if the author of an ebook is entitled to one dollar on each copy sold, then the price must be at least one dollar. By contrast, lump sum royalties, which are a single royalty on a product over its entire commercial life, do not show up in marginal costs. For example, if I sell a story to a digital magazine for $2000, and that is my only revenue expectation from this story, then that $2000 is a fixed cost to the magazine and does not affect marginal costs: it pays no more in royalties when it sells an additional copy. That is also the case for many academic authors, who may not receive any royalty at all for their scientific or technical articles. Once again the marginal cost of electronic distribution is practically zero.

Nonetheless, articles in digitized academic journals for which the authors receive no royalties are hardly priced at zero. In fact, they can be very expensive.\textsuperscript{20} This is true because intellectual property rights also

create product differentiation, which blunts the impact of competition quite considerably, even when there are no royalties. For example, Amazon at this writing (Feb., 2015) lists more than 40 Kindle electronic Italian cookbooks, ranging in price from zero to $25.00. Books that are still under copyright cannot be precise copies of one another. Unless licensed, the second of two identical books would infringe the copyright on the first. To the extent they differ, however, customers have preferences for one over another and this permits prices at above cost even though the market has multiple competitors.21

The impact of legally enforceable copyright protection is evidenced by the market for complete digital distribution of books for which the copyright has expired. Typically, these are books that were originally copyrighted in the United States before 1923. Entry into the public domain not only makes royalties unnecessary, but it also permits head-to-head competition between undifferentiated versions of a product. For example, the above referenced Italian cookbook on Amazon.com with a price of zero was published in 1919, so it is in the public domain.22 The price of public domain famous books, such as a fully digital edition of Moby Dick (originally published in 1851) is also zero on several websites, including Amazon, Gutenberg, Google Books (several editions), and Hathitrust (also several editions). In this case no license fee need be paid and different sellers can offer identical text without fear of copyright infringement. Moby Dick is also sold in unlicensed, public domain hard copy editions in stores such as Barnes & Noble. There the price is positive, however,23 reflecting the positive costs of individual book production and distribution. Finally, one element of product differentiation that can produce positive prices even on public domain digital content is format specificity. If an electronic file


format is specific to a device, then a firm may be able to charge a positive price to owners of that device.\textsuperscript{24}

When market power is measured by traditional antitrust tools, firms with high fixed costs appear to have significant amounts of market power. This problem is not limited to the Lerner Index. None of the antitrust tools for assessing power is particularly sensitive to the presence of fixed costs. Even traditional product and geographic market definition considers how firms respond to greater or lesser competition within a certain product or geographic range, and over a relatively short period of time. For example, a court might assess an antitrust market by considering the price responses that occur when a new pizza restaurant comes into a community that previously had only one, or the amount by which one firm lowers its price in response to a perceived competitor's price cut. But these short run responses generally assume fixed cost assets that are already in place, so most of the response, such as lowering one's price when new entry occurs, consider mainly variable costs. Previous investment in such things as R&D is not calculated.\textsuperscript{25}

To be sure, antitrust should not draw an inference of substantial market power unless returns over a fairly long run are excessive. Often purely digital products are sold in competitive, product differentiated markets. For example, the market for "apps" for electronic calculators or notepads that can run on a device such as an iPad often shows competition among numerous suppliers. These markets are simultaneously competitive but may also exhibit high price-cost margins if only the short run is considered.\textsuperscript{26} Product differentiation largely explains prices above marginal cost as well as differences in pricing.

\textsuperscript{24} See the discussion of standard setting, infra, text at notes 79–86.

\textsuperscript{25} The Government's 2010 Horizontal Merger Guidelines account for this by distinguishing "rapid entrants" in response to a price increase from other entrants. An entrant is "rapid" if it need not incur significant sunk or fixed costs in order to migrate into the price-affected market. See U.S. Department of Justice and Federal Trade Commission, Horizontal Merger Guidelines §5.1, (Aug. 19, 2010), available at http://www.justice.gov/atr/public/guidelines/hmg-2010.html.

At the same time, a single firm’s inability to earn high returns over the long run does not preclude the exercise of market power either. It does mean, however, that market power must be exercised collaboratively rather than unilaterally. For example, a combination of high fixed costs plus low variable costs, as in the "app" example, creates inducements for price fixing or in some cases for market division, which occurs when two or more sellers are able to slice the market into pieces, giving each seller an exclusive right in each piece. Both price fixing and market division can serve to reduce market wide output and increase the prices of the product in question.  

That proposition is inconsistent with absence of market power. If a cartel of firms lacking any power attempted to raise price (such as a group of 10 tomato growers in a market of 10,000) they would simply lose all their sales.  

While high fixed costs might serve to explain why a cartel occurs, they certainly do not justify it. One reason is that product differentiation is typically sufficient to produce above cost returns even when fixed costs are high. The real concern is markets with high fixed costs whose output cannot be differentiated.  

Another reason for not tolerating price fixing in markets with high fixed costs is that colluding firms will charge the monopoly (or cartel) price, not the minimum profitable price. The full monopoly price in a market could be much higher than the minimum price necessary to sustain production, and thus represents a significant wealth transfer away from consumers, as well as inefficiency.  

Naked price fixing and market division can be condemned under antitrust’s per se rule without an inquiry into market power. That still leaves the problem of unilateral conduct or collaborative activities that have efficiency-creating potential and are traditionally assessed under the rule of reason. This requires an assessment of market power, whether or not it is difficult to accomplish.  

In its recent Actavis decision, which involved competition between name brand and generic pharmaceutical drugs, the United States Supreme Court held that market power could be inferred from a large "pay for delay" settlement from a branded drug maker to a generic. Under that agreement the generic firm would stay out of the market for a specified term in  

exchange for the pioneer's payment, often in the hundreds of millions of dollars.\textsuperscript{28} The high pay-for-delay settlement indicates power because it shows that the payer has volume and margins that are worth protecting. To be sure, the payer's output may reflect the power of a valid patent, but one should not confuse the patent validity question with the power question. Further, even if a patent is perfectly valid, a horizontal price fixing or market division agreement is not justified for the same reason noted above - - that is, it tends to equate the value of the patent with the full monopoly or cartel value of the market.\textsuperscript{29}

As \textit{Actavis} suggests, in some cases one can estimate market power from behavior, and these estimates can be more reliable than estimates taken from information about price-cost relationships.\textsuperscript{30} Just as digital technology, pharmaceuticals are a market where high price-cost margins are poor indicators of power because they do not pick up development costs, which are significant, but are incurred up front, mainly prior to production. Production costs are low and margins are consequently very high. As a result when a chemically identical generic competitor enters the market prices drop, often dramatically.\textsuperscript{31} These differences between price and short run cost are not as extreme as for purely digital technologies, but they are substantial nonetheless.

An important message of \textit{Actavis}, however, is that market power can be inferred from other criteria than market definition or price-cost relationships in circumstances where this evidence is not very helpful. Behaviors such as large payments to keep someone out of one’s market are rational acts only on the premise that a firm has significant power.\textsuperscript{32} Courts should look more closely at these nontraditional mechanisms for evaluating power, including the ability to impose onerous terms on others.

\textsuperscript{28} FTC v. Actavis, Inc., 133 S.Ct. 2223, 2236 (2013).
Another common feature of digital markets is networks, which also create complexities for assessing market power. Networked markets are frequently “two-sided,” or multi-sided. This means that transactions move along more than a single avenue between buyers and the seller. The seller in a two-sided market faces two or more groups of buyers that can either compete with or complement one another.\(^{33}\)

For example, credit card companies must compete for both merchant acceptance and card users, and a practice that enlarges one side might either enlarge or diminish the other side. Too high a price to merchants will reduce their number, and this in turn will make the card less valuable to users. As a result, in order to determine the optimal price to merchants the card issuer must consider the impact on card users as well. Subscription magazines also earn revenue from both subscribers and advertisers. The advertisers are willing to pay more as the subscription audience is larger, and these higher payments reduce the magazine's revenue needs from consumers. For their part, consumers might welcome lower magazine prices but also might resist excessive advertising. In order to earn a profit the magazine must optimize across these two groups together.\(^{34}\) In some cases the optimal price to one group is zero.\(^{35}\) For example, in traditional television antenna markets as well as nonsatellite AM and FM radio, consumers watch or listen for free and the stations earn their revenue from advertisers. A bigger audience increases advertising revenue, but at least some members of the audience may switch channels if they hear more advertising than they want. A similar situation occurs in large internet search engines, such as Google search, which is largely free to users but financed by advertising.\(^{36}\)

Multi-sided markets are a common feature of digital networks. A variety of digital websites such as news magazines, music servers, and some


games are free to users and supported by advertising. Or in some cases, including Spotify or Pandora, they come in both a free version that is largely advertising supported, but also a premium version for which the users pay but the advertising has either been removed or severely limited. Looking only at the listener market one might see a form of price discrimination intended to capture both high demand premium and low demand free customers. But price discrimination involves selling at different ratios of price to cost, and before we can measure these ratios we must know the revenue from both customer use and advertising. Conceivably, although unlikely, the platform operator is earning more from its "free" advertising-supported customers than from its paid customers.

Measuring market power in multi-sided markets poses special difficulties because of "feedback" effects that occur when a price change in one side affects size and revenue on a different side. Looking at one side alone, there is no necessary relationship between price and marginal cost and even a consumer price of zero may be a component in a perfectly rational and competitive business strategy. Assessing market power often requires looking at all sides of the market together. For example, it would be incorrect to conclude that an advertising-sponsored internet music site lacked power because its price to subscribers is zero. It would also be incorrect to conclude that a magazine has substantial market power because a significant change in the subscription price would not lead to a profit-defeating reduction in subscribers. The loss of revenue from subscribers would have to added to any loss of advertising revenue that results from a lower subscription base.

Market multi-sidedness can make traditional market share measures much less valuable as well. For example, by charging a price of zero a seller might acquire an enormous share of the audience market for its particular product. But its share of the advertising market in which it actually earns its revenue might be very small. Further, the advertising market and the audience market might have very different boundaries. For example, a magazine about sports fishing might appeal mainly to people whose hobby is fishing, but it might attract advertisers from a number of different markets that do not compete with one another, including fishing equipment, travel agencies, airlines, resort rentals, boats, outdoor clothing, clothing.

37 E.g., Wallace v. IBM Corp., 467 F.3d 1104 (7th Cir. 2006) (not unlawful predatory pricing for IBM to charge a price of zero for its open source operating system when attached to computer hardware).
38 Rochet & Tirole, supra note 34.
and the like. These advertisers might advertise in a wide variety of markets related to sports and leisure but hardly limited to fishing.

These problems are further exacerbated by the fact that in most multi-sided platform markets fixed costs are very high, limiting the use of price-cost margins to assess power. These complexities have led to the criticism that often antitrust agencies simply ignore multi-sidedness and consider power by focusing their attention excessively or exclusively on one side of the market alone. Countering that is the fact that whether a practice is unreasonably exclusionary is often a consequence of market share, or dominance, and a firm that is dominant in one side of a multi-sided market can often exclude rivals anticompetitively.

All of these factors serve as a warning that assessment of market power is extremely difficult in markets characterized by very low variable costs, intellectual property rights, networking, multi-sidedness, or some combination of these things. Not uncommonly, networked digital markets exhibit all of them. Power evaluations in these situations are at significant risk of false positives or false negatives if the market is not fully understood. Further, answers may differ depending on the question being asked. For example, suppose that there are twenty note taking "apps" available for the iPad or other Apple device. Each one of these, assuming it is not free, sells at a price considerably above short run marginal cost. This latter fact, standing alone, should not serve to establish a monopoly power requirement for an exclusionary practice. We also need to determine just how the defendant app manufacturer's practice will result in market wide (as opposed to individual) exclusion, as well as the likelihood that such exclusion will occur. At the same time, however, we need not hesitate to condemn price fixing or naked market division among these same manufacturers.

Finally, as noted previously, in purely digital markets intellectual property rights are almost always crucial to the ability to exercise significant market power. The principal IP right that is relevant here is copyright, although trademark rights and occasionally patents may have importance as well. Once a book such as Moby Dick enters the public

domain it can be very cheaply copied and digitization reduces the costs to practically nothing. As a result even explicit price fixing is not likely to maintain prices above cost for extended periods. If an anticompetitive restraint should occur, it would not be in the public domain product itself, although it could be in the hardware or infrastructure that are necessary for distributing such content. What makes collusion in digital media profitable is copyright protection, which permits cartel members to charge a higher price without losing excessive sales to outsiders.

These observations should serve to highlight one feature of digital markets that has been the focus of most antitrust litigation -- namely, the "product" that consumers want is frequently only the tail, while the delivery device is the dog. For example, the major bottlenecks in the eBook and eMusic industries have not been the books or songs themselves, which are rarely capable of being monopolized, but rather technological constraints on reading or listening devices and the file formats that they run. Thus in the ongoing Apple iTunes litigation the plaintiffs claim that Apple strategically manipulated hardware configurations and file formats in order to maintain incompatibility with non-Apple systems, thus locking customers into a single technology and set of Apple devices. In these situations the enemy of competition is incompatibility, or lack of portability, across platforms. The discussion below of antitrust policy and Google Search illustrates the importance, sometimes unappreciated, of portability.

Digital Technologies and Consumer Choice: Google Search

The other side of the market power coin is consumer choice. One consequence of the simultaneous revolutions in telecommunications and digital technology is that consumers have never faced a wider array of choices, and the cost of switching among alternative products has never been lower. 

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40 Apple iPod iTunes Antitrust Litigation, 2014 WL 4809288 (N.D.Cal. Sept. 26, 2014). At this writing the case has been tried and resulted in a jury verdict for defendant apple.
Here an important factor is the degree of dependence between dedicated hardware and compatible digital choices.\textsuperscript{42} While purely digital systems are or can be made to be highly portable across different platforms, hardware is often much less so. As an example, consider the differences between the Microsoft/Windows cases of more than a decade ago\textsuperscript{43} and the Google search case, now likely concluded in the USA but ongoing in Europe. Microsoft was able to exploit a high degree of dedication between computer hardware—so called “IBM-compatible” or Intel-based computer stations—and the Windows operating systems. A business that operated 300 Windows computers could switch to the Apple operating system only by switching out its computers. This would be extraordinarily costly, not only for the computers themselves but also for the training of employees, the replacement of a great deal of application software, and so on.

The Google Search cases presents a sharp contrast. The U.S. and EU investigations into Google Search should be regarded skeptically, notwithstanding Google’s high search market share in Europe. Most search engines are multi-platform products that run equally well on all of the most popular platforms, which include Windows, Apple, and Android devices. To be sure, Google may be the default, or preinstalled search engine on Android mobile phones as well as some others, but it is only the default and consumers are generally able to install alternative search engines. Microsoft makes its own search engine, Bing, which is generally the default search engine accompanying Microsoft operating systems. The story for desktop and laptop computers is even simpler from the consumers’ perspective. Any of the more popular search engines, of which there are many, can be installed almost instantaneously and at no charge. Not uncommonly, computer users have several search engines available. Any time they are unhappy with the results of one engine’s search they can turn to another one.


Here, high market share should not be confused with monopoly. The latter requires the ability to hold prices above the competitive level or provide an inferior service even while retaining one’s own dominant market share. As a result competition policy makers should be wary of technological locks that make it difficult for consumers to switch to a different search engine. Having done that, the concern about the content of a particular search becomes far less important.

To be sure, deception is a problem. Most deception has nothing to do with monopoly, however, and is best addressed by consumer protection or tort law. Durable monopoly requires that consumers be paying too much (or obtaining too little) but are helpless to do anything about it. By contrast, the best cure for deception is to enjoin or penalize it. For example, there is far less reason for concern about a Google search result that favors its own asset, such as YouTube, a Google subsidiary—if (1) searchers are informed about the bias and (2) have easy access to alternative search engines. If Google persistently favored its own assets in a way that harmed consumers they can readily and without cost switch to a different search engine. The best way to address this problem is informational: requiring Google to inform consumers when favored sites are located more prominently in search results, with "favored" meaning either assets that Google owns or where Google has accepted compensation for high placement. Beyond that, management of search algorithms is best left to the market.

This suggests that the competition law authorities should focus on ensuring that every platform from which search engines are launched, including mobile platforms, have adequate alternatives available to which reasonably well informed customers can easily switch. If a more forceful behavioral approach is called for, managing the default is a much simpler solution than managing the search algorithm. Further, as one episode suggests, it is likely to be effective. Early in 2015 Firefox, the third most popular web browser worldwide and in the United States, 44 shifted its default search engine from Google to Yahoo. Soon after Google’s share of all U.S. search dropped from 77.3% to 75.2%, while Yahoo’s increased from 8.6% to 10.6 percent. Interestingly, Microsoft Bing, which was not involved in the change of default search engine, was unaffected. 45 Looking

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44 Ongoing statistics on browser market share are available from *StatCounter Global Stats, available at statcounter.com.*

only at Firefox users, Google’s share of search fell from 86.1% to 60.8%, while Yahoo’s increased from 7.5% to 32.2%. These data suggest that the choice of a default search engine can have an impact on market share, although at this writing it is too early to say how significant or durable these changes will be. Managing search engine defaults would be a far more tractable approach to this competition problem than any attempt to micromanage the Google search algorithm, which will almost certainly require ongoing supervision, effectively turning Google search into a public utility. For example, a simple order could prevent devices from being sold with a default search engine, but instead upon initial opening go to a screen that permits the user to select a default.

Of course, as one journalist pointed out, customers who use Firefox browser with Yahoo as the default search engine can always switch back, and some of them have.\(^46\) Nevertheless, the market share response to a switch in the default search engine means a great deal for competition policy analysis. If Google is in fact a monopolist why would someone switch back to it? Assuming that they are not constrained to do so, the explanation is that they prefer Google search for some reason.

Digitization, Cost Structure, and Collusion: the eBooks Antitrust Case

The eBooks antitrust case is a challenge to collusive behavior born in the United States, but which later expanded to Europe and elsewhere. Apple facilitated the creation of a cartel of book publishers that not only increased the price of electronic books\(^47\) but also imposed pricing rules in the form of most favored nation clauses on Apple’s competitor Amazon. A most-favored nation clause (MFN) is a provision in a contract that requires

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a dealer to charge at least as high a price, or in some cases a higher price, to rivals as are charged to the contract buyer. At this writing the case is on appeal to the Second Circuit.48

The technology of ebooks is currently transforming the book market, with implications that go far beyond this particular price fixing agreement. Most significantly, ebooks are rapidly changing the cost structure of the industry from one that had a nontrivial fixed cost component and relatively high variable costs to one in which nearly all the costs other than royalties and trivial distribution costs are fixed.

For traditional publishing fixed costs generally refer to the costs of manuscript acquisitions, editorial staff, typesetting and at least some marketing. Variable costs include paper and other stock, printing, cutting, binding, inventory, shipping, and of course retailer carrying costs.49 The publishing market was never particularly problematic for antitrust enforcers. The market contained numerous small publishers and only rarely had a dominant firm. The sheer number of sellers as well as the extent of product differentiation served to limit the opportunities for collusion. The one exception was local readership newspapers, which could acquire a dominant position in their geographic markets.50

The book industry does have a long history of resale price maintenance. In the United States it actually dates back to 1908, before the antitrust laws were even applied to resale price maintenance. In the Bobbs-Merrill decision the Supreme Court refused to enforce a price maintenance clause in a copyright license agreement.51 However, the vehicle was not competition policy but rather copyright law's "first-sale" doctrine. The British "Net Book Agreement," which largely prevented discounting of books below the publisher's announced price, was another example.52 Today

50 E.g., Lorain Journal Co. v. United States, 342 U.S. 143 (1951).
most resale price maintenance is once again legal in the United States, although the EU and Canada deal with it more harshly.

The eBook has drastically changed the cost structure of the book publishing market. Acquisition, editing costs and royalties are still variable, but editing has become less expensive in the age of computers. Once a book has been typeset into an electronic file most fixed costs except for advertising and promotion are spent. Further, while advertising might be considered a variable cost for some purposes, it is not a cost that is attached to each individual unit sold. In fact, the advertising accompanying an ebook is itself digitized. Inventory does not need to be maintained, other than the obligation to keep a master copy of the digital file. A virtually infinite number of copies can be made, all at the trivial cost of electronic transmission.

This change in cost structure is having remarkable effects on the book market, many of which are not yet realized. First, as the Apple eBooks case illustrates, it increases the incentive to collude. This is true of many industries with high fixed costs. Competition tends to drive prices to variable, or marginal, cost without enough remaining to cover fixed costs. Offsetting this in the book industry is product differentiation: each title is unique, very likely giving publishers at least some pricing discretion.

The dramatic rise of the ebook has cut enormously into the sales of traditional brick-and-mortar bookstores, as well as national distribution of physical hard- and soft- copy books. Eventually it may even threaten the existence of any book retailer who is independent of the publisher, including giants such as Apple and Amazon.com. While Apple's 30% markup has been widely noted, actual markups vary from something less than that amount, to more than 100% for independently published books. These markups seem very high in relation to services rendered. eBooks need not be inventoried and there is little concern about returns or losses. As a result, risk is minimal. Most of the relevant publication and promotional information is in electronic form and is supplied by the publisher in any event. To be sure the major retailers such as Amazon and Apple offer a format for reading the book file, but the format market is


competitive and new ones are being introduced all the time. Many of the larger commercial publishers, such as Penguin Random House, Hachette, Harper Collins, Simon & Schuster, Macmillan, Harlequin, and also the quasi-commercial university presses, such as Oxford, Harvard, and Cambridge produce ebooks in a variety of formats. Others, such as Penn Press, tend to favor direct distribution intended for more generic readers, such as Adobe Digital Editions or Bluefire Reader. Public domain ebooks, such as those published before 1923 in the United States, are available in an even wider variety of file formats.

We may well see the day when the dealer intermediary in the book market becomes superfluous. In order to survive, intermediaries such as Amazon or Apple will have to be able to provide sufficient value to publishers to make them the best choice. Alternatively, they may try to take advantage of market restraints, such technological incompatibilities or technology ties with their devices. These restraints might serve to delay migration to more efficient distribution methods, but probably not indefinitely.

There is no good technological or business reason that ebooks cannot be distributed directly by the publishers to an internet site, or perhaps by consortia of publishers. Indeed, we may see the emergence of a system roughly equivalent to the “blanket license” that governs the distribution of recorded music over radio stations or other media. That is, authors’ books would be digitized and then placed by nonexclusive license into a massive database accessed by a website. Readers could then pay for and download individual titles, which they could then preserve themselves or else have maintained for them on a cloud service operated by the website. Any number of file formats could be offered. The transaction costs of operating such a system would be very low.

While some observers of the book business see a monopoly equilibrium favoring giant intermediaries such as Amazon, the history of

industrial organization and antitrust strongly suggests the contrary. Two powerful evolutionary, output increasing phenomena are relevant here: vertical integration and coalescence around a standard.

Firms integrate vertically when it is profitable, and the main sources of profit are elimination of costly market transactions, production cost savings that accrue when a firm performs successive steps itself, and avoidance of monopoly or cartel pricing in either an upstream or a downstream market. For example, oil refiners fearful of collusion among gasoline stations may respond by distributing gasoline directly through wholly-owned stations.

In the eBook industry Amazon’s markups, assuming they are in excess of distribution costs, provide a classic opportunity for vertical integration. One attribute of digital distribution is that the costs of vertical integration are very low, certainly much lower than the cost of building a nationwide network of gasoline stations or retail stores. To the extent intermediaries such as Amazon or Apple are charging too high a price for distribution services, one would expect publishers to integrate vertically into distribution. Both authors/artists and consumers would benefit.

To be sure, traditional book sellers often supply important point-of-sale information in addition to the books themselves. For example, a well informed employee in a high quality bookshop could be a treasure trove of information. But that particular informational service has been greatly eclipsed by a proliferation of online sources, including both professional and readers' book reviews.

As to coalescence around a single standard, one can assume that most readers want their books conveniently accessible, which means that


they can be accessed and stored on a single reader. Incompatible device or file formats can frustrate this, and part of Amazon’s success is that it has been able to provide a one-stop shop for people’s reading, as well as the largest bookstore, at least for books that are still under copyright. Even here, however, it has had to make some concessions. For example, it has never been able to attain a significant position in the device market, and just as people want their reading in one place they also want other types of computer activities in one place as well. So Amazon offers free Kindle reader apps for iPhones and iPads, as well as Microsoft-based and Android devices other than Kindle. Apple’s real claim to control is its proprietary software and eBook format. Under it, a reader’s books are freely transportable to Kindle applications on other devices, but they are not so easily transportable to non-Kindle devices.

The biggest bottleneck to efficient eBook distribution is proprietary standards. While file formats are protected by copyright and perhaps some patents, a wide variety of them are available. The history of most technologies is that for an initial period a great deal of incompatibility exists as each seller attempts to market its own preferred format or distribution system. In the early days of the automobile cars burned many types of fuels, and the early days of videotapes saw a standards war between Sony Betamax and VHS. Later came high density digital video, with a competitive fight between Blu-Ray and HD DVD. But these multiple standards are inefficient and as the industry matures unification is likely. Today a large number of publishers and manufacturers of electronic readers have coalesced around the EPUB file format. Amazon's Kindle files and devices are largely incompatible with EPUB, although some workarounds are available.

Movement towards a single standard is likely to happen in the ebook market as well. The internet and device market will develop readers that will cover the new standard and enable consumers to maintain a single electronic library for books procured from different sources. Whether firms like Amazon or Apple will be able to hold out by offering unique features,

56 See Bohannan & Hovenkamp, Creation Without Restraint, supra, note 51 at 357–361 (recounting development of unified standards).
57 See http://idpf.org/epub.
58 See http://fire.wonderhowto.com/how-to/add-any-ebook-format-your-kindle-fire-hdx-0156913/.
is difficult to say, but I venture a prediction that in the long run theirs will be a losing battle. In particular, why should a large publishing house continue to pay Amazon a significant commission when it can self-distribute for much less?

Net Neutrality

Insofar as antitrust policy is concerned, internet neutrality, or "net neutrality," presents problems in vertical integration and pricing, including price discrimination. In the United States these practices violate the antitrust laws only infrequently, although they are certainly relevant in merger cases and potentially relevant to the law of tying arrangements or exclusive contracting. EU law sweeps more broadly and the European Parliament has recently imposed significant limitations on the power of providers to discriminate between types of offerings.60

The term net "neutrality" is hardly self-defining. For some people "neutrality" means charging everyone the same periodic price, such as 40 dollars per month, no matter how much they use and what the speed. For others, neutrality means charging people in proportion to use, asking higher volume or higher speed users to pay more. Some look at whether different content suppliers, as opposed to viewers, can obtain more bandwidth by paying more. Some look at whether, certain providers are being excluded altogether, for either economic or noneconomic reasons. The questions are all complicated by the fact that internet access is a two sided market, in which providers obtain revenues from both consumers and providers.

One issue that dominates the larger debate over net neutrality is that the internet has for all practical purposes become a public highway, reaching deep into people’s daily lives. As a result, concerns analogous to the “universal services” concerns of public utility policy cannot be ignored, and these may justify subsidizing certain portions of the market. Fundamentally, however, these are not antitrust concerns, and antitrust law does not have good tools for addressing them. To the extent they are important, however, a case can be made for government regulation of access and prices that goes beyond antitrust.

60 Recent activity is summarized at https://ec.europa.eu/digital-agenda/en/eu-actions.
The discussion here is limited to antitrust policy, which focuses on competitive concerns that might result from lack of net neutrality. As an antitrust matter, the concern over internet distribution is with maintaining competition, which means a state of affairs that maximizes overall output and that does not unreasonably exclude.

Under United States antitrust law net neutrality issues can become an antitrust problem when a vertically integrated firm excludes programming that competes with its own assets. For example, Comcast Cable, an internet service provider, also owns NBC, a large distributor of programming, including movies. If Comcast attempted to reduce competition with NBC by placing limits on Netflix, a major streamer of movies and television programming, that could certainly raise antitrust issues. Such problems are customarily dealt with preemptively under the law of vertical mergers; or as exclusive contracting or refusal to deal if no merger is under consideration.61

Pricing is a different matter, and would not frequently present an antitrust problem. First of all, per unit pricing is actually the norm in roughly similar technologies, including telephony, electricity, natural gas, and the like. Second, price discrimination that is unrelated to exclusion of a competitor is usually efficient and is a virtually inherent feature in public utility policy.62 As a result, differential pricing to either users or content providers rarely raises antitrust issues unless the pricing is designed in such a way as to exclude a rival or limit its competitive effectiveness. As noted previously, society may wish to mandate a particular price discrimination rule in order to meet an articulated universal service obligation, but this would not be an antitrust rule. At this writing the Federal Communications Commission is considering classifying the internet as a common carrier, giving it a set of regulatory power analogous to other public utilities.63

Antitrust may also have a role to play when older technologies that have an entrenched position confront new technologies, including internet

63 FCC vote schedule for Feb. 26, 2015 (monitor).
technologies. The concerns have been raised with respect to the proposed mergers between Comcast Cable and Time-Warner cable, and also of AT&T and DirecTV, a satellite provider. These mergers involve both old technology cable companies and relatively new technology internet service providers (ISPs). Traditional hard wired cable television delivered with scheduled programs into users' homes is increasingly being displaced by internet "on demand" programming. The switch away from cable is particularly prominent among younger views. At this writing the market is in flux. In January, 2015, ESPN/Dish Network announced a standalone internet streaming that will permit people with broadband to receive channels on the internet directly. This move will almost certainly hasten the migration away from traditional cable toward internet based television services.

One potential concern about large cable television mergers is restraints on innovation—in this case, that companies will limit the migration of consumers from traditional cable to internet programming. The rationale is not difficult to discern: the internet is, or can be made to be, both more efficient and more competitive. The fear, expressed in Netflix’s forceful opposition to the Comcast merger, is that cable television companies will either cap internet bandwidth or price it out in a way that makes Netflix and other internet content streamers more costly. The issue is complex. On the one hand, the cable companies may not obtain as much revenue from internet data streaming as they do from carrying programs themselves. On the other side, consumers typically pay an extra fee for their internet access, and sometimes this fee is quite large in relation to the bandwidth that they obtain.

In the United States several cable companies offer broadband internet services, but they have generally been laggards in the move toward greater internet bandwidths. Google and AT&T are now both installing

64 Both mergers are scheduled for initial government decision in early 2015 (monitor).
67 “Netflix Opposes Comcast’s Merger with Time Warner Cable, Calls it Anticompetitive,” WASHINGTON POST, April 21, 2014.
ultra high speed internet in many communities. However, this internet is typically not tied to a cable television company at all, although it may be bundled with satellite television.

The situation is somewhat precarious for the cable companies, because the movement away from traditional cable is well underway. The range and robustness of alternatives is growing larger by the day. Depending on available alternatives, viewers faced with limitations on internet speed or access offered by a cable company may simply drop cable altogether and make a different deal for internet service provision. That is increasingly an option in many communities. Nevertheless, large cable companies continue to have a dominant market share in many areas, and by and large they earn more revenue from traditional cable than they do from internet access.

In most cases these problems must be addressed by regulatory alternatives other than antitrust. Even a monopolist can generally charge any price or regulate the quality of its output, provided that it does so unilaterally and does not unreasonably exclude rivals. While cable companies may be holding back on internet speed, that fact alone is not an antitrust violation. By contrast, a merger between a cable television provider and an existing broadband company could prove anticompetitive if it threatened to restrain innovation in the broadband market, and holding back on otherwise available higher speeds could certainly qualify, provided that other market conditions for competitive harm were present. The 2010 Federal Horizontal Merger Guidelines discuss such possibilities in a section covering mergers that limit “innovation and product variety.”

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68 U. S. Dep’t of Justice & FTC, Horizontal Merger Guidelines §6.4 (2010), available at http://www.justice.gov/atr/public/guidelines/hmg-2010.html. The 2010 Guidelines also state in the opening section that “[a] merger enhances market power if it is likely to encourage one or more firms to raise price, reduce output, diminish innovation, or otherwise harm customers as a result of diminished competitive constraints or incentives.” Id. §1. See 4 PHILLIP E. AREEDA & HERBERT HOVENKAMP, ANTITRUST LAW ¶900.1c (2015 Supp.).
Today the patent system is subjected to frequent criticism that it is not working, that far too many patents are issued, and that discerning their validity and scope is extremely costly and produces uncertain results. These critiques are hardly new and some of them were asserted more than a century ago, even by Supreme Court Justices. The concerns are not evenly arrayed across all industries, however. In some markets, such as chemical production and pioneer pharmaceuticals, the patent system works relatively well. In others, including electronics, software and most information technologies, it works very poorly.

In information technologies the more controversial patent/competition issues concern standard setting, FRAND royalty obligations, the right to an injunction on FRAND-encumbered patents, software and business method patents, as well as issues related to cross licensing or package licensing. These issues often arise in technologies relating to the creation, formatting, dissemination, and consumption of digital information. One important reason is the crucial importance of networking in information technologies, which demands interoperability, and thus technological compatibility, among the devices and programs of different competitors.

The extent to which these problems should be addressed by antitrust law in addition to or instead of patent law has been controversial. To begin with, it is not the purpose of antitrust law to repair defects in other federal government regulatory systems, including the patent system. For most abuses the patent system itself is quite able to keep its house in order. Questions about patent validity, scope, and infringement are all governed by the Patent Act, as well as most questions about improper litigation

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69 E.g., BOHANNAN & HOVENKAMP, CREATION WITHOUT RESTRAINT, supra note 51, Chs. 4–5; JAMES BESSEN & MICHAEL J. MEURER, PATENT FAILURE: HOW JUDGES, BUREAUCRATS, AND LAWYERS PUT INNOVATORS AT RISK (2008).
70 David J. Brewer (Justice), The Patent System, 3 Yale L.J. 149 (1894). See HOVENKAMP, OPENING OF AMERICAN LAW, supra note 55, Ch. 10.
72 See discussion infra, text at notes 80–87.
conduct. Questions about entitlement to an injunction for patent infringement, or the mechanism for computing royalties, are also fundamentally about patent law or even contract law, but not antitrust.

On the other hand, the patent system does not have satisfactory tools for permitting consumer or end user challenges to harmful patent practices. Infringement defendants, who are almost always producers, can litigate questions about patent validity and scope as well as overclaiming or litigation misconduct, and they do so all the time. Nothing in the United States Patent Act, however, gives consumers a general right to challenge such practices. When consumers do obtain such rights it is most typically under the antitrust laws, which do permit consumers to challenge anticompetitive practices that raise prices or reduce product quality. For example, while only patent infringement defendants can challenge improper infringement actions directly under the Patent Act, and then only by a defense, counterclaim, or request for attorneys fees, consumers can bring an action under the antitrust laws for improper infringement actions that result in monopoly and higher prices.

What makes the consumer action feature of antitrust law particularly important is that consumer welfare is just as central to good intellectual property policy as to good competition policy. Consumers consistently benefit from innovation that reduces costs or improves product or service quality. As a result they are the optimal surrogates for patent efficiency. The story for producers is more ambiguous. Producers certainly benefit from their own innovation as well as the ones that they can procure from

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others. They can also benefit from practices that restrain the innovations of their competitors, however, or that permit them to profit from the assertion of legal rights that confer no social benefit whatsoever. In sum, consumers are inherently better plaintiffs for enforcing IP rights, just as they are for enforcing antitrust law. We simply have not developed a good institutional mechanism for consumer involvement in IP law.

Another advantage of antitrust policy for evaluating patent practices is its economic, ex ante approach to decision making. In a welcome development, the Supreme Court's 2013 Actavis decision recognized that some restraints of trade governing patents can be addressed without litigating issues of patent validity or scope. Antitrusts’ economic approach to restraints creates appropriate incentives by relying on rational expectations about consequences to guide people's behavior at the time that they contemplate it. Thus the antitrust consequences of a settlement should be based on what the parties reasonably believed about patent validity and infringement at the time that they entered into their settlement, as well as objective indicators about competitive effects. In order to be useful policy, incentives must be attached to behavior at the time the behavior is contemplated.

When it comes to assessing the competitive effects of patent practices, antitrust law has some distinct comparative advantages over patent law. Industrial economists have been studying the effects of industry practices on output and competitiveness for decades. By contrast, neither economic scholarship nor congressional or other government fact finding has produced much useful information about how patent issuance, duration, scope or enforcement affect economic welfare. In that state of affairs it is hardly clear that competition policy should be yielding much territory to patent policy.

Standard Setting and FRAND Encumbered Patents

"FRAND" refers to a patentee's contract or contract-like obligation to license one or more of its patents on "fair, reasonable and nondiscriminatory" terms. FRAND agreements most generally arise in the context of standard setting organizations, particularly in industries such as digital video technology or cellular phones, where compatibility and ability to interconnect are essential. A standard setting organization, or SSO, is typically created to identify and adopt standards for technology in such industries that enable the devices of various manufacturers to function on a single network. A multi-producer market such as the ones for cellular phones or digital video could not exist without such standards.

Frequently an SSO will have several choices of technologies to address a particular problem or provide a new feature to the community of producers adopting its standards. At that point the SSO may ask the owners of these technologies to "bid" for the right to have their technology adopted as a standard. Part of this bid is a FRAND commitment. This means that the technology owner agrees in advance that if its technology is adopted as the standard, it will license the technology to all users on fair, reasonable, and nondiscriminatory terms. Once the technology is selected, two things happen. First, the chosen technology becomes much more valuable on the marketplace. Prior to selection it was perhaps one of many options and had to vie with others and perhaps even with unpatented public domain alternatives. Once selection occurs, however, then all manufacturers on the network that want to take advantage of that technology will use the one that has been selected. By contrast, technologies that are not selected generally become less valuable. Some may even become worthless, particularly if they were dedicated to a single use for which there is no longer a market.

As a result, rejection of a particular technology has produced some antitrust challenges by disappointed owners.82

The winning patents that constitute the selected technology (now called SEP’s, or "standard-essential patents) become "FRAND-encumbered," which means that they can be licensed by anyone on FRAND terms. The meaning of FRAND encumbrance has led to several litigation issues, many of which are relevant to competition policy. One has to do with whether the owner of a FRAND-encumbered patent is entitled to get an injunction against a user, or relatedly, the circumstances under which such an injunction is appropriate. The second has to do with how a "fair, reasonable, and nondiscriminatory" royalty obligation is to be computed.

United States law generally limits antitrust to a fairly restricted domain. As a result, most of these problems are viewed as presenting issues of patent law or sometimes contract law, but not antitrust law. This includes questions about whether the owner of a FRAND encumbered patent is entitled to an injunction. The principal exception permitting application of antitrust law in U.S. courts is for firms that make legal claims that are so poorly founded that they have no reasonable expectation of winning.83 But claims for injunction on FRAND-encumbered patent do not fall into that category, at least not as of this writing. In 2014 a decision in the Federal Circuit Court of Appeals split three ways on this issue, indicating that any of three different position on it is reasonable. Judge Rader, at that time the Chief Judge of the Federal Circuit, wrote in dissent that the owner of a FRAND-encumbered patent should be able to obtain an injunction on the same terms as any other patentee.84 Most of the important decisions, such as eBay,85 which rejected the rule of virtually automatic injunctions against patent infringers, and the recent round of FRAND cases, are not antitrust cases at all.86

82 E.g., Golden Bridge Tech., Inc. v. Motorola, Inc., 547 F.3d 266 (5th Cir. 2008).
84 Apple, Inc. v. Motorola, Inc., 757 F.3d 1286, 1332–1334 (Fed. Cir. 2014). At this writing a motion for a rehearing en banc is pending.
86 E.g., Apple v. Motorola, supra note 84; Microsoft Corp. v. Motorola, Inc., 696 F.3d 872 (9th Cir. 2012); Microsoft Corp. v. Motorola, Inc., 963 F.Supp.2d 1176 (W.D. Wash. 2013).
This does not mean that antitrust could never have a role. One might imagine a conspiracy among owners of FRAND-encumbered patents to deny relief, or a conspiracy among producers to deny a firm's application for a standard in order to protect their own technologies. But fundamental questions about the meaning and scope of FRAND status is a question of patent law, not of antitrust.

Patent Pooling and Related Technology Sharing

In patent law a "pool" refers to a situation in which two or more firms share a technology via common licensing. For example, if two television manufacturers each own some patents that give their own televisions desirable features, they may "cross license," thus enabling both manufacturers to share these features. Such sharing generally improves consumer welfare to the extent that the features are desirable and can be distributed across the entire market. Because patents are nonrivalrous, desirable features can be duplicated an infinite number of times. If the two firms have patent portfolios of roughly equal value then the cross-licensing might be royalty free; if not, then one firm may pay the other a royalty.

The firms may also agree about whether or not to license their shared technology to outside firms. Some pools are composed entirely of patent portfolio owners who share their technology with one another. Often, however, a large pool will have both "licensor members," who both manufacture and submit their patents to the pool for licensing; and also "licensee members," who manufacture one or more products but do not have patents of their own to license to the pool. A good example of such a large pool is MPEG-LA, which has collected thousands of patents related to digital video technology. That pool's website lists both its licensor members and its licensee members.

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87 E.g., Golden Bridge Tech., Inc. v. Motorola, Inc., 547 F.3d 266 (5th Cir. 2008) (rejecting such a claim).
Our understanding of the economic rationale for and competitive effects of patent pools has evolved considerably. Today it seems clear that the rationales for pooling in networked information intensive technologies are different than the rationales in more traditional technologies. In a technologically simpler time, the most common explanations were that pools were procompetitive if the patents in the pool were complements to one another, but that they were likely to be anticompetitive when patents competed.\(^9\) When two things are complements, such as hardware and software, they are efficiently used together. By contrast, a user selects one among several competing products. At the atmospheric level this view of patent pools makes economic sense. For example, if a manufacturer of digital memory devices and another manufacturer of digital displays should pool their patents, each might more efficiently be able to produce a device such as a laptop computer than included both memory and a display. By contrast, if two patentees of duplicate technology should pool, the rationale is more likely to be price fixing. A licensee would need technology from one of them but not both, and the pool may serve as a price agreement device.

This rationale fails to explain the phenomenon of widespread pooling of complex digital technologies. Several other characteristics of these markets must be considered as well. First, information technology patents are frequently complex and involve many claims. As a result they often function as both market substitutes and complements, making this distinction less defensible. A good illustration is the Federal Circuit’s 2010 *Princo* decision.\(^{91}\) The pooling in that case involved rewritable digital video discs, and the problem in controversy involved patented technologies for locating the electronic "stylus" in such a way that it could begin recording precisely where it left off a previous recording session. One firm had developed and patented an analog technology for solving this problem, while the other had developed a digital alternative. The digital technology was regarded as technologically superior, but it was also less stable and somewhat buggy. As a result, for the time being the analog technology was preferred by manufacturers. In the devices the two technologies functioned as substitutes rather than complements. A manufacturer would ordinarily

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require one or the other but not both. In this case, however, practicing the analog technology required infringement of at least one claim in the digital patent as well. In sum, even though the two technologies appeared to be substitutes in the market, the patents functioned as legal complements to the extent that a firm wishing to use the analog technology had to obtain a license for both.

Upon closer inspection the complement/substitute distinction is not particularly helpful in complex information technology markets. Indeed, a large pool such as MPEG-LA contains thousands of patents whose functional relationship to one another is as both complements and substitutes, as well as many patents whose precise scope has never been determined.92

Further, the question whether patents operate as substitutes or complements, or neither, can be quite specific to the particular licensee. To illustrate, the patents in the MPEG-LA pool relate to digital video technology that operates under a common standard. The devices that employ this technology include generators of digital video content, such as cameras and video cameras. But they also include devices that accept digital content generated elsewhere and process it -- including displays, storage devices, compilers and editors, and the like. The users also include software that reads and processes digital video content while neither producing nor displaying it. A device such as a smartphone might perform several or even all of these functions, while a device such as a computer monitor (display only) or camera (generation only) performs only one or a few.

In such markets the distinction between complementary and substitute patents is largely meaningless. Rather, pooling functions as a mechanism for managing communal ownership when sharing property rights is less costly and more effective than defending individual boundaries. That is to say, the modern digital pool operates more like a common pool resource frequently used in old-fashioned markets such as fisheries, livestock grazing, or irrigation.93

92 MPEG-LA states that it controls more than 5000 patents. See http://www.mpegla.com/main/Pages/AboutHistory.aspx.
Why might the several rights owners of a fishing lake "pool" their rights, giving each member access to all, rather than attempting to divide the lake into individual sectors permitting each one to appropriate its own investment? First, identifying, setting and defending boundaries could be very costly. Second, dividing the territory in this way could be devastating to the yield.

On the first issue, information technology patents are often characterized by ambiguous claim drafting that makes interpretation costly, often on the order of several thousand dollars per patent in situations where often dozens or even hundreds of patents are in issue. By simply cross-licensing their portfolios, or licensing them in the aggregate to manufacturing licensees, the firms can eliminate most of the costly problems that attend individual patent interpretation. That is, once they have licensed out everything they own they have no motive for ascertaining which of their many patents a licensee might be using. This is simply a special, although perhaps not widely appreciated, application of Ronald Coase's well known article on *The Nature of the Firm*, which argued that the boundaries of a firm are determined by the firm's continuous comparison of the costs of doing something for itself against those of using the market. In this case the cost of maintaining individual boundaries exceed the cost of sharing and then managing the shared resources. A firm intent on maximizing its profits will choose the marginally less costly alternative.

Patent pools in digital technologies have raised some antitrust problems, although surprisingly few given the amount of power that the larger pools have. Price fixing or express output limitation agreements in product markets could certainly provoke antitrust challenges, but such

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restrictions are not common. \textsuperscript{96} One important difference between traditional common pool resources and patent pools is that the resources in a traditional commons such as a fishery are rivalrous, or "subtractive." That is, each member's use reduces the amount that is left over for others. Further, overuse is an important problem, given that individual members do not bear the full cost of resource development. For example, overfishing in fishery commons is to be expected because each member has an incentive to put in as little as possible while taking out as much as possible. For this reason catch or related use limitations will almost certainly be necessary. There is nothing suspicious about an agreement among ten members of a fishery commons to limit each person's catch to, say, 100 fish per week.\textsuperscript{97}

In contrast, intellectual property rights are nonrivalrous. One person's use of a patent does nothing to diminish the quantity of what is left over. As a result, jointly agreed output limitations by the members of a patent pool are inherently more suspicious and should be reviewed for the possibility of price fixing.

Most of the antitrust challenges to patent pools in information technologies have not involved price fixing, but rather tying or equivalent claims. For example, the licensee from a large patent pool might complain it is required to take the entire pool of, say, 1200 patents, when it believes that its own product infringes no more than a small fraction of that number.\textsuperscript{98} Nero AG, the unsuccessful challenger to the MPEG pool, is a software company whose products are used for photo and video editing, but not creating new content or displaying it.

Claims such as Nero's made some sense in a time when the substitutes/complements distinction was the ruling rationale for pooling. By stating that a particular patent was not wanted, the licensee was in fact asserting that this particular patent was not a complementary technology insofar as the licensee's own production was concerned. If it were, he would presumably want it.

\textsuperscript{96} On good historical example, which condemned product price fixing, is United States v. Line Material Co., 333 U.S. 287 (1948).

\textsuperscript{97} \textsc{Bohannan \& Hovenkamp, Creation Without Restraint, supra} note 51, at 325–335.

But the substitute/complement distinction rarely serves to justify the existence of large patent pools in information technologies. The more central problem is the cost of determining the scope of each patent and also examining the licensee's products and determining which of the pool's many patents the devices infringe. Those costs could easily exceed the costs of the licensing agreement itself, which is of course why the patents were licensed in this fashion in the first place. Indeed, when extended over the entire range of licensees the cost of examining all of the patents and determining which ones were infringed by every licensee's products would be heroic. If doing this were efficient, we would not expect pooling to exist in the first place.

**Conclusion**

Digital and other information technologies have presented public and private antitrust plaintiffs with daunting challenges. These include the assessment of market power, as well as understanding both unilateral and collaborative activity. In the process the case law and literature has both understated and exaggerated competitive problems.

There is little reason for thinking that competition cannot be made to work in most markets involving digital and other information technologies. Nevertheless, effective policy design requires careful thought. The trick is to keep the channels open for new entry, resource movement, and consumer choice—things that antitrust policy is capable of doing well. Intellectual property rights must be respected, but too often they serve to hinder rather than facilitate the free flow of information. Antitrust and the competition economics that guides it has the advantage of good empirical tools, a rich dataset, and statutes and judicially-directed policy goals that are aligned with the consumer welfare interests in both competition and innovation.