

The University of Chicago Law Review

Volume 68

Winter 2001

Number 1

Antitrust Divestiture in Network Industries

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The landmark Microsoft case raises challenging questions concerning antitrust remedies. In this Article, we propose a framework for assessing the costs and benefits of different remedies, particularly divestiture, in monopolization cases involving network industries. Our approach can assist a court or enforcement agency not only in analyzing the welfare effects of divestiture, but also in choosing more generally among alternative kinds of remedies. The framework would, for example, apply to a court's choice between damages and injunctive remedies or between behavioral injunctions and structural injunctions. After developing our framework, we apply it to the divestiture proposals made by the government and others in the Microsoft case. We argue that those proposals leave open important questions that must be answered before divestiture can be shown to be either the best remedial alternative or to create likely net gains in economic welfare.

INTRODUCTION

The late William F. Baxter went to Washington to fight monopolies in 1981. By the time he returned to teaching at Stanford University three years later, the Bell System had been restructured from one company into eight.¹ Baxter's handiwork was the most ambitious antitrust divestiture since the government's breakup of Standard Oil in 1911.² As architect of the AT&T divestiture, Baxter believed that a theory of antitrust liability should map coherently on to a proposed remedy. The remedy should end the conduct that is alleged to have harmed consumer welfare and that forms the basis

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¹ See *United States v American Telephone & Telegraph Co*, 552 F Supp 131, 142 n 42 (D DC 1982), *affd as Maryland v United States*, 460 US 1001 (1983).

² See generally *Standard Oil Co of New Jersey v United States*, 221 US 1 (1911).

for a finding of liability. The remedy in a public antitrust action should do no more and no less. Regardless of liability, if “there is no assurance that appropriate relief could be obtained,” then the government must question the value to consumers of prosecuting the antitrust case at issue.³ Accordingly, on the same day that he announced the AT&T divestiture, Assistant Attorney General Baxter terminated the government’s other major monopolization case—the one against America’s second titan of information technologies, IBM.⁴ Elegantly simple, Baxter’s principle concerning the efficacy of antitrust remedies deserves the eponym “Baxter’s axiom.”⁵ It would serve well as a Hippocratic oath for antitrust enforcers and jurists. In fact, Baxter’s insight is really an application of basic principles of welfare economics to the questions of when to bring antitrust cases and how to resolve them in a socially beneficial manner.

About a year into the Department of Justice’s pursuit of AT&T, Bill Gates and Paul Allen founded the company that became Microsoft Corporation.⁶ Since that time, Microsoft has grown to a market capitalization of approximately \$340 billion⁷ and today symbolizes how a “New Economy” has risen from the advent of affordable, ubiquitous personal computing and the phenomenal growth of the Internet. The company is also a post-industrial giant that has been alternately lionized, vilified, and, ultimately, investigated and prosecuted by the Antitrust Division of the U.S. Department of Justice. It took less than fifteen years for a startup from the West to replace the century-old Bell System as the principal target of public antitrust scrutiny. It remains to be seen whether Microsoft will become the government’s trophy for wise enforcement, like the Bell System perhaps, or its haunting

³ *In re International Business Machines Corp.*, 687 F.2d 591, 594 (2d Cir. 1982) (quoting William F. Baxter, Assistant Attorney General, U.S. Department of Justice). See also Abbott B. Lipsky, Jr. and J. Gregory Sidak, *Essential Facilities*, 51 *Stan L. Rev.* 1187, 1188–89 (1999) (noting that Baxter believed that antitrust liability rules and remedies must share a common logic); Richard L. Schmalensee, *Bill Baxter in the Antitrust Arena: An Economist’s Appreciation*, 51 *Stan L. Rev.* 1317, 1324–27 (1999) (noting Baxter’s refusal to proceed with cases lacking a “plausible and coherent consumer benefit rationale”).

⁴ See Ernest Holsendolph, *U.S. Settles Phone Suit, Drops I.B.M. Case: A.T.&T. to Split Up, Transforming Industry*, *NY Times* A1 (Jan 9, 1982).

⁵ Though to our knowledge it has not been denominated as such before now, Baxter’s axiom has long influenced academic writings on antitrust and regulatory policy. See, for example, J. Gregory Sidak, Note, *Rethinking Antitrust Damages*, 33 *Stan L. Rev.* 329, 352 (1981) (“By articulating the economic foundation for antitrust damages, the Supreme Court can reconcile the law of antitrust damages with the law of antitrust liability, thereby producing a unified theory of competitive rights whose purpose and effect [are] to enhance the wealth of society.”); Richard Schmalensee, *The Control of Natural Monopolies* 49 (Lexington 1979) (“The mere existence of a natural monopoly problem that the unaided market cannot solve does not imply the desirability of imposing an inevitably imperfect control system.”).

⁶ See Richard J. Gilbert, *Networks, Standards, and the Use of Market Dominance: Microsoft* (1995), in John E. Kwoka, Jr. and Lawrence J. White, eds., *The Antitrust Revolution: Economics, Competition and Policy* 409, 410 (Oxford 3d ed. 1999).

⁷ See <<http://biz.yahoo.com/p/m/msft.html>> (visited Sept 17, 2000) (\$337.8 billion).

nemesis, like IBM. Baxter taught us that the government's proof of liability does not suffice to predict its success in crafting a remedy.

On November 5, 1999, Judge Thomas Penfield Jackson issued his findings of fact in the civil antitrust case of *United States v Microsoft Corporation*.⁸ On November 19, 1999, he appointed as a mediator in the case Chief Judge Richard Posner of the U.S. Court of Appeals for the Seventh Circuit.⁹ Following weeks of settlement discussions, Microsoft and the government returned to the courtroom on February 22, 2000, to present closing arguments.¹⁰ Judge Jackson likened Microsoft to the Standard Oil trust, and one state attorney general said that any remedies ordered in the case must be "drastic and far reaching."¹¹ Judge Jackson issued his conclusions of law on April 3, 2000, finding Microsoft liable for violating the Sherman Antitrust Act.¹²

When Judge Jackson ruled for the government, the task before the trial court changed from determining liability to identifying a suitable remedy. Following Baxter's axiom, any remedy should address the conduct for which Microsoft was found liable and advance economic welfare at the lowest possible social cost. The problem is a challenging one. As expressed by Timothy Bresnahan, the Stanford economist then serving as the Antitrust Division's chief economist, the government's case against Microsoft can be likened to a dog chasing a fire truck: what is he supposed to do once he catches it?¹³ Well, the dog caught the truck, and the question of what to do was no longer hypothetical.

On April 28, 2000, the government offered its answer: separate Microsoft's operating systems business from its applications business and, among other things, order a divestiture of the firm into two independent companies. Four distinguished economists—Robert E. Litan of the Brookings Institution, Roger G. Noll of Stanford University, William D. Nordhaus of Yale University, and Frederic Scherer of Harvard University—filed an amicus brief the same week which proposed an alternative divestiture remedy and argued that the government's proposed remedy was inadequate and would be hard to administer.¹⁴ They observed that the Microsoft case presents important and novel questions in terms of fashioning a remedy:

⁸ See *United States v Microsoft Corp.*, 84 F Supp 2d 9, 12–112 (D DC 1999) ("Findings of Fact").

⁹ See Joel Brinkley, *Microsoft Case Gets U.S. Judge as a Mediator*, NY Times A1 (Nov 20, 1999). See also Steve Lohr, *The Microsoft-U.S. Negotiations: Tough Talk in Chicago*, NY Times C1 (Feb 21, 2000).

¹⁰ See Joel Brinkley and Steve Lohr, *Microsoft Chided as Antitrust Trial Draws to a Close*, NY Times A1 (Feb 23, 2000).

¹¹ Id at A1, C14 (quoting Richard Blumenthal, Attorney General of Connecticut).

¹² See *United States v Microsoft Corp.*, 87 F Supp 2d 30, 35 (D DC 2000) ("Conclusions of Law").

¹³ See Timothy F. Bresnahan, *New Modes of Competition: Implications for the Future Structure of the Computer Industry*, in Jeffrey A. Eisenach and Thomas M. Lenard, eds, *Competition, Innovation and the Microsoft Monopoly: Antitrust in the Digital Marketplace* 155, 206–07 (Kluwer Academic 1999).

¹⁴ See Remedies Brief of Amici Curiae Robert E. Litan, Roger G. Noll, William D. Nordhaus, and

[T]his Court will establish in the process of setting a remedy in this matter the contours of relief in monopolization cases where the defendant's value arises primarily from intangible assets in the form of intellectual property rather than the tangible capital assets characteristic of such prior major monopolization cases as Standard Oil, Alcoa, and AT&T. In essence, this case provides an important test of how antitrust law and remedies should be applied in the "New Economy," where informational capital is the scarce and precious asset and physical assets are relatively minor and hardly unique.¹⁵

These economists argued that aggressive divestiture remedies are more justified in markets characterized by intellectual rather than physical capital. Microsoft predictably responded that a lesser set of remedies would suffice,¹⁶ and other equally eminent economists, including Paul Krugman of MIT, warned of the unintended consequences of a divestiture remedy.¹⁷ On May 17, 2000, the government stated in reply to Microsoft's filing that divestiture was the only practical remedy.¹⁸ The trial court accepted the government's arguments and ordered Microsoft broken up into two companies.¹⁹

The purpose of this Article is to establish principles for answering the remedial question faced by the court and for assessing Judge Jackson's decision to order a divestiture of Microsoft. In Part I, we explore differences between forms of economic competition—particularly network competition and Schumpeterian rivalry—relevant to antitrust analysis in dynamic industries. Those two concepts of competition are important to understanding conflicting views of the Microsoft case.

Microsoft's opponents have argued that the existence of "network externalities" creates market conditions that justify antitrust intervention against aspects of Microsoft's pricing, product introduction, product integration, and acquisition strategies. A network externality, or "network effect," exists when the value of a product or service increases with the breadth of demand for that product or service. The typical example is the telephone system, which becomes more valuable to any given subscriber as other people subscribe and become available to communicate with the sub-

Frederic Scherer, *United States v Microsoft Corp.*, Civil Action No 98-1232, 46–49 (D DC filed Apr 27, 2000) ("Litan Brief").

¹⁵ *Id.* at 4.

¹⁶ See Microsoft Corporation's Proposed Final Judgment, *United States v Microsoft Corp.*, Civil Action No 98-1232 (D DC filed May 10, 2000).

¹⁷ See Paul Krugman, *Microsoft: What Next?*, NY Times A21 (Apr 26, 2000); Paul Krugman, *Dirty Windows Policy*, NY Times sec 4, 19 (Apr 30, 2000); Robert W. Hahn, *Breaking Up Is Hard to Do, So Don't Do It*, LA Times M5 (Apr 30, 2000).

¹⁸ Plaintiff's Reply Memorandum in Support of Proposed Final Judgment, *United States v Microsoft Corp.*, Civil Action No 98-1232 (D DC filed May 17, 2000). See also Jerry Guidera, *Government Asks Judge to Disregard Microsoft's Remedy*, Wall St J A6 (May 18, 2000).

¹⁹ *U.S. v Microsoft Corp.*, 97 F Supp 2d 59 (D DC 2000).

scriber. As the benefits offered by one network grow, so too do the costs to consumers of choosing, or switching to, a rival offering. Competition in network markets can therefore take on a winner-take-all dynamic with competitive strategies geared towards gaining an early lead in market penetration.

“Schumpeterian rivalry” is a distinct vision of competition that, though not mutually exclusive of network competition, may have implications for the durability of network monopolies and for antitrust enforcement in network markets. In this view, which some critics of the government’s case against Microsoft contend is applicable to software markets, firms compete through technological innovation to achieve market dominance, but dominance that is continually challenged and subject to displacement by subsequent innovations. As with network competition, this form of rivalry may have an all-or-nothing flavor. Winners enjoy a period of dominance, during which they receive above-cost prices that include the returns necessary to induce risky investment in product innovation, but are subject to being supplanted by rivals in a later innovation cycle.

In Part II, we draw from principles of antitrust jurisprudence and microeconomics to propose an approach for choosing appropriate remedies in monopolization cases involving network industries. We present a three-step test for assessing the welfare effects of a remedy, which can also be used to compare the relative costs and benefits of available remedies. Step one is to evaluate whether the static (short-term, holding technology constant) efficiency consequences of a proposed remedy will yield a net gain. Do the gains in allocative efficiency (that is, reductions in price and increases in output) exceed the losses in productive efficiency (that is, ability to reduce production costs), if any, associated with a particular remedy? If so, then step two is to compare the static efficiency gains from the first step with any effects that the remedy is likely to have on dynamic (long-term, with technological change) efficiency. Examples of dynamic efficiency include innovation that reduces production costs or develops new products and services for consumers. If the net gain is positive, then step three is to evaluate the remedy in terms of its enforcement costs, broadly defined. The optimal remedy is the one that produces the greatest overall efficiency gains net of enforcement and administrative costs.

In Part III, we describe the government’s basic theory of liability in the Microsoft case. We then examine Judge Jackson’s findings of fact and his conclusions of law.

In Part IV, we use the axiomatic approach developed in Part II to evaluate the structural remedies proposed to the court in the Microsoft case. We focus our analysis on the vertical and horizontal divestiture remedies requested by the government and by some amici curiae. We also discuss how the analysis would extend to other structural and behavioral remedies such as compulsory licensing, line-of-business restrictions, prohibitions on

product integration, disclosure of the application programming interfaces (“APIs”), and limitations on contractual terms with customers. We conclude that the divestiture proposals before the court do not contain the elements necessary to show either that divestiture is likely to create net social benefits or, even assuming it would, that it would do so at lower cost than alternative forms of relief.²⁰

In Part V, we examine whether, as has been widely suggested, the 1984 divestiture of AT&T provides the proper blueprint for formulating remedies in the Microsoft case. We conclude that it does not on multiple grounds.

In Part VI, we pose, but leave for others to answer, two more general questions concerning the process of selecting a remedy in the Microsoft case.

I. DYNAMIC COMPETITION: NETWORK EFFECTS AND SCHUMPETERIAN RIVALRY

As discussed in the Introduction to this Article, two different ways of understanding market structure and performance have emerged in the Microsoft case, as well as in numerous other antitrust and regulatory contexts in recent years: network competition and innovation-based, or “Schumpeterian,” competition. The adoption of one or the other of those frameworks can be of great practical consequence. High profit margins might appear to be the benign and necessary recovery of legitimate investment returns in a Schumpeterian framework, but they might represent exploitation of customer lock-in and monopoly power when viewed through the lens of network economics. Market dominance in the former case is likely to be temporary, but in the latter to become entrenched. The issue is particularly complex because, in network industries characterized by rapid innovation, both forces may be operating and can be difficult to isolate. Neither the Schumpeterian nor the network externalities framework justifies anticompetitive behavior, but each might yield different conclusions about what constitutes evidence of such behavior and what the likely consequences of such behavior will be. These factors are, in turn, directly relevant to the choice of an appropriate remedy where antitrust violations have occurred.

²⁰ We assume that the effects of a remedy on static and dynamic efficiency are likely to exceed enforcement costs by a substantial amount (perhaps several orders of magnitude). If that is not the case, then a court should double check its results under our proposed analysis in a manner suggested by the following example. Suppose, ignoring enforcement costs, one remedy would provide net benefits of ten dollars, while a second remedy would provide net benefits of only eight dollars. But suppose also that the first remedy would require enforcement costs of five dollars, while the second would require enforcement costs of only one dollar. In this example, the second would be superior when considered net of enforcement costs.

A. Network Effects

The various government complaints against Microsoft have built an account of antitrust liability upon the theoretical research on network effects. Critical to the government's theory in the Microsoft cases has been the idea that computer software, like telecommunications, is a good that relies upon an interconnected web of fixed infrastructure. The economic properties of such network goods and their effects on market behavior have been an important part of the justification for antitrust intervention against some of Microsoft's pricing, product introduction, product integration, and acquisition activities.

1. Network externalities.

For current purposes, the most important result from the literature on network economics is the creation in some product markets of network externalities.²¹ Network externalities are benefits to society that accrue as the size of a network grows: An individual consumer's demand to use (and hence her benefit from) the telephone network, for example, increases with the number of other users on the network whom she can call or from whom she can receive calls.²² Just as one consumer's demand to use the telephone network increases with the number of other users on the network, so also the demand for a particular word processing or spreadsheet program increases as it becomes more commonly used or more compatible with other programs.

²¹ The seminal paper in the literature on network effects is Jeffrey Rohlfs, *A Theory of Interdependent Demand for a Communications Service*, 5 Bell J Econ & Mgmt Sci 16 (1974). For subsequent contributions to the literature, see Stanley M. Besen and Joseph Farrell, *Choosing How to Compete: Strategies and Tactics in Standardization*, 8 J Econ Persp 117 (1994); Michael L. Katz and Carl Shapiro, *Systems Competition and Network Effects*, 8 J Econ Persp 93 (1994); Joseph Farrell and Carl Shapiro, *Standard Setting in High-Definition Television*, 1992 Brookings Papers on Econ Activity: Microeconomics 1; Michael L. Katz and Carl Shapiro, *Product Introduction with Network Externalities*, 40 J Indus Econ 55 (1992); Garth Saloner, *Economic Issues in Computer Interface Standardization*, 1 Econ Innov New Tech 135 (1990); Stanley M. Besen and Garth Saloner, *The Economics of Telecommunications Standards*, in Robert W. Crandall and Kenneth Flamm, eds, *Changing the Rules: Technological Change, International Competition, and Regulation in Communications* 177 (Brookings 1989); Janusz A. Ordover and Garth Saloner, *Predation, Monopolization, and Antitrust*, in Richard Schmalensee and Robert D. Willig, eds, 1 *Handbook of Industrial Organization* 537 (North-Holland 1989); Joseph Farrell and Garth Saloner, *Installed Base and Compatibility: Innovation, Product Preannouncements, and Predation*, 76 Am Econ Rev 940 (1986); Michael L. Katz and Carl Shapiro, *Product Compatibility Choice in a Market with Technological Progress*, 38 Oxford Econ Papers 146 (Supp 1986); Michael L. Katz and Carl Shapiro, *Technology Adoption in the Presence of Network Externalities*, 94 J Pol Econ 822 (1986); Joseph Farrell and Garth Saloner, *Standardization, Compatibility, and Innovation*, 16 RAND J Econ 70 (1985); Michael L. Katz and Carl Shapiro, *Network Externalities, Competition, and Compatibility*, 75 Am Econ Rev 424 (1985). For differing, nontechnical overviews of this literature, see Stan J. Liebowitz and Stephen E. Margolis, *Winners, Losers & Microsoft: Competition and Antitrust in High Technology* 49–115 (Independent Institute 1999); Carl Shapiro and Hal R. Varian, *Information Rules: A Strategic Guide to the Network Economy* 183–84 (Harvard Business 1999).

²² See, for example, Lester D. Taylor, *Telecommunications Demand in Theory and Practice* 9 (Kluwer Academic 1994); Bridger M. Mitchell and Ingo Vogelsang, *Telecommunications Pricing: Theory and Practice* 11 (Cambridge 1991); Jean Tirole, *The Theory of Industrial Organization* 405 (MIT 1988).

If the network characteristic of a good is significant, then consumers will be attracted to the firm with the largest market share. In the absence of interconnection or compatibility, consumers will receive a larger network benefit from choosing the good or service that has the largest number of other users. For example, consider the “instant messaging” systems offered by various Internet service providers. There is currently no legal requirement that subscribers to one provider be allowed to send instant messages to subscribers of another. Any provider can keep its messaging system proprietary. In the absence of interconnection, it is costly for consumers to subscribe to multiple services, and if consumers might find it comparatively beneficial to purchase only the service offering the largest instant-messaging network externality. The history of local telephone service in the first decades of the twentieth century, during which AT&T refused to connect with independent competitors, illustrates how such a dynamic can lead to monopoly.

2. Lock-in, path dependence, and barriers to entry.

A second important theme in the literature on network effects concerns lock-in of customers to a particular network and the related possibility of technological path dependence.²³ The existence of network externalities can confer benefits on the first firm in a market to gain a significant early lead in market penetration, especially if production exhibits increasing returns to scale. That early lead can have a decisive effect on the market’s structure well into the future because consumers are attracted to the good or service that offers the largest network benefit, and that benefit then only becomes larger and more attractive to later consumers. One consequence is that consumers can become “locked in” to a particular network. In the absence of interconnection or interoperability among competing network goods or services, switching from the market leader to a rival will entail at least a short-term loss in network benefit. This lock-in effect, in turn, makes entry or expansion by rivals more difficult because they cannot attain a critical mass of customers. The network is thus said to “tip” to the incumbent, which creates a barrier to entry in the costs to rivals of overcoming the network benefits associated with the incumbent’s product.

To enter, a firm must have either a sufficiently better product such that consumers find it worthwhile to incur switching costs (such as loss in network benefits and retraining costs) or a sufficient cost advantage such that it can compensate consumers for those switching costs through lower prices. To avoid being in such a catch-up position, firms will have the incentive to gear competitive strategies towards capturing an early lead and to continue innovat-

²³ See W. Brian Arthur, *Positive Feedbacks in the Economy*, 262 *Sci Am* 92 (Feb 1990); W. Brian Arthur, *Competing Technologies, Increasing Returns, and Lock-In by Historical Events*, 99 *Econ J* 116 (1989); Paul A. David, *Clio and the Economics of QWERTY*, 75 *Am Econ Rev Papers and Proc* 332 (1985).

ing to stay ahead of potential rivals who might “leapfrog” its incumbent lead position. The race to gain and to maintain dominance in a network market might also, of course, provide motives to engage in anticompetitive conduct, as the trial court found Microsoft to have done.

A large network externality can determine the path of technological change in a market in much the same way it can determine market structure. The market leader will set the technological standard—for example, Microsoft’s Windows operating system—even if other technological standards are superior in some economic or engineering sense. Subsequent innovation in the market, and in markets for complementary products, might thus follow the path set by the technology that first takes a meaningful lead even if that path is not, *ex post*, seen to be the optimal one. Path dependency and lock-in can, of course, occur for reasons other than network externalities (for example, the costs of learning to use a competing product). Moreover, network externalities need not create lock-in. If switching to a new system is low cost or if it is cheap to use multiple systems, then entry is feasible and the market may support multiple networks of varying sizes. Some scholars have also disputed the validity of the empirical cases used to document the existence of path-dependent outcomes.²⁴ The theoretical case for lock-in and path dependency in network markets has nonetheless been an important motivation for the government’s antitrust enforcement to constrain Microsoft’s dominance in operating systems and its growth in complementary software applications.

A consequence of network externalities and lock-in effects is that antitrust enforcement in network markets becomes complicated. On one hand, if anticompetitive conduct is not detected and stopped early, dominant market share may “tip” in favor of the bad actor. The harm to consumers will at that point be done and might not be able to be undone without imposition of yet additional costs on consumers. On the other hand, distinguishing anticompetitive actions from beneficial competitive conduct can be difficult when firms are competing not just for market share, but for commercial viability and the market itself. For example, aggressive pricing that looks predatory in a conventional market might constitute a rational competitive strategy in a market where one’s future existence depends on early penetration. Network dynamics may thus raise the risks of both action and inaction by antitrust authorities. In the 1994 Tunney Act proceeding concerning Microsoft, Nobel laureate Kenneth J. Arrow observed:

The analysis of the Department of Justice and the *amici curiae* brief agree that the software market is peculiarly characterized by increasing returns to scale and therefore natural barriers to entry. Large-scale operation is low-cost operation and also conveys advantages to the

²⁴ The leading critics are Professors Stan Liebowitz and Stephen Margolis. See Liebowitz and Margolis, *Winners, Losers & Microsoft* at 117–234 (cited in note 21).

buyer. Virtually all the costs of production are in the design of the software and therefore independent of the amount sold, so that marginal costs are virtually zero. There are also fixed costs in the need to risk large amounts of capital and the costs associated with developing a reputation as a quality supplier. Further, there are network externalities, in particular, the importance of an established product with a large installed base and the related advantage of a product that is compatible with other complementary applications.²⁵

Given this confluence of economic forces, Professor Arrow warned that “a rule of penalizing market successes that are not the result of anticompetitive practices will, among other consequences, have the effect of taxing technological improvements and is unlikely to improve welfare in the long run.”²⁶

B. Schumpeterian Rivalry

An alternative, and sometimes complementary, explanation for the performance of dynamic markets is that firms compete through innovation for temporary market dominance, from which they may be displaced by the next wave of product advancements.²⁷ The distinguished economist Joseph Schumpeter coined the phrase “creative destruction” to express the idea that the pursuit of market power is a creative and dynamic force that “incessantly revolutionizes the economic structure *from within*, incessantly destroying the old one, incessantly creating a new one.”²⁸ Hence the labeling of such innovation-based competition as “Schumpeterian.” Though he died decades before the advent of personal computing, Schumpeter saw such rivalry as “the essential fact about capitalism.”²⁹ Creative destruction means that a firm’s acquisition or possession of market power may be fleeting. In the most famous passage of Schumpeter’s classic discussion on creative destruction, he wrote:

[S]ince we are dealing with an organic process, analysis of what happens in any particular part of it—say, in an individual concern or industry—may indeed clarify details of mechanism but is inconclusive beyond that. Every piece of business strategy acquires its true signifi-

²⁵ Declaration of Kenneth J. Arrow, attached to Memorandum of the United States of America in Support of Motion to Enter Final Judgment and in Opposition to the Positions of I.D.E. Corporation and Amici, *United States v Microsoft Corp.*, Civil Action No 94-1564, 5–6 (D DC filed Jan 18, 1995) (on file with author).

²⁶ *Id.* at 10.

²⁷ See Joseph A. Schumpeter, *Capitalism, Socialism and Democracy* 81–86 (Harper & Bros 1942). For representative applications of Schumpeterian concepts to the assessment of market power in software markets, see Richard Schmalensee, *Antitrust Issues in Schumpeterian Industries*, 90 *Am Econ Rev Papers and Proc* 192, 193 (2000) (arguing that “[t]raditional tests for monopoly power do not measure . . . [the] fragility” of market dominance in the software industry); David J. Teece and Mary Coleman, *The Meaning of Monopoly: Antitrust Analysis in High-Technology Industries*, 43 *Antitrust Bull* 801, 820–22 (1998).

²⁸ Schumpeter, *Capitalism, Socialism and Democracy* at 83 (cited in note 27).

²⁹ *Id.*

cance only against the background of that process and within the situation created by it. It must be seen in its role in the perennial gale of creative destruction; it cannot be understood irrespective of it or, in fact, on the hypothesis that there is a perennial lull.

But economists who, *ex visu* of a point in time, look for example at the behavior of an oligopolistic industry—an industry which consists of a few big firms—and observe the well-known moves and countermoves within it that seem to aim at nothing but high prices and restrictions of output are making precisely that hypothesis. They accept the data of the momentary situation as if there were no past or future to it and think that they have understood what there is to understand if they interpret the behavior of those firms by means of the principle of maximizing profits with reference to those data. The usual theorist's paper and the usual government commission's report practically never try to see that behavior, on the one hand, as a result of a piece of past history and, on the other hand, as an attempt to deal with a situation that is sure to change presently—as an attempt by those firms to keep on their feet, on ground that is slipping away from under them. In other words, the problem that is usually being visualized is how capitalism administers existing structures, whereas the relevant problem is how it creates and destroys them.³⁰

Unless government imposes artificial barriers to market entry,³¹ the incumbent will be repeatedly challenged and eventually supplanted by actual and potential competitors. Schumpeterian competition can thus be viewed as occurring sequentially over time rather than simultaneously across a market. That version of competition, Schumpeter explained, “commands a decisive cost or quality advantage and . . . strikes not at the margins of the profits and the outputs of the existing firms but at their foundations and their very lives.”³² Such competition, moreover, “acts not only when in being but also when it is merely an ever-present threat. It disciplines before it attacks.”³³

There are two important implications for antitrust enforcement. First, in markets characterized by Schumpeterian rivalry, pricing at a level higher than that found under the theoretically simplistic case of perfect competition is not only legitimate, but also necessary to induce investment in developing and deploying new technology. Second, in such markets periodic dominance by one firm or a few firms may be symptomatic of healthy, innovation-based competition and may be subject to displacement, even

³⁰ Id at 83–84.

³¹ State governments traditionally imposed entry barriers by granting monopoly telephone franchises. The federal government similarly forbade AT&T from entering the computer business. See *United States v Western Electric Co., Inc.*, 1956 Trade Cases (CCH) ¶ 68,246 at 71,138 (D NJ).

³² Schumpeter, *Capitalism, Socialism and Democracy* at 84 (cited in note 27).

³³ Id at 85.

novation-based competition and may be subject to displacement, even when goods with network externalities are at issue. Creative destruction thus implies that antitrust policy based on static analysis of today's market conditions can be misleading and, over time, injurious to consumers.

An example of a view of competition that discounts Schumpeterian rivalry is found in Professor Paul Romer's testimony submitted on the government's behalf in the remedies phase of the Microsoft case:

Microsoft has harmed the innovative process because it has limited competition, and competitive markets are, on balance, the best mechanism for guiding technology down a path that benefits consumers. No system of comprehensive central planning, neither one controlled by a government, nor one controlled by the managers of a single firm, can hope to be as robust and reliable a mechanism as competition among many actual and potential firms for purchases by final users.³⁴

What is most significant about this passage is that Romer considers actual competition for market share to be essential for innovation. It may be true, although the empirical literature is highly ambiguous, that competition is "on balance" beneficial for technological development. But whether that assertion is true and which form of competition it is true for—actual and/or Schumpeterian—depend on the particular industry at issue. And Romer does not make clear how the form of competition that he advocates—multiple firms operating in simultaneous rivalry—is applicable to software markets that arguably contain significant network properties. Romer implicitly rejects the possibility that competition may take the form of pressure, from fringe firms and potential entrants, that does not necessarily produce multiple firms that divide market share at any given time. That omission is all the more conspicuous when one juxtaposes the preceding passage against the following passage from the same testimony by Romer:

In coming years, portable devices, wireless communications and voice recognition may obsolete many deeply embedded assumptions about when, where, and how users access digital information. At the same time, improvements in the bandwidth of fiber optic data communications networks and the extension of these networks ever closer to the desktop may narrow the gap between the capacity of the pipe that

³⁴ Declaration of Paul M. Romer, *United States v Microsoft Corp.*, Civil Action No 98-1232 ¶ 14 (D DC filed Apr 27, 2000) ("Romer Declaration"). Romer, however, then supports this general statement with the following example from the telecommunications industry: "Before the breakup of AT&T, engineers described the advantages of having a single firm that produced all the telephone desksets that connected to the telephone network. Since the breakup, consumers have benefited from the wider range of choice and more rapid innovation in the handsets that competition made possible." *Id.* That assessment incorrectly ascribes the deregulation of customer premise equipment ("CPE") to the antitrust divestiture of AT&T, rather than to deregulatory initiatives of the Federal Communications Commission that were wholly independent of the antitrust case. See, for example, Robert W. Crandall, *After the Breakup: U.S. Telecommunications in a More Competitive Era* 34–35 (Brookings 1991).

connects two different computers and the pipe that connects components located inside the case of a single computer. Either one of these developments, and especially the two of them together, could lay the foundation for new software innovations as powerful as the browser and the Web.³⁵

These developments would seem to provide the conditions for a Schumpeterian version of competition. Yet, Romer does not analyze the costs and benefits of the government's proposed remedies in the Microsoft case in terms of their effect on such a sequential process.

It would ignore recent economic history to presume that Microsoft is immune from being leapfrogged and displaced from its dominant market position. In hindsight it may seem hard to understand how the Justice Department could have allowed itself to become a latter day Captain Ahab, spending thirteen years in pursuit of a whale named IBM.³⁶ Though IBM was the undisputed market leader in mainframe computers in the 1960s, by the time the government dropped its antitrust case in 1982, the mainframe had already been harpooned by the personal computer. And in that market, despite its brand name and experience, IBM emerged as just one of several strong competitors. In a competitive economy, Schumpeter observed, businesses will be enticed to compete vigorously for "spectacular prizes" despite the fact that "they receive in return only modest compensation."³⁷ In the analogous context of designing efficient regulatory regimes (as opposed to efficient remedial regimes under antitrust law), the "most important" caveat for policymakers is that "static models cannot be confidently relied on for quantitative guidance in the real, dynamic world."³⁸

In 1992, William Baxter said of the then-current rumors of a possible government antitrust action against Microsoft, "[t]here are a lot of companies bellyaching that Microsoft is too effective a competitor. Let us pray that that is not seen as a bad thing to be."³⁹ Speaking in 1995, the man who vigorously pursued AT&T but gave up the government's chase of IBM saw "strong parallels between IBM and Microsoft."⁴⁰ Baxter viewed the success of both IBM and Microsoft in Schumpeterian terms:

Each of the firms got out in front technologically, each was enormously successful and delivered incredible value to the American people over a period of years and, as a result, won a very large market

³⁵ Romer Declaration at ¶ 31 (cited in note 34).

³⁶ See Franklin M. Fisher, John J. McGowan, and Joen E. Greenwood, *Folded, Spindled, and Mutilated: Economic Analysis and U.S. v. IBM I* (MIT 1983).

³⁷ Schumpeter, *Capitalism, Socialism and Democracy* at 73–74 (cited in note 27).

³⁸ Richard Schmalensee, *Good Regulatory Regimes*, 20 RAND J Econ 417, 435 (1989).

³⁹ John Schwartz and Anita Amirrezvani, *Does Bill Play Fair*, Newsweek 58, 59 (Nov 30, 1992) (quoting William F. Baxter).

⁴⁰ Jonathan Marshall, *Antitrust Punishes Market Winners*, San Fran Chron E1 (July 24, 1995) (quoting William F. Baxter).

share It's terribly important that companies not be given a signal that success and capture of large market share will bring antitrust attack The social value of what IBM and Microsoft delivered is far greater than any harm they could have done by anticompetitive practices.⁴¹

Baxter similarly observed in 1997 that in the New Economy “companies will compete *for* markets, rather than *in* markets.”⁴² Speaking specifically of the threat to Microsoft's Windows from Sun Microsystems's Java computing language, Baxter observed that there will be “a series of companies leapfrogging one another,” such that “[t]he worst thing we can do is weaken the incentives to be the successful frog.”⁴³

This admonition from the architect of the AT&T divestiture, though made before the government's evidence against Microsoft was revealed in court, remains pertinent. It counsels all concerned to ask, given the defendant's liability, how the remedy phase in *Microsoft* or any antitrust case might be resolved in a socially beneficial manner.⁴⁴

II. A SYSTEMATIC APPROACH TO DESIGNING EFFICIENT ANTITRUST REMEDIES

In this Part, we address the following question: When is permanent injunctive relief—and divestiture in particular—the appropriate remedy in an antitrust case? Antitrust remedies can be classified into two general categories: damages and injunctions. Injunctive remedies can be further classified into behavioral remedies and structural remedies. Behavioral injunctions bar a defendant firm from engaging in particular actions that a court has deemed anticompetitive (or in the case of a consent decree, actions that the defendant has agreed to alter even if it has not conceded them to be illegal). In the context of Microsoft, a behavioral remedy might prevent the firm from conditioning the distribution of Windows on anything other than the ability of an original equipment manufacturer (“OEM”) to pay for the license and promise to respect Microsoft's intellectual property.

Although behavioral remedies alter the actions that the defendant and, as a consequence, competitors in the relevant market may pursue, they do not directly alter the structure of the relevant market or the distribution of the assets needed to compete among rival firms. In contrast, structural remedies affect market structure directly by redistributing competitive as-

⁴¹ Id.

⁴² Russ Mitchell and Marianne Lavelle, *Road Runner v. Coyote: As Microsoft Case Shows, Markets Move Faster than Justice*, US News & World Rep 58, 59 (Dec 15, 1997) (quoting William F. Baxter).

⁴³ Id. (quoting William F. Baxter).

⁴⁴ Professor Baxter passed away November 27, 1998. See Michael M. Weinstein, *W. F. Baxter, 69, Ex-Antitrust Chief, Is Dead*, NY Times B15 (Dec 2, 1998).

sets in the relevant market. The redistribution can be accomplished by breaking the defendant company into two or more pieces and reorganizing the company's assets (which can include employees) among the two or more newly created competitors. Alternatively, these assets can be redistributed by requiring the defendant to sell or otherwise to make available to its competitors some input, right, or facility that will allow rivals to compete in the market. Compulsory licensing of intellectual property and mandatory access to essential facilities are general examples. One structural remedy that has been proposed for Microsoft would require the company to auction its Windows source code to competitors.⁴⁵

The remainder of Part II is organized as follows. In Part II.A, we describe a test for evaluating and comparing the economic welfare consequences of alternative injunctive remedies. In Part II.B, we examine existing antitrust jurisprudence to see how it relates to our efficiency-based test and to see whether the case law establishes additional principles that must be applied. We find existing antitrust law to offer surprisingly little guidance on remedies and to highlight the need for an axiomatic approach to the problem.

A. An Economic Welfare Test for Designing Optimal Injunctive Remedies

From an economic standpoint, the normative goal of law and public policy should be to increase society's overall wealth. This economic welfare criterion implies that a policy can impose costs so long as it creates offsetting benefits. A much more stringent standard of economic welfare, and one that hence provides a much weaker mandate for public policy, is Pareto efficiency, which holds a policy to be efficient only if it makes some parties better off without making any party worse off.⁴⁶ In the absence of compensating side payments from the winners to the losers, few policies would qualify as Pareto efficient. A more practical formulation is that a policy can impose costs on some parties so long as the policy beneficiaries can (at least theoretically) compensate the losers and still be better off. That principle is often referred to in the literature as the Pareto criterion, and is what we will mean here when we use "Pareto" descriptively.⁴⁷ Policymakers in several branches of economics, from the environment⁴⁸ to international

⁴⁵ This structural remedy was suggested by Professor Nicholas Economides of New York University. See Joel Brinkley, *A Microsoft Remedy: Antitrust Experts Offer Prescriptions*, NY Times C1 (Nov 15, 1999).

⁴⁶ For a discussion of Pareto efficiency, see Hal R. Varian, *Microeconomic Analysis* 225–26 (Norton 3d ed 1992).

⁴⁷ See, for example, William J. Baumol, *Superficiality: Applications and Theory* 7–9 (MIT 1986).

⁴⁸ See, for example, Kenneth J. Arrow, et al, *Benefit-Cost Analysis in Environmental, Health, and Safety Regulation: A Statement of Principles* 5 (AEI 1996) ("A benefit-cost analysis is a useful way of organizing a comparison of the favorable and unfavorable effects of proposed policies.")

trade,⁴⁹ have employed the Pareto principle as a starting point for policy formulation. It is similarly applicable to the choice of legal remedies.

Much of the literature on optimal remedies concerns designing awards to the breached-against party of a contract, to a victim of a tort, or to a victim of a crime. In general, the literature is concerned with designing a remedy that induces an efficient level of economic activity or an efficient level of resource use. For example, in contract law, an optimal damages award is one under which breach will occur only if the overall gains to the parties are greater from breach than from performance.⁵⁰ An optimal penalty in a criminal proceeding should minimize the social cost of crime, which equals the sum of the harms it causes and the costs of preventing it.⁵¹ When considering the tradeoffs between types of criminal punishment, “efficiency requires exhausting the ability to punish criminals cheaply with fines before resorting to the costly punishment of imprisonment.”⁵² Achieving efficiency—namely, minimizing the social cost of accidents—is also the aim in designing remedies for tort victims.⁵³

Similarly, with respect to antitrust law, many commentators have argued that substantive liability rules should minimize the combined social cost of three variables: (1) the costs that arise when competitively neutral or efficiency enhancing behavior is deterred or mischaracterized as injurious to consumers; (2) the costs that arise when conduct injurious to consumers is not recognized as such; and (3) the costs of litigating claims under the rule.⁵⁴ If the probability or social cost of failing to recognize injurious behavior is small, then antitrust officials should employ a comparatively tolerant rule that minimizes the combined costs to consumers of false positives, false negatives, and the significant administrative costs under the An-

⁴⁹ See, for example, Paul R. Krugman and Maurice Obstfeld, *International Economics: Theory and Policy*? 196-97 (Addison-Wesley 5th ed 2000). Krugman and Obstfeld acknowledge that a free trade policy results in “winners” and “losers.” So long as the winners can compensate the losers and still be made better off, however, free trade should be pursued.

⁵⁰ For example, when both parties to a contract are risk neutral, expectation damages can be shown to be an efficient substitute for explicit contract provisions governing the breach, whereas reliance damages and restitution damages may lead to an inefficient breach. See A. Mitchell Polinsky, *An Introduction to Law and Economics* 29 (Little, Brown 1983). See also Richard A. Posner, *Economic Analysis of Law* 130-50 (Aspen 5th ed 1998).

⁵¹ In particular, society should invest in deterrence up until the point that the marginal social cost of deterrence equals the marginal benefit of deterrence. See, for example, Robert Cooter and Thomas Ulen, *Law and Economics* 400-04 (Addison-Wesley 2d ed 1995).

⁵² *Id.* at 404.

⁵³ For example, it can be demonstrated that “a negligence rule with perfect compensation and the legal standard equal to the efficient level of care gives the injurer incentives for efficient precaution.” *Id.* at 277.

⁵⁴ See J. Gregory Sidak, *Debunking Predatory Innovation*, 83 Colum L Rev 1121, 1144-45 (1983); Frank H. Easterbrook, *Predatory Strategies and Counterstrategies*, 48 U Chi L Rev 263, 318-19 (1981); Paul L. Joskow and Alvin K. Klevorick, *A Framework for Analyzing Predatory Pricing Policy*, 89 Yale L J 213, 223, 240 (1979); Richard Schmalensee, *On the Use of Economic Models in Antitrust: The Realemon Case*, 127 U Pa L Rev 994, 1018-19 n 98 (1979).

titrust Division's consent decree process. If harms are likely to be great or identification of illegal conduct is difficult, then a more stringent per se rule may be appropriate.

A similar kind of framework is useful in evaluating possible antitrust remedies. In the first part of this section, we extend the Pareto criterion to the remedy decision by constructing a three-part framework for evaluating the countervailing gains and losses in economic efficiency that a particular remedy might cause. We begin by describing three forms of economic efficiency: allocative, productive, and dynamic efficiency. Allocative efficiency is present when goods and services are allocated to the uses in which they have the highest value.⁵⁵ Productive efficiency is present when producers use goods and services in such a manner as to minimize costs, subject to technological constraints.⁵⁶ Dynamic efficiency refers to decisions made over time and includes efficiencies in investment and technological innovation.⁵⁷ When the government intervenes in markets in the name of increasing one form of efficiency, such as allocative efficiency, it must take care that its actions not cause a larger sacrifice in another form of efficiency, such as productive or dynamic efficiency. Recognition of this tradeoff has been increasingly incorporated in antitrust jurisprudence since the 1970s.⁵⁸

In step one, the government bears the burden of demonstrating that, in a static framework, the *gain* (or recovery of what economists call the "deadweight loss" that comes from inefficient allocation) associated with an expected decrease in price exceeds any productive efficiency *loss* caused by the proposed remedy.⁵⁹ To compute the gain from a horizontal divestiture in the current Microsoft case, for example, the government must estimate the extent to which an increased number of operating system providers would reduce price.⁶⁰ It must then examine whether divestiture, perhaps by chang-

⁵⁵ See Paul A. Samuelson and William D. Nordhaus, *Economics* 264 (McGraw-Hill 15th ed 1995).

⁵⁶ See Robert H. Bork, *The Antitrust Paradox: A Policy at War with Itself* 104-06 (Basic Books rev ed 1993); Oliver E. Williamson, *Economies as an Antitrust Defense: The Welfare Tradeoffs*, 58 *Am Econ Rev* 18, 21 (1968).

⁵⁷ See J. Gregory Sidak and Daniel F. Spulber, *Deregulatory Takings and the Regulatory Contract: The Competitive Transformation of Network Industries in the United States* 522 (Cambridge 1997); Teece and Coleman, 43 *Antitrust Bull* at 824-25 (cited in note 27).

⁵⁸ See, for example, *Continental TV, Inc v GTE Sylvania, Inc*, 433 US 36, 54 (1977) (recognizing that vertical restraints may allow a manufacturer to achieve efficiencies in distribution).

⁵⁹ Efficiency requires that the party who can produce the evidence at the lowest cost should bear the evidentiary burden. See Richard A. Posner, *An Economic Approach to the Law of Evidence*, 51 *Stan L Rev* 1477, 1503-04 (1999); Richard D. Friedman, *Economic Analysis of Evidentiary Law: An Underused Tool, an Undeveloped Field*, 19 *Cardozo L Rev* 1531, 1533 (1998); Bruce L. Hay, *Allocating the Burden of Proof* 72 *Ind L J* 651, 674-75 (1997); Jason S. Johnston, *Bayesian Fact-Finding and Efficiency: Toward an Economic Theory of Liability under Uncertainty*, 61 *S Cal L Rev* 137, 175-78 (1987); Richard A. Posner, *An Economic Approach to Legal Procedure and Judicial Administration*, 2 *J Legal Stud* 399, 409-10 (1973).

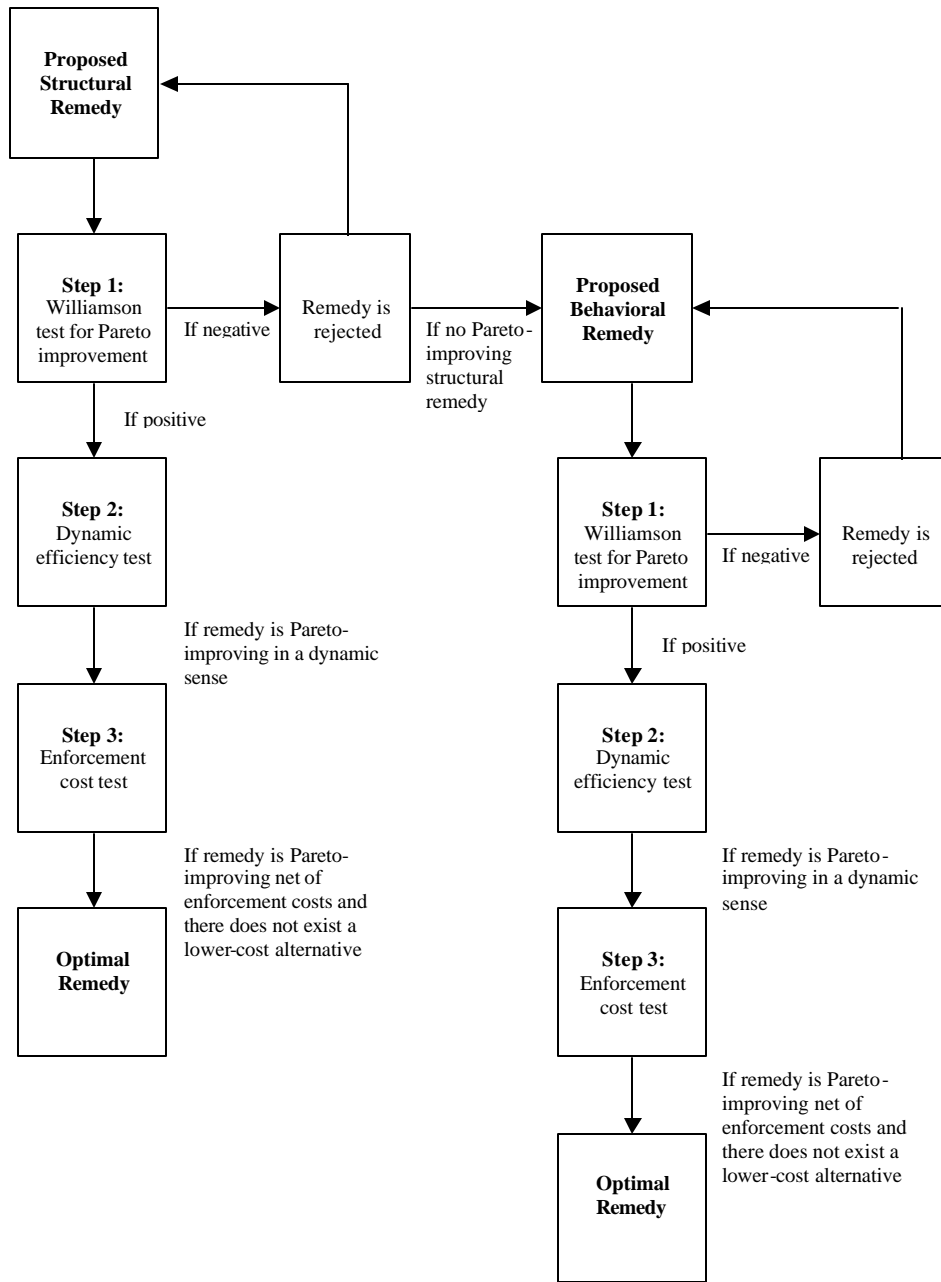
⁶⁰ Some structural proposals, such as the auctioning of source code, may create more than one competitor in the "market" for Intel-based operating systems.

ing the cost structure of production, would entail any productive inefficiencies. If the government cannot demonstrate that the net welfare change of a structural remedy is positive in a static sense, then that particular remedy should be withdrawn from consideration.

If the gains in allocative efficiency exceed the loss in productive efficiency in a static sense, then the second step is to demonstrate that those static net gains in efficiency offset any loss in dynamic efficiency. Because the loss in dynamic efficiency would occur in the future, it must be discounted appropriately for comparison with any static net efficiency gains. If the government cannot demonstrate that the net welfare change of a structural remedy is positive net of the dynamic efficiency loss, then that particular remedy should be withdrawn from consideration. Assuming that the net benefits of several structural remedies are shown to be positive in a dynamic sense, the decisionmaker should proceed to step three of the framework.

The third step is to rank the set of Pareto-improving remedies according to their welfare impact. Although several structural remedies might yield social benefits of the same order of magnitude, there might well be a wide variation in the enforcement costs associated with each potential remedy. Enforcement costs are the transaction cost of antitrust remedies and should be broadly conceived to include administrative costs, monitoring costs, and the misallocation of resources associated with rent-seeking activity. Efficiency requires the rejection of a remedy if (1) the enforcement costs associated with that remedy exceed its welfare impact *or* (2) there exists another remedy that would yield the same welfare gains but at a lower enforcement cost. A structural remedy that meets both criteria of our test—namely, the remedy is Pareto-improving net of enforcement costs and there does not exist a remedy that achieves the same efficiency gains with lower enforcement costs—is the optimal remedy. Figure 1 summarizes the three-step decision framework described above.

FIGURE 1: THREE-STEP TEST FOR DETERMINING THE OPTIMAL REMEDY



1. Step one: The injunctive remedy should produce a net gain in static economic efficiency.

The first step in our test for designing an optimal antitrust injunction is to evaluate a proposed remedy's net effect on static economic efficiency (before considering the loss in dynamic efficiency and enforcement costs). We explain this analysis first for the case of structural remedies, and then for behavioral remedies.

Antitrust laws in general and merger policies in particular are designed to promote consumer welfare. In the late 1960s, Oliver E. Williamson demonstrated the effects on consumer welfare of a merger that restricts output (by raising prices) and lowers marginal costs (by achieving certain productive efficiencies).⁶¹ To defend a merger, according to Williamson, the merging parties must demonstrate that the cost savings achieved through greater efficiencies exceed the deadweight loss (the amount between the increased market price and the price that consumers would be willing to pay for the lost output).⁶² Cost reductions should be considered a social benefit, not just a private benefit to the parties, because the saved resources would be free to produce outputs elsewhere in the economy. Moreover, even under a merger to monopoly, a portion of the cost savings would be passed on to consumers.⁶³ According to Robert Bork, Williamson's insight can be extended to any antitrust analysis:

[Williamson's framework] can be used to illustrate all antitrust problems, since it shows the relationship of the only two factors involved, allocative inefficiency and productive efficiency. The existence of these two elements and their respective amounts are the real issues in every properly decided antitrust case. They are what we have to estimate—whether the case is about the dissolution of a monopolistic firm, a conglomerate merger, a requirements contract, or a price-fixing agreement.⁶⁴

The Department of Justice and the Federal Trade Commission have come to embrace that test for both vertical⁶⁵ and horizontal merger analysis.⁶⁶

⁶¹ See Williamson, 58 Am Econ Rev at 21–23 (cited in note 56).

⁶² Id at 33–34.

⁶³ See, for example, Jerry A. Hausman and Gregory K. Leonard, *Efficiencies from the Consumer Viewpoint*, 7 Geo Mason L Rev 707, 708–09 (1999).

⁶⁴ Bork, *Antitrust Paradox* at 108 (cited in note 56).

⁶⁵ U.S. Department of Justice, *Merger Guidelines—1984* § 4.24 (CCH 1984) (“As in the case of horizontal mergers, the Department will consider expected efficiencies in determining whether to challenge a vertical merger.”).

⁶⁶ *Department of Justice and Federal Trade Commission Horizontal Merger Guidelines* § 4 (1992) (“Because the antitrust laws, and thus the standards of the Guidelines, are designed to proscribe only mergers that present a significant danger to competition, they do not present an obstacle to most mergers. As a consequence, in the majority of cases, the Guidelines will allow firms to achieve available efficiencies through mergers without interference from the Agency.”).

Observers will note that the test for approving a horizontal merger can be inverted to provide the test for requiring a horizontal divestiture. Rather than asking the merging parties to demonstrate the net benefits of the merger, in the case of a forced divestiture, the government should demonstrate that structural relief increases net social gains. Because allocative inefficiency and productive efficiency are at the core of all antitrust problems, the government should bear the burden of proving the expected effect of a remedy on both.

The test for divestiture is the inverse of the test for merger—namely, a comparison of the efficiency gains and the deadweight loss imposed by the “anti-merger” caused by the order of divestiture. In Microsoft’s case, it would be possible to calculate the minimum price decline in the Windows operating system (and ultimately in personal computers) that must occur for the divestiture to be welfare enhancing. To do so, the court would need to estimate the efficiency gains that would be jeopardized if a divestiture were imposed. For any given level of efficiency loss, one could estimate the price decline that would need to occur conditional on different estimates of the elasticity of demand for Windows and PCs. The result would be a matrix that showed a range of price declines.⁶⁷ The larger the range of necessary price declines over the relevant parameters, the greater would be the government’s burden of proving that its divestiture proposal was predicated on a credible model that predicted a substantial price decline following divestiture.

A similar analysis should apply to behavioral remedies designed to restrict an upstream firm from exercising vertical control over a downstream distributor. Microsoft, for example, can be viewed as an upstream provider of operating systems, and OEMs, such as PC makers, can be viewed as the downstream distributor of the final product. The decision rule that should be employed by antitrust authorities regarding vertical control is, again, simple to state: Outlaw only those vertical restraints that reduce social welfare. The application of that rule to the specific competitive environment and the specific behavior in question, however, is likely to prove more difficult.⁶⁸

For example, Jean Tirole demonstrates that under simple models of vertical control where the downstream firm is assumed to have market power, “[social] welfare is unambiguously increased by the elimination of

⁶⁷ For a similar line of analysis, see Bernard J. Reddy, David S. Evans, and Albert L. Nichols, *Why Does Microsoft Charge So Little for Windows?* (Nat'l Econ Res Assoc 1999).

⁶⁸ To clarify, there are three elements in the chain here: manufacturer, operating system, and applications. Paul Krugman has argued that divestiture might create independently owned monopolies in the operating systems and applications markets. This would raise the specter of double marginalization. But no one argues that OEMs have (significant) market power, and thus there can be no risk of monopoly by the OEMs or double marginalization. There are various reasons (such as externalities and free-riding) why Microsoft’s restrictions on OEMs are procompetitive, but those reasons do not concern double marginalization. Rather, they pertain to traditional arguments of vertical foreclosure.

the double marginalization.”⁶⁹ Only one firm rather than two marks up the price of the upstream product, leading to a lower price and higher output. Other models of vertical control, including a model of downstream moral hazard and a model of input substitution, are used to demonstrate that “vertical restraints need not be detrimental to welfare, even when they are meant to increase monopoly profit.”⁷⁰ By contrast, some vertical restraints may be privately desirable (in the sense that they eliminate the distortions caused by dual ownership) and at the same time socially undesirable.⁷¹ For example, in some cases when an upstream firm enters into a long-term contract with the downstream firms, Tirole demonstrates that “private contracting yields too much foreclosure—i.e., too little competition—from a social viewpoint.”⁷² With respect to policymaking, Tirole issues the following warning:

At the same time, this conclusion [that vertical restraints can increase or decrease welfare] puts far too heavy a burden on the antitrust authorities. It seems important for economic theorists to develop a careful classification and operative criteria to determine in which environments certain vertical restraints are likely to lower social welfare.⁷³

Until the theory has sufficiently advanced, antitrust enforcement will be prone to error in classifying vertical arrangements as either benign or anti-competitive.

The prospect of erroneously proscribing a socially beneficial vertical arrangement through either structural or behavioral injunctions is grounds for caution. Indeed, the evolution of antitrust jurisprudence in the last twenty-five years towards fewer per se rules has been driven in part by the recognition that many vertical agreements previously viewed with hostility may be efficient and beneficial for consumers. Therefore, just as in the case of divestiture, the government should bear the burden of showing that the particular arrangement at issue forecloses too much competition from a social viewpoint. The first step in presenting its case should involve the best attempt to classify the alleged anticompetitive behavior based on the existing industrial organization literature. Next, the government should demonstrate how related cases, either in theory or through evidence, have resulted

⁶⁹ Tirole, *Theory of Industrial Organization* at 177 (cited in note 22). For a nontechnical discussion of double marginalization in the context of the Microsoft case, see Krugman, *Microsoft: What Next?*, NY Times at A21 (cited in note 17); Krugman, *Dirty Windows Policy*, NY Times at sec 4, 19 (cited in note 17).

⁷⁰ Tirole, *Theory of Industrial Organization* at 181 (cited in note 22).

⁷¹ The Chicago School holds that there are no monopoly reasons for vertical control, and that observed vertical controls are meant to improve the efficiency of vertical relationships because the monopolist can always exhaust its monopoly power by raising its price. See, for example, Posner, *Economic Analysis of Law* at 337–40 (cited in note 50).

⁷² Tirole, *Theory of Industrial Organization* at 187 (cited in note 22).

⁷³ Id at 186.

in too much foreclosure. Finally, the government should attempt to quantify the gains enjoyed by the private parties to the contract. The mere existence of the voluntary contract is evidence that *private* gains were realized. If those gains outweigh the social costs, then the conduct leads to a net increase in efficiency and policy should emphasize getting the private parties to internalize the costs rather than give up the gains.

a) *Calculating the gain in allocative efficiency.* To calculate the allocative efficiency that would be restored by a divestiture, the government must accurately model the market environment in which the defendant firm operates. Without such a model, it is impossible to estimate the amount by which prices would decrease after the divestiture. The choice of economic model must be governed by a thorough understanding of the means by which firms compete in the relevant market. For example, the assumptions underlying the model must be justified with real-world data, including estimates of the relevant cost curves and price elasticities (that is, responses of supply and demand to changes in the price of a product or in the prices of that product's substitutes and complements). Richard Posner has argued that estimation of the price elasticity of demand for the relevant product is the most critical aspect in determining whether a merger would be illegal.⁷⁴ In particular, he has explained that "the greater the elasticity of demand, the smaller the ratio of the monopoly to the competitive price, and the less monopoly power the firm will have."⁷⁵

Moreover, in certain competitive environments, such as those with consumption externalities,⁷⁶ it is not obvious that more competitors would lead to lower prices. For example, in the case of operating systems, the more consumers use one standard, the more valuable that standard becomes for other consumers. If operating systems were competitively supplied, no individual producer would be able to capture the gains from "growing the market." Hence, it is not clear whether prices in a competitive operating systems market would be less than prices in a monopolistic operating systems market. Again, the government should explain with specificity the mechanism of any predicted price decline in a systematic fashion.

For example, to estimate accurately the change in the price of Windows due to an injunctive remedy, it is necessary to assess the "benchmark price" from which prices would fall if a structural remedy were imposed. As Steven Salop has demonstrated, the competitive benchmark for analyzing both market effects and market power is the price "that would prevail in the absence of the alleged anticompetitive restraint."⁷⁷

⁷⁴ See Posner, *Economic Analysis of Law* at 324 (cited in note 50).

⁷⁵ *Id.*

⁷⁶ With consumption externalities, "the utility of one consumer is directly affected by the actions of another consumer." Varian, *Microeconomic Analysis* at 432 (cited in note 46).

⁷⁷ Steven C. Salop, *The First Principles Approach to Antitrust, Kodak, and Antitrust at the Millennium*, 68 *Antitrust L J* 187, 188 (2000).

There are several pitfalls to be avoided when computing the price decline to be expected from a given remedy. First, one might be tempted to associate the current price of the defendant's product with the static monopoly price. If the current price were equal to the static monopoly price, and demand conditions were such that the monopoly price were well above cost, then the decline in price caused by a horizontal divestiture would certainly be significant. In a simple static model, the markup over price charged by a monopolist is the inverse of the elasticity of demand. Assuming marginal costs greater than zero, if the divestiture created a more competitive environment, the price of the product at issue could fall in percentage terms by as much as the inverse of the demand elasticity.⁷⁸

With respect to Microsoft, several economists have argued that the defendant does not currently price at the monopoly level. One study found that if Microsoft priced according to a static monopoly model with the kinds of durable entry barriers assumed by the government, the price for Windows would range from nine hundred to sixteen hundred dollars, well above the retail price of fifty dollars.⁷⁹ Stated differently, how can a firm charging fifty dollars for a product be a "monopolist" if a true monopolist would charge roughly twenty to thirty times that amount? The authors of that paper explain that Microsoft cannot charge the static monopoly price because "it faces intense competition from firms that would like their products to displace Windows,"⁸⁰ and that could enter the market if Microsoft raised its prices to monopoly levels. Robert Hall has argued that Microsoft needed to keep its prices sufficiently low so as to make self-supply by OEMs "barely unprofitable."⁸¹ Absent concerns about competitive entry, Hall calculates that a monopolist would charge over eight hundred dollars per license for Windows.⁸² Hence, for the purpose of structural analysis, the

⁷⁸ Letting m be the marginal cost and e the elasticity of demand, the monopoly price is $m / (1 - 1/e)$ and the competitive price is m . The percentage decrease in price is equal to $1/e$. A caveat is required, however. This relationship holds only if marginal cost is increasing, or if there are no fixed costs. In the presence of fixed costs (or, equivalently, with declining marginal cost), the "competitive" price will necessarily exceed marginal cost.

⁷⁹ See Reddy, Evans, and Nichols, *Why Does Microsoft Charge So Little for Windows?* at 13 (cited in note 67).

⁸⁰ *Id.* at 1.

⁸¹ Robert E. Hall, *Towards a Quantification of the Effects of Microsoft's Conduct* 4, Hoover Institution Working Paper (Dec 16, 1999) (on file with authors). A subsequent version of the paper appeared as Chris E. Hall and Robert E. Hall, *Toward a Quantification of the Effects of Microsoft's Conduct*, 90 *Amer Econ Rev Papers and Proc* 188 (May 2000).

⁸² Hall, *Towards a Quantification of the Effects of Microsoft's Conduct* at 3 (cited in note 81). Hall's use of a Cournot model is questionable in this setting. The Cournot model describes a "noncooperative" oligopoly, in which each firm maximizes profits by equating its own marginal cost and marginal revenue on the basis of the observed output of competitor firms. Phillip E. Areeda, Herbert Hovenkamp, and John L. Solow, 4 *Antitrust Law: An Analysis of Antitrust Principles and Their Application* ¶ 925a (Aspen rev ed 1998).

The model makes several untested assumptions before calculating what the fixed cost of entry would have to be for fifty dollars to be the limit price charged by a static monopolist. Setting aside dis-

current price of Windows cannot be assumed to equal the monopoly price. If it does not, then the price reduction and static welfare gains resulting from divestiture become less certain.

Second, even if one recognizes that the current price does not reflect the monopoly price, it would be incorrect to use the current price as the benchmark price from which prices would fall in the event of a divestiture. If a behavioral remedy could prevent Microsoft from engaging in allegedly anticompetitive conduct that elevated the price of Windows, then it would be incorrect to attribute the entire fall in prices uniquely to a structural remedy. Some of the price drop would occur from ending the anticompetitive conduct at issue, without any further structural change. Incorporating that portion of the fall in price from the current level to the benchmark price would overstate the size of the efficiency gain owing specifically to the structural remedy. Thus, when estimating the size of the static efficiency gain from a structural remedy, the benchmark price should be the price that would prevail in the relevant market with its existing (that is, pre-divestiture) structure but *without* anticompetitive conduct. The price drop used to calculate the welfare gain from the structural remedy would then be the difference between that benchmark price and the price predicted under the government's model of competition.

To summarize, the correct benchmark price from which any efficiency calculation is performed for structural remedies must acknowledge two important features. First, when predicting the magnitude of a post-remedy price drop, it is incorrect to presume the benchmark price to be that of a short-term monopolist with no threat of entry. Both entry threats and demand elasticities need to be taken into account.⁸³ Second, a remedy (short of divestiture) that eliminated anticompetitive conduct might itself reduce prices in the relevant market.

Hence, for the purpose of *behavioral* analysis, the correct change in price would equal the difference between the current price and the price that

agreements about whether those assumptions were reasonable, one must recognize that Hall's next step was simply to speculate that if Microsoft's actions raised the cost of entry by some dollar amount, they would raise the limit price for Windows. Hall, *Towards a Quantification of the Effects of Microsoft's Conduct* at 5–7 (cited in note 81). Hall's calculation, however, was a hypothetical example, not a calculation that used actual data. Hall did not actually compute the extent (if any) to which Microsoft's actions had raised the fixed cost of entry; he simply showed that a change in that fixed cost would increase the monopolist's limit price for Windows. *Id.* At least one court evaluating an antitrust claim has found that a Cournot model may be too conjectural to be useful in the real world. See *Concord Boat Corp v Brunswick Corp*, 207 F3d 1039, 1057 (8th Cir 2000) (rejecting under *Daubert v Merrell Dow Pharmaceuticals, Inc*, 509 US 579, 592 (1993), testimony of Professor Hall on the ground that it "used the Cournot model to construct a hypothetical market which was not grounded in the economic reality of the [relevant product] market, for it ignored inconvenient evidence").

⁸³ See Drew Fudenberg and Jean Tirole, *Pricing Under the Threat of Entry by a Sole Supplier of a Network Good*, Harvard University Working Paper (June 8, 1999) (on file with authors) (arguing that, when a network good is supplied by a single incumbent, the threat of entry of an incompatible good is welfare enhancing even though actual entry may lower welfare).

would prevail in the absence of the alleged anticompetitive conduct. However, for the purpose of *structural* analysis, the correct change in price would equal the difference between the price that would prevail in the absence of the alleged anticompetitive conduct and the competitive price (presumably achieved through divestiture).

b) Calculating the loss in productive efficiency. A remedy should preserve as much as possible any operational efficiency achieved by a firm's structure or strategies. Several experts who are studying the government's case against Microsoft have recognized that principle. For example, Steven Davis has argued that any proposed remedy should allow Microsoft to bundle Internet browsers with other software in its Windows operating system because integrating the two products has time and cost advantages over separate products.⁸⁴

The consumer benefits from bundling and interoperability can be substantial.⁸⁵ And when they are, a remedy that prevents bundling because of its perceived effects on competitors would also eliminate its benefits for consumers. Courts have thus shied away from preventing efficient bundling in the name of competition. A key example from the applicable case law was IBM's decision to integrate memory storage and processing capability into a single machine.⁸⁶ IBM's production decision clearly hurt competing manufacturers of peripheral memory storage equipment, but the United States Court of Appeals for the Ninth Circuit held that the integration represented a genuine efficiency and technological advance and therefore was not anticompetitive under the antitrust laws. For a remedy that barred efficient bundling also to preserve consumer welfare, it would have to lower the price of the product at issue enough to compensate for the lost benefit from bundling. More generally, to calculate the productive efficiencies lost as a result of the injunctive remedy, the government must present a thorough depiction of the relevant cost curves for the defendant firm. Estimates of economies of scale (for a horizontal divestiture) and economies of scope

⁸⁴ See Louis Uchitelle, *Economists Debate Solution for Microsoft Case*, NY Times C8 (Jan 10, 2000).

⁸⁵ See Steven H. Wildstrom, *Why I'm Rooting for Microsoft: A Close Look at Its Browser Shows It Should Be Linked with the Operating System*, Bus Wk 30 (Feb 23, 1998); *Microsoft Internet Explorer*, PC Computing 236 (Jan 1998).

⁸⁶ See *California Computer Products, Inc v International Bus Machs Corp*, 613 F2d 727, 744 (9th Cir 1979). See also *Berkey Photo, Inc v Eastman Kodak Co*, 603 F2d 263, 283 (2d Cir 1979) (permitting Kodak's integration of camera and film); *In re IBM Peripheral EDP Devices Antitrust Litigation*, 481 F Supp 965, 1003 (N D Cal 1979) (declining to find product integration per se anticompetitive, but rather examining the effect on consumers), aff'd and modified on other grounds as *Transamerica Computer Co v International Bus Machs Corp*, 698 F2d 1377 (9th Cir 1983); *ILC Peripherals Leasing Corp v International Bus Machs Corp*, 458 F Supp 423, 443 (N D Cal 1978) (holding several product integrations to be reasonable responses to competition), aff'd as *Memorex Corp v International Bus Machs Corp*, 636 F2d 1188 (9th Cir 1980); *Telex Corp v International Bus Machs Corp*, 367 F Supp 258, 346-48 (N D Okla 1973) (permitting bundling in computers on technological justifications), rev'd on other grounds, 510 F2d 894 (10th Cir 1975). See also Sidak, 83 Colum L Rev at 1126-43 (cited in note 54).

(for a vertical divestiture) are required to appreciate the magnitude of the cost savings at risk from a proposed divestiture.

2. Step two: The net gain in static economic efficiency should offset any potential losses in dynamic efficiency.

The idea that dynamic innovation and allocative efficiency might differ in their respective responses to market structure was suggested over fifty years ago. Joseph A. Schumpeter wrote in 1942 that, for purposes of economic welfare, “perfect competition is not only impossible but inferior, and has no title to being set up as a model of ideal efficiency.”⁸⁷ With that conjecture, he opened to question the very foundation of American antitrust law. The Sherman and Clayton Antitrust Acts were premised on the idea that competition, not economic concentration, would best allocate society’s resources and preserve economic welfare. Schumpeter’s argument that most technological innovation would come from large corporations with market power and organized R&D operations implied that antitrust law’s ideal of competition could have substantial social costs over time.⁸⁸

Antitrust policy in the United States focuses on market power and on how that power will affect prices and output in the relevant market. Market share serves as an imperfect but workable proxy for market power—the ability to raise prices and restrict output in a nontransitory manner—and its centrality in U.S. competition policy fits logically with antitrust’s basic premise that economic performance improves with competition. With a few specific exceptions, such as natural monopolies, economic theory and antitrust policy have long favored more competition over less for the purposes of lowering prices, expanding output, and making consumers better off.

The presumption that increased benefits come from increased competition may become less universal, however, when one takes into account not only lower prices for a given set of goods produced under a fixed set of technologies, but also efficient innovative activity by firms over time. Theoretical and empirical research has shown that, depending on various conditions, either monopoly power or competition may increase total innovation.⁸⁹

The debate over the relationship between market structure and innovation is an important and difficult one. For current purposes, however, the

⁸⁷ Schumpeter, *Capitalism, Socialism, and Democracy* at 106 (cited in note 27).

⁸⁸ Of course, antitrust’s competitive ideal has evolved over time. When Schumpeter was writing, the ideal was rivalry among small, atomized economic actors. Any cooperation or concentration that deviated from that standard was inherently suspect. The Chicago School revolution did much to improve understanding of why different market structures might result in different contexts and to reduce rigid adherence to the perfectly competitive model. Competition, because of its benefits for allocative efficiency, nonetheless remained the touchstone of antitrust policy.

⁸⁹ See, for example, F.M. Scherer, *Schumpeter and Plausible Capitalism*, 30 *J Econ Literature* 1416, 1421–24 (1992).

important fact is that such a debate exists, as does consensus that the relationship is likely to depend heavily on firm- and industry-specific factors. For that reason, a remedy cannot be assumed to have dynamic benefits, or not to have dynamic costs, simply because it has static efficiency benefits.

It is therefore necessary to ask how, in a specific case, a particular remedy might affect dynamic innovation. Will a remedy in a monopolization case eliminate monopoly rent, or merely appropriate the legitimate and efficient returns needed to induce risky investment in the first place? This question has, by analogy, been considered in the economic theory of utility regulation.⁹⁰ “In the absence of a detailed long-term contract,” Jean-Jacques Laffont and Jean Tirole observe, “the regulated firm may refrain from investing in the fear that once the investment is in place, the regulator would pay only for variable cost and would not allow the firm to recoup its sunk cost.”⁹¹ One can make a similar point with respect to antitrust enforcement that misdiagnoses market power or that misclassifies conduct as anticompetitive.

Antitrust litigation that seeks to lower the firm’s price and targets monopoly rents for eradication will not threaten dynamic efficiency, as firms will continue to face efficient incentives to invest. Only the inefficient monopoly rent, not the risk-adjusted competitive return on investment, will be reduced. But if antitrust litigation appropriates (intentionally or unintentionally) the quasi-rents with which the firm would recover its sunk costs in specialized investments, dynamic efficiency suffers.⁹² It then has an effect

⁹⁰ See Victor P. Goldberg, *Relational Exchange: Economics and Complex Contracts*, 23 Am Beh Scientist 337, 340 (1980), reprinted in Victor P. Goldberg, ed, *Readings in Contract Law* 16, 18 (Cambridge 1989). See also Victor P. Goldberg, *Regulation and Administered Contracts*, 7 Bell J Econ 426, 432–36 (1976) (noting that market participants seek some assurance regarding the long-term availability of the market before investing). For subsequent analyses that analogize utility regulation to the cost recovery aspects of contracting, see Jean-Jacques Laffont and Jean Tirole, *Competition in Telecommunications* 137–61 (MIT 2000); Sidak and Spulber, *Deregulatory Takings* at 101–13 (cited in note 57); Jean-Jacques Laffont and Jean Tirole, *A Theory of Incentives in Procurement and Regulation* 53–127 (MIT 1993); Glenn Blackmon and Richard Zeckhauser, *Fragile Commitments and the Regulatory Process*, 9 Yale J Reg 73, 76–78 (1992); Daniel F. Spulber, *Regulation and Markets* 610–17 (MIT 1989); Dennis L. Weisman, *Default Capacity Tariffs: Smoothing the Transitional Regulatory Asymmetries in the Telecommunications Market*, 5 Yale J Reg 149, 157–61 (1988); Paul L. Joskow and Richard Schmalensee, *Incentive Regulation for Electric Utilities*, 4 Yale J Reg 1, 8–12 (1986).

⁹¹ Laffont and Tirole, *A Theory of Incentives* at 54 (cited in note 90).

⁹² The relationship between economic rent, quasi-rent, and investment can be explained as follows:

Suppose that to carry out production a firm must invest k dollars. Suppose that the investment k is irreversible, so that k represents sunk costs. The firm has operating costs c and expects to earn revenues R . The firm’s economic rent is defined as revenues net of operating cost and investment cost, $R - c - k$. Economic rent provides the incentive for entry. The firm’s economic quasi-rent is defined as net revenue, $R - c$. The quasi-rent provides incentives to stay in the industry after entry costs have been sunk. Having sunk k , the firm decides whether or not to produce on the basis of its comparison of R and c only. It would manifest the fallacy of sunk costs for the firm to base the production decision on the magnitude of k . Thus, after k is sunk, only quasi-rents—not economic rents—affect the firm’s decision whether or not to produce the good.

That condition does not mean that pricing should not take into account sunk costs k . The fallacy of

similar to the effects of contractual opportunism⁹³ or regulatory holdup.⁹⁴ If the decrease in price caused by the antitrust remedy represents an ex post reduction of the legitimate return to investment, the defendant firm would not have faced a positive expected value ex ante when deciding whether to make its original investment. Hence, the defendant firm would not have invested in the project that gave rise to the antitrust intervention. Once a case is brought that mistakes legitimate quasi-rents for illegally achieved monopoly returns, the precedent will become a risk factor that truncates the expected returns to investment—and hence incentives to invest—for all firms in the industry. The result is a decrease in dynamic efficiency.

The foregoing principle counsels not only that enforcement agencies exercise care in how they categorize conduct or price-cost margins, but also that they do not go so far in remedying anticompetitive conduct that they also deter beneficial activity. Thus, antitrust authorities should bear the burden of demonstrating that the price decrease associated with a proposed remedy would not go so far as to expropriate legitimate, risk-adjusted returns on investment. And, if such remedial precision is not feasible, then the government should be able to show that the likely gain in static efficiency exceeds the present discounted value of any probable loss in dynamic efficiency.

3. Step three: Taking enforcement costs into account.

A complete analysis of the gains from a remedy must take account of expected enforcement costs. This is not to say that such costs cannot be worthwhile. High enforcement costs may be an essential part of a highly beneficial remedy. But if another remedy could achieve the same level of benefits at a lesser social cost, then the original remedy would fail the Pareto test. The Pareto criterion might also not be met if a remedy exists that achieves lower benefits but entails lower enforcement costs that compensate for the forgone gain. Thus, just as a court or agency should not impose a remedy that bars efficient or procompetitive behavior, nor should it ignore a remedy's administrative costs. Indeed, an antitrust remedy "should not induce resource misallocation in a manner irreconcilable with the very

forward-looking costs ignores the expectations of the investor when the decision to invest k is made. Thus, the fallacy of forward-looking costs would be to base the investment decision on quasi-rents alone, ignoring the magnitude of k . Before the firm has sunk k , it is economic rents that count, not quasi-rents.

Sidak and Spulber, *Deregulatory Takings* at 423–24 (cited in note 57).

⁹³ See Oliver E. Williamson, *Transaction-Cost Economics: The Governance of Contractual Relations*, 22 *J L & Econ* 233, 234 (1979); Benjamin Klein, Robert G. Crawford, and Armen A. Alchian, *Vertical Integration, Appropriable Rents, and the Competitive Contracting Process*, 21 *J L & Econ* 297, 297–98 (1978). See also Benjamin Klein and Keith Leffler, *The Role of Market Forces in Assuring Contractual Performance*, 89 *J Pol Econ* 615, 617–18 (1981).

⁹⁴ See Sidak and Spulber, *Deregulatory Takings* at 107 (cited in note 57).

maximization of consumer welfare that animates antitrust doctrine.”⁹⁵ It can, of course, be difficult to quantify remedial costs. They might be quite diffuse, falling on court systems, government agencies, private enterprises, and, in the form of resource misallocation, the general public. In this section we discuss several factors that may affect the social costs of administering a given antitrust remedy.

The importance of taking enforcement costs into account is enormous, though often underemphasized. Consider some of the arguments in *Microsoft*. Paul Romer submitted testimony on the costs and benefits of the government’s proposed divestiture of Microsoft, yet that testimony contained scant analysis of the transaction costs of such a remedy. He conceded that “[t]here is genuine uncertainty about the exact magnitudes of the benefits and any costs” associated with the government’s proposed remedies, but concluded that “any reasonable calculation shows that the expected benefits overwhelm the costs.”⁹⁶ Similarly, Rebecca Henderson, another of the government’s economic witnesses on remedies, asserted that divesting Microsoft’s operating systems business from the company’s applications business is the appropriate remedy because “[a] regulatory alternative capable of achieving the same ends would necessarily have to be highly intrusive and would almost certainly be significantly less effective.”⁹⁷

Absent from each witness’s analysis was rigorous discussion of the monitoring and oversight costs of the government’s proposed remedy, including the costs associated with strategic litigation over interpretation of the government’s proposed final judgment. Given the experience of litigation under the AT&T divestiture decree and the corresponding provisions that superseded it in the Telecommunications Act of 1996, which we discuss in greater detail in Part V, Romer’s and Henderson’s assessments of the likely costs of the government’s proposed remedy in the Microsoft case, and of how those costs compare with the costs of other remedies, is incomplete.

One can easily imagine, to take only one example, that the meaning of “middleware” would be thoroughly litigated by interested parties, just as the meaning of “information services” was thoroughly litigated under the Modification of Final Judgment (“MFJ”).⁹⁸ The experience of the AT&T divestiture suggests it may be overly sanguine to assume, as Romer does, that legal fees would be “one-time costs” that would be “very small compared to the value to society of the increased innovation that can reasonably be ex-

⁹⁵ Lipsky and Sidak, 51 *Stan L Rev* at 1239 (cited in note 3).

⁹⁶ Romer Declaration at ¶ 71 (cited in note 34).

⁹⁷ Declaration of Rebecca Henderson, *United States v Microsoft Corp*, Civil Action No 98-1232, 36 ¶ 111 (D DC filed Apr 28, 2000) (“Henderson Declaration”).

⁹⁸ *United States v American Telegraph and Telephone Co*, 552 F Supp 131, 226–34 (D DC 1982) (“Modification of Final Judgment”).

pected to follow from the reorganization” of Microsoft.⁹⁹ Similarly, with respect to the conduct provisions of the government’s proposed remedy, the history of the MFJ teaches that Romer is making a strong assumption in saying that, as long as “Microsoft and the successor companies intend to comply with the law, these prohibitions should not impose undue costs on their legitimate business activities.”¹⁰⁰

Pure conduct remedies would clearly involve enforcement costs like those mentioned above, so it is unclear why a structural remedy that also entails conduct restrictions would not also have such costs. Any complete analysis of enforcement costs needs systematically to compare the litigation, monitoring, and other administrative costs of remedies under consideration. A discussion of some of the factors that affect such costs follows.

a) *The connection between the remedy and the anticompetitive act.* In the law of antitrust damages, it is a fundamental principle, most directly associated with the Supreme Court’s 1977 decision in *Brunswick Corp v Pueblo Bowl-O-Mat, Inc.*,¹⁰¹ that damages are available only for “antitrust injury,” which is “injury of the type the antitrust laws were intended to prevent and that flows from that which makes defendants’ acts unlawful.”¹⁰² Writing in 1979, William Baxter predicted that *Brunswick* “will force the federal courts, at least at the damages stage, to articulate with precision those respects in which the defendant’s conduct is anticompetitive.”¹⁰³ In cases where damages may not be sufficient or available, injunctive remedies should embody the same principle: they should correspond closely to the behavior that produced antitrust liability and be no broader than is necessary to rectify the antitrust injury.

Stated differently, when searching for the optimal remedy, it is potentially costly to devise a solution that addresses any actions outside the scope of the particular case at hand. A remedy need not address any conduct that either (1) has been alleged, but not established, to be anticompetitive or (2) could be anticompetitive but is of a kind that has yet to occur. Applying this principle to the government’s case against Microsoft, Nicholas Economides has argued that the optimal remedy would correct the specific allegations that are raised in the government’s case but would have little effect on fu-

⁹⁹ Romer Declaration at ¶ 64 (cited in note 34).

¹⁰⁰ *Id.* at ¶ 66.

¹⁰¹ 429 US 477 (1977).

¹⁰² *Id.* at 489 (emphasis added). See also *Atlantic Richfield Co v USA Petroleum Co*, 495 US 328, 338–39 (1990); *Cargill, Inc v Monfort of Colorado, Inc*, 479 US 104, 116–17 (1986); *Associated General Contractors of Cal, Inc v California State Council of Carpenters*, 459 US 519, 539–40 (1983); *Blue Shield of Virginia v McCready*, 457 US 465, 483 n 19 (1982); *J. Truett Payne Co, Inc v Chrysler Motors Corp*, 451 US 557, 562 (1981); *Brown Shoe Co, Inc v United States*, 370 US 294, 320 (1962) (holding that antitrust injury is to consumers, not competitors).

¹⁰³ William F. Baxter, *Placing the Burger Court in Historical Perspective*, 47 Antitrust L J 803, 816 (1979).

ture behavior of other kinds.¹⁰⁴ Injunctive relief may of course proscribe future conduct of the kind that gave rise to antitrust liability in the first place. But for the remedy more broadly to bar an action whose anticompetitive nature neither has been adjudicated in the particular case nor is determinable per se would run a greater risk of reducing consumer welfare.

b) *The optimal remedy should minimize administrative costs.* Clearly, among the set of remedies that achieve the same goal, the preferable remedy would be the one that imposes the smallest administrative and monitoring costs. For example, even something so apparently discrete as auctioning assets or intellectual property rights would entail some social costs, such as designing the optimal auction, administering the auction, and ensuring that the defendant complies with the rules of the auction. While in some cases such costs will be trivial in comparison with the remedial gains, in other cases they will not and might substantially undermine the remedial goals.

Indeed, the question of whether an antitrust remedy is practical to administer is critical in shaping any remedy. Ideally, a remedy should be “self-executing” in the sense that it should not require significant oversight or intervention from the courts or a government enforcement agency. But as a practical matter, few injunctive remedies are truly self-executing, and the effectiveness of most remedial solutions will therefore depend in part on how easily they can be administered or enforced.

One factor in administrability will be the number of terms or definitions subject to legal dispute. Consider a consent decree administered by a court. Judges have limited resources. The more complex an injunction, the more motions a judge will have to decide concerning the order or decree, and the more information she will have to collect and process just to keep up with the markets at issue. Masses of conflicting information may be brought forward by parties disputing interpretation of the order, requesting to modify the order, or claiming that the order has been violated.

Another signpost of a decree’s practicability is the extent to which it involves the court in the day-to-day administration of a business. This measure partly reflects a concern about judicial resources. But it also points to an implicit understanding that courts’ expertise lies in answering legal questions, not making business decisions about questions such as pricing, product introduction, and investment in risky ventures. The business judgment rule in corporate law is founded on the same understanding. Delaware corporate law, for example, grants a “presumption that in making a business decision the directors of a corporation acted on an informed basis, in good faith and in the honest belief that the action taken was in the best interests of the company.”¹⁰⁵ Robert Clark has explained that the business judgment

¹⁰⁴ See Brinkley, *A Microsoft Remedy*, NY Times at C1 (cited in note 45) (interviewing Nicholas Economides).

¹⁰⁵ *Aronson v Lewis*, 473 A2d 805, 812 (Del 1984). See also *Cede & Co v Technicolor, Inc*, 634 A2d 345, 361 (Del 1993).

rule provides “that the business judgment of the directors will not be challenged or overturned by courts . . . even for judgments that appear to have been clear mistakes.”¹⁰⁶ The same concerns over institutional competence that motivate the business judgment rule counsel that a court not devise an injunctive remedy that it is unlikely to have the expertise and resources to execute.

This concern that courts by nature are unsuited to entangle themselves in running a business arises again today in the debate about whether antitrust law has become a system of regulation.¹⁰⁷ Of remedies in essential facilities cases, the late Phillip Areeda wrote: “No court should impose a duty to deal that it cannot explain or adequately and reasonably supervise. The problem should be deemed irremedial by antitrust law when compulsory access requires the court to assume the day-to-day controls characteristic of a regulatory agency.”¹⁰⁸ Areeda’s point about preserving the boundary between

antitrust enforcement and industrial regulation applies generally to injunctive remedies. The ability of an enjoined firm’s rivals to counter legitimate competitive actions with litigation rather than with competitive advances of their own reduces consumer welfare and raises administrative costs. And any mechanism or requirement for prior approval in the consent decree process destroys the element of surprise as a tool of competitive rivalry. A consent decree makes a competitive industry resemble a regulated industry in which a commission must issue a certificate of public convenience and necessity before an allegedly dominant firm may offer a new service or enter the market.¹⁰⁹

The question of practicality is often whether a given remedy is more or less practical than another remedy, not whether it is practical in an absolute sense. For example, behavioral injunctions are often considered less practical to administer than structural divestiture. The breakup of AT&T’s telephone monopoly in 1984 arose partly because divestiture was viewed as an *alternative* to increased regulation of AT&T and the Regional Bell Operating Companies (“RBOCs”). In the course of the decree negotiations, AT&T and the Department of Justice considered alternatives that would not have

¹⁰⁶ Robert C. Clark, *Corporate Law* 123–24 (Little, Brown 1986).

¹⁰⁷ For a general discussion, see Michael L. Weiner, *Antitrust and the Rise of the Regulatory Consent Decree*, 10 *Antitrust* 4, 8 (Fall 1995) (discussing the shift from judicial to administrative regulation); A. Douglas Melamed, *Antitrust: The New Regulation*, 10 *Antitrust* 13, 13–15 (Fall 1995) (arguing that transformation of antitrust law into regulation is partly a result of increased use of consent decrees); Thomas E. Kauper, *The Justice Department and the Antitrust Laws: Law Enforcer or Regulator?*, 35 *Antitrust Bull* 83 (1990) (discussing the changing role of the Department of Justice in antitrust enforcement).

¹⁰⁸ Phillip Areeda, *Essential Facilities: An Epithet in Need of Limiting Principles*, 58 *Antitrust LJ* 841, 853 (1990).

¹⁰⁹ See David Bank, *Is Microsoft a New ‘Public Utility’?*, *Wall St J B1* (May 19, 1998) (“The U.S. government’s long-range strategy against Microsoft Corp. is finally coming into view, and it is audacious: Treat the software giant like a regulated utility.”).

split up the Bell System but that would have entailed detailed injunctive prescriptions for pricing, interconnection, equipment sales, and manufacture. The Department of Justice and perhaps AT&T concluded that divestiture would be better than a detailed system of behavioral constraints. AT&T asked a top network engineer to consider the impact of some of the Department's proposed injunctions on its network. He concluded: "I think at this point the warning must be raised that we may be heading into a massive straightjacket that will make the network almost inoperable in the future and weigh this against the penalties to the public and to ourselves of some degree of divestiture."¹¹⁰ The theory of divestiture was to avoid such dire outcomes by creating a resolution under which there would be no need for injunctions because the activities whose integration would have been enjoined would now be the province of separate firms. Experience ultimately showed that the structural alternative to behavioral injunctions was hardly self-executing. The MFJ, the consent decree which governed the pieces of the former Bell System after the AT&T divestiture, required the RBOCs to secure the Antitrust Division's permission whenever they sought to enter new markets or offer new services. The district court ultimately received over nine hundred waiver petitions that required it to rule on the meaning and scope of the decree's theoretically crisp line-of-business restrictions.¹¹¹ There is a good case to be made that Judge Greene handled this burden wisely under the circumstances.¹¹² But whether one thinks well or ill of the net effects of the AT&T divestiture—and on this there is hearty debate—it cannot be denied that the relief was costly to administer. And the greater the administrative requirements of a remedy, the greater the risk that antitrust enforcement converts into expensive and inefficient industrial policy.

One further implication of the above discussion is that showing one remedy to be more practicable than another does not end the analysis. One also should ask whether *any* remedy is sufficiently practicable to yield net benefits, for that question bears on the issue of whether an action ought to be brought at all, or whether an existing case should be terminated.

c) The remedy should adapt to technological change. The technological environment of an industry may have important effects on the costs of antitrust enforcement in that industry. On one hand, technological uncertainty might counsel a conservative approach and modest scope for proposed remedies. On the other hand, Assistant Attorney General Joel Klein argued that rapid technological innovation, in combination with increasing

¹¹⁰ Peter Temin and Joseph Weber, *The Modification of Final Judgment: Its Logic and Errors*, 8 U Fla J L & Pub Pol 201, 207 (1997) (quoting network engineer Joseph Weber).

¹¹¹ See Michael K. Kellogg, John Thorne, and Peter W. Huber, *Federal Telecommunications Law* §§ 7.1–7.9 (Little, Brown 1992).

¹¹² See Joseph D. Kearney, *From the Fall of the Bell System to the Telecommunications Act: Regulation of Telecommunications*, 50 Hastings L J 1395, 1459–71 (1999) (commending Judge Greene's adherence to the MFJ's structural approach).

returns to scale and network externalities, means that high technology markets are particularly susceptible to monopolization.¹¹³ He therefore advocated more vigorous antitrust enforcement in such markets.¹¹⁴ There is little question that the risks of enforcement and nonenforcement alike rise in markets that change quickly and that are subject to lock-in effects. Where both paths are risky, the hard task is to choose the one with the greater margin between expected benefits and possible error costs.

In advocating “a remedy that puts in place a *market structure* conducive to competition and innovation” for Microsoft, Carl Shapiro has posited that “the goal of enabling, but not compelling, competition to Windows in the market for operating systems” makes it “important to identify, as best we can, the likely sources of such competition in the foreseeable future.”¹¹⁵ Shapiro asserts that, to the extent that those predictions are difficult to make with accuracy, such uncertainty strengthens the case for choosing divestiture as a remedy:

One promising entry path into the market for operating systems is via cross-platform middleware. If such middleware becomes widely used, more and more applications may be written to that middleware, making it far easier for new operating systems to run many popular applications. I do not believe it is possible to identify today with any confidence the specific middleware that will play this role in the next several years. Therefore, the remedy chosen by the Court should broadly prevent Microsoft from blocking the emergence or widespread distribution of middleware.¹¹⁶

Shapiro emphasizes that “[t]he fact that we cannot confidently predict today the most significant modes of entry in the future supports the structural relief proposed by the plaintiffs.”¹¹⁷ Similarly, Professor Daniel Rubinfeld of the University of California, Berkeley (who was chief economist of the Antitrust Division during the Microsoft case) and Professor Franklin Fisher of MIT have argued that high technology industries demand greater antitrust intervention, not less.¹¹⁸ In particular, they argue that because the likelihood for locking in a large customer base is greater for high technology industries, antitrust agencies should intervene more aggressively.¹¹⁹

¹¹³ See Joel Klein and Preeta Bansal, *International Antitrust Enforcement in the Computer Industry*, 41 *Vill L Rev* 173, 176–77 (1996).

¹¹⁴ See *id.* at 173.

¹¹⁵ Declaration of Carl Shapiro, *United States v Microsoft Corp*, Civil Action No 98-1232, 2, 3 (DC DC filed Apr 28, 2000) (“Shapiro Declaration”).

¹¹⁶ *Id.* at 4.

¹¹⁷ *Id.* at 4 n 3.

¹¹⁸ Franklin M. Fisher and Daniel L. Rubinfeld, *U.S. v Microsoft—An Economic Analysis*, in David S. Evans, et al, eds, *Did Microsoft Hurt Consumers: Two Opposing Views* 1, 7 (AEI-Brookings Joint Center for Regulatory Studies 2000). See also Franklin M. Fisher, *The IBM and Microsoft Cases: What’s the Difference?*, 90 *Amer Econ Rev Papers and Proc* 180 (May 2000).

¹¹⁹ See *id.*

The same factors, however, cut in the opposite direction as well: Rapid technological change and the need for standards may encourage firms in computer markets to grow to a scale that threatens competition, but those same forces also create the risk that antitrust enforcers may do more harm than good in designing remedies.

The rapid obsolescence of computer software and hardware implies a frequent replacement of the “infrastructure,” which makes the software industry far more susceptible to Schumpeterian competition and entry than the traditionally regulated network industries. Therefore, contrary to the prediction that consumers will be compelled by network effects to use overpriced or technically inferior products, the PC software industry might contain precisely the conditions for a sequential process of creative destruction. Serious inquiry is warranted before one can determine that it serves the interests of consumers to exclude any firm from, or handicap any firm in, such competition for the market.

d) The remedy should not encourage rent seeking. Some scholars in law and economics have questioned whether antitrust law, despite its goal of public economic welfare maximization, truly can avoid falling prey to the pursuit of private “rents” by self-serving actors. Indeed, there seems no reason to believe that an injunction or consent decree in an antitrust case would be immune from rent-seeking behavior by rivals seeking to protect themselves from competition through litigation or other gamesmanship. A remedy intended to benefit the public could turn into one that benefits private actors at the expense of the public.

In the 1960s and 1970s, legal and economic scholars at the University of Chicago challenged the public interest theory of regulation, which posited that regulation served the interests of consumers.¹²⁰ According to Stigler, Becker, Peltzman, Posner, and other Chicagoans, regulation serves the private interests of regulated firms by effecting a form of government-sponsored cartelization. The effect of regulation is to create economic rents (supracompetitive returns) that could not be earned in the absence of government-imposed restrictions on market entry. “Rent seeking behavior” connotes the various activities that interest groups undertake to receive such income transfers through the legislative or regulatory process.¹²¹

¹²⁰ See, for example, George J. Stigler, *The Theory of Economic Regulation*, 2 Bell J Econ & Mgmt Sci 3 (1971). See also Gary S. Becker, *A Theory of Competition Among Pressure Groups for Political Influence*, 98 Q J Econ 371 (1983); Sam Peltzman, *Toward a More General Theory of Regulation*, 19 J L & Econ 211 (1976); Richard A. Posner, *Theories of Economic Regulation*, 5 Bell J Econ 335 (1974).

¹²¹ For classic discussions of rent-seeking behavior, see Dennis C. Mueller, *Public Choice II* 229–46 (Cambridge 1989); Mancur Olson, Jr., *The Logic of Collective Action: Public Goods and the Theory of Groups* 141–48 (Harvard 1965); James Buchanan and Gordon Tullock, *The Calculus of Consent: Logical Foundations of Constitutional Democracy* 284–86 (Michigan 1962).

Antitrust is not immune to certain kinds of rent-seeking behavior.¹²² If a remedy creates opportunities for competitors or others to seek private gain at public expense through litigation and related activities, the transaction costs of administering the remedy and the costs of erroneous decisions in enforcing the remedy could dissipate the expected value of the relief granted.

In summary, a consumer welfare test for antitrust remedies requires analysis of more than just static efficiency and the behavior of short-run market prices. Rather, before a court or enforcement agency can conclude that a remedy is efficient, a case must be made that expected price reductions will offset any production cost increases or losses in consumer-side network externalities; that the net gain from such price reductions will not entail offsetting costs in the form of inefficiently reduced innovation incentives; and that the remaining net gains can then not be achieved at a lower cost through an alternative remedial plan.

B. Reconciling the Economic Welfare Test with Existing Law

The corpus of antitrust law is surprisingly unhelpful in articulating a set of necessary and sufficient conditions for issuing an injunctive remedy, whether the injunction is formally styled as a court order or as a consent decree. The Sherman Act empowers the Department of Justice and the Federal Trade Commission (“FTC”) to seek injunctive relief for antitrust violations. The Clayton Act similarly authorizes the government, as well as private parties, to seek injunctive relief. The judicial authority to issue injunctions and the executive authority to enter into consent decrees give courts, the Department, and the FTC broad flexibility in designing remedies such as divestitures, rescissions, spin-offs,¹²³ compulsory licensing of intellectual property,¹²⁴ recordkeeping and reporting, price regulation, and so on. Even

¹²² See Fred S. McChesney, *Be True to Your School: Chicago’s Contradictory Views of Antitrust and Regulation*, in Fred S. McChesney and William F. Shugar II, eds, *The Causes and Consequences of Antitrust: The Public-Choice Perspective* 323, 328–31 (Chicago 1995). McChesney is also responsible for a substantial body of work on “rent extraction”—the extortion by politicians of monetary contributions from private groups. See Fred S. McChesney, *Money for Nothing: Politicians, Rent Extraction, and Political Extortion* (Harvard 1997); Fred S. McChesney, *Rent Extraction and Interest-Group Organization in a Coasean Model of Regulation*, 20 *J Legal Stud* 73 (1991); Fred S. McChesney, *Rent Extraction and Rent Creation in the Economic Theory of Regulation*, 16 *J Legal Stud* 101 (1987).

¹²³ A spin-off distributes the shares of an acquired company to the stockholders of the acquiring firm. The acquired firm is set up as a separate entity. See, for example, *In re Procter & Gamble Co.*, 63 *FTC* 1465 (1963) (ordering divestment of acquired liquid bleach company and restoration as a “going concern”), enforced by *FTC v Procter & Gamble Co.*, 386 US 568 (1967).

¹²⁴ See, for example, *United States v National Lead Co.*, 332 US 319 (1947) (upholding compulsory licensing of patents for titanium pigments but rejecting the Department of Justice’s request for royalty-free licensing); *Hartford-Empire Co v United States*, 323 US 386 (1945) (subjecting pool of eight hundred glass-blowing patents to compulsory licensing for reasonable royalty); *American Cyanamid Co v FTC*, 363 F2d 757, 772 (6th Cir 1966) (holding that patents may be subject to compulsory license if patent holder receives a reasonable royalty).

if the tradition of equity did not empower antitrust authorities to request, and courts to order, a broad range of remedies, the role that consent decrees play in antitrust litigation offers them a similarly wide breadth of options. Because of the prevalence of consent decrees, we will begin by analyzing principles from the applicable law on decrees. We will then briefly examine the principles found in other antitrust case law.

1. Limited lessons from Tunney Act jurisprudence.

Most antitrust suits are resolved by a consent decree, an agreement negotiated between the Department of Justice and the antitrust defendant.¹²⁵ A consent decree is an agreement between the parties entered as an order of the court.¹²⁶ As a negotiated agreement, some courts see the consent decree more as a contract, while others liken it more to a judicial order.¹²⁷ The Supreme Court explained in *United States v Armour & Co*¹²⁸ that in a consent decree the parties

waive their right to litigate the issues involved in the case and thus save themselves the time, expense, and inevitable risk of litigation. Naturally, the agreement reached normally embodies a compromise; in exchange for the saving of cost and elimination of risk, the parties each give up something they might have won had they proceeded with the litigation.¹²⁹

Moreover, because the consent decree is not an admission of liability, it does not serve as prima facie evidence of liability in later antitrust suits

¹²⁵ From 1955 to 1973, about 80 percent of the Department of Justice's civil antitrust actions were settled by decrees. Between 1973 and 1983, 92 percent of such actions ended in consent decrees. See Janet L. McDavid, et al., *Antitrust Consent Decrees: Ten Years of Experience Under the Tunney Act*, 52 Antitrust L J 883, 883 nn 2–3 (1983).

¹²⁶ One scholar has described the distinguishing characteristics of the consent decree in the following terms:

The "consent decree" category is a subset of the "settlement" category. In a "settlement," the parties agree to terminate a lawsuit. In a "consent decree," the parties agree to terminate a lawsuit and the court enters the agreement as an order of the court. One difference . . . is that if a party breaches an ordinary settlement agreement, the other party must file a new lawsuit to enforce their private settlement contract; by contrast, if a party breaches a consent decree, then that contract can be enforced as a continuation of the original lawsuit, and the breaching party can be held in contempt. A second difference . . . is that third parties cannot be bound unless the court is involved; that is, a consent decree must be used.

Sanford I. Weisburst, *Judicial Review of Settlements and Consent Decrees: An Economic Analysis*, 28 J Legal Stud 55, 58 n 13 (1999).

¹²⁷ See *Lorain NAACP v Lorain Board of Education*, 979 F2d 1141, 1148 (6th Cir 1992) (noting that a consent decree was declared by one court to be "a voluntary settlement agreement which could be fully effective without judicial intervention" and by another court to be "a final judicial order . . . plac[ing] the power and prestige of the court behind the compromise struck by the parties") (quotations omitted). See also Jed Goldfarb, Note, *Keeping Rufo in Its Cell: The Modification of Antitrust Consent Decrees After Rufo v. Inmates of Suffolk County Jail*, 72 NYU L Rev 625, 630 (1997).

¹²⁸ 402 US 673 (1971).

¹²⁹ Id at 681.

against the defendant by private parties or others.¹³⁰ In practical effect, the Department of Justice or the FTC can obtain in a consent decree anything to which the parties will agree, including divestiture, compulsory licensing, or other concessions.

a) Criteria for approval of an antitrust consent decree. The Antitrust Procedures and Penalties Act of 1974, better known as the Tunney Act,¹³¹ establishes substantive and procedural standards for the approval of a consent decree and thus provides the administrative underpinnings for the resolution of most actual cases. Congress passed the Tunney Act in response to concerns that the Department of Justice had negotiated several consent decrees in the late 1960s and early 1970s without adequate public or judicial scrutiny.¹³² The statute therefore establishes procedures to ensure public comment on proposed decrees and to minimize secrecy.¹³³ It also requires courts to scrutinize decrees to ensure that they are “in the public interest” before entering them as orders of the court.¹³⁴ But the view that the Tunney Act was needed to prevent a widespread practice among judges of rubber-stamping consent decrees is exaggerated. Long before the Tunney Act was passed, the Supreme Court had repeatedly held that a consent decree was a court order as well as a contract,¹³⁵ and some review of the decree was necessary under general equitable principles. The Court emphasized that considerable deference was owed to the Attorney General’s discretion, and later courts followed in this tradition.¹³⁶ But courts sometimes asked for modifications of proposed decrees to protect the rights of third parties, or they examined whether the decree was consistent with the complaint.¹³⁷ Congress intended the Tunney Act to continue this scrutiny, not to alter it radically.¹³⁸

The Tunney Act’s public interest standard has remained amorphous.¹³⁹ It more closely resembles a laundry list of factors than a test.¹⁴⁰ Thus, the

¹³⁰ See Clayton Act § 5(a), 15 USC § 16(a) (1994) (exempting consent decrees from rule that final judgments are prima facie evidence of liability for purposes of collateral estoppel).

¹³¹ Pub L No 93-528, 88 Stat 1706 (1974), codified as amended at 15 USC § 16(b)–(h) (1994).

¹³² See *id.*

¹³³ See *id.*

¹³⁴ *Id.* at § 16(e).

¹³⁵ See *Sam Fox Publishing Co v United States*, 366 US 683, 689 (1961); *United States v Swift & Co*, 286 US 106, 114–15 (1932).

¹³⁶ See McDavid, et al, 52 Antitrust L J at 887 (cited in note 125).

¹³⁷ See, for example, *United States v Standard Oil Co*, 1973-2 Trade Cases (CCH) ¶ 74,692 at 95,067 (N D Ohio).

¹³⁸ See McDavid, et al, 52 Antitrust L J at 892 (cited in note 125).

¹³⁹ One commentator has observed that the court:

[M]ay consider the competitive impact of the decree, including termination of the alleged antitrust violations, provisions for enforcement and modification, duration of the relief sought, and the anticipated effects of alternative remedies considered. In addition, it may consider anything else that bears on the adequacy of the decree, including the impact on the general public in addition to individuals alleging specific injury from the antitrust violation. One of the public benefits explicitly allowed to be considered is the benefit of carrying the case through to trial.

Paula J. Blizzard, *Consent Decree Standard of Review: United States v. Microsoft Corporation*, 13

Act itself does not provide particular guidance as to which remedy a court should prefer. Rather, it establishes procedures to prevent the appearance of a decree's being corrupted by politics or collusion. And its public interest standard affirms that courts, as well as the Department of Justice, have some role in using substantive analysis, as described below, to shape an antitrust remedy.

There are ultimately limits to this judicial discretion. Early in 1995, Judge Stanley Sporkin, presiding over an earlier suit by the Department of Justice against Microsoft, refused to approve the consent decree¹⁴¹ proposed in that case.¹⁴² Under the consent decree, Microsoft promised not to use per-processor licenses.¹⁴³

The decree moreover barred Microsoft from conditioning the licensing of one covered product on the purchase of another.¹⁴⁴ Judge Sporkin's concern was that the court did not have enough information to assess the decree, and that the decree, as well as the Department of Justice's complaint, failed to address alleged anticompetitive practices by Microsoft, such as the promotion of "vaporware."¹⁴⁵ The U.S. Court of Appeals for the D.C. Circuit, however, held that the lower court had overreached its authority and reassigned the case to another judge on remand.¹⁴⁶ The court held that the Tunney Act does not give a judge the power to review practices that are outside the scope of the complaint¹⁴⁷ and that a judge may reject a consent decree only if it "make[s] a mockery of judicial power."¹⁴⁸ Few strong principles are likely to emerge from such a framework of review.

b) General principles for modifying or vacating a consent decree. Another source of potential guidance is jurisprudence on altering consent

Berkeley Tech L J 355, 358–59 (1998).

¹⁴⁰ See Weisburst, 28 J Legal Stud at 98 (cited in note 126). Weisburst adds that the public interest factors alone "do not indicate to the parties what the court expects from the proposed consent decree." Id.

¹⁴¹ See *United States v Microsoft Corp.*, 1995-2 Trade Cases (CCH) ¶ 71,096 (D DC 1995).

¹⁴² See *United States v Microsoft Corp.*, 159 FRD 318 (D DC 1995).

¹⁴³ See *Microsoft Corp.*, 1995-2 Trade Cases (CCH) ¶ 71,096 at 75, 244. The per-processor license was an *option* available to an OEM, which could get a small discount if it promised to pay a royalty for each computer it shipped with CPU models that it specified in the license agreement. So an OEM might agree to pay a royalty for every Intel 80486 computer; but it would not owe royalties on computers with Intel 80686 chips or AMD chips or Cyrix chips unless it actually shipped a Microsoft operating system with those computers. OEMs could and did ship different computers with different chips, and not all OEMs used the per-processor licenses. Many units were shipped with per-system or per-copy licenses.

¹⁴⁴ See *id.*

¹⁴⁵ *Microsoft Corp.*, 159 FRD at 326, 334–36 ("Vaporware" is the practice of releasing misleading information about upcoming software products.). See also Lloyd C. Anderson, *United States v. Microsoft, Antitrust Consent Decrees, and the Need for a Proper Scope of Judicial Review*, 65 Antitrust L J 1, 2 (1996) (noting Judge Sporkin's concern that the decree did not address vaporware and other allegedly anticompetitive practices).

¹⁴⁶ *United States v Microsoft Corp.*, 56 F3d 1448 (DC Cir 1995).

¹⁴⁷ See *id.* at 1459. Compare *United States v BNS*, 858 F2d 456, 462 (9th Cir 1988) (noting that "a court may consider matters not discussed in the complaint").

¹⁴⁸ *Id.* at 1462.

decrees. The court with which a consent decree is entered generally retains the right to modify or vacate the decree. Writing for the Supreme Court in *United States v Swift & Co*¹⁴⁹ in 1932, Justice Benjamin Cardozo acknowledged “the power of a court of equity to modify an injunction in adaptation to changed conditions though it was entered by consent.”¹⁵⁰ Similarly, Judge Henry Friendly wrote for the Second Circuit in 1983 that “[t]he power of a court of equity to modify a decree of injunctive relief is long-established, broad, and flexible.”¹⁵¹ The standards for modifying or vacating antitrust consent decrees remain linked to the more general jurisprudence of consent decrees and injunctive remedies. Rule 60(b)(5) of the Federal Rules of Civil Procedure provides that a judgment may be vacated or modified if “it is no longer equitable that the judgment should have prospective application.”¹⁵²

In *Swift*, decided before the adoption of Rule 60(b)(5), the Supreme Court reversed a modification of a consent decree entered against major meat packers for anticompetitive behavior.¹⁵³ Noting that the meat packers “are not suffering hardship so extreme and unexpected as to justify us in saying they are the victims of oppression,”¹⁵⁴ the Court held that “[n]othing less than a clear showing of grievous wrong evoked by new and unforeseen conditions”¹⁵⁵ was necessary to warrant the alteration of a consent decree. The “grievous wrong” standard was widely adopted as the general approach to modifying consent decrees.¹⁵⁶

In *United States v United Shoe Machinery Corp.*,¹⁵⁷ the Court held that the *Swift* standard did not apply where the government is the party who seeks to modify the terms of the decree to accomplish its purposes.¹⁵⁸ In *United Shoe Machinery*, the government had sought to have the consent decree governing United Shoe modified so as to require the company to be

¹⁴⁹ 286 US 106 (1932).

¹⁵⁰ *Id.* at 114.

¹⁵¹ *New York State Assn for Retarded Children, Inc v Carey*, 706 F2d 956, 967 (2d Cir 1983).

¹⁵² FRCP 60(b)(5). See also *Rufo v Inmates of Suffolk County Jail*, 502 US 367, 379 (1992) (finding that there is a “flexible standard for the modification of consent decrees”). The rule in the D.C. Circuit is that the Supreme Court’s flexible standard for modification of consent decrees also applies to antitrust consent decrees. *United States v Western Electric Co, Inc*, 46 F3d 1198, 1203–04 (DC Cir 1995); *United States v Motorola Inc*, 1999-1 Trade Cases (CCH) ¶ 72,517 (D DC 1999).

¹⁵³ See 286 US at 118–20. Justice Cardozo’s opinion was joined by only three justices. Justices Butler and Van Devanter dissented. Chief Justice Hughes, Justice Sutherland, and Justice Stone did not participate in the case.

¹⁵⁴ *Id.* at 119.

¹⁵⁵ *Id.*

¹⁵⁶ See, for example, *Roberts v St. Regis Paper Co.*, 653 F2d 166, 174 (5th Cir 1981); *De Filippis v United States*, 567 F2d 341, 344 (7th Cir 1977); *Humble Oil & Refining Co v American Oil Co*, 405 F2d 803, 813 (8th Cir 1969). Several courts did adopt a relaxed standard for modification of consent decrees in the institutional reform setting. See, for example, *Heath v De Courcy*, 888 F2d 1105, 1109 (6th Cir 1989); *Plyler v Evatt*, 846 F2d 208, 211–12 (4th Cir 1988); *New York State Assn for Retarded Children*, 706 F2d at 970.

¹⁵⁷ 391 US 244 (1968).

¹⁵⁸ See *id.* at 248–49.

split into two competing businesses.¹⁵⁹ The district court refused to modify the decree, relying on *Swift*.¹⁶⁰ In reversing, the Court distinguished the government's proposed modification of the decree from *Swift*, where the defendants against whom the decree was entered were seeking to "escape [the] impact" of the decree.¹⁶¹

In *Rufo v Inmates of Suffolk County Jail*,¹⁶² the Supreme Court held in 1992 that the *Swift* standard was not codified by Rule 60(b)(5).¹⁶³ Stating that the "grievous wrong" language of *Swift* "was not intended to take on a talismanic quality, warding off virtually all efforts to modify consent decrees," the Court adopted "a less stringent, more flexible standard."¹⁶⁴ Under *Rufo*, a consent decree may be modified "when changed factual conditions make compliance with the decree substantially more onerous[,] . . . when a decree proves to be unworkable because of unforeseen obstacles[,] . . . or when enforcement of the decree without modification would be detrimental to the public interest."¹⁶⁵ The party seeking the modification bears the burden of establishing these conditions.¹⁶⁶ The Court refused to require that the change in factual conditions be "unforeseen or unforeseeable."¹⁶⁷ However, where a change in facts or conditions was anticipated, "[a] party would have to satisfy a heavy burden" in asking a court to modify the decree.¹⁶⁸

Rufo involved institutional reform—a consent decree requiring Suffolk County, Massachusetts, to construct a new jail. Since *Rufo*, the lower courts have split on the application of *Rufo* outside the context of institutional reform litigation. Some circuits have held that *Rufo* applies regardless of the context.¹⁶⁹ Others have limited *Rufo* to the institutional reform setting.¹⁷⁰ Still other courts have found that neither *Swift*'s grievous-wrong standard

¹⁵⁹ See *id.* at 247.

¹⁶⁰ See *id.*

¹⁶¹ *Id.* at 249.

¹⁶² 502 US 367 (1992).

¹⁶³ See *id.* at 378–79.

¹⁶⁴ *Id.* at 380.

¹⁶⁵ *Id.* at 384.

¹⁶⁶ See *id.* at 383.

¹⁶⁷ *Id.* at 385.

¹⁶⁸ *Id.*

¹⁶⁹ See *Bellevue Manor Associates v United States*, 165 F3d 1249, 1255 (9th Cir 1999); *Western Electric*, 46 F3d at 1203 (holding that *Rufo* applies in the context of antitrust consent decrees); *In re Hendrix*, 986 F2d 195, 198 (7th Cir 1993) (holding that *Rufo* was the "coup de grace" for the *Swift* standard). The Second Circuit held that the flexible standard of *Rufo* "is not limited to cases in which institutional reform is achieved in litigation brought directly against a governmental entity." *Patterson v Newspaper & Mail Deliverers' Union of New York*, 13 F3d 33, 38 (2d Cir 1993). Instead, the flexible standard is appropriate whenever "a decree seeks pervasive change in long-established practices affecting a large number of people, and the changes are sought to vindicate significant rights of a public nature." *Id.*

¹⁷⁰ See *Epp v Kerrey*, 964 F2d 754, 756 (8th Cir 1992) ("[T]he Supreme Court has recently relaxed application of *Swift*'s grievous wrong standard in 'institutional reform litigation.'"); *W.L. Gore & Associates, Inc v C.R. Bard, Inc*, 977 F2d 558, 562 (Fed Cir 1992); *Lorain NAACP*, 979 F2d at 1149.

nor *Rufo*'s more flexible approach applies in every case.¹⁷¹ Despite this difference of opinion among the circuits, there is little doubt that *Rufo* applies to antitrust decrees, as the U.S. Court of Appeals for the D.C. Circuit in 1995 found *Rufo* applicable to a motion to modify the antitrust decree that effected the AT&T divestiture.¹⁷²

2. Lessons from Sherman Act jurisprudence on the optimal design of antitrust remedies.

The jurisprudence of the Sherman and Clayton Antitrust Acts does not enunciate grand principles for the design of optimal remedies. One can observe recurrent themes, but they must be teased out of the disparate cases. In this section, we identify and discuss those themes.

The long debate about whether the Sherman Act is intended to protect consumer welfare and to advance economic efficiency or to serve more populist goals is well beyond the scope of this Article. But in brief, we note that the view that consumer welfare should be a paramount goal of the Act is supported by two main arguments. First, the language of the Act itself refers to monopoly and competition, primarily economic concepts, and not to the more populist idea that the antitrust laws are intended to stop any commercial power from becoming "too big." Second, while some legislators may not have realized this, it is not always possible for the antitrust laws to serve *both* consumer welfare and the goal of breaking up anything "too big"—these goals may well contradict each other.

Alternative theoretical bases for antitrust law cannot justify adopting remedies that cause a net harm to consumers. This principle is at the heart of Baxter's axiom. In choosing a behavioral or structural remedy, courts must avoid remedies that would harm the public and remain alert to the unintended consequences of a remedy, both at the time the decree is entered and as the decree is implemented over time.

a) Conditions for adopting injunctive remedies. One threshold principle that emerges from Anglo-American traditions of law and equity is that injunctions are available when damages are an insufficient remedy.¹⁷³ Thus, injunctive remedies should not be considered unless damages are either insufficient to address the harm or unavailable for legal or practical reasons. The initial presumption in the remedies phase, in other words, should be

¹⁷¹ See *Building & Construction Trades Council v NLRB*, 64 F3d 880, 888 (3rd Cir 1995) ("It would be a mistake to view either *Rufo* or *Swift* as encapsulating a universal formula for deciding when [a consent decree should be modified]."); *Alexis Lichine & Cie v Sacha A. Lichine Estate Selections, Ltd.*, 45 F3d 582, 586 (1st Cir 1995) ("In our view, Rule 60(b)(5) sets forth the umbrella concept of 'equitable' that both *Swift* and *Rufo* apply to particular, widely disparate fact situations.").

¹⁷² See *Western Electric*, 46 F3d at 1203.

¹⁷³ See, for example, *Beacon Theatres, Inc v Westover*, 359 US 500, 506–07 (1959) ("The basis for injunctive relief in the federal courts has always been irreparable harm and inadequacy of legal remedies.").

that economic harm is compensable through payment of monetary damages. From an economic perspective, damages that are correctly calculated will force the defendant to internalize the social cost of his harmful behavior and thus desist from continuing it.¹⁷⁴ And, of course, the payment of damages is administratively tidier, for both courts and litigants, than the continued oversight and interpretation of an injunctive remedy. In addition, a damage remedy runs less of a risk than an injunction does of mistakenly curtailing activities or preventing firm structures that achieve operational efficiencies. It bears emphasis that Microsoft is subject to (1) a remedy from the district court; (2) private lawsuits (including potential ones that might be brought by Netscape, OEMs, and Sun); and (3) indirect purchaser cases in multiple jurisdictions. Thus, if Microsoft ultimately loses in the government's case, it will face Judge Jackson's remedy (including any potential modifications by appellate courts), plus treble damages in the direct purchaser cases, plus treble damages in the indirect purchaser cases.

Identifying when a damage remedy is sufficient, and therefore preclusive of injunctive relief, can be difficult in some cases. As Dennis Carlton and Jeffrey Perloff have noted, the economic theory of damages "starts from the proposition that the purpose of damages is to deter inefficient activity but not to be so burdensome as to deter efficient activity."¹⁷⁵ Hence, an optimal damage award is one that balances the costs and benefits of deterrence. Calculation of the optimal damage award thus requires an appreciation of the ex ante payoff calculations of the firm. A profit-maximizing firm has an incentive to violate antitrust laws if the expected punishment is less than the expected gain.¹⁷⁶ If the probability of detection is less than one, an ex post damage award equal to the actual damages incurred may not discourage that activity in the future. This is part of the reason the federal antitrust laws allow an injured party to recover treble damages.¹⁷⁷ Given this background, necessary conditions for the execution of a damage remedy are (1) a proper estimation of damages that were incurred because of the anti-competitive behavior and (2) a proper estimation of the probability of detection and prosecution at the time the anticompetitive behavior was per-

¹⁷⁴ See, for example, Posner, *Economic Analysis of Law* at 342-46 (cited in note 50).

¹⁷⁵ Dennis W. Carlton and Jeffrey M. Perloff, *Modern Industrial Organization* 800 (HarperCollins 2d ed 1994). See also Michael K. Block, Frederick C. Nold, and J. Gregory Sidak, *The Deterrent Effect of Antitrust Enforcement*, 89 J Pol Econ 429 (1981); Kenneth G. Elzinga and William Breit, *The Antitrust Penalties: A Study in Law and Economics* (Yale 1976). This economic analysis of antitrust penalties flows directly from the economic analysis of deterrence, the seminal work on which includes papers by two Nobel laureates. See George J. Stigler, *The Optimum Enforcement of Laws*, 78 J Pol Econ 526 (1970); Gary S. Becker, *Crime and Punishment: An Economic Approach*, 76 J Pol Econ 169 (1968).

¹⁷⁶ See Carlton and Perloff, *Modern Industrial Organization* at 795 n 2 (cited in note 175).

¹⁷⁷ See Clayton Act § 4(a), 15 USC § 15(a) (1994). Of course, if the plaintiff's possibility of winning an unmeritorious antitrust suit is greater than zero, then treble damages simply exacerbate the incentive for rent-seeking parties to file excessive numbers of suits.

formed. Where such calculations cannot reasonably be made, injunctive relief should be considered.

Injunctive relief also comes into play where damages are not available as a remedy. Unlike states that have the power to request monetary damages on behalf of their citizens, the Department of Justice can only sue for actual damages that the U.S. government has itself incurred.¹⁷⁸ In addition, the Department of Justice can sue for monetary fines up to ten million dollars.¹⁷⁹ But where such fines neither compensate for nor adequately deter the harm done, injunctions need to be considered.

Section 4 of the Clayton Act authorizes “any person who shall be injured in his business or property by reason of anything forbidden in the antitrust laws” to sue for treble damages.¹⁸⁰ A “person” for this purpose generally includes private persons and corporations, but it includes the U.S. government only when the government sues under Section 4A in its capacity as a consumer of goods (for example, in a suit against a federal contractor).¹⁸¹ Under Section 4C of the Clayton Act, the attorney general of a state may bring a *parens patriae* civil suit to recover damages for natural persons residing in the state.¹⁸² Section 16 of the Clayton Act authorizes private plaintiffs to seek injunctive relief, including divestiture.¹⁸³ Permanent or temporary injunctive relief may not be obtained, however, if the private plaintiff has an adequate damage remedy.¹⁸⁴ The question of the sufficiency of a damage remedy (or, alternately, the necessity of injunctive relief) therefore generally arises when a private plaintiff seeks injunctive relief in addition, or as an alternative, to damages.¹⁸⁵

A damage remedy is used to address monetary harms suffered by the antitrust defendant’s competitors and customers. Higher costs of doing business are generally compensable by money damages. For example, a shoe manufacturer that paid more to lease shoe machines when it was prevented by antitrust violations from buying them from the defendant was en-

¹⁷⁸ Clayton Act § 4(a), (c), 15 USC § 15(a), (c) (1994).

¹⁷⁹ See 15 USC § 2 (1994).

¹⁸⁰ 15 USC § 15(a).

¹⁸¹ See *United States v Cooper Corp.*, 312 US 600 (1941) (holding that the United States is generally not a person entitled to maintain a suit for treble damages for violations of the Sherman Act). See also William E. Kovacic, *Illegal Agreements with Competitors*, 57 Antitrust L J 517, 524 (1988) (discussing collusive conduct among rivals for government contracts); *Hawaii v Standard Oil Co of California*, 405 US 251 (1972) (holding that a state could not claim damages on behalf of its citizens); *Georgia v Evans*, 316 US 159 (1942) (allowing the state of Georgia to recover treble damages recompensing it as buyer of products from antitrust defendant supplier of commodities).

¹⁸² See 15 USC § 15(c).

¹⁸³ See 15 USC § 26 (1994 & Supp 1998).

¹⁸⁴ See, for example, *Oakland Tribune, Inc v Chronicle Publishing Co, Inc*, 762 F2d 1374 (9th Cir 1985) (holding that plaintiff newspaper cannot obtain preliminary injunction for prospective loss of circulation and revenue due to defendant’s actions, as this is purely monetary harm for which damages are adequate).

¹⁸⁵ See, for example, J. Gregory Sidak, *Antitrust Preliminary Injunctions in Hostile Tender Offers*, 30 U Kan L Rev 491, 494–95 (1982).

titled to recover the difference in cost from the defendant shoe machinery manufacturer.¹⁸⁶ In cases of price fixing or tying, the difference between the defendant's price and the market price paid by a consumer of the good is redressed by monetary damages.¹⁸⁷ Profits lost when a monopolist drives a competitor out of business are recoverable by money damages,¹⁸⁸ and the measure of damages includes lost future profits.¹⁸⁹ Loss of the business's value as a going concern is also compensable by monetary damages as an alternative to future profits.¹⁹⁰

By contrast, injunctive relief is available in a narrower range of situations. Section 16 of the Clayton Act provides that injunctive relief shall be granted "[w]hen and under the same conditions and principles as injunctive relief against threatened conduct that will cause loss or damage is granted by courts of equity."¹⁹¹ The statute does not expressly call for an inquiry into the adequacy of damages, but the tradition of equity plainly supplies it. In that tradition, an injunction may be obtained only when *irreparable harm* is threatened without it.¹⁹² Damages are generally considered adequate when the harm is purely monetary, the figure is calculable, and the defendant can pay. Examples of harms that are adequately redressed by monetary damages include the failure to place advertisements for a business in the Yellow Pages¹⁹³ and a newspaper's lost circulation revenues.¹⁹⁴

Thus, an injunctive remedy is available when anticompetitive conduct threatens to drive a business from the market. When the existence of a plaintiff's business is threatened, the court is likely to presume that an irreparable harm is threatened, without undertaking an elaborate inquiry into whether such harm in some way could be compensated by money damages.¹⁹⁵ Sometimes, threatened loss of market share, customers, or goodwill

¹⁸⁶ See *Hanover Shoe, Inc v United Shoe Machinery Corp*, 392 US 481 (1968).

¹⁸⁷ See *Pogue v International Industries, Inc*, 524 F2d 342 (6th Cir 1975); *Commonwealth Edison Co v Allis-Chalmers Manufacturing Co*, 315 F2d 564 (7th Cir 1963).

¹⁸⁸ See, for example, *Bigelow v RKO Radio Pictures, Inc*, 327 US 251 (1946).

¹⁸⁹ See *Lehrman v Gulf Oil Corp*, 464 F2d 26, 47 (5th Cir 1972).

¹⁹⁰ See *Malley-Duff & Associates, Inc v Crown Life Insurance Co*, 734 F2d 133, 148 (3d Cir 1984).

¹⁹¹ 15 USC § 26.

¹⁹² See, for example, *Concord Boat Corp v Brunswick Corp*, 1998 US Dist LEXIS 14571, *2 (E D Ark) ("No injunction should issue absent a showing that the allegedly unlawful conduct is likely to cause irreparable harm."); *Paint Products Co v Dutch Boy, Inc*, 1980-2 Trade Cases (CCH) ¶ 63,497 at 76,658 (D Conn 1980) (The standard for obtaining a preliminary injunction includes "a finding of possible immediate and irreparable injury.").

¹⁹³ See *Triebwasser & Katz v American Tel & Tel Co*, 535 F2d 1356, 1359-60 (2d Cir 1976).

¹⁹⁴ *Oakland Tribune*, 762 F2d at 1376.

¹⁹⁵ In *Foremost International Tours, Inc v Quantas Airways, Ltd*, 379 F Supp 88 (D Hawaii 1974), aff'd 525 F2d 281 (9th Cir 1975), the court explained:

The danger that Foremost will suffer irreparable injury before the CAB has investigated the charges of deceptive practices and unfair methods of competition is very real. Foremost has established that the existence of its business life as a competitor in the freewheeling tour market is threatened. This is a sufficient showing of irreparable injury to warrant a preliminary injunction

will entitle a plaintiff to an injunction.¹⁹⁶ An impending loss of corporate control that threatens to reveal confidential information may also persuade the court to grant an injunction.¹⁹⁷ Injunctions are commonly available to stop an anticompetitive merger or acquisition from going forward.

Courts have found a threat of irreparable harm when the antitrust defendant threatens to repeat its behavior. In *Zenith Radio Corp v Hazeltine Research, Inc.*,¹⁹⁸ the Supreme Court upheld an injunction against Hazeltine, a corporation that licensed U.S. patents in radio and television technology and that had participated in several patent pools, the most troublesome one being in Canada.¹⁹⁹ Zenith, a would-be competitor, had been awarded money damages suffered when it was excluded from the Canadian market over a four-year period. Given evidence that the Canadian pool would not retreat, the Court upheld an injunction against Hazeltine that would prevent it from asserting its claims through the Canadian pool. Writing for the majority, Justice White noted: “Neither the relative quiescence of the pool during the litigation nor claims that objectionable conduct would cease with the judgment negated the threat to Zenith’s foreign trade. That threat was too clear for argument, and injunctive relief . . . was wholly proper.”²⁰⁰ By contrast, when an antitrust defendant can convince the court that its behavior will not be repeated, money damages for past conduct are adequate.²⁰¹

The Court in *Zenith Radio* did not expressly ask whether money damages would be inadequate if and when the conduct was repeated. Some later courts found it enough that money damages would not be adequate at the time of the suits then before them. Money damages could be obtained only after the harm was sustained and its amount could be proven. Therefore money damages are viewed as inadequate whenever there is a nonspeculative threat of future harm. In a case enjoining a producer of gasoline from terminating or refusing to renew distributors’ leases in retaliation for the antitrust suit, one court stated, “A future injury of uncertain date and incalculable magnitude is irreparable harm, and protection from such an injury is a

even though the amount of direct financial harm might be ascertainable. Courts should be particularly concerned with threats to the existence of a moving party’s business in the area of antitrust. An award of only money damages in lieu of preserving a competitor disserves the public interest.

379 F Supp at 97 (citations omitted). See *Semmes Motors, Inc v Ford Motor Co*, 429 F2d 1197, 1205 (2d Cir 1970); *Bowman v National Football League*, 402 F Supp 754 (D Minn 1975).

¹⁹⁶ See, for example, *John B. Hull, Inc v Waterbury Petroleum Products, Inc*, 588 F2d 24, 28 (2d Cir 1978); *Erewhon, Inc v Northeast Health Food Merchants*, 428 F Supp 551, 554 (D Mass 1977).

¹⁹⁷ See *Crane Co v Briggs Manufacturing Co*, 280 F2d 747, 750 (6th Cir 1960).

¹⁹⁸ 395 US 100 (1969).

¹⁹⁹ See *id* at 131–33.

²⁰⁰ *Id* at 131–32.

²⁰¹ See, for example, *SCM Corp v Xerox Corp*, 507 F2d 358, 362 (2d Cir 1974) (holding that amid promises not to bring patent infringement claims against plaintiff for period of suit, disclosure of patented material would be an “irrevocable step, because once the plans are revealed, their secrecy cannot later be restored,” such that injunction of suit was inappropriate).

legitimate end of injunctive relief.’²⁰² But at least one court has concluded that damages for future lost profits adequately compensate a plaintiff company against the future danger, and that a plaintiff can have either an injunction or future damages, but not both.²⁰³

Symmetry thus exists between the sufficient conditions for damages and the necessary conditions for injunctive relief. Damages are deemed sufficient under the law when (1) the harm is purely monetary, (2) the figure is calculable, and (3) the defendant does not threaten to repeat its behavior. Injunctive relief is necessary when the harm to a competitor is irreparable. Conveniently, the courts have defined irreparable harm to mean (1) the harm would entail the loss of a competitor’s business, (2) the figure is incalculable, and (3) there is a nonspeculative threat of future harm.

With respect to the government’s antitrust case against Microsoft, the application of the above analysis would proceed as follows if damages were available: First, did Microsoft’s competitors incur harm beyond purely monetary damages, such as loss of business, due to Microsoft’s anticompetitive behavior? Second, if not, are the damages that were incurred calculable? Stated differently, is there an economic model that can be used to estimate the amount of the damages incurred by consumers or competitors? Third, conditional upon a properly calibrated damage figure that was paid by Microsoft—that is, a figure that accounted for the likelihood of detection and prosecution—is there a nonspeculative threat of future harm that could not be curbed by the threat of similar damages?

b) Choosing among injunctive remedies. The Clayton Act and the Sherman Act give the federal courts jurisdiction to use injunctive remedies to prevent and restrain antitrust violations.²⁰⁴ In cases brought by the Department of Justice, the alternatives before the court at the remedies stage are either behavioral (conduct) remedies, or structural remedies. Behavioral remedies include orders for a company to abstain from acquiring new businesses of a certain type, to refrain from offering certain goods or services,

²⁰² *Phillips v Crown Central Petroleum Corp.*, 602 F2d 616, 630 (4th Cir 1979). Compare *Cia. Petrolera Caribe, Inc v Arco Caribbean, Inc.*, 754 F2d 404, 407–08 (1st Cir 1985) (noting that the injury requirement under Section 16 is less demanding than under Section 4, as Section 16 only requires a showing of a “threat of antitrust injury,” rather than an actual injury).

²⁰³ In *International Wood Processors v Power Dry, Inc.*, 593 F Supp 710 (D SC 1984), aff’d 792 F2d 416 (4th Cir 1986), the court explained:

[P]laintiff is not entitled to equitable relief because its remedy at law is adequate. As part of its theory of damages at trial, plaintiff asserted that defendants’ unlawful conduct deprived it of future profits on sales of RFV kilns. . . . Thus, plaintiff requested and received prospective damages. . . . [I]t can suffer no further future harm once it has been compensated for the profits from the sales it claims it would have made absent defendant’s unlawful conduct. Its remedy at law is therefore adequate. Injunctive relief would afford a double recovery

593 F Supp at 737.

²⁰⁴ See Phillip E. Areeda and Herbert Hovenkamp, 2 *Antitrust Law* § 345 at 162 (Little, Brown rev ed 1995).

to sell to all buyers on the same terms (nondiscrimination) or on regulated terms, to modify or to cancel the defendant's existing contracts.²⁰⁵ The principal structural remedies are divestiture and dissolution.

i) Behavioral versus structural remedies. In choosing among behavioral and structural remedies, courts enjoy wide discretion. It is important to note that any structural remedy contains implicit behavioral restrictions. For example, a divestiture of Microsoft's Internet browser software would implicitly require that Microsoft refrain from giving preferential treatment to the spin-off over other Internet browser providers. Structural remedies may carry with them all or many of the administrative costs necessary to enforce purely behavioral restrictions. Thus, when considering structural and behavioral remedies, one cannot presume that the long-term administrative costs will be lower for the former than for the latter.

If a behavioral remedy more modest than divestiture would effectively remove the danger to existing competition, it may be sufficient even when taking enforcement costs into account.²⁰⁶ In *United Shoe Machinery Corp v United States*,²⁰⁷ for example, the 1953 trial court chose three simple behavioral constraints instead of divestiture. The first required United to sell every machine it leased; the second required nondiscriminatory lease terms, with repair unbundled from rates for use; and the third required compulsory licensing of patents on a reasonable royalty basis. In rejecting more restrictive provisions, the court noted that "it would be undesirable, at least until milder remedies have been tried," to bar United Shoe from leasing its machines altogether.²⁰⁸

Structural remedies intended to alter incentives are more likely to be used when the court perceives a monopolist as being particularly durable or likely to repeat its anticompetitive conduct. Intent is one indication of this. In affirming the dissolution of the Standard Oil combination, the Supreme Court found that the evidence showed Standard Oil's intent to eliminate competitors to be "so certain as practically to cause the subject not to be within the domain of reasonable contention."²⁰⁹

Another indicator of durability is the fact that other remedies have been tried before and failed, generally over a period of decades. Divestiture of single-firm monopolists in the twentieth century was rarely, if ever, attempted without alternatives having first been exhausted. For example, the

²⁰⁵ See *id.* at 163.

²⁰⁶ See *United States v Aluminum Co of America*, 91 F Supp 333, 418-19 (S D NY 1950) (limiting the divestiture of Alcoa to a simple requirement that Alcoa and Aluminum Limited of Canada have no common stockholders, so that the danger to effective future competition would be removed and the opportunities for a new potential competition increased). See also *United States v Aluminum Co of America*, 153 F Supp 132, 171 (S D NY 1957) (finding that failure of a new competitor to emerge does not render a remedy ineffective so long as older competitors remain strong).

²⁰⁷ 110 F Supp 295 (D Mass 1953), *affd* 347 US 521 (1954) (*per curiam*).

²⁰⁸ 110 F Supp at 349.

²⁰⁹ *Standard Oil Co of New Jersey v United States*, 221 US 1, 77 (1911).

Department of Justice had pursued United Shoe Machinery since 1912,²¹⁰ but did not satisfy the courts that divestiture was required until 1969.²¹¹

Extra caution is due where a single firm with unified management and product development is being divested. The theatres divested in *United States v Paramount Pictures, Inc.*,²¹² for example, could be segregated into separate enterprises without unduly affecting the management of the producer's core business. Standard Oil was really a combination, not a single firm. *United Shoe* divested a single firm with unified management, but the shoe machinery industry was not especially "convergent" or networked: there were no dynamic pushing machines to be integrated with shoe manufacture. As AT&T operates in a fast-moving industry offering consumers the benefit of network effects, its divestiture is probably most analogous to Microsoft's. But the divestiture of AT&T quickly became a long-running administrative obligation for the court and the parties subject to the decree.

Indeed, the cases mentioned above show that practicability has traditionally been a significant factor in deciding to elect a conduct or a structural remedy. This issue is related to the level of intrusiveness into the day-to-day operation of the business that the remedy would require of the court or other antitrust enforcer. This partly reflects the concern that it would take too much time for the court to do this. But it also points to an implicit understanding that courts' expertise lies in answering legal questions, not making business decisions about questions such as pricing.

For example, in considering a proposed remedy in the antitrust suit against the major motion picture studios, later resulting in the *Paramount* decrees, the lower court proposed to allow the exhibitors of movies to obtain them through competitive bidding, rejecting divestiture.²¹³ Reversing, the Supreme Court offered as one reason for rejecting competitive bidding that it would not do anything to decrease the studios' market power; vertically integrated theater/studios would still be guaranteed access to their own pictures and thus have an advantage over independents.²¹⁴ The Court also explained that the "highest bid" for a picture could not be determined simply by comparing the money amount offered for the picture—one would also have to consider nonmonetary considerations, such as the size and location of a theatre, whether rental would be paid by a share of gross receipts, or other terms. The Court protested that the decree "involves the ju-

²¹⁰ *United Shoe Machinery*, 110 F Supp at 298.

²¹¹ See *United States v United Shoe Machinery Corp*, 1969 Trade Cases (CCH) ¶ 72,688 at 86,445–46 (ordering divestiture).

²¹² See 66 F Supp 323 (S D NY 1946), affd in part and revd in part, *United States v Paramount Pictures*, 334 US 131 (1948).

²¹³ See 66 F Supp at 323; *United States v Paramount Pictures, Inc.*, 70 F Supp 53 (S D NY 1947), affd in part and revd in part, 334 US 131 (1948), on remand 85 F Supp 881 (S D NY 1949), affd 339 US 984 (1950). For an economic analysis of the case, see Arthur De Vany and Ross D. Eckert, *Motion Picture Antitrust: The Paramount Cases Revisited*, 14 Research in L & Econ 51 (1991).

²¹⁴ See *Paramount*, 334 US at 162–63.

diciary so deeply in the daily operation of this nationwide business and promises such dubious benefits that it should not be undertaken.”²¹⁵ On remand, the lower court opted for divestiture instead.²¹⁶

Some have argued that, as a general rule, divestiture remedies are actually less disruptive, intrusive, and costly to administer than conduct remedies.²¹⁷ This was reportedly the reason that AT&T opted for divestiture in 1984. Note, however, that the administrative realities of the AT&T case refute the proposition that structural remedies are necessarily more practicable than conduct remedies. As we will discuss more extensively in Part V, courts were continually faced with monitoring the behavior of the units into which AT&T was broken up.

Indeed, the AT&T case illustrates the fact that ambitious structural remedies that incorporate supervisory and behavioral elements might require as much, or even more, continued judicial scrutiny as behavioral remedies require. AT&T may not have felt the brunt of the implicit behavioral requirements, but the Bell Companies split off from AT&T certainly did, as many injunctions were deployed to maintain the segregation between markets created by the decree.

The MFJ provided a waiver process by which the RBOCs could request the court’s permission to enter new markets. Under Section VIII(C) of the decree, the RBOCs were entitled to have a particular line-of-business restriction lifted if they could show that “there [was] no substantial possibility” that a BOC could use its monopoly power to impede competition in the market that it proposed to enter.²¹⁸ But the waiver process worked much less smoothly in practice than it had been expected to in theory. In 1993, the average waiver request had been pending for thirty-six months even though the Department of Justice opposed relief in only 4 of the 266 requests.²¹⁹ By 1994, the backlog period had grown to 54.7 months, although the court approved 96 percent of the waiver requests on which it had ruled.²²⁰ By that point, the ostensibly straightforward consent decree had become a new layer of regulation for the telecommunications industry.²²¹

²¹⁵ Id at 162.

²¹⁶ See *United States v Paramount Pictures, Inc.*, 85 F Supp 881 (S D NY 1949), affd 339 US 984 (1950).

²¹⁷ See, for example, Thomas D. Morgan, *Cases and Materials on Modern Antitrust Law and Its Origins* 100 (West 1994) (Divestiture is a “relatively easy” remedy to implement when “the defendant has been composed of several formerly separate firms and has retained multiple production facilities.”).

²¹⁸ Modification of Final Judgment § VIII(C), 552 F Supp at 231.

²¹⁹ See Paul H. Rubin and Hashem Dezhbakhsh, *Costs of Delay and Rent-Seeking Under the Modification of Final Judgment*, 16 Managerial & Decision Econ 385, 385–87 (1995), cited in Jerry A. Hausman and J. Gregory Sidak, *A Consumer-Welfare Approach to the Mandatory Unbundling of Telecommunications Networks*, 109 Yale L J 417, 428 (1999).

²²⁰ See Rubin and Dezhbakhsh at 387–89 (cited in note 219).

²²¹ See Sidak and Spulber, *Deregulatory Takings* at 56 (cited in note 57); Temin and Weber, 8 U Fla J L & Pub Pol at 209–10 (cited in note 110); Paul W. MacAvoy, *The Failure of Antitrust and Regulation to Establish Competition in Long-Distance Telephone Services* (MIT & AEI 1996); Glen O. Robin-

Concern about unforeseen implementation costs and economic consequences was a significant reason the trial court refused in 1953 to order divestiture in *United Shoe*; the government had apparently not given divestiture much thought until the remedies phase of the trial arrived. The court found the plan to break the single firm up into three “unrealistic,” given that United Shoe’s operations were all centered in a single plant and used common tools, a common lab, and a common managerial force.²²² The court noted that:

A petition for dissolution should reflect greater attention to practical problems and should involve supporting economic data and prophecies such as are presented in corporate reorganization and public utility dissolution cases. Moreover, the petition should involve a more formal commitment by the Attorney General, than is involved in the divergent proposals that his assistants have made in briefs and in oral arguments addressed to the Court.²²³

The case can thus be read for the proposition that any far-reaching relief proposal must at least take thorough and coherent account of practical details and their possible consequences.

ii) Divestiture versus compulsory licensing. A quasi-structural, and more common, alternative to divestiture is the compulsory licensing of copyrights or patents for a reasonable fee.²²⁴ A patent or copyright owner subject to compulsory licensing must license the intellectual property to all comers, losing his right of refusal. In deciding whether to order compulsory licensing with a fee, or the harsher remedy of royalty-free licensing, one commentator reports that “[m]ost courts stress current economic considerations when deciding whether to order compulsory licensing; . . . the emphasis of many other courts which have favored dedication or royalty-free licensing has been on past conduct instead.”²²⁵ When compulsory licensing for a fee is ordered, it will usually be for the practical reason that the intel-

son, *The Titanic Remembered: AT&T and the Changing World of Telecommunications*, 5 Yale J Reg 517, 537 (1988).

²²² *United Shoe Machinery*, 110 F Supp at 348.

²²³ *Id.*

²²⁴ See, for example, *United States v Glaxo Group Ltd*, 410 US 52, 60–64 (1973); *United States v National Lead Co*, 332 US 319, 348 (1947); *United States v United Techs Corp*, 1980-1 Trade Cases (CCH) ¶ 63,792 (N D NY 1981) (partial divestiture); *International Tel & Tel Corp v General Tel & Elec Corp*, 351 F Supp 1153 (D Hawaii 1973) (judgment, not consent decree), *affd in part and revd in part*, 518 F2d 913 (9th Cir 1975). As of 1980, compulsory licensing had been used as a remedy in more than 125 cases. See also Mark A. Lemley, Comment, *The Economic Irrationality of the Patent Misuse Doctrine*, 78 Cal L Rev 1599, 1608 n 63 (1990).

²²⁵ Lawrence Schlam, *Compulsory Royalty-Free Licensing as an Antitrust Remedy for Patent Fraud: Law, Policy and the Patent-Antitrust Interface Revisited*, 7 Cornell J L & Pub Pol 467, 513 (1998).

lectual property involved is the source of the perceived anticompetitive effect.²²⁶

In choosing between a compulsory licensing remedy and divestiture, courts will consider whether the anticompetitive conduct at issue closely involves the patent or copyright. If so, a remedy that focuses on the licenses might be more effective than a divestiture of assets.²²⁷ William Kovacic reports that economists have not generally found compulsory licensing remedies effective in deconcentrating markets;²²⁸ on the other hand, he finds as much or more criticism of divestiture remedies.²²⁹

The case law on remedies does not, in the end, provide a set of axioms that can be applied systematically to the choice among antitrust remedies. It does, however, provide broad guidance on several points. Notably, it suggests that less intrusive remedies like damages should be considered first, and that more stringent relief like divestiture must not be entered into blindly or without careful consideration of possible practical consequences. To the extent that the applicable precedent bears on the question at all, it is consistent with the economic welfare approach we have described. We next apply our framework for evaluating antitrust remedies to the particular case of Microsoft.

III. THE THEORY AND FINDINGS OF *MICROSOFT*

On May 18, 1998, the U.S. Department of Justice and, separately, a group of twenty states and the District of Columbia (which we collectively call “the states”) filed civil lawsuits against Microsoft asserting violations of federal antitrust laws and, in the states’ actions, additional violations of the states’ respective antitrust laws.²³⁰ The complaints were the culmination

²²⁶ When a reasonable fee is ordered, the court must set the rate to be paid for the license on the theory that if it does not the “compulsory” nature of the license would be meaningless. The results of these judicial ventures into rate-making are as problematic as other regulatory exercises in price setting, and are not generally considered successful. One proposal to solve the pricing problem with the compulsory license is to auction the license to the highest bidder. This will yield a market price. This type of auction would produce only one licensee, the highest bidder. The auction can also be modified to yield a number of licensees. One might, for example, select a number of licensees in advance, take a number of bids equal to the number of licensees, and require each licensee to pay the highest bid.

²²⁷ See *United States v Spectra-Physics, Inc.*, 1981-2 Trade Cases (CCH) ¶ 64,290, 1981 US Dist LEXIS 15030 (N D Cal) (holding that consent decree required compulsory licensing for a fee rather than divestiture when merger of two companies lessened competition in the development of certain laser-based products).

²²⁸ See William E. Kovacic, *Failed Expectations: The Troubled Past and Uncertain Future of the Sherman Act as a Tool for Deconcentration*, 74 Iowa L Rev 1105, 1106-07 n 9 (1989) (“Most commentators have concluded that compulsory licensing decrees generally have contributed little to the accomplishment of deconcentration objectives.”), citing F.M. Scherer, *Innovation and Growth: Schumpeterian Perspectives* 207, 220 (MIT 1984). But see Kovacic, 74 Iowa L Rev at 1111 n 30 (linking compulsory licensing of Xerox patent to greater innovation).

²²⁹ See Kovacic, 74 Iowa L Rev at 1108 n 19 (cited in note 228).

²³⁰ Complaint, *United States v Microsoft Corp.*, Civil Action No 98-1232 (D DC filed May 18, 1998) (“DOJ Microsoft Complaint”); Complaint, *New York v Microsoft Corp.*, Civil Action No 98-1233

of an extensive investigation jointly pursued by the Department of Justice and the states.²³¹ Shortly after the complaints were filed Judge Jackson concluded, upon Microsoft's motion,²³² that the cases were substantially similar and ordered them consolidated.²³³

In Part III.A, we explain the government's theory of liability in the 1998 lawsuit against Microsoft. In Part III.B, we summarize Judge Jackson's 1999 findings of fact. In Part III.C, we summarize Judge Jackson's 2000 conclusions of law.

A. The Government's Theory of Liability in the 1998 Lawsuit against Microsoft

In their 1998 lawsuit against Microsoft, the Justice Department and the states alleged that over the course of several years Microsoft purposefully engaged in a series of actions—involving competitors, distributors of Internet browsers, and computer manufacturers—designed to preserve Microsoft's dominance in the personal computer operating systems market and to extend that monopoly to the Internet browser market.²³⁴ More specifically, the Department and the states argued that Microsoft committed two violations of Section 1 of the Sherman Act by entering into certain exclusive dealing and tying arrangements that served to restrain competition in the Internet browser and PC operating systems markets.²³⁵ The government also argued that through the same exclusive dealing and tying arrangements, as well as other behavior, Microsoft illegally maintained its alleged monopoly power in the PC operating systems market and attempted to monopolize the

(D DC filed May 18, 1998). The states submitted a revised complaint on July 17, 1998. Revised Complaint, *New York v Microsoft Corp*, Civil Action No 98-1233 (D DC filed July 17, 1998) ("State Microsoft Complaint"). The states participating in the July 17, 1998, complaint were: California, Connecticut, Florida, Illinois, Iowa, Kansas, Kentucky, Louisiana, Maryland, Massachusetts, Michigan, Minnesota, North Carolina, New Mexico, New York, Ohio, South Carolina, Utah, West Virginia, and Wisconsin. The District of Columbia also participated. On December 7, 1998, South Carolina withdrew from the states' case.

²³¹ See Ted Bridis, *Feds, 18 States to File Antitrust Suits Against Microsoft*, Denver Post C3 (May 14, 1998).

²³² See Motion of Defendant Microsoft Corporation to Consolidate, *United States v Microsoft Corp*, Civil Action No 98-1232 (D DC filed May 21, 1998).

²³³ See *United States v Microsoft Corp*, Civil Action No 98-1232, slip op at 1 (D DC May 22, 1998). In a subsequent order denying in the main Microsoft's motion for summary judgment, Judge Jackson explained that "[t]he complaints allege essentially the same antitrust violations" and "seek virtually the same relief." *United States v Microsoft Corp*, 1998-2 Trade Cases (CCH) ¶72,261 at 82,668 (D DC 1998).

²³⁴ DOJ Microsoft Complaint at ¶¶ 1-38, 53-123 (cited in note 230); State Microsoft Complaint at ¶¶ 9-78 (cited in note 230); Plaintiffs' Joint Proposed Conclusions of Law, *United States v Microsoft Corp*, Civil Action No 98-1232, 1-2, 2-54, 66-70 (D DC filed Dec 6, 1999) ("Plaintiffs' Proposed Conclusions of Law").

²³⁵ DOJ Microsoft Complaint at ¶¶ 130-37 (cited in note 230); State Microsoft Complaint at ¶¶ 93-97 (cited in note 230); Plaintiffs' Proposed Conclusions of Law at 1-2, 54-66 (cited in note 234).

Internet browser market²³⁶—actions which constituted two violations of Section 2 of the Sherman Act.²³⁷

The cornerstone of the government's case against Microsoft was its contention that Microsoft wielded monopoly power in the market for operating systems for Intel-based PCs.²³⁸ An operating system, as the government explained, coordinates the interactions between a PC's central processing functions and both its hardware components and software applications. In this regard, an operating system is often called a "platform" for software applications.²³⁹ Software applications communicate with the operating system through the system's application programming interfaces ("APIs").²⁴⁰ The APIs in turn allow software applications to use "the operating system's underlying software routines in order to perform various functions, such as displaying a character on a monitor."²⁴¹ The Department of Justice observed that Microsoft's Windows product was the operating system in use in over 80 percent of Intel-based PCs and was being installed in over 90 percent of new PCs.²⁴²

The government argued that Microsoft retained monopoly power in the operating systems market because OEMs had no commercially practical alternative to Microsoft's Windows. They lacked a suitable alternative, the government contended, because the operating systems market is characterized by economies of scale in software production and network effects that create high barriers to successful entry. The Department of Justice explained that, for an operating system to be used widely, it must support numerous software applications desired by consumers. In turn, software writers will create new applications to run on operating systems that are widely used to make such applications attractive to the greatest number of potential consumers. The more widely used an operating system is, therefore, the

²³⁶ DOJ Microsoft Complaint at ¶¶ 138–41 (cited in note 230); State Microsoft Complaint at ¶¶ 85–90 (cited in note 230); Plaintiffs' Proposed Conclusions of Law at 1–54 (cited in note 234).

²³⁷ In addition to the four Sherman Act claims described above, the states asserted a fifth claim under the Sherman Act arguing that Microsoft violated Section 2 of the Sherman Act by engaging in monopoly leveraging. That claim was not included in the federal complaint and was disposed of by the court on summary judgment. State Microsoft Complaint at ¶¶ 85–90 (cited in note 230).

²³⁸ DOJ Microsoft Complaint at ¶¶ 1–6, 57–60 (cited in note 230); State Microsoft Complaint at ¶¶ 17, 22–27 (cited in note 230). According to the Department of Justice's complaint, Intel-based PCs were the most widely used PCs in the United States. DOJ Microsoft Complaint at ¶ 2 (cited in note 230).

²³⁹ DOJ Microsoft Complaint at ¶¶ 54, 66 (cited in note 230). See also State Microsoft Complaint at ¶¶ 9–10 (cited in note 230) (asserting that software applications "run on top of" operating systems).

²⁴⁰ State Microsoft Complaint at ¶ 10 (cited in note 230).

²⁴¹ Plaintiffs' Joint Proposed Findings of Fact, *United States v. Microsoft Corp.*, Civil Action No 98-1232 ¶ 8.2 (D DC filed Aug 10, 1999) ("Plaintiffs' Proposed Findings of Fact").

²⁴² DOJ Microsoft Complaint at ¶ 2 (cited in note 230). The Department of Justice contended that Microsoft, which manufactured a number of operating systems, enjoyed in excess of an 80 percent share of the PC operating systems market overall. *Id.* at ¶¶ 57–58. The states argued in their complaint that Microsoft controlled over 90 percent of this overall market. State Microsoft Complaint at ¶ 17 (cited in note 230).

more likely it is to become further embraced by consumers.²⁴³ Judge Jackson subsequently used the phrase “applications barrier to entry” to describe this burden to would-be competitors of Microsoft.²⁴⁴

This entry cost rendition of the applications barrier to entry, however, requires closer scrutiny. Viewed slightly differently, the applications barrier to entry results not from sunk costs, but from the chicken-and-egg problem created by path dependence: Consumers want to use an operating system with many applications. Applications writers want to write for an operating system with many consumers. So once an operating system becomes successful, consumers will not buy a different one, and applications writers will not write for a different one.

Although the government argued that Microsoft faced no meaningful actual competition from alternate operating systems, it nonetheless contended that software products existed that were potential competitive threats to Microsoft’s operating system monopoly. These products included Internet browsers—most notably, Netscape’s Navigator browser, the first browser to gain widespread use by the public—and the Java technologies, a new programming language produced by Sun Microsystems.²⁴⁵ The Department of Justice explained that Internet browsers allow computer users to “conveniently . . . locate, access, display, and manipulate content and applications located” on the World Wide Web,²⁴⁶ and Java “is designed in part to permit applications written in it to be run on different operating systems.”²⁴⁷

Internet browsers and the Java technologies, the government argued, have two characteristics that make them potential competitive threats to Microsoft’s Windows operating system. First, they are cross-platform technologies, meaning that they are designed to run on a number of existing operating systems, including Windows. Second, in addition to other functions that they perform, because they expose their own APIs,²⁴⁸ they have the potential to serve as platforms for the software applications that currently run

²⁴³ DOJ Microsoft Complaint at ¶¶ 2–3, 57–60, 66–68 (cited in note 230); State Microsoft Complaint at ¶¶ 15–21 (cited in note 230); Plaintiffs’ Proposed Conclusions of Law at 9–12 (cited in note 234). In prior proceedings between the Department of Justice and Microsoft, the U.S. Court of Appeals for the D.C. Circuit recognized that the software industry is characterized by “increasing returns to scale and network externalities.” *United States v Microsoft*, 147 F3d 935, 939 (DC Cir 1998). See also *United States v Microsoft*, 56 F3d 1448, 1452 (DC Cir 1995) (“It is undisputed that the software market is characterized by ‘increasing returns,’ resulting in natural barriers to entry.”).

²⁴⁴ *Findings of Fact*, 84 F Supp 2d 9, ¶¶ 30–31 (D DC 1999).

²⁴⁵ DOJ Microsoft Complaint at ¶¶ 4–9, 61–68 (cited in note 230); State Microsoft Complaint at ¶¶ 32–37 (cited in note 230); Plaintiffs’ Proposed Conclusions of Law at 14–15, 21–24 (cited in note 234).

²⁴⁶ DOJ Microsoft Complaint at ¶¶ 6, 56, 63 (cited in note 230). See also State Microsoft Complaint at ¶ 28 (cited in note 230).

²⁴⁷ DOJ Microsoft Complaint at ¶¶ 7, 63 (cited in note 230). See also State Microsoft Complaint at ¶ 36 (cited in note 230).

²⁴⁸ Plaintiffs’ Proposed Findings of Fact at ¶¶ 53.2–53.3, 58.1.1–58.2 (cited in note 241).

on Windows.²⁴⁹ To the extent that Internet browsers and the Java technologies can support numerous software applications and can run on operating systems other than Windows, they could, according to the government's theory, break down the applications barrier to entry into the PC operating systems market and thereby diminish Microsoft's alleged monopoly power.²⁵⁰

The government's complaint argued that, as early as 1995, Microsoft recognized the threat that these new technologies posed to the applications barrier to entry and, therefore, to Microsoft's operating system monopoly. In response, Microsoft introduced in mid-1995 its own competing Internet browser product—the Internet Explorer (“IE”). The government argued that Microsoft moreover sought to prevent competing Internet browsers and the Java technologies from gaining widespread use among consumers so that those technologies would not become economically attractive to significant numbers of software writers as alternate platforms for software applications.

The Department of Justice contended that, as the first step in its alleged campaign, Microsoft sought the agreement of Netscape to divide the Internet browser market between browsers compatible with Windows (Microsoft's share) and browsers that can run on platforms other than Windows (Netscape's share).²⁵¹ Upon Netscape's refusal, the government alleged, Microsoft sought to foreclose Netscape's distribution to consumers by entering into agreements with OEMs, Internet service providers (“ISPs”), online service providers (“OLs”), and Internet content providers (“ICPs”) that required them to distribute, promote, purchase, or use IE and that significantly limited their ability to distribute or promote competing Internet browsers—including Netscape's Navigator.²⁵²

²⁴⁹ DOJ Microsoft Complaint at ¶¶ 7–9 (cited in note 230); State Microsoft Complaint at ¶¶ 32–37 (cited in note 230).

²⁵⁰ DOJ Microsoft Complaint at ¶¶ 4–9, 66–68 (cited in note 230); State Microsoft Complaint at ¶¶ 32–37 (cited in note 230). In prior proceedings between the Department of Justice and Microsoft, the U.S. Court of Appeals for the District of Columbia Circuit said: “Widespread use of multi-platform browsers as user interfaces has some potential to reduce any monopoly-increasing effects of network externalities in the operating systems market.” *Microsoft*, 147 F3d at 939.

²⁵¹ DOJ Microsoft Complaint at ¶¶ 14, 70–74 (cited in note 230). See also Plaintiffs' Proposed Conclusions of Law at 24–25 (cited in note 234). The states contended that Microsoft had recognized the threat that Internet browsers posed to its operating system monopoly as early as October 1994. They argued that Microsoft first sought to combat this threat by seeking to acquire the rights to Netscape's Navigator. Upon Netscape's refusal, according to the states, Microsoft then sought to divide the browser market with Netscape. State Microsoft Complaint at ¶¶ 40–45 (cited in note 230).

²⁵² The Department of Justice and the states conceded that Microsoft had modified some of these agreements. They argued, however, that the modifications were too limited to remove all anticompetitive aspects of the agreements, did not ameliorate past anticompetitive effects, and could be withdrawn at any time. DOJ Microsoft Complaint at ¶¶ 10–15, 17–22, 26–34, 61–64, 75–103 (cited in note 230); State Microsoft Complaint at ¶¶ 45–55, 57, 62–78 (cited in note 230); Plaintiffs' Proposed Conclusions of Law at 26–38 (cited in note 234).

The government further contended that Microsoft, besides limiting the distribution of Navigator, which in itself was an important distribution vehicle for Java, took a number of steps specifically to limit the distribution of cross-platform Java. The government argued that Microsoft offered developers Java tools that, when used to write software applications, produced applications that would run properly only on Windows and were difficult to port to other operating systems. According to the government, Microsoft failed to warn developers that these tools would negate the cross-platform nature of Java applications. The government also argued that Microsoft threatened to withhold information regarding Windows from software developers using cross-platform technologies. Microsoft's actions significantly impaired "the ability of Java to develop into a truly robust" software platform and, thereby, to erode the applications barrier to entry.²⁵³

In assessing Microsoft's legal liability, the government characterized the agreements into which Microsoft had entered with ISPs, ICPs, OLSs, and OEMs as exclusionary and argued that because these agreements inhibited competition in the Internet browser market, and concomitantly in the PC operating systems market, without serving a procompetitive purpose, they violated Section 1 of the Sherman Act.²⁵⁴ In addition, the government argued that IE and Windows are separate products under antitrust tying law,²⁵⁵ and that Microsoft's integration of these two products served to restrain competition in the Internet browser market and thus constituted an illegal tie in violation of Section 1 of the Sherman Act.²⁵⁶

²⁵³ Plaintiffs' Proposed Conclusions of Law at 47 (cited in note 234).

²⁵⁴ DOJ Microsoft Complaint at ¶¶ 130–33 (cited in note 230); State Microsoft Complaint at ¶¶ 78, 97 (cited in note 230); Plaintiffs' Proposed Conclusions of Law at 63–66 (cited in note 234). To demonstrate that a defendant has violated Section 1 of the Sherman Act by entering into exclusionary agreements a plaintiff must show, in general, that the agreements restricted competition by foreclosing a significant amount of supply or outlet capacity, and that they served no procompetitive purpose. *Tampa Electric Co v Nashville Coal Co*, 365 US 320, 327–35 (1961) (holding an exclusive dealing agreement not in violation of Section 1 because it did not foreclose competition).

²⁵⁵ The government concluded that IE and Windows are separate products under antitrust tying law by applying the consumer separate demand test articulated by the Supreme Court in *Eastman Kodak Co v Image Technical Services, Inc.*, 504 US 451, 462 (1992) (conducting separate inquiries into market power in the two tied markets), and *Jefferson Parish Hospital Dist No 2 v Hyde*, 466 US 2, 19–23 (1984) (examining the character of the demand for individual items in an alleged tying arrangement). Plaintiff's Proposed Conclusions of Law at 54–61 (cited in note 234). Under this test, a court would conclude that two products are separate if there is sufficient consumer demand for the products on a separate basis, and, thus, vendors find it efficient to provide the two products separately. *Eastman Kodak*, 504 US at 462; *Jefferson Parish*, 466 US at 21–22. The government reached the same conclusion, however, by applying a standard that the D.C. Circuit articulated in *Microsoft*, 147 F3d at 935. In this case the D.C. Circuit developed a standard to determine whether Windows and IE are "integrated" or separate products under the terms of the Justice Department's and Microsoft's 1995 consent decree. In general, under the D.C. Circuit's standard, two items that are technologically commingled are a single, "integrated" product if the commingled product offers benefits beyond that which a consumer might obtain if the consumer separately purchased and then combined the two items or functionalities herself. *Id.* at 948–53. See generally J. Gregory Sidak, *An Antitrust Role for Software Integration*, 18 Yale J Reg (forthcoming 2001).

²⁵⁶ DOJ Microsoft Complaint at ¶¶ 134–37 (cited in note 230); State Microsoft Complaint at ¶¶

The government further argued that to the extent Microsoft's illegal tie-ins, illegal exclusionary contracts, and other behaviors promoting IE served significantly to limit competition in the Internet browser market, Microsoft was guilty of attempted monopolization of this market in violation of Section 2 of the Sherman Act.²⁵⁷ Finally, the government alleged most forcefully that these same actions served to erode potential competitive threats to Microsoft's operating systems monopoly, and that Microsoft thereby illegally maintained its monopoly in the PC operating systems market in violation of Section 2 of the Sherman Act.²⁵⁸

B. Judge Jackson's 1999 Findings of Fact

On November 5, 1999, Judge Thomas Penfield Jackson issued his findings of fact in the Microsoft case overwhelmingly supporting the factual allegations made by the government.²⁵⁹ In short, Judge Jackson found that Intel-compatible PC operating systems constitute the relevant product market²⁶⁰ and that Microsoft holds monopoly power²⁶¹ in that market.²⁶² He

28–31, 93–95 (cited in note 230); Plaintiffs' Proposed Conclusions of Law at 54–63 (cited in note 234). To demonstrate under a per se rule that a defendant has illegally tied one product to another in violation of the Sherman Act, a plaintiff must show that (1) the tying and the tied products are really two separate products; (2) the defendant conditioned the sale of the tying product on the purchase of the tied product; (3) the defendant had sufficient economic power in the market for the tying product to restrain competition in the market for the tied product; and (4) a not insubstantial amount of commerce in the interstate market for the tied product was affected. *Eastman Kodak*, 504 US at 461–62. See *Multistate Legal Studies, Inc v Harcourt Brace Jovanovich Legal & Professional Pub, Inc*, 63 F3d 1540, 1546 (10th Cir 1995) (applying the *Kodak* test to the market for bar review courses).

²⁵⁷ DOJ Microsoft Complaint at ¶¶ 140–41 (cited in note 230); State Microsoft Complaint at ¶¶ 88–92 (cited in note 230); Plaintiffs' Proposed Conclusions of Law at 66–70 (cited in note 234). To prove that a defendant has attempted to monopolize a market, a plaintiff must demonstrate that the defendant engaged in anticompetitive conduct with the specific intent of monopolizing the market and that there was a dangerous probability that the defendant would in fact monopolize the market. *Spectrum Sports, Inc v McQuillan*, 506 US 447, 456 (1993).

²⁵⁸ DOJ Microsoft Complaint at ¶¶ 138–39 (cited in note 230); State Microsoft Complaint at ¶¶ 85–87 (cited in note 230); Plaintiff's Proposed Conclusions of Law at 2–3, 21–23, 44–47, 52–54 (cited in note 234). To demonstrate that a defendant is guilty of the offense of illegally maintaining monopoly power, a plaintiff must show that the defendant retains monopoly power in the market and that it deliberately maintained that power through means other than the development "of a superior product, business acumen, or historic accident." *United States v Grinnell Corp*, 384 US 563, 570–71 (1966).

²⁵⁹ Judge Jackson said of his findings: "Virtually everything I did may be vulnerable on appeal. . . ." Peter Spiegel, *Microsoft Judge Defends Himself Against Charges of Misconduct: Software Giant Appeals Judge's Breakup Judgment*, *Fin Times* 4 (Oct 7, 2000).

²⁶⁰ In antitrust analysis the term "relevant market" refers to the market in which the defendant's alleged monopoly power or anticompetitive behavior is to be assessed. The relevant market has two dimensions, the product market and the geographic market. The former identifies "the producers or sellers of products that compete to some substantial degree with the product in question," and the latter identifies the "area of effective competition . . . in which the seller operates, and to which the purchaser can practicably turn for supplies." ABA Section of Antitrust Law, 1 *Antitrust Law Developments* 233, 449, 532–33 (4th ed 1997) (citations omitted).

²⁶¹ In antitrust law, monopoly power is "the power to control prices or exclude competition." *United States v E.I. du Pont de Nemours & Co*, 351 US 377, 391 (1956).

²⁶² *Findings of Fact*, 84 F Supp 2d 9, ¶¶ 18–66 (D DC 1999).

also agreed with the bulk of the government's contentions regarding Microsoft's actions over the past decade. Most significantly for assessing Microsoft's legal liability, he concluded that these actions "could only have been advantageous if they operated to reinforce monopoly power,"²⁶³ and that while they bestowed some benefits on consumers, in the main they harmed them by inhibiting competition and innovation in the computer industry.²⁶⁴ We discuss these findings in greater detail below.

1. The relevant market.

Judge Jackson affirmed the government's contention that the relevant market for purposes of evaluating whether Microsoft wields monopoly power is the worldwide market for Intel-compatible PC operating systems.²⁶⁵ For the majority of consumers, Judge Jackson stated, currently and in all likelihood in the near future, there are no substitutes for Intel-compatible PC operating systems that would not engender significant costs.²⁶⁶

On the demand side, Judge Jackson concluded that consumers do not perceive Intel-compatible server operating systems, non-Intel-compatible PC operating systems (including Apple's Mac OS operating system),²⁶⁷ network computers, server-based computing through browsers, other information appliances²⁶⁸ such as smart wireless phones and hand-held computers, or middleware, to be substitutes for an Intel-compatible PC operating system.²⁶⁹ Middleware, Judge Jackson explained, refers to software pro-

²⁶³ Id at ¶ 67.

²⁶⁴ Id at ¶¶ 408–12.

²⁶⁵ Id at ¶ 18. Judge Jackson rejected Microsoft's contention that a relevant market defined to include only Intel-compatible PC operating systems is too narrow for purposes of addressing the factual question of whether Microsoft wields monopoly power. Microsoft had argued that to assess this question, Judge Jackson should not employ a structural approach that determines "the geographic and product boundaries for an identifiable market," and then analyzes the market shares of the firms within that market. Defendant Microsoft Corporation's Revised Proposed Findings of Fact, *United States v Microsoft Corp.*, Civ Action No 98-1232 ¶ 132 (D DC filed Sept 10, 1999) ("Microsoft's Proposed Findings of Fact"). Rather, Judge Jackson should employ a behavioral approach that requires a court to identify whether there are any limits on an alleged monopolist's ability to raise prices or exclude entry, and on whether the alleged monopolist's behavior is consistent with the retention of monopoly power. Microsoft argued that this latter approach more accurately assesses the dynamics of the marketplace, and that under this approach Judge Jackson should consider "the impact of competition between Windows and all other platform software." Id at ¶ 155.

²⁶⁶ *Findings of Fact*, 84 F Supp 2d at ¶ 21.

²⁶⁷ Judge Jackson noted, however, that inclusion of the Mac OS in the relevant market would not change his conclusion regarding the degree of Microsoft's market power. Id.

²⁶⁸ Judge Jackson noted that within the next few years it is possible that information appliances, alone or in combination, might be substitutable for Intel-compatible PC operating systems for what Judge Jackson determined is a small percentage of consumers who do not use all of the features of their PC. Id at ¶ 23.

²⁶⁹ Id at ¶¶ 19–29. Microsoft had argued that all of these products compete with Windows in its function as a software applications platform and thereby serve to constrain Microsoft's pricing ability. Microsoft's Proposed Findings of Fact at ¶ 199–239 (cited in note 265).

grams, such as Internet browsers and Sun's Java class libraries, that expose their own APIs to software application developers while relying on the APIs of the underlying operating system to run.

Judge Jackson also rejected the possibility of supply-side substitution. He agreed with the government's contention that there is an applications barrier to entry into the Intel-compatible PC operating systems market.²⁷⁰ Judge Jackson explained that while a firm could develop a new operating system, and some firms have, it would take years before such a system could support the breadth of applications that currently run on Windows and thus offer consumers a meaningful alternative.²⁷¹ He found similar hurdles to impede supply-side substitution by middleware developers or server-based systems, noting that it would take years before they offered consumers a realistic alternative to Windows because of the applications barrier to entry.²⁷²

2. Microsoft's power in the relevant market.

In antitrust analysis, monopoly power is defined as "the power to control market prices or exclude competition."²⁷³ Judge Jackson concluded that Microsoft wields monopoly power in the market for Intel-compatible PC operating systems because it could charge more for Windows than it could have in a competitive market, and that it could do so for a sustained period of time without losing a significant number of customers.²⁷⁴ We discuss more fully below Judge Jackson's conclusions regarding Microsoft's market power.

a) Market share and barriers to entry. To reach his conclusion that Microsoft had market power, Judge Jackson evaluated the firm's market share, often viewed by courts as the most significant indicia of market power,²⁷⁵ or at a minimum, as the starting point in any monopoly power analysis.²⁷⁶ Judge Jackson concluded that Microsoft retains a "dominant, persistent and increasing share" worldwide in the market for Intel-compatible PC operating systems. Over the last few years, he found, this share has stood at 95 percent.²⁷⁷

The court found Windows's dominant position to be insulated from competition because of the large number of software applications that Win-

²⁷⁰ *Findings of Fact*, 84 F Supp 2d at ¶¶ 30–31. See also *id* at ¶¶ 36–44.

²⁷¹ *Id* at ¶¶ 30–31.

²⁷² *Id* at ¶ 32.

²⁷³ *United States v E.I. du Pont de Nemours & Co*, 351 US 377, 391 (1956).

²⁷⁴ *Findings of Fact*, 84 F Supp 2d 9 at ¶ 33 (D DC 1999).

²⁷⁵ See *Eastman Kodak Co v Image Technical Services, Inc*, 504 US 451, 464 (1992) ("The existence of [market] power ordinarily is inferred from the seller's possession of a predominant share of the market.").

²⁷⁶ ABA Section of Antitrust Law, 1 *Antitrust Law Developments* at 234–42 (cited in note 260).

²⁷⁷ Judge Jackson determined that even if he included Apple's Mac OS in the relevant market, Microsoft's market share would still register over 80 percent. *Findings of Fact*, 84 F Supp 2d at ¶ 35.

dows supports.²⁷⁸ Judge Jackson concluded that it would be prohibitively expensive for a new operating system vendor to recreate the seventy thousand plus applications that currently run on Windows and that software vendors will not write for a new system until they are confident that it will be well established.²⁷⁹ Microsoft never faced the same entry barriers that a new entrant must confront, Judge Jackson found, because it never confronted a “highly penetrated market dominated by a single competitor.”²⁸⁰

b) Price restraints on Microsoft and Microsoft’s pricing behavior. Although Judge Jackson acknowledged that the evidence available at trial did not allow him to determine with confidence the monopoly price for Windows, he nevertheless cited certain factors as indicative of Microsoft’s power over price. These factors include: Microsoft’s failure to consider competitors’ prices, Microsoft’s decision to price Windows 95 at the same price as Windows 98,²⁸¹ an internal document showing that Microsoft had wide latitude in the price it could charge for Windows 98, and the fact that Microsoft price discriminates in the licensing fees for Windows.²⁸² Judge Jackson concluded that even if Microsoft charges less than the full monopoly price, this does not mean that it does not have monopoly power. Microsoft, Judge Jackson declared, uses a substantial part of its monopoly power to impose “burdensome restrictions on its customers” designed to increase and maintain its market dominance.²⁸³

Judge Jackson dismissed Microsoft’s contention that it could not wield monopoly power because it invests large sums in research and development, noting that even monopolists have incentives to innovate. He similarly rejected Microsoft’s arguments that its monopoly power was constrained by its installed base, piracy, and long-term threats from alternative technologies.

3. Middleware threats to Microsoft’s operating system monopoly.

Judge Jackson concluded that, beginning in the spring of 1995, Microsoft perceived the emergence of cross-platform middleware, such as Netscape’s Navigator browser and Sun’s Java class libraries, as threats to its

²⁷⁸ Id at ¶¶ 36–44.

²⁷⁹ Id at ¶¶ 40–41.

²⁸⁰ Id at ¶ 43.

²⁸¹ Judge Jackson explained that in a competitive market one would expect the price of an older version of a product to “stay the same or decrease.” Id at ¶ 62.

²⁸² Id at ¶¶ 62–66. See *Coal Exporters Assn of the United States v United States*, 745 F2d 76, 91 (D DC 1984) (“[T]he ability of a firm to price discriminate is an indicator of significant monopoly power.”). Because Judge Jackson’s findings of fact contained no citations or footnotes explaining this list, it is not obvious to which internal document the judge was referring. Microsoft did introduce evidence concerning prices of forty-nine to eighty-nine dollars for upgrades, which counted for a small percentage of sales and had different characteristics from OEM sales.

²⁸³ *Findings of Fact*, 84 F Supp 2d at ¶ 66.

monopoly power.²⁸⁴ Judge Jackson explained that Microsoft feared these technologies because they were well positioned to serve as platforms for “network-centric applications that run in association with Web pages,”²⁸⁵ they could run on multiple operating systems (hence called “cross-platform”), and they exposed their own APIs upon which software developers could rely in lieu of the APIs in the underlying operating system. Microsoft recognized, Judge Jackson concluded, that if middleware programs became widely used, and at the same time exposed sufficient numbers of APIs to support the advanced, full-featured applications that run on Windows, then large numbers of software developers would have sufficient incentive to write applications that relied entirely on middleware APIs, and developers and consumers alike would no longer be reliant on Windows as an applications platform. In this manner, middleware could potentially “dissipate” the positive feedback loop that supports the applications barrier to entry and, in the parlance of Microsoft’s worst fears, turn Windows into a commodity.²⁸⁶

Although Judge Jackson concluded that the threat to Microsoft’s operating system monopoly posed by middleware technologies was not imminent because these technologies exposed significantly fewer APIs than Windows, and thus could not support the full-featured applications that Windows supports,²⁸⁷ he found that Microsoft nevertheless feared these technologies because of the potential threat that they posed.²⁸⁸ We discuss Judge Jackson’s conclusions regarding Microsoft’s response to these potential threats in the following two sections.

a) Microsoft’s response to the browser threat. Based on the evidence at trial, Judge Jackson concluded that Microsoft first sought to contain the threat posed by Navigator by seeking Netscape’s agreement, in mid-1995, to divide the browser market.²⁸⁹ Judge Jackson found that Microsoft hoped to induce Netscape not to expose the APIs in the Windows version of its browser so that Navigator would not compete as a platform-level browser able to support software applications. In exchange, Microsoft would cede the non-Windows browser market to Netscape, provide Netscape with technical assistance to develop browser applications that relied on Microsoft’s Internet technologies, and provide Netscape with preferential access to technical information that Netscape needed to create a Windows version of

²⁸⁴ Id at ¶¶ 68–77. Judge Jackson noted that Microsoft recognized Java as a threat to its monopoly power in the spring of 1996. Id at ¶ 75.

²⁸⁵ Id at ¶ 69.

²⁸⁶ Id at ¶ 72.

²⁸⁷ Id at ¶ 77.

²⁸⁸ Id.

²⁸⁹ Id at ¶¶ 79–86. Judge Jackson observed that at the time of Microsoft’s proposal, Navigator was the only browser that enjoyed enough market share to potentially erode the applications barrier to entry. Id at ¶ 89.

its browser.²⁹⁰ When Netscape refused Microsoft's proposal, Microsoft delayed the provision of Windows technical information to Netscape. The court found that the delay prevented Netscape from releasing the Windows 95 version of its browser until several months after Microsoft's retail release of Windows 95 and IE,²⁹¹ thereby maximizing IE's market share at "Navigator's expense."²⁹²

Judge Jackson found, however, that Microsoft also competed on quality and price. Specifically, from 1995 onwards Microsoft spent more than one hundred million dollars annually in efforts to improve the quality of IE to the point where industry reviewers were split over whether IE or Navigator was the superior product.²⁹³ Microsoft also spent thirty million dollars annually promoting IE.²⁹⁴ Judge Jackson further found that Microsoft bundled IE with Windows 95, later technically integrated IE with Windows 98, and offered IE for free. Microsoft did this despite its large monetary investment in the product and the potential to obtain significant revenues from its sale. Judge Jackson conceded that Microsoft might have given IE away for free to respond to competition rather than to preserve the applications barrier to entry.²⁹⁵ He concluded, however, that the determination to preserve that barrier "was the main force driving its decision to price the product at zero."²⁹⁶ Accordingly, the court agreed with the government's evidence that Microsoft acted to foreclose to Navigator the two browser distribution channels that "lead most efficiently to browser usage": the OEM and Internet Access Provider ("IAP") channels.²⁹⁷

Judge Jackson also concluded that browsers and operating systems are two separate products because consumers seek to purchase them separately, and there is general agreement within the software industry that the functionalities that these two products provide are distinct.²⁹⁸ Noting Microsoft's argument that other vendors bundle browsers with their operating systems, Judge Jackson concluded that Microsoft is the only vendor that does not give OEMs and consumers the choice either not to install the browser or to uninstall it.²⁹⁹ Given the government's demonstration at trial that IE can be removed without negatively affecting the functionality of Windows, Judge

²⁹⁰ *Id.* at ¶¶ 90–92.

²⁹¹ *Id.* at ¶¶ 90–92.

²⁹² *Id.* at ¶¶ 133–36.

²⁹³ *Id.* at ¶¶ 134–36.

²⁹⁴ *Id.* at ¶ 140.

²⁹⁵ *Id.*

²⁹⁶ *Id.* at ¶ 136.

²⁹⁷ *Id.* at ¶¶ 143–48.

²⁹⁸ *Id.* at ¶¶ 150–54. In support of his conclusion Judge Jackson observed that some consumers do not want a browser with their operating system, and corporate consumers using multiple operating systems seek to purchase a browser independently of the operating system to ensure the maintenance of uniform browser software across different operating system platforms used within the company. *Id.* at ¶¶ 151–52.

²⁹⁹ *Id.* at ¶ 153.

Jackson concluded that there is no technical reason to prohibit consumers from removing IE from Windows.³⁰⁰

He further found that the integration of IE and Windows reduced the speed of a PC for consumers, a clear downside for consumers who did not want a browser.³⁰¹ Finally, Judge Jackson concluded that Microsoft integrated IE into Windows not for any procompetitive purpose, but purely to restrict Navigator's distribution and to stop "Navigator from weakening the applications barrier to entry."³⁰²

b) *Microsoft's response to the threat posed by Sun Microsystems's implementation of Java.* Sun Microsystems designed the Java programming language to allow applications written in Java to run on any operating system. Java allowed developers to write software with advanced functionality by relying on some of the APIs in the underlying operating system. Judge Jackson found that, in response, Microsoft took actions that made it difficult to take Java-based applications that relied on Windows APIs and port them into non-Windows environments.³⁰³

Microsoft, Judge Jackson found, also refused to include new Java libraries in IE that expanded the ability of Java to support full-featured applications because this would make applications more easily portable.³⁰⁴ Microsoft also attempted to thwart the development of additional Java class libraries by threatening to withhold Windows operating systems support from Intel's microprocessors and other threats to induce Intel to stop helping Sun develop Java class libraries. Judge Jackson found that Intel acquiesced.³⁰⁵ Judge Jackson concluded that Microsoft would not have acted to make it more difficult to port Java applications absent its commitment to preserve the applications barrier to entry.³⁰⁶

C. Judge Jackson's 2000 Conclusions of Law

On April 3, 2000, Judge Jackson issued his conclusions of law.³⁰⁷ He concluded that "Microsoft maintained its monopoly power by anticompetitive means and attempted to monopolize the Web browser market, both in violation of § 2," and that "Microsoft also violated § 1 of the Sherman Act by unlawfully tying its Web browser to its operating system."³⁰⁸ Judge Jack-

³⁰⁰ Id at ¶¶ 175–85.

³⁰¹ Id at ¶ 173.

³⁰² Id at ¶ 155.

³⁰³ Id at ¶¶ 387–89.

³⁰⁴ Id at ¶¶ 386–94.

³⁰⁵ Id at ¶¶ 393–406.

³⁰⁶ Id at ¶ 407 ("It is not clear whether, absent Microsoft's interference, Sun's Java efforts would by now have facilitated porting between Windows and other platforms enough to weaken the applications barrier to entry. What is clear, however, is that Microsoft has succeeded in greatly impeding Java's progress to that end with a series of actions whose sole purpose and effect were to do precisely that.").

³⁰⁷ *Conclusions of Law*, 87 F Supp 2d 30 (D DC 2000).

³⁰⁸ Id at 35.

son, however, found in Microsoft's favor on the claim that its "marketing arrangements with other companies constituted unlawful exclusive dealing under criteria established by leading decisions under § 1."³⁰⁹ Conceptually, Judge Jackson divided his discussion into three sections: claims based on Section 2 of the Sherman Act, claims based on Section 1, and claims based on state law. We summarize here his findings only with respect to the first two categories.

1. Claims under Section 2 of the Sherman Act.

Judge Jackson reiterated that "there are currently no products—and that there are not likely to be any in the near future—that a significant percentage of computer users worldwide could substitute for Intel-compatible PC operating systems without incurring substantial costs."³¹⁰ Those facts created a presumption that Microsoft had monopoly power,³¹¹ which Microsoft failed to rebut.³¹² Judge Jackson added that

over the past several years, Microsoft has comported itself in a way that could *only* be consistent with rational behavior for a profit-maximizing firm if the firm knew that it possessed monopoly power, and if it was motivated by a desire to preserve the barrier to entry protecting that power.³¹³

Judge Jackson then considered whether Microsoft maintained its monopoly power by anticompetitive means. He noted that "[i]f the evidence reveals a significant exclusionary impact in the relevant market," then "liability will attach—unless the defendant comes forward with specific, pro-competitive business motivations that explain the full extent of its exclusionary conduct."³¹⁴

Judge Jackson then considered in greater detail Microsoft's conduct with respect to Netscape's Navigator and its conduct with respect to Sun's Java technology. Judge Jackson accepted all of the government's arguments that Microsoft's conduct with respect to Netscape's Navigator or Sun's Java technology was anticompetitive. He concluded, among other things, that Microsoft lacked any legitimate business justification for its decision not to offer a "browserless" version of Windows 98 to consumers and OEMs.³¹⁵ Judge Jackson stated that "Microsoft's decision to tie Internet Explorer to

³⁰⁹ Id. On the claims for which he found Microsoft liable under federal antitrust law, Judge Jackson also found Microsoft liable under analogous state antitrust statutes. Id.

³¹⁰ Id at 36.

³¹¹ Id at 36–37, citing *United States v AT&T Co*, 524 F Supp 1336, 1347–48 (D DC 1981), *affd as Maryland v United States*, 460 US 1001 (1983).

³¹² *Conclusions of Law*, 87 F Supp 2d 30, 36–37 (D DC 2000).

³¹³ Id at 37 (emphasis added).

³¹⁴ Id at 38, citing *Eastman Kodak Co v Image Technical Services, Inc*, 504 US 451, 483 (1992), and *Aspen Skiing Co v Aspen Highlands Skiing Corp*, 472 US 585, 605 n 32 (1985).

³¹⁵ *Conclusions of Law*, 87 F Supp 2d at 40.

Windows cannot truly be explained as an attempt to benefit consumers and improve the efficiency of the software market generally, but rather as part of a larger campaign to quash innovation that threatened its monopoly position.”³¹⁶ With respect to Java, Judge Jackson found in the government’s favor that, “[a]s part of its grand strategy to protect the applications barrier, Microsoft employed an array of tactics designed to maximize the difficulty with which applications written in Java could be ported from Windows to other platforms, and vice versa.”³¹⁷

Judge Jackson emphasized, however, that Microsoft’s actions should be viewed in totality to appreciate their significance for purposes of determining liability under Section 2:

Microsoft’s campaign to protect the applications barrier from erosion by network-centric middleware can be broken down into discrete categories of activity. But only when the separate categories of conduct are viewed, as they should be, as a single, well-coordinated course of action does the full extent of the violence that Microsoft has done to the competitive process reveal itself. In essence, Microsoft mounted a deliberate assault upon entrepreneurial efforts that, left to rise or fall on their own merits, could well have enabled the introduction of competition into the market for Intel-compatible PC operating systems.³¹⁸

Judge Jackson also concluded that the totality of the facts reinforced the conclusion that Microsoft was, in his words, “predacious.”³¹⁹ For these reasons, Judge Jackson found Microsoft liable for monopolization in violation of Section 2 of the Sherman Act.

In addition to finding that Microsoft’s conduct toward Netscape constituted actual monopolization of the market for Intel-compatible PC operating systems, Judge Jackson found that the same evidence supported a finding that Microsoft had engaged in attempted monopolization of the market for Internet browsers.³²⁰ He therefore found Microsoft liable under Section 2 for attempting to obtain monopoly power in a second market by anticompetitive means.

2. Claims under Section 1 of the Sherman Act.

Judge Jackson found that Microsoft violated Section 1 of the Sherman Act through tying arrangements, but that Microsoft did not so violate the law through its exclusive dealing arrangements.

³¹⁶ Id.

³¹⁷ Id at 43.

³¹⁸ Id at 44, citing *Continental Ore Co v Union Carbide & Carbon Corp*, 370 US 690, 699 (1962).

³¹⁹ *Conclusions of Law*, 87 F Supp 2d at 45–46.

³²⁰ Id.

With respect to tying, Judge Jackson agreed with the government that “Microsoft’s combination of Windows and Internet Explorer by contractual and technological artifices constitutes unlawful tying to the extent that those actions forced Microsoft’s customers and consumers to take Internet Explorer as a condition of obtaining Windows.”³²¹ In reaching that conclusion, Judge Jackson ruled that the applicable precedent for evaluating Microsoft’s product bundling was not the D.C. Circuit’s 1998 decision in *United States v Microsoft*,³²² but rather the Supreme Court’s decisions in *Eastman Kodak Co v Image Technical Services, Inc*³²³ and *Jefferson Parish Hospital District No 2 v Hyde*,³²⁴ neither of which specifically concerned product integration in the computer software industry.³²⁵ Judge Jackson stated: “The fact that Microsoft ostensibly priced Internet Explorer at zero does not detract from the conclusion that consumers were forced to pay, one way or another, for the browser along with Windows.”³²⁶

Judge Jackson found that Microsoft had not violated Section 1 by imposing exclusive dealing arrangements in contracts with “some OLSs, ICPs, ISVs, Compaq and Apple” that required those firms “to promote and distribute Internet Explorer to the partial or complete exclusion of Navigator.”³²⁷ He observed:

Notwithstanding the extent to which these “exclusive” distribution agreements preempted the most efficient channels for Navigator to achieve browser usage share, . . . Microsoft’s multiple agreements with distributors did not ultimately deprive Netscape of the ability to have access to every PC user worldwide . . . [I]n 1998 alone, for example, Netscape was able to distribute 160 million copies of Navigator, contributing to an increase in its installed base from 15 million in 1996 to 33 million in December 1998. As such, the evidence does not support a finding that these agreements completely excluded Netscape from any constituent portion of the worldwide browser market, the relevant line of commerce.³²⁸

Nonetheless, Judge Jackson emphasized that “[t]he fact that Microsoft’s arrangements with various firms did not foreclose enough of the relevant market to constitute a § 1 violation in no way detracts from the Court’s assignment of liability for the same arrangements under § 2.”³²⁹

³²¹ Id at 47.

³²² 147 F3d 935 (DC Cir 1998).

³²³ 504 US 451 (1992).

³²⁴ 466 US 2 (1984).

³²⁵ *Conclusions of Law*, 87 F Supp 2d 30, 48 (D DC 2000).

³²⁶ Id at 50.

³²⁷ Id at 51.

³²⁸ Id at 53.

³²⁹ Id.

IV. ECONOMIC WELFARE AND DIVESTITURE IN *MICROSOFT*

Shortly after the Justice Department and the states filed their complaints against Microsoft in 1998, Judge Jackson bifurcated the case into a liability phase and a remedies phase.³³⁰ Once the liability phase was completed with the findings of fact and conclusions of law discussed above, the district court turned to the question of the appropriate remedy.

Before, during, and after the liability phase of the trial, a number of scholars and former government officials in law and economics proposed remedies to cure the competitive problems alleged by the government or subsequently identified in Judge Jackson's findings of fact.³³¹ Some of these commentators disputed the need for any remedy (on the rationale that Microsoft's conduct did not violate the antitrust laws), while others advocated the whole range of possible remedies. Robert Hall proposed a framework for calculating damages that would be imposed on Microsoft.³³² Others proposed behavioral remedies that included (1) explicit and implicit line-of-business restrictions; (2) compulsory licensing of the source code for Windows; and (3) mandatory access to the Windows platform.³³³ Proposed structural remedies included (1) a vertical divestiture of Microsoft into distinct companies along lines of business (that is, operating systems ("OS") software, applications programs, and Internet services, sites, and products); (2) a horizontal divestiture of multiple, vertically integrated firms; and (3) a vertical separation along lines of business (OS software, applications, and Internet) and then a further horizontal breakup of the OS division into multiple, equal parts.³³⁴ In the end, the government asked for a structural injunction requiring vertical divestiture of Microsoft into two separate companies,

³³⁰ Steve Lohr, *If Microsoft Loses Case, Remedies are Thorny*, NY Times C1 (Dec 14, 1998).

³³¹ The academics included Timothy F. Bresnahan of Stanford University (and subsequently Deputy Assistant Attorney General (Chief Economist) of the Antitrust Division); Ronald A. Cass, Dean of Boston University's law school; Nicholas Economides of New York University; Robert E. Hall of Stanford University; Herbert Hovenkamp of the University of Iowa; Paul Rothstein of Georgetown University; and Steven Salop of Georgetown University. See Joel Brinkley, *U.S. and State Officials Weigh Microsoft Remedies*, NY Times C1 (Nov 17, 1999); Brinkley, *A Microsoft Remedy*, NY Times at C1 (cited in note 104). Other commentators included former antitrust officials, such as William J. Baer, former Director of the Bureau of Competition at the FTC; Charles F. "Rick" Rule, former Assistant Attorney General of the Antitrust Division of the Justice Department during the Reagan Administration; and Robert Litan, Director of Economic Studies at the Brookings Institution and former Deputy Assistant Attorney General of the Antitrust Division during the Clinton Administration. See John M. Broder and Joel Brinkley, *How Microsoft Sought Friends in Washington*, NY Times 1 (Nov 7, 1999).

In addition, when Judge Jackson issued his findings of fact during the liability phase of the trial, he asked Professor Lawrence Lessig, then of Harvard Law School, to submit an amicus curiae brief. See Steve Lohr, *Internet Law Expert Returns to Antitrust Case*, NY Times C5 (Nov 29, 1999); Denise Caruso, *Settlement Talks in the Microsoft Case Hinge on a Question: Are the Laws of Government or Software Supreme?*, NY Times C5 (Dec 6, 1999).

³³² Robert E. Hall, *Toward a Quantification of the Effects of Microsoft's Conduct* at 2-7 (cited in note 81).

³³³ See the discussion of various behavioral remedies in Litan Brief at 29-30 (cited in note 14).

³³⁴ For a discussion of various structural remedies, see *id.* at 24.

one engaged in the operating systems business and the other in the applications business.³³⁵ As noted in the Introduction, a group of distinguished amici consisting of Robert Litan, Roger Noll, William Nordhaus, and Frederic Scherer asked for a more far-reaching divestiture that, in addition to vertically separating the operating systems and applications businesses, also horizontally divides the operating systems business into three competing firms.³³⁶ Microsoft itself countered with a proposal for behavioral restrictions.³³⁷

After a short hearing and rapid briefing cycle, in which the court declined to hear testimony or to take further evidence on the remedies question, Judge Jackson adopted the government's divestiture proposal and ordered Microsoft to submit a plan of "reorganization" dividing the company vertically into two distinct firms.³³⁸ At the time of this writing, the district court's decision is pending en banc appellate review by the U.S. Court of Appeals for the District of Columbia Circuit.

In the following sections, we apply the economic welfare framework set out in Part II of this Article to the court's divestiture order. We find that the record supporting the remedy is insufficient to show either that the remedy is reasonably likely to provide net economic benefits or to provide greater benefits than alternative remedies. Moreover, we show why even the theoretical arguments in favor of vertical divestiture leave unaddressed important questions that cast doubt on the optimality of divestiture. Part IV.A.2 then applies the welfare analysis to the most prominent proposal for an alternative structural remedy, the amicus filing by Litan et al, and finds that it, too, leaves open basic questions that must at least be explored before that remedy's absolute or comparative benefits can reasonably be judged.

We cannot, from our analysis, determine what kind of remedy is best for resolving the Microsoft case. The data and analysis to support such a calculation mirror the very information that we argue is necessary (and missing) in the arguments supporting divestiture. But we do conclude that neither the government nor the amici have met the burden of showing their respective remedies to be the best available from the standpoint of economic welfare. In the sections that follow, we will explain where we think the divestiture proposals contain gaps in their analyses that preclude reasonable assessment of their individual or comparative effects on economic welfare.

³³⁵ Plaintiff's Revised Proposed Final Judgment, *United States v Microsoft Corp*, Civil Action No 98-1232, 2 (D DC filed May 26, 2000).

³³⁶ Litan Brief at 46-67 (cited in note 14).

³³⁷ Microsoft Corporation's Proposed Final Judgment, *United States v Microsoft Corp*, Civil Action No 98-1232 (D DC filed May 10, 2000).

³³⁸ *United States v Microsoft Corp*, 97 F Supp 2d 59, 63 (D DC 2000).

A. Structural Injunctions and Microsoft

The fundamental case for divestiture is well summarized by Herbert Hovenkamp, a distinguished antitrust scholar and an adviser to the states in the Microsoft litigation. He has argued that divestiture is the only remedy that would end Microsoft's alleged monopoly and produce competition in the operating systems market.³³⁹ He stated: "If the findings show significant abuse of monopoly power, then the appropriate remedy is to break up the monopoly—not to hobble the company or try to regulate it."³⁴⁰ Divestiture is thus presented as the only way to remove both Microsoft's incentive *and* ability to engage in anticompetitive conduct, and to avoid continuing government oversight. Indeed, advocates of a Microsoft divestiture along lines of "relevant markets" have attempted to establish in a principled way that (1) any optimal remedy must address Microsoft's power in the operating systems market, because otherwise the company still has a monopoly that it has incentives to preserve; and (2) any behavioral remedy would be more intrusive than any structural remedy. On the first point, for example, Eliot L. Spitzer, the Attorney General of New York and the lead plaintiff of the states in the case, argued that Judge Jackson's findings of fact focused the real problem on the operating system: "It's an overwhelming opinion now that [the remedy] has to address their monopoly in operating systems."³⁴¹ And on the second point, Steven Salop among others has argued that a conduct remedy, such as forcing the company to rewrite contracts or to modify its behavior, would be "too intrusive and regulatory."³⁴²

Behavioral remedies—such as those suggested by Hal Varian of the University of California, Berkeley, Robert Hall of Stanford University, or Nicholas Economides of New York University—more modestly seek to address Microsoft's *ability* to engage in anticompetitive behavior. Stated differently, behavioral remedies concede that Microsoft's incentive to maintain market power in the operating systems market would remain intact. Rather than "breaking up the monopoly," behavioral remedies would seek to curb Microsoft's ability to maintain its monopoly. Once it is decided that not only the ability, but also the incentive, to engage in anticompetitive activities must be eliminated, then behavior modifications cannot even be considered. As we will discuss below, however, it does not follow that all structural remedies eliminate the incentives to engage in anticompetitive activities.

By apparently convincing Judge Jackson that Microsoft's underlying incentives must be curbed, the government and supporting amici were able

³³⁹ Brinkley, *A Microsoft Remedy*, NY Times at C1 (cited in note 104) (quoting Herbert Hovenkamp).

³⁴⁰ Id.

³⁴¹ Joel Brinkley, *Prosecutors Seeking to Break the Grip of Windows System*, NY Times A1 (Nov 10, 1999).

³⁴² Id.

to point the remedial process in one direction—namely, restoring competition in operating systems through divestiture. In the following sections we analyze first the vertical divestiture urged by the government and ordered by the district court. We then examine the more complete divestiture proposal filed by the amicus brief of Litan and others.

1. The court-ordered vertical divestiture.

Under the district court's order, Microsoft is required to restructure itself from a vertically integrated firm into two, nonrival companies engaged in distinct yet complementary lines of business. One company would produce operating systems software,³⁴³ and the second would produce application programs.³⁴⁴ Implicit in this divestiture remedy is the notion that each company would be prohibited from engaging in the other's principal lines of business to prevent any overlap or re-integration that divestiture was designed to eliminate. Accordingly, this proposed remedy is not purely structural but also includes behavioral constraints. As a starting point for our critique, it is important to note that the vertical divestiture ordered by the court would not directly alter Microsoft's position in the operating systems market. Accordingly, it would leave in place the very monopoly power that the court found to create incentives for Microsoft to engage in anticompetitive actions. The remedy would instead remove Microsoft's ability to act on its incentives in the particular manner that the government alleged. And it would, in the government's view, spur competition over time in the operating systems market because the newly independent applications company would now have the incentive to maximize its markets by writing programs

³⁴³ An operating system is best defined by Judge Jackson in his findings of fact:

An "operating system" is a software program that controls the allocation and use of computer resources (such as central processing unit time, main memory space, disk space, and input/output channels). The operating system also supports the functions of software programs, called "applications," that perform specific user-oriented tasks. The operating system supports the functions of applications by exposing interfaces, called "application programming interfaces," or "APIs." These are synapses at which the developer of an application can connect to invoke pre-fabricated blocks of code in the operating system. These blocks of code in turn perform crucial tasks, such as displaying text on the computer screen. Because it supports applications while interacting more closely with the PC system's hardware, the operating system is said to serve as a "platform."

Findings of Fact, 84 F Supp 26 ¶ 2 (D DC 1999).

³⁴⁴ The application programs market is sometimes also referred to as the "software for computation" market, as it generally encompasses word processors, spreadsheets, presentation aids, and personal productivity tools. See Chris E. Hall and Robert E. Hall, *National Policy on Microsoft: A Neutral Perspective, Version 2.0* 1–2, available online at <<http://www.NetEcon.com>> (visited Nov 28, 2000). Microsoft is best known for the applications programs that it sells in its Microsoft Office suite, namely Word (a word processing program), Excel (a spreadsheet program), PowerPoint (a presentation aids program), Access (a database program), and Outlook (a contact manager, email-fax handler, and address book program). *Id.*

that would run “cross platform” on operating systems other than Windows or other Microsoft products.³⁴⁵

a) Static efficiency gains. The first relevant point for the welfare analysis of vertical divestiture in this case pertains to the expected static gains for consumers. Would this form of vertical divestiture create better products or lower prices for consumers? The argument is that the independent applications company will have the incentive to make its products capable of running across multiple platforms and, indeed, to encourage the proliferation of such competing platforms. As Carl Shapiro argued on the government’s behalf, the supplier of an application benefits if the complementary operating systems on which it runs become less expensive.³⁴⁶ This divested applications company, then, would theoretically act to erode the applications barrier for potential new entrants into the operating systems market. Consumers would, in turn, benefit from competition between Windows and these new entrants.

But there are reasons to be less than sanguine that such competition will develop through the efforts of an application company born of a vertically cleaved Microsoft. Making an application portable to non-Windows operating systems has costs. Only some applications may thus be ported, because the fixed costs of developing portability will initially have to be recouped from the comparatively thin base of users of the alternative operating system. Profitable opportunities for porting may thus be limited. It is unclear, then, that these limited incentives to encourage complementary product development will cause applications developers to stimulate substantial or meaningful competition among operating systems.

Moreover, the applications company will have a choice between investing in porting an existing application beyond the dominant operating system or investing those same resources to develop a new application for the dominant platform. Depending on the relative costs, it could be more sensible for the applications company to develop something new that runs on Windows rather than making an existing application portable to Linux. In the event that the firm’s supply of necessary programming talent is limited—for example, by the current shortage of such skilled labor in the United States—even otherwise profitable investments in porting may be foregone in the near term. It is also unclear whether there are economies of scale in creating compatibility or portability. So, it is uncertain that many new applications would be written to run across platforms, and, even if they are so written, it must at least be considered that the additional development costs imposed by such portability would decrease the pace of applications innovation as compared with development of applications for a single platform.

³⁴⁵ See Romer Declaration at ¶¶ 5–9 (cited in note 34).

³⁴⁶ Shapiro Declaration at 10 (cited in note 115).

Therefore, before the government's theory that the applications layer will stimulate competition at the operating system layer of the market can be accepted, some clearer idea is needed of the relative costs and benefits of portability versus new development for the dominant platform. And, the reduction in operating system prices that the applications company would expect from competition in that market must be included as part of that calculation. There has been substantial debate about the extent to which Microsoft engaged in monopoly pricing of Windows. If the price of Windows has been close to the competitive level, the direct benefits to consumers will be less and applications providers will be less likely to gain from writing for new platforms or spurring competition among operating systems. Until the potential static price gains from competition (or the threat thereof) are determined, the incentives of the applications providers are unclear in the government's model. The implications are twofold: First, the key comparative benefit of structural relief—that it will eliminate underlying anticompetitive incentives—might well not materialize. And second, even if those incentives are eliminated, the static gains to consumers are hard to gauge. The predicted reductions in price, increased choice of operating systems, and increased production of applications software may either not appear or even run in the wrong direction, especially if there were cost efficiencies to pre-divestiture integration or if the combined price of operating systems and applications increases because of double marginalization, described above in Section II. These risks may or may not be large, but they cannot be ignored in making the case for divestiture.

b) Dynamic efficiency. There is also an unexamined question in the district court's remedy with regard to dynamic efficiencies. The linchpin of the vertical divestiture is the incentive the applications company will have to invite and create cross-platform portability and compatibility. Part of the benefit that the government argues will ensue is the static gain to consumers of lower prices for operating systems. But the other part of the predicted benefit involves innovation that will occur because a reduced applications barrier to entry will give entrepreneurs incentives to create new middleware and operating systems. As Paul Romer states in his declaration for the government, one of the key benefits sought by the government's remedy is, through competition, to increase the rate of innovation in the software industry.³⁴⁷ For reasons already discussed above, it is unclear from the government's model what the incentives of applications providers will be upon vertical divestiture or what the effect of divestiture will be on the output of new applications software. But even assuming that OS competition develops and that the supply of applications software increases, divestiture's effect on innovation may be temporary and ambiguous.

³⁴⁷ Romer Declaration at ¶ 9 (cited in note 34).

The impact may be temporary because, even with compatibility across platforms, a firm may gain a decisive lead in the market if the costs of such compatibility are high and applications developers begin to perceive the opportunity to write for an emerging market winner and thereby avoid those costs. The dynamic would become self-reinforcing between the complementary applications and operating systems products. So, it cannot be taken as given that simultaneous, as compared with sequential, competition at the operating systems level is a stable or optimal equilibrium. Yet that assumption is present in the arguments favoring divestiture.³⁴⁸

The dynamic impact may be ambiguous because the court-ordered remedy will handicap one major player in the innovation race: the Microsoft operating systems company itself. To the extent that an “operating system” is an evolving product, the line-of-business restrictions that prevent applications from being incorporated into Microsoft’s operating system would appear to put Microsoft at a disadvantage to other operating system producers. There may be in the view of some parties an appealing “rough justice” to that result given the district court’s findings. There is also an economic argument that, to the extent Microsoft can still use its lead in the installed base to disadvantage competitors, the gains from new operating systems would offset any chilled innovation by Microsoft. But two counterpoints need further examination before the limits on operating system innovation by Microsoft itself are discounted.

First, consumers may have to incur switching costs to move to a new operating system that contains desired innovations. If consumers could obtain the same innovation without the switching costs, they would be better off. So, it must be more explicitly taken into account that any limits on Microsoft’s innovation will cost consumers, and only then can the net benefits of entry by new operating systems be properly assessed. Second, the degree of competition might in fact be better over time if Microsoft were allowed to develop Windows or another operating system without concern for the operating system-applications boundary. Freezing the scope of the dominant technology might allow inferior firms to enter the market and gain an installed base, just by virtue of being permitted to include more functionality in their products. Should any such firm gain dominance as a result of Microsoft’s line-of-business restriction, then it is unlikely that the cause of innovation will have been served. Even if such a firm does not succeed, consumers will still have been deprived of one important source of applications innovation. The benefits of the line-of-business restrictions might exceed the costs, but that claim must be carefully demonstrated, not merely assumed. It thus, again, bears consideration whether conduct remedies

³⁴⁸ See, for example, *id.* (basing his conclusion that Microsoft harmed the innovative process on the assumption that “competitive markets, are, on balance, the best mechanism for guiding technology down a path that benefits consumers”).

might achieve many of the dynamic benefits of vertical divestiture without running some of the risks. The tradeoffs may be hard to predict, but they cannot be assumed away if a reasonable case is to be made for a welfare-maximizing remedy.

c) *Administrative cost.* Because the vertical divestiture does not directly eliminate Microsoft's incentives to act anticompetitively, the district court's remedy relies heavily on conduct requirements to reduce the operating system company's ability to follow those incentives. A second welfare-related observation about the district court's remedy is thus that its administrative costs cannot be presumed to be lower than the costs of administering a purely behavioral injunction. As the government's own witnesses and the supporting amici have all made clear, the efficacy of the court-ordered remedy depends upon numerous conduct provisions. The "interim" conduct remedies go to the heart of the violations that the court found Microsoft to have committed: they force the integrated company to stop its anticompetitive actions pending divestiture and prohibit the operating systems company from resuming certain kinds of conduct to preserve its monopoly once divestiture is complete.³⁴⁹ With respect to limiting Microsoft's ability to act on monopolistic incentives, the court's remedy would, for example, prevent the operating systems company from: (1) directly tying its operating system product to its own Internet product; (2) entering into exclusionary agreements that promote its own Internet browser product; and (3) attempting to monopolize the Internet browser market. The very oversight and enforcement difficulties that a purely behavioral injunction would entail are thus present to some degree in the "structural" remedy ordered by the court. To the extent the structural remedy was sold in part as being easier to administer and less regulatory than a pure conduct remedy, the distinction may be weak or nonexistent.

Indeed, the regulatory aspects of the court's vertical divestiture order are critical to reaching an objective determination of whether divestiture is comparatively appropriate in this case. To begin with, numerous definitional issues will likely emerge as focal points for litigation. Although the product markets for operating systems, applications, and Internet services can generally be defined, it would be complex to define with specificity the category of products that each divested company could or could not produce and sell.³⁵⁰ It would be very difficult to find a principled basis for distinguishing application software functions from functions that may properly be considered, or incorporated into, an operating system.³⁵¹ Robert Litan has noted that "over the last ten years, [Microsoft has] expanded [its] operating

³⁴⁹ Shapiro Declaration at 17 (cited in note 115); Romer Declaration at ¶ 41 (cited in note 34).

³⁵⁰ See Jonathan Zittrain, *The Un-Microsoft Un-Remedy: Law Can Prevent the Problem That It Can't Patch Later*, 31 Conn L Rev 1361, 1371 (1999) (It would be "a painful and difficult job [to identify] what is currently properly part of the operating system and what is a separate application.").

³⁵¹ Robert W. Hahn, *The Costs of Regulating Microsoft*, 21 Reg 62, 67 (Summer 1998).

system over time to include more and more things that used to be called applications so that if we split the company in two at this point in time, we would potentially freeze technology.”³⁵²

It is, therefore, reasonable to think that under this divestiture proposal, the three companies would, like the Baby Bell companies in connection with the AT&T consent decree, constantly be in the position of petitioning the court to determine whether they could pursue the development of certain products or whether they could obtain a waiver of the line-of-business restrictions to sell certain products. This process would require the court continually to oversee the decree. Indeed, the amicus brief of Litan and others raises precisely this concern in arguing that a more stringent divestiture than the one the court ordered is necessary. They argue that line-of-business restrictions would have to be imposed on the operating systems company and that non-discrimination requirements would be necessary for the applications company.³⁵³ Both of these remedies would entail continuous monitoring (not to mention the definitional questions raised above).

Because vertical divestiture neither eliminates anticompetitive incentives nor makes it less costly to stop the firm from acting on those incentives, it is not necessarily more effective than a conduct remedy. To be sure, the element of direct vertical control that can exist within a single corporation is absent, and the incentives of the applications company to cooperate with the operating systems company might be different than under integration, but the theoretical advantage of structural relief over behavioral relief becomes much less obvious when it does not strike at the underlying incentives themselves or do away with regulatory oversight.³⁵⁴

In sum, then, the remedy ordered by the district court leaves open several important questions. The record supporting the remedy does not take into account the comparative costs and benefits of alternative structural and behavioral remedies sufficiently to know that vertical divestiture is the best option. Moreover, within each category of gains on which remedies should be compared—static, dynamic, and administrative efficiency—there are important gaps in the analysis that prevent a complete assessment of either the absolute or comparative benefits of vertical divestiture of Microsoft.

³⁵² Bob Edwards, U.S. vs. Microsoft : *Likely Outcomes*, Interview with Robert Litan, NPR’s Morning Edition (Feb 19, 1999) (“Interview with Robert Litan”).

³⁵³ Litan Brief at 46–48 (cited in note 14).

³⁵⁴ For example, what Microsoft had once attempted to achieve through vertical integration into the Internet browser market it could now attempt to achieve through vertical contracts with other providers of Internet browsers. Microsoft could potentially reach agreements with the companies owning Navigator and Internet Explorer, pursuant to which Microsoft would promise such companies the types of marketing advantages that it had offered ISPs and others in exchange for their agreement to make their systems proprietary to the Windows operating system. This solution would not prevent software writers from writing applications to run on top of the browsers, nor would it prevent the evolution of server-based computing delivered through the Internet. It might, however, preserve the market power that Microsoft possesses with respect to PC operating systems.

2. The amicus “complete divestiture” proposal.

The Litan et al amici filed a remedy proposal with the district court that evinced concern that the government’s vertical divestiture proposal would neither eliminate Microsoft’s anticompetitive incentives nor create competition in the operating systems market.³⁵⁵ We will assume arguendo that the Litan amici are correct in their assertion that a fundamental goal of antitrust remedies should be to introduce competition where monopoly previously stood.³⁵⁶ There are several respects in which the Litan proposal needs further elaboration and evidence before it can be deemed the welfare-maximizing remedy choice. Litan and his colleagues clearly recognize that fact. They acknowledge that, while they believe their proposal to be the best one, a careful process of evidence and review is necessary before that conclusion can be confirmed.³⁵⁷ Below we address some questions that their brief raises for a comparative welfare analysis of divestiture alternatives, and we identify some of the specific evidentiary inquiries that a court would have to pursue before adopting the amicus proposal.

The Litan proposal is that Microsoft should, first, divest vertically in the manner ordered by the district court.³⁵⁸ The operating systems company should then further divest horizontally into three identical, competing firms.³⁵⁹ They call this remedy “full” divestiture.³⁶⁰ This remedy would thus directly end the operating system monopoly and thereby replace incentives to protect market power with incentives to compete for market share. This is an important distinction from the vertical divestiture that the court ordered, and moreover may create a greater difference between “full” divesti-

³⁵⁵ Litan Brief at 1 (cited in note 14).

³⁵⁶ We note only that the proposition is not self-evident, especially where network effects and Schumpeterian dynamics may lead to competition for a market, and not merely for market share. The goal of the court should certainly be to eliminate the anticompetitive behavior, but how far the court should go to foster entry when a change in the monopolist’s behavior does not itself spark competition might be a different question. We agree that competition should be the court’s goal, but we also note that it will not necessarily be within the court’s remedial purview.

³⁵⁷ Litan Brief at 52–53 (cited in note 14).

³⁵⁸ See id at 46.

³⁵⁹ See id at 49–66. Others have also made similar proposals. For example, Steven Salop, Craig Romaine, and Robert Levinson have advocated such a multidimensional divestiture. Robert J. Levinson, R. Craig Romaine, and Steven C. Salop, Draft, *The Flawed Fragmentation Critique of Structural Remedies in the Microsoft Case 2* (Charles River Jan 2000), available online at <<http://www.crai.com>> (visited Nov 21, 2000). Similarly, Thomas Lenard has proposed a vertical divestiture of applications combined with a horizontal divestiture of the operating systems business. Nevertheless, his proposed hybrid remedy differs slightly from the one generally put forward. He would let Microsoft bundle as many applications as it wanted with the operating system before divestiture, so that competition would automatically occur among those applications upon division of the operating systems company into separate, competing firms. Thomas M. Lenard, *Creating Competition in the Market for Operating Systems: A Structural Remedy for Microsoft 27* (Progress & Freedom Foundation Jan 2000), available online at <<http://www.pff.org/remedies.htm>> (visited Nov 21, 2000).

³⁶⁰ Litan Brief at 45, 49 (cited in note 14).

ture and vertical divestiture than the difference that exists between vertical divestiture and conduct remedies. But while the amicus proposal might resolve some of the potential flaws with the court-ordered relief, it raises its own set of concerns that must be addressed before the economic welfare effects of “complete” divestiture can be assessed with sufficient confidence to order such relief.

a) Static efficiency. The first question concerns the static gains to consumers. On one hand, the horizontal competition that would result from this type of break-up could lead to lower prices for the Windows operating system. On the other hand, however, this remedy could fracture the Windows standard and dissipate the consumer-side network externality. Although the new companies would all begin competing with the same operating system, over time they would be free to develop different, competing versions that could eliminate the convenience that Microsoft has created with a single, standardized Windows operating system. Robert Litan, for example, has conceded that “a lot of consumers like the fact that there is only one effective operating system right now,” and “[t]hey don’t want to have to go shop for software that may only work on one of the operating systems and not both.”³⁶¹

If there are network effects and economies of scale in software production, those forces might drive consumers and software writers to embrace a single operating system—not three or more. The result could be (1) a rush by the competitors to standardize or otherwise become compatible, (2) a battle for the market by competitors that results in the network’s “tipping” towards one of the three firms, or (3) product differentiation that fractures the network externality and harms consumers. The situation is not hypothetical. Consider the trend recently exhibited by the Linux operating system. Currently, there are about fifteen English language versions of the Linux operating system for an Intel-based PC.³⁶² Although each version is based on the same freely available source code, the differences among versions are large enough that there is no guarantee that a commercial application for Linux will run on all of them.³⁶³ To ensure that developers will be able to create applications for Linux that will install and execute on any of the Linux operating system versions, a Linux Standard Base committee has already been formed to define a standard set of guidelines and application programming interfaces.³⁶⁴

Steven Salop, Craig Romaine, and Robert Levinson have criticized the thesis that the creation of multiple Windows OS companies would fragment the Windows operating system.³⁶⁵ Given the enormous installed base of the

³⁶¹ Interview with Robert Litan (cited in note 352).

³⁶² Jason Levitt, *Achilles’ Heel: Linux Libraries*, Information Wk *1 (Jan 24, 2000).

³⁶³ *Id.*

³⁶⁴ *Id.*

³⁶⁵ Levinson, Romaine, and Salop, *The Flawed Fragmentation Critique* at 1–7 (cited in note 359).

Windows operating system,³⁶⁶ they argue that “[a]lthough the new Windows companies subsequently *could* choose to drastically deviate from this standard and create highly incompatible products, they are unlikely to do so.”³⁶⁷ They first argue that network effects give consumers and developers a strong interest in maintaining a unitary Windows standard.³⁶⁸ Because of switching costs, “unless a new operating system is significantly superior to Windows, a user would be unwilling to switch to it.”³⁶⁹ They posit that the three competing Windows operating system companies would have incentives to remain compatible with each other because of the value that consumers and developers place on compatibility.³⁷⁰ Otherwise, they argue, developers, sellers of computers, and consumers would punish a company that deviated from the standard.³⁷¹

Furthermore, the authors propose that the costs of developing applications that fit with the new Windows operating system products, porting costs, would remain low for various reasons: (1) the operating system products will be identical to start with,³⁷² so porting costs would not be an issue at the time of the breakup;³⁷³ (2) each operating system company would have strong incentives to be backwards compatible with earlier versions of Windows products;³⁷⁴ (3) each operating system company faces incentives for long-term compatibility, and because the standard APIs would not be rewritten, “only those few routines that benefit from the use of [each new OS company’s] proprietary extensions would be affected”;³⁷⁵ (4) each operating system would start from the same common code base and a common hardware platform;³⁷⁶ and (5) the OS companies and standard-setting bodies would have incentives to coordinate their development efforts.³⁷⁷ They conclude that the “fragmentation criticism actually amounts to an attack on any remedy that causes operating system competition. It is competition, not the structural remedy, that allegedly leads to fragmentation.”³⁷⁸

Salop and his colleagues might be right, but there are important considerations to the contrary. First, the concern about fragmentation is *not* an

³⁶⁶ Id at 4.

³⁶⁷ Id.

³⁶⁸ Id at 7–9.

³⁶⁹ Id at 10.

³⁷⁰ Id at 5, 16–21.

³⁷¹ Id at 5–6, 17–18.

³⁷² Id at 11.

³⁷³ Id at 12.

³⁷⁴ Id at 12–17.

³⁷⁵ Id at 17, 19.

³⁷⁶ Id at 20.

³⁷⁷ Id at 20–21 (“Such supplementary cooperation may take the form of a formal standard-setting process, administered by either an impartial industry group or a computer industry group consisting of interested applications, operating systems, and hardware producers. Such a group may formally adopt existing improvements to the Windows standard as industry standard.”).

³⁷⁸ Id at 3.

attack on competition itself, particularly if competition is sequential rather than simultaneous. Indeed, the costs of fragmentation and the network benefits from compatibility might be precisely what make the standard form of competition less likely than Schumpeterian competition in software markets. Simultaneous competition is great if it endures and produces benefits that offset any possible fragmentation costs. It may also, as Salop and his colleagues contend, create ways around the fragmentation problem. But it might not, especially if one of the three Windows companies gains a significant market lead. The concern about a court-ordered divestiture is that it could create fragmentation costs without any offsetting benefits that endure long enough to compensate consumers for the lost network externality.

Second, a common code basis is no guarantee that a standard will not fragment. All it takes for fragmentation to become a concern (as it has for Linux, Unix, or Java) is for each new OS company to make a few scattered changes to the two million lines of code in Windows 2000. It is not necessarily the case that only “drastic” departures from the Windows standard impose unacceptable costs. Rather, any risk that a program has departed from the standard requires costly inquiries on the part of consumers and developers as to how far the departure has gone, and what its implications are.³⁷⁹ A little bit of incompatibility can add up to drastic costs.

Third, formal standard-setting bodies are unlikely to be of much help in formalizing the Windows standard. Such bodies are reluctant to make any systems with a significant proprietary component into standards. Java, for example, has not been adopted as an international standard because key components of Java are copyrighted by Sun Microsystems—only about 30 percent of Java is in the public domain.³⁸⁰ Only if a system is in the public domain, like the “C” programming language, will a standards body be willing to take it over.

What remains of the Salop argument is the theory that network effects—the high value that everyone places on having one standard—will be powerful enough to prevent fragmentation. The history of operating systems, however, shows that every system controlled by more than one company has struggled with fragmentation. Unix, which began as one version of code and which had, and still has, an enormous installed base of users, fragmented into different versions in the late 1980s despite massive efforts to standardize.³⁸¹ As already mentioned, Linux faces worries about fragmentation, despite the strong incentives that would seem to exist to

³⁷⁹ See, for example, Michael A. Cusumano and David B. Yoffie, *What Netscape Learned from Cross-Software Development*, Committee of the ACM 72, 74–75 (Oct 1999) (“[T]ailoring even small amounts of code to specific platforms can create a logistics nightmare, because the different teams and code bases have to be synchronized.”).

³⁸⁰ Ellis Booker, *Licensees to Sun: Let Go of Java, or We Will Walk*, Internet Wk *1 (Jan 10, 2000).

³⁸¹ See, for example, Tom Quinlan, *AT&T Seeking Partners in Unix Labs*, InfoWorld 3 (Dec 24, 1990) (“In yet another effort to unite the various factions backing different versions of Unix, AT&T is negotiating with Unix vendors to sell as much as 40 percent of its Unix Systems Laboratory, which controls the development and licensing of the Unix operating system.”); Philip J. Gill, *Finally, a Binary*

tation, despite the strong incentives that would seem to exist to avoid that result in order to foster applications development.³⁸² Java developers also worry about fragmentation, their concerns heightened by Sun's decision to abandon its efforts to work with official standards bodies to provide a Java standard; Sun will continue to police Java compatibility itself through its copyrights, despite opposition from other developers, including IBM, Hewlett Packard, and Microsoft, which have threatened to move forward with their own version.³⁸³ There is at least some good evidence to suggest that network effects might well not be enough to maintain the standard in the case of the Microsoft operating system.

The fragmentation suffered by Unix, Java, and Linux has not been fatal, and those competitors have continued to be viable in the market. Fragmentation reflects a trade-off between innovation and standardization; there are benefits from fragmentation as well as increased costs. But there is a difference between letting that trade-off be made in the marketplace and making it by court order or regulation. Windows is a dominant operating system today in part because it offers consumers the benefits of opting out of the "fragmentation" problem. Depriving the market of that alternative is not something to be done without careful analysis of offsetting benefits.

A second concern raised by the Litan proposal involves productive efficiencies. Even if fragmentation does not deprive consumers of interoperability, that interoperability might come at a cost. As Litan has himself stated, horizontal division of the operating systems business might "slow down the development of application software because those applications guys are going to have to write three or four versions [one for each] operating system."³⁸⁴ For example, in designing a browser to work across different platforms, developers would have to incur a number of different types of costs:

UNIX PC Standard, Datamation 59, 60 (Dec 15, 1990) ("Lotus Development Corp. now supports Lotus 1-2-3 for three versions of UNIX."); Matthew May, *Customers Hunt the Missing Link*, The Times (Nov 5, 1990) ("[R]idiculously, there are several different and incompatible versions of Unix, reducing the effectiveness of the concept. The industry has formed two camps: Unix International, headed by AT&T, and the Open Software Foundation, dominated by IBM.").

³⁸² See text accompanying notes 361–72.

³⁸³ Carol Sliwa, *Sun Drops Java Standard Effort: Decision Spurs Mixed Reaction Among Users*, ComputerWorld 85 (Dec 13, 1999); Geoff Friesen, *What's Brewing in Java's Future?*, JavaWorld at *1 (July 1999).

³⁸⁴ Interview with Litan (cited in note 352). The chief information officer of a web-based office supply company expressed this concern following the issuance of Judge Jackson's findings of fact:

If all of a sudden I start losing the interaction between applications and operating systems, I'm going to see an increase in support levels and an increase in complexity as we try to keep them inter-operating Once we do that, our costs are going up. The profitability of the company could be affected.

Mitch Wagner, *What's Next Microsoft—Judge's Findings Raise Interoperability Fears*, Internet Wk 194 (Nov 15, 1999) (quoting Mark Resh, Standard Forms, Inc).

Netscape engineers found that doing cross-platform development well requires minimizing several costs, or “penalties.” One is the additional time and human effort needed to create abstracted, cross-platform code. A second involves tailoring at least some code for different platforms which is almost always necessary. And a third comes from testing and debugging, as engineers spend extra time making sure features work properly on different platforms.³⁸⁵

One way to avoid the problem of degraded interoperability would be to allow competitors in the operating systems market to collaborate on the promulgation of vendor-neutral standards, such as TCP/IP.³⁸⁶ For example, all the new vertically integrated firms could agree on the compatibility of the operating system and so compete on the basis of one common standard.

Of course, the recommendation to allow collaborative standard setting among competitors in the operating systems market would introduce its own set of antitrust questions: A substantial body of law exists on the question of whether standard setting among horizontal competitors enhances efficiency and benefits consumer welfare or instead facilitates collusion or the exclusion of entrants.³⁸⁷ It would be wrong to assume that collaborative standard setting on subsequent versions of the Windows operating system (or its successor) would be out of reach of public or private antitrust litigation. Even if such standard settings were genuinely competitively neutral, the opportunity for strategic, private antitrust litigation would exist.

b) Dynamic efficiency. There are also fundamental questions about the effect on innovation and dynamic efficiency that could be expected from the Litan amicus proposal of complete divestiture. If the Windows standard stays coherent enough not to impose costs on consumers, competition among the newly formed OS competitors will arguably create static price benefits for consumers. But such cohesion might well exacerbate rather than reduce the applications barrier to entry for non-Windows operating systems. If applications providers know that the biggest return will come from writing for Windows, and that there is little price reduction in operating systems to be had from entry by other (non-Windows) system producers (price reductions that would increase demand for complementary applications), then it is unclear that innovation outside the Windows platform will be helped by complete divestiture. Put another way, if the remedy merely replaces the Windows monopoly with a Windows oligopoly that

³⁸⁵ Cusumano and Yoffie, *What Netscape Learned* at 77 (cited in note 379) (“Several Netscape engineers estimated there was at least a 15 percent–20 percent human effort and time penalty in design and coding (excluding integration and system testing), based on the extra human and computing resources needed to develop cross-platform code, rather than, say, just a Windows or just a Unix version of the product.”).

³⁸⁶ See Wagner, *What’s Next Microsoft*, *Internet Wk* at 194 (cited in note 384).

³⁸⁷ See Lawrence A. Sullivan and Warren S. Grimes, *The Law of Antitrust: An Integrated Handbook* § 5.4 at 218–23 (West 2000).

sells operating systems at lower prices, then the benefits for non-Windows operating systems seem improbable. Depending on the costs of creating portability, then, the effect of the Litan amicus proposal on the applications barrier to entry is not certain to be positive.

If, on the other hand, the Windows standard fractures, then one of two things may happen. As already discussed, consumers might suffer a loss of network benefit, but they might receive a compensating benefit in the form of innovation by new entrants into the operating system and middleware markets. On the other hand, one Windows company might gain a lead and reconstitute the very network monopoly that divestiture was designed to end. That result is not necessarily bad, because the interim competition might lead to a much better and less expensive product. But, at a minimum, the relationship between fragmentation, standardization, and dynamic benefits warrants further consideration before a complete divestiture remedy could be reasonably adopted in *Microsoft*.

c) Administrative costs. Finally, the administrative costs of the Litan et al proposal are unlikely to be negligible. The amici note that their remedy will entail “some minimum conduct restraints during the near term.”³⁸⁸ These conduct restraints pertain to recombination among the four companies created by full divestiture, non-discrimination in licensing, limits on hiring employees from other “WinCos,” and cross-ownership among the four companies by top management.³⁸⁹ Even if one assumes these conduct restraints can be efficiently and effectively enforced, however, the complete divestiture proposal also requires the very difficult initial task of dividing the Windows company into comparable thirds. If this task were not well accomplished, much of the remedy’s force would be lost. On the other hand, in an industry where, as the amici themselves argue,³⁹⁰ the important assets are “informational” and intellectual rather than tangible, the lines along which a company should be horizontally divided are more difficult to discern. Administering this initial division could entail protracted and heavy costs that should not be ignored in comparing remedies.

In sum, Litan et al propose an interesting remedy worthy of careful consideration. But, despite the detailed argument they present, and the efforts they make to place “complete divestiture in comparative perspective with alternative remedies,” the amici nonetheless leave out important considerations that must be addressed before the case for their proposal is complete. Litan et al themselves recognize this point. They describe their proposal as a “sketch”³⁹¹ and make an observation with which we wholly agree: “only careful and thorough review of this and the prominent alternative remedy proposals . . . can provide sufficient supporting detail to assure the

³⁸⁸ Litan Brief at 56 (cited in note 14).

³⁸⁹ *Id.*

³⁹⁰ *Id.* at 58.

³⁹¹ *Id.* at 52.

court that this (or indeed any) remedy proposal is best suited to meet the major remedy goals.”³⁹² The district court did not engage in such a process, with the result that neither the absolute nor comparative economic welfare effects of the remedy it adopted, or of any other remedy before the court, has been sufficiently assessed.

V. THE AT&T DIVESTITURE AS A MODEL FOR *MICROSOFT*

Before *Microsoft*, the most recent use of antitrust law to restructure an American industry was the government’s lawsuit against AT&T that culminated in the 1982 settlement leading to the breakup of the Bell System in 1984. Implicitly and explicitly, the Bell breakup has been touted as the blueprint for Microsoft, so much so that pieces resulting from the company’s proposed divestiture have been dubbed “Baby Bills” after the “Baby Bells.”³⁹³ Professors Litan, Noll, Nordhaus, and Scherer urged in their amicus brief:

To the extent that the Court . . . sees a structural remedy as presenting greater risks than a conduct decree, we believe that it can learn from, and be comforted by, the extensive experience that has been gained in other markets that have been deregulated over the past two decades, or where structural antitrust relief has been imposed (notably, in the case of the breakup of AT&T).³⁹⁴

They regard the AT&T divestiture as the primary cause of a host of beneficial developments:

[C]ritics of the AT&T breakup have been proved wrong at virtually every turn. The breakup now is widely acknowledged to have unleashed powerful forces of competition in long-distance telephone markets; to have induced policy makers to recognize (in the Telecommunications Act of 1996) that not even local telephone service is subject to natural monopoly; and perhaps most important, to have accelerated innovation in telecommunications, especially in the rapid technical development and deployment of fiber optic cable that has facilitated the rapid growth of the Internet.³⁹⁵

Before the AT&T divestiture is casually taken to support similar remedies in other cases and other industries, it is worth examining more critically the arguments in the excerpt quoted above. We think the above-quoted assessment is too sanguine and that courts should be uneasy about using the

³⁹² Id at 52–53.

³⁹³ See, for example, Editorial, *Open Windows*, LA Times B4 (Jan 11, 1999).

³⁹⁴ Litan Brief at 24 (cited in note 14).

³⁹⁵ Id at 25. For a similarly optimistic assessment of the relevance of the AT&T decree to the proposed divestiture of Microsoft, see Joel Brinkley, *Microsoft Cites AT&T to Fight Breakup*, NY Times C4 (May 15, 2000); Richard Gilbert, *A Better Breakup Than AT&T's*, NY Times A31 (May 10, 2000).

AT&T divestiture as a model for formulating remedies in the Microsoft, or any other, case. Our point is not that the MFJ's net effects were harmful or that the decree was in some way a failure compared with the alternatives for relief in that case.³⁹⁶ The substantial debate on those issues is outside the scope of this Article. Rather, our point is that, even if the MFJ did produce net benefits, it also entailed very high, unanticipated costs. The AT&T case shows not only that the predictions of antitrust litigants and judges about the future of a technologically dynamic industry are often wrong, but also that enforcing and interpreting a complex decree can be administratively costly and potentially harmful to consumer welfare. The prospect of such costs counsels more caution than comfort in adopting a structural remedy, and requires that a compelling case be made for the benefits that society can expect from such relief.

A. The Antitrust Suit

In 1974 the Department of Justice brought suit against AT&T,³⁹⁷ arguing that AT&T had violated Section 2 of the Sherman Act by using its dominant position in telephone equipment and local exchange service to monopolize the markets for long-distance telecommunications and telephone equipment. The government argued that AT&T had systematically refused interconnection to its long-distance competitors,³⁹⁸ had abused the regulatory process in protecting its monopoly,³⁹⁹ and had engaged in predatory pricing in long-distance markets.⁴⁰⁰ The Department of Justice was concerned that such predation could continue because cross-subsidies could flow from the local telephone monopolies to long-distance services.⁴⁰¹

The suit ended with a consent decree finalized in 1984.⁴⁰² This decree, known as the Modification of Final Judgment ("MFJ"),⁴⁰³ imposed both structural and behavioral constraints on AT&T. The principal structural

³⁹⁶ The MFJ was issued as a consent decree in *United States v AT&T Co*, 552 F Supp 131 (DDC 1982), affd as *Maryland v United States*, 460 US 1001 (1983).

³⁹⁷ Modification of Final Judgment, 552 F Supp at 139.

³⁹⁸ *AT&T*, 524 F Supp at 1353–54. See also Paul W. MacAvoy and Kenneth Robinson, *Winning by Losing: The AT&T Settlement and Its Impact on Telecommunications*, 1 Yale J Reg 1, 14–17 (1983).

³⁹⁹ *AT&T*, 524 F Supp at 1356.

⁴⁰⁰ *Id* at 1356–57, 1364–65. For a harsh critique of the Department of Justice's theory of pricing "without regard to cost" as predatory, see MacAvoy and Robinson, 1 Yale J Reg at 26–27 (cited in note 398) ("[P]ricing without regard to cost is a most peculiar standard to apply in an industry that is required by regulation to deviate from cost-based pricing.").

⁴⁰¹ See Modification of Final Judgment, 552 F Supp at 165, 188; *United States v Western Electric Co*, 673 F Supp 525, 531–32 (D DC 1987), affd 894 F2d 1387 (DC Cir 1990). See also Kellogg, Thorne, and Huber, *Federal Telecommunications Law* at §§ 4.4–4.5 (cited in note 111); MacAvoy, *The Failure of Antitrust* at 16–19 (cited in note 221) (stating that although the government's case was weak, Judge Greene placed the burden of disproving the monopolization charges on AT&T).

⁴⁰² See Modification of Final Judgment, 552 F Supp at 131.

⁴⁰³ The settlement "modified" a 1956 consent decree into which the government had entered with AT&T. *Id* at 135–38. See also *United States v Western Electric Co*, 1956 Trade Cases (CCH) ¶ 68, 246 (D NY 1956) (original decree).

component was vertical divestiture on a massive scale. Before divestiture, AT&T consisted of three main parts: (1) local exchange companies that provided about 80 percent of U.S. local telephone service; (2) AT&T Long Lines, providing almost all U.S. long-distance service; and (3) Western Electric, including Bell Laboratories, which provided research and manufacturing of almost all of AT&T's equipment.⁴⁰⁴ The MFJ required AT&T to divest itself of its local exchange operations, from which were created seven new regional Bell operating companies ("RBOCs").⁴⁰⁵ These were Ameritech, Bell Atlantic, BellSouth, NYNEX, Pacific Telesis, Southwestern Bell, and US West. To create the RBOCs, AT&T was required to transfer assets to the RBOCs⁴⁰⁶ and give them "on a royalty-free basis, all existing patents and all patents issued for a period of five years following approval of the proposed decree,"⁴⁰⁷ as well as other technical information.

The theory behind the divestiture was that AT&T could, absent such a remedy, use revenues from monopoly local exchange service to cross-subsidize activities in other markets.⁴⁰⁸ The RBOCs, having been divested from AT&T, were thus barred from entering the long-distance service or information services markets,⁴⁰⁹ and from manufacturing or selling telephone

⁴⁰⁴ See, for example, Hausman and Sidak, 109 Yale L J at 427 (cited in note 219).

⁴⁰⁵ As there was to be no competition between the RBOCs, it theoretically did not matter how many of them there were. The MFJ states that "nothing in this Modification of Final Judgment shall require or prohibit the consolidation of the ownership of the BOCs into any particular number of entities." Modification of Final Judgment § I(A)(4), 552 F Supp at 227. AT&T was left to decide how many RBOCs there would be along the lines of administrative convenience, noting that a single RBOC would be at greater risk of antitrust attack but that an RBOC needed to be spread over several states to protect from state-level regulatory uncertainty. See Kellogg, Thorne, and Huber, *Federal Telecommunications Law* at § 4.7.3 (cited in note 111).

⁴⁰⁶ Section I(A)(1) of the decree required AT&T to transfer enough assets to the RBOCs to allow them to operate. AT&T was not compensated for the transfers. Kellogg, Thorne, and Huber, *Federal Telecommunications Law* at § 4.9.1 (cited in note 111).

⁴⁰⁷ Modification of Final Judgment, 552 F Supp at 177. Judge Greene ultimately ruled that "all" patents included patents for services that the RBOCs were barred from entering. *United States v Western Electric Co.*, 569 F Supp 1057, 1086 (D DC 1983).

⁴⁰⁸ To cross-subsidize means to set prices below average incremental cost. William J. Baumol and J. Gregory Sidak, *Toward Competition in Local Telephony* 62 (MIT & AEI 1994). The Department of Justice's theory that local exchange service had been used to cross-subsidize long-distance service was wrong. Regulators anxious to keep politically sensitive local telephone services charges low had directed that cross-subsidies flow in the other direction, particularly throughout the 1960s and 1970s. See Hausman and Sidak, 109 Yale L J at 428 n 23 (cited in note 219) ("In actuality, long distance service had long cross-subsidized local service at the direction of regulators."); Temin and Weber, 8 U Fla J L & Pub Pol at 211-12 (cited in note 110) ("[M]assive subsidies had been flowing from long distance to local service.").

⁴⁰⁹ Information services were defined as "the offering of a capability for generating, . . . utilizing, or making available information which may be conveyed via telecommunications." Modification of Final Judgment § IV(J), 552 F Supp at 229. See also Kellogg, Thorne, and Huber, *Federal Telecommunications Law* at § 6.4 (cited in note 111). These services included data processing, electronic publishing, voice answering services, email, videotext, and electronic Yellow Pages. The restriction was lifted in 1991. See *United States v Western Electric Co.*, 767 F Supp 525, 529 (D DC 1991), aff'd 993 F2d 1572 (DC Cir 1993).

equipment.⁴¹⁰ The RBOCs were, moreover, required to provide every long-distance carrier equal access to local exchange networks.⁴¹¹

The decree contained several mechanisms for adjustment of its provisions over time. One such mechanism was a triennial review of the line-of-business restrictions on the RBOCs.⁴¹² Because of a series of appeals to the D.C. Circuit and subsequent remands to Judge Greene's court, the first triennial review was still not completed in 1993, when the third review was due. The second triennial review never took place.⁴¹³

A second adjustment mechanism was the MFJ's waiver process by which the RBOCs could request the court's permission to enter new markets and be relieved of their line-of-business restrictions. Under Section VIII(C) of the decree, the RBOCs were entitled to have a particular line-of-business restriction lifted if they could show that "there [was] no substantial possibility" that an RBOC could use its monopoly power to impede competition in the market that it proposed to enter.⁴¹⁴ When a modification of the MFJ was uncontested, Section VII of the decree governed, and the modification was to be granted if it was found to be in the "public interest" (that is, consistent with the Tunney Act).⁴¹⁵

B. Costs and Benefits of the MFJ

The decree is often credited with furthering the growth of competition in long-distance services. Since 1984, residential rates have fallen from around thirty-five or forty cents per minute to discounted prices of five cents. Average prices for long-distance service have fallen at least 50 percent between 1984 and the present.⁴¹⁶ In addition, competition among long-distance providers after divestiture led to rapid deployment of fiber optic cable that later formed the infrastructure capable of handling the explosion of data traffic sparked by the Internet.

While these benefits are substantial, we note two things. First, it is likely that some of those benefits would have resulted notwithstanding the MFJ. Fiber deployment, for example, began prior to the MFJ. Although it would likely have proceeded more slowly absent the decree's equal access rule that opened up long-distance markets, the "fiber revolution" was under

⁴¹⁰ See Kellogg, Thorne, and Huber, *Federal Telecommunications Law* at § 6.5 (cited in note 111). Judge Greene added a provision that allowed the RBOCs to provide customer premises equipment though not to other carriers. Modification of Final Judgment § VIII(A), 552 F Supp at 231.

⁴¹¹ Modification of Final Judgment, 552 F Supp at 227. See Kellogg, Thorne, and Huber, *Federal Telecommunications Law* at § 5 (cited in note 111).

⁴¹² Modification of Final Judgment, 552 F Supp at 195 ("The Department of Commerce has undertaken to report to the Court every three years concerning the continuing need for the restrictions imposed by the decree.").

⁴¹³ See Hausman and Sidak, 109 Yale L J at 429 (cited in note 404).

⁴¹⁴ Modification of Final Judgment, 552 F Supp at 195, 225, 231.

⁴¹⁵ See *United States v Western Electric Co.*, 900 F2d 283, 305-07 (DC Cir 1990).

⁴¹⁶ MacAvoy, *The Failure of Antitrust* at 77 (cited in note 221).

way prior to the decision to break up the Bell System.⁴¹⁷ For another example, the decline in long-distance prices is at least partly attributable to regulatory decisions by the FCC relating to subsidy flows from long-distance to local service. The FCC “rebalanced” local and long-distance rates by creating a “subscriber line charge” (“SLC”) on consumers’ local bills to replace subsidies taken from long-distance revenues. The effect of the SLC was to raise the customer’s monthly bill for exchange access and enable long-distance carriers to reduce rates accordingly.⁴¹⁸ In addition, at least some of the long-distance price change is attributable not to the AT&T divestiture but to the FCC’s decision to reduce access charges that long-distance companies pay to local carriers.⁴¹⁹ Indeed, the FCC imposed price caps on the Bell operating companies in their sale of access to interexchange carriers transporting interstate toll calls. The effect of that policy was to force down over time the cost of the largest single input used by the interexchange carriers in the supply of interstate long-distance service. That reduction in cost reduced long-distance prices, though not by as great a percentage as costs fell.⁴²⁰ More generally, Robert Crandall has argued that vertical divestiture was not a necessary condition for the growth of competition, and notes that it therefore was rejected by Canada in bringing competition to its own telephone service sector.⁴²¹

Second, the MFJ had costs, even if one thinks those costs were eventually offset. Consider first the administrative burdens of the decree; it is particularly important to consider the waiver process noted above. In 1993, the average waiver request had been pending for thirty-six months, although the Department of Justice opposed relief in only 4 of the 266 requests. By 1994, the period had grown to 48.3 months, though 96 percent of all waiver requests that had been ruled on had been approved by the court.⁴²²

Another category of costs involves inefficiencies of the line-of-business restrictions on the RBOCs, which reduced competition in long-distance telecommunications and in telecommunications equipment manufacturing by excluding the RBOCs from those markets.⁴²³ Jerry Hausman

⁴¹⁷ See Howard Shelanski, *Competition and Deployment of New Technology in US Telecommunications*, 2000 U Chi Legal F 85, 105–08.

⁴¹⁸ Crandall, *After the Breakup* at 31–33, 135–37 (cited in note 34).

⁴¹⁹ See, for example, Temin and Weber, 8 U Fla J L & Pub Pol at 214–15 (cited in note 110).

⁴²⁰ MacAvoy, *The Failure of Antitrust* at 35–81 (cited in note 221).

⁴²¹ Robert W. Crandall, *Regulation and Entry in Telecommunications: Comparing the U.S. and Canada* 12–13 (unpublished manuscript on file with authors).

⁴²² See Rubin and Dezhbakhsh, 16 Managerial & Decision Econ at 385–88 (cited in note 219).

⁴²³ Sidak and Spulber, *Deregulatory Takings and the Regulatory Contract* at 96–99 (cited in note 57) (“It is open to question whether the MFJ’s line-of-business restrictions benefited consumer welfare when they took effect on January 1, 1984. Today those restrictions, reincarnated in the checklist [of the 1996 Telecommunications Act] most assuredly do not.”). Spulber has noted the expertise that the RBOCs could bring to equipment manufacture. Daniel F. Spulber, *Deregulating Telecommunications*, 12 Yale J Reg 25, 66 (1995).

has shown empirically that consumer welfare fell by billions of dollars per year because these restrictions delayed the introduction of new telecommunications services. For example, the price of cellular long-distance service fell by about 25 percent when the MFJ's restrictions were finally removed.⁴²⁴ These costs must be taken into account in assessing the MFJ's lessons for future cases.

Not all the benefits of the post-divestiture era can thus be tied to the divestiture decree. And the decree must also be charged with some costs, some of which are counterfactual and easy to overlook or dismiss. But even if the decree produced net benefits, and even if those benefits could be tied to resolution of the government's antitrust case, the correct comparison for remedial purposes is not between the post-divestiture era and the monopoly era, but between the post-divestiture era and what would have resulted *under alternative remedies*. That counterfactual analysis is hard to do, but it might well lead to a very different assessment of whether the MFJ is a welcome or a warning for similar relief in *Microsoft*.

VI. UNANSWERED QUESTIONS ABOUT THE GOVERNMENT'S APPROACH TO REMEDIES

After the drama of the Microsoft trial, two puzzling questions linger concerning the remedial phase of the case. The first concerns the mapping of the government's theory of liability into a theory of remedies: Why did the government's ultimate request for permanent injunctive relief bear no resemblance to its initial request for preliminary injunctive relief? The government requested in its motion for preliminary injunction that Microsoft provide Netscape's web browser, Navigator, mandatory access (at an unspecified price) to the Windows platform.⁴²⁵ Yet the Department of Justice did not seek to enjoin preliminarily the other acts by Microsoft that eventually formed the very foundation of the government's theory of the case.

Given the government's ultimate decision to propose divestiture as the permanent injunctive remedy in the Microsoft case, why did the government not pursue with greater clarity and vigor a preliminary injunctive remedy to stem the putative tide of consumer welfare losses upon which the divestiture of Microsoft is predicated? Stated differently, why did the preliminary remedy sought by the government ultimately bear little relationship to its subsequent theory of the case?

Second, why did the government not seek a broader, comparative inquiry at the remedies phase of the trial, or itself give more complete public

⁴²⁴ Jerry Hausman, *Valuing the Effect of Regulation on New Services in Telecommunications*, Brookings Papers on Econ Activity: Microeconomics 1, 13–24 (1997).

⁴²⁵ The government later dropped even this request for injunctive relief. As one of us noted in 1999, this remedy would have raised serious constitutional questions under the First and Fifth Amendments. See Lipsky and Sidak, 51 *Stan L Rev* at 1223–25, 1227–31, 1240–48 (cited in note 3).

consideration to alternative resolutions? For example, why did the government exclude the possibility of monetary remedies from its theory of the case? One possible explanation is the belief that Judge Jackson lacked the authority to order damages (or a fine of equivalent magnitude) in the government's *civil* case against Microsoft. Similarly, one might argue, the availability of equitable remedies such as disgorgement and restitution is unclear in light of the fact that the government's cause of action is based on the civil provisions of the Sherman Act or similar state antitrust statutes, and not general principles of equity.

This explanation, however, is not entirely satisfactory either as a matter of law or of public policy. As a matter of antitrust law, courts have observed that restitution might be an appropriate remedy in certain cases. The U.S. District Court for the District of Columbia, for example, observed in 1999 that "a typical restitution or disgorgement scenario might fit within the contours of § 16 [of the Clayton Act], such as where plaintiffs seek to deprive antitrust violators of the benefits of their illegal conduct."⁴²⁶ Moreover, although the government in the Microsoft case did not expressly request a monetary remedy in its prayer for relief, its complaint nonetheless did expressly pray the court to "enter such additional relief as it may find just and proper."⁴²⁷ The Supreme Court has likened the remedy of divestiture to the remedy of restitution.⁴²⁸ It is not clear why "just and proper" relief of undefined form should encompass divestiture but not restitution.

As a matter of policy, if, as nearly every observer maintains, the Microsoft case is the most portentous antitrust case in several decades, then an innovative use of a monetary remedy should have been actively considered rather than dismissed out of hand. The shortcomings inherent in the various injunctive remedies proposed in the Microsoft case counsel one to reconsider seriously the efficacy and feasibility of monetary remedies. Such remedies are not limited to "damages," strictly speaking. To an economist, all monetary remedies look alike, whether they are called damages, fines, restitution, disgorgement, or something else. All of these monetized remedies are a way of posting the "price" to the defendant (and other prospective parties) of committing the conduct in question. This view may be ascribed

⁴²⁶ Compare *FTC v Mylan Laboratories, Inc.*, 62 F Supp 2d 25, 40 (D DC 1999), with *In re Multi-district Vehicle Air Pollution Litigation*, 538 F2d 231, 233–34 (9th Cir 1976) (Because Section 16 of the Clayton Act "limits the equitable remedy under its terms to those against 'threatened loss or damage,' [Section 16] does not allow the claimed relief for past loss.").

⁴²⁷ DOJ Microsoft Complaint at 46 (cited in note 230).

⁴²⁸ *Schine Chain Theatres, Inc v United States*, 334 US 110, 128 (1948) ("To require divestiture of theatres unlawfully acquired is not to add to the penalties that Congress has provided in the antitrust laws. Like restitution it merely deprives a defendant of the gains from his wrongful conduct. It is an equitable remedy designed in the public interest to undo what could have been prevented had the defendants not outdistanced the government in their unlawful project.").

to the contemporary law and economics movement,⁴²⁹ but it also is found in the writings of Oliver Wendell Holmes more than a century ago.⁴³⁰

Clearly, it is not beyond the competence of courts and economists to produce and weigh estimates of an appropriate monetary remedy in the Microsoft case. Robert Hall has produced a novel theoretical model calculating damages as a remedy in the Microsoft case.⁴³¹ Reasonable minds might disagree over whether his model bears sufficient relation to the actual facts of the Microsoft case to be a useful tool in its current form. But even if it is not, Hall's damage model is a useful starting point for an important analysis. As Philip Areeda noted years ago in a frequently cited article, there exists the anomalous possibility in antitrust cases of "antitrust violations without damage recoveries."⁴³² In an argument similar to Baxter's Axiom, Areeda argued that "an antitrust damage assessment cannot be divorced from thoughtful attention to the rationale for liability and the internal logic of the liability holding."⁴³³ A monetary damage analysis would invite Judge Jackson and the parties to focus on an attempt to quantify the harm to consumers that has been alleged to flow from Microsoft's conduct.⁴³⁴

Damages are only an example of the truncated analysis that appears at the remedial stage of the Microsoft case. More generally, the case presents both the need and opportunity for a careful examination of remedies in network industries, especially industries with the particular cost and asset characteristics of the software industry. Indeed, for products whose development costs are very high but whose production and distribution costs are negligible, and for firms whose principal assets are intellectual and informational rather than physical, both the measures of antitrust liability and the effects of antitrust remedies may differ from those that appear in more conventional markets. There is thus a need for carefully considered antitrust precedent in the "new economy," and *Microsoft* would seem to be a case in which the government would have wanted the court to create such precedent. Yet there was little effort by the government systematically and publicly to weigh the various conduct and structural remedies proposed by dif-

⁴²⁹ See, for example, Robert Cooter, *Prices and Sanctions*, 84 Colum L Rev 1523, 1524–26 (1984).

⁴³⁰ Oliver Wendell Holmes, *The Path of the Law*, 10 Harv L Rev 457, 462 (1897) ("The duty to keep a contract at common law means a prediction that you must pay damages if you do not keep it,—and nothing else."). For a modern restatement of this principle by Judge Posner, see *Horwitz-Matthews, Inc v City of Chicago*, 78 F3d 1248, 1250–51 (7th Cir 1996).

⁴³¹ See Hall, *Towards a Quantification* at 1 (cited in note 81).

⁴³² Phillip E. Areeda, *Antitrust Violations without Damage Recoveries*, 89 Harv L Rev 1127, 1127 (1976).

⁴³³ *Id.* at 1139.

⁴³⁴ Recent empirical research suggests that the government's various antitrust investigations against Microsoft between 1991 and 1997 actually reduced economic welfare, as measured by the market value of firms in the computer industry. See George Bittlin gmayer and Thomas W. Hazlett, *DOS Capital: Has Antitrust Action against Microsoft Created Value in the Computer Industry?*, 55 J Fin Econ 329, 352–53 (2000).

ferent parties and commentators. Without basis in a careful, on-the-record assessment and comparison of alternative remedies, the result in *Microsoft* will not only be of questionable virtue in the instant case, but also of little value for similar cases that might arise in the future.

CONCLUSION

The landmark case against Microsoft is the U.S. government's most significant monopolization case since the breakup of the Bell System in 1982 and the first major antitrust case concerning the "New Economy" created by the phenomenal growth of the Internet. In this Article, we propose an economic welfare approach to evaluating remedial alternatives not only in *Microsoft*, but in all antitrust cases involving network industries and other dynamic markets. We show that even where anticompetitive conduct has been found to occur, it does not follow that a particular remedy for that conduct would yield a net increase in economic welfare. To determine whether a remedy is likely to benefit consumers and long-run economic welfare, the remedy must be shown to produce a net increase in the sum of three kinds of efficiency: allocative, productive, and dynamic. To justify a specific remedy, it does not suffice to show merely that the remedy would reduce prices in the short run or create market opportunities for a particular group of competitors. A case must instead be made that price declines will offset any production cost increases or losses in consumer-side network externalities; that the net gain from such price reductions will not entail offsetting costs in the form of inefficiently reduced innovation incentives; and that the remaining net gains cannot be achieved at a lower cost through an alternative remedial plan.

When the foregoing framework is applied to the remedial proposals pending before the court in *Microsoft*, we find that important gaps are revealed. There are important strengths, but potentially fatal weaknesses, in the divestiture proposals offered by the government and some amici curiae. Those proposals cannot be responsibly adopted unless those weaknesses can be addressed and their potentially negative implications for economic welfare demonstrated to be offset by other economic gains that flow uniquely from divestiture.