(b) The Department of Justice filed a proposed consent decree with its Microsoft complaint, which was the result of negotiation between it and Microsoft, under which the per-processor license and other practices were to be discontinued. Is such a decree appropriate and adequate?[34]

318. (a) The Alpha Company invented, patented, and manufactured a unique and important article. It has monopoly power. On the several occasions when other firms began experimental production of competing articles, Alpha instituted immediate suit for infringement of its patent before its officials examined the allegedly infringing articles. Has Alpha violated §2?[35]

(b) Beta Company produces equipment for drilling oil wells. Its patented cutting tool ("bit") is the only one used for drilling deep wells in hard formations. Beta is considered to have monopoly power. Beta sells its bits to oil and drilling companies under a contract requiring buyers to return used bits to Beta for retipping, if practicable, or disposal. Beta maintains a large laboratory that examines all used and worn-out bits to discover defects that can be corrected by technical improvements in the composition, setting, or housing of the bit. Do these contracts offend §2?[36]

(c) Gamma Company is the sole producer of an important, unique, and much-demanded article purchased by consumers. Gamma has been earning profits at the rate of 100 percent on its investment. It spends about 10 percent of its revenues on advertising, notwithstanding the facts that its name is a household word, its sales increase only at the rate of national population growth, and it has no present competitors. The Justice Department is aware that several potential entrants into this market considered the ordinary risk of entry tolerable but decided that it would be too costly to overcome consumer preferences so intensely and artfully developed by Gamma. Have Gamma's advertising policies violated §2?

UNITED STATES v. MICROSOFT CORP.

253 F.3D 34 (D.C. Cir. 2001)

EDWARDS, Chief Judge, WILLIAMS, GINSBURG, SENTELLE, RANDOLPH, ROGERS and TATEL, Circuit Judges. . . . Per Curiam: . . . The action against Microsoft arose pursuant to a complaint filed by the United States and separate complaints filed by individual States. The District Court determined that Microsoft had maintained a monopoly in the market for Intel-compatible PC operating

34. The appropriateness of this consent decree was initially challenged by the District Court judge, who was later criticized by the Court of Appeals for refusing to approve it. See the discussion on the Tunney Act in ¶141. For discussion of the argument that the efficiencies gained by computer users from having one standard operating system, so that all computers are compatible, make attacks on Microsoft's monopoly unwise, *see* Gifford, note 33, at 638-643. Is this possibility relevant in light of *Engineers*, Ch. 2B?

35. *Compare Professional Real Estate*, in Ch. 2F.

36. Cole v. Hughes Tool Co., 215 F.2d 924 (10th Cir. 1954), cert. denied, 348 U.S. 927 (1955); Williams v. Hughes Tool Co., 186 F.2d 278, 285 (10th Cir. 1950), cert. denied, 341 U.S. 903 (1951) (reasonable practice notwithstanding effect on retipping business or on secondhand market).

systems in violation of §2; attempted to gain a monopoly in the market for Internet browsers in violation of §2; and illegally tied two purportedly separate products, Windows and Internet Explorer ("IE"), in violation of §1. The District Court then found that the same facts that established liability under §§1 and 2 of the Sherman Act mandated findings of liability under analogous state law antitrust provisions. To remedy the Sherman Act violations, the District Court issued a Final Judgment requiring Microsoft to submit a proposed plan of divestiture, with the company to be split into an operating systems business and an applications business. The District Court's remedial order also contains a number of interim restrictions on Microsoft's conduct. . . .

[W]e affirm in part and reverse in part the District Court's judgment that Microsoft violated §2 of the Sherman Act by employing anticompetitive means to maintain a monopoly in the operating system market; we reverse the District Court's determination that Microsoft violated §2 of the Sherman Act by illegally attempting to monopolize the Internet browser market; and we remand the District Court's finding that Microsoft violated §1 of the Sherman Act by unlawfully tying its browser to its operating system. Our judgment extends to the District Court's findings with respect to the state law counterparts of the plaintiffs' Sherman Act claims.

We also find merit in Microsoft's challenge to the Final Judgment embracing the District Court's remedial order. There are several reasons supporting this conclusion. First, the District Court's Final Judgment rests on a number of liability determinations that do not survive appellate review; therefore, the remedial order as currently fashioned cannot stand. Furthermore, we would vacate and remand the remedial order even were we to uphold the District Court's liability determinations in their entirety, because the District Court failed to hold an evidentiary hearing to address remedies-specific factual disputes.

Finally, we vacate the Final Judgment on remedies, because the trial judge engaged in impermissible ex parte contacts by holding secret interviews with members of the media and made numerous offensive comments about Microsoft officials in public statements outside of the courtroom, giving rise to an appearance of partiality. Although we find no evidence of actual bias, we hold that the actions of the trial judge seriously tainted the proceedings before the District Court and called into question the integrity of the judicial process. We are therefore constrained to vacate the Final Judgment on remedies, remand the case for reconsideration of the remedial order, and require that the case be assigned to a different trial judge on remand. . . .

I. Introduction

A. Background

In July 1994, officials at the Department of Justice ("DOJ"), on behalf of the United States, filed suit against Microsoft, charging the company with, among other things, unlawfully maintaining a monopoly in the operating system market through anticompetitive terms in its licensing and software

developer agreements. The parties subsequently entered into a consent decree, thus avoiding a trial on the merits. [United States v. Microsoft Corp., 56 F.3d 935 (D.C. Cir. 1998) (*"Microsoft I"*).] Three years later, the Justice Department filed a civil contempt action against Microsoft for allegedly violating one of the decree's provisions. On appeal from a grant of a preliminary injunction, this court held that Microsoft's technological bundling of IE 3.0 and 4.0 with Windows 95 did not violate the relevant provision of the consent decree. [United States v. Microsoft Corp., 147 F.3d 935 (D.C. Cir. 1998) (*"Microsoft II"*).] We expressly reserved the question whether such bundling might independently violate §§1 or 2 of the Sherman Act.

On May 18, 1998, shortly before issuance of the *Microsoft II* decision, the United States and a group of State plaintiffs filed separate (and soon thereafter consolidated) complaints, asserting antitrust violations by Microsoft and seeking preliminary and permanent injunctions against the company's allegedly unlawful conduct. . . . Relying almost exclusively on Microsoft's varied efforts to unseat Netscape Navigator as the preeminent Internet browser, plaintiffs charged four distinct violations of the Sherman Act: (1) unlawful exclusive dealing arrangements in violation of §1; (2) unlawful tying of IE to Windows 95 and Windows 98 in violation of §1; (3) unlawful maintenance of a monopoly in the PC operating system market in violation of §2; and (4) unlawful attempted monopolization of the Internet browser market in violation of §2. The States also brought pendent claims charging Microsoft with violations of various State antitrust laws.

The District Court scheduled the case on a "fast track." . . . After a 76-day bench trial, the District Court issued its Findings of Fact. This triggered two independent courses of action. First, the District Court established a schedule for briefing on possible legal conclusions, inviting Professor Lawrence Lessig to participate as amicus curiae. Second, the District Court referred the case to mediation to afford the parties an opportunity to settle their differences. The Honorable Richard A. Posner, Chief Judge of the United States Court of Appeals for the Seventh Circuit, was appointed to serve as mediator. . . . Mediation failed after nearly four months of settlement talks between the parties. . . .

B. OVERVIEW . . .

The litigation timeline in this case is hardly problematic. Indeed, it is noteworthy that a case of this magnitude and complexity has proceeded from the filing of complaints through trial to appellate decision in a mere three years. . . .

What is somewhat problematic, however, is that just over six years have passed since Microsoft engaged in the first conduct plaintiffs allege to be anticompetitive. As the record in this case indicates, six years seems like an eternity in the computer industry. By the time a court can assess liability, firms, products, and the marketplace are likely to have changed dramatically. This, in turn, threatens enormous practical difficulties for courts considering the appropriate measure of relief in equitable enforcement actions, both in crafting injunctive remedies in the first instance and reviewing those

remedies in the second. Conduct remedies may be unavailing in such cases, because innovation to a large degree has already rendered the anticompetitive conduct obsolete (although by no means harmless). And broader structural remedies present their own set of problems, including how a court goes about *restoring* competition to a dramatically changed, and constantly changing, marketplace. That is just one reason why we find the District Court's refusal in the present case to hold an evidentiary hearing on remedies — to update and flesh out the available information before seriously entertaining the possibility of dramatic structural relief — so problematic.

We do not mean to say that enforcement actions will no longer play an important role in curbing infringements of the antitrust laws in technologically dynamic markets, nor do we assume this in assessing the merits of this case. Even in those cases where forward-looking remedies appear limited, the Government will continue to have an interest in defining the contours of the antitrust laws so that law-abiding firms will have a clear sense of what is permissible and what is not. And the threat of private damage actions will remain to deter those firms inclined to test the limits of the law.

The second matter of note is more theoretical in nature. We decide this case against a backdrop of significant debate amongst academics and practitioners over the extent to which "old economy" §2 monopolization doctrines should apply to firms competing in dynamic technological markets characterized by network effects. In markets characterized by network effects, one product or standard tends towards dominance, because "the utility that a user derives from consumption of the good increases with the number of other agents consuming the good." M. Katz & C. Shapiro, *Network Externalities, Competition, and Compatibility,* 75 Am. Econ. Rev. 424 (1985). For example, "[a]n individual consumer's demand to use (and hence her benefit from) the telephone network . . . increases with the number of other users on the network whom she can call or from whom she can receive calls." H. Shelanski & J.G. Sidak, *Antitrust Divestiture in Network Industries,* 68 U. Chi. L. Rev. 1, 8 (2001). Once a product or standard achieves wide acceptance, it becomes more or less entrenched. Competition in such industries is "for the field" rather than "within the field." *See* H. Demsetz, *Why Regulate Utilities?,* 11 J.L. & Econ. 55, 57 & n.7 (1968).

In technologically dynamic markets, however, such entrenchment may be temporary, because innovation may alter the field altogether. *See* J. Schumpeter, *Capitalism, Socialism and Democracy* 81-90 (Harper Perennial, 5th ed. 1976). Rapid technological change leads to markets in which "firms compete through innovation for temporary market dominance, from which they may be displaced by the next wave of product advancements." Shelanski & Sidak, at 11-12 (discussing Schumpeterian competition, which proceeds "sequentially over time rather than simultaneously across a market"). Microsoft argues that the operating system market is just such a market.

Whether or not Microsoft's characterization of the operating system market is correct does not appreciably alter our mission in; assessing the alleged antitrust violations in the present case. As an initial matter, we note that there is no consensus among commentators on the question of whether,

and to what extent, current monopolization doctrine should be amended to account for competition in technologically dynamic markets characterized by network effects. *Compare* S. Salop & R. Romaine, *Preserving Monopoly: Economic Analysis, Legal Standards, and Microsoft,* 7 Geo. Mason L. Rev. 617 (1999) (arguing that exclusionary conduct in high-tech networked industries deserves heightened antitrust scrutiny in part because it may threaten to deter innovation), *with* R. Cass & K. Hylton, *Preserving Competition: Economic Analysis, Legal Standards and Microsoft,* 8 Geo. Mason L. Rev. 1 (1999) (equivocating on the antitrust implications of network effects and noting that the presence of network externalities may actually encourage innovation by guaranteeing more durable monopolies to innovating winners). . . .

Moreover, it should be clear that Microsoft makes no claim that anticompetitive conduct should be assessed differently in technologically dynamic markets. It claims only that the measure of monopoly power should be different. For reasons fully discussed below, we reject Microsoft's monopoly power argument. *See infra* Section II.A. . . .

II. Monopolization

Section 2 of the Sherman Act makes it unlawful for a firm to "monopolize." The offense of monopolization has two elements: "(1) the possession of monopoly power in the relevant market and (2) the willful acquisition or maintenance of that power as distinguished from growth or development as a consequence of a superior product, business acumen, or historic accident." *Grinnell.* The District Court applied this test and found that Microsoft possesses monopoly power in the market for Intel-compatible PC operating systems. Focusing primarily on Microsoft's efforts to suppress Netscape Navigator's threat to its operating system monopoly, the court also found that Microsoft maintained its power not through competition on the merits, but through unlawful means. Microsoft challenges both conclusions. We defer to the District Court's findings of fact, setting them aside only if clearly erroneous. We review legal questions de novo.

We begin by considering whether Microsoft possesses monopoly power, *see infra* Section II.A, and finding that it does, we turn to the question whether it maintained this power through anticompetitive means. Agreeing with the District Court that the company behaved anticompetitively, *see infra* Section II.B, and that these actions contributed to the maintenance of its monopoly power, *see infra* Section II.C, we affirm the court's finding of liability for monopolization.

A. MONOPOLY POWER

[The court suggested two ways to demonstrate monopoly power: (1) that a firm has in fact profitably raised price substantially above competitive levels; or (2) possession of "a dominant share of a relevant market that is protected by entry barriers." The court argued that the first avenue is rarely fruitful in practice. The court upheld the district court's finding that Intel compatible

PC operating systems were a relevant market because only a very substantial price increase would cause users to switch to Apple's Macintosh operating system or other information appliances such as hand-held personal digital assistants. Also upheld were the district court findings that Microsoft had more than a 95 percent market share and that Windows enjoyed a massive "applications barrier to entry" in the form of over 70,000 applications written for Windows. IBM's OS/2 at its peak had approximately 2,500 applications. The court rejected Microsoft's argument that it could not be a monopolist because software was a uniquely dynamic market, so that it had to invest enormous sums in research and development and could not and did not charge the short-run monopoly price, for fear of being displaced over time.

The court also gave background on the operating system market. Operating systems perform many functions. For example, they allocate computer memory and control printers and keyboards. They also make available routines called Application Programming Interfaces, or APIs, that software applications use to perform widely-used functions such as opening a new window or drawing a box on the screen. These APIs are specific to a given operating system, so that it is usually time consuming and costly to "port" applications written for one operating system for use on another. "Middleware" refers to software products that expose their own APIs, but that require some operating system to run. Netscape Navigator and Java both are middleware products written for multiple operating systems, and both are central to this case. In the long run, if such programs and their APIs became sufficiently popular, then "developers could rely upon the APIs exposed by such middleware" to cheaply port programs from one operating system to another.]. . . .

B. ANTICOMPETITIVE CONDUCT

As discussed above, having a monopoly does not by itself violate §2. A firm violates §2 only when it acquires or maintains, or attempts to acquire or maintain, a monopoly by engaging in exclusionary conduct "as distinguished from growth or development as a consequence of a superior product, business acumen, or historic accident." *Grinnell; see also Alcoa* ("The successful competitor, having been urged to compete, must not be turned upon when he wins.").

In this case, after concluding that Microsoft had monopoly power, the District Court held that Microsoft had violated §2 by engaging in a variety of exclusionary acts (not including predatory pricing), to maintain its monopoly by preventing the effective distribution and use of products that might threaten that monopoly. Specifically, the District Court held Microsoft liable for: (1) the way in which it integrated IE into Windows; (2) its various dealings with Original Equipment Manufacturers ("OEMs"), Internet Access Providers ("IAPs"), Internet Content Providers ("ICPs"), Independent Software Vendors ("ISVs"), and Apple Computer; (3) its efforts to contain and to subvert Java technologies; and (4) its course of conduct as a whole. Upon appeal, Microsoft argues that it did not engage in any exclusionary conduct.

Whether any particular act of a monopolist is exclusionary, rather than merely a form of vigorous competition, can be difficult to discern: the means of illicit exclusion, like the means of legitimate competition, are myriad. The challenge for an antitrust court lies in stating a general rule for distinguishing between exclusionary acts, which reduce social welfare, and competitive acts, which increase it.

From a century of case law on monopolization under §2, however, several principles do emerge. First, to be condemned as exclusionary, a monopolist's act must have an "anticompetitive effect." That is, it must harm the competitive *process* and thereby harm consumers. In contrast, harm to one or more *competitors* will not suffice. . . .

Second, the plaintiff, on whom the burden of proof of course rests, must demonstrate that the monopolist's conduct indeed has the requisite anticompetitive effect. . . .

Third, if a plaintiff successfully establishes a prima facie case under §2 by demonstrating anticompetitive effect, then the monopolist may proffer a "procompetitive justification" for its conduct. *See Kodak.* If the monopolist asserts a procompetitive justification — a nonpretextual claim that its conduct is indeed a form of competition on the merits because it involves, for example, greater efficiency or enhanced consumer appeal — then the burden shifts back to the plaintiff to rebut that claim.

Fourth, if the monopolist's procompetitive justification stands unrebutted, then the plaintiff must demonstrate that the anticompetitive harm of the conduct outweighs the procompetitive benefit. In cases arising under §1 of the Sherman Act, the courts routinely apply a similar balancing approach under the rubric of the "rule of reason." . . .

Finally, in considering whether the monopolist's conduct on balance harms competition and is therefore condemned as exclusionary for purposes of §2, our focus is upon the effect of that conduct, not upon the intent behind it. Evidence of the intent behind the conduct of a monopolist is relevant only to the extent it helps us understand the likely effect of the monopolist's conduct. *See, e.g., Chicago Board of Trade* ("knowledge of intent may help the court to interpret facts and to predict consequences"); *Aspen.* . . .

1. Licenses Issued to Original Equipment Manufacturers

The District Court condemned a number of provisions in Microsoft's agreements licensing Windows to OEMs, because it found that Microsoft's imposition of those provisions (like many of Microsoft's other actions at issue in this case) serves to reduce usage share of Netscape's browser and, hence, protect Microsoft's operating system monopoly. The reason market share in the browser market affects market power in the operating system market is complex, and warrants some explanation.

Browser usage share is important because, as we explained in Section II.A above, a browser (or any middleware product, for that matter) must have a critical mass of users in order to attract software developers to write applications relying upon the APIs it exposes, and away from the APIs exposed by Windows. Applications written to a particular browser's APIs, however,

would run on any computer with that browser, regardless of the underlying operating system. . . . If a consumer could have access to the applications he desired — regardless of the operating system he uses — simply by installing a particular browser on his computer, then he would no longer feel compelled to select Windows in order to have access to those applications; he could select an operating system other than Windows based solely upon its quality and price. In other words, the market for operating systems would be competitive.

Therefore, Microsoft's efforts to gain market share in one market (browsers) served to meet the threat to Microsoft's monopoly in another market (operating systems) by keeping rival browsers from gaining the critical mass of users necessary to attract developer attention away from Windows as the platform for software development . . . .

In evaluating the restrictions in Microsoft's agreements licensing Windows to OEMs, we first consider whether plaintiffs have made out a prima facie case by demonstrating that the restrictions have an anticompetitive effect. In the next subsection, we conclude that plaintiffs have met this burden as to all the restrictions. We then consider Microsoft's proffered justifications for the restrictions and, for the most part, hold those justifications insufficient.

a. Anticompetitive Effect of the License Restrictions. The restrictions Microsoft places upon Original Equipment Manufacturers are of particular importance in determining browser usage share because having an OEM preinstall a browser on a computer is one of the two most cost-effective methods by far of distributing browsing software. (The other is bundling the browser with Internet access software distributed by an IAP.) The District Court found that the restrictions Microsoft imposed in licensing Windows to OEMs prevented many OEMs from distributing browsers other than IE. In particular, the District Court condemned the license provisions prohibiting the OEMs from: (1) removing any desktop icons, folders, or "Start" menu entries; (2) altering the initial boot sequence; and (3) otherwise altering the appearance of the Windows desktop.

The District Court concluded that the first license restriction — the prohibition upon the removal of desktop icons, folders, and Start menu entries — thwarts the distribution of a rival browser by preventing OEMs from removing visible means of user access to IE. The OEMs cannot practically install a second browser in addition to IE, the court found, in part because "[p]re-installing more than one product in a given category . . . can significantly increase an OEM's support costs, for the redundancy can lead to confusion among novice users." That is, a certain number of novice computer users, seeing two browser icons, will wonder which to use when and will call the OEM's support line. Support calls are extremely expensive and, in the highly competitive original equipment market, firms have a strong incentive to minimize costs. . . .

Most telling, in presentations to OEMs, Microsoft itself represented that having only one icon in a particular category would be "less confusing for endusers." Accordingly, we reject Microsoft's argument that we should vacate the District Court's [finding that relates] to consumer confusion.

As noted above, the OEM channel is one of the two primary channels for distribution of browsers. By preventing OEMs from removing visible means

of user access to IE, the license restriction prevents many OEMs from preinstalling a rival browser and, therefore, protects Microsoft's monopoly from the competition that middleware might otherwise present. Therefore, we conclude that the license restriction at issue is anticompetitive. We defer for the moment the question whether that anticompetitive effect is outweighed by Microsoft's proffered justifications.

The second license provision at issue prohibits OEMs from modifying the initial boot sequence — the process that occurs the first time a consumer turns on the computer. Prior to the imposition of that restriction, "among the programs that many OEMs inserted into the boot sequence were Internet sign-up procedures that encouraged users to choose from a list of IAPs assembled by the OEM." Microsoft's prohibition on any alteration of the boot sequence thus prevents OEMs from using that process to promote the services of IAPs, many of which — at least at the time Microsoft imposed the restriction — used Navigator rather than IE in their Internet access software. Microsoft does not deny that the prohibition on modifying the boot sequence has the effect of decreasing competition against IE by preventing OEMs from promoting rivals' browsers. Because this prohibition has a substantial effect in protecting Microsoft's market power, and does so through a means other than competition on the merits, it is anticompetitive. Again the question whether the provision is nonetheless justified awaits later treatment.

Finally, Microsoft imposes several additional provisions that, like the prohibition on removal of icons, prevent OEMs from making various alterations to the desktop: Microsoft prohibits OEMs from causing any user interface other than the Windows desktop to launch automatically, from adding icons or folders different in size or shape from those supplied by Microsoft, and from using the "Active Desktop" feature to promote third-party brands. These restrictions impose significant costs upon the OEMs; prior to Microsoft's prohibiting the practice, many OEMs would change the appearance of the desktop in ways they found beneficial.

The dissatisfaction of the OEM customers does not, of course, mean the restrictions are anticompetitive. The anticompetitive effect of the license restrictions is, as Microsoft itself recognizes, that OEMs are not able to promote rival browsers, which keeps developers focused upon the APIs in Windows. . . . [T]his type of license restriction, like the first two restrictions, is anticompetitive: Microsoft reduced rival browsers' usage share not by improving its own product but, rather, by preventing OEMs from taking actions that could increase rivals' share of usage.

b. Microsoft's Justifications for the License Restrictions. Microsoft argues that the license restrictions are legally justified because, in imposing them, Microsoft is simply "exercising its rights as the holder of valid copyrights." Microsoft also argues that the licenses "do not unduly restrict the opportunities of Netscape to distribute Navigator in any event."

Microsoft's primary copyright argument borders upon the frivolous. The company claims an absolute and unfettered right to use its intellectual property as it wishes. . . . As the Federal Circuit succinctly stated: "Intellectual property rights do not confer a privilege to violate the antitrust laws." In re Indep. Serv. Orgs. Antitrust Litig., 203 F.3d 1322, 1325 (Fed. Cir. 2000).

Although Microsoft never overtly retreats from its bold and incorrect position on the law, it also makes two arguments to the effect that it is not exercising its copyright in an unreasonable manner, despite the anticompetitive consequences of the license restrictions discussed above. . . . Microsoft cites two cases indicating that a copyright holder may limit a licensee's ability to engage in significant and deleterious alterations of a copyrighted work. *See* Gilliam v. ABC, 538 F.2d 14, 21 (2d Cir. 1976); WGN Cont'l Broad. Co. v. United Video, 693 F.2d 622, 625 (7th Cir. 1982). The relevance of those two cases for the present one is limited, however, both because those cases involved substantial alterations of a copyrighted work, *see Gilliam*, and because in neither case was there any claim that the copyright holder was, in asserting its rights, violating the antitrust laws, *see WGN Cont'l Broad.* . . .

Apart from copyright, Microsoft raises one other defense of the OEM license agreements: It argues that, despite the restrictions in the OEM license, Netscape is not completely blocked from distributing its product. That claim is insufficient to shield Microsoft from liability for those restrictions because, although Microsoft did not bar its rivals from all means of distribution, it did bar them from the cost-efficient ones.

In sum, we hold that with the exception of the one restriction prohibiting automatically launched alternative interfaces, all the OEM license restrictions at issue represent uses of Microsoft's market power to protect its monopoly, unredeemed by any legitimate justification. The restrictions therefore violate §2 of the Sherman Act.

2. Integration of IE and Windows

Although Microsoft's license restrictions have a significant effect in closing rival browsers out of one of the two primary channels of distribution, the District Court found that "Microsoft's executives believed . . . its contractual restrictions placed on OEMs would not be sufficient in themselves to reverse the direction of Navigator's usage share. Consequently, in late 1995 or early 1996, Microsoft set out to bind [IE] more tightly to Windows 95 as a technical matter."

Technologically binding IE to Windows, the District Court found, both prevented OEMs from pre-installing other browsers and deterred consumers from using them. In particular, having the IE software code as an irremovable part of Windows meant that pre-installing a second browser would "increase an OEM's product testing costs," because an OEM must test and train its support staff to answer calls related to every software product pre-installed on the machine; moreover, pre-installing a browser in addition to IE would to many OEMs be "a questionable use of the scarce and valuable space on a PC's hard drive."

Although the District Court, in its Conclusions of Law, broadly condemned Microsoft's decision to bind "Internet Explorer to Windows with . . . technological shackles," its findings of fact in support of that conclusion center upon three specific actions Microsoft took to weld IE to Windows: excluding IE from the "Add/Remove Programs" utility; designing Windows so as in certain circumstances to override the user's choice of a default browser other than IE; and commingling code related to browsing

and other code in the same files, so that any attempt to delete the files containing IE would, at the same time, cripple the operating system. As with the license restrictions, we consider first whether the suspect actions had an anticompetitive effect, and then whether Microsoft has provided a procompetitive justification for them.

a. Anticompetitive Effect of Integration. As a general rule, courts are properly very skeptical about claims that competition has been harmed by a dominant firm's product design changes. In a competitive market, firms routinely innovate in the hope of appealing to consumers, sometimes in the process making their products incompatible with those of rivals; the imposition of liability when a monopolist does the same thing will inevitably deter a certain amount of innovation. This is all the more true in a market, such as this one, in which the product itself is rapidly changing. Judicial deference to product innovation, however, does not mean that a monopolist's product design decisions are pre se lawful.

The District Court first condemned as anticompetitive Microsoft's decision to exclude IE from the "Add/Remove Programs" utility in Windows 98. Microsoft had included IE in the Add/Remove Programs utility in Windows 95, but when it modified Windows 95 to produce Windows 98, it took IE out of the Add/Remove Programs utility. This change reduces the usage share of rival browsers not by making Microsoft's own browser more attractive to consumers but, rather, by discouraging OEMs from distributing rival products. Because Microsoft's conduct, through something other than competition on the merits, has the effect of significantly reducing usage of rivals' products and hence protecting its own operating system monopoly, it is anticompetitive; we defer for the moment the question whether it is nonetheless justified.

Second, the District Court found that Microsoft designed Windows 98 "so that using Navigator on Windows 98 would have unpleasant consequences for users" by, in some circumstances, overriding the user's choice of a browser other than IE as his or her default browser. Plaintiffs argue that this override harms the competitive process by deterring consumers from using a browser other than IE even though they might prefer to do so, thereby reducing rival browsers' usage share and, hence, the ability of rival browsers to draw developer attention away from the APIs exposed by Windows. . . . Because the override reduces rivals' usage share and protects Microsoft's monopoly, it too is anticompetitive.

Finally, the District Court condemned Microsoft's decision to bind IE to Windows 98 "by placing code specific to Web browsing in the same files as code that provided operating system functions." Putting code supplying browsing functionality into a file with code supplying operating system functionality "ensure [s] that the deletion of any file containing browsing-specific routines would also delete vital operating system routines and thus cripple Windows. . . ." As noted above, preventing an OEM from removing IE deters it from installing a second browser because doing so increases the OEM's product testing and support costs; by contrast, had OEMs been able to remove IE, they might have chosen to pre-install Navigator alone. . . .

In view of the contradictory testimony in the record, some of which supports the District Court's finding that Microsoft commingled browsing

and non-browsing code, we cannot conclude that the finding was clearly erroneous. . . .

b. Microsoft's Justifications for Integration. Microsoft proffers no justification for two of the three challenged actions that it took in integrating IE into Windows — excluding IE from the Add/Remove Programs utility and commingling browser and operating system code. Although Microsoft does make some general claims regarding the benefits of integrating the browser and the operating system, it neither specifies nor substantiates those claims. Nor does it argue that either excluding IE from the Add/Remove Programs utility or commingling code achieves any integrative benefit. . . . Accordingly, we hold that Microsoft's exclusion of IE from the Add/Remove Programs utility and its commingling of browser and operating system code constitute exclusionary conduct, in violation of §2.

As for the other challenged act that Microsoft took in integrating IE into Windows — causing Windows to override the user's choice of a default browser in certain circumstances — Microsoft argues that it has "valid technical reasons." Specifically, Microsoft claims that it was necessary to design Windows to override the user's preferences when he or she invokes one of "a few" out "of the nearly 30 means of accessing the Internet." According to Microsoft:

> The Windows 98 Help system and Windows Update feature depend on ActiveX controls not supported by Navigator, and the now-discontinued Channel Bar utilized Microsoft's Channel Definition Format, which Navigator also did not support. Lastly, Windows 98 does not invoke Navigator if a user accesses the Internet through "My Computer" or "Windows Explorer" because doing so would defeat one of the purposes of those features — enabling users to move seamlessly from local storage devices to the Web *in the same browsing window.*

The plaintiff bears the burden not only of rebutting a proffered justification but also of demonstrating that the anticompetitive effect of the challenged action outweighs it. In the District Court, plaintiffs appear to have done neither, let alone both; in any event, upon appeal, plaintiffs offer no rebuttal whatsoever. Accordingly, Microsoft may not be held liable for this aspect of its product design. . . .

[In subsections 3 and 4, the court also reviewed the district court's condemnation of Microsoft's agreements with various Internet access providers (IAPs), and its "dealings" with internet content providers (ICPs), independent software vendors (ISVs), and Apple Computer. Microsoft had agreed to give IAPs IE free of charge, and in fact offered them a bounty for each customer that they signed up for service using the IE browser. Although the court acknowledged that providing a customer an attractive deal is in "very rare circumstances . . . predatory," plaintiffs did not press the predatory theory on appeal, and the court refused to condemn Microsoft on that basis. However, the court did condemn Microsoft for exclusive contracts with all the leading IAPs. In the AOL contract, for example, Microsoft put the AOL icon in a folder on the Windows desktop in exchange for AOL not promoting "any non-Microsoft browser, nor [providing] software using any non-Microsoft browser except at the customer's request, and even then AOL [must not be supplying] more than 15% of its subscribers with a browser

other than IE." Although the court recognized that exclusive deals are commonplace and do not always limit competition, by "ensuring that the 'majority' of all IAP subscribers are offered IE either as the default browser or as the only browser, Microsoft's deals with the IAPs clearly have a significant effect in preserving its monopoly; they help keep usage of Navigator below the critical level necessary for Navigator or any other rival to pose a real threat to Microsoft's monopoly." As Microsoft offered no procompetitive justification for these agreements, the court affirmed the district court's decision holding these contracts to be exclusionary devices that violate §2 of the Sherman Act.

The court, however, held that the district court's findings regarding the deals with ICPs did not support liability. The problem here was that, unlike the IAP agreements, the district court stated that "there is not sufficient evidence to support a finding that Microsoft's promotional restrictions actually had a substantial, deleterious impact on Navigator's usage share." The court held that demonstrating a substantial effect upon competition, not merely insubstantial exclusion, is necessary to prove a Sherman Act violation.

The ISV deals were illegal. Although the district court did not identify specifically what share of the market for browser distribution was foreclosed by them, and "although the ISVs [were] a relatively small channel for browser distribution, they take on greater significance because, as discussed above, Microsoft had largely foreclosed the two primary channels to its rivals." Again, Microsoft offered no procompetitive business justification for requiring ISVs to make IE their default browser and to steer people to IE in other ways.

Finally, the court upheld the lower court's condemnation of the most dramatic Microsoft deal uncovered in the DOJ's investigation — the deal with Apple. Microsoft had threatened to discontinue its development of Mac Office, the dominant office productivity suite of programs that ran on Apple's OS. Microsoft only agreed to continue in exchange for Apple promoting IE over all other browsers. Again, Microsoft offered no justification for the exclusivity other than that it was one part of an "overall agreement." The court thought this irrelevant and that this exclusive arrangement not only foreclosed a substantial amount of rival browser distribution, but also ensured "that developers would not view Navigator as truly cross-platform middleware."]

5. Java

Java, a set of technologies developed by Sun Microsystems, is another type of middleware posing a potential threat to Windows' position as the ubiquitous platform for software development. The Java technologies include: (1) a programming language; (2) a set of programs written in that language, called the "Java class libraries," which expose APIs; (3) a compiler, which translates code written by a developer into "bytecode"; and (4) a Java Virtual Machine ("JVM"), which translates bytecode into instructions to the operating system. Programs calling upon the Java APIs will run on any machine with a "Java runtime environment," that is, Java class libraries and a JVM.

In May 1995 Netscape agreed with Sun to distribute a copy of the Java runtime environment with every copy of Navigator, and "Navigator quickly became the principal vehicle by which Sun placed copies of its Java runtime environment on the PC systems of Windows users." Microsoft, too, agreed to promote the Java technologies — or so it seemed. For at the same time, Microsoft took steps "to maximize the difficulty with which applications written in Java could be ported from Windows to other platforms, and vice versa." Specifically, the District Court found that Microsoft took four steps to exclude Java from developing as a viable cross-platform threat: (a) designing a JVM incompatible with the one developed by Sun; (b) entering into contracts, the so-called "First Wave Agreements," requiring major ISVs to promote Microsoft's JVM exclusively; (c) deceiving Java developers about the Windows-specific nature of the tools it distributed to them; and (d) coercing Intel to stop aiding Sun in improving the Java technologies.

a. The Incompatible JVM. The District Court held that Microsoft engaged in exclusionary conduct by developing and promoting its own JVM. Sun had already developed a JVM for the Windows operating system when Microsoft began work on its version. The JVM developed by Microsoft allows Java applications to run faster on Windows than does Sun's JVM, but a Java application designed to work with Microsoft's JVM does not work with Sun's JVM and vice versa. The District Court found that Microsoft "made a large investment of engineering resources to develop a high-performance Windows JVM," and, "[b]y bundling its . . . JVM with every copy of [IE] . . . Microsoft endowed its Java runtime environment with the unique attribute of guaranteed, enduring ubiquity across the enormous Windows installed base." As explained above, however, a monopolist does not violate the antitrust laws simply by developing a product that is incompatible with those of its rivals. *See supra* Section II.B. 1. In order to violate the antitrust laws, the incompatible product must have an anticompetitive effect that outweighs any procompetitive justification for the design. Microsoft's JVM is not only incompatible with Sun's, it allows Java applications to run faster on Windows than does Sun's JVM. Microsoft's faster JVM lured Java developers into using Microsoft's developer tools, and Microsoft offered those tools deceptively, as we discuss below. The JVM, however, does allow applications to run more swiftly and does not itself have any anticompetitive effect. Therefore, we reverse the District Court's imposition of liability for Microsoft's development and promotion of its JVM.

b. The First Wave Agreements . . . [W]e reject the district court's condemnation of low but non-predatory pricing by Microsoft [to independent software vendors (ISVs) in the First Wave Agreements].

To the extent Microsoft's First Wave Agreements with the ISVs conditioned receipt of Windows technical information upon the ISVs' agreement to promote Microsoft's JVM exclusively, they raise a different competitive concern. The District Court found that, although not literally exclusive, the deals were exclusive in practice because they required developers to make Microsoft's JVM the default in the software they developed.

While the District Court did not enter precise findings as to the effect of the First Wave Agreements upon the overall distribution of rival JVMs, the record indicates that Microsoft's deals with the major ISVs had a significant

effect upon JVM promotion. As discussed above, the products of First Wave ISVs reached millions of consumers. The First Wave ISVs included such prominent developers as Rational Software, "a world leader" in software development tools, and Symantec, which, according to Microsoft itself, is "the leading supplier of utilities such as anti-virus software." Moreover, Microsoft's exclusive deals with the leading ISVs took place against a backdrop of foreclosure: the District Court found that "[w]hen Netscape announced in May 1995 [prior to Microsoft's execution of the First Wave Agreements] that it would include with every copy of Navigator a copy of a Windows JVM that complied with Sun's standards, it appeared that Sun's Java implementation would achieve the necessary ubiquity on Windows." As discussed above, however, Microsoft undertook a number of anticompetitive actions that seriously reduced the distribution of Navigator, and the District Court found that those actions thereby seriously impeded distribution of Sun's JVM. Because Microsoft's agreements foreclosed a substantial portion of the field for JVM distribution and because, in so doing, they protected Microsoft's monopoly from a middleware threat, they are anticompetitive.

Microsoft offered no procompetitive justification for the default clause that made the First Wave Agreements exclusive as a practical matter. Because the cumulative effect of the deals is anticompetitive and because Microsoft has no procompetitive justification for them, we hold that the provisions in the First Wave Agreements requiring use of Microsoft's JVM as the default are exclusionary, in violation of the Sherman Act.

c. Deception of Java Developers. Microsoft's "Java implementation" included, in addition to a JVM, a set of software development tools it created to assist ISVs in designing Java applications. The District Court found that, not only were these tools incompatible with Sun's cross-platform aspirations for Java — no violation, to be sure — but Microsoft deceived Java developers regarding the Windows-specific nature of the tools. Microsoft's tools included "certain 'keywords' and 'compiler directives' that could only be executed properly by Microsoft's version of the Java runtime environment for Windows." As a result, even Java "developers who were opting for portability over performance . . . unwittingly [wrote] Java applications that [ran] only on Windows." That is, developers who relied upon Microsoft's public commitment to cooperate with Sun and who used Microsoft's tools to develop what Microsoft led them to believe were cross-platform applications ended up producing applications that would run only on the Windows operating system.

When specifically accused by a *PC Week* reporter of fragmenting Java standards so as to prevent cross-platform uses, Microsoft denied the accusation and indicated it was only "adding rich platform support" to what remained a cross-platform implementation. An e-mail message internal to Microsoft, written shortly after the conversation with the reporter, shows otherwise:

> [O]k, i just did a followup call. . . . [The reporter] liked that i kept pointing customers to w3c standards [(commonly observed Internet protocols)]. . . . [But] he accused us of being schizo with this vs. our java approach, i said he misunderstood[—] that [with Java] we are merely trying to add rich platform support to an interop layer. . . . this plays well . . . at this point its [sic] not good to create MORE noise around our win32 java classes, instead we should just quietly grow j++ [(Microsoft's development tools)] share and assume that people will

> take more advantage of our classes without ever realizing they are building win32-only java apps.

Finally, other Microsoft documents confirm that Microsoft intended to deceive Java developers, and predicted that the effect of its actions would be to generate Windows-dependent Java applications that their developers believed would be cross-platform; these documents also indicate that Microsoft's ultimate objective was to thwart Java's threat to Microsoft's monopoly in the market for operating systems. One Microsoft document, for example, states as a strategic goal: "Kill cross-platform Java by grow[ing] the polluted Java market."

Microsoft's conduct related to its Java developer tools served to protect its monopoly of the operating system in a manner not attributable either to the superiority of the operating system or to the acumen of its makers, and therefore was anticompetitive. Unsurprisingly, Microsoft offers no procompetitive explanation for its campaign to deceive developers. Accordingly, we conclude this conduct is exclusionary, in violation of §2 of the Sherman Act.

d. The Threat to Intel. The District Court held that Microsoft also acted unlawfully with respect to Java by using its "monopoly power to prevent firms such as Intel from aiding in the creation of cross-platform interfaces." In 1995 Intel was in the process of developing a high-performance, Windows-compatible JVM. Microsoft wanted Intel to abandon that effort because a fast, cross-platform JVM would threaten Microsoft's monopoly in the operating system market. At an August 1995 meeting, Microsoft's Gates told Intel that its "cooperation with Sun and Netscape to develop a Java runtime environment . . . was one of the issues threatening to undermine cooperation between Intel and Microsoft." Three months later, "Microsoft's Paul Maritz told a senior Intel executive that Intel's [adaptation of its multimedia software to comply with] Sun's Java standards was as inimical to Microsoft as Microsoft's support for non-Intel microprocessors would be to Intel."

Intel nonetheless continued to undertake initiatives related to Java. By 1996 "Intel had developed a JVM designed to run well . . . while complying with Sun's cross-platform standards." In April of that year, Microsoft again urged Intel not to help Sun by distributing Intel's fast, Sun-compliant JVM. And Microsoft threatened Intel that if it did not stop aiding Sun on the multimedia front, then Microsoft would refuse to distribute Intel technologies bundled with Windows.

Intel finally capitulated in 1997, after Microsoft delivered the coup de grace.

> [O]ne of Intel's competitors, called AMD, solicited support from Microsoft for its "3DX" technology. . . . Microsoft's Allchin asked Gates whether Microsoft should support 3DX, despite the fact that Intel would oppose it. Gates responded: "If Intel has a real problem with us supporting this then they will have to stop supporting Java Multimedia the way they are. I would gladly give up supporting this if they would back off from their work on JAVA."

Microsoft's internal documents and deposition testimony confirm both the anticompetitive effect and intent of its actions.

Microsoft does not deny the facts found by the District Court, nor does it offer any procompetitive justification for pressuring Intel not to support cross-platform Java. Microsoft lamely characterizes its threat to Intel as "advice." The District Court, however, found that Microsoft's "advice" to Intel to stop aiding cross-platform Java was backed by the threat of retaliation, and this conclusion is supported by the evidence cited above. Therefore we affirm the conclusion that Microsoft's threats to Intel were exclusionary, in violation of §2 of the Sherman Act. . . .

C. CAUSATION

As a final parry, Microsoft urges this court to reverse on the monopoly maintenance claim, because plaintiffs never established a causal link between Microsoft's anticompetitive conduct, in particular its foreclosure of Netscape's and Java's distribution channels, and the maintenance of Microsoft's operating system monopoly. This is the flip side of Microsoft's earlier argument that the District Court should have included middleware in the relevant market. According to Microsoft, the District Court cannot simultaneously find that middleware is not a reasonable substitute *and* that Microsoft's exclusionary conduct contributed to the maintenance of monopoly power in the operating system market. Microsoft claims that the first finding depended on the court's view that middleware does not pose a serious threat to Windows, *see supra* Section II.A, while the second finding required the court to find that Navigator and Java would have developed into serious enough cross-platform threats to erode the applications barrier to entry. We disagree.

Microsoft points to no case, and we can find none, standing for the proposition that, as to §2 *liability* in an equitable enforcement action, plaintiffs must present direct proof that a defendant's continued monopoly power is precisely attributable to its anticompetitive conduct. As its lone authority, Microsoft cites the following passage from Professor Areeda's antitrust treatise: "The plaintiff has the burden of pleading, introducing evidence, and presumably proving by a preponderance of the evidence that reprehensible behavior has *contributed significantly* to the . . . maintenance of the monopoly." III P. Areeda & H. Hovenkamp, *Antitrust Law* ¶650c (3d ed. 2008) (emphasis added).

But, with respect to actions seeking injunctive relief, the authors of that treatise also recognize the need for courts to infer "causation" from the fact that a defendant has engaged in anticompetitive conduct that "reasonably appear[s] capable of making a significant contribution to . . . maintaining monopoly power." *Id.* at ¶651c. . . . To require that §2 liability turn on a plaintiff's ability or inability to reconstruct the hypothetical marketplace absent a defendant's anticompetitive conduct would only encourage monopolists to take more and earlier anticompetitive action.

We may infer causation when exclusionary conduct is aimed at producers of nascent competitive technologies as well as when it is aimed at producers of established substitutes. Admittedly, in the former case there is added uncertainty, inasmuch as nascent threats are merely *potential* substitutes.

But the underlying proof problem is the same — neither plaintiffs nor the court can confidently reconstruct a product's hypothetical technological development in a world absent the defendant's exclusionary conduct. To some degree, "the defendant is made to suffer the uncertain consequences of its own undesirable conduct." III P. Areeda & H. Hovenkamp, *Antitrust Law* ¶651c (3d ed. 2008).

Given this rather edentulous test for causation, the question in this case is not whether Java or Navigator would actually have developed into viable platform substitutes, but (1) whether as a general matter the exclusion of nascent threats is the type of conduct that is reasonably capable of contributing significantly to a defendant's continued monopoly power and (2) whether Java and Navigator reasonably constituted nascent threats at the time Microsoft engaged in the anticompetitive conduct at issue. As to the first, suffice it to say that it would be inimical to the purpose of the Sherman Act to allow monopolists free reign to squash nascent, albeit unproven, competitors at will — particularly in industries marked by rapid technological advance and frequent paradigm shifts. As to the second, the District Court made ample findings that both Navigator and Java showed potential as middleware platform threats. Counsel for Microsoft admitted as much at oral argument.

Microsoft's concerns over causation have more purchase in connection with the appropriate remedy issue, i.e., whether the court should impose a structural remedy or merely enjoin the offensive conduct at issue. As we point out later in this opinion, divestiture is a remedy that is imposed only with great caution, in part because its long-term efficacy is rarely certain. Absent some measure of confidence that there has been an actual loss to competition that needs to be restored, wisdom counsels against adopting radical structural relief. But these queries go to questions of remedy, not liability. In short, causation affords Microsoft no defense to liability for its unlawful actions undertaken to maintain its monopoly in the operating system market. . . .[37]

319. (a) Was Microsoft's Windows operating system protected from competition by a substantial applications barrier to entry? Did Netscape threaten to erode this barrier? If so, how?

(b) Did the incompatibilities in Microsoft's version of Java help Microsoft maintain its operating system monopoly?

(c) What potentially exclusionary actions did Microsoft take to promote Internet Explorer and discourage the adoption of Netscape? Were these actions successful? Would they have been successful if Netscape were a much superior browser? How exclusionary must actions be to constitute monopolization?

320. (a) Microsoft presented evidence of technical reasons for opening Internet Explorer at certain times even though Netscape was the default browser. The court observes that the government did not rebut this evidence

37. The excerpt here contains only background facts and the court's consideration of monopolization. *See* ¶¶360-361 for other portions of this opinion. — Eds.

system. Yet, there are many Apple devotees who believe its computers are superior, despite their high prices.

(a) Is Macintosh hardware a relevant market for purposes of a monopolization case? What about the market for Macintosh computers (which combines hardware and software)?

(b) Assuming the answer in ¶a is affirmative, if Apple sells 100 percent of Macintosh computers, does it have monopoly power?

UNITED STATES v. MICROSOFT CORP.

253 F.3d 34 (D.C. Cir. 2001)

EDWARDS, Chief Judge, WILLIAMS, GINSBURG, SENTELLE, RANDOLPH, ROGERS and TATEL, Circuit Judges. Per Curiam. [Parts I, IIB, and IIC of the opinion are found in Chapter 3A.]

II MONOPOLIZATION . . .

A. MONOPOLY POWER

While merely possessing monopoly power is not itself an antitrust violation, it is a necessary element of a monopolization charge. *See Grinnell.* The Supreme Court defines monopoly power as "the power to control prices or exclude competition." *Cellophane.* More precisely, a firm is a monopolist if it can profitably raise prices substantially above the competitive level. . . . Where evidence indicates that a firm has in fact profitably done so, the existence of monopoly power is clear. . . . Because such direct proof is only rarely available, courts more typically examine market structure in search of circumstantial evidence of monopoly power. 2A Areeda et al., *Antitrust Law* ¶531a, at 156; *see also, e.g., Grinnell.* Under this structural approach, monopoly power may be inferred from a firm's possession of a dominant share of a relevant market that is protected by entry barriers. *See Rebel Oil.* "Entry barriers" are factors (such as certain regulatory requirements) that prevent new rivals from timely responding to an increase in price above the competitive level.

The District Court considered these structural factors and concluded that Microsoft possesses monopoly power in a relevant market. Defining the market as Intel-compatible PC operating systems, the District Court found that Microsoft has a greater than 95% share. It also found the company's market position protected by a substantial entry barrier. . . .

1. Market Structure

a. Market Definition. "Because the ability of consumers to turn to other suppliers restrains a firm from raising prices above the competitive level," Rothery Storage & Van Co. v. Atlas Van Lines, 792 F.2d 210, 218 (D.C. Cir. 1986), the relevant market must include all products "reasonably interchangeable by consumers for the same purposes." *Cellophane.* In this case, the District Court defined the market as "the licensing of all Intel-compatible PC

operating systems worldwide," finding that there are "currently no products — and . . . there are not likely to be any in the near future — that a significant percentage of computer users worldwide could substitute for [these operating systems] without incurring substantial costs." Calling this market definition "far too narrow," Microsoft argues that the District Court improperly excluded three types of products: non-Intel compatible operating systems (primarily Apple's Macintosh operating system, Mac OS), operating systems for non-PC devices (such as handheld computers and portal websites), and "middleware" products, which are not operating systems at all.

We begin with Mac OS. Microsoft's argument that Mac OS should have been included in the relevant market suffers from a flaw that infects many of the company's monopoly power claims: the company fails to challenge the District Court's factual findings, or to argue that these findings do not support the court's conclusions. The District Court found that consumers would not switch from Windows to Mac OS in response to a substantial price increase because of the costs of acquiring the new hardware needed to run Mac OS (an Apple computer and peripherals) and compatible software applications, as well as because of the effort involved in learning the new system and transferring files to its format. The court also found the Apple system less appealing to consumers because it costs considerably more and supports fewer applications. Microsoft responds only by saying: "the district court's market definition is so narrow that it excludes Apple's Mac OS, which has competed with Windows for years, simply because the Mac OS runs on a different microprocessor." This general, conclusory statement falls far short of what is required to challenge findings as clearly erroneous. . . . Microsoft neither points to evidence contradicting the District Court's findings nor alleges that supporting record evidence is insufficient. And since Microsoft does not argue that even if we accept these findings, they do not support the District Court's conclusion, we have no basis for upsetting the court's decision to exclude Mac OS from the relevant market.

Microsoft's challenge to the District Court's exclusion of non-PC based competitors, such as information appliances (handheld devices, etc.) and portal websites that host server based software applications, suffers from the same defect: the company fails to challenge the District Court's key factual findings. In particular, the District Court found that because information appliances fall far short of performing all of the functions of a PC, most consumers will buy them only as a supplement to their PCs. The District Court also found that portal websites do not presently host enough applications to induce consumers to switch, nor are they likely to do so in the near future. Again, because Microsoft does not argue that the District Court's findings do not support its conclusion that information appliances and portal websites are outside the relevant market, we adhere to that conclusion.

This brings us to Microsoft's main challenge to the District Court's market definition: the exclusion of middleware. Because of the importance of middleware to this case, we pause to explain what it is and how it relates to the issue before us.

Operating systems perform many functions, including allocating computer memory and controlling peripherals such as printers and keyboards. Operating systems also function as platforms for software applications. They do this by "exposing" — i.e., making available to software developers — routines or protocols that perform certain widely-used functions. These are known as Application Programming Interfaces, or "APIs." For example, Windows contains an API that enables users to draw a box on the screen. Software developers wishing to include that function in an application need not duplicate it in their own code. Instead, they can "call" — i.e., use — the Windows API. Windows contains thousands of APIs, controlling everything from data storage to font display.

Every operating system has different APIs. Accordingly, a developer who writes an application for one operating system and wishes to sell the application to users of another must modify, or "port," the application to the second operating system. This process is both time-consuming and expensive.

"Middleware" refers to software products that expose their own APIs. Because of this, a middleware product written for Windows could take over some or all of Window's valuable platform functions — that is, developers might begin to rely upon APIs exposed by the middleware for basic routines rather than relying upon the API set included in Windows. If middleware were written for multiple operating systems, its impact could be even greater. The more developers could rely upon APIs exposed by such middleware, the less expensive porting to different operating systems would be. Ultimately, if developers could write applications relying exclusively on APIs exposed by middleware, their applications would run on any operating system on which the middleware was also present. Netscape Navigator and Java — both at issue in this case — are middleware products written for multiple operating systems.

Microsoft argues that, because middleware could usurp the operating system's platform function and might eventually take over other operating system functions (for instance, by controlling peripherals), the District Court erred in excluding Navigator and Java from the relevant market. The District Court found, however, that neither Navigator, Java, nor any other middleware product could now, or would soon, expose enough APIs to serve as a platform for popular applications, much less take over all operating system functions. Again, Microsoft fails to challenge these findings, instead simply asserting middleware's "potential" as a competitor. The test of reasonable interchangeability, however, required the District Court to consider only substitutes that constrain pricing in the reasonably foreseeable future, and only products that can enter the market in a relatively short time can perform this function. Whatever middleware's ultimate potential, the District Court found that consumers could not now abandon their operating systems and switch to middleware in response to a sustained price for Windows above the competitive level. Nor is middleware likely to overtake the operating system as the primary platform for software development any time in the near future.

Alternatively, Microsoft argues that the District Court should not have excluded middleware from the relevant market because the primary focus

of the plaintiffs' §2 charge is on Microsoft's attempts to suppress middleware's threat to its operating system monopoly. According to Microsoft, it is "contradict[ory]" to define the relevant market to exclude the "very competitive threats that gave rise" to the action. The purported contradiction lies between plaintiffs' §2 theory, under which Microsoft preserved its monopoly against middleware technologies that threatened to become viable substitutes for Windows, and its theory of the relevant market, under which middleware is not presently a viable substitute for Windows. Because middleware's threat is only nascent, however, no contradiction exists. Nothing in §2 of the Sherman Act limits its prohibition to actions taken against threats that are already well-developed enough to serve as present substitutes. *See infra* Section II.C. Because market definition is meant to identify products "reasonably interchangeable by consumers," *Cellophane*, and because middleware is not now interchangeable with Windows, the District Court had good reason for excluding middleware from the relevant market.

B. MARKET POWER

Having thus properly defined the relevant market, the District Court found that Windows accounts for a greater than 95% share. The court also found that even if Mac OS were included, Microsoft's share would exceed 80%. Microsoft challenges neither finding, nor does it argue that such a market share is not predominant. *Cf. Grinnell* (87% is predominant); *Kodak* (80%); *Cellophane* (75%).

Instead, Microsoft claims that even a predominant market share does not by itself indicate monopoly power. Although the "existence of [monopoly] power ordinarily may be inferred from the predominant share of the market," *Grinnell*, we agree with Microsoft that because of the possibility of competition from new entrants, looking to current market share alone can be "misleading." . . . In this case, however, the District Court was not misled. Considering the possibility of new rivals, the court focused not only on Microsoft's present market share, but also on the structural barrier that protects the company's future position. That barrier — the "applications barrier to entry" — stems from two characteristics of the software market: (1) most consumers prefer operating systems for which a large number of applications have already been written; and (2) most developers prefer to write for operating systems that already have a substantial consumer base. This "chicken-and-egg" situation ensures that applications will continue to be written for the already dominant Windows, which in turn ensures that consumers will continue to prefer it over other operating systems.

Challenging the existence of the applications barrier to entry, Microsoft observes that software developers do write applications for other operating systems, pointing out that at its peak IBM's OS/2 supported approximately 2,500 applications. This misses the point. That some developers write applications for other operating systems is not at all inconsistent with the finding that the applications barrier to entry discourages many from writing for these less popular platforms. Indeed, the District Court found that IBM's

difficulty in attracting a larger number of software developers to write for its platform seriously impeded OS/2's success.

Microsoft does not dispute that Windows supports many more applications than any other operating system. It argues instead that "[i]t defies common sense" to suggest that an operating system must support as many applications as Windows does (more than 70,000, according to the District Court) to be competitive. Consumers, Microsoft points out, can only use a very small percentage of these applications. As the District Court explained, however, the applications barrier to entry gives consumers reason to prefer the dominant operating system even if they have no need to use all applications written for it:

> The consumer wants an operating system that runs not only types of applications that he knows he will want to use, but also those types in which he might develop an interest later. Also, the consumer knows that if he chooses an operating system with enough demand to support multiple applications in each product category, he will be less likely to find himself straitened later by having to use an application whose features disappoint him. Finally, the average user knows that, generally speaking, applications improve through successive versions. He thus wants an operating system for which successive generations of his favorite applications will be released — promptly at that. The fact that a vastly larger number of applications are written for Windows than for other PC operating systems attracts consumers to Windows, because it reassures them that their interests will be met as long as they use Microsoft's product.

Thus, despite the limited success of its rivals, Microsoft benefits from the applications barrier to entry.

Of course, were middleware to succeed, it would erode the applications barrier to entry. Because applications written for multiple operating systems could run on any operating system on which the middleware product was present with little, if any, porting, the operating system market would become competitive. But as the District Court found, middleware will not expose a sufficient number of APIs to erode the applications barrier to entry in the foreseeable future.

Microsoft next argues that the applications barrier to entry is not an entry barrier at all, but a reflection of Windows' popularity. It is certainly true that Windows may have gained its initial dominance in the operating system market competitively — through superior foresight or quality. But this case is not about Microsoft's initial acquisition of monopoly power. It is about Microsoft's efforts to maintain this position through means other than competition on the merits. Because the applications barrier to entry protects a dominant operating system irrespective of quality, it gives Microsoft power to stave off even superior new rivals. The barrier is thus a characteristic of the operating system market, not of Microsoft's popularity, or, as asserted by a Microsoft witness, the company's efficiency.

Finally, Microsoft argues that the District Court should not have considered the applications barrier to entry because it reflects not a cost borne disproportionately by new entrants, but one borne by all participants in the operating system market. According to Microsoft, it had to make major investments to convince software developers to write for its new operating

system, and it continues to "evangelize" the Windows platform today. Whether costs borne by all market participants should be considered entry barriers is the subject of much debate. . . . We need not resolve this issue, however, for even under the more narrow definition it is clear that there are barriers. When Microsoft entered the operating system market with MS-DOS and the first version of Windows, it did not confront a dominant rival operating system with as massive an installed base and as vast an existing array of applications as the Windows operating systems have since enjoyed. Moreover, when Microsoft introduced Windows 95 and 98, it was able to bypass the applications barrier to entry that protected the incumbent Windows by including APIs from the earlier version in the new operating systems. This made porting existing Windows applications to the new version of Windows much less costly than porting them to the operating systems of other entrants who could not freely include APIs from the incumbent Windows with their own.

2. Direct Proof

Having sustained the District Court's conclusion that circumstantial evidence proves that Microsoft possesses monopoly power, we turn to Microsoft's alternative argument that it does not behave like a monopolist. Claiming that software competition is uniquely "dynamic," the company suggests a new rule: that monopoly power in the software industry should be proven directly, that is, by examining a company's actual behavior to determine if it reveals the existence of monopoly power. According to Microsoft, not only does no such proof of its power exist, but record evidence demonstrates the absence of monopoly power. The company claims that it invests heavily in research and development and charges a low price for Windows (a small percentage of the price of an Intel-compatible PC system and less than the price of its rivals).

Microsoft's argument fails because, even assuming that the software market is uniquely dynamic in the long term, the District Court correctly applied the structural approach to determine if the company faces competition in the short term. Structural market power analyses are meant to determine whether potential substitutes constrain a firm's ability to raise prices above the competitive level; only threats that are likely to materialize in the relatively near future perform this function to any significant degree. The District Court expressly considered and rejected Microsoft's claims that innovations such as handheld devices and portal websites would soon expand the relevant market beyond Intel-compatible PC operating systems. Because the company does not challenge these findings, we have no reason to believe that prompt substitutes are available. The structural approach, as applied by the District Court, is thus capable of fulfilling its purpose even in a changing market. Microsoft cites no case, nor are we aware of one, requiring direct evidence to show monopoly power in any market. We decline to adopt such a rule now.

Even if we were to require direct proof, moreover, Microsoft's behavior may well be sufficient to show the existence of monopoly power. Certainly, none of the conduct Microsoft points to — its investment in R&D and the

relatively low price of Windows — is inconsistent with the possession of such power. The R&D expenditures Microsoft points to are not simply for Windows, but for its entire company, which most likely does not possess a monopoly for all of its products. Moreover, because innovation can increase an already dominant market share and further delay the emergence of competition, even monopolists have reason to invest in R&D. Microsoft's pricing behavior is similarly equivocal. The company claims only that it never charged the short-term profit-maximizing price for Windows. Faced with conflicting expert testimony, the District Court found that it could not accurately determine what this price would be. In any event, the court found, a price lower than the short-term profit-maximizing price is not inconsistent with possession or improper use of monopoly power. Microsoft never claims that it did not charge the long-term monopoly price. Microsoft does argue that the price of Windows is a fraction of the price of an Intel-compatible PC system and lower than that of rival operating systems, but these facts are not inconsistent with the District Court's finding that Microsoft has monopoly power.

More telling, the District Court found that some aspects of Microsoft's behavior are difficult to explain unless Windows is a monopoly product. For instance, according to the District Court, the company set the price of Windows without considering rivals' prices, something a firm without a monopoly would have been unable to do. The District Court also found that Microsoft's pattern of exclusionary conduct could only be rational "if the firm knew that it possessed monopoly power." It is to that conduct that we now turn. . . .

361. (a) The *Microsoft* court suggests two ways to demonstrate monopoly power: (1) actually raising price above competitive levels; or (2) "possession of a dominant share of a relevant market that is protected by entry barriers." Left unanswered is the question of what happens if the defendant proves that its prices are low. Suppose that Microsoft had demonstrated that it was charging a competitive price and earning no profits. Would the court still have found that Microsoft had monopoly power, just unexercised power, or would the court have inferred that Microsoft must not actually have power? What is the appropriate result?

(b) What do you think of Microsoft's argument that "middleware" products should be included in the market? Is the Justice Department attempting to have its cake and eat it too by arguing that Microsoft monopolizes the market by excluding middleware, but that middleware should be excluded from the market?

(c) Suppose that Windows 95, Microsoft's state-of-the-art operating system at the time the case was filed, had a competitor that was functionally equivalent to Windows 95, that ran on the same Intel chips, and that ran the same 70,000 applications (equally well or poorly). If these two companies decided to merge, would these two programs constitute a market under the merger guidelines approach? If so, does this suggest that "operating systems functionally equivalent to Windows 95" was a relevant market during the time period when the case was filed, and in which Microsoft had a 100 percent share?

be an antitrust violation if Kodak, instead of tying, designed machines that more frequently required new parts, which consumers would have to buy from Kodak at inflated prices?[78]

(c) Given that (under the Court's theory) Kodak has a monopoly over the supply of its unique parts, why does it tie parts to service rather than simply raising the prices on its parts but making them available to anyone as the dissent suggests?

(d) Can you reconcile the Court's acceptance of the plaintiff's theory at the time of Kodak's motion for summary judgment with the Court's reversal of the jury verdict in *Brooke Group*?

UNITED STATES v. MICROSOFT CORP.
253 F.3D 34 (D.C. CIR. 2001)

EDWARDS, Chief Judge, WILLIAMS, GINSBURG, SENTELLE, RANDOLPH, ROGERS and TATEL, Circuit Judges. Per curiam. [The facts and monopolization discussion are set forth in Chapter 3A in ¶318 and the monopoly power discussion is set forth in Chapter 3B in ¶358.]

IV. TYING

Microsoft also contests the District Court's determination of liability under §1 of the Sherman Act. The District Court concluded that Microsoft's contractual and technological bundling of the IE web browser (the "tied" product) with its Windows operating system ("OS") (the "tying" product) resulted in a tying arrangement that was per se unlawful. We hold that the rule of reason, rather than per se analysis, should govern the legality of tying arrangements involving platform software products. The Supreme Court has warned that "'[i]t is only after considerable experience with certain business relationships that courts classify them as per se violations. . . . '" *BMI* (quoting *Topco*). While every "business relationship" will in some sense have unique features, some represent entire, novel categories of dealings. As we shall explain, the arrangement before us is an example of the latter, offering the first up-close look at the technological integration of added functionality into software that serves as a platform for third-party applications. There being no close parallel in prior antitrust cases, simplistic application of per se tying rules carries a serious risk of harm. Accordingly,

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to "assess the potential costs and economic risks at the time they signed the franchise agreement"); Lee v. Life Ins. Co. of N. Am., 23 F.3d 14, 20 (1st Cir.), cert. denied, 513 U.S. 964 (1994) (dismissing college students' claim that university's conditioning continued matriculation on payment of fee to use school's medical clinic constituted lock-in because the students knew ex ante that they were buying a package), *with* Wilson v. Mobil Oil Corp., 940 F. Supp. 944, 953 (E.D. La. 1996) (arguing that information and switching costs alone, despite complete ex ante disclosure of the tie, may create a relevant market for antitrust purposes).

78. For an economic analysis of *Kodak*, *see* C. Shapiro, *Aftermarkets and Consumer Welfare: Making Sense of* Kodak, 63 Antitr. L.J. 483 (1995); *see also* M. Schwartz & G. Werden, *A Quality-Signaling Rationale for Aftermarket Tying,* 64 Antitr. L.J. 387 (1996).

we vacate the District Court's finding of a per se tying violation and remand the case. Plaintiffs may on remand pursue their tying claim under the rule of reason.

The facts underlying the tying allegation substantially overlap with those set forth in Section II.B in connection with the §2 monopoly maintenance claim. The key District Court findings are that (1) Microsoft required licensees of Windows 95 and 98 also to license IE as a bundle at a single price; (2) Microsoft refused to allow OEMs to uninstall or remove IE from the Windows desktop; (3) Microsoft designed Windows 98 in a way that withheld from consumers the ability to remove IE by use of the Add/Remove Programs utility; and (4) Microsoft designed Windows 98 to override the user's choice of default web browser in certain circumstances. The court found that these acts constituted a per se tying violation. Although the District Court also found that Microsoft commingled operating system-only and browser-only routines in the same library files, it did not include this as a basis for tying liability despite plaintiffs' request that it do so.

There are four elements to a per se tying violation: (1) the tying and tied goods are two separate products; (2) the defendant has market power in the tying product market; (3) the defendant affords consumers no choice but to purchase the tied product from it; and (4) the tying arrangement forecloses a substantial volume of commerce. *See Kodak*; *Jefferson Parish*.

Microsoft does not dispute that it bound Windows and IE in the four ways the District Court cited. Instead it argues that Windows (the tying good) and IE browsers (the tied good) are not separate products,'' and that it did not substantially foreclose competing browsers from the tied product market. . . .

We first address the separate-products inquiry, a source of much argument between the parties and of confusion in the cases. Our purpose is to highlight the poor fit between the separate-products test and the facts of this case. We then offer further reasons for carving an exception to the per se rule when the tying product is platform software. In the final section we discuss the District Court's inquiry if plaintiffs pursue a rule of reason claim on remand.

A. SEPARATE-PRODUCTS INQUIRY UNDER THE PER SE TEST . . .

[The court reviewed the precedential tests for determining when two products are separate, emphasizing the test in *Jefferson Parish*. In the court's view, *Jefferson Parish* emphasized that the question should hinge on whether there is sufficient consumer demand in the marketplace to support independent markets despite whatever efficiencies tying may bring. *Jefferson Parish* sought to use the practices in the market as a rough proxy to balance efficiencies against the losses in consumer choice from integration or tying. The court found merit in Microsoft's argument that, in circumstances like those in the present case, the consumer demand test could "chill innovation to the detriment of consumers by preventing firms from integrating into their products new functionality previously provided by stand-alone products — and hence, by definition subject to separate consumer demand." Accordingly, the court found the *Jefferson Parish* separate-products test

to be an inappropriate aspect of the per se rule to apply to Microsoft's actions.]

B. PER SE ANALYSIS INAPPROPRIATE FOR THIS CASE

We now address directly the larger question as we see it: whether standard per se analysis should be applied "off the shelf" to evaluate the defendant's tying arrangement, one which involves software that serves as a platform for third-party applications. There is no doubt that "[i]t is far too late in the history of our antitrust jurisprudence to question the proposition that *certain* tying arrangements pose an unacceptable risk of stifling competition and therefore are unreasonable 'per se.'" *Jefferson Parish*. But there are strong reasons to doubt that the integration of additional software functionality into an OS falls among these arrangements. Applying per se analysis to such an amalgamation creates undue risks of error and of deterring welfare enhancing innovation.

The Supreme Court has warned that "'[i]t is only after considerable experience with certain business relationships that courts classify them as per se violations. . . . '" *BMI* (quoting *Topco*); accord *Sylvania*; White Motor Co. v. United States, 372 U.S. 253 (1963); *Jerrold*; *see also* Frank H. Easterbrook, Allocating Antitrust Decisionmaking Tasks, 76 Geo. L.J. 305 (1987). Yet the sort of tying arrangement attacked here is unlike any the Supreme Court has considered. The early Supreme Court cases on tying dealt with arrangements whereby the sale or lease of a patented product was conditioned on the purchase of certain unpatented products from the patentee. *See Motion Picture Patents*; *United Shoe Machinery*; *IBM*; *International Salt*. Later Supreme Court tying cases did not involve market power derived from patents, but continued to involve contractual ties. *See* Times-Picayune Publishing Co. v. United States, 345 U.S. 594 (1953) (defendant newspaper conditioned the purchase of ads in its evening edition on the purchase of ads in its morning edition); *Northern Pacific* (defendant railroad leased land only on the condition that products manufactured on the land be shipped on its railways); *Loew's* (defendant distributor of copyrighted feature films conditioned the sale of desired films on the purchase of undesired films); *Fortner* (defendant steel company conditioned access to low interest loans on the purchase of the defendant's prefabricated homes); *Jefferson Parish* (defendant hospital conditioned use of its operating rooms on the purchase of anesthesiological services from a medical group associated with the hospital); *Kodak* (defendant photocopying machine manufacturer conditioned the sale of replacement parts for its machines on the use of the defendant's repair services).

In none of these cases was the tied good physically and technologically integrated with the tying good. Nor did the defendants ever argue that their tie improved the value of the tying product to users *and* to makers of complementary goods. In those cases where the defendant claimed that use of the tied good made the tying good more valuable to users, the Court ruled that the same result could be achieved via quality standards for substitutes of the tied good. *See, e.g., International Salt*; *IBM*. Here

Microsoft argues that IE and Windows are an integrated physical product and that the bundling of IE APIs with Windows makes the latter a better applications platform for third-party software. It is unclear how the benefits from IE APIs could be achieved by quality standards for different browser manufacturers. We do not pass judgment on Microsoft's claims regarding the benefits from integration of its APIs. We merely note that these and other novel, purported efficiencies suggest that judicial "experience" provides little basis for believing that, "because of their pernicious effect on competition and lack of *any* redeeming virtue," a software firm's decisions to sell multiple functionalities as a package should be "conclusively presumed to be unreasonable and therefore illegal without elaborate inquiry as to the precise harm they have caused or the business excuse for their use." *Northern Pacific* (emphasis added).

Nor have we found much insight into software integration among the decisions of lower federal courts. . . . While the paucity of cases examining software bundling suggests a high risk that per se analysis may produce inaccurate results, the nature of the platform software market affirmatively suggests that per se rules might stunt valuable innovation. We have in mind two reasons.

First, as we explained in the previous section, the separate-products test is a poor proxy for net efficiency from newly integrated products. Under per se analysis the first firm to merge previously distinct functionalities (e.g., the inclusion of starter motors in automobiles) or to eliminate entirely the need for a second function (e.g., the invention of the stain-resistant carpet) risks being condemned as having tied two separate products because at the moment of integration there will appear to be a robust "distinct" market for the tied product. Rule of reason analysis, however, affords the first mover an opportunity to demonstrate that an efficiency gain from its "tie" adequately offsets any distortion of consumer choice.

The failure of the separate-products test to screen out certain cases of productive integration is particularly troubling in platform software markets such as that in which the defendant competes. Not only is integration common in such markets, but it is common among firms without market power. We have already reviewed evidence that nearly all competitive OS vendors also bundle browsers. Moreover, plaintiffs do not dispute that OS vendors can and do incorporate basic internet plumbing and other useful functionality into their OSs. Firms without market power have no incentive to package different pieces of software together unless there are efficiency gains from doing so. The ubiquity of bundling in competitive platform software markets should give courts reason to pause before condemning such behavior in less competitive markets.

Second, because of the pervasively innovative character of platform software markets, tying in such markets may produce efficiencies that courts have not previously encountered and thus the Supreme Court had not factored into the per se rule as originally conceived. For example, the bundling of a browser with OSs enables an independent software developer to count on the presence of the browser's APIs, if any, on consumers' machines and thus to omit them from its own package. It is true that software developers can bundle the browser APIs they need with their own products, but that may

force consumers to pay twice for the same API if it is bundled with two different software programs. It is also true that OEMs can include APIs with the computers they sell, but diffusion of uniform APIs by that route may be inferior. First, many OEMs serve special subsets of Windows consumers, such as home or corporate or academic users. If just one of these OEMs decides not to bundle an API because it does not benefit enough of its clients, ISVs that use that API might have to bundle it with every copy of their program. Second, there may be a substantial lag before all OEMs bundle the same set of APIs — a lag inevitably aggravated by the first phenomenon. In a field where programs change very rapidly, delays in the spread of a necessary element (here, the APIs) may be very costly. Of course, these arguments may not justify Microsoft's decision to bundle APIs in this case, particularly because Microsoft did not merely bundle with Windows the APIs from IE, but an entire browser application (sometimes even without APIs). A justification for bundling a component of software may not be one for bundling the entire software package, especially given the malleability of software code. Furthermore, the interest in efficient API diffusion obviously supplies a far stronger justification for simple pricebundling than for Microsoft's contractual or technological bars to subsequent *removal* of functionality. But our qualms about redefining the boundaries of a defendant's product and the possibility of consumer gains from simplifying the work of applications developers makes us question any hard and fast approach to tying in OS software markets.

There may also be a number of efficiencies that, although very real, have been ignored in the calculations underlying the adoption of a per se rule for tying. We fear that these efficiencies are common in technologically dynamic markets where product development is especially unlikely to follow an easily foreseen linear pattern. Take the following example from ILC Peripherals Leasing Corp. v. IBM Corp., 448 F. Supp. 228 (N.D. Cal. 1978), a case concerning the evolution of disk drives for computers. When IBM first introduced such drives in 1956, it sold an integrated product that contained magnetic disks and disk heads that read and wrote data onto disks. Consumers of the drives demanded two functions — to store data and to access it all at once. In the first few years consumers' demand for storage increased rapidly, outpacing the evolution of magnetic disk technology. To satisfy that demand IBM made it possible for consumers to remove the magnetic disks from drives, even though that meant consumers would not have access to data on disks removed from the drive. This componentization enabled makers of computer peripherals to sell consumers removable disks. Over time, however, the technology of magnetic disks caught up with demand for capacity, so that consumers needed few removable disks to store all their data. At this point IBM reintegrated disks into their drives, enabling consumers to once again have immediate access to all their data without a sacrifice in capacity. A manufacturer of removable disks sued. But the District Court found the tie justified because it satisfied consumer demand for immediate access to all data, and ruled that disks and disk heads were one product. A court hewing more closely to the truncated analysis contemplated by *Northern Pacific* would perhaps have overlooked these consumer benefits.

These arguments all point to one conclusion: we cannot comfortably say that bundling in platform software markets has so little "redeeming virtue," *Northern Pacific*, and that there would be so "very little loss to society" from its ban, that "an inquiry into its costs in the individual case [can be] considered [ ] unnecessary." *Jefferson Parish* (O'Connor, J., concurring). We do not have enough empirical evidence regarding the effect of Microsoft's practice on the amount of consumer surplus created or consumer choice foreclosed by the integration of added functionality into platform software to exercise sensible judgment regarding that entire class of behavior. (For some issues we have no data.) "We need to know more than we do about the actual impact of these arrangements on competition to decide whether they . . . should be classified as per se violations of the Sherman Act." *White Motor*. Until then, we will heed the wisdom that "easy labels do not always supply ready answers," *BMI,* and vacate the District Court's finding of per se tying liability under Sherman Act §1. We remand the case for evaluation of Microsoft's tying arrangements under the rule of reason. . . . That rule more freely permits consideration of the benefits of bundling in software markets, particularly those for OSs, and a balancing of these benefits against the costs to consumers whose ability to make direct price/quality tradeoffs in the tied market may have been impaired. *See Jefferson Parish* (noting that per se rule does not broadly permit consideration of procompetitive justifications); *Northern Pacific*.

Our judgment regarding the comparative merits of the per se rule and the rule of reason is confined to the tying arrangement before us, where the tying product is software whose major purpose is to serve as a platform for third-party applications and the tied product is complementary software functionality. While our reasoning may at times appear to have broader force, we do not have the confidence to speak to facts outside the record, which contains scant discussion of software integration generally. Microsoft's primary justification for bundling IE APIs is that their inclusion with Windows increases the value of third-party software (and Windows) to consumers. Because this claim applies with distinct force when the tying product is *platform* software, we have no present basis for finding the per se rule inapplicable to software markets generally. Nor should we be interpreted as setting a precedent for switching to the rule of reason every time a court identifies an efficiency justification for a tying arrangement. Our reading of the record suggests merely that integration of new functionality into platform software is a common practice and that wooden application of per se rules in this litigation may cast a cloud over platform innovation in the market for PCs, network computers and information appliances. . . .

442. (a) Is applying the *Jefferson Parish* separate-products test problematic for innovative integrated products? When, if ever, should such products be viewed as separate in a per se analysis?

(b) In the monopolization portion of the opinion, the court found that the government made a sufficient showing of anticompetitive effects or danger of such effects in the operating system market that resulted from the contractual and technological integration of the browser and the operating system. To win the tying claim under the rule of reason, the government must apparently show anticompetitive effects in the browser