UNITED STATES of America,
Appellee,

v.

MICROSOFT CORPORATION,
Appellant.

Nos. 00–5212 and 00–5213.

United States Court of Appeals,
District of Columbia Circuit.

Argued Feb. 26 and 27, 2001.

Decided June 28, 2001.

Rehearing Denied Aug. 2, 2001.

United States and individual states brought antitrust action against manufacturer of personal computer operating system and Internet web browser. The United States District Court for the District of Columbia, Thomas Penfield Jackson, J., concluded that manufacturer had committed monopolization, attempted monopolization, and tying violations of the Sherman Act, 87 F.Supp.2d 30, and issued remedial order requiring manufacturer to submit proposed plan of divestiture, 97 F.Supp.2d 59. Manufacturer appealed, and states petitioned for certiorari. The Supreme Court declined to hear direct appeal, denied petition, and remanded, 530 U.S. 1301, 121 S.Ct. 25, 147 L.Ed.2d 1048. The Court of Appeals held that: (1) manufacturer committed monopolization violation; (2) manufacturer did not commit attempted monopolization violation; (3) rule of reason, rather than per se analysis, applied to tying claim; (4) remand was required to determine if manufacturer committed tying violation; (5) vacation of remedies decree was required; and (6) district judge's comments to the press while the case was pending required his disqualification on remand.

Affirmed in part, reversed in part, and remanded in part.

Richard J. Urowsky and Steven L. Holley argued the causes for appellant. With them on the briefs were John L. Warden, Richard C. Pepperman, II, William H. Neukom, Thomas W. Burt, David A. Heiner, Jr., Charles F. Rule, Robert A. Long, Jr., and Carter G. Phillips. Christopher J. Meyers entered an appearance.

Lars H. Liebeler, Griffin B. Bell, Lloyd N. Cutler, Louis R. Cohen, C. Boyden Gray, William J. Kolasky, William F. Adkinson, Jr., Jeffrey D. Ayer, and Jay V. Prabhu were on the brief of amici curiae The Association for Competitive Technology and Computing Technology Industry Association in support of appellant.

David R. Burton was on the brief for amicus curiae Center for the Moral Defense of Capitalism in support of appellant.

Robert S. Getman was on the brief for amicus curiae Association for Objective Law in support of appellant.

Jeffrey P. Minear and David C. Frederick, Assistants to the Solicitor General, United States Department of Justice, and John G. Roberts, Jr., argued the causes for appellees. With them on the brief were A. Douglas Melamed, Acting Assistant Attorney General, United States Department of Justice, Jeffrey H. Blattner, Deputy Assistant Attorney General, Mary Jean Moltenbrey, Director, Catherine G. O'Sullivan, Robert B. Nicholson, Adam D. Hirsh, Andrea Limmer, David Seidman, and Christopher Sprigman, Attorneys, Eliot Spitzer, Attorney General, State of New York, Richard L. Schwartz, Assistant Attorney General, and Kevin J. O'Connor, Office of the Attorney General, State of Wisconsin.

John Rogovin, Kenneth W. Starr, John F. Wood, Elizabeth Petrela, Robert H. Bork, Theodore W. Ullyot, Jason M. Mahler, Stephen M. Shapiro, Donald M. Falk, Mitchell S. Pettit, Kevin J. Arquit, and Michael C. Naughton were on the brief for amici curiae America Online, Inc., et al., in support of appellee. Paul T. Cappuccio entered an appearance.

Lee A. Hollaar, appearing pro se, was on the brief for amicus curiae Lee A. Hollaar.

Carl Lundgren, appearing pro se, was on the brief for amicus curiae Carl Lundgren.

Before: EDWARDS, Chief Judge, WILLIAMS, GINSBURG, SENTELLE, RANDOLPH, ROGERS and TATEL, Circuit Judges.

Opinion for the Court filed PER CURIAM.

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PER CURIAM:

Microsoft Corporation appeals from judgments of the District Court finding the company in violation of §§ 1 and 2 of the Sherman Act and ordering various remedies.

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 Intelcompatible PC operating 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. *United States v. Microsoft Corp.*, 87 F.Supp.2d 30 (D.D.C.2000) ("*Conclusions of Law*"). 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. *Id.* 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. *United States v. Microsoft Corp.*, 97 F.Supp.2d 59, 64–65 (D.D.C.2000) ("*Final Judgment*"). The District Court's remedial order also contains a number of interim restrictions on Microsoft's conduct. *Id.* at 66–69.

II. Monopolization

[1, 2] Section 2 of the Sherman Act makes it unlawful for a firm to "monopolize." 15 U.S.C. § 2. 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." *United States v. Grinnell Corp.,* 384 U.S. 563, 570–71, 86 S.Ct. 1698, 16 L.Ed.2d 778 (1966). 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. Fed R. Civ. P. 52(a). We review legal questions *de novo. United States ex rel. Modern*

Elec., Inc. v. Ideal Elec. Sec. Co., 81 F.3d 240, 244 (D.C.Cir.1996).

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.

[8] 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. *See* Direct Testimony of Frederick Warren–Boulton ¶ 20, *reprinted in* 5 J.A. at 3172–73. 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." *See* Direct Testimony of James Barksdale ¶ 70, *reprinted in* 5 J.A. at 2895–96. For example, Windows contains an API that enables users to draw a box on the screen. *See* Direct Testimony of Michael T. Devlin ¶ 12, *reprinted in* 5 J.A. at 3525. 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. *See* Direct Testimony of James Barksdale ¶ ¶ 70–71, *reprinted in* 5 J.A. at 2895–97. Windows contains thousands of APIs, controlling everything from data storage to font display. *See* Direct Testimony of Michael Devlin ¶ 12, *reprinted in* 5 J.A. at 3525.

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. *Findings of Fact* ¶ 4. This process is both timeconsuming and expensive. *Id.* ¶ 30.

"Middleware" refers to software products that expose their own APIs. *Id.* ¶ 28; Direct Testimony of Paul Maritz ¶ ¶ 234–36, *reprinted in* 6 J.A. at 3727–29. Because of this, a middleware product written for Windows could take over some or all of Windows'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. *See* Direct Testimony of Avadis Tevanian, Jr. ¶ 45, *reprinted in* 5 J.A. at 3113. Netscape Navigator and Java—both at issue in this case—are middleware products written for multiple operating systems. *Findings of Fact* ¶ 28.

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. *Id.* ¶ ¶ 28–29. Again, Microsoft fails to challenge these findings, instead simply asserting middleware's "potential" as a competitor. Appellant's Opening Br. at 86. The test of reasonable interchangeability, however, required the District Court to consider only substitutes that constrain pricing in the reasonably fore-

seeable future, and only products that can enter the market in a relatively short time can perform this function. *See Rothery,* 792 F.2d at 218 ("Because the ability of consumers to turn to other suppliers restrains a firm from raising prices above the competitive level, the definition of the 'relevant market' rests on a determination of available substitutes."); *see also Findings of Fact* ¶ 29 ("[I]t would take several years for middleware . . . to evolve" into a product that can constrain operating system pricing.). 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. *Findings of Fact* ¶ ¶ 28, 29. Nor is middleware likely to overtake the operating system as the primary platform for software development any time in the near future. *Id.*

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]," 2/26/2001 Ct. Appeals Tr. at 20, to define the relevant market to exclude the "very competitive threats that gave rise" to the action. Appellant's Opening Br. at 84. 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," *du Pont,* 351 U.S. at 395, 76 S.Ct. 994, and because middleware is not now interchangeable with Windows, the District Court had good reason for excluding middleware from the relevant market.

With these principles in mind, we now consider Microsoft's objections to the District Court's holding that Microsoft violated § 2 of the Sherman Act in a variety of ways.

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. "The overwhelming majority of consumers will only use a PC operating system for which there already exists a large and varied set of . . . applications, and for which it seems relatively certain that new types of applications and new versions of existing applications will continue to be marketed. . . ." *Findings of Fact* ¶ 30. 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. Plaintiffs also argue that Microsoft's actions injured competition in the browser market—an argument we will examine below in relation to their specific claims that Microsoft attempted to monopolize the browser market and unlawfully tied its browser to its operating system so as to foreclose competition in the browser market. In evaluating the § 2 monopoly maintenance claim, however, our immediate concern is with the anticompetitive effect of Microsoft's conduct in preserving its monopoly in the operating system market.

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*

[22] The restrictions Microsoft places upon Original Equipment Manufacturers are of particular importance in determining browser usage share because having an OEM pre-install 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.) *Findings of Fact* ¶ 145. The District Court found that the restrictions Microsoft imposed in licensing Windows to OEMs prevented many OEMs from distributing browsers other than IE.

Conclusions of Law, at 39–40. 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. *Findings of Fact* ¶ 213.

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. *Id.* ¶ 203. 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." *Id.* ¶ 159; *see also id.* ¶ 217. 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. *Id.* ¶ 210.

Microsoft denies the "consumer confusion" story; it observes that some OEMs do install multiple browsers and that executives from two OEMs that do so denied any knowledge of consumers being confused by multiple icons. *See* 11/5/98 pm Tr. at 41–42 (trial testimony of Avadis Tevanian of Apple), *reprinted in* 9 J.A. at 5493–94; 11/18/99 am Tr. at 69 (trial testimony of John Soyring of IBM), *reprinted in* 10 J.A. at 6222.

Other testimony, however, supports the District Court's finding that fear of such confusion deters many OEMs from preinstalling multiple browsers. *See, e.g.,* 01/13/99 pm Tr. at 614–15 (deposition of Microsoft's Gayle McClain played to the court) (explaining that redundancy of icons may be confusing to end users); 02/18/99 pm Tr. at 46–47 (trial testimony of John Rose of Compaq), *reprinted in* 21 J.A. at 14237–38 (same); 11/17/98 am Tr. at 68 (deposition of John Kies of Packard Bell–NEC played to the court), *reprinted in* 9 J.A. at 6016 (same); 11/17/98 am Tr. at 67–72 (trial testimony of Glenn Weadock), *reprinted in* 9 J.A. at 6015–20 (same). Most telling, in presentations to OEMs, Microsoft itself represented that having only one icon in a particular category would be "less confusing for endusers." *See* Government's Trial Exhibit ("GX") 319 at MS98 0109453. Accordingly, we reject Microsoft's argument that we should vacate the District Court's Finding of Fact 159 as it 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 pre-installing 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." *Findings of Fact* ¶ 210. 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. *See id.* ¶ 212; GX 295, *reprinted in* 12 J.A. at 14533 (Upon learning of OEM practices including boot sequence modification, Microsoft's Chairman, Bill Gates, wrote: "Apparently a lot of OEMs are bundling non-Microsoft browsers and coming up with offerings together with [IAPs] that get displayed on their machines in a FAR more prominent way than MSN or our Internet browser."). 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. *See, e.g., Findings of Fact* ¶ 214; GX 309, *reprinted in* 22 J.A. at 14551 (March 1997 letter from Hewlett–Packard to Microsoft: "We are responsible for the cost of technical support of our customers, including the 33% of calls we get related to the lack of quality or confusion generated by your product.... We must have more ability to decide how our system is presented to our end users. If we had a choice of another supplier, based on your actions in this area, I assure you [that you] would not be our supplier of choice.").

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. *Findings of Fact* ¶ 212 (quoting Microsoft's Gates as writing, "[w]inning Internet browser share is a very very important goal for us," and emphasizing the need to prevent OEMs from promoting both rival browsers and IAPs that might use rivals' browsers); *see also* 01/13/99 Tr. at 305–06 (excerpts from deposition of James Von Holle of Gateway) (prior to restriction Gateway had pre-installed non-IE internet registration icon that was larger than other desktop icons). This kind of promotion is not a zero-sum game; but for the restrictions in their licenses to use Windows, OEMs could promote multiple IAPs and browsers. By preventing the OEMs from doing so, this 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.

...

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." *Findings of Fact* ¶ 160.

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 preinstalled 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." *Id.* ¶ 159.

Although the District Court, in its Conclusions of Law, broadly condemned Microsoft's decision to bind "Internet Explorer to Windows with ... technological shackles," *Conclusions of Law,* at 39, 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*

[27] As a general rule, courts are properly very skeptical about claims that competition has been harmed by a dominant firm's product design changes. *See, e.g., Foremost Pro Color, Inc. v. Eastman Kodak Co.,* 703 F.2d 534, 544–45 (9th Cir. 1983). 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. *See Findings of Fact* ¶ 59. Judicial deference to product innovation, however, does not mean that a monopolist's product design decisions are per se lawful. *See Foremost Pro Color,* 703 F.2d at 545; *see also Cal. Computer Prods.,* 613 F.2d at 739, 744; *In re IBM Peripheral EDP Devices Antitrust Litig.,* 481 F.Supp. 965, 1007–08 (N.D.Cal.1979).

[28] The District Court first condemned as anticompetitive Microsoft's decision to exclude IE from the "Add/Remove Programs" utility in Windows 98. *Findings of Fact* ¶ 170. Microsoft had included IE in the Add/Remove Programs utility in Windows 95, *see id.* ¶¶ 175–76, 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. *See id.* ¶ 159. 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. *Id.* ¶¶ 171–72. 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. Microsoft does not deny, of course, that overriding the user's preference prevents some people from using other browsers. Because the override reduces rivals' usage share and protects Microsoft's monopoly, it too is anticompetitive.

[29] 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." *Id.* ¶ 161; *see also id.* ¶¶ 174, 192. 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 . . . ." *Id.* ¶ 164. 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. *See id.* ¶ 159.

Microsoft denies, as a factual matter, that it commingled browsing and non-browsing code, and it maintains the District Court's findings to the contrary are clearly erroneous. According to Microsoft, its expert "testified without contradiction that '[t]he very same code in Windows 98 that provides Web browsing functionality' also performs essential operating system functions—not code in the same files, but the very same software code." Appellant's Opening Br. at 79 (citing 5 J.A. 3291–92).

Microsoft's expert did not testify to that effect "without contradiction," however. A Government expert, Glenn Weadock, testified that Microsoft "design[ed] [IE] so that some of the code that it uses co-resides in the same library files as other code needed for Windows." Direct Testimony ¶ 30. Another Government expert likewise testified that one library file, SHDOCVW.DLL, "is really a bundle of separate functions. It contains some functions that have to do specifically with Web browsing, and it contains some general user interface functions as well." 12/14/98 am Tr. at 60–61 (trial testimony of Edward Felten), *reprinted in* 11 J.A. at 6953–54. One of Microsoft's own documents suggests as much. *See* Plaintiffs' Proposed Findings of Fact ¶ 131.2.vii (citing GX 1686 (under seal) (Microsoft document indicating some functions in SHDOCVW.DLL can be described as "IE only," others can be described as "shell only" and still others can be described as providing both "IE" and "shell" functions)).

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. *See Anderson v. City of Bessemer City,* 470 U.S. 564, 573–74, 105 S.Ct. 1504, 84 L.Ed.2d 518 (1985) ("If the district court's account of the evidence is plausible in light of the record viewed in its entirety, the court of appeals may not reverse it even though convinced that had it been sitting as the trier of fact, it would have weighed the evidence differently."). Accordingly, we reject Microsoft's argument that we should vacate Finding of Fact 159 as it relates to the commingling of code, and we conclude that such commingling has an anticompetitive effect; as noted above, the commingling deters OEMs from pre-installing rival browsers, thereby reducing the rivals' usage share and, hence, developers' interest in rivals' APIs as an alternative to the API set exposed by Microsoft's operating system.

b. *Microsoft's justifications for integration*

[30] 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, *see, e.g.,* Direct Testimony of James Allchin ¶ 94, *reprinted in* 5 J.A. at 3321 ("Our vision of deeper levels of technical integration is highly efficient and provides substantial benefits to customers and developers."), 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. Plaintiffs plainly made out a *prima facie* case of harm to competition in the operating system market by demonstrating that Microsoft's actions increased its browser usage share and thus protected its operating system monopoly from a middleware threat and, for its part, Microsoft failed to meet its burden of showing that its conduct serves a purpose other than protecting its operating system monopoly. 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." Appellant's Opening Br. at 82. 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*.

Id. (internal citations omitted). 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.

3. Agreements with Internet Access Providers

The District Court also condemned as exclusionary Microsoft's agreements with various IAPs. The IAPs include both Internet Service Providers, which offer consumers internet access, and Online Services ("OLSs") such as America Online ("AOL"), which offer proprietary content in addition to internet access and other services. *Findings of Fact* ¶ 15. The District Court deemed Microsoft's agreements with the IAPs unlawful because:

> ... Micro-soft extended valuable promotional treatment to the ten most important IAPs in exchange for their commitment to promote and distribute [IE] and to exile Navigator from the desktop. *Id.* ¶ ¶ 255–58, 261, 272, 288–90, 305–06. ...

...

In this case, plaintiffs allege that, by closing to rivals a substantial percentage of the available opportunities for browser distribution, Microsoft managed to preserve its monopoly in the market for operating systems. The IAPs constitute one of the two major channels by which browsers can be distributed. *Findings of Fact* ¶ 242. Microsoft has exclusive deals with

"fourteen of the top fifteen access providers in North America[, which] account for a large majority of all Internet access subscriptions in this part of the world." *Id.* ¶ 308. 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. *See, e.g., id.* ¶ 143 (Microsoft sought to "divert enough browser usage from Navigator to neutralize it as a platform."); *see also* Carlton, at 670.

Plaintiffs having demonstrated a harm to competition, the burden falls upon Microsoft to defend its exclusive dealing contracts with IAPs by providing a procompetitive justification for them. Significantly, Microsoft's only explanation for its exclusive dealing is that it wants to keep developers focused upon its APIs—which is to say, it wants to preserve its power in the operating system market. 02/26/01 Ct. Appeals Tr. at 45–47. That is not an unlawful end, but neither is it a procompetitive justification for the specific means here in question, namely exclusive dealing contracts with IAPs. Accordingly, we affirm the District Court's decision holding that Microsoft's exclusive contracts with IAPs are exclusionary devices, in violation of § 2 of the Sherman Act.

4. Dealings with Internet Content Providers, Independent Software Vendors, and Apple Computer

The District Court held that Microsoft engages in exclusionary conduct in its dealings with ICPs, which develop websites; ISVs, which develop software; and Apple, which is both an OEM and a software developer. *See Conclusions of Law,* at 42–43 (deals with ICPs, ISVs, and Apple "supplemented Microsoft's efforts in the OEM and IAP channels"). The District Court condemned Microsoft's deals with ICPs and ISVs, stating: "By granting ICPs and ISVs free licenses to bundle [IE] with their offerings, and by exchanging other valuable inducements for their agreement to distribute, promote[,] and rely on [IE] rather than Navigator, Microsoft directly induced developers to focus on its own APIs rather than ones exposed by Navigator." *Id.* (citing *Findings of Fact* ¶ ¶ 334–35, 340).

[36] With respect to the deals with ICPs, the District Court's findings do not support liability. After reviewing the ICP agreements, the District Court specifically 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." *Findings of Fact* ¶ 332. Because plaintiffs failed to demonstrate that Microsoft's deals with the ICPs have a substantial effect upon competition, they have not proved the violation of the Sherman Act.

[37] As for Microsoft's ISV agreements, however, the District Court did not enter a similar finding of no substantial effect. The District Court described Microsoft's deals with ISVs as follows:

> In dozens of "First Wave" agreements signed between the fall of 1997 and the spring of 1998, Microsoft has promised to give preferential support, in the form of early Windows 98 and Windows NT betas, other technical information, and the right to use certain Microsoft seals of approval, to important ISVs that agree to certain conditions. One of these conditions is that the ISVs use Internet Explorer as the default browsing software for any software they develop with a hypertext-based user inter-

face. Another condition is that the ISVs use Microsoft's "HTML Help," which is accessible only with Internet Explorer, to implement their applications' help systems.

Id. ¶ 339. The District Court further found that the effect of these deals is to "ensure [ ] that many of the most popular Web-centric applications will rely on browsing technologies found only in Windows," *id.* ¶ 340, and that Microsoft's deals with ISVs therefore "increase[ ] the likelihood that the millions of consumers using [applications designed by ISVs that entered into agreements with Microsoft] will use Internet Explorer rather than Navigator." *Id.* ¶ 340.

The District Court did not specifically identify what share of the market for browser distribution the exclusive deals with the ISVs foreclose. Although the ISVs are 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. In that light, one can tell from the record that by affecting the applications used by "millions" of consumers, Microsoft's exclusive deals with the ISVs had a substantial effect in further foreclosing rival browsers from the market. (Data introduced by Microsoft, *see* Direct Testimony of Cameron Myhrvold ¶ 84, *reprinted in* 6 J.A. at 3922–23, and subsequently relied upon by the District Court in its findings, *see, e.g., Findings of Fact* ¶ 270, indicate that over the two-year period 1997–98, when Microsoft entered into the First Wave agreements, there were 40 million new users of the internet.) Because, by keeping rival browsers from gaining widespread distribution (and potentially attracting the attention of developers away from the APIs in Windows), the deals have a substantial effect in preserving Microsoft's monopoly, we hold that plaintiffs have made a *prima facie* showing that the deals have an anticompetitive effect.

Of course, that Microsoft's exclusive deals have the anticompetitive effect of preserving Microsoft's monopoly does not, in itself, make them unlawful. A monopolist, like a competitive firm, may have a perfectly legitimate reason for wanting an exclusive arrangement with its distributors. Accordingly, Microsoft had an opportunity to, but did not, present the District Court with evidence demonstrating that the exclusivity provisions have some such procompetitive justification. *See Conclusions of Law,* at 43 (citing *Findings of Fact* ¶ ¶ 339–40) ("With respect to the ISV agreements, Microsoft has put forward no procompetitive business ends whatsoever to justify their exclusionary terms."). On appeal Microsoft likewise does not claim that the exclusivity required by the deals serves any legitimate purpose; instead, it states only that its ISV agreements reflect an attempt "to persuade ISVs to utilize Internet-related system services in Windows rather than Navigator." Appellant's Opening Br. at 114. As we explained before, however, keeping developers focused upon Windows—that is, preserving the Windows monopoly—is a competitively neutral goal. Microsoft having offered no procompetitive justification for its exclusive dealing arrangements with the ISVs, we hold that those arrangements violate § 2 of the Sherman Act.

[38] Finally, the District Court held that Microsoft's dealings with Apple violated the Sherman Act. *See Conclusions of Law,* at 42–43. Apple is vertically integrated: it makes both software (including an operating system, Mac OS), and hardware (the Macintosh line of computers). Microsoft primarily makes software, including, in addition to its operating system,

a number of popular applications. One, called "Office," is a suite of business productivity applications that Microsoft has ported to Mac OS. The District Court found that "ninety percent of Mac OS users running a suite of office productivity applications [use] Microsoft's Mac Office." *Findings of Fact* ¶ 344. Further, the District Court found that:

> In 1997, Apple's business was in steep decline, and many doubted that the company would survive much longer.... [M]any ISVs questioned the wisdom of continuing to spend time and money developing applications for the Mac OS. Had Microsoft announced in the midst of this atmosphere that it was ceasing to develop new versions of Mac Office, a great number of ISVs, customers, developers, and investors would have interpreted the announcement as Apple's death notice.

Id. ¶ 344. Microsoft recognized the importance to Apple of its continued support of Mac Office. *See id.* ¶ 347 (quoting internal Microsoft e-mail) ("[We] need a way to push these guys[, *i.e.*, Apple] and [threatening to cancel Mac Office] is the only one that seems to make them move."); *see also id.* ("[Microsoft Chairman Bill] Gates asked whether Microsoft could conceal from Apple in the coming month the fact that Microsoft was almost finished developing Mac Office 97."); *id.* at ¶ 354 ("I think ... Apple should be using [IE] everywhere and if they don't do it, then we can use Office as a club.").

In June 1997 Microsoft Chairman Bill Gates determined that the company's negotiations with Apple " 'have not been going well at all.... Apple let us down on the browser by making Netscape the standard install.' Gates then reported that he had already called Apple's CEO ... to ask 'how we should announce the cancellation of Mac Office....' " *Id.* at ¶ 349. The District Court further found that, within a month of Gates' call, Apple and Microsoft had reached an agreement pursuant to which

> Microsoft's primary obligation is to continue releasing up-to-date versions of Mac Office for at least five years.... [and] Apple has agreed ... to "bundle the most current version of [IE] ... with [Mac OS]"... [and to] "make [IE] the default [browser]".... Navigator is not installed on the computer hard drive during the default installation, which is the type of installation most users elect to employ.... [The] Agreement further provides that ... Apple may not position icons for nonMicrosoft browsing software on the desktop of new Macintosh PC systems or Mac OS upgrades.

Id. ¶ ¶ 350–52. The agreement also prohibits Apple from encouraging users to substitute another browser for IE, and states that Apple will "encourage its employees to use [IE]." *Id.* ¶ 352.

This exclusive deal between Microsoft and Apple has a substantial effect upon the distribution of rival browsers. If a browser developer ports its product to a second operating system, such as the Mac OS, it can continue to display a common set of APIs. Thus, usage share, not the underlying operating system, is the primary determinant of the platform challenge a browser may pose. Pre-installation of a browser (which can be accomplished either by including the browser with the operating system or by the OEM installing the browser) is one of the two most important methods of browser distribution, and Apple had a not insignificant share of worldwide sales of operating systems. *See id.* ¶ 35 (Microsoft has 95% of the market not counting Apple and "well above" 80% with Apple included in the relevant market). Because Microsoft's exclusive contract with Apple

has a substantial effect in restricting distribution of rival browsers, and because (as we have described several times above) reducing usage share of rival browsers serves to protect Microsoft's monopoly, its deal with Apple must be regarded as anticompetitive. *See Conclusions of Law,* at 42 (citing *Findings of Fact* ¶ 356) ("By extracting from Apple terms that significantly diminished the usage of Navigator on the Mac OS, Microsoft helped to ensure that developers would not view Navigator as truly cross-platform middleware.").

Microsoft offers no procompetitive justification for the exclusive dealing arrangement. It makes only the irrelevant claim that the IE-for-Mac Office deal is part of a multifaceted set of agreements between itself and Apple, *see* Appellant's Opening Br. at 61 ("Apple's 'browsing software' obligation was [not] the quid pro quo for Microsoft's Mac Office obligation[;] . . . *all* of the various obligations . . . were part of one 'overall agreement' between the two companies."); that does not mean it has any procompetitive justification. Accordingly, we hold that the exclusive deal with Apple is exclusionary, in violation of § 2 of the Sherman Act.

C. Causation

[44] 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. *See Findings of Fact* ¶ 411 ("There is insufficient evidence to find that, absent Microsoft's actions, Navigator and Java already would have ignited genuine competition in the market for Intel-compatible PC operating systems."). 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." 3 PHILLIP E. AREEDA & HERBERT HOVENKAMP, ANTITRUST LAW ¶ 650c, at 69 (1996) (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.* ¶ 651c, at 78; *see also Morgan v. Ponder,* 892 F.2d 1355, 1363 (8th Cir.1989); *Barry Wright,* 724 F.2d at 230. 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." 3 AREEDA & HOVENKAMP, ANTITRUST LAW ¶ 651c, at 78.

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. *Findings of Fact* ¶ ¶ 59–60. As to the second, the District Court made ample findings that both Navigator and Java showed potential as middleware platform threats. *Findings of Fact* ¶ ¶ 68–77. Counsel for Microsoft admitted as much at oral argument. 02/26/01 Ct. Appeals Tr. at 27 ("There are no constraints on output. Marginal costs are essentially zero. And there are to some extent network effects. So a company like Netscape founded in 1994 can be by the middle of 1995 clearly a potentially lethal competitor to Windows because it can supplant its position in the market because of the characteristics of these markets.").

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. *See infra* Section V.E. 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. *See* 3 AREEDA & HOVENKAMP, ANTITRUST LAW ¶ 653b, at 91–92 ("[M]ore extensive equitable relief, particularly remedies such as divestiture designed to eliminate the monopoly altogether, raise more serious questions and require a clearer indication of a significant causal connection between the conduct and creation or maintenance of the market power."). 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.