

distribution channel for browsing software even approaches the efficiency of OEM pre-installation and IAP bundling.”), and had relegated it to more costly and less effective methods (such as mass mailing its browser on a disk or offering it for download over the internet); but because Microsoft has not “completely excluded Netscape” from reaching any potential user by some means of distribution, however ineffective, the court concluded the agreements do not violate § 1. *Conclusions of Law*, at 53. Plaintiffs did not cross-appeal this holding.

Turning to § 2, the court stated: “the fact that Microsoft’s arrangements with various [IAPs and other] firms did not foreclose enough of the relevant market to constitute a § 1 violation in no way detracts from the Court’s assignment of liability for the same arrangements under § 2. . . . [A]ll of Microsoft’s agreements, including the non-exclusive ones, severely restricted Netscape’s access to those distribution channels leading most efficiently to the acquisition of browser usage share.” *Conclusions of Law*, at 53.

On appeal Microsoft argues that “courts have applied the same standard to alleged exclusive dealing agreements under both Section 1 *and* Section 2,” Appellant’s Opening Br. at 109, and it argues that the District Court’s holding of no liability under § 1 necessarily precludes holding it liable under § 2. The District Court appears to have based its holding with respect to § 1 upon a “total exclusion test” rather than the 40% standard drawn from the caselaw. Even assuming the holding is correct, however, we nonetheless reject Microsoft’s contention.

The basic prudential concerns relevant to §§ 1 and 2 are admittedly the same: exclusive contracts are commonplace—particularly in the field of distribution—in our competitive, market economy, and imposing upon a firm with market power the risk of an antitrust suit every time it enters into such a contract, no matter how small the effect, would create an unacceptable and unjustified burden upon any such firm. At the same time, however, we agree with plaintiffs that a monopolist’s use of exclusive contracts, in certain circum-

stances, may give rise to a § 2 violation even though the contracts foreclose less than the roughly 40% or 50% share usually required in order to establish a § 1 violation. See generally Dennis W. Carlton, *A General Analysis of Exclusionary Conduct and Refusal to Deal—Why Aspen and Kodak Are Misguided*, 68 ANTITRUST L.J. 659 (2001) (explaining various scenarios under which exclusive dealing, particularly by a dominant firm, may raise legitimate concerns about harm to competition).

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 deci-

sion 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).

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.

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 interface. 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 anti-competitive 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.

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 long-

er. . . . [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 non-Microsoft 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.

## 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. *Findings of Fact* ¶ 28. 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. *Id.* ¶ 73. Programs calling upon the Java APIs will run on any machine with a "Java runtime environment," that is, Java class libraries and a JVM. *Id.* ¶ ¶ 73, 74.

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." *Id.* ¶ 76. 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." *Conclusions of Law*, at 43. 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. *Conclusions of Law*, at 43–44. 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, *Findings of Fact* ¶ 389, but a Java application designed to work with Microsoft's JVM does not work with Sun's JVM and vice versa. *Id.* ¶ 390. The District Court found that Microsoft "made a large investment of engineering resources to develop a high-performance Windows JVM," *id.* ¶ 396, 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," *id.* ¶ 397. 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 pro-competitive 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*

The District Court also found that Microsoft entered into First Wave Agreements with dozens of ISVs to use Microsoft's JVM. *See Findings of Fact* ¶ 401 ("[I]n exchange for costly technical support and other blandishments, Microsoft induced dozens of important ISVs to make their Java applications reliant on Windows-specific technologies and to refrain from distributing to Windows users JVMs that complied with Sun's standards."). Again, we reject the District Court's condemnation of low but non-predatory pricing by Microsoft.

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 exclu-

sively, 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. *Id.* ¶ 401.

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. *Id.* ¶ 340. The First Wave ISVs included such prominent developers as Rational Software, *see* GX 970, *reprinted in* 15 J.A. at 9994-10000, "a world leader" in software development tools, *see* Direct Testimony of Michael Devlin ¶ 2, *reprinted in* 5 J.A. at 3520, and Symantec, *see* GX 2071, *reprinted in* 22 J.A. at 14960-66 (sealed), which, according to Microsoft itself, is "the leading supplier of utilities such as anti-virus software," Defendant's Proposed Findings of Fact ¶ 276, *reprinted in* 3 J.A. at 1689. 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." *Findings of Fact* ¶ 394. 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. *Conclusions of Law*, at 43-44. 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. *See Findings of Fact* ¶ 401.

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." *Id.* ¶ 394; *see also* Direct Testimony of James Gosling ¶ 58, *reprinted in* 21 J.A. at 13959 (Microsoft added "programming instructions . . . that alter the behavior of the code."). As a result, even Java "developers who were opting for portability over performance . . . unwittingly [wrote] Java applications that [ran] only on Windows." *Conclusions of Law*, at 43. 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.

GX 1332, *reprinted in 22 J.A. at 14922–23.*

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." GX 259, *reprinted in 22 J.A. at 14514; see also id.* ("Cross-platform capability is by far *the* number one reason for choosing/using Java.") (emphasis in original).

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." *Conclusions of Law*, at 43. 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." *Findings of Fact* ¶396. 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." *Id.* ¶405.

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." *Id.* ¶396. In April of that year, Microsoft again urged Intel not to help Sun by distributing Intel's fast, Sun-compliant JVM. *Id.* 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. *Id.* ¶404.

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."

*Id.* ¶406.

Microsoft's internal documents and deposition testimony confirm both the anticompetitive effect and intent of its actions. *See, e.g.*, GX 235, reprinted in 22 J.A. at 14502 (Microsoft executive, Eric Engstrom, included among Microsoft's goals for Intel: "Intel to stop helping Sun create Java

Multimedia APIs, especially ones that run well . . . on Windows.”); Deposition of Eric Engstrom at 179 (“We were successful [in convincing Intel to stop aiding Sun] for some period of time.”).

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.

#### 6. Course of Conduct

The District Court held that, apart from Microsoft’s specific acts, Microsoft was liable under § 2 based upon its general “course of conduct.” In reaching this conclusion the court relied upon *Continental Ore Co. v. Union Carbide & Carbon Corp.*, 370 U.S. 690, 699 (1962), where the Supreme Court stated, “[i]n [Sherman Act cases], plaintiffs should be given the full benefit of their proof without tightly compartmentalizing the various factual components and wiping the slate clean after scrutiny of each.”

Microsoft points out that *Continental Ore* and the other cases cited by plaintiffs in support of “course of conduct” liability all involve conspiracies among multiple firms, not the conduct of a single firm; in that setting the “course of conduct” is the conspiracy itself, for which all the participants may be held liable. See Appellant’s Opening Br. at 112–13. Plaintiffs respond that, as a policy matter, a monopolist’s unilateral “campaign of [acts intended to exclude a rival] that in the aggregate has the requisite impact” warrants liability even if the acts viewed individually would be lawful for want of a significant effect upon competition. Appellees’ Br. at 82–83.

We need not pass upon plaintiffs’ argument, however, because the District Court did not point to any series of acts, each of which harms competition only slightly but the cumula-

tive effect of which is significant enough to form an independent basis for liability. The “course of conduct” section of the District Court’s opinion contains, with one exception, only broad, summarizing conclusions. *See, e.g., Conclusions of Law*, at 44 (“Microsoft placed an oppressive thumb on the scale of competitive fortune. . . .”). The only specific acts to which the court refers are Microsoft’s expenditures in promoting its browser, *see id.* (“Microsoft has expended wealth and foresworn opportunities to realize more. . . .”), which we have explained are not in themselves unlawful. Because the District Court identifies no other specific acts as a basis for “course of conduct” liability, we reverse its conclusion that Microsoft’s course of conduct separately violates § 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. *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, ANTI-TRUST 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, ANTI-TRUST 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, ANTI-TRUST 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.

### III. ATTEMPTED MONOPOLIZATION

Microsoft further challenges the District Court's determination of liability for "attempt[ing] to monopolize . . . any part of the trade or commerce among the several States." 15 U.S.C. § 2 (1997). To establish a § 2 violation for attempted monopolization, "a plaintiff must prove (1) that the defendant has engaged in predatory or anticompetitive conduct with (2) a specific intent to monopolize and (3) a dangerous probability of achieving monopoly power." *Spectrum Sports, Inc. v. McQuillan*, 506 U.S. 447, 456 (1993); see also *Times-Picayune Pub. Co. v. United States*, 345 U.S. 594, 626 (1953); *Lorain Journal Co. v. United States*, 342 U.S. 143, 153-55 (1951). Because a deficiency on any one of the three will defeat plaintiffs' claim, we look no further than plaintiffs' failure to prove a dangerous probability of achieving monopoly power in the putative browser market.

The determination whether a dangerous probability of success exists is a particularly fact-intensive inquiry. Because the Sherman Act does not identify the activities that constitute the offense of attempted monopolization, the court "must examine the facts of each case, mindful that the determination of what constitutes an attempt, as Justice Holmes explained, 'is a question of proximity and degree.'" *United States v. Am. Airlines, Inc.*, 743 F.2d 1114, 1118 (5th Cir. 1984) (quoting *Swift & Co. v. United States*, 196 U.S. 375, 402 (1904)). The District Court determined that "[t]he evidence supports the conclusion that Microsoft's actions did pose such a danger." *Conclusions of Law*, at 45. Specifically, the District Court concluded that "Netscape's assent to Microsoft's market division proposal would have, *instanter*, resulted in Microsoft's attainment of monopoly power in a second market," and that "the proposal itself created a dangerous probability of that result." *Conclusions of Law*, at 46 (citation omitted). The District Court further concluded that "the predatory course of conduct Microsoft has pursued since June

of 1995 has revived the dangerous probability that Microsoft will attain monopoly power in a second market.” *Id.*

At the outset we note a pervasive flaw in the District Court’s and plaintiffs’ discussion of attempted monopolization. Simply put, plaintiffs have made the same argument under two different headings—monopoly maintenance and attempted monopolization. They have relied upon Microsoft’s § 2 liability for monopolization of the operating system market as a presumptive indicator of attempted monopolization of an entirely different market. The District Court implicitly accepted this approach: It agreed with plaintiffs that the events that formed the basis for the § 2 monopolization claim “warrant[ed] *additional* liability as an illegal attempt to amass monopoly power in ‘the browser market.’” *Id.* at 45 (emphasis added). Thus, plaintiffs and the District Court failed to recognize the need for an analysis wholly independent of the conclusions and findings on monopoly maintenance.

To establish a dangerous probability of success, plaintiffs must as a threshold matter show that the browser market can be monopolized, *i.e.*, that a hypothetical monopolist in that market could enjoy market power. This, in turn, requires plaintiffs (1) to define the relevant market and (2) to demonstrate that substantial barriers to entry protect that market. Because plaintiffs have not carried their burden on either prong, we reverse without remand.

#### A. *Relevant Market*

A court’s evaluation of an attempted monopolization claim must include a definition of the relevant market. *See Spectrum Sports*, 506 U.S. at 455–56. Such a definition establishes a context for evaluating the defendant’s actions as well as for measuring whether the challenged conduct presented a dangerous probability of monopolization. *See id.* The District Court omitted this element of the *Spectrum Sports* inquiry.

Defining a market for an attempted monopolization claim involves the same steps as defining a market for a monopoly maintenance claim, namely a detailed description of the purpose of a browser—what functions may be included and what

are not—and an examination of the substitutes that are part of the market and those that are not. *See also supra* Section II.A. The District Court never engaged in such an analysis nor entered detailed findings defining what a browser is or what products might constitute substitutes. In the Findings of Fact, the District Court (in a section on whether IE and Windows are separate products) stated only that “a Web browser provides the ability for the end user to select, retrieve, and perceive resources on the Web.” *Findings of Fact* ¶ 150. Furthermore, in discussing attempted monopolization in its Conclusions of Law, the District Court failed to demonstrate analytical rigor when it employed varying and imprecise references to the “market for browsing technology for Windows,” “the browser market,” and “platform-level browsing software.” *Conclusions of Law*, at 45.

Because the determination of a relevant market is a factual question to be resolved by the District Court, *see, e.g., All Care Nursing Serv., Inc. v. High Tech Staffing Servs., Inc.*, 135 F.3d 740, 749 (11th Cir. 1998); *Tunis Bros. Co., Inc. v. Ford Motor Co.*, 952 F.2d 715, 722–23 (3d Cir. 1991); *Westman Comm’n Co. v. Hobart Int’l, Inc.*, 796 F.2d 1216, 1220 (10th Cir. 1986), we would normally remand the case so that the District Court could formulate an appropriate definition. *See Pullman–Standard v. Swint*, 456 U.S. 273, 291–92 & n.22 (1982); *Janini v. Kuwait Univ.*, 43 F.3d 1534, 1537 (D.C. Cir. 1995); *Palmer v. Shultz*, 815 F.2d 84, 103 (D.C. Cir. 1987). A remand on market definition is unnecessary, however, because the District Court’s imprecision is directly traceable to plaintiffs’ failure to articulate and identify evidence before the District Court as to (1) what constitutes a browser (*i.e.*, what are the technological components of or functionalities provided by a browser) and (2) why certain other products are not reasonable substitutes (*e.g.*, browser shells or viewers for individual internet extensions, such as Real Audio Player or Adobe Acrobat Reader). *See* Plaintiffs’ Joint Proposed Findings of Fact, at 817–19, *reprinted in* 2 J.A. at 1480–82; Plaintiffs’ Joint Proposed Conclusions of Law § IV (No. 98–1232); *see also Lee v. Interstate Fire & Cas. Co.*, 86 F.3d 101,

105 (7th Cir. 1996) (stating that remand for development of a factual record is inappropriate where plaintiff failed to meet burden of persuasion and never suggested that additional evidence was necessary). Indeed, when plaintiffs in their Proposed Findings of Fact attempted to define a relevant market for the attempt claim, they pointed only to their separate products analysis for the tying claim. *See, e.g., Plaintiffs' Joint Proposed Findings of Fact*, at 818, *reprinted in 2 J.A.* at 1481. However, the separate products analysis for tying purposes is not a substitute for the type of market definition that *Spectrum Sports* requires. *See infra* Section IV.A.

Plaintiffs' proposed findings and the District Court's actual findings on attempted monopolization pale in comparison to their counterparts on the monopoly maintenance claim. *Compare Findings of Fact* ¶ 150, and Plaintiffs' Joint Proposed Findings of Fact, at 817–819, *reprinted in 2 J.A.* at 1480–82, *with Findings of Fact* ¶ ¶ 18–66, and Plaintiffs' Joint Proposed Findings of Fact, at 20–31, *reprinted in 1 J.A.* at 658–69. Furthermore, in their brief and at oral argument before this court, plaintiffs did nothing to clarify or ameliorate this deficiency. *See, e.g., Appellees' Br.* at 93–94.

#### *B. Barriers to Entry*

Because a firm cannot possess monopoly power in a market unless that market is also protected by significant barriers to entry, *see supra* Section II.A, it follows that a firm cannot threaten to achieve monopoly power in a market unless that market is, or will be, similarly protected. *See Spectrum Sports*, 506 U.S. at 456 (“In order to determine whether there is a dangerous probability of monopolization, courts have found it necessary to consider . . . the defendant’s ability to lessen or destroy competition in that market.”) (citing cases). Plaintiffs have the burden of establishing barriers to entry into a properly defined relevant market. *See 2A PHILLIP E. AREEDA ET AL., ANTITRUST LAW* ¶ 420b, at 57–59 (1995); *3A PHILLIP E. AREEDA & HERBERT HOVENKAMP, ANTITRUST LAW* ¶ 807g, at 361–62 (1996); *see also Neumann v. Reinforced*

*Earth Co.*, 786 F.2d 424, 429 (D.C. Cir. 1986). Plaintiffs must not only show that barriers to entry protect the properly defined browser market, but that those barriers are “significant.” See *United States v. Baker Hughes Inc.*, 908 F.2d 981, 987 (D.C. Cir. 1990). Whether there are significant barriers to entry cannot, of course, be answered absent an appropriate market definition; thus, plaintiffs’ failure on that score alone is dispositive. But even were we to assume a properly defined market, for example browsers consisting of a graphical interface plus internet protocols, plaintiffs nonetheless failed to carry their burden on barriers to entry.

Contrary to plaintiffs’ contention on appeal, see Appellees’ Br. at 91–93, none of the District Court’s statements constitutes a finding of barriers to entry into the web browser market. Finding of Fact 89 states:

At the time Microsoft presented its proposal, Navigator was the only browser product with a significant share of the market and thus the only one with the potential to weaken the applications barrier to entry. Thus, had it convinced Netscape to accept its offer of a “special relationship,” Microsoft quickly would have gained such control over the extensions and standards that network-centric applications (including Web sites) employ as to make it all but impossible for any future browser rival to lure appreciable developer interest away from Microsoft’s platform.

This finding is far too speculative to establish that competing browsers would be unable to enter the market, or that Microsoft would have the power to raise the price of its browser above, or reduce the quality of its browser below, the competitive level. Moreover, it is ambiguous insofar as it appears to focus on Microsoft’s response to the perceived platform threat rather than the browser market. Finding of Fact 144, on which plaintiffs also rely, is part of the District Court’s discussion of Microsoft’s alleged anticompetitive actions to eliminate the platform threat posed by Netscape Navigator. This finding simply describes Microsoft’s reliance

on studies indicating consumers' reluctance to switch browsers, a reluctance not shown to be any more than that which stops consumers from switching brands of cereal. Absent more extensive and definitive factual findings, the District Court's legal conclusions about entry barriers amount to nothing more than speculation.

In contrast to their minimal effort on market definition, plaintiffs did at least offer proposed findings of fact suggesting that the possibility of network effects could potentially create barriers to entry into the browser market. *See* Plaintiffs' Joint Proposed Findings of Fact, at 822–23, 825–27, *reprinted in* 2 J.A. at 1485–86, 1488–90. The District Court did not adopt those proposed findings. *See Findings of Fact* ¶ 89. However, the District Court did acknowledge the possibility of a different kind of entry barrier in its Conclusions of Law:

In the time it would have taken an aspiring entrant to launch a serious effort to compete against Internet Explorer, Microsoft *could have* erected the same type of barrier that protects its existing monopoly power by adding proprietary extensions to the browsing software under its control and by extracting commitments from OEMs, IAPs and others similar to the ones discussed in [the monopoly maintenance section].

*Conclusions of Law*, at 46 (emphasis added).

Giving plaintiffs and the District Court the benefit of the doubt, we might remand if the *possible existence* of entry barriers resulting from the *possible creation and exploitation* of network effects in the browser market were the only concern. That is not enough to carry the day, however, because the District Court did not make two key findings: (1) that network effects were a necessary or even probable, rather than merely possible, consequence of high market share in the browser market and (2) that a barrier to entry resulting from network effects would be “significant” enough to confer monopoly power. Again, these deficiencies are in large part traceable to plaintiffs' own failings. As to the first point, the District Court's use of the phrase “could have”

reflects the same uncertainty articulated in testimony cited in plaintiffs' proposed findings. *See* Plaintiffs' Joint Proposed Findings of Fact, at 822 (citing testimony of Frederick Warren-Boulton), at 826 (citing testimony of Franklin Fisher), *reprinted in* 2 J.A. at 1485, 1489. As to the second point, the cited testimony in plaintiffs' proposed findings offers little more than conclusory statements. *See id.* at 822-27, *reprinted in* 2 J.A. at 1485-90. The proffered testimony contains no evidence regarding the cost of "porting" websites to different browsers or the potentially different economic incentives facing ICPs, as opposed to ISVs, in their decision to incur costs to do so. Simply invoking the phrase "network effects" without pointing to more evidence does not suffice to carry plaintiffs' burden in this respect.

Any doubt that we may have had regarding remand instead of outright reversal on the barriers to entry question was dispelled by plaintiffs' arguments on attempted monopolization before this court. Not only did plaintiffs fail to articulate a website barrier to entry *theory* in either their brief or at oral argument, they failed to point the court to evidence in the record that would support a finding that Microsoft would *likely* erect *significant* barriers to entry upon acquisition of a dominant market share.

Plaintiffs did not devote the same resources to the attempted monopolization claim as they did to the monopoly maintenance claim. But both claims require evidentiary and theoretical rigor. Because plaintiffs failed to make their case on attempted monopolization both in the District Court and before this court, there is no reason to give them a second chance to flesh out a claim that should have been fleshed out the first time around. Accordingly, we reverse the District Court's determination of § 2 liability for attempted monopolization.

#### 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 bun-

dling 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. *Conclusions of Law*, at 47–51. 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. . . .” *Broad. Music, Inc. v. CBS*, 441 U.S. 1, 9 (1979) (quoting *United States v. Topco Assocs.*, 405 U.S. 596, 607–08 (1972)). 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, 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, *Findings of Fact* ¶¶ 137, 155, 158; (2) Microsoft refused to allow OEMs to uninstall or remove IE from the Windows desktop, *id.* ¶¶ 158, 203, 213; (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, *id.* ¶ 170; *cf. id.* ¶ 165 (stating that IE was subject to Add/Remove Programs utility in Windows 95); and (4) Microsoft designed Windows 98 to override the user’s choice of default web browser in certain circumstances, *id.* ¶¶ 171, 172. The court found that these acts constituted a per se tying violation. *Conclusions of Law*, at 47–51. Although the District Court also found that Microsoft commingled operating sys-