



## Microsoft on Trial

As the moving company unloaded dozens of document boxes into his summer cottage during the first week of July 1999, US Federal District Judge Thomas Penfield Jackson contemplated the difficult decisions he had to make in the government's antitrust case against the Microsoft Corporation. During the previous week, testimony and closing arguments were concluded in what had been called "the antitrust case of the century." Not even the government's suit, ultimately requiring John D. Rockefeller's Standard Oil Company to be broken into 34 pieces in 1911, had elicited as intense media coverage as the Microsoft case. And the position of Standard Oil, controlling 80 percent of US refined petroleum product sales during 1911, was arguably not as strategic to the dynamism of the US economy as Microsoft's role in providing key software for a booming information technology revolution. Judge Jackson had to decide whether, as alleged by the US Department of Justice, Microsoft had illegally monopolized the supply of personal computer operating systems. The trial, originally expected to take two months from its October 19, 1998, starting date, had continued for eight months and generated two million pages of documentation. If he concluded that Microsoft had violated the Sherman Antitrust Act as charged, Judge Jackson had to decide what remedial measures he should order to be implemented. However he decided the complex issues before him, his opinion would have to be "bullet-proof," for the losing party would almost certainly appeal to the United States Supreme Court.

### Early History: The Deal that Backfired

Microsoft began business in 1975 to provide a version of the BASIC operating system for personal computer kits. Microsoft co-founders William H. (Bill) Gates III and Paul Allen shared the crucial vision that software need not be something included with the machine and written by hardware producers, as was the prevailing model. Rather, software was potentially a promising business in its own right.

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The fledgling company got its history-making break in 1980, when IBM awoke to the significance of the personal computer (PC) as a promising new computer medium. Apple Computer, founded in 1976 by Stephen Wozniak and Steve Jobs, was experiencing rapid growth in 1980 after taking a three-year head start over IBM with its modestly-priced but versatile Apple II. To meet the competitive challenge in PCs, IBM opted for a “fast second” response, scheduling only one year to market a PC under the IBM brand. This was too little time to develop an operating system and components from scratch using standard IBM practices. To maintain the tight schedule, IBM sacrificed the proprietary position it normally sought and turned to suppliers for key building blocks. Intel’s 8088 chip became IBM’s choice for the microprocessor. Microsoft won the operating system contract after IBM broke off stalemated negotiations with the company then offering the most popular PC operating system. To meet IBM’s demands, Microsoft’s Gates purchased for \$25,000 an existing Intel-compatible operating system from another Seattle firm, made essential modifications, renamed it *MS/DOS* (Microsoft disk operating system), and licensed it to IBM. In August 1981, the *MS/DOS* operating system for the IBM PC was introduced via TV commercials featuring the engaging Charlie Chaplin creation, the Little Clown.

IBM’s new computer was a resounding success. Its sales of two million units by 1984 far exceeded IBM’s original half-million unit forecast. Enjoying the prestige of IBM, the personal computer graduated from the status of a hobbyist’s amusement to that of a serious business tool, a credible alternative to institutional computers costing millions of dollars. IBM’s clout facilitated the PC’s acceptance by software application program writers. As the IBM PC became the machine of choice on which software developers focused, application programs proliferated. This attracted more users to the PC. The growing installed base of users in turn attracted still more application writers, precipitating classic “network effects.”<sup>1</sup> These occur in markets in which compatibility is important and where products or services become more valuable as more adopters join the network of users.

As applications proliferated, the balance of power between IBM and Microsoft began to shift. IBM’s reputation let this “snowballing” phenomenon start, but Microsoft, rather than IBM, was positioned as owner of the operating system to be the primary beneficiary. It was in Microsoft’s business interest to license *MS/DOS* to computer manufacturers other than IBM. As early as 1982, fully compatible IBM PC “clones” appeared using *MS/DOS* and Intel microprocessors. With adoption by ever more clones, *MS/DOS* gathered strength as the leading personal computing standard while IBM lost PC market share to clones.

Apple Computer was the principal non-conformist. Apple’s unique operating system for the *Macintosh*, introduced in 1984, amounted to a second industry standard featuring a graphics-orientation with a mouse driven interface and pull-down menus. The Mac had great appeal thanks

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<sup>1</sup> See Michael L. Katz and Carl Shapiro, “Systems Competition and Network Effects,” *Journal of Economic Perspectives*, vol. 9 (spring 1994), pp. 93-115.

to acknowledged user-friendliness and a “killer application,” its desktop publishing software. Along with these advantages, the company kept its operating system proprietary. Once Apple successfully launched “Mac” models in the business market, it threatened Microsoft’s position as the dominant PC operating system.

To meet the Apple challenge, Microsoft began in 1983 to develop a graphical interface that would make *MS/DOS* easier to use. This was the first step toward *Windows*, an operating system that at first piggy-backed on *MS/DOS* but was destined eventually to supplant it. *Windows* was developed by Microsoft in parallel with work on both *MS/DOS* and a contemplated IBM alternative, *OS/2*. Early *Windows* versions enjoyed quite modest success until Microsoft emulated the *Macintosh* graphics approach so closely that Apple sued for copyright infringement. Apple alleged that the “look and feel” of the *Macintosh* had been illegally appropriated, but lost the six-year long legal contest.

This blow to a serious rival reduced Microsoft’s need for its united front with IBM. Strains in their marriage of convenience began to grow in 1989 as Microsoft lost interest in helping IBM further with the development of *OS/2*. Conflicts of interest finally ended the decade-long partnership. Microsoft opted for a full commitment to *Windows*, confident that the large installed base of *MS/DOS* users could be transitioned to *Windows*, whose early versions were fully backward-compatible with *MS/DOS*.

With the launch of *Windows 3.0* in 1990, Microsoft’s strategy paid off. At last in Apple’s league with a smoothly working graphical user interface approach, *Windows 3.0* was spectacularly successful. By the end of 1992, *Windows* had achieved cumulative sales of 20 million units. By March 1998, the total value of Microsoft’s common stock had grown to \$418 billion. Exhibit 1 shows how the value of a \$1,000 investment in Microsoft’s common stock at the time of its initial public sale in March 1986 grew in the ensuing decade.

### **The *Windows* Juggernaut Meets the Internet**

Once underway, the *Windows* juggernaut continued to advance. Two factors interacted to perpetuate Microsoft’s operating system dominance. First, the vast majority of programmers wrote their software first—and often exclusively—for the *Windows* operating system because it had such a large share of the market, a share that ever more adopters made ever more valuable. Second, *Windows* users were reluctant to change operating systems because switching requires buying and learning how to use completely new programs.

With the *Windows* operating system controlling the basic operations of some 90 percent of PCs sold, Microsoft also gained substantial positions in PC software applications. In word processors and spreadsheets, the market “tipped” decisively toward Microsoft’s Word and Excel in 1995, when their market shares soared while those of the former market leaders, WordPerfect and

Lotus, plummeted. In “office productivity” suites, collections of business software built around a core of word processors and spreadsheets, Microsoft rapidly gained the lion’s share, attaining 93 percent of world sales by 1998.<sup>2</sup> By 1998, applications software contributed almost half of Microsoft’s sales revenues. Bill Gates was well on the way to realizing his avowed dream of a PC on every desk and every PC running Microsoft software.

Just as Microsoft seemed unassailable in dominating the world of the desktop PC, the company’s hegemony came under threat from the explosive growth of the Internet. The Internet had been in place as a scientific communications network for decades, but it became user-friendly for the first time in the early 1990s through the creation of the World Wide Web (“the Web”) and Web browsers, the specialized software that enables users easily to access, display, and manipulate content and applications located on the Web. The joint availability of the Web and browsers ignited the Internet boom and threatened to destabilize Microsoft’s position. Beating Microsoft to the punch, Netscape Communications Corporation, founded in April 1994, released a first version of its Web-browsing software, *Navigator*, in October 1994. It experienced extraordinary growth, with sales of \$75 million in the first year and \$375 million in the second. Netscape was immediately a runaway leader in the market for browser software. Microsoft lagged in grasping the significance of the Internet, just as IBM had been late to react to the PC revolution. Or if Microsoft was not late in seeing the Web’s significance, as it insisted in testimony before Judge Jackson, it delayed in bringing Internet software to market. It did not leave the field to others for long, however.

In May 1995, Bill Gates described the Internet as “the most important single development to come along since the IBM PC was introduced in 1981.” Along with others, he saw that the Internet held the potential to fundamentally transform the way people use computers once again. It was clear that, in one way or another, people would be linked to and across information networks. The prospect of such a networked world also altered the computer industry’s competitive landscape. There were opportunities for all sorts of Internet-related software: for programs to run websites and conduct business electronically; for operating systems that power networks and network servers; and for operating systems driving devices that link users to the Net, such as cell phones and other hand-held devices, or Web TV. With the introduction of *Windows 95* in the summer of 1995, Microsoft offered as an added feature its own browser version, the *Internet Explorer*, which was developed around a core design licensed in December 1994 by Microsoft from a much smaller company, Spyglass.

Joining the Internet revolution from a position of strength was important to Microsoft because this would enable Microsoft to steer future developments in directions advantageous to itself. A hoped-for future would be one in which the two worlds of the *Windows* desktop and the Internet were united in a way that preserved and extended the pivotal role of *Windows*. In a Microsoft-friendly future, a version of *Windows* would be the software underlying everything from

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<sup>2</sup> The estimate is from Dataquest, a market research firm, as cited in the *New York Times*, May 27, 1998.

telephones to TVs to the large server computers that power the Web and ran initially for the most part on *UNIX* operating systems. Microsoft's new rivals preferred alternative "post-PC" scenarios of the networked economy, visualizing an "internetworked world" in which the PC would be marginalized.

### Microsoft's Paranoia

Microsoft faced two perceived threats spawned and nurtured by the Internet. One was the browser. The other was *Java*, a programming language conceived in 1995 to run software on the Internet. Both threatened Microsoft because they jointly raised the possibility of a software universe in which applications and operating systems were "decoupled" from one another. With decoupling, applications would be promiscuous, able to interface with a wide array of operating systems. A proliferation of such promiscuous programs would undermine the network effects to which Microsoft owed the strength of its core asset, *Windows*.

Software application programs must be linked to the computer on which they run through Application Program Interfaces or APIs, which are analogous to the wall sockets into which the plug of an electrical appliance fits. As personal computer architecture had evolved, the key APIs were embodied in the operating system, i.e., *MS/DOS*, *Windows*, or the *Macintosh* system. The detailed instructions that allow *Windows* to function (the so-called "source code") were both copyrighted and kept secret—a form of protected intellectual property belonging to Microsoft. To computer makers and software writers Microsoft disclosed mainly information on the APIs. Its superior knowledge of application interface information was a potential source of considerable power for Microsoft. It granted or withheld at its pleasure the technical wherewithal for application developers to effect interfaces with 90 percent of personal computers. Even a rival like Netscape had to seek Microsoft's cooperation. Such a competitor, if not denied access outright, could still be hurt, as Netscape asserted it was after June 1995, by delayed or incomplete release of interface specifications. A disfavored developer's programs might work, but less well than others' did. Insiders and compliant partners, on the other hand, could be favored with timelier and more extensive disclosure of interface specifications.

A thriving non-Microsoft browser such as Netscape *Navigator* had the potential to disrupt these power dynamics. The browser could facilitate a "middleware" strategy to circumvent *Windows*' dominance. If present in many computers, the middleware/browser could become a platform for developers creating applications that are not *Windows*-based. Knowing that *Navigator* would be widely disseminated, they could write programs binding to the APIs it exposes and remain indifferent to whether it resides on *Windows* or some other operating system. In other words, by relying on the browser as the source of APIs, the developer could write software applications that operated "cross-platform."

A successful non-Microsoft browser could also undercut Microsoft's *Windows* dominance by facilitating the spread of the *Java* programming language. Rapidly emerging since its creation in 1995 by Sun Microsystems, *Java* was designed so that it would be possible to develop "write-once, run-anywhere" programs. *Java* was fundamentally different from other programming languages such as C++, Pascal, and BASIC. Other languages are dependent on the underlying operating system. A program written in C++ for a *Macintosh* will not normally work on a PC using *Windows*. By contrast, *Java* could be used to write applications with the ability to run on any computer. The only requirement is the presence of a *Java* interpreter, known as the "*Java* virtual machine" (JVM). Once installed, the JVM resides permanently on the user's computer and stands ready to run a *Java*-based program, e.g., one brought to the computer from the Internet through a browser. For applications software writers, this meant that they needed to create only a single *Java*-compatible program and be assured that it could be understood by any major operating system. There would be no need for multiple applications software versions to accommodate the diversity among computer operating systems. For this reason, people began writing *Java*-based applications at an increasing rate. The number of software writers using *Java* was estimated in late 1998 to be 900,000.<sup>3</sup>

The promiscuity of *Java* programs and the ability of browsers to provide cross-operating system interfaces together threatened a wholesale disruption altering the pivotal status of the *Windows*-based desktop PC. The operating system could become a stripped-down version of its former self merely ensuring that *Java*-based instructions fetched by a browser from the Internet properly controlled computer hardware functions. Although it was hardly in Microsoft's business interest to implement such a *Windows*-displacing option, others stood ready to take it up. *Linux*, for instance, was a free "open-source" operating system emerging through the pooled volunteer efforts of programmers over the Web. After 1995, *Linux* versions exhibited increasing ability to run *Windows*-dependent programs. A *Linux* provider could offer a skeleton operating system in lieu of *Windows*. Such a stripped down product would not even be confined to desktop computing devices. Not requiring extensive hardware, it could serve as a universal operating system for a variety of devices such as cellular telephone terminals, TV set-top boxes, and any number of portable single-purpose devices for sending e-mail or purchasing from on-line businesses or tapping into giant databases on remote servers. The devices would not have to become complex, since the programs they accessed on the Net—those written in *Java* at any rate—could be executed not only as needed but piece by piece.

All such developments of a future Net- or server-centric scenario could obviate what Microsoft rivals sneeringly called the "bloatware" of big desktop programs such as word processors and spreadsheets. Their remote storage on widely-used networks, and the advent of "thin" access devices, could usher in a "post-PC" era of computing as different from the two decades of the PC as the PC era was from that preceding the PC revolution.

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<sup>3</sup> See "The Real Threat to Microsoft," *Business Week*, November 30, 1998, p. 36.

Microsoft's management was fearful that these potentially revolutionary developments would undermine the company's highly profitable position as the leading provider of personal computer operating systems and important *Windows*-dependent applications packages. [See Exhibit 2 regarding Microsoft's profits during the mid- to late-1990s.] To avert them, or at least turn them to Microsoft's advantage, the company aggressively pursued a series of tactical and strategic moves. Those measures plus Microsoft's dominant position in the provision of personal computer operating systems led to the major government antitrust suit pending before Judge Jackson.

### **Monopolization under the Sherman Antitrust Act**

The principal allegation of the US Department of Justice Antitrust Division, joined by 19 state attorneys general, was that Microsoft had monopolized and was attempting to monopolize the market for personal computer operating systems. Section 2 of the Sherman Act, passed in 1890 and amended only slightly thereafter, states that:

Every person who shall monopolize, or attempt to monopolize, or combine or conspire with any other person or persons, to monopolize any part of the trade or commerce among the several states, or with foreign nations, shall be deemed guilty of a felony. ...

In enacting this language, the US Congress left deliberately vague the meaning of the word "monopolize." Clarification had to come through the accumulation over time of precedents articulated in individual cases by the federal courts and in particular the Supreme Court. As those precedents, beginning with the Supreme Court's decision in the 1911 *Standard Oil* case, had evolved by 1999, the necessary proof of monopolization required at least three key elements.

First, the structure of the relevant market had to approximate that of a monopoly. This did not mean that a single firm had to control 100 percent of all sales, as pure monopoly is defined in standard economics textbooks. Rather, the accused firm had to maintain substantial dominance and control of the relevant market, as evidenced by a persisting market share well above 65 percent. As Judge Learned Hand put it in an important 1945 decision concerning the Aluminum Company of America, 90 percent "is enough to constitute a monopoly; it is doubtful whether 60 or 64 percent would be enough; and certainly 33 percent is not."<sup>4</sup>

Second, and necessary to implement the first test, the market in which the subject firm's share is measured must itself be meaningfully defined and not simply gerrymandered to reach a predetermined conclusion. Early precedents implied a focus on the degree of product substitution: the market should include close substitute products but exclude those that are not reasonably close

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<sup>4</sup> US v. Aluminum Co. of America, et al., 148 F. 2nd 416, 424 (1945).

substitutes. What is “close” or “not close” is in itself a matter for delicate judgment. Guidelines issued by the US antitrust agencies in 1982 for defining markets in merger control cases emphasized the role of prices in stimulating substitution among products.<sup>5</sup> In defining a relevant market, the antitrust agencies would begin with a narrowly defined set of products and then ask what would happen if those products’ prices were raised (e.g., owing to newly acquired monopoly power) by five percent. If other products would capture such a large volume of sales from the included products that the price increase would be unprofitable, the market is defined too narrowly. Additional products should be included until a five-percent price increase would not be defeated by the incursion of excluded substitutes.

These two indicia of monopolization are essentially structural, i.e., pertaining to the *structure* of the appropriately defined market. For illegal monopolization to be found, the precedents state, there must also be elements of business *conduct* from which it can be inferred that the subject firm deliberately sought and/or maintained its monopoly position by practices plausibly deemed unreasonable under the circumstances, going beyond what would be expected from firms competing fairly on the merits of their products and costs. In its 1911 *Standard Oil* “rule of reason” decision, the Supreme Court singled out actions that were “inconsistent with ... advancing the development of business power by usual methods” but which instead “involved the intent to drive others from the field and to exclude them from their right to trade.”<sup>6</sup> Later monopolization cases set standards for inferring monopolistic intent that required conduct less egregious than driving specifically targeted firms from the field through unreasonable tactics. Thus, in 1966 the Supreme Court ruled that monopolization had 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.<sup>7</sup> How much support those newer criteria would be accorded by a Supreme Court that had through new appointments turned increasingly conservative on antitrust matters since the 1970s was unclear. Yet it was clear from *Alcoa* and similar cases that enterprises should not be condemned for monopolization if the monopoly was “thrust upon” them or if they merely gained their dominant position by offering products much better than those of their rivals. “The successful competitor,” wrote Judge Learned Hand, “having been urged to compete, must not be turned upon when he wins.”<sup>8</sup>

### Microsoft’s Market Position

The government’s approach to the structural aspects of the Microsoft case was straightforward. The primary focus was personal computer operating systems, for which, at least

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<sup>5</sup> US Department of Justice, *Merger Guidelines* (Washington: June 14, 1982).

<sup>6</sup> *US v. Standard Oil Company of New Jersey, et al.*, 221 US 1, 76 (1911).

<sup>7</sup> *US v. Grinnell Corp.*, 384 US 563 (1966).

<sup>8</sup> *US v. Aluminum Co. of America, et al.*, 148 F. 2d 416, 430 (1945).



with the technologies available in 1998, there were no obvious substitutes. Given “network effects” and the substantial costs consumers had incurred for complementary applications software and learning how to use it, consumers were unlikely to substitute away from accepted operating systems even if their prices were elevated substantially above competitive levels. Within the PC operating systems market, Microsoft had maintained since the early 1980s a dominant position. Indeed, during the late 1990s, its share of the PC operating system installed base and also its share of new PC operating systems was on the order of 90 percent—at the upper bound of the range identified by Judge Hand in the *Alcoa* decision.

Microsoft challenged these allegations on several grounds. Its principal economic expert witness, Professor Richard Schmalensee of the Massachusetts Institute of Technology, observed that the boundaries between operating systems and other software were fluid and constantly changing. Functions that were once sold separately had frequently been “bundled” into the operating system, and since this could continue, a much more expansive view should be taken of the relevant market—one that encompassed many if not all personal computer software packages. In such a broadly defined market, Microsoft’s share was much less than the 65 percent threshold identified by Judge Hand.

Furthermore, even though Microsoft’s share in supplying the functions traditionally performed by PC operating systems might have been high in 1998, it was by no means clear that the same would be true in the future. Given the rapid pace of change in connection with Internet technologies, Microsoft’s operating system might be displaced by alternative technologies—e.g., as indicated earlier, some combination of simplified operating systems and browsers used on television receivers or cellular telephones. Government witnesses argued in reply that although such changes were possible, there was no evidence that they were actually happening, and indeed, Microsoft was striving vigorously to prevent them from happening. And even if completely new ways of interacting with the Internet came into vogue, personal computers configured to use operating systems in accepted ways would continue to enjoy substantial market acceptance, especially for office-based word processing and number-crunching applications.

Microsoft’s economic expert argued in addition that the government had overlooked a crucial source of competition to Microsoft—the competition from *Windows* packages that had already been sold and installed, and hence over which Microsoft had no effective control. This “installed base” competition inhibited Microsoft from charging monopolistic prices. Had Microsoft tried to obtain monopoly prices on *Windows 98*, for example, competition from the tens of millions of copies of *Windows 95* already installed would have allowed it to sell few *Windows 98* packages.

Professor Schmalensee admitted that the prices of *Windows 98* were well above marginal cost—a condition viewed by economists as symptomatic of monopoly power. But software was different, he continued. Most of the relevant cost is incurred in a front-end lump sum for development; once the software is written and debugged, the marginal costs of reproduction are

trivial, i.e., a dollar or two per installation. If prices did not exceed marginal costs, development costs could not be recouped and progress in software development would grind to a halt. There was disagreement between Schmalensee and the government's economic witnesses, Professor Franklin Fisher (like Schmalensee, from the MIT faculty) and Frederick Warren-Boulton concerning the level and trend of *Windows* operating system prices. Schmalensee portrayed them as modest and essentially stable despite continuing increases in functionality. He argued further that if Microsoft really attempted to maximize its short-run profits on *Windows 98*, an econometric study suggested, it would charge 16 times more than the average price of roughly \$65 paid by computer makers. Government witnesses observed in reply that more than half the personal computers sold in the consumer market during 1998 bore prices of less than \$1,000, and if *Windows 98* were priced at the levels implied, many or most of those sales would not have been occurred. Warren-Boulton presented evidence suggesting that *Windows* prices had risen over time, in sharp contrast to the history of personal computer prices generally and the prices of most computer components. This he viewed as indicative of monopoly power.

### Microsoft's Conduct

In attempting to prove that Microsoft's conduct exhibited intent to acquire and maintain a monopoly position, the government placed strong emphasis on how Microsoft positioned its *Internet Explorer* browser software relative to the *Windows* operating system. Key antitrust issues here involved the concepts of "tying" and "bundling." Tying occurs when a firm says in effect to its customers, "If you buy product A from us, you must also buy from us product B." Tying by firms with monopoly power had been viewed as an antitrust violation ever since it was singled out as illegal under the Clayton Antitrust Act of 1914, where "the effect ... may be to substantially lessen competition or tend to create a monopoly." Court interpretations of these provisions took a generally tough line, but by 1984 had evolved to require a three-pronged test. Tying was illegal if (1) the tying and tied products were distinct; (2) the firm tying a product had sufficient power in the tying good market to force the purchase of the tied good; and (3) the tying agreement foreclosed or threatened to foreclose a substantial volume of trade.<sup>9</sup> Complications arise under the first of these criteria when products are *bundled*, that is, sold as an integrated package with a single price rather than separately. When products are sold in bundled form it can be hard to tell whether or not they are distinct. Bundling was ruled illegal in certain prior monopolization cases, but the precedents evolved to require a finding that the relevant conduct was unreasonable in view of the specific case facts.

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<sup>9</sup> Jefferson Parish Hospital District No. 2, et al., v. Hyde, 466 US 2, 15-18 (1984).

### ***Windows 95 and Explorer***

The *Internet Explorer* browser that Microsoft adapted from a licensed Spyglass design was introduced in late 1995. Prior to that time, in June 1995, Microsoft and Netscape executives met to discuss their browser products. Testimony and documents from Netscape officials revealed that Netscape's goal in the meeting was to gain access to *Windows 95* APIs needed to make Netscape's *Navigator* browser run successfully. A Netscape executive, supported by detailed notes taken at the meeting, testified that Microsoft representatives tried to persuade Netscape to agree to a division of the browser market, with *Navigator* becoming the sole browser for earlier versions of *Windows* and other operating systems (such as *Macintosh*) while Microsoft's *Explorer* would be the only browser offered by the two companies for *Windows 95* and subsequent *Windows* versions. As an incentive for accepting its proposal, Microsoft offered to invest a 20 percent equity share in Netscape. Whatever the proposal was, it was rejected by Netscape. Microsoft witnesses denied suggesting a division of the market, which would be clearly illegal. They insisted that they were merely seeking to learn Netscape's plans and to inform Netscape that Microsoft would be competing aggressively in the browser arena.

When Microsoft's *Internet Explorer* was ready for marketing in late 1995, it was made available separately to consumers running older versions of *Windows* and also, in a modified version, to *Macintosh* owners. But for purchasers of *Windows 95* or new computers loaded with *Windows 95*, *Explorer* was provided as an added feature at no incremental price, i.e., in a bundle that included both the operating system and the browser. For the Spyglass Company, which had licensed Microsoft to use its core browser architecture and had 82 additional royalty licenses outstanding, Microsoft's effective zero-price strategy came as an unpleasant surprise, undermining much of Spyglass' \$20 million annual revenue. For Netscape too, the Microsoft strategy meant that *Navigator* had to compete against a zero-price product, and Netscape subsequently began distributing all copies of *Navigator* free, attempting to make up for the revenue loss through sales of complementary services. The government's expert economic witness asserted that Microsoft's zero-price strategy was predatory, aimed at driving competing browsers out of the market and failing to cover marginal costs, which included not only the modest cost of distributing *Explorer* on compact discs or over the Internet but also the more substantial cost of providing post-sale advice to *Explorer* purchasers. Microsoft witnesses argued in reply that Microsoft's strategy was by no means unique, since Netscape had seeded the market by distributing millions of copies of its *Navigator* browser free, and that consumers buying new computers loaded with *Windows 95* preferred to obtain the browser as part of a bundle rather than having to purchase and install the browser separately.

Even though Microsoft's *Internet Explorer* was provided at a zero incremental price to *Windows 95* buyers, many computer makers preferred to include Netscape's *Navigator* in the new computers they sold and/or to feature *Navigator* on the first screen that confronts computer users following boot-up. This preference was attributable to *Navigator*'s earlier availability and the strong

consumer acceptance it enjoyed. In June 1996, Compaq, at the time the world's leading personal computer seller, announced that it would not only include *Navigator* as a standard feature in the computers it sold, but it would remove from the *Windows* desktop screen the icon for *Explorer*. Microsoft responded by notifying Compaq that its *Windows 95* license would be terminated forthwith—a threat that led Compaq to back off from its *Navigator*-favoring strategy. Other *Windows*-based computer makers were induced to feature *Explorer* on their machines' desktop screens by discounts for *Windows 95* that were larger if *Explorer* were given pride of place than if it was not. Microsoft defended these practices by arguing that the discounts let end users enjoy lower prices and the convenience of one-click access to *Explorer* websites. And that they did not prevent other browser vendors, e.g., Netscape, from finding alternative ways such as direct transmission over the Internet to emplace their browsers in users' computers. In 1996, the leading provider of on-line network services, America Online (AOL), disclosed preliminary plans to distribute Netscape's *Navigator* to its roughly five million subscribers. AOL's choice was motivated in part by the revealed consumer preference for *Navigator* and by AOL's unhappiness over Microsoft's decision to initiate a network service competing with AOL's. However, Microsoft induced AOL to choose *Internet Explorer* instead by offering AOL's icon a preferred position on the *Windows* desktop. Microsoft executives insisted that AOL's decision was influenced less by the valuable screen "real estate" offered by Microsoft than by Microsoft's superior responsiveness to AOL's technical requirements. Apple Computer, which did not use Microsoft's *Windows* operating systems, nevertheless depended upon Microsoft for popular applications software programs such as the *Office* suite. When Apple made Netscape's *Navigator* the default browser on its *Macintosh* computers, it was informed in 1997 that Microsoft would cease developing *Macintosh*-compatible versions of *Office*—a threat that led Apple to reverse course and feature *Explorer* instead of *Navigator*. Microsoft thereupon rewarded Apple by investing \$150 million in the company, which at the time was experiencing declining product acceptance and growing financial stress.

### **The Transition to *Windows 98***

An early antitrust skirmish between Microsoft and the federal government ended with a negotiated consent decree in July 1994. The focus then was Microsoft operating system price terms that in effect established a zero price against which other operating systems had to compete. The terms of the decree were vague on questions of tying and bundling complementary products.

When Microsoft introduced the *Windows 98* operating system in 1998, *Internet Explorer* was physically integrated into the new operating system so that file access within the user's internal computer memory could be accomplished using *Explorer* in the same way that one would search for information externally on the World Wide Web. Needless to say, no separate and additional price was charged *Windows 98* purchasers for the physically bundled browser feature, so again, independent browser vendors had to compete against what was essentially a zero price.

Forewarned by a Microsoft advance product announcement, the Department of Justice brought suit to enjoin the bundling of *Internet Explorer* with *Windows 98*. A preliminary injunction was issued by Judge Jackson, but it was overturned on appeal to the Federal Appellate Court for the District of Columbia in 1998. The ruling by two Appellate Court judges (with a third dissenting) stressed two points: first, that the courts had little competence in judging such product design questions, and so it was undesirable for them to intervene; and second, that integration of features by a monopolist should not be viewed as anticompetitive as long as there was *some* technological justification for the integration.<sup>10</sup> This view surprised antitrust scholars who accepted a weighing of benefits against costs as a routine part of monopolization proceedings, but it could be rationalized on the premise that the courts are not adept at performing such balancing exercises. Stung by the Appellate Court's decision, the Department of Justice converted its ongoing antitrust action against Microsoft (the second in five years), which was originally to be focused narrowly on Microsoft's *Internet Explorer* strategy, into a more broad-ranging attack on Microsoft's business policies.

The 1998 bundling action continued to receive attention, however. Computer experts called as government witnesses testified that it was neither necessary nor, given the already great complexity of *Windows* operating systems, desirable from a reliability standpoint to bundle the browser with the operating system. One expert demonstrated in the courtroom that removing *Internet Explorer* from *Windows 98*, or at least, removing its icons from PC desktop screens, was feasible. Microsoft witnesses asserted in rebuttal that only a small fraction of the integrated *Explorer* code had been removed. Their attempt to show that even such a modest change impaired other *Windows 98* functions precipitated a widely publicized comedy of errors. It became known that the demonstration computer operating system had been altered from the configuration used by the government witness and then, when a supposedly identical system was used, the demonstration failed. Microsoft continued to insist that bundling benefited consumers and complementary software writers.

From extensive testimony, it was clear that Microsoft had exerted strenuous efforts to win market share for *Internet Explorer*, as Microsoft representatives stressed, or to impair Netscape's *Navigator* from becoming an industry standard outside Microsoft's control—the interpretation emphasized by government advocates. Evaluation of these strategies was complicated by the acquisition in 1999 of Netscape Communications by network service provider AOL. Microsoft counsel insisted that the \$10 billion acquisition price showed that Microsoft's actions had not undermined Netscape's viability and that the AOL-Netscape merger, with additional joint venture linkages to Sun Microsystems concerning its *Java* language, made the competitive threat of alternative Internet access technologies to Microsoft all the more potent. Government counsel argued in reply that Microsoft had already won the key battle, preventing *Navigator* from acquiring

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<sup>10</sup> Anne Gearan, "Federal Appeals Court Overturns Microsoft Injunction," *Chicago Daily Law Bulletin*, vol. 144, June 23, 1998, p. 1.

such a large browser market share that it became a standard through which competing operating systems could gain a defensible foothold.

### **Other Conduct**

Government prosecutors broadened their attack to include other Microsoft conduct allegedly aimed at maintaining its dominance and frustrating threats to its *Windows* operating system monopoly.

In March 1996, Microsoft signed a licensing agreement with Sun Microsystems under which it agreed to implement the *Java* language in Microsoft software in a way that maintained cross-platform compatibility. In fact, Microsoft's implementations left out or changed key *Java* components permitting *Java* programs to run well on operating systems other than *Windows*. Sun sued for breach of contract in 1997, and the government included the Microsoft *Java* story in its antitrust case, alleging that it represented yet another attempt by Microsoft to thwart the ascendance of web-based systems threatening *Windows*' dominance. Microsoft defended its actions by insisting that it was merely remedying flaws in the basic *Java* language and improving it so that it worked better in the *Windows* environment. The credibility of this defense was impaired, however, by an internal Microsoft memorandum stating that a "strategic objective" of Microsoft was to "kill cross-platform *Java* by growing the polluted *Java* market."

Other testimony and documents focused on the relationships between Microsoft and Intel, whose complementary operating system and microprocessor positions were described in computer industry colloquy as "the Wintel duopoly." The two companies had a history dating back to 1982 of cooperating to maintain their common platform standard. In 1995, however, Intel responded to new opportunities opened up by the Internet by developing microprocessor chips that would deliver audio and video signals in a stream of digital bits. Learning of Intel's plans, Microsoft executives, according to an Intel witness, threatened that they would withhold software development support for future versions of Intel's microprocessors unless Intel cancelled its audio-video chip plans, which were perceived to intrude onto Microsoft turf. Microsoft also urged Intel to scale back its technical collaboration with Sun Microsystems in fine-tuning the performance of *Java* on Intel chips. Microsoft counsel insisted that its discussions with Intel on these matters were not really threats but only efforts to ascertain whether Microsoft's symbiotic relationship with Intel was about to become more rivalrous.

### **Injury to Competition?**

In the extensive body of case precedents accumulated under the Sherman Act's monopolization doctrine, considerable attention was paid to the language of the complementary Clayton Antitrust Act, which declared various questionable business practices to be illegal only

when their effect was “to substantially lessen competition or tend to create a monopoly.” An even longer line of scholarly discourse asked whether conduct that injured *competitors* was a violation of the antitrust laws, or whether the requisite proof of anticompetitive effect was injury to the *quality of competition*. This debate resurfaced in the context of the Microsoft case. Critics of the government’s approach urged that Microsoft’s conduct may have been disadvantageous to rivals such as Netscape, AOL, Spyglass, Sun, and the providers of such popular applications software as *WordPerfect* and *Lotus 123*, but that consumers were the net beneficiaries after unsuccessful competitors’ bodies were removed from the battlefield. Microsoft insisted through the 1998-99 trial before Judge Jackson that its principal motivation was simply, in the words of Bill Gates, to provide “great software.” Microsoft’s principal economic witness asserted that consumers benefited also from greatly increased functionality during a period when the prices of *MS/DOS* or *Windows*, even without an adjustment for general inflation, did not increase.

Although a government witness provided evidence of upward price creep, the government’s main rebuttal was both subtler and more speculative. The really serious threat to consumer welfare, the government claimed, came from Microsoft’s ability to thwart the emergence of superior alternative applications software packages because would-be developers have inferior access to *Windows* APIs. Even more importantly, consumers would be the losers if Microsoft were successful in its strategy, proclaimed in many internal decision-making memoranda, of impeding the emergence of Internet computing modes not dependent upon the *Windows* gateway. Whether it would in fact be able to defend *Windows* from nascent threats necessarily remained speculative at the time of the trial before Judge Jackson. The government could bolster its case only by arguing that the stakes involved in keeping access to the Internet as open as possible were huge, and therefore that the benefit of the doubt should be resolved against access-blocking strategies by a monopolist.

### **Noblesse Oblige?**

Not directly incorporated by the Justice Department’s legal theories, but lurking in the background, was another doctrine with strong roots in US antitrust precedents—the notion that under certain circumstances, firms with a monopoly position in the ownership of some “essential facility” achieved by fully legitimate means nevertheless have an obligation to serve all would-be clients in an even-handed manner. In an early precedent, the US Supreme Court ruled that several railroads owning the only railroad bridge across the Mississippi River into the St. Louis area had to let other (competing) railroads use the bridge on non-discriminatory terms.<sup>11</sup> In another case, an Ohio newspaper with a local monopoly was found to violate the Sherman Act when it refused to accept advertisements from businesses that also advertised on a new local radio station.<sup>12</sup>

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<sup>11</sup> US v. Terminal Railroad Association, 224 US 383 (1912).

<sup>12</sup> Lorain Journal Co. v. United States, 343 US 143 (1951).

Witness after witness for the government described Microsoft's industry-standard *Windows* operating systems as the essential utility of modern personal computing and a key gateway to the Internet. A possible implication was that Microsoft as a near monopolist carried an obligation to deal with other computer hardware producers, software vendors, and service providers in an especially open and even-handed way. Conditioning the provision of information on *Windows* APIs upon compliance with other Microsoft wishes, or denying preferential computer screen icons to firms that competed with Microsoft, could be seen as stepping beyond the bounds of the "essential facility" precedents.

## Remedies

If Judge Jackson concluded that Microsoft violated Sherman Act Section 2 because of its dominant position and business practices that unreasonably secured that position, remedies would have to be imposed. The usual remedies in monopolization cases are of two main types—conduct and/or structural. With a conduct remedy, the court orders the defendant to change its business practices in prescribed ways, monitors compliance with the order, and imposes fines or other remedies in cases of non-compliance. With a structural remedy, the court mandates changes in the market's structure that are expected to compel desirable conduct more or less automatically through the impersonal play of structurally invigorated competition—e.g., by forcing the monopolizing firm to shed some assets. The differences in the two remedial approaches are sometimes compared to differences between surgery, with one-time-only intervention, and sustained drug therapy in medicine. The choice of remedies entails in part a question of which approaches are likely to be most effective, but the severity of the remedy imposed is normally graduated to the egregiousness of the antitrust violations found.

The Department of Justice and the 19 collaborating state attorneys general did not propose specific remedies at the time they concluded their prosecutorial case, preferring, as is not uncommon, to leave the question of remedies open until Judge Jackson issued his findings on whether and to what degree Microsoft had violated the antitrust laws. However, extensive discussions at public forum and in the press had identified an array of possible approaches.

On the conduct side, the principal alternatives were as follows:

***Unbundling Internet Explorer:*** Microsoft would be required to develop unintegrated versions of *Explorer* and *Windows* and to market them at separate and remunerative prices.

***Bundling a rival web browser:*** Microsoft would be required to include in its standard *Windows* packages one or more alternative browsers, any of which could be removed or included by computer makers in response to specific customer



demands. The most obvious candidate for mandated inclusion would be Netscape's *Navigator*.

***Creating a "Chinese Wall" within Microsoft:*** Microsoft would be required to enforce strict segregation of the groups that develop applications software (such as word processing and spreadsheet programs) and browsers from the group developing operating systems. Applications software writers would receive information about new APIs on schedules and to an extent identical to those enjoyed by outside software vendors.

***Non-Discriminatory API Release:*** With or without a Chinese wall, Microsoft would be required to release full information on operating system APIs to all interested parties a specified number of months before commercial product release. After those preliminary disclosures, periodic revisions to document "bug fixes" would have to be disclosed equally widely and expeditiously. Provisions like this were imposed upon IBM in 1984 to settle a European Commission complaint against IBM's market dominance and practices in Europe.

***Precluding Preferential Deals and Coercion:*** Microsoft would be enjoined from coercing software vendors or computer assemblers into accepting business relationships preferentially favorable to Microsoft and from offering operating system price discounts conditioned on terms preferentially favorable to other Microsoft products or services.

All of these remedies would require the court or some other agency to monitor Microsoft's conduct continuously—a task that proved to be difficult under the 1994 consent decree accepted by Microsoft. Some structural remedy proposals offered the possibility of less invasive and persistent post-decree monitoring. The leading structural alternatives included:

***Vertical Divestiture:*** Microsoft would be broken into at least two and possibly more separate companies, from all but one of which Bill Gates and his fellow founders would be required to divest their controlling common stock interests and directorships. One company would develop and sell operating systems; one or more others would develop and sell applications software. A divestiture of this sort would be similar to the separation in 1983 of seven regional telephone companies from the long-distance service and manufacturing operations retained by AT&T.

***Horizontal Divestiture:*** Microsoft would be broken into three or more "Baby Bills," each endowed initially with all of the software code for application programs and operating systems. Divestiture of controlling stock interests in all but one of the new companies would also be required. A problem in

implementing such a proposal is that most of Microsoft's operations are concentrated at a single site in Redmond, Washington.

**Open Access to Source Code:** Microsoft would be required to publish openly all the source code (involving tens of millions of instruction lines) for its *Windows* operating systems, so that any software writer developing programs interfacing with *Windows* could know not only the external interface specifications but how they are supported internally. As with non-discriminatory release of APIs, frequent updates would be required, e.g., over the Internet. Microsoft would retain exclusive copyright to the published code. Open publication of software code is not uncommon; it was practiced, for example, by the sponsors of the *Linux* operating system and by Sun Microsystems with respect to *Java*.

**Compulsory Licensing of Source Code:** Microsoft would be required not only to publish its operating system source code, but also to grant copyright licenses to use it to other firms. Under one proposal, rights to replicate the *Windows* source code in competing versions would be auctioned off to the highest three bidders in a competitive auction, the proceeds of the auction going to Microsoft. Under another proposal, rights to all or parts of the *Windows* code would be granted to any firm willing to pay a royalty rate on subsequent sales proportionate to, e.g., the fraction of Microsoft's 1999 sales devoted to research and development times the fraction of the *Windows* code used in the applicant's derived products. Under the latter proposal, firms could develop operating systems with much leaner functionality than *Windows* or build parts of the *Windows* code into applications that operated on alternative operating system platforms. A problem with requiring such licenses is that the diverse variants of *Windows* might be incompatible, increasing costs for applications writers and lessening interoperability of software. It might be combated by requiring the creation of a standards committee comprising representatives of Microsoft, independent software houses, computer manufacturers, and computer users. The standards committee could either evaluate derivative operating systems and grant the equivalent of a *Good Housekeeping* seal of approval for those that met stringent compatibility standards, or it could allow or disallow system API changes to ensure a continuously compatible standard.

## Conclusion

By late fall of 1999, i.e., a year after the Microsoft case trial began, Judge Jackson expected to have reached decisions on whether Microsoft's position in the market and its conduct warranted a finding of monopolization. He could not be unaware that even though government antitrust officials had not proposed remedies, his decision would have to take into account alternative remedy possibilities and whether they were likely to improve the performance of information

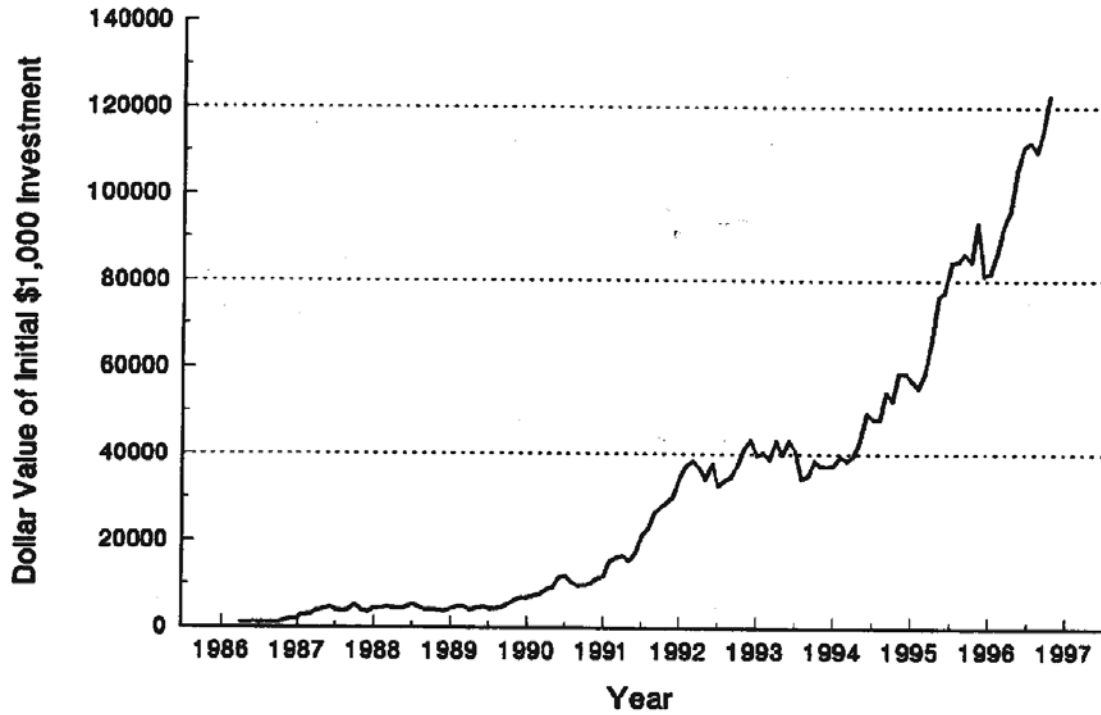
technology industries in the foreseeable future. Few decisions he had faced in the past were more difficult, and none had been more important.

**Questions for discussion:**

1. Is Microsoft a monopolist in the Sherman Act sense? To what extent should speculative future threats to its position influence the conclusion on this point?
2. Did Microsoft's conduct warrant a finding that its market position was not merely thrust upon it or won through superior foresight and skill?
3. If Microsoft is found to have monopolized, what remedy(ies) should be imposed? What are the likely benefits and costs of alternative remedies?
4. If Microsoft is found not to have violated the Sherman Act, should its conduct be regulated by the government? If so, how? Are governments capable of regulating market structure and/or conduct in areas as dynamic as computer software?

Exhibit 1

Growth of \$1,000 March 1986 Investment in Microsoft Common Stock



**Exhibit 2**  
**Microsoft Income Statements and Balance Sheets**

<b>Income Statements</b>		1996	1997	1998
In millions, except earnings per share				
Year Ended June 30		1996	1997	1998
Revenue		\$8,671	\$11,358	\$14,484
Operating expenses:				
Cost of revenue		1,188	1,085	1,197
Research and development		1,432	1,925	2,502
Acquired in-process technology		-	-	296
Sales and marketing		2,657	2,856	3,412
General and administrative		316	362	433
Other expenses		19	259	230
<b>Total operating expenses</b>		<b>5,612</b>	<b>6,487</b>	<b>8,070</b>
Operating income		3,059	4,871	6,414
Interest income		320	443	703
Income before income taxes		3,379	5,314	7,117
Provision for income taxes		1,184	1,860	2,627
Net income		2,195	3,454	4,490
Preferred stock dividends		-	15	28
Net income available for common shareholders		\$2,195	\$ 3,439	\$ 4,462
Earnings per share <sup>1</sup> , *				
Basic		\$ 0.93	\$ 1.44	\$ 1.83
Diluted		\$ 0.86	\$ 1.32	\$ 1.67

<b>Balance Sheets</b>		1997	1998
In millions			
June 30		1997	1998
Assets			
Current assets:			
Cash and short-term investments *		\$ 8,966	\$13,927
Accounts receivable		980	1,460
Other		427	502
<b>Total current assets</b>		<b>10,373</b>	<b>15,889</b>
Property and equipment *		1,465	1,505
Equity investments		2,346	4,703
Other assets		203	260
<b>Total assets</b>		<b>\$14,387</b>	<b>\$22,357</b>
Liabilities and stockholders' equity			
Current liabilities:			
Accounts payable		\$ 721	\$ 759
Accrued compensation		336	359
Income taxes payable *		466	915
Unearned revenue *		1,418	2,888
Other		669	809
<b>Total current liabilities</b>		<b>3,610</b>	<b>5,730</b>
Common stock and paid-in capital - shares authorized 8,000; shares issued and outstanding 2,408 and 2,470 *		4,509	8,025
Retained earnings		5,288	7,622
<b>Total stockholders' equity</b>		<b>10,777</b>	<b>16,627</b>
<b>Total liabilities and stockholders' equity</b>		<b>\$14,387</b>	<b>\$22,357</b>