Fax Cover Sheet

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From: Rebecca Henderson
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Re: Tunney Act Submission
Comments on the proposed United States v. Microsoft Settlement

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Tunney Act Submission
United States v. Microsoft

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January 2002

Introduction

My name is Rebecca Henderson. I am the Eastman Kodak LFM Professor of Management at the MIT Sloan School of Management, where I have been teaching since 1988. I am also a Research Associate at the National Bureau of Economic Research. My C.V. is attached.[1]

I write to express my deep concern with the terms of the proposed settlement between the United States and the Microsoft Corporation. In my view it does almost nothing to remedy the harm caused by Microsoft's prior illegal conduct, and the provisions that it includes in an attempt to forestall future anticompetitive conduct fall short on a number of important dimensions. Moreover it creates incentives for Microsoft to engage in behavior that has the potential to create significant harm for consumers.

1. A failure to remedy the harm caused by prior illegal conduct.

As the Court found and the Appeals Court maintained, Microsoft engaged in a systematic pattern of illegal conduct in an attempt to undermine Netscape's position in the browser market. Microsoft came to believe that the Netscape Browser had the potential to develop into "cross-platform middleware," since it potentially enabled the development of full-featured PC applications on a range of platforms. Microsoft viewed this possibility as a potent threat to its monopoly and moved against Netscape with devastating effect. Microsoft's predatory conduct crushed the possibility that Netscape might emerge as a viable alternative platform for full-featured applications development.

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[1] In 1999 I was retained by the Department of Justice as an expert witness in connection with the remedies phase of the Microsoft trial. The declaration that I filed in the spring of 2000 as a result of this work is available on the Department of Justice's web site. While I do not believe that anything in this document is inconsistent with the opinions that I would have expressed in court had I been called as a witness, the opinions expressed here are entirely my own. Nothing in this document draws in any way on confidential information to which I was given access in the course of my work with the Justice Department.

Microsoft's success in preventing the emergence of browser-based alternative platforms that would threaten the applications barrier to entry, along with its current overwhelming and increasing share of browser usage, puts the firm in an extraordinarily strong position to prevent the emergence of other threats to its desktop monopoly. The proposed settlement does almost nothing to attempt to redress this harm.

A world in which Netscape had succeeded in building a dominant share of the browser market would have been one that was significantly more conducive to competition (and significantly more threatening to the Microsoft monopoly). A successful independent browser would not only have been potentially important cross platform middleware in its own right: it would also have been of enormous assistance to the further development of additional independent middleware. Both would have greatly increased the possibility that Microsoft's desktop monopoly would have faced significant competition.

Had Netscape succeeded the world would probably be different in three important respects. First, the Netscape browser might have become an ideal platform for web-centric and network-centric applications cross-platform applications. Second, if there had been a widely-distributed browser outside Microsoft's control, new middleware initiatives such as Java, that involve software running on the client would certainly have been able to achieve widespread distribution without Microsoft's sufferance. Third, the existence of such a browser would have given Microsoft much less control over the evolution of important Internet interfaces, increasing the possibility that new types of middleware running on the server might emerge to facilitate challenges to the Windows monopoly.

(i) The Netscape Browser might have become a platform for applications development

An independent browser might have become an ideal platform for web-centric and network-centric cross-platform applications. An independent browser enables developers to write cross-platform applications without additional porting costs. As the Court found, "for at least the next few years, the overwhelming majority of consumers accessing server-based applications will do so using an Intel-compatible PC system and a browser," (FOF 27) and a "browser product is particularly well positioned to serve as a platform for network-centric applications that run in association with Web pages." (FOF 69). Or as Microsoft's Ballmer expressed it: "the browser is as much a platform for what people will want to do in the Internet over the next several years as DOS was the platform for what people would want to do on personal computers." (RX 21, at 4).

Microsoft's illegal actions ensured that Netscape did not have the opportunity to develop into this kind of cross platform middleware, and the proposed settlement does nothing to reverse this.

(ii) A successful Netscape Browser would have developed into a distribution vehicle for additional non Microsoft cross platform middleware

As both the Court and the Appeals Court found, one of the goals of Microsoft's illegal conduct was the suppression of platform independent Java. An independent, widely distributed Netscape Browser would have become an ideal vehicle for the distribution of this kind of platform independent middleware. Microsoft, in contrast, has very little incentive to distribute client based middleware that might facilitate the development of cross platform applications. Netscape's defeat in the browser war means not only that the browser itself is not available as a platform for applications development but also that the Java virtual machine, and other middleware technologies like it, are much less likely to be widely available on the PC. The proposed settlement attempts to make the distribution of alternative middleware possible, but its provisions are incomplete and are likely to be ineffective.

(iii) Microsoft's control of the browser gives it enormous influence over the future development of the Internet, allowing it to ensure that server based technologies that might lower the applications barrier to entry and facilitate threats to the OS monopoly are unlikely to emerge.

Owning the dominant browser gives Microsoft great influence over the evolution of the Internet, and in particular over the evolution of important Internet interfaces. As Paul Maritz recognized, "By controlling the client, you also control the servers." GX 498, at MS980168614. This set of interfaces goes beyond the browser APIs to which developers can directly write applications, to include the set of interfaces that constitute the communications protocols between the browser and the network. For information to be received and viewed in Internet Explorer, the developer has to follow these interfaces, and so has to conform to Microsoft standards.

The importance of browser interfaces is widely acknowledged. Ron Rasmussen, an executive with operating system supplier Santa Cruz Operation, testified: "if there is one person or one company who controlled the browser and its look and feel and how it presented applications, it could severely enhance or detract from the application functionality of . . . the server." Rasmussen Dep., 12/15/98am, at 67:14 - 68:3. Similarly Brian Croll of Sun testified that "having a degree of control over the browser" is "critical" because the browser is "linked very closely to whether a server is useful or not." Because the "two sides need to talk to each other," Sun cannot sell servers if the browser "can't talk to the server." Croll Dep., 12/15/98pm, at 60:22 – 61:16.

Control over the browser thus gives Microsoft significant control over the software running on the server, and this in turn makes it significantly less likely that software running on servers will develop into potentially powerful "cross platform middleware", facilitating competition to the Microsoft Windows OS. Just as a platform independent browser might have become an attractive platform for cross platform applications development, so a server operating system that could be accessed through

Microsoft independent standards by an independent browser might have become an attractive platform for applications development, greatly increasing the probability that serious competition to the Windows OS might emerge.

Microsoft's control of the browser greatly reduces the probability that this will happen. Developers and content providers will generally choose to write to the interfaces that will enable them to reach the broadest possible audience (FOF 361). This led Microsoft, when it had a low market share in browsers, to pledge to write Internet Explorer to conform to some of the public interfaces promulgated by the World Wide Web Consortium (W3C). RX 15 (Microsoft Press Release, 7/8/97). In fact, Microsoft itself had difficulty when its market share was only 30% in convincing its own Office developers to take advantage of IE 4 features. GX 514, at MS7 0075706.

Given IE's dominant position today, web developers have an incentive to write to IE's interfaces first and foremost, and now that it has a dominant share, Microsoft has stated that it may not always choose to support public interfaces. RX 16 (MSDN Online 2/7/00). To the extent that Microsoft is able to impose Microsoft-specific interfaces on the Internet, the capabilities of users of non-Microsoft browsers to view content may be degraded or eliminated. Cf. FOF 322 (Microsoft contracts requiring that content providers offer content viewable only with IE or "with acceptable degradation when used with other browsers"), and the ability of server based software to develop into cross platform middleware will be severely curtailed.

The ability to influence the development of web-based applications is a highly valuable tool for future anticompetitive campaigns should Microsoft choose to mount them. As web-based applications grow in importance, so does Microsoft's ability to steer them towards being IE-centric, and, given its control over the browser-to-operating system interface, Windows-centric as well. The proposed settlement does nothing to address this issue.

(iv) Conclusion

In summary, the proposed settlement does little or nothing to redress the harm caused by Microsoft's destruction of the browser threat. Microsoft's victory leaves it in control of all browser interfaces, without the need to accommodate an independent browser that might have served as an important platform for cross platform applications, and without any real threat that a Java virtual machine (or other comparable cross platform middleware) might be widely distributed.

Prevention of Future Harm

The proposed settlement instead attempts to ensure that Microsoft will not act against *future* middleware threats as it acted against Netscape. Unfortunately its provisions in this respect are insufficient to prevent the harm they seek to guard against.

(i) The definition of Middleware

Many of the most important provisions of the proposed settlement refer to actions that Microsoft must take in regard to "Middleware" products. For example, in section III D, Microsoft is required to "disclose to ISVs, IHVs etc... the APIs and related Documentation that are used by Microsoft Middleware to interoperate with a Windows Operating System Product." Similarly section III H requires that Microsoft allow end users and OEMs to make a number of choices with respect to the nature of the Middleware that is installed and invoked on the end user's PC.

In both cases the definitions of "Middleware" are overly restrictive, and omit both current software that might well be considered "middleware" in the terms of the original case and new software that might emerge to take on the characteristics of middleware. In the case of section III D, Middleware is defined in section VI, point K as:

1. the functionality provided by Internet Explorer, Microsoft's Java Virtual Machine, Windows Media Player, Windows Messenger, Outlook Express and their successors in a Windows Operating System Product and

2. for any functionality that is first licensed, distributed or sold by Microsoft after the entry of this Final Judgment and that is part of any Windows Operating System Product

a. Internet browser, email client software, networked audio/video client software, instant messaging software or

b. functionality provided by Microsoft software that ---

i. is, or in the year preceding the commercial release of any new Windows Operating System Product was distributed separately by Microsoft (or by an entity acquired by Microsoft) from a Windows Operating System Product;

ii. is similar to the functionality provided by a Non-Microsoft Middleware Product; and

iii. is Trademarked

There are two problems with this definition. The first is that it omits a number of

types of software that might reasonably be considered potentially platform independent middleware. For example it omits Handheld Computing Device synchronization software. Handheld computers are probably currently complements to the PC: their use encourages PC use and vice versa. But if the power and speed of these devices increases sufficiently, and if a significant number of important applications become available over the web via server hosting and other kinds of services, one can imagine a world in which the existence of Handheld Computing Devices might greatly facilitate the development of substitutes for Windows. Thus software that enables a PC to synchronize with a Handheld Computing Device is arguably "Middleware" in the sense of the case. Other types of software that might plausibly develop into "Middleware" in the sense of the case but that are omitted from the settlements definition include voice recognition software, and directory and directory service support software.

The second problem with this definition is that it is inherently static. In focusing on a subset of current Middleware products it omits, by definition, any *future* middleware products that might emerge. The path of technological progress in an industry as dynamic as the computer industry is impossible to predict. In focusing on current Middleware products rather than on the more general question of which classes are software are likely to facilitate competition to the Windows monopoly, the settlement makes it unlikely that entirely new Middleware – the kinds of products that are perhaps most likely to facilitate challenges to Windows – will be covered by any of the provisions of the settlement.

This static focus is particularly evident in the definition of "Middleware" in operation in the case of Section III H. Here "Middleware" is defined by the statement:

> *Microsoft's obligations under this Section III.H as to any new Windows Operating System Product shall be determined based on the Microsoft Middleware Products which exist seven months prior to the last beta test version*

Notice that this means that these obligations apply only to those Middleware Products for which Microsoft has produced a product of its own. They would not cover, for example, the first editions of the Netscape browser! More generally, if new forms of Middleware emerge, the settlement gives Microsoft strong incentives to bind them to the operating system immediately. If Microsoft never issue the Middleware as a separate product, by the terms of this clause it is never "Middleware", and Microsoft never has to meet its obligations under Section III H.

(ii) Giving Microsoft control over the pace and shape of technological development

The agreement as currently written is also flawed in that much of the assistance it purports to offer to potentially important competitive Middleware is not only very slow, but is also technically limited in important ways.

The provisions of Section III.D, for example, require Microsoft to release key information about the ways in which Middleware can interoperate with the Windows

Operating system *"no later than the last major beta release of that Microsoft Middleware."* The timing of a beta release varies by product, but in most cases the availability of a beta release signals that the hard work of new product development has been done, and the product is more or less ready for sale. Delaying the release of key technical information to third party suppliers until the time of a beta release puts third party suppliers under a very significant handicap, since it forces them to enter the market significantly after Microsoft.

In the case of Netscape, for example, denying them access to key interface information until after the beta release of Microsoft's first browser product would have forced them to delay their entry to the marketplace very significantly and would have deprived them of the early entry, "first mover" advantage that is often the one of the most advantages that third party suppliers can offer consumers. Competition thrives where new, innovative firms can enter a market quickly with dramatically new offerings. This provision would serve to slow competition to the speed at which Microsoft wishes to compete.

The provisions of Section III.D. are also flawed in that they restrict the release of critical technical information to *"the APIs and related Documentation that are used by Microsoft Middleware to interoperate with a Windows Operating System Product."* This effectively forces potentially competitive Middleware to use the same interfaces as Microsoft's middleware. Clearly some information is better than none. But to the degree that the purpose of competition is precisely to encourage the generation of alternatives that do not mirror Microsoft's offerings, forcing competitive software to use the same kinds of interfaces as Microsoft's own offerings leaves tremendous control over the direction of technological development in Microsoft's hands. Those competitive offerings that wish to interoperate with the operating system in different ways will get no help from this provision.

(iii) Who counts?

Section J.2. of the proposed settlement allows Microsoft to condition the license of "any API, Documentation or Communication Protocol related to anti-piracy systems, anti-virus technologies, license enforcement mechanisms, authentication/authorization security..." to persons or entities that:

> *"meets reasonable, objective standards established by Microsoft (my emphasis) for certifying the authenticity and viability of its business."*

I read this provision as suggesting that Microsoft can refuse to release key information – information that is increasingly critical to the development of any third party Middleware – to any firm that Microsoft deems "inauthentic" or "not viable." Would Microsoft have deemed Netscape viable, in its early days? Will the company believe that firms whose business model is based on the exploitation of Linux are viable? This provision allows Microsoft to deny critical information to precisely those kinds of firms

that are most likely to provide significant competition in the marketplace – those firms that may be too small or too new or too unconventional to be "viable."

(iv) *Forced Licensing*

Section I.5 provides that:

> *"an ISV, IHV, IAP, ICP or OEM may be required to grant to Microsoft on reasonable and nondiscriminatory terms a license to any intellectual property rights it may have relating to the exercise of their options or alternatives provided by this Final Judgment; the scope of such license shall be no broader than is necessary to insure that Microsoft can provide such options or alternatives."*

I find this wording ambiguous and potentially troubling. First, I wonder why any third party should be required to license anything to Microsoft. Microsoft's obligations extend to the provision of technical information about interfaces and to offering to OEMs and to end consumers the ability to remove Microsoft supplied Middleware. It is not at all clear to me why Microsoft should need to know anything about third party software in order to meet these obligations. Second, I am troubled by a possible interpretation of this language. One interpretation is that it forces third parties to license their software to Microsoft in order that Microsoft should be able to offer the same options and alternatives *as the third party supplier*. Would this language not have forced Netscape to license their browser to Microsoft so that Microsoft could provide the Netscape browser as an alternative? If an OEM chooses to install Real Player as the default media player, does this language imply that Microsoft has the right to license Real Player so that Microsoft also has the option to offer Real Player as the default media player? Surely this kind of forced licensing can only suppress competition?

(v) Second guessing consumer choice:

Although the current agreement purports to make it much easier for OEMs to install alternative Middleware and thus to offer end users a real choice of systems, the agreement severely restricts this choice in two important respects.

In the first place, Section C.3. allows for the installation of third party Middleware provided that

> *"any such Non-Microsoft Middleware displays on the desktop no user interface or a user interface of a similar size and shape to the user interface displayed by the corresponding Microsoft Middleware Product."*

Just as section III.D. restricts the design of competitive Middleware by limiting competitive knowledge of key interfaces to knowledge of only those technical interfaces used by equivalent Microsoft authored Middleware, so this provision restricts the presentation of potentially competitive Middleware to a "look and feel" roughly similar to

Microsoft Middleware. How can this restriction increase consumer welfare? If OEMs believe that end users would welcome Middleware that uses a very different kind of user interface for their alternative Middleware, should they not be allowed to install it?

In the second place, Section H.3. permits Microsoft to offer end users the choice to install Microsoft middleware as default software 14 days after the first boot of their system. While this provision may seem innocuous, its real effect will be to remove choice from the OEM. As the trial established, OEMs cannot afford the costs of widespread consumer confusion. Imagine a world in which consumers face every day – or every hour (!) -- a screen saying something like "are you *sure* you want to use Product ABC? Why not use Microsoft XXX, a product designed to work seamlessly with the operating system?" Many consumers may be effectively forced into switching products in the face of what may well be perceived as an implicit threat. Real competition cannot thrive under such circumstances. OEMs should have the power to configure systems in the ways they wish. Competition in the market place can decide if these configurations create value for end users.

Microsoft incentives from this agreement.

Lastly, the agreement is flawed in that it creates incentives for Microsoft to take actions that may significantly reduce consumer choice. Framed as it is, the current agreement creates very strong incentives for Microsoft never to release another piece of separate "Middleware"! Releasing Middleware will incur obligations – Microsoft will need to release technical information and to permit OEMs to remove the Microsoft authored product. These obligations can be easily evaded by immediately bolting new applications to the operating system. This will create two kinds of harm. In the first place, it will lead inevitably to increasingly "bloated" code. Consumers that might have preferred to purchase a "slimmer" Operating System will be unable to do so. Indeed in the worst case Microsoft might actively invest in the generation of "spaghetti code" – systems in which the code necessary to provide the new functionality and the code necessary to run the operating system are deliberately commingled. Such commingling may significantly lower the overall performance of the operating system. In the second place, such immediate "bolting" will defeat the intention of the settlement: potential third party suppliers of such Middleware will not have access to the key technical information that would enable them to seamlessly interoperate with the operating systems, nor will OEMs have the opportunity to install them in place of the Microsoft Middleware.

It is possible, of course, that the fully integrated Microsoft solution that this agreement gives Microsoft strong incentives to provide may be a technologically superior solution. But this solution will be imposed on consumers without the process of competition that has historically proven to be such a source of consumer benefit.

Conclusion

The proposed settlement falls short in two critically important respects. Not only does it do almost nothing to redress the harm caused by Microsoft's illegal conduct with respect to Netscape, leaving Microsoft with all the fruits of its illegal victory, but the provisions that it includes in an attempt to prevent a repetition of Microsoft's conduct in the browser case are limited and incomplete.

Suppose a Middleware threat with the potential impact of the Netscape browser were to emerge next year, or two years from now. The terms of the proposed settlement do little to ensure that Microsoft could not engage in an anticompetitive campaign to successfully crush it. Unless Microsoft chooses to recognize it as "Middleware" by producing a competing product, as opposed to simply copying the functionality and immediately bolting it to the operating system, it would not be covered by the terms of this settlement. Even if Microsoft were to choose to recognize it (and they would have strong incentives to avoid so doing), the current settlement would allow Microsoft to decide that the firm producing it did not have a "viable" business: to delay releasing critical technical information until after the release of its own beta product; to insist that its user interface be of "similar size and shape" to Microsoft's own product and, 14 days after first boot up, to bombard consumers with the option to switch to the Microsoft alternative.

Microsoft's victory in the browser war leaves it in a significantly stronger position to protect its operating systems monopoly and to block threats from any competition that might emerge to challenge it. The settlement does very little to remedy this situation and is instead rife with the potential for significant consumer harm.

Curriculum Vitae

Name: Rebecca Henderon **Department:** BPS, Sloan School
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Education

Harvard University Ph.D. 1983-1988
Doctorate in Business Economics. Thesis: *The Failure of Established Firms in the Face of Technological Change: A Study of Photolithographic Alignment Equipment.*
Massachusetts Institute of Technology S.B. 1978-1981
Mechanical Engineering.

Academic Employment:

Eastman Kodak LFM Professor, MIT Sloan School, 1999-
Tenured Associate Professor, MIT Sloan School, 1995-1999
Research Associate, National Bureau of Economic Research, 1995-
Thomas Henry Carroll Foundation Visiting Professor of Management, Harvard Business School. 1996-1997
Robert Noyce Associate Professor, MIT Sloan School, 1993-1995
Research Fellow, National Bureau of Economic Research, 1990-1995
Visiting Assistant Professor, Stanford Graduate School of Business, 1992-1993.
Assistant Professor, MIT Sloan School, 1988-1992

Non Academic Employment:

McKinsey and Company	Summer associate.	Summer 1986
Harvard University	Research assistant, K. Clark.	Summer 1985
General Electric	Analyst, strategic planning.	Summer 1984
McKinsey and Company	Analyst.	1981-1983

Honors and Awards:

ASQ Award for Scholarly Contribution	1996
Teacher of the Year	2001
Runner-up, Teacher of the Year	1990, 1991, 1992, 1993, 1995, 1996, 1998, 1999
Dively Award for best thesis proposal, H.B.S	1988
Alumane Award, (outstanding female graduate) MIT.	1981
Elected to *Phi Beta Kappa*	1981

Boards and Advisory Panels

Boards

The Whitehead Institute for Biomedical Research, Cambridge, MA.	1999 -
Linbeck Construction Corporation, Houston Texas.	2000 -
The Ember Corporation, Cambridge MA	2001 -

Advisory Panels

The Department of Social and Decision Sciences, Carneige Mellon	1995 –
ThePlatform, Inc	2000 -

Anti-Trust Experience

Retained by the Department of Justice as an expert witness in connection with the remedies phase of the Microsoft trial. Summer 1999 – Spring 2000. Declaration available on line at: www.usdoj.gov/atr/cases/ms_remediespapers.htm

Editorial Responsibilities

Department Head, Strategy, Management Science	1995 – 2000
Member, Editorial Board:	
Administrative Science Quarterly	1994 –
The Strategic Management Journal	1994 –
Economics of Innovation and New Technology	1995 –
Research Policy	1998 –
Management Science	2000 -

Publications

Journal Articles (Refereed).

"Putting Patents in Context: Exploring Knowledge Transfer from MIT" Jointly with Ajay Agrawal, forthcoming in Management Science

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"Trends in University Patenting 1965-1992," (Jointly with Adam Jaffe and Manuel Trajtenberg.) Forthcoming in the Center for Economic Policy Research conference volume: University Goals, Institutional Mechanisms and the "Industrial Transferability" of Research.

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