

U.S. v. Microsoft: Where did the time go?

Sean Ennis

Centre for Competition Policy and Norwich Business School,
University of East Anglia

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Contact Details:

Sean Ennis s.ennis@uea.ac.uk

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Professor Sean F. Ennis*

UEA

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* Centre for Competition Policy and Norwich Business School, University of East Anglia, Norwich, NR4 7TJ, UK. Email: s.ennis@uea.ac.uk. I thank colleagues at UEA and former colleagues at the OECD and U.S. Department of Justice for discussion. Thanks to Farasat Bokhari and David Deller for helpful comments. I never performed any work on the case under question though I was an employee of U.S. DOJ during much of the time of the case under discussion.

1. Introduction

Competition law is sometimes faulted for being slow to reach conclusions. The consequences of slowness are problematic if delayed justice enables continuation of illegal activity that engrains market outcomes in ways that are difficult to reverse. To explore the implications of case timing on outcomes, this paper examines an iconic antitrust case. Based on the beginning date and end date of the *U.S. v Microsoft* antitrust case, and the market shares of Microsoft's Internet Explorer browser before, during and after this period, we suggest that the Microsoft case was, in one respect, a Pyrrhic victory for the U.S. Department of Justice (DOJ) Antitrust Division. By the time the case had completed its legal process, Microsoft's browser market share in the U.S. was, by most measures, above 90% and near an all-time peak.¹ After the conclusion of the case and appeals, Microsoft's browser market shares fell gradually. This paper relates browser market shares to the case chronology, exploring whether structural breakpoints in the market share time series can be found that are plausibly related to the case.

The subject of speed of enforcement and market impact matters because of concerns that processes are too "slow" and that different processes are needed.² The potential harms from slow processes are that harm (if any) may be ongoing for a longer period than desirable and that the set of effective and feasible remedies can be limited when market position is more strongly entrenched and products more integrated. This discussion has been amplified in several expert reports on digital competition and a recent report from the U.S. House of Congress.³ As debate continues about appropriate methods of treating monopolization and abuse of dominance cases, it is instructive to examine past cases to understand their chronologies and the impacts of resolution speed on outcomes.

This paper examines market impacts related to "slow" enforcement by focusing on one leading abuse case. A detailed case-specific analysis is appropriate for exploring questions of enforcement speed, particularly given the relatively small number of major monopolization and abuse of

¹ While the case was not directly concerned with the browser shares, and Microsoft pursued also many legal means to achieve higher browser penetration, such as technical innovation and low pricing, the case may be suggestive of impacts from "slow" cases in fast-changing markets.

² See, for example, Baker (2019), Kwoka (2020) and Wu (2018).

³ See, for example, the UK Digital Expert Panel report *Unlocking Digital Competition*, the EC's expert report *Competition Policy for the Digital Era*, the Stigler Center's Committee on Digital Platforms *Final Report* and the US House of Congress Majority Staff Report and Recommendations: Investigation of Competition in Digital Markets.

dominance cases. In complex litigation, outcomes are not obvious at the beginning of a case. Broad consideration of harms from delayed outcomes should also consider the harms from potentially erroneous *early* resolution of cases or preliminary injunctions.⁴ In the current state of affairs, much of the social value of major cases arises from their prospective effect and precedential value rather than the direct effect of prosecuting and cessation of a behavior of concern.

The purpose of this examination is not to suggest that the process followed in this case or other such cases is inappropriate. Appropriate enforcement *may* sometimes be slow. Slow resolution may be conducive to the formation of more appropriate and nuanced precedent but may at times result in fast moving markets tipping to create monopoly positions. At times, this slowness may result in situations that create ongoing restrictions on competition and that are difficult to remedy.

The substantive debate in this case is not directly relevant to the focus of this paper. The economic arguments have been well described, from multiple perspectives, in prior work, including Gilbert and Katz (2001), Jenkins and Bing (2007), Klein (2001), Rubinfeld (2004), Sidak and Teece (2009) and Whinston (2001). This paper complements these by focusing on the timing of the case and the potential for anti-competitive harm during extended case procedures, as well as potential for subsequent remedies.

This analysis adds to the existing literature by focusing specifically on the timing association between browser market shares and chronology of the case. The empirical techniques used to identify breakpoints in time series can be an important element for the analysis of legal cases.

The rest of the paper proceeds as follows. In section 2, the different steps of the legal procedure are identified in a summary fashion to understand key moments in time as potential structural breaks. In section 3, market shares of the browser are presented, and market share data analysed for breakpoints potentially related to stages of the legal procedure. Section 4 concludes.

⁴ If the outcome of the case had been different, and Microsoft had succeeded in convincing the courts of the legality of its behavior, the forced cessation of its bundling behavior by the courts would have created another situation that might have been difficult to remedy from its behavior being unduly constrained.

2. Chronology in *U.S. v Microsoft*

The Microsoft case involved typical steps of investigation and litigation of a major antitrust case. As a subject for a studying the relationship between dates of key events and outcomes, the case is attractive in the sense that its oral history is particularly well developed and outcome data (on market shares) publicly available.⁵ In particular, the oral history and contemporaneous news reporting has information on the initial date of a complaint to DOJ, providing a full picture of the beginning of the case that is not publicly known for most cases.

The core behavior of concern could be characterized as a tie or bundle, with Microsoft effectively requiring computer manufacturers to load Internet Explorer if they wished to load Windows. Since computer purchasers generally sought a computer that would work straight out of the box, and users generally wanted the Windows operating system, this requirement led to substantial default loading of Internet Explorer. In effect, Internet Explorer was alleged not to be competing on the merits with its main browser competitor Netscape. Rather, Microsoft was alleged to leverage its monopoly power over the operating system into the browser. The alleged rationale for Microsoft's action was the fear that a ubiquitous browser front end could potentially allow for product designs that would supplant the Microsoft operating systems.

After a DOJ investigation, reportedly started in follow-up to one or more reported complaints in mid-1996, the DOJ filed a contempt complaint against Microsoft in October 1997 for violation of the 1995 consent decree.⁶ The case in chief was filed in a complaint by the DOJ and 20 states in October 1998. As with any major investigation, the investigation phase took time, with a bit more than a year elapsing between the reported complaint (from Netscape) and the filing of the DOJ complaint. This amount of time elapsing is not particularly long or unusual, given the complexity of the facts, the significance of the case and the necessity of refining arguments and ensuring the facts are consistent with these.⁷ After alleging the consent decree violation, the DOJ requested a preliminary injunction that would have required Microsoft to cease its allegedly problematic

⁵ See, e.g., Heilemann (2000) for a remarkably detailed oral history, based on interviews with many case participants, describing the way that a complaint was prepared for Netscape and submitted to DOJ. The dating in Heilemann is confirmed by contemporaneous AP reporting.

⁶ As background, it is worth noting that Microsoft was operating under a July 1995 consent decree that forbade Microsoft from using its operating system dominance to prevent competition.

⁷ To give a sense of complexity, the Ribak and Creighton white paper of the complaint was allegedly 222 pages.

behavior until the outcome of a full trial was known. This request was granted by the lower court judge and reversed on appeal. Consequently, no injunction on Microsoft's actions was in force during the core litigation of the case, apart from that already in place in the 1995 consent decree. After litigation that involved 76 days of testimony over eight months, and issuance of findings, settlement discussions, appeals, further review, a final settlement was reached by DOJ and Microsoft. The ongoing restrictions on behaviour would not be fully certain until the outcome of the settlement, and review of comments on the settlement, a process which ended in November 2002.

The final settlement that was accepted by the court in November 2002 placed substantial restrictions on Microsoft's ability to engage in the type of tying and bundling that leveraged its market power in operating systems to Internet browsers. The settlement also ensured ongoing monitoring of Microsoft's behaviour.

A number of key steps in the case are listed in Table 1. This timeline shows that important and complex litigation steps, many of fundamental importance to establishing the facts of the case, the relevant law, the necessity of an injunction or the elements of a remedy. While substantial time elapsed during this period, Microsoft was provided with due process and opportunities to rebut and develop its own case. While the outcome of the case found against Microsoft, one should recall that Microsoft had substantial defenses, such as the claim that it offered a better and more integrated product than Netscape, including in terms of pricing, that would benefit many consumers. It is not clear that a shorter case timeline could have guaranteed to the same extent due process protections and full collection and analysis of the evidence and law.

Table 1. Chronology: *U.S. v Microsoft*

August 7, 1996	Netscape complained to DOJ about Microsoft ⁸ . The date on which an investigation was formally opened is unclear from the public record, to my knowledge.
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⁸ See AP "Reports: Netscape Complains to Government About Microsoft", 7 August 1996, downloaded 19 April 2021 from <https://apnews.com/article/e18dd20836b41f4176ddcc931a6c1f9f> and Heilemann (2000) reporting on Reback and Creighton's July 1996 "White Paper Regarding the Recent Anticompetitive Behavior of the Microsoft Corporation."

October 27, 1997	DOJ filed a complaint for violation of the 1995 consent decree claiming Microsoft demanded PC manufacturers include the Internet Explorer Web browser with their hardware products to obtain a Windows 95 license.
December 11, 1997	In a preliminary injunction, Judge Jackson ordered Microsoft to stop requiring PC makers to ship Internet Explorer along with Windows 95. The injunction was staid, pending appeal.
May 18, 1998	DOJ, with 20 state attorneys general, files complaint under Sections 1 and 2 of the Sherman Act against Microsoft, alleging the company abused its market power to thwart competition, including Netscape.
June 28, 1998	U.S Appeals court overturns preliminary injunction.
October 19, 1998	Court hears opening arguments in the first day of the trial.
January 12, 1999	Final day of the government's case.
June 24, 1999	Trial adjourns having had 76 days of testimony spread out over more than eight months.
September 21, 1999	Closing arguments of trial.
November 5, 1999	Judge Thomas Penfield Jackson entered findings of fact, determining that Microsoft held monopoly power and has used it to harm consumers, rivals, and other companies.
April 3, 2000	Judge Thomas Penfield Jackson entered conclusions of law that Microsoft violated antitrust laws, consistently acting to maintain its power over industry competitors.
June 13, 2000	Microsoft appeals the ruling.
April 28, 2000	The DOJ and states file a proposed remedy to split Microsoft into two separate companies.
June 7, 2000	Judge Jackson orders Microsoft broken up into two companies
September 26, 2000	The Supreme Court refuses to hear the case.
June 28, 2001	The federal appeals court reverses the breakup order.
November 6, 2001	A settlement between DOJ and Microsoft is filed with the court.
November 1, 2002	Judge Colleen Kollar-Kotelly rules that the proposed settlement serves the public interest. This ruling is necessary under the Tunney Act.

Source: AP, Court documents, DOJ, NYT, Wired.

While this timeline represents the end of the main court procedures, the settlement involved monitoring of Microsoft behavior and public reports suggest that this monitoring was, at times, intense.⁹ As a result, ongoing oversight by DOJ of Microsoft continued after November 2002.

In total, 61 months passed between the government filing of the first related complaint in October 1997 and the ultimate conclusion of the court proceedings in November 2002. From the reported date of a complainant available over Associated Press in August 1996, the total time elapsed until the conclusion of court proceedings is 75 months.

3. Data analysis

According to some interpretations of the case, the objective of the behavior of Microsoft during the case was to protect its operating system from “commoditization”¹⁰ by ensuring that alternative interfaces, such as browsers, could not unilaterally bypass the operating system. One measure of the success of that strategy is browser market shares. As Microsoft increased the market share of its own browser Internet Explorer, the more capability it had to ensure that its operating system remained central to the user experience. Internet Explorer market share could be expected to increase as a result of the leveraging alleged by DOJ. Browser market shares could also increase as a result of competition on the merits. Market shares are likely one of the best externally observable sources of data on the effects from the leveraging arguments that were central to the government case.

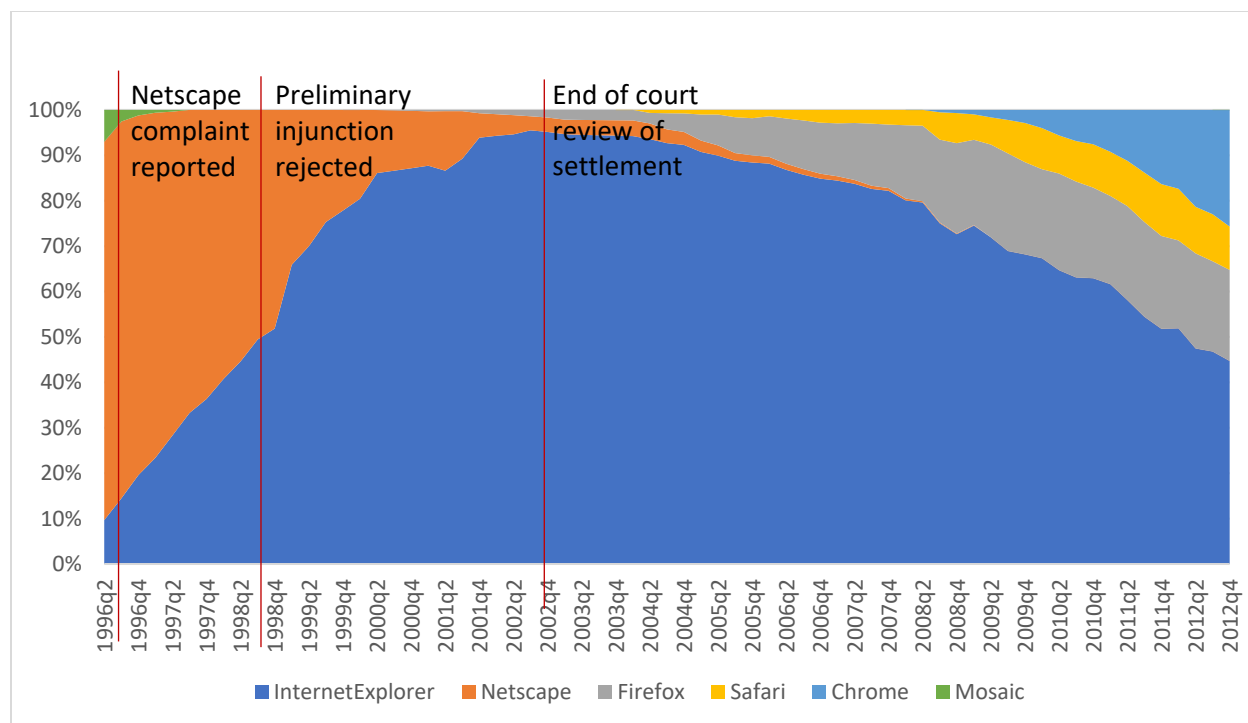
3.1 Browser usage market shares

Finding continuous data on browser shares from a single contemporaneous, longitudinal and representative source was not possible from publicly available information. However, from information spliced together from different sources, the author was able to construct a continuous series from 1996 Q2 to 2012 Q4 that is particularly illustrative of browser shares over time. This is presented in Figure 1.

Figure 1. Browser Usage Shares: 1996-2012

⁹ See for example the DOJ’s “Microsoft Consent Decree Compliance Advisory – August 1, 2003”.

¹⁰ This term was attributed to Bill Gates.



Source: Author's calculations based on data from EWS Web Servers at UIUC, WebSide Story, The Counter and StatOwl.

A broad characterization of the market share data suggests that during the majority of the period following receipt of the Netscape complaint, in which Microsoft was allegedly under investigation or under court procedures, its browser market share in the U.S. increased from under 20% to more than 90%. At the conclusion of the proceedings, Microsoft had a near complete monopoly of internet browser usage.¹¹ At some point subsequent to the conclusion of the primary legal proceedings in November 2002, Microsoft's market share stopped increasing and began a slow path of decline such that, by 2012, Internet Explorer's browser market share under 50%.

While these market shares may not be fully representative of all users in the U.S. or worldwide, or the combined experience of all websites in the U.S. or worldwide, they are a reasonable representation of usage market shares over time. While there are multiple sources merged together to provide a full time series, the data that overlap are close to each other both in magnitude and direction of movement, suggesting a broad similarity in outcomes of the measurements.

3.2. Breakpoints

¹¹ This does not mean that Microsoft had an equivalent share of installations. Many people or computers had access to both Netscape and Internet Explorer, for example.

This section tests several hypotheses on whether key events in the case were associated with breakpoints in the Internet Explorer market share time series. It then performs a more general test to identify a breakpoint. Bai (1994), Bai (1997) and Zeileis et al. (2003) discuss how to consider breakpoints in a time series. These methods do not appear to have been applied to legal cases up to this point, to the author's knowledge. Yet they can provide significant value when applied to a data series that is associated with key events in a legal case and which is sufficiently long to provide sufficient degrees of freedom.

The approach to test for individual breakpoints around key case developments can help to show whether legal actions have any impact and whether bringing charges against the plaintiff is alone associated with changed outcomes or whether other developments during the case that increased the probability of government winning or losing the case were relevant breakpoints or whether only the final certain outcome is associated with changed outcomes.

The five hypotheses tested are that market share trends changed substantially as a result of:

H1: Filing of the initial complaint (1997 Q3)

H2: Filing of the main complaint (1998 Q2)

H3: Ordering of a breakup by the district court (2000 Q2)

H4: The appellate court's reversal of the district court remedy (2001 Q2)

H5: The conclusion of Tunney Act proceedings (2002 Q3)

Each of these hypotheses is tested against the null hypothesis H0 that there was no substantial change in market share trends.

These hypotheses are tested using quarterly usage market share in the following model:

$$Y_t = \beta_0 + \beta_1 X_t + \beta_2 (X_t - X^*) D_i + u_t \quad (1)$$

Where:

1. X_t is date t
2. X^* is the date of the selected major case event
3. $D_i = \begin{cases} 1 & \text{if } X_t \geq X^* \\ 0 & \text{if } X_t < X^* \end{cases}$

and

$$4. \quad Y_t = \ln\left(\frac{s_t}{1-s_t}\right)$$

The term Y_t is a modified market share converted from conventional market share s_t of Internet Explorer to an unbounded variable more suited to the testing techniques used here. It is monotonically moving in line with the market share series.

The results from testing hypotheses 1 through 5 in a single shift in linear processes are shown in Table 2. A single shift in linear processes is selected due to the general directional uniformity of the share series over time. Possibilities include further increases in market share, as the modified market share measure is not bounded and can increase substantially¹²; flatlining; starting to systematically decrease; or adopting a variable path. While the single shift in linear process is a simplification, tests are made for multiple breakpoints as well. The purpose of these tests is not to understand the causal factors that would explain changes in market share but rather to identify breakpoints in a time series of interest.

¹² This measure is not bounded until market share hits its absolute maximum of 100%, at which point it is undefined.

Table 2. Regression results for different hypotheses on breakpoints in market share of Internet Explorer with dependent variable $\ln(s/(1-s))$

	Hypothesis				
	H1	H2	H3	H4	H5
Constant	-4.04***	-3.56***	-2.87***	-2.51***	-1.97***
	(0.984)	(0.645)	(-0.253)	(0.150)	(0.069)
Time	1.09***	0.668***	0.341***	0.268***	0.194***
	(0.212)	(0.094)	(0.020)	(0.0098)	(0.0036)
Dummy	-1.09***	0.684***	-0.384***	-0.326***	-0.275***
	(0.215)	(0.094)	(0.023)	(0.012)	(0.0051)
DofFreedom	64	64	64	64	64
Adj R-squared	0.281	0.445	0.817	0.919	0.978
F-statistic	13.9	27.4	149	378	1494
Significance codes *** 0.001, ** 0.01, * 0.05					
Standard errors in parentheses					

Source: Author calculations

F-statistics are commonly used to assess model fit and select between models due to their differing explanatory power in reducing the sum of residuals. The F-statistics from these 5 regressions suggest that H5 is the hypothesis with the best explanatory power and the largest difference with the null hypothesis. This is therefore the retained hypothesis from the set of 5. The fact that coefficients are significant in other models does not mean their applicable models are accepted, as the different models must first be compared with each other to determine which one has the best explanatory power.

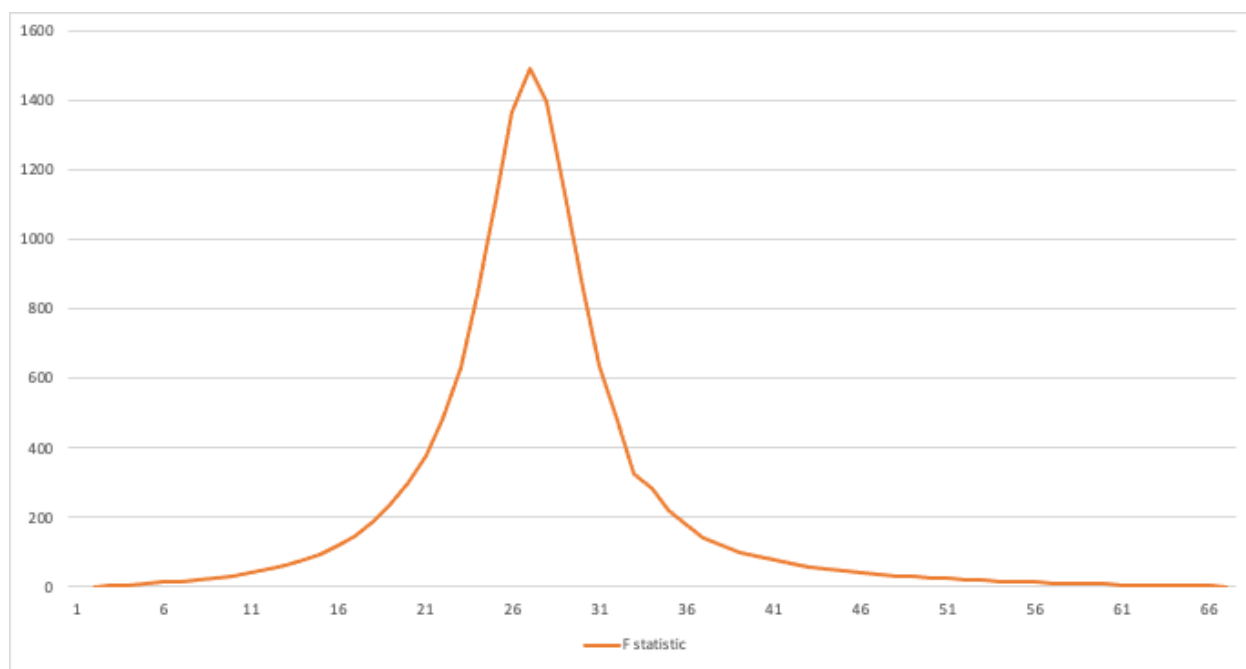
The coefficient for the dummy in H5 is negative and significantly different from 0. This suggests that of the four possibilities outlined, the preferred conclusion is of a systematic decrease in market share following the break. This is a particularly interesting outcome in light of the required change in behaviour of Microsoft that was governed by the final settlement, as the alternative of increasing share subsequent to the final settlement or flatlining subsequent to the final settlement are both ruled out by the negative coefficient.

To complete the examination of a potential structural break in market shares, we test for a breakpoint in the series without imposing a particular date of a hypothesised break. This less

constrained procedure can be done for a single shift in linear processes by comparing F-statistics from all possible breakpoints, as in model 1, for breakpoints from time $t=1$ to time $t=n$, where n is the last observation. As noted by Zeileis et al. (2002), the maximum of the F-statistic models, for a single breakpoint, is associated with the best fit OLS model to the data.

This approach results in the F-statistics reported in Figure 2.

Figure 2. F-statistic for Breakpoint in Internet Explorer Browser Usage Share



Source: Author's calculations based on data from EWS Web Servers at UIUC, WebSide Story, The Counter and StatOwl.using model in formula (1) for all possible breakpoints, F-statistic calculated with R.

The maximum F-statistic, and best fit of a unique breakpoint, is found in 2002 Q4. Interestingly, the unconstrained breakpoint estimate yields precisely the quarter in which the Tunney Act proceeding of the settlement concluded, and the case was over, though the quarters right before and after 2002 Q4 are also strong in terms of explanatory power. This unconstrained breakpoint estimate could suggest that the conclusion of antitrust enforcement was a turning point in the

market share of Microsoft's Internet Explorer, potentially suggesting the ultimate long-run efficacy of competition law enforcement.

One point that is worth noting is the absence of finding a breakpoint prior to the conclusion of the case. This is particularly interesting as the "policy" change from a final decision was arguably possible to anticipate as early as 1999 with the finding of facts in the case. Yet there is no evidence of Microsoft anticipating the final "policy" through a change in the outcome variable path in the year 2000. This raises a more general question of whether outcomes related to legal cases like this, in which the behavior is fundamental to a company strategy, may not respond to anticipation of an outcome because the most appropriate time for a company to adjust its business strategy is when the outcome is fully known.

4. Conclusion

The welfare consequences from the delayed outcomes in antitrust cases are complex to measure and beyond the scope of this paper. While the actions taken by Microsoft were deemed illegal by the courts, it is worth noting that Microsoft did not charge for its browser, while Netscape charged corporate customers for use of its browser. Thus in some respects, at least, total consumer costs for browsers fell as Microsoft's market share increased. On the other hand, to the extent that Microsoft's actions benefitted its operating system, and that the operating system has market power, this market power, and potentially higher prices from the market power, may have been sustained.

Focusing narrowly on the browser shares, a major question is what would have happened if the court's preliminary injunction had been upheld by the higher courts. Then one may expect that Microsoft's browser market share would have increased more slowly after the appellate court ruling on the preliminary injunction. The delay, between the June 1998 appellate court rejection of the district court's preliminary injunction and the final decision on the settlement in November 2002, was a period of 53 months in which the share of the Microsoft browser rose from about 45% to more than 90%.

Interestingly, though, a full examination of any costs from delay of reaching enforceable outcome should include the possibility that plaintiff's behavior could have been found legal and that early

measures, such as an injunction to prevent certain behaviour, might in general have costly market consequences of preventing legal outcomes should the behavior ultimately be found legal.

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