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# DOS *Kapital*: Has antitrust action against Microsoft created value in the computer industry?

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## Abstract

Antitrust enforcement that efficiently constrains Microsoft's behavior benefits firms supplying complements to and/or substitutes for Microsoft's operating system and applications software. However, from 1991 through 1997, 29 reports of federal antitrust enforcement action against Microsoft were accompanied by declines in the value of an index of 159 computer industry firms (excluding Microsoft). The mean loss to those firms exceeded \$1 billion per event. Eight retreats or setbacks in enforcement were associated with increased computer sector value. Thus, financial markets reveal compelling evidence against the joint hypothesis that (a) Microsoft conduct is anticompetitive and (b) antitrust policy enforcement produces net efficiency gains. © 2000 Elsevier Science S.A. All rights reserved.

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## 1. The value of antitrust

Microsoft's sway over operating systems and applications puts everyone else in the industry at a disadvantage, said Alan C. Ashton, president of WordPerfect Corp., Orem, Utah. They are a threat to everybody in the industry.

*Wall Street Journal*, December 11, 1992, p. A4

Since the advent of the personal computer in 1981, Microsoft's operating systems and application programs have claimed impressive shares of a rapidly expanding market for PC software. This success has attracted attention not only within the industry but also from state and federal antitrust enforcers, the private antitrust bar, and the public at large. Since 1990, federal authorities – first at the Federal Trade Commission (FTC) and then at the Department of Justice's Antitrust Division (DOJ) – initiated a series of antitrust investigations of Microsoft. These inquiries resulted in a 1995 consent decree between Microsoft and the DOJ, and a 1997 DOJ suit alleging that Microsoft had violated the decree. In 1998, the DOJ and 20 states filed a new suit on broader charges.

Is Microsoft 'a threat to everybody in the industry'? If so, does that harm consumers? Will antitrust policy help alleviate that threat? For some analysts, Microsoft's high market share, coupled with certain of the firm's aggressive marketing practices, implies predatory conduct (DOJ, 1998; more generally, see Gilbert and Williamson, 1998). For others, Microsoft's success in the highly competitive and rapidly growing computer sector offers a classic example of a 'good monopoly', one that garners market share by offering popular products at low prices ('A case built on speculation, dubious theories', *Wall Street Journal*, May 19, 1998, op-ed page; Liebowitz and Margolis, 1999).

Whatever Microsoft's intent or success in monopolizing PC software, it is unclear what kind of policy would promote lower prices for consumers, the goal championed by Bork (1978) and other antitrust analysts. A policy that corrects an identified market failure improves welfare only if the value created exceeds the policy's cost. Even Microsoft's foes fear that intervention by the government and the courts will result in net losses: 'Supporters and critics of the case both dread the same doomsday scenarios of the technology industry: that the suits will ultimately lead to much broader government intervention in the software business' ('Microsoft friends and foes alike fear government's intervention', *Wall Street Journal Interactive Edition*, May 14, 1998).

In this paper we ask, Have antitrust enforcement initiatives increased the stock market value of Microsoft's alleged victims? The Microsoft case seems especially suited for a stock price study. First, the long history of investigations, filings, court decisions, and other antitrust announcements offer a substantial number of policy events. Second, a large number of computer industry firms will prosper if the market for operating systems and major desktop applications

becomes more competitive. This study exploits these circumstances by examining share price reactions for both Microsoft and a portfolio of 159 other computer firms around 54 antitrust enforcement announcements involving Microsoft over the seven years 1991–97.

## 2. The Microsoft question and the stock market

The basic facts are straightforward, but interpretations vary. Microsoft has a large market share in desktop operating systems and in several important lines of PC software. It has also earned a high rate of return on its past investments. Additionally, the firm's stock boasts a very high *P/E* ratio, indicating that investors anticipate unusually high earnings growth in the future. Finally, Microsoft employs aggressive business practices.

To Microsoft's critics, these facts are consistent with the view that Microsoft gained a monopoly through predation and that the stock market expects this strategy to produce an even larger flow of monopoly rents in the future. The critics claim that quality-adjusted prices of operating systems, software, and related products are higher now – or will be higher in the future – because of Microsoft's actions. To Microsoft's supporters, these same facts are consistent with the view that Microsoft outcompetes rivals by expanding output and lowering prices for consumers and that stock investors expect continued competitive superiority in a rapidly growing industry. The supporters claim Microsoft's practices might have hurt competitors, but not consumers.

Specific aspects of the Microsoft debate demonstrate the difficulty of relying on economic theory alone. For example, after initially giving away its browser, Netscape began to charge \$49 per copy. Soon afterwards, Microsoft incorporated its browser, Internet Explorer, with Windows 98, essentially charging a price of zero. Microsoft also required computer manufacturers installing Windows 98 to place an IE icon on the opening screen (Nash, 1996; Quittner and Slatalla, 1998). Did Microsoft's 'tie-in' and/or zero pricing hurt Netscape? Would its actions ultimately hurt consumers by eliminating a rival? It seems clear that prices for browsers were lower in the short run, but the elimination of a rival might mean higher prices in the long run. As a matter of economic theory, the ultimate effects are unclear.

Another line of controversy concerns 'network effects' in operating systems and applications software. Network effects arise when a product becomes more valuable as more people use it. Telephones and fax machines provide classic examples. When a single firm controls the underlying standard, the result may be a 'winner-take-all' outcome. Economic analyses (Declaration of Kenneth J. Arrow, *U.S. v. Microsoft*, Jan. 17, 1995) and popular treatments ('The force of an idea', *The New Yorker*, Jan. 12, 1998) of the Microsoft case have highlighted network effects. However, network effects cut both ways. 'The theory of

increasing returns is crucial to the case against Microsoft... [but] increasing returns are equally crucial to the case *for* Microsoft – as a reason why trying to break it up would be a bad thing’ (‘The legend of Arthur’, *Slate Magazine*, Jan. 14, 1998; see also ‘Soft microeconomics: the squishy case against you-know-who’, *Slate Magazine*, April 23, 1998). Again, theory is inconclusive. Such ambiguity plagues nearly every other aspect of the nearly decade-old discussion about Microsoft and monopoly.

We will attempt to break this deadlock with the help of some evidence. We turn to the verdict of the financial markets, examining the stock returns of firms allegedly hurt by Microsoft’s anticompetitive behavior. The use of financial data to study the effects of regulation is summarized by Schwert (1981). Three types of studies are relevant. One type, pioneered by Eckbo (1983) and Stillman (1983), examines the effects of mergers or merger policy by examining the stock prices of competitors. Prager (1992) looks at competing firms in the celebrated 1904 *Northern Securities* decision (which brought mergers under the Sherman Act). Mullin et al. (1995) examine the stock prices of competing and vertically related firms in the *U.S. Steel* divestiture suit. Banerjee and Eckard (1998) look at the prices of competitors of merging firms during the 1897–1903 merger wave.

The second group of event studies examines the stock price effects for firms that are actual or potential targets of regulation. Jarrell and Peltzman (1985) investigate the direct and the indirect spillover effects of product recalls. Mitchell and Netter (1989) implicate antitakeover legislation as a precipitating factor in the 1987 stock crash by looking at returns of ‘in-play’ stocks, and Schipper and Thompson (1983) analyze securities and tax law changes by looking at the stock price movements of frequent acquirers. In the case of Microsoft, antitrust action may have had legal implications for other firms. In fact, the FTC has investigated both Intel and Cisco since the Department of Justice filed its most recent charges against Microsoft. America Online (AOL) has been the target of litigation by state attorneys general.

The third group of studies focuses on litigation between private parties. It turns out that the stock gains accruing to a successful litigant are often more than offset by the losses to other firms. Cutler and Summers (1988) look at the Pennzoil-Texaco litigation, as do Hertzfel and Smith (1993, p. 442), who specifically note ‘the importance of evaluating industry effects when drawing conclusions about the social costs of litigation’. Similarly, Bizjak and Coles (1995) report that financial distress, behavioral constraints, and the costs of follow-on suits result in a net decline in the total value of the opposing parties in a private suit. In the case here, the government suit may represent litigation carried out on behalf of Microsoft’s rivals.

One point deserves emphasis. The stock market will not render a verdict on whether Microsoft’s behavior was anticompetitive. Rather, it will reflect investors’ judgments about the marginal effect of antitrust enforcement on the expected profitability of firms allegedly victimized by monopolization. If stock

values in the computer sector decline with enforcement actions, this could reflect a belief that antitrust enforcement will impose losses, but not that Microsoft's practices helped the rest of the industry. Fortuitously, this focuses on the proper margin for policy analysis: of comparison not of an existing market structure to a theoretically improved alternative, but what exists before policy intervention to what is expected after.

### 3. Testing antitrust policy effects

Under anyone's theory of antitrust – the pro-consumer view that antitrust enforcement lowers quality-adjusted prices for consumers (Buchanan and Lee, 1992) or the 'capture theory' view that antitrust protects competitors (Baumol and Ordober, 1985; Gilligan et al., 1989; Wolf, 1993) – Microsoft share prices should fall with unexpected enforcement. Formally, the expected abnormal return to Microsoft shareholders will be negative during 'pro-enforcement' news windows:  $E(R_{MS}) < 0$ , where  $R_{MS}$  is the return to Microsoft stock during the event window, adjusted for marketwide returns. Conversely, either view predicts that setbacks to antitrust actions directed against Microsoft will imply rising share prices:  $E(R_{MS}) > 0$  during 'anti-enforcement' event windows. Antitrust prosecution brings no benefits, while entailing the following: litigation costs, diverted managerial attention, constraints on operations (due to antitrust liability), lost monopoly profits, and civil penalties levied by a court or agreed to in a consent decree. While Microsoft's stock price reactions do not distinguish between the two views of antitrust policy, they do identify the enforcement actions that matter to investors.

Under the pro-consumer view, effective antitrust action against Microsoft should produce three types of beneficiaries. First, firms that buy Microsoft products will directly benefit (through lower input costs). Second, firms that produce complementary products will indirectly benefit (through an outward shift in demand for their products). Third, according to the predation and vertical foreclosure arguments central to the case against Microsoft, effective antitrust enforcement will ease barriers to entry for Microsoft's rivals. This implies that, during pro-enforcement event windows,  $E(R)_{NMS} > 0$ , where  $R_{NMS}$  is the abnormal return to non-Microsoft computer companies, and that during anti-enforcement event windows,  $E(R_{NMS}) < 0$ . Conversely, under the pro-consumer view, setbacks in enforcement produce the opposite results. Microsoft's customers, the producers of complementary products, and its rivals should all lose.

Under the capture view of antitrust, enforcement could hurt consumers by imposing substantial litigation costs, by deterring efficiency-enhancing behavior, by implicitly putting other successful firms at risk of becoming targets of antitrust, or by increasing the uncertainty of investment. Stock prices of firms in

the computer industry could in fact fall, especially the stock prices of customers and producers of complements. Retreats or setbacks in enforcement will have opposite effects, which would be reflected in rising computer industry stock prices.

#### 4. Antitrust events and the computer portfolio

News of a Federal Trade Commission investigation of Microsoft first leaked to the press in March 1991. That investigation led the FTC to vote on a preliminary injunction against the firm in February 1993, when it deadlocked (hence, filing no action). It deadlocked a second time in July 1993 on whether it would file a case. In an unusual policy twist, the Department of Justice immediately began its own investigation utilizing the FTC files. This inquiry resulted in a July 1994 agreement between Microsoft and the DOJ, finalized as a consent decree in August 1995. In the interim, a series of court actions ensued, including rejection of the proposed consent decree by District Court Judge Stanley Sporkin (who found the agreement too lenient towards Microsoft), and then reinstatement of the decree by the D.C. Circuit. The DOJ eventually filed a suit against Microsoft on October 21, 1997 accusing the firm of violating the 1995 consent decree. Legal skirmishing, including a much broader antitrust suit filed by the DOJ in May 1998, continued into 1999. We end our study, however, at December 31, 1997.

Table 1 provides details of the 54 events used in this study. The list was created from the *Wall Street Journal Index*, and consists of every breaking news story concerning Microsoft and antitrust. Table 1 includes the returns, net of the market, for both Microsoft and an equally weighted index of computer industry firms over the one- and three-day windows surrounding publication dates. These are the net returns to Microsoft and to the equally weighted index of other computer firms based on the market model. This index is described in more detail below. Stock return data used throughout this study are from the Center for Research in Security Prices at the University of Chicago. Table 1 also lists other news stories in the *Wall Street Journal* that could have had a major effect on Microsoft share prices on or near event dates.

Table 1 classifies three event groups. ‘Pro-enforcement’ events report stricter antitrust enforcement against Microsoft, while ‘anti-enforcement’ events entail clear setbacks for, or withdrawal from, vigorous antitrust enforcement. ‘Ambiguous’ events involve either (1) enforcement actions with unclear implications or (2) another major contemporaneous event likely to substantially affect Microsoft’s stock price. To illustrate, the March 12, 1991 revelation that Microsoft was the target of an investigation had straightforward negative implications for Microsoft shareholders, while no possibly offsetting *Journal* stories appear simultaneously. (The closest was a March 20 report on insider sales.) Hence the

Table 1

One- and three-day residual returns for microsoft and the computer industry (excluding microsoft) around dates with *Wall Street Journal* news articles involving Microsoft and antitrust, 1991–1997. The ‘news summary’ column includes a short description of the event and any other story published, with date of publication, that could have influenced returns. ‘Pro’ events are categorized as pro-enforcement, ‘anti’ are categorized as anti-enforcement, and those assigned a question mark are ambiguous either because of the nature of the enforcement action or due to a contaminating event.

Published date	Residual return		3-day		News summary/Category	
	1-day	Industry (%)	Microsoft (%)	Industry (%)		
	Microsoft (%)	Industry (%)	Microsoft (%)	Industry (%)		
1 3/12/91	-2.30	-0.80	-1.54	-0.94	Microsoft is target of FTC investigation.	Pro
2 4/15/91	5.69	-1.60	-2.61	-1.57	FTC is broadening its investigation. 65% increase in earnings (4/17).	?
3 10/21/92	2.14	0.52	1.69	1.37	FTC has subpoenaed data from Microsoft.	Pro
4 12/11/92	-2.77	-0.79	-4.53	-1.84	FTC staff lawyers sent report on Dec. 4 requesting injunction against Microsoft.	Pro
5 2/8/93	-3.44	-0.58	0.18	-3.98	FTC splits 2–2, no preliminary injunction against Microsoft.	?
6 7/15/93	-0.66	-0.72	-1.36	-1.85	FTC ends its two-year probe of Intel, to take up Microsoft allegations.	?
7 7/22/93	-0.93	0.48	-3.46	1.07	FTC unable to reach a conclusion.	?
8 8/2/93	-2.40	0.61	-7.82	0.98	DOJ is reviewing documents from Microsoft.	Pro
9 8/23/93	1.11	0.99	0.74	-0.11	DOJ reported 8/20 it will launch a formal investigation of Microsoft.	Pro
10 6/6/94	3.00	0.20	2.06	-2.23	DOJ investigation intensifying, taking depositions. No other reports.	Pro
11 7/1/94	-3.41	-1.24	-4.51	-0.97	Information-gathering portion of DOJ investigation is over.	?
12 7/18/94	3.49	0.02	2.52	-1.85	Microsoft signed consent decree.	Anti
13 10/17/94	-1.44	0.02	-1.17	-0.14	Microsoft acquisition likely to spur antitrust probe.	?
14 10/24/94	0.27	0.45	1.77	0.59	DOJ will examine agreement to purchase Intuit.	?
15 11/22/94	0.37	-0.30	-0.22	-0.80	Microsoft’s proposed acquisition of Intuit is facing continuing scrutiny.	?
16 1/11/95	0.63	-0.03	1.20	1.30	Competitors file brief, try to unravel consent decree.	Pro
17 1/16/95	0.89	0.06	2.34	0.43	Sporkin invites Jacobovitz and Reback to present oral arguments.	Pro

Table 1 (continued)

Published date	Residual return		News summary/Category			
	1-day				3-day	
	Microsoft (%)	Industry (%)			Microsoft (%)	Industry (%)
18 1/20/95	-2.24	-0.29	-1.98	-1.13	Sporkin asks DOJ and Microsoft to explain why changes should not be made in consent decree.	Pro
19 1/23/95	1.92	-0.78	-1.99	-0.87	Sporkin at loggerheads with Bingham and MS attorney; Apple appeals case to Supreme Court. Sony and MS agree on partnership, free upgrades on Word 6.0.	Pro
20 2/1/95	-0.73	0.58	-1.80	0.73	DOJ has issued subpoenas in Microsoft/Intuit investigation.	Pro
21 2/15/95	-2.63	0.01	-2.85	0.04	Sporkin rejects government's consent as too lenient.	Pro
22 2/23/95	-0.59	-0.34	0.66	-1.41	Apple alleges Microsoft threatened it.	Pro
23 2/24/95	-0.94	-0.65	0.43	-1.15	Story about antitrust chief Bingham calling Gates Saturday night.	?
24 3/8/95	4.44	0.52	6.03	1.19	DOJ and Microsoft ask federal appeals court to reverse Sporkin's decision.	Anti
25 4/25/95	2.95	-0.07	4.67	1.40	Three-judge appeals panel voiced concerns that Sporkin may have exceeded his authority.	Anti
26 4/28/95	3.64	0.09	2.47	0.08	DOJ files suit against Intuit deal. MS is pressing to complete the deal.	?
27 5/1/95	0.52	-0.57	0.70	-0.50	DOJ unveils key documents in unusual move.	?
28 5/22/95	0.99	-0.18	1.95	0.01	Microsoft said it is ending its plan to acquire Intuit.	?
29 6/9/95	1.94	1.11	-0.11	2.61	DOJ racing to finish an investigation aimed at MS plan to bundle access to its new software.	?
30 6/12/95	-2.17	0.06	-1.62	1.14	DOJ looking at Microsoft stipulation against patent infringement suits.	Pro
31 6/19/95	1.75	0.73	5.24	1.79	Appeals court reinstates consent decree Sporkin rejected.	Anti
32 6/22/95	-0.26	-0.35	-1.74	0.26	DOJ issues subpoenas to publishers, others.	Pro
33 7/14/95	3.65	0.18	8.35	1.22	DOJ unveils antitrust arguments. Net income increase, (7/18).	?
34 7/24/95	0.60	1.51	-2.27	2.26	DOJ withdraws broad subpoenas.	Anti
35 7/31/95	-2.24	-0.64	-6.24	-0.79	DOJ extends investigation to new area-bundling of software.	Pro



36	8/9/95	3.11	0.96	0.63	0.83	DOJ says it will take no action prior to Windows 95 shipment.	Anti
37	8/22/95	4.75	0.83	1.03	0.80	Judge formalizes consent.	Anti
38	2/6/96	-1.78	-0.17	1.20	-0.51	DOJ takes interest in Microsoft acquisition of Vermeer Technologies, internet tools.	Pro
39	9/20/96	-0.58	0.00	-0.10	0.93	DOJ has launched an investigation of Microsoft's Internet software business.	Pro
40	2/12/97	-1.01	-0.32	-2.40	-2.59	State of Texas has launched an antitrust investigation of Microsoft.	Pro
41	5/20/97	2.00	0.18	2.32	0.44	DOJ requests additional information about Microsoft's planned acquisition of WebTV Networks. MS has signed up more than a dozen business-information providers (5/22).	Pro
42	6/30/97	-0.87	0.77	-4.23	-0.29	At the urging of competitors, three senators have asked the FTC to once again investigate Microsoft's business practices, including compliance with the 1994 consent decree.	Pro
43	7/14/97	4.33	0.68	4.08	2.08	Newscape trying to convince government that Microsoft plans to use new Internet software to lock out rivals. MS to announce that it will link up with Disney and Warner Bros. (7/15); Net income announcement (7/18).	?
44	8/4/97	0.10	0.21	0.87	2.82	Microsoft closed its purchase of Web TV after DOJ ends its lengthy review without taking action.	Anti
45	8/19/97	1.44	-0.35	-0.05	-1.63	DOJ is reviewing Microsoft's minority stake in Apple as well as three unrelated investments.	Pro
46	10/7/97	-0.45	-0.90	1.17	-0.06	Four more states join investigation of Microsoft.	Pro
47	10/17/97	0.70	-0.68	-0.74	-2.21	Microsoft under investigation by European officials.	Pro
48	10/21/97	1.96	-0.52	-1.35	-0.40	U.S. sues Microsoft over PC browser-move to restrict bundling with Windows 95 hits key market strategy. MS profit tops analysts' forecasts.	?
49	11/3/97	-0.49	-0.58	-1.66	0.13	Senate internet panel to probe Microsoft's power.	Pro
50	11/10/97	-0.33	-0.18	1.40	-1.01	Texas sues Microsoft, alleging licenses impede state's probe.	Pro
51	12/8/97	1.90	1.09	0.48	-0.74	Microsoft, Justice Department face off, but hearing ends without decision.	?
52	12/12/97	-1.29	-2.75	-2.65	-5.46	Microsoft is dealt a blow on internet plans-judge orders firm to stop bundling software with Windows operating systems.	Pro
53	12/18/97	-1.94	-0.93	-4.90	0.93	U.S., Microsoft clash on court-order compliance.	Pro
54	12/30/97	0.30	-0.55	1.06	-0.24	Microsoft is again assailed by DOJ, which says firm thwarts court order.	Pro

event is classified as pro-enforcement. In contrast, the April 15, 1991 article announcing that the FTC was broadening its investigation (clearly pro-enforcement) was followed by an April 17 report that Microsoft earnings increased 65%. This event is placed in the ambiguous category.

Table 1 lists 29 pro-enforcement events. These stories report antitrust investigations, inquiries proceeding or expanding, pressure on antitrust authorities for stricter enforcement, signals implying a collapse of the negotiated consent decree, and state-level antitrust investigations of Microsoft. Table 2 reports the summary statistics for the event dates and all days in the sample. Average abnormal returns over the 29 pro-enforcement dates for Microsoft equal  $-0.45\%$  on the day of publication and  $-1.16\%$  over three days ( $t - 1, t, t + 1$ ). The computer industry portfolio also declines: average abnormal returns are  $-0.26\%$  over the one-day window and  $-0.53\%$  over the three-day window. On average, both Microsoft and other computer firm stocks decline in value when antitrust measures directed against Microsoft are announced in the press.

Table 1 reports eight anti-enforcement events (i.e., positive events for Microsoft shareholders). Four involve the joint struggle of Microsoft and the DOJ with Judge Sporkin over the proposed consent decree. Table 2 reports Microsoft's mean abnormal return on those eight news dates as  $2.65\%$ . The three-day

Table 2

Means, medians and standard deviations of residual returns for Microsoft and the rest of the computer industry at announcements of enforcement actions in the *Wall Street Journal*.

		1-day		3-day	
		Microsoft (%)	Industry (%)	Microsoft (%)	Industry (%)
Pro-enforcement $n = 29$	Mean	-0.45	-0.26	-1.16	-0.53
	Median	-0.58	-0.29	-1.54	-0.24
	SD	1.60	0.73	2.73	1.48
Ambiguous $n = 17$	Mean	0.85	-0.13	0.33	-0.26
	Median	0.52	-0.18	0.18	-0.40
	SD	2.57	0.76	2.99	1.55
Anti-enforcement $n = 8$	Mean	2.65	0.59	2.34	1.15
	Median	3.03	0.63	1.77	1.29
	SD	1.70	0.53	2.82	1.40
All event $n = 54$	Mean	0.42	-0.09	-0.16	-0.18
	Median	0.29	-0.05	0.06	-0.09
	SD	2.23	0.75	2.99	1.57
All days $n = 1771$	Mean	0.00	0.00	0.00	0.00
	SD	1.75	0.87	2.92	1.72

return is 2.34%. Average abnormal returns for the rest of the industry are 0.59% and 1.15% over one and three days, respectively. Microsoft and other computer firm stocks generally increase in value when antitrust enforcement declines.

Table 2 shows that the 17 ambiguous events are accompanied by a positive one-day return for Microsoft (0.85%) and a much higher standard deviation. Microsoft's median one-day return (0.53%) is substantially closer to zero. Over three days, Microsoft's mean and median returns are even closer to zero (0.33% and 0.18%). Industry returns are negative, especially over three days.

Note that Microsoft's returns provide a barometer for our choice of event dates. Three facts support our a priori classification and suggest that the associated publication dates mark events of importance for Microsoft shareholders. First, Microsoft's one-day return is higher on the eight anti-enforcement dates than on the 29 pro-enforcement dates ( $t = 4.74$ ). Second, Microsoft's one-day return is statistically indistinguishable from zero on the ambiguous dates ( $t = 1.36$ ) and much more volatile. Third, the standard deviation of Microsoft's returns is higher on the 54 event dates than for the sample as a whole.

To construct a portfolio of non-Microsoft computer sector stocks, we include all firms in *Hoover's Guide to Computer Companies 1995* that are publicly traded in the U.S. and operate primarily in the computer industry. We allocate the resulting 159 firms to one of nine industry segments based on their description in *Hoover's*. We exclude two product lines – electronic content and mainframes – because each has only two firms. Not all firms are publicly listed throughout the sample period. The Appendix lists the nine industry segments, their representative products, and the names of the firms in each. We calculate the simple mean return in each segment and then calculate the simple mean return across segments. We also utilize an index with equal weighting for each firm in the industry (save Microsoft), and the results for that model are reported as well. They do not vary substantially from the results based on equally weighted segments, which are the results we discuss below. Either method avoids having a handful of large-capitalization firms such as Intel, Hewlett-Packard, and Compaq dominate a value-weighted portfolio.

## 5. Empirical results

This paper estimates the marginal effect of Microsoft antitrust enforcement news on equity values in each of nine segments of the computer industry. We employ the multivariate regression model used extensively in stock market studies of regulation. Binder (1985) discusses the use of the multivariate

regression model in event studies and credits the method to Gibbons (1980, Appendix D).<sup>1</sup>

Define  $D_t$  as a  $[0, 1]$  variable that equals unity if a given event occurs on day  $t$ ; let  $R_{it}$  be the return for an index, segment, or firm  $i$  on day  $t$ , and let  $M_t$  be the return on the market on day  $t$ . We estimate the following regression:

$$R_{it} = a_i + b_i M_t + \sum_{k=-5}^5 c_{i,t+k} D_{i,k} + \varepsilon_{it}. \quad (1)$$

The term  $b_i$  is the coefficient of the market model. The  $c_{i,t+k}$  coefficients yield estimates of the daily leading, simultaneous, or lagging effects of an event, and the summed values of the estimated  $c_{i,t+k}$ 's over  $k = [-5, 5]$  yield the cumulative effect. The discussion of results will focus on the three-day window,  $k = [-1, 1]$ .

### 5.1. Antitrust events signed a priori

Table 3 presents estimates from Eq. (1) for eight anti-enforcement and 28 pro-enforcement events. (While 29 news stories are assigned pro-enforcement status, the last event date, December 30, 1997, occurs too late to allow estimation of lagging effects.) During the latter, Microsoft shares decline by an average of 1.20% over three days ( $t = -2.06$ ), while the rest of the industry declines 0.71% per event ( $t = -2.45$ ). Manufacturers of components and network products, as well as distributors, experience statistically significant declines of 1% or more. The other sectors are all negative over three days. The top panel of Fig. 1 shows the comparatively strong negative effects for Microsoft over these 28 events and substantially weaker, though still negative, effects for the computer industry portfolio.

Also seen in Table 3 are mirrored results during the eight anti-enforcement events. Microsoft's stock increases by 2.36% on average over the three-day windows ( $t = 2.19$ ), while the equally weighted nine-segment portfolio experiences three-day returns of 1.18% ( $t = 2.21$ ). Firms making components, network products, PC software, and semi-conductors witnessed three-day returns in excess of 1%. No industry segments exhibit negative three-day returns, while the few negative returns over one or 11-day windows are statistically insignificant. The bottom panel of Fig. 1 graphs the cumulative returns indicating that the anti-enforcement events have strong positive effects on Microsoft shares and positive, although smaller, effects on other computer stocks.

<sup>1</sup> Also see Salinger (1992). Papers using this method include Schipper and Thompson (1983), Rose (1985), Smith et al. (1986), Binder (1988), Karafiath and Glascock (1989), Cornett and Tehranian (1990), and Alexander and Spivey (1994).

Table 3

## Computer sector returns during Microsoft antitrust news windows

Coefficients and *t*-statistics for regressions of firm or industry segment returns on lagging and leading dummy variables that are coded as shown in Table 1. Coefficients for the constant and the market return are calculated but not reported. One pro-enforcement event is omitted due to insufficient data for estimation of the lagging terms.

Firm or Segment	8 Anti-enforcement events			28 Pro-enforcement events		
	11-Day [ - 5, 5]	3-Day [ - 1, 1]	1-Day [0]	11-Day [ - 5, 5]	3-Day [ - 1, 1]	1-Day [0]
Microsoft	-0.0039 (-0.019)	0.0236 (2.19)	0.0265 (4.28)	-0.0194 (-2.01)	-0.0120 (-2.06)	-0.0049 (-1.45)
Average of computer firms	0.0149 (1.45)	0.0117 (2.19)	0.0060 (1.94)	-0.0029 (-0.60)	-0.0059 (-2.04)	-0.0028 (-1.70)
Average of computer segments	0.0131 (1.29)	0.0118 (2.21)	0.0060 (1.94)	-0.0035 (-0.74)	-0.0071 (-2.45)	-0.0036 (-2.07)
Component	0.0271 (1.57)	0.0198 (2.20)	0.0147 (2.83)	-0.0121 (-1.51)	-0.0184 (-3.79)	-0.0036 (-1.28)
Computer	0.0181 (1.21)	0.0085 (1.09)	0.0072 (1.60)	-0.0045 (-0.65)	-0.0064 (-1.52)	-0.0050 (-2.06)
Corporate	-0.0075 (-0.42)	0.0022 (0.24)	-0.0065 (-1.23)	-0.0060 (-0.73)	-0.0092 (-1.86)	-0.0052 (-1.81)
Distributor	-0.0153 (-0.89)	0.0079 (0.88)	0.0027 (0.53)	-0.0052 (-0.66)	-0.0111 (-2.31)	-0.0005 (-0.18)
Network	0.0072 (0.44)	0.0124 (1.45)	0.0104 (2.10)	-0.0117 (-1.53)	-0.0108 (-2.34)	-0.0062 (-2.33)
PC-Software	0.0201 (1.31)	0.0143 (1.73)	0.0057 (1.21)	0.0003 (0.05)	-0.0023 (-0.52)	-0.0022 (-0.87)
Peripheral equipment	0.0180 (0.92)	0.0072 (0.69)	0.0025 (0.42)	0.0014 (0.15)	-0.0003 (-0.06)	-0.0071 (-2.22)
Semi-conductor	0.0308 (1.49)	0.0258 (2.39)	0.0188 (3.02)	0.0049 (0.51)	-0.0043 (-0.73)	-0.0005 (-0.14)
Non-PC Software	0.0189 (1.51)	0.0085 (1.28)	-0.0007 (-0.19)	0.0010 (0.18)	-0.0007 (-0.19)	-0.0007 (-0.36)

The dollar values implied by these estimates are of interest. The 159 computer firms used in this study have an aggregate market capitalization of \$141 billion in January 1991 and \$754 billion in December 1997. (This increase reflects the growth in value of the firms as well as an increase in the number of firms.) The

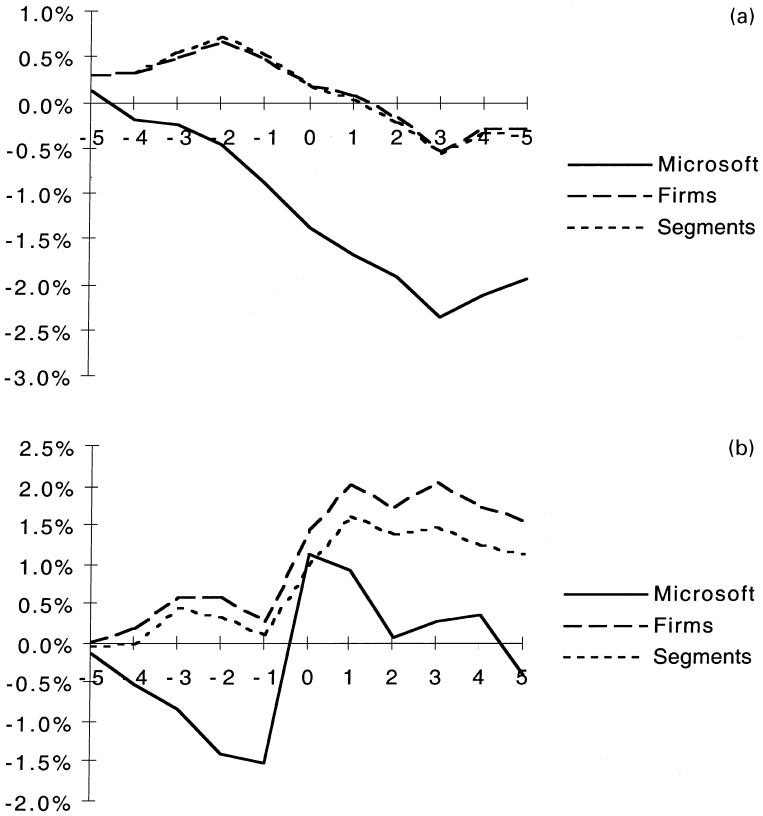


Fig. 1. Cumulative residual returns for Microsoft, equally weighted average of all computer firms in the sample (excluding microsoft), and equally weighted average of all segments (excluding Microsoft). The upper panel shows the cumulative residual returns from day - 5 through day 5 around 28 'pro-enforcement' antitrust event dates involving Microsoft. The solid line shows the cumulative returns for Microsoft, the long dashes for an equally weighted portfolio of all other firms in our sample, and the short dashes for a portfolio of equally weighted segments (themselves equally weighted averages). The lower panel shows similar cumulative returns for eight 'anti-enforcement' antitrust event dates involving Microsoft. The list of dates appears in Table 1. (a) Pro-enforcement events ( $n = 28$ ), (b) Anti-enforcement events ( $n = 8$ ).

mean three-day return per event of  $-0.59\%$  for the average of all computer firms implies a loss of several hundred million to several billion dollars per event. In fact, this group experiences mean market-adjusted declines in value of \$1.2 billion on the three days surrounding each of 29 pro-enforcement events. The cumulative decline is \$35 billion. Conversely, the same group of firms has a mean increase in value of \$8.8 billion on the three days surrounding each of the

eight anti-enforcement events. The cumulative increase is \$70 billion. Clearly, in view of the large standard errors attached to these estimates, they should be taken with a grain of salt. The fact that the cumulative increase is greater than the cumulative decline might only reflect the possibility that good news for Microsoft came as more of a surprise than bad news. Still, these dollar estimates offer some idea of the importance for the computer industry as a whole of policies directed against Microsoft.

### 5.2. *Antitrust events defined by Microsoft stock price reactions*

As an alternative to a classification system that relies on the investigator's judgment, we allow Microsoft stock price movements themselves to identify announcements as good or bad news for Microsoft. A positive event for Microsoft, which we classify as anti-enforcement, occurs on one of the 54 dates in Table 1 when either a) Microsoft's cumulative residual return exceeds 2% over the five-day interval  $[-4, 0]$  or b) Microsoft's daily residual return exceeds 2% on any day of the three-day interval  $[-2, 0]$ . The longer, five-day criterion based on cumulative returns is intended to capture slow releases of information, and the shorter, three-day criterion is intended to capture sudden releases of information. We define a negative (pro-enforcement) event symmetrically. For the 1771 days in the sample Microsoft's cumulative five-day residual excess returns exceed two percent 26.7% of the time and fall below minus two percent 28.9% of the time. Microsoft's daily excess returns exceed 2 percent with probability 16.6%, and fall below  $-2\%$  with probability 11.7%.

Twenty-four of the 54 events are accompanied by increases in Microsoft stock as defined here; of these, six are among the eight defined a priori as anti-enforcement events in Table 1. We eliminate the July 14 and July 24, 1995 event because they coincide with a sharp increase and then collapse of Microsoft's stock price that was linked with shifting earnings expectations in connection with the July 18 publication of earnings news. The two event dates are separated by only five trading days. Twenty-three of the 54 events in Table 2 are flagged by threshold declines in Microsoft stock; of these, 15 are among the 29 defined as pro-enforcement events in Table 1.

The results in Table 4 show that negative movements of Microsoft stock at the time of enforcement actions coincide with negative returns for rest of the industry. Not surprisingly, Microsoft stock declines by 2.18% over three days ( $t = -3.49$ ) and by 4.52% over 11 days ( $t = -3.89$ ). However, the industry as a whole declines by 0.62% over three days ( $t = -2.00$ ) and by 1.05% over 11 days ( $t = -1.83$ ). Fig. 2 shows this pattern and that both Microsoft and other computer stocks continue to decline after the event dates.

On news accompanied by positive Microsoft stock movements, the rest of the industry prospers. Microsoft's stock price increases an average of 1.49% during

Table 4

Computer sector returns during microsoft antitrust news windows accompanied by increases or decreases in Microsoft stock price

Coefficients and *t*-statistics for regressions of firm or industry segment returns on lagging and leading dummy variables equal to unity if (a) an antitrust event listed in Table 1 occurred and (b) Microsoft's cumulative residual return increased by more than 2% over the five days  $[-4, 0]$  or increased by 2% on any day  $[-2, 0]$  (to identify implied anti-enforcement events), or Microsoft's cumulative residual return declined by more than 2% over the five days  $[-4, 0]$  or declined by 2% on any day  $[-2, 0]$  (to identify implied pro-enforcement events).

Firm or Industry	Antitrust news & Microsoft increases ( $n = 24$ )			Antitrust news & Microsoft decreases ( $n = 23$ )		
	11-Day [-5, 5]	3-Day [-1, 1]	1-Day [0]	11-Day [-5, 5]	3-Day [-1, 1]	1-Day [0]
Microsoft	0.0076 (0.73)	0.0149 (2.48)	0.0167 (4.60)	-0.0452 (-3.89)	-0.0218 (-3.49)	-0.0066 (-1.81)
Average all computer firms	0.0053 (1.02)	0.0000 (0.01)	0.01 (0.53)	-0.0105 (-1.83)	-0.0056 (-1.81)	-0.0025 (-1.38)
Average all computer segments	0.0065 (1.26)	-0.0004 (-0.12)	0.0006 (0.33)	-0.0105 (-1.83)	-0.0062 (-2.00)	-0.0029 (-1.61)
Components	-0.0001 (-0.01)	-0.0039 (-0.78)	0.0031 (1.02)	-0.0073 (-0.75)	-0.0112 (-2.13)	-0.0027 (-0.87)
Computer	0.0038 (0.51)	-0.0024 (-0.55)	-0.0033 (-1.23)	-0.0105 (-1.24)	-0.0082 (-1.82)	-0.0049 (-1.85)
Corporate	0.0033 (0.37)	-0.0001 (-0.01)	-0.0029 (-0.94)	-0.0130 (-1.30)	-0.0078 (-1.46)	-0.0047 (-1.51)
Distributor	-0.0122 (-1.41)	-0.0010 (-0.20)	-0.0006 (-0.21)	-0.0197 (-2.04)	-0.0038 (-0.73)	0.0028 (0.91)
Network	-0.0011 (-0.13)	-0.0024 (-0.51)	0.0002 (0.06)	-0.0171 (-1.85)	-0.0037 (-0.75)	-0.0052 (-1.79)
PC-Software	0.0102 (1.28)	0.0001 (0.14)	0.0009 (0.32)	-0.0100 (-1.12)	-0.0078 (-1.63)	-0.0048 (-1.70)
Peripheral Equipment	0.0184 (1.84)	0.0008 (0.14)	-0.0023 (-0.66)	-0.0156 (-1.40)	-0.0065 (-1.10)	-0.0064 (-1.83)
Semi-Conductor	0.0324 (3.10)	0.0022 (0.36)	0.0079 (2.18)	0.0089 (0.76)	-0.0024 (-0.39)	0.0001 (0.01)
Non-PC Software	0.0039 (0.61)	0.0029 (0.77)	0.0025 (1.11)	-0.0106 (-1.50)	-0.0043 (-1.12)	-0.0005 (-0.22)

the three-day windows. Note that the cumulative return over the longer 11-day interval is only 0.76%. Fig. 2 shows that for this cluster of events, Microsoft stock declines after day zero, largely reversing earlier gains. (The decline over



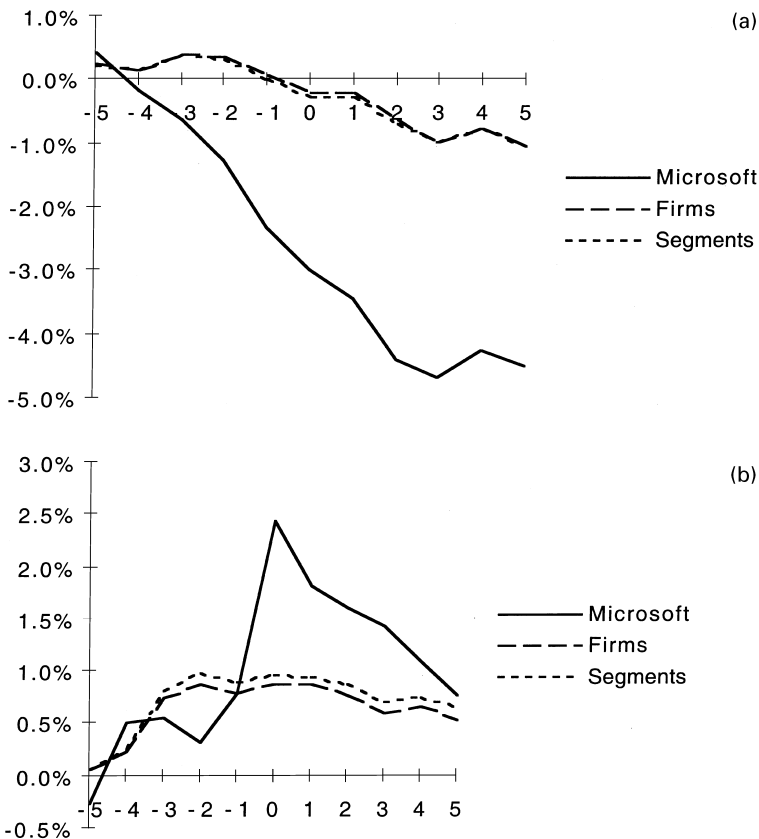


Fig. 2. Cumulative residual returns for Microsoft, equally weighted average of all computer firms in the sample (excluding Microsoft), and equally weighted average of all segments (excluding Microsoft). The upper panel shows the cumulative residual returns from day  $-5$  through day 5 around 23 antitrust event dates involving Microsoft and marked by threshold declines in Microsoft's residual returns. The solid line shows the cumulative returns for Microsoft, the long dashes for an equally weighted portfolio of all other firms in our sample, and the short dashes for a portfolio of equally weighted segments (themselves equally weighted averages). The lower panel shows similar cumulative returns for 24 antitrust event dates involving Microsoft and marked by threshold increases in Microsoft's residual returns. The list of dates appears in Table 1. Enforcement actions accompanied by Microsoft stock price (a) declines ( $n = 23$ ), (b) increases ( $n = 24$ ).

days 2 through 5 is not statistically significant.) The average of all computer segments (and the average of all firms) experience returns that are statistically indistinguishable from zero around these 'positive' events. As seen in Fig. 2, cumulative industry returns move up about 1% in the four days prior to the event dates.

### 5.3. *A fishing expedition*

The results in Tables 3 and 4 offer no support for the view that investors expect antitrust enforcement to improve efficiency. Events implying an antitrust victory for Microsoft do not harm the industry, and actions hurting Microsoft do not help. Yet perhaps we have overlooked financial market evidence that supports the pro-consumer view of antitrust.

To investigate this possibility, we reverse our method. Instead of testing abnormal returns around event dates to determine whether the pattern suggests that investors expect antitrust policy to enhance efficiency, we cull the data for windows displaying the pattern consistent with pro-consumer policy expectations – specifically, a negative correlation between Microsoft and computer sector returns. What sorts of events generate these results, and, specifically, do policy interventions play a role?

We identify one-day and three-day periods over which either Microsoft's abnormal return declines by at least 1.5 standard deviations while the abnormal return of the computer portfolio increases by at least one standard deviation, or the inverse occurs (Microsoft up, computer industry down). Table 5 shows the relevant dates, one- and three-day returns, and possible causative events for the Microsoft stock price movement and/or the large opposing movement in other computer firm stocks. The flagged dates occur in 19 clusters, numbered at the left. The bold percentages pass the respective hurdles (one- or three-day). Typically, the related news stories deal with earnings news, product announcements, or other non-antitrust litigation (e.g., Apple's 'look-and-feel' suit, March 7, 1991).

Of the 54 antitrust news events in the 1991–97 period, only three coincide with substantial capital losses for Microsoft and capital gains for the non-Microsoft computer sector, or the reverse. The first is the April 15, 1991 announcement that the FTC was broadening its investigation. However, the signs of the one-day returns (Microsoft positive, industry negative) are opposite from those implied by the pro-efficiency theory of antitrust, while the three-day returns for both Microsoft and the industry are negative. The second date is February 5, 1993, when the FTC vote on issuing a preliminary injunction split 2-2. While the one-day price movements are consistent with the pro-efficiency view of antitrust (Microsoft up, computer sector down), the three-day returns for both Microsoft and the industry are strongly negative. The third and final event involves the July 31, 1995 story that the DOJ was planning to examine Microsoft's bundling practices. This was preceded by a decline in Microsoft's shares and positive returns for the rest of the industry on the three days centered on July 27. However, other events – such as the July 26 announcement that Microsoft had settled a California consumer protection lawsuit and a July 27 announcement that Oracle, Apple, and IBM were teaming up against Microsoft – are more closely linked in time. Overall, the small number of instances in which Microsoft

and computer industry shares react in substantial opposition around the announcement of antitrust enforcement news concerning Microsoft, as well as examination of the few episodes showing the appropriate correlation, lend little support to the pro-efficiency view of antitrust.

#### 5.4. *Antitrust enforcement and the correlation between Microsoft and computer industry returns*

A final test is again generated by the negative correlation between Microsoft's residual return and the residual return of the computer sector that is implied by a pro-efficiency antitrust regime. Successes and failures of such a regime should lower the typical positive correlation between Microsoft's residual returns and the residual returns of the rest of the industry. In fact, the correlation increases on the 54 event dates ( $r = 0.3258$ ) compared to the 1717 non-event days ( $r = 0.2578$ ). An analysis of the algebraic signs of residual returns yields a similar result. Victories for effective antitrust should result in more negative Microsoft residual returns accompanied by positive rest-of-industry residual returns. In fact, the frequency of that combination declines on the 54 event dates compared to the rest of the sample, from 23.6% to 14.8%. That decline is statistically significant at the 5% level ( $t = 1.75$ ). Similarly, setbacks for effective antitrust should result in more positive Microsoft residual returns accompanied by negative rest-of-industry returns. However, that pattern occurs at roughly the same rate on the 54 event dates, 18.9% rather than 20.4% of the time.

#### 5.5. *Summary of empirical results*

We have been unable to find evidence that antitrust initiatives against Microsoft created expected gains for the rest of the computer industry. Policy measures affect Microsoft share prices, which decline in response to pro-enforcement news and increase with the release of anti-enforcement news. On average, however, the pro-enforcement (anti-enforcement) actions are accompanied by declines (increases) in the rest of the computer industry. Even a deliberate search for effects that would yield opposing price movements fails to find evidence that antitrust efforts have helped the industry. Indeed, investors appear to believe that antitrust enforcement *increases* the link between the fortunes of Microsoft and other computer firms.

### 6. *The political economy of U.S. vs. Microsoft*

If antitrust enforcement against Microsoft produces zero or negative returns for allegedly victimized computer firms, why does it occur? We offer three possible explanations warranting further study.

Table 5  
One- and three-day periods with large negative (positive) Microsoft returns and large positive (negative) returns for the rest of the industry

The table shows excess returns for day  $t$  or the compounded returns for days  $t - 1$  through  $t + 1$  on which Microsoft's excess return exceeded 1.5 standard deviations and the return for the industry fell below 1.0 standard deviations, or the reverse. *Wall Street Journal* news stories at or near each cluster of dates either involve antitrust or related legal action or otherwise could explain the inverse movement of Microsoft and the rest of the industry. Boldface indicates returns that pass the hurdle for inverse movements. Returns clustered by groups of event dates.

Dates	One-day return ( $t$ )		Three-day return ( $t - 1, t, t + 1$ )		Story and Date
	Microsoft (%)	Industry (%)	Microsoft (%)	Industry (%)	
1. 3/6/91	-3.71	-0.68	-5.59	1.99	A federal judge boosts Apple's chances of profiting from GUI by striking down key defense arguments in its case against MS, H-P, 3/7 FTC broadening investigation, 4/15; Microsoft reports increased earnings, 4/17 Net income figures, 1/20 FTC splits 2 - 2 against injunction, administrative action still possible, 2/8 Patent office rejects MS rights to "Windows" trademark, 2/25
3/7/91	3.11	1.36	-7.84	1.27	
4/15/91	5.69	-1.60	-2.61	-1.57	
3. 1/17/92	-1.23	0.80	-5.46	1.83	No stories Earnings report, 4/19 New OS "Chicago", 4/25 Earnings report, 4/14; reports on pending Intuit deal, 4/21 MS settled Calif. lawsuit, 7/26; Oracle, Apple, and IBM team up against MS, 7/27; DOJ to look at bundling of web software, 7/31
4. 2/5/93	5.08	2.18	-3.37	-4.65	
5. 2/23/93	3.56	1.71	3.06	-4.04	
2/24/93	3.28	0.98	6.86	-2.05	
6. 2/8/94	-2.65	1.09	-3.44	2.49	
7. 4/18/94	-0.99	-0.44	6.31	-1.75	
4/19/94	6.54	1.60	7.73	-4.30	
4/20/94	2.12	-2.31	8.67	-2.68	
8. 4/18/95	-0.42	-0.54	6.44	-2.33	
9. 7/27/95	-0.62	1.27	-5.04	2.10	

10.	12/6/95	498	- 1.27	2.76	- 2.95	MS announces NBC pact, 12/7; MS announces new flurry of new internet products, 12/7
11.	12/20/95	- 3.43	1.04	1.42	3.81	No stories
12.	1/16/96	305	- 1.24	- 1.77	- 4.28	Microsoft to buy Vemeer (web software co.), 1/16
13.	9/25/96	- 1.25	1.38	- 4.97	2.24	Bingaman recuses herself from MS case, 9/23
14.	12/17/96	329	- 1.73	2.82	- 2.21	Story on MS issue of preferred stock, possible raid on competitors, 12/16
15.	12/18/96	2.07	0.54	5.61	- 3.49	
	4/4/97	- 2.77	1.32	1.02	2.24	MS, Intel, and Compaq initiative on digital TV standards, 4/4; MS to buy Web TV, 4/7
16.	4/17/97	- 0.05	0.68	8.68	- 2.89	
	4/18/97	8.94	- 1.54	10.40	- 2.13	Earnings report, 4/18
	4/21/97	1.39	- 1.27	11.08	- 4.95	
	4/22/97	0.57	- 2.22	6.07	- 3.95	
17.	5/2/97	- 3.28	0.98	- 7.52	3.13	No stories
	5/5/97	- 3.99	0.86	- 8.87	2.50	
	5/6/97	- 1.86	0.64	- 5.63	3.17	Borland sues MS, 5/8
18.	7/18/97	- 3.95	1.08	- 5.12	0.87	Java announcement, 7/18
19.	7/22/97	2.92	- 1.23	- 2.23	- 1.15	MS to acquire Progressive Networks, 7/22; MS to increase sales, marketing efforts, 7/24

### 6.1. Private use of antitrust

Clearly, some of Microsoft's competitors have an economic interest in government action. This possibility is recognized in the 'raising rivals' costs' literature (Krattenmaker and Salop, 1986) and in work that emphasizes the use of antitrust to constrain competitors' strategies (Baumol and Ordover, 1985; Baron, 1998). Attacks on Microsoft can be profitable even for firms that benefit from Microsoft products generally. Netscape's browser competes with Microsoft's Internet Explorer, for instance, but is complementary with ('dependent on' in the antitrust allegation) Microsoft's operating systems MS-DOS, Windows 95, Windows 98, and NT.

In fact, managers of several computer firms have actively promoted the case against Microsoft. Netscape cooperated with the 1998 Department of Justice case, and retained former Judge Robert Bork to write a 'white paper' for public dissemination and to argue the case in television debates and op-ed page articles.<sup>2</sup> Sun Microsystems and Oracle executives have also endorsed the case against Microsoft. Sun CEO Scott McNealy comments, 'I think the government is doing all the right things. Government has to come in and discipline (Microsoft) until the rest of the world catches up' ('Microsoft antitrust case splits Valley', *San Jose Mercury News*, October 12, 1998). Similar sentiments have been expressed by Oracle CEO Larry Ellison ('In parts of Silicon Valley, muted applause', *New York Times* online edition, May 19, 1998). Novell prevailed upon Orrin Hatch (R-UT), its home state senator and powerful head of the Judiciary Committee, to hold hearings on the problem of monopoly in the computer industry, and to pressure the Department of Justice to take sterner enforcement measures against Microsoft. A trade association has been established to pressure policymakers to increase regulatory scrutiny of Microsoft. The Project to Promote Competition and Innovation in the Digital Age (ProComp) is 'funded by Microsoft's competitors including Sun Microsystems and Netscape'. ('Microsoft, foes square off over Windows 98', *San Jose Mercury News*, May 6, 1998).

We examine the returns of individual firms and find no systematic evidence that the likely beneficiaries (e.g., Netscape, Sun, Novell, Apple) realize higher returns when antitrust enforcement measures are taken against Microsoft. In specific instances, however, antitrust enforcement actions did seem to benefit Netscape shareholders. For example, the December 12, 1997 court order that kept Microsoft from bundling its software was accompanied by negative returns

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<sup>2</sup>'Culture clash', *National Journal*, May 16, 1998, p. 1102; 'Book Bork, browser Bork', *Slate Magazine*, Dec. 10, 1998; 'Browser Bork replies', *Slate Magazine*, Dec. 29, 1998; 'What antitrust is all about', *New York Times*, May 4, 1998, op-ed page; 'The most misunderstood antitrust case', *Wall Street Journal*, May 22, 1998, op-ed page; 'Full text of Bork's 'White Paper' on DOJ vs. MS, ZDNN, July 29, 1998, online at [www.zdnet.com](http://www.zdnet.com).

for both Microsoft and the industry as a whole but a 6.2% increase in Netscape's price. (This gain was quickly reversed.) If the expected benefits to competing firms are in fact scant, managerial support for antitrust in this instance could reflect a principal-agent problem. The specter of Microsoft could provide a rationalization for managerial shortcomings. As shown, such distractions do not come cheaply. Companies producing highly complementary goods to Microsoft stand to incur the largest capital losses from inefficient antitrust interventions. Consistent with shareholder interests revealed in the financial market data examined above, they have opposed the case. This anti-antitrust group includes the major computer makers (Compaq, Dell, Hewlett-Packard), the major chip maker (Intel), and the major computer retailers (CompUSA and Vanstar). In fact, the CEO's of 26 major computer industry firms signed a letter sent to the Department of Justice in May 1998 requesting that the government refrain from filing additional antitrust charges against Microsoft ('Microsoft seeks allies to halt antitrust move', *Wall Street Journal Interactive Edition*, May 1, 1998; 'PC Makers, despite Microsoft suit, aren't clamoring to control screen', *Wall Street Journal Interactive Edition*, May 19, 1998).

The behavior of individual states also sheds light on the political support for action against Microsoft. The May 1998 suit filed by the DOJ was accompanied by a suit filed by 20 states. As has been widely observed in the press, these states appear to have been the subject of intense lobbying pressure from locally based computer companies. California, home to important Microsoft competitors such as Sun, Oracle, and Netscape, filed; Texas, home to important Microsoft complement suppliers such as Compaq, Dell, and CompUSA, did not, despite the fact that the Texas attorney general had originally begun the states' investigation of Microsoft ('Microsuits', *Slate Magazine* online, May 22, 1998; 'Politics play a role in states' status in antitrust action against Microsoft', *Wall Street Journal Interactive Edition*, May 28, 1998).

## 6.2. Bureaucratic self-interest

Government agents may themselves gain from legal action. Top-level antitrust officials typically enjoy short tenure and receive much of their compensation in human capital (Wilson, 1980). At the state level, attorneys general often use high-visibility litigation to enhance their political stature. The Microsoft case is 'the type of case attorneys general dream about, regardless of how deeply it affects – or fails to directly affect – their states' consumers or businesses ... It's also true that a number of the AGs (the letters are sometimes said to stand for 'aspiring governors') involved in the suit are seeking higher office' ('Politics play a role in states' status in antitrust action against Microsoft', *Wall Street Journal Interactive Edition*, May 28, 1998). In the case of Microsoft, antitrust officials have also received substantial favorable publicity. Tellingly, rival agencies have fought over federal jurisdiction, and the Federal Trade Commission initiated

what some dub ‘copycat’ investigations of Intel and Cisco (‘The main event: ‘Browser’ Bill Gates vs. Joel ‘The Trustbuster’ Klein’, *Time Magazine* online, June 1, 1998; ‘Wrestling for glory in the antitrust arena’, *Washington Post*, June 12, 1998, p. F1; ‘Justice Department and FTC battle to bust the biggest antitrust prizes’, *Wall Street Journal Interactive Edition*, June 11, 1998).

### 6.3. Political extraction

The rent-seeking literature points out that policy makers exploit the competition between interest groups for government favors. Policy makers may also extract rents from private parties. In this framework, political officeholders are not entirely passive. They achieve some degree of market power and exploit this incumbency to demand payments from various economic actors with rents at risk (McChesney, 1997). Transfers can take the form of campaign contributions, non-monetary political support, or public cooperation on a policy issue (including a consent decree in an antitrust case).

According to some accounts, the government took action against Microsoft at least in part because it lacked a ‘Washington presence’. Compared to other large firms, Microsoft historically contributed only small sums to political campaigns. It only recently opened a Washington office to represent its interests. Policy makers might have been attempting to ‘correct’ this ‘underinvestment’ in political goodwill with heightened antitrust scrutiny (‘Culture clash’, *National Journal*, May 16, 1998, p. 1102).

## 7. Conclusion

In what *The Economist* identifies as ‘the biggest antitrust case in a generation’ (‘At war with Microsoft’, *The Economist*, May 23–29, 1998, online version), a large number of firms have products that are tied to the success of the allegedly monopolized product, desktop operating systems. These firms will prosper if actions are taken – by Microsoft or the DOJ – to make operating systems cost less, function better, or provide a more convenient platform for popular products. Policy actions that are expected to effectively constrain Microsoft’s market power should simultaneously increase economic efficiency and improve profitability for firms throughout the sector.

This study turns to the stock market evidence. Have repeated antitrust initiatives against Microsoft increased the expected earnings of (non-Microsoft) firms in the computer industry? The answer is a decisive ‘no’. In fact, government action against Microsoft appears to inflict capital losses on the computer sector as a whole. Retreats in antitrust enforcement offer symmetric confirmation: withdrawals from policy enforcement have been accompanied by positive shareholder returns throughout the computer sector.



These results deserve attention for three reasons. First, the burden of proof ought to be on policy intervention. A case of this magnitude generates clear costs to the government (i.e., taxpayers) and to Microsoft. In fact, each enforcement action lowered Microsoft’s stock by 1.2%, roughly \$3 billion at May 1998 share prices. It should produce visible gains in the form of positive returns to the large number of other firms in the computer sector. That such gains fail to be in evidence is the key finding of this study. Moreover, rather than generating offsetting gains, each enforcement action decreased a broad index of other computer stocks by 0.7%, equivalent to an additional loss of \$5 billion dollars in May 1998.

The second reason these results demand attention is that they suggest that antitrust policy has lowered returns to investments in the computer sector and discouraged capital inflows. Policy risk increases the cost of capital across an entire industry when intervention occurs at a key point within that sector. Pindyck (1991) and Dixit and Pindyck (1994) model the investment-reducing effect of public policy uncertainty.

Third, stock market data produce a bottom-line evaluation of public policy. Rather than narrowly focusing on alleged abuses of market power, financial markets also consider likely policy outcomes. When actual markets are compared to hypothetical alternatives in traditional antitrust analysis, policy makers run the risk of ‘fanciful reasoning [wherein] much mischief and little useful purpose is served by pronouncing failure if no clearly superior feasible alternative can be described and implemented with expected net gains’ (Gilbert and Williamson, 1998, p. 7). Financial markets set asset prices by utilizing the best available predictions as to what the full spectrum of antitrust enforcement actions will achieve. The verdicts rendered by ‘courts of investor opinion’ constitute reliable economic evidence compared to the available alternatives.

## Appendix A

Perm numbers and names of firms used in this study, from Hoover’s Guide to Computer Companies 1995. Firms are assigned to an industry segment on the basis of the company description. Not all firms are publicly listed during the entire 1991–1997 period.

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Perm #	Name
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Components Thin-film magnetic heads, printed circuit boards, disk drives, hard drives, SCSI hardware.

77039	READ RITE CORPORATION
57808	VISHAY INTERTECHNOLOGY INC
68161	S C I SYSTEMS INC
66384	WESTERN DIGITAL CORP

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Perm #	Name
89894	MAXTOR CORP
69607	SEAGATE TECHNOLOGY
88795	HUTCHINSON TECHNOLOGY INC
48267	L S I LOGIC CORP
65024	QUANTUM CORP
11365	KOMAG INC
11970	AMERICAN POWER CONVERSION CORP
77183	SYQUEST TECHNOLOGY INC
10353	ADAPTEC INC
75831	DIGI INTERNATIONAL INC
79251	BELL MICROPRODUCTS INC

Computers: PC's, workstations, servers.

12490	INTERNATIONAL BUSINESS MACHS CORP
27828	HEWLETT PACKARD CO
43916	DIGITAL EQUIPMENT CORP
14593	APPLE COMPUTER INC
68347	COMPAQ COMPUTER CORP
10078	SUN MICROSYSTEMS INC
44792	INTERGRAPH CORP
74617	TANDEM COMPUTERS INC
85041	A S T RESEARCH INC
11081	DELL COMPUTER CORP
57592	DATA GENERAL CORP
79973	GATEWAY 2000 INC
11283	SEQUENT COMPUTER SYSTEMS INC

Corporate: Systems integration, information systems consulting.

10890	UNISYS CORP
40125	COMPUTER SCIENCES CORP
80057	WANG LABORATORIES INC NEW
77882	CONTROL DATA SYSTEMS INC
73075	STRATUS COMPUTER INC
76723	FUTURE NOW INC
76846	TECHNOLOGY SOLUTIONS CO
81639	PSINET INC

Distributor: Retailer, wholesaler of computer parts, software.

15560	TANDY CORP
77179	COMPUSA INC

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Perm #	Name
29209	ARROW ELECTRONICS INC
12260	MERISEL INC
11964	EGGHEAD INC
78180	MICRO WAREHOUSE INC
10182	TECH DATA CORP
61524	COMDISCO INC
43781	INACOMP COMPUTER CTRS INC
89763	COMPUCOM SYSTEMS INC
11484	MICROAGE INC
11475	INTELLIGENT ELECTRONICS INC
79483	ELEK TEK INC
76790	LIUSKI INTERNATIONAL INC
75779	RANDOM ACCESS INC
11233	TIGER DIRECT INC

Network: LAN hubs, modems, network file servers.

75625	CABLETRON SYSTEMS INC
76754	BAY NETWORKS INC
76076	CISCO SYSTEMS INC
76129	3COM CORP
51393	B B N CORP
77049	U S ROBOTICS CORP
76654	CHIPCOM CORP
72486	STANDARD MICROSYSTEMS CORP
79024	WALL DATA INC
77793	STRATACOM INC
76842	ARTISOFT INC
86917	COMPUTER NETWORK TECHNOLOGY CP
79152	AUSPEX SYSTEMS INC
77451	XIRCOM INC
77740	NETFRAME SYSTEMS INC
76683	PROTEON INC
79016	TRICORD SYSTEMS INC
79940	ASANTE TECHNOLOGIES INC
81106	SHIVA CORP

PC Software: Database programs, spreadsheets, fax software, entertainment, educational, word processing.

10104	ORACLE CORP
90609	NOVELL INC

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Perm #	Name
50156	LOTUS DEVELOPMENT CORP
76792	SYBASE INC
75902	BORLAND INTERNATIONAL INC
85631	AUTODESK INC
75510	ADOBE SYSTEMS INC
75607	SYMANTEC CORP
77837	BANYAN SYSTEMS INC
78975	INTUIT INC
12259	SIERRA ON LINE INC
77331	FRAME TECHNOLOGY CORP
77094	BRODERBUND SOFTWARE INC
11917	PHOENIX TECHNOLOGY LTD
10114	ACCLAIM ENTERTAINMENT INC
91871	SOFTWARE PUBLISHING CORP
80252	MAPINFO CORP
76698	QUARTERDECK CORP
77971	ELECTRONICS FOR IMAGING INC
80337	MINNESOTA EDUCATIONAL COMP CORP
81248	GENERAL MAGIC INC
79991	MACROMEDIA INC

Peripherals: Scanners, printers, storage and retrieval systems, video monitors.

27983	XEROX CORP
58464	STORAGE TECHNOLOGY CORP
60425	CONNER CORP
40061	TEKTRONIX INC
10147	E M C CORP MA
76566	ZILOG INC
45891	IOMEGA CORP
77781	AMPEX CORP DEL
76281	RADIUS INC
78070	MEDIA VISION TECHNOLOGY INC
20897	CAMBEX CORP
80244	GLOBAL VILLAGE COMMUNICATION
79413	PINNACLE MICRO INC

Semiconductor: Microprocessor, memory chips.

15579	TEXAS INSTRUMENTS INC
59328	INTEL CORP
51377	NATIONAL SEMICONDUCTOR CORP

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Perm #	Name
22779	MOTOROLA INC
61241	ADVANCED MICRO DEVICES INC
14702	APPLIED MATERIALS INC
53613	MICRON TECHNOLOGY INC
79848	V L S I TECHNOLOGY
75603	CIRRUS LOGIC INC
12067	NOVELLUS SYSTEMS INC

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Non-PC Software: Mainframe data processing software, CAD/CAM, electrical design software, executive information systems.

38914	CERIDIAN CORP
25778	COMPUTER ASSOCIATES INTL INC
10419	CREATIVE TECHNOLOGIES CORP
65074	STERLING SOFTWARE INC
30884	LEGENT CORP
11403	CADENCE DESIGN SYSTEMS INC
77859	COMPUTERVISION CORP NEW
10691	INFORMIX CORP
78711	NEWBRIDGE NETWORKS CORP
52813	MENTOR GRAPHICS CORP
11103	SYSTEMS SOFTWARE ASSOC INC
75912	PARAMETRIC TECHNOLOGY CORP
79190	SANTA CRUZ OPERATION INC THE
75828	ELECTRONIC ARTS INC
77357	SYNOPSIS INC
11976	B M C SOFTWARE INC
76752	PROGRESS SOFTWARE INC
11531	FILENET CORP
10398	INTERLEAF INC
10765	CONVEX COMPUTER CORP
13777	AMERICAN SOFTWARE INC
76620	PLATINUM TECHNOLOGY INC
78083	PEOPLESOFT INC
77030	HYPERION SOFTWARE CORP
79081	DAVIDSON and ASSOCIATES INC
79829	F T P SOFTWARE INC
53621	LEARNING COMPANY INC
86597	CHEYENNE SOFTWARE INC
79385	FOURTH SHIFT CORP
77663	NETWORK COMPUTING DEVICES INC

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Perm #	Name
78890	CENTURA SOFTWARE CORP
79157	C D W COMPUTER CENTERS INC
73294	SULCUS COMPUTER CORP
75873	CAERE CORP
79379	DATAWARE TECHNOLOGIES INC
77581	STAC INC
77538	LEARNING COMPANY
80488	XCELLENET INC
80262	PARCPLACE DIGITALK INC
80272	SOFTDESK INC
79577	CORNERSTONE IMAGING INC
81169	NETCOM ON LINE COMM SVCS INC
77976	MCAFEEASSOCIATES INC

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