U.S. vs. Microsoft: A Study of Consolidation Forces

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ABSTRACT

The United States Department of Justice and Microsoft Corporation are engaged in a vigorous legal dispute over the inclusion of Internet technologies in Windows 95. This dispute, however, is merely the most recent antitrust case brought against a high-technology company in recent times, and it follows a great deal of history regarding competition in high-technology industries. This thesis explores these issues through a review of the history of antitrust laws, the regulation of industries that inevitably are monopolized due to market forces, and the process of standardization in technological fields.

This review concludes that while the current Justice Department action is unlikely to succeed, Microsoft is vulnerable to antitrust action, and, in fact, a number of Microsoft’s business practices are similar to practices that were challenged decades ago when used by such companies as IBM and Xerox. In addition, although it does not appear inevitable that a single company monopolize the operating system market for a given type of computer, it is unclear whether Microsoft’s monopoly is so entrenched that it has become irreversible.

Thesis Supervisor: Randall Davis
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Contents

1 Introduction ................................................................................................................. 5

2 Trusts and Antitrust Regulation ................................................................................... 7
  2.1 Background .............................................................................................................. 7
  2.2 Government Antitrust Regulation .......................................................................... 8
    2.2.1 Antitrust Enforcement (1890-1940) ................................................................. 10
    2.2.2 Antitrust Enforcement (1940-1970) ................................................................. 11
    2.2.3 Antitrust Enforcement (1970-present) ............................................................. 13
    2.2.4 Market Definition ............................................................................................. 15
  2.3 Key Technological Antitrust Cases .......................................................................... 17
  2.4 Microsoft Antitrust Position ................................................................................... 20
  2.5 Microsoft Antitrust Dispute ................................................................................... 24
    2.5.1 The Justice Department Petition ...................................................................... 26
    2.5.2 Microsoft's Response ....................................................................................... 28
    2.5.3 Conclusions Regarding Justice Department Petition ....................................... 31
  2.6 Conclusion ............................................................................................................... 32

3 Natural Monopolies and Oligopolies ........................................................................ 34
  3.1 Background .............................................................................................................. 34
  3.2 Natural Monopolies and Oligopolies ................................................................... 34
  3.3 The Computer Software Industry ............................................................................ 37
    3.3.1 Economies of Scale in the Computer Operating System Industry .................. 37
    3.3.2 Is the Operating System Market a Natural Monopoly? .................................... 39
    3.3.3 Is Microsoft’s Dominance Forever? ................................................................. 43
  3.4 Conclusion ............................................................................................................... 45

4 Standardization ........................................................................................................... 47
  4.1 Background .............................................................................................................. 47
  4.2 Standard Selection .................................................................................................. 47
  4.3 Historical Examples .................................................................................................. 51
  4.4 Antitrust Analysis of Standardization ..................................................................... 54
  4.5 Lessons for Microsoft ............................................................................................. 56
  4.6 Conclusion ............................................................................................................... 57

5 Conclusion .................................................................................................................. 59

6 References ................................................................................................................... 61
1 Introduction

The dispute between Microsoft Corporation and the United States Department of Justice over Microsoft's alleged bundling of Internet Explorer with Windows 95 dates back in many ways to a consent decree signed by the two parties in 1993. This decree, discussed in detail later, limits the licensing tactics Microsoft can use for Windows 95 and is the basis for the complaint. The Justice Department contends that one of the provisions of the decree prohibits Microsoft's inclusion of Internet Explorer with Windows 95, and on October 20, 1997, the Department asked District Court Judge Thomas Penfield Jackson to hold Microsoft in contempt of the consent decree. Microsoft has disputed the Justice Department's interpretation of the consent decree, and the case is stalled while a preliminary matter on appeal is resolved.

The central issues in the Microsoft dispute, however, are not new. Antitrust law dates back to the end of the nineteenth century, and a number of cases brought by the Justice Department in the 1950s, 1960s, and 1970s bear remarkable similarity to the present case. In Chapter 2, antitrust laws will be briefly reviewed, and key cases will be analyzed to draw possible historical lessons regarding the current case involving Microsoft. Next, the thesis will examine the situation of natural monopolies, industries in

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1 A consent decree is essentially a contract between the Justice Department and a private company to settle a lawsuit. It is particularly common for antitrust cases brought by the Justice Department to be settled in this manner.

2 On May 18, 1998, the Justice Department and 20 states filed additional antitrust complaints against Microsoft, alleging a wide variety of illegal behavior. Due to the proximity of this filing with the thesis deadline, these filings could not be addressed.
which economies of scale and other market factors are so strong that the “natural” state of
the industry is for a single company to possess a monopoly. There are strong similarities
between these industries and Microsoft’s operating system business, since the need for a
standard operating system is undeniable. Many people argue that this need for
standardization is so strong that it would not be possible for there to be more than one
popular operating system for a particular type of computer. Chapter 3 explores this issue,
and examines the regulation of natural monopolies for possible insights into dealing with
Microsoft. Chapter 3 also explores a common phenomenon, oligopolies, in which an
industry is dominated by a very small number of competitors. By analyzing these two
types of industrial organizations, natural monopolies and oligopolies, lessons are drawn
for the Microsoft case. Chapter 4 explores the issue of standardization in additional depth
with a detailed analysis of the process of standardization and the forces that promote
standardization. Key historical instances of standardization are reviewed for lessons
applicable to the Microsoft case. Finally, Chapter 5 summarizes the conclusions of the
thesis and discusses possible future work.
2 Trusts and Antitrust Regulation

2.1 Background

Until late in the nineteenth century, the standard business enterprise in the United States was a small, local firm, that competed with other small, local firms. Few firms could expand beyond this size because of the lack of practical means of traveling and communicating over large distances. With the advent of the railroad industry, however, many of the barriers became less significant, and larger, nationwide firms started to form. Over time, business entrepreneurs such as John Rockefeller began to see the attraction of large, nationwide companies, each monopolizing a particular industry. Larger firms would be significantly more efficient, due to economies of scale, and the lack of competition would allow the firm to charge a monopoly price for a given good. This goal was often accomplished through the formation of a trust company, a particular type of incorporated entity, that would purchase as many rivals as possible and attempt to bankrupt others, leaving the trust with a near-monopoly of the industry. Rockefeller, for example, formed the Standard Oil Trust in this manner, and at its peak, it had “a 90 percent share of the refining and sale of petroleum products.” Similar trusts were formed in a variety of other industries, such as tobacco, steel, and meat-packing. Although issues of monopolization and cartelization had existed for centuries, the formation of trusts was a pivotal event that triggered a governmental response in the United States.

3 Viscusi, et. al., p. 271
2.2 Government Antitrust Regulation

During the last roughly 25 years of the nineteenth century, so-called populist causes, including regulation of monopolies, grew in political popularity. At least three distinct groups of people have formulated different arguments for such regulation. One group, consisting mainly of populists, argue that antitrust laws increase competition, which reduces retail prices and benefits consumers. Many economists approach antitrust regulations similarly but focusing on efficiency instead of pricing. Thus, many economists argue that antitrust regulations promote competition, which reduces the economic inefficiency and stagnation that often accompanies monopolies. These two rationale are quite compatible, both focusing on the gains that usually accompany increased competition. There is, however, a third rationale that runs completely contrary to the first two. Many populists argue for antitrust regulation on the grounds that trusts are too efficient and that small, inefficient businesses need protection from large, efficient trusts. These supporters attempt to use antitrust regulation to achieve a goal (maintaining inefficiency) contrary to the goal (reducing inefficiency) of the first two groups of supporters. All three groups were involved in the effort to pass antitrust laws during the late nineteenth century and the early twentieth century, so it is not possible to develop a single coherent theory behind these laws. The effects and uses of the laws, however, can be traced historically.

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4 In fact, the evidence is mixed as to whether trusts raised or lowered retail prices. There is significant evidence that, contrary to the general consensus, consumers benefited from trusts through lower prices due to the trusts' economies of scale. This issue, however, is not relevant to the analysis.
Congress's first comprehensive attempt to address monopolies was the 1890 Sherman Act. Section 1 of the Sherman Act declared illegal "[e]very contract, combination in the form of trust or otherwise, or conspiracy, in restraint of trade or commerce," while Section 2 subjected to punishment "[e]very person who shall monopolize, or attempt to monopolize, or combine or conspire with any other person or persons, to monopolize any part of the trade or commerce."

This law went largely unenforced until early in the twentieth century, when Presidents Theodore Roosevelt and William Howard Taft championed the cause of "trust-busting." Based on lawsuits filed during their presidencies, most large trusts eventually were broken up pursuant to the Sherman Act.

In 1914, almost 25 years later, Congress passed two more acts that, together with the Sherman Act, form the substantive basis for current U.S. antitrust policy. The Clayton Act prohibited a host of specific business practices, including "price discrimination, tying clause and exclusive dealing agreements, interlocking directorates, and mergers between competitors" when the effect would be to "substantially lessen competition or tend to create a monopoly."


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5 15 U.S.C.A. Sec. 1
6 15 U.S.C.A. Sec. 2
7 A tying arrangement occurs when a company "bundles" two independent products and only sells them together, as a single product.
8 Interlocking directorates is the practice in which companies control seats on each others' boards, resulting in the same individuals effectively controlling all of the companies in the arrangement.
9 This provision actually contained a loophole which rendered it unenforceable. The loophole was closed in a 1950 amendment to the Clayton Act.
10 Viscusi, et. al., p. 62
Act. The Act also banned “unfair methods of competition . . and unfair or deceptive acts or practices,” and gave the FTC broad leeway in both defining and enforcing this prohibition.\textsuperscript{11} As is often the case with legislation, the text of these laws provides little guidance as to their actual effect; in fact, they have been applied in radically different ways during different time periods. Viscusi, et. al., based heavily on Greer, identifies roughly three period defined by distinct interpretations of antitrust law.

### 2.2.1 Antitrust Enforcement (1890-1940)

The first period, roughly between 1890 and 1940, encompasses almost all of the “famous” historic antitrust cases. Probably the most well-known case was against Standard Oil; as previously described, John Rockefeller built up Standard Oil into a near-monopoly through a series of agreements with its competitors and through a number of allegedly unfair competitive practices. Standard Oil was accused “of engaging in predatory pricing to drive competitors out of business, of buying up pipelines in order to foreclose crude oil supplies to rivals, of securing discriminatory rail freight rates, and of conducting business espionage.”\textsuperscript{12} In 1911, after a lengthy court dispute, the Supreme Court found Standard Oil in violation of the Sherman Act, and Standard Oil was dissolved into 33 separate companies.\textsuperscript{13} A similar finding shortly thereafter resulted in the breakup of the Tobacco Trust into 16 companies.\textsuperscript{14}

\begin{footnotesize}
\begin{itemize}
  \item[\textsuperscript{11}] Ibid., p. 63
  \item[\textsuperscript{12}] Ibid., p. 271
  \item[\textsuperscript{13}] Ibid., p. 271
  \item[\textsuperscript{14}] Ibid., p. 271
\end{itemize}
\end{footnotesize}
Key to the era, however, was the Supreme Court’s 1920 ruling on United States Steel, a steel trust controlling over 65 percent of the steel and iron markets.  In 1911 (before the passage of the Clayton Act), the Federal government accused it of violating the Sherman Act, but nine years later, the Supreme Court found no evidence of abusive tactics of the kind found in the Standard Oil case and held that United States Steel had not violated the Sherman Act. The Court stated that “the law does not make mere size an offense or the existence of unexerted [market] power an offense.” Taken together, the United States Steel ruling and the Standard Oil ruling trace out the interpretation of the Sherman Act during this period. Effectively, the Supreme Court would find a violation of the Sherman Act only in cases in which, in addition to proving the existence of a monopoly arrangement, the government showed that abusive or predatory tactics had been used to form the monopoly. The mere fact that a monopoly existed was not considered sufficient at this time to prove a violation of the Sherman Act.

2.2.2 Antitrust Enforcement (1940-1970)

The second era of antitrust interpretation, which Viscusi, et al., places roughly between 1940 and 1970, exhibits a much more expansive interpretation of antitrust laws. In 1945, Judge Learned Hand (a noted appellate court judge), found the Aluminum Company of America (Alcoa) guilty of monopolization in violation of the Sherman Act. This decision was based on Judge Hand’s computation of Alcoa’s market share as 90 percent and his determination that “[n]othing compelled [Alcoa] to keep doubling and

\[\text{\footnotesize 15 Ibid., p. 275}  \]
\[\text{\footnotesize 16 Ibid., p. 275}  \]

11
Effectively, Alcoa’s increases in production capacity beyond what Judge Hand considered necessary to compete were taken as evidence of intent to monopolize, even in the absence of the types of abusive or predatory tactics that were required in earlier cases.

A similar case, decided in 1953, involved United Shoe Machinery, the dominant manufacturer of shoe production equipment in the country. United Shoe’s practice was to lease its equipment for 10-year terms, require the lessee to use United Shoe’s equipment for that term, and include free repair services as a provision of the lease. These business practices were held to support a charge of monopolization under the Sherman Act, although they were certainly not in the same category as Standard Oil’s allegedly abusive tactics.

Combined, the Alcoa case and the United Shoe case mark a period of antitrust enforcement during which evidence of abuse or predation was not required; the mere presence of business tactics which could serve to promote monopoly was taken to be sufficient to violate the Sherman Act. During this period, the Justice Department brought a large number of antitrust complaints against large companies, such as IBM, Xerox, and AT&T. Most of these were settled by consent decrees, many of which remain in force today.

17 Ibid., p. 278. The computation of Alcoa’s market share at 90 percent itself involves a number of other important questions, such as what constitutes the market, which will be considered in more detail later.
2.2.3 Antitrust Enforcement (1970-present)

The current era of antitrust enforcement is not quite so clear as the other two. No major antitrust cases have reached the Supreme Court, and there do not seem to be any particular lower-court cases that have set the tone. Anecdotal evidence, however, suggests two trends, although the causes are unclear. First, the Justice Department and the Federal Trade Commission appear to be bringing fewer large antitrust cases and seem to be settling almost all of ones it brings through consent decrees. In 1974, the Justice Department filed an antitrust case against AT&T, seeking to separate its regulated and unregulated businesses. The case was settled through a consent decree in 1982, when AT&T agreed to divest its local telephone services providers (called Regional Bell Operating Companies (RBOCs) or Baby Bells) in exchange for being freed from certain restrictive consent decrees it had agreed to earlier. A case against Xerox, which will be discussed in detail later, was also settled by a consent decree. On the contrary, there do not seem to be any large antitrust cases which either the Justice Department or the FTC won by taking them to trial, nor do there appear to be any large antitrust cases filed by either body which seek massive divestitures, as there were decades ago.

A second anecdotal trend has been greater judicial scrutiny over antitrust cases. An infamous example is a 1969 case filed against IBM in the final hours of President Lyndon Johnson’s administration.\textsuperscript{18} The details will be deferred until later, but the case continued for 13 years before it was dismissed in 1982, based on Assistant Attorney General William Baxter’s determination that the case was “without merit” and that

\textsuperscript{18} Fisher, et. al., p. 1
government’s chance of prevailing were “one in ten thousand.”\(^{19}\) Although President Ronald Reagan’s Justice Department was certainly not known for its aggressive enforcement of antitrust laws, the dismissal was based at least in part on the conclusion that the government risked losing in court, an outcome that would have been highly unlikely during the 1950s and 1960s.

In another antitrust case, the FTC alleged that a number of breakfast cereal manufacturers had conspired to monopolize the industry, but an FTC administrative law judge dismissed the complaint, and the FTC declined to appeal.\(^{20}\) Yet another case, this one brought by a private company against Eastman Kodak, also resulted in victory for the alleged monopolist.\(^{21}\)

Taken together, these cases trace out a theory of antitrust enforcement since 1970.\(^{22}\) In parallel, both the Justice Department and the courts have become more hostile to antitrust complaints. The Justice Department has brought fewer complaints and has settled more of them, likely in part due to a fear of losing in court. At least one consent decree (the AT&T divestiture) could be considered mutually advantageous to both sides due to the removal of certain restrictions that had been imposed by a prior consent decree, making it more of a “trade” between AT&T and the Justice Department. As previously noted, it is difficult to find even a single case filed in the past 25 years that comes close to any of the large historic antitrust cases. At the same time, practices that during the 1950s

\(^{19}\) Viscusi, et. al., p. 282
\(^{20}\) Ibid., p. 281
\(^{21}\) Ibid., p. 280
\(^{22}\) This is certainly not the only possible interpretation for this period, however.
and 1960s would have been considered proof of attempts to monopolize are now considered insufficient to support an action under the Sherman Act. In this way, the current period is closer to the period before 1940, when evidence of abusive or predatory practices was required to support antitrust charges.

2.2.4 Market Definition

Aside from general interpretation of antitrust laws, one issue that is almost always in dispute in antitrust cases is the precise delineation of the market alleged to have been monopolized. Market share is defined, a bit simplistically, as the portion of a given market that a particular company’s products constitute; however, that definition merely begs the question of what constitutes the market. For example, in the Alcoa case, there was considerable dispute over two questions: first, whether Alcoa’s internal use of aluminum should be counted as part of Alcoa’s share of the market; and second, whether the market should include reprocessed aluminum. When Alcoa’s internal use was excluded and the market is expanded to include reprocessed aluminum, both to Alcoa’s benefit, Judge Hand computed Alcoa’s market share as 33 percent, which he stated was not sufficient to constitute a monopoly. However, when Alcoa’s internal use was included and reprocessed aluminum was excluded, the market share was 90 percent, clearly sufficient to establish a monopoly. For a variety of reasons not relevant here, Judge Hand ruled that the second calculation is the proper one, resulting in the finding that Alcoa
possessed a monopoly.\textsuperscript{23} It is clear, however, that establishing the proper market
definition was a key element of the government’s victory in the case.

Another famous example is a 1956 case that turned on whether cellophane
constituted an entire market (in which case duPont would have had a 75 percent share) or
whether the market extended to other forms of flexible wrapping materials, such as wax
paper and aluminum foil (which would have put duPont’s share at only 18 percent). In
this case, the court found for duPont based on the latter analysis. As another example,
consider the market that United States Steel was alleged to have monopolized. If its
market were taken to be the production of steel, then its share would be very high. On the
other hand, if its market were taken to be the production of building materials, then its
share would be very low, since other materials like concrete and stone would be included.
In many instances, these other materials can be substituted for steel, so it is not
completely clear which is the proper delineation of the market. Similarly, for Standard
Oil, if the market were broadened to other energy sources, such as coal and natural gas,
the Supreme Court would have found in Standard Oil’s favor. Clearly, the answers to
these questions are not always obvious, and there have been no conclusive court decisions
on this matter.

Viscusi, et. al., propose an economic answer to the question of market definition.
They propose that the market should include all products that a hypothetical cartel “would

\textsuperscript{23} Ibid., pp. 277-278
need to control in order to charge a price, say, 5 percent, above its marginal cost.” In the cellophane case, since duPont controlled no other products yet was charging a price in excess of 5 percent above the marginal cost of production, no other products would be needed by a hypothetical cartel. As a result, Viscusi, et. al., conclude that based on an economic definition of the market, cellophane is the only product in the market. Effectively, products are considered to be substitutes if they would compete with each other if priced at marginal cost. This definition will prove useful when examining Microsoft’s position in particular.

2.3 Key Technological Antitrust Cases

During the most aggressive period of antitrust enforcement, between roughly 1940 and 1970, many of the large antitrust cases concerned companies in technology-related industries. In 1952, the Justice Department accused IBM of monopolizing the market in tabulating machines (the predecessors to computers, these machines performed calculations using punch cards as the input and output). In part, the complaint cited the fact that IBM’s patents allowed it to exclude competitors; to settle the matter, IBM agreed to license its patents to competitors under reasonable terms.

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24 Ibid., p. 269. Marginal cost is the cost to produce one additional unit, which necessarily excludes any overhead expenses.
25 Watson, pp. 215-220. Of course, this type of antitrust analysis ignores the fact that patent laws are specifically designed to grant the inventor of a technology a monopoly on its use for a fixed period of time as a means for encouraging innovation. It is unclear how the Justice Department has reconciled intellectual property laws, which grant monopolies, and antitrust laws, which prohibit monopolization.
As previously discussed, the Justice Department in 1969 brought another antitrust case involving IBM; the complaint accused IBM of monopolizing the market for “general purpose digital computers” through four allegedly improper tactics: (1) a pricing policy that “quotes a single price for hardware, software[,] and related support,” thereby preventing competition in the software and computer support markets; (2) using its overwhelming installed base of software and support to prevent competitors from effectively competing in the hardware market; (3) introducing low-profit products in niche markets to prevent competitors from gaining a foothold in the industry and preannouncing products to discourage buyers from purchasing a competitor’s product; and (4) giving “exceptional discriminatory allowances in favor of universities and other educational institutions” as a means of dominating these markets. Effectively, the Justice Department argued, IBM’s pricing and marketing policies, aimed at protecting its standards from competitors, resulted in illegal monopolization. The Justice Department sought a court-ordered breakup of IBM.

One particularly relevant dispute that later arose concerned so-called plug-compatible manufacturers. A number of companies sold computer accessories, such as disk drives and memory expansion modules, that were designed to work with IBM computers identically to the IBM-manufactured accessories. In an amended complaint, the Justice Department charged IBM with using a variety of marketing strategies to prevent its customers from purchasing from plug-compatible manufacturers. As previously stated, the lawsuit stretched on for 13 years, until the Justice Department
dismissed it in 1982. In the interim, however, IBM did address a few of the complaints by, for example, introducing a new pricing policy under which hardware, software, and support were separated.27 A number of private antitrust lawsuits were also filed against IBM by plug-compatible manufacturers; IBM settled one of these and won the rest outright.

During the 1970s, Xerox was accused of similar violations of antitrust law. Specifically, the Federal Trade Commission alleged that Xerox used its patents and technical skill to produce products that competitors could not duplicate.28 In addition, Xerox’s insistence on leasing copy machines, instead of selling them, was targeted as a business practice that restricted competition. In a 1975 consent decree, Xerox agreed to license its patents to competitors, supply them with technical “know-how,” and end its refusal to sell its copy machines.29

This case, together with the two IBM cases, sketches out antitrust enforcement involving technology-intensive industries. In these cases, the Justice Department and the Federal Trade Commission considered almost any business practice by a monopolist, whether concerned with pricing, marketing, or intellectual property protection, to be grounds for action under the Sherman and Clayton Acts. If the effect of the practice was to promote the company’s monopoly, then even a legitimate rationale for the policy was considered insufficient to protect the firm from antitrust action.

26 Viscusi, et. al., p. 282
27 Watson, pp. 380-381
28 Greer, p. 147.
29 Viscusi, et. al., p. 280
2.4 Microsoft Antitrust Position

As with most antitrust analyses, there is great ambiguity regarding whether Microsoft is in violation of the Sherman Act. To support a complaint against Windows 95 (considering only the core operating system, not any included accessories), for example, the Justice Department would first need to define the market. In fact, it is not clear how to define the market; if the market includes operating systems for all computer systems then Microsoft clearly does not have a monopoly.\(^{30}\) Intuitively, however, the market should include only operating systems for Intel-based computers, in which case Microsoft clearly has a monopoly.\(^{31}\) This intuition can be verified by utilizing the economic rule for market definition proposed by Viscusi, et. al.\(^{32}\) Since the selling price for Windows 95 is clearly significantly higher than the marginal cost of production, Microsoft must control all products a hypothetical cartel would need to be able to charge 5 percent above the marginal cost of production,\(^{33}\) and therefore Windows 95 can be considered a market of its own.\(^{34}\)

Having established that Microsoft monopolizes the Windows 95 market, one must determine whether the other requisite elements are present to support an action under the

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\(^{30}\) The operating systems for most workstations, for example, are versions of Unix. Mainframe computers and minicomputers would most likely use a proprietary operating system written by the manufacturer.

\(^{31}\) Even if the market were broadened to include operating systems for non-Intel “personal computers,” like Apple’s Macintosh operating system, Microsoft would still have a monopoly.

\(^{32}\) Recall, Viscusi, et. al., proposes that the market should include all products that a hypothetical cartel “would need to control in order to charge a price, say, 5 percent, above its marginal cost.” Viscusi, et. al., p. 267.

\(^{33}\) Recall that the marginal cost of production is the cost to produce one additional unit, in this case, the cost of producing, packaging, and servicing another copy of Windows 95, but excluding any development costs or other fixed costs associated with the product.

\(^{34}\) We ignore the question of whether Windows NT should be part of the market as well. Its inclusion would not change the analysis because it is also produced by Microsoft.
Sherman Act. First, one must search for evidence of abuse or predation in Microsoft’s actions. During any time period, either of these elements would be sufficient to sustain an antitrust action; however, in the Windows 95 case, neither appears present. Certainly, rumors abound of abusive tactics Microsoft has used; however, these accusations are almost exclusively directed at Microsoft’s other businesses, not its operating system business. Even outspoken members of the computer industry generally accept the inevitability of Microsoft’s dominance of the operating system market, and most appear to believe that it is beneficial for the industry due to the benefits of standardization. Therefore, an antitrust violation would likely not have been found under the standards used before roughly 1940.

Even between 1940 and 1970, it seems unlikely that an antitrust action could have been sustained against Microsoft over Windows 95. The need for standardization is great, and there have been few serious challengers to Windows’s dominance. The main one, IBM’s OS/2 3.0, never achieved much market share, even after it was able to run Windows software, and its failure seems unlinked to Microsoft’s actions. Overall, during any time period, it seems unlikely that Microsoft’s monopoly in Windows 95 is more attributable to market forces and mistakes by other companies, as opposed to improper tactics by Microsoft. Therefore, it seems that Microsoft would be vulnerable to action under the Sherman Act over its Windows 95 monopoly.

35 For example, Microsoft is commonly alleged to be using abusive tactics to promote its web browser, Internet Explorer, to the detriment of Netscape Navigator.
36 After IBM and Microsoft ended their joint development agreement for OS/2, IBM developed OS/2 3.0 (marketed as OS/2 Warp), an operating system designed to compete directly with Windows. It never achieved much success, and IBM eventually discontinued it.
The more difficult question is whether Microsoft’s conduct with regard to its other products could be found to violate the Sherman Act. Consider two particular examples: Internet Explorer and Office. In the case of Internet Explorer, Microsoft clearly does not have a monopoly; however, it is often alleged that Microsoft’s actions are intended to lead to a monopoly. Specifically, Microsoft is often accused of maintaining an illegal “tying” arrangement, prohibited by the Clayton Act, in which the purchase of Windows 95 is conditioned on the acceptance of Internet Explorer. To resolve traditional tying cases, courts generally look to a number of factors, including, for example, whether consumers consider the two products to be separate and whether both products would be commercially viable standing alone. It is clear that web browsing software certainly has an existence independent of Windows 95, and that Windows 95 has an existence independent of web browsing software. The issue is confused, however, by Microsoft’s assertion that Internet Explorer contains more than just a web browser, but rather that it contains a set of system functions which third-party software can use to access the Internet, as well as shell improvements that better integrate the Internet into the computing environment.

From a traditional tying standpoint, a reasonable conclusion is that the system functions and the shell improvements do not have a separate existence, but that the web browser does; according to this analysis, Microsoft could be required to remove specifically the web browsing features from Windows 95 and sell those features

37 Based on the prior reasoning, we define the market to include all comparable products designed for a Windows 95 environment.
separately under the Clayton Act. Furthermore, this seems reasonable from an intuitive standpoint as well; no one would dispute that Windows 95 is enhanced by the addition of system calls and shell improvements\textsuperscript{38} to access the Internet, and there are no potential competitors to Microsoft in this realm. On the other hand, Microsoft does have competitors for web browsing software, so it seems reasonable that it should not be able to monopolize this market by tying it to Windows 95. This should maximize the benefit to consumers, since they receive the system calls and shell improvements that only Microsoft can provide, but they retain a choice of web browsers. Interestingly, this is similar to the approach the Justice Department tried to use against IBM in the 1969 case; in that case, IBM was accused, in part, of tying software and support services with hardware purchases. Since IBM revised its pricing scheme before the case went to trial, it is unclear whether a Court would have found that arrangement in violation of the Clayton Act.

For Office, on the other hand, Microsoft has a monopoly, and the question is whether the monopoly was obtained in violation of antitrust laws. Specifically, it is often alleged that the collaboration between Microsoft's operating system division and its application software division gave Microsoft an unfair advantage, which enabled it to monopolize the application software market. For example, the collaboration between the two divisions allows development of application software to begin before Microsoft officially releases operating system specifications, which gives Microsoft's applications

\textsuperscript{38} We neglect the question of whether the inclusion of the shell itself constitutes a tying arrangement. This question is complicated, and involves many issues similar to the Internet Explorer question (whether the shell is integrated with the operating system, whether the shell is commercially feasible as an independent program, etc.); however, it is beyond the scope of this analysis.
division significant lead-time over the competition. In addition, there are many system calls that Microsoft has not documented to other software developers, but which Office uses, which gives Microsoft an advantage.

In this case, the antitrust analysis appears straight-forward. None of these tactics seems to rise to the level of abuse or predation, so before roughly 1940, Microsoft would have been in compliance with antitrust laws. Between 1940 and 1970, these tactics would probably have been sufficient to constitute a violation, either under the monopolizing provisions of the Sherman Act or under the “unfair methods of competition” provision of the Federal Trade Commission Act. These issues are similar to those raised by the Justice Department in its 1969 case involving plug-compatible manufacturers, although that case provides little guidance since it is not clear whether the Justice Department would have won the 1969 case in court, especially under earlier antitrust interpretation. Intuitively, however, consumers would benefit if Microsoft were legally enjoined from using these allegedly improper tactics to develop its software. Consumers’ interests lie in maintaining competition to prevent stagnation, which would be accomplished through such an action.

2.5 Microsoft Antitrust Dispute

Microsoft’s current dispute with the Justice Department began in the summer of 1993, when the Federal Trade Commission concluded a three-year investigation of Microsoft’s business practices39 by deadlocking 2-2 on whether to bring a complaint. At

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39 The precise matters are no longer relevant; they included allegations that Microsoft and IBM illegally colluded in dividing the operating system market between Windows and OS/2, as well as merger negotiations between Microsoft and Novell, which produced a competing operating system (Novell DOS) with a five percent market share.
this point, the Justice Department began its own investigation into potential violations of the Sherman Act and concluded that sufficient evidence existed to bring a complaint on four Microsoft licensing practices: (1) so-called per-processor licenses (requiring computer manufacturers, or OEMs, to pay the license fee for a Microsoft operating system for each computer containing an Intel processor, regardless of whether or not a Microsoft operating system is installed); (2) excessive contract terms; (3) minimum commitments; and (4) certain types of non-disclosure agreements.

Negotiations among the Department of Justice, the European Union’s competition agency, Directorate-General IV, and Microsoft over these issues yielded a consent decree filed on July 15, 1994. The decree prohibited “per-processor” licenses (section IV(C) of the consent decree) and minimum commitments (section IV(F)), and it restricted Microsoft from negotiating excessively long contracts (section IV(A)) and non-disclosure agreements (sections IV(K) and IV(L)).\footnote{Consent Decree, pp. 5-12.} In addition, according to the competitive impact statement published by the Justice Department, which is disputed by Microsoft, the consent decree provided prospective relief against other potentially anti-competitive business practices: restrictions on OEMs’ installing competing operating systems or products (sections IV(B) and IV(E)(2)), requirements that OEMs license other Microsoft products as a condition of licensing Windows (section IV(E)(1)), institution of certain types of “per-system” license fees (section IV(G)), prohibitions on pricing based on other
than a “per-copy” fee or an allowed per-system fee (section IV(D)), and prohibitions on “lump-sum” pricing (section IV(H)).

2.5.1 The Justice Department Petition

On October 20, 1997, the Justice Department filed a petition in the Federal District Court for the District of Columbia asking that Microsoft’s licensing practices regarding Internet Explorer be declared in violation of the 1994 consent decree. Specifically, the petition alleges that Microsoft requires OEMs licensing Windows 95 to also license Internet Explorer, and that this requirement violates section IV(E)(1) of the consent decree, which prohibits Microsoft from entering “into any License Agreement in which the terms of that agreement are expressly or impliedly conditioned upon: (1) the licensing of any other Covered Product, Operating System Software product or other product (provided, however, that this provision in and of itself shall not be construed to prohibit Microsoft from developing integrated products).”

The Justice Department asserts that this provision creates two mutually exclusive sets of products — “integrated” products and “other” products — and that the determination of the status of Internet Explorer requires balancing evidence on both sides. It therefore supports its petition in two distinct ways: First, it offers evidence that purportedly demonstrates that Internet Explorer is an “other” product, and second, it

41 Competitive Impact Statement, pp. 7-8.
42 Judicial approval of the consent decree, required under the Tunney Act, did not actually occur until 1995. The decree is nonetheless dated to 1994.
43 Consent Decree, pp. 6-7.
44 The Justice Department also makes an argument, unimportant in this context, that the proviso excludes only product development, not marketing or licensing, from the prohibition.
offers evidence that purportedly precludes Internet Explorer from being an “integrated” product. If true, this evidence, combined with the Department’s interpretation of section IV(E)(1), would prove that Microsoft’s licensing practices are prohibited.

As evidence that Internet Explorer is not an “integrated” product, the Justice Department cites a number of statements from OEMs that Windows 95 and Internet Explorer are not integrated and that “Internet Explorer 3.0 can be removed readily from PCs on which it has been preinstalled by an OEM without affecting the performance or functioning of the underlying Windows 95 operating system,” although no further support is offered, and this statement presupposes the Justice Department’s understanding of what constitutes the “Windows 95 operating system.” To show that Internet Explorer affirmatively qualifies as an “other” product, the Justice Department cites four pieces of evidence. First, it asserts that there is considerable independent demand for Windows 95 and Internet Explorer. Certainly the success of Netscape Navigator evinces demand for web browsers independent of operating systems, and the Justice Department reasonably asserts that there is demand from OEMs for Windows 95 without Internet Explorer. Second, the Justice Department cites Microsoft’s marketing practices as evidence that Microsoft acknowledges the distinct demands for the two products, specifically its distribution of Internet Explorer separately from Windows 95, its distribution of it for other operating systems, and internal Microsoft documents tracking its market share

45 Justice Department Memorandum, p. 27.
46 Ibid., p. 20.
47 Ibid.
48 Ibid., pp. 21-22.
49 Ibid., p. 22.
separately.\textsuperscript{50} Finally, the Justice Department asserts that the success of Navigator shows that selling web browsers separately from operating systems is commercially feasible\textsuperscript{51} (no one disputes the feasibility of selling operating systems separately from web browsers), and it argues without substantiation that this separation is the “commercial norm” in the industry.\textsuperscript{52}

\subsection*{2.5.2 Microsoft's Response}

Microsoft, in its response filed on November 10, 1997,\textsuperscript{53} concedes that it requires OEMs to license Windows 95 and Internet Explorer together. In its defense, Microsoft advances a three-pronged argument. First, it asserts that some form of Internet Explorer has always been part of Windows 95 and that the Justice Department was aware of this fact during the negotiation of the consent decree; since Windows 95 is explicitly identified as a single “Covered product” in the consent decree, under its code-name Chicago, this argument would render the Justice Department’s argument nonsensical.\textsuperscript{54}

Although this point should be a simple factual matter, the Justice Department and Microsoft vigorously disagree on the facts, and it is difficult to judge between them. Since this dispute has no bearing on the technological issues involved, it will not be pursued further.

\textsuperscript{50} Ibid., pp. 24-25.
\textsuperscript{51} Ibid., pp. 26-27.
\textsuperscript{52} Ibid.
\textsuperscript{53} Microsoft’s memorandum in opposition on its web site, used for this analysis, is unpaginated. Page citations are to the version printed from the web site, which will not correspond to pages in the actual filing.
\textsuperscript{54} Microsoft Memorandum in Opposition, pp. 17-18.
Microsoft's second defense is a different interpretation of section IV(E)(1).

According to Microsoft, instead of being an exclusive-or construction, section IV(E)(1) contains two clauses: a prohibition covering “the licensing of any other Covered Product, Operating System Software product or other product” and a proviso which supersedes it related to integrated products.\(^{55}\) Under this interpretation, Microsoft is prohibited from conditioning the license of Windows 95 on licensing any “other” product \textit{unless} the “other” product is also an integrated product, in which case the prohibition does not apply. Under this interpretation, the Justice Department must affirmatively show that Internet Explorer is not an “integrated” product, not merely that it is an “other” product, so considerations such as separate consumer demand and separate marketing for Internet Explorer are irrelevant.\(^{56}\)

This leaves the Justice Department with only its unproved assertion, agreed to by certain OEMs, that Internet Explorer is not integrated with Windows 95. Against this, Microsoft provides sworn declarations from several of its employees that Internet Explorer is a “set of core operating system services” and not a “self-contained application”\(^{57}\); for example, Microsoft claims that it provides services that certain programs, like Quicken, use to perform local operations;\(^{58}\) Microsoft also claims that even its main competitor, Netscape, describes Internet Explorer as “virtually an operating system upgrade.”\(^{59}\) Thus, under Microsoft’s interpretation of section IV(E)(1), the

\(^{55}\) Ibid., pp. 18-19.
\(^{56}\) Ibid.
\(^{57}\) Ibid., p. 20.
\(^{58}\) Ibid., pp. 20-21.
\(^{59}\) Ibid., p. 27.
evidence is clear that Internet Explorer qualifies for the exemption as an “integrated”
product, and its licensing agreements are therefore in compliance with the consent decree.

Finally, Microsoft asserts that even given the Justice Department’s interpretation
of section IV(E)(1), the evidence is stronger that Internet Explorer is an “integrated”
product as opposed to an “other” one. Effectively, Microsoft considers Internet
Explorer to be a particularly useful upgrade to Windows 95, sufficiently useful that
consumers are willing to pay to receive it without waiting until Windows 98 is released.
Thus, Microsoft’s decision to distribute Internet Explorer separately under a “product”-
like description instead of under an “operating system upgrade”-like description is purely
a marketing one. Similarly, although Microsoft sells web browsers for other operating
systems under the name “Internet Explorer,” these are in fact different pieces of software
distributed under the same name due to a perceived marketing advantage.

Effectively, Microsoft argues that although marketing decisions may drive
nomenclature, nomenclature decisions cannot be used to support technological statements
such as whether or not two pieces of software are integrated. Microsoft also disputes the
Justice Department’s notion that the “commercial norm” is to sell operating systems
separately from web browsers. Microsoft argues that “the Justice Department seems to
be relying on the notion that there is an objectively ascertainable and widely understood
definition of what is and is not contained in an operating system like Windows 95” but

60 Ibid., p. 25-26
61 Ibid., p. 26-27.
62 Ibid., p. 27.
63 Ibid.
64 Ibid., pp. 28-29.
that "[n]othing could be further from the truth." This dispute highlights a key issue, namely what precisely constitutes an operating system. Overall, however, this part of Microsoft’s defense provides evidence that, in its view, successfully justifies its license agreements even given the Justice Department’s interpretation of section IV(E)(1).

2.5.3 Conclusions Regarding Justice Department Petition

Although the interpretation of section IV(E)(1) should theoretically be simple, neither the Justice Department’s interpretation, nor Microsoft’s, is compelling. According to Microsoft, courts have held that a proper interpretation of a clause such as this must "give effect to all of its provisions. [italics in original]" Under the Justice Department’s interpretation, section IV(E)(1) would bar Microsoft from including in Windows 95 any functionality that it sells separately and that has separate competitors. This would preclude, for example, Microsoft from selling separately an updated version of its disk defragmentation utility included with Windows 95. Clearly it seems unreasonable that section IV(E)(1) should require Microsoft to withhold its technological advances from the public to demonstrate that such advances do not constitute "other" products. The Justice Department’s interpretation also relies extremely heavily on internal marketing decisions, such as the name Microsoft uses for a product and the method Microsoft uses to track usage of the product. It again seems unreasonable that Microsoft should be forced to make marketing decisions with an eye toward a consent decree dealing with licensing issues.

65 Ibid., p. 28.
On the other hand, Microsoft's interpretation of section IV(E)(1) also seems unreasonable. By Microsoft's analysis, any "other" product that is even the slightest bit integrated into Windows 95 is exempt from the prohibition, in which case Microsoft can require its license as a condition of licensing Windows 95. Since integration could potentially be as simple as putting the "other" product into the same box, this would render the clause completely meaningless. In its reply brief, the Justice Department states, "Microsoft flatly stated that its interpretation of the Final Judgment would enable it to require OEMs to put 'orange juice' or 'a ham sandwich' in the box with a PC preinstalled with Windows 95." 67 This interpretation is consistent with Microsoft’s position in the case, but it does not seem reasonable overall. In summary, therefore, there does not seem to be a reasonable interpretation of section IV(E)(1) which does not negate either the prohibition or the proviso, so it seems unlikely that the section can be enforced in court.

2.6 Conclusion

This chapter reviewed antitrust laws, both in general and as applied to Microsoft. First, the origins of antitrust laws were reviewed, and their enforcement was analyzed. Next, a number of technology-specific antitrust cases were reviewed in an attempt to determine the scope of activities that the Justice Department has considered improper under antitrust laws. Microsoft's market position was then examined to determine, to the extent feasible, whether Microsoft is vulnerable to action under the Sherman Act. This analysis revealed that Microsoft's operating system business is likely not subject to action

67 Justice Department Reply Brief, p. 5.
under the Sherman Act but that its applications business has engaged in conduct similar to the conduct of IBM and Xerox that triggered antitrust action during the 1960s and the 1970s. Finally, Microsoft’s current dispute with the Justice Department was examined, from the initiation of the consent decree to the present, to gauge the validity of the Justice Department’s and Microsoft’s arguments. Although the analysis is quite complicated, it does not appear that there exists a coherent interpretation of the provision of the 1993 consent decree that is at issue, so it is questionable whether the Justice Department’s enforcement action can succeed.
3 Natural Monopolies and Oligopolies

3.1 Background

One of the most basic fields of study of economic study is the question of how and why different industries organize in different ways. Some industries, like local telephone service, are characterized by a single firm dominating each geographic area. Other industries have a very small number of firms competing in each area; for example, the cola market in the United States is controlled almost exclusively by Coca-Cola and PepsiCo. Still other markets have a large number of competitors; the beef industry has a very large number of producers, and beef from different sources is intermingled for sale across the country. It is not clear which type of organization characterizes the computer software industry generally, nor the computer operating system market specifically; however, this question is fundamental to understanding Microsoft’s market position.

3.2 Natural Monopolies and Oligopolies

Viscusi, et. al., defines a market as a natural monopoly if the minimum aggregate production cost occurs when a single firm monopolizes production. A bit simplistically, a natural monopoly occurs if, in the steady-state, it is not possible for there to be more than one profitable firms in the industry; therefore, a single firm will “naturally” attain a monopoly. With rare exceptions, natural monopolies occur in industries with relatively high fixed costs and relatively low marginal costs, which results in maximum efficiency

68 Viscusi, et. al., p. 323
if a single firm bears the fixed costs and then supplies the entire market. For example, the fixed costs of producing and distributing electrical power are very high (due to the large investment required to build a generation plant), whereas the cost of adding an additional consumer is very low (due to the small cost of connecting an additional home or business to the power distribution grid); therefore, the electric utility industry is generally considered to be a natural monopoly. Other similar industries include railroads, telecommunications, natural gas, and cable television.  

From a public policy standpoint, there is a clear dilemma in industries that have the characteristics of a natural monopoly. Efficiency considerations argue for minimizing the total production cost, which requires allowing the monopoly; however, this will inevitably result in a lack of competition, relatively high prices, and stagnation in the industry. Preventing the monopoly, through a simple antimonopoly statute, for example, results in inefficiency, which is not a desirable outcome either. The generally accepted government response is comprehensive regulation of natural monopolies. At the federal level, agencies like the Interstate Commerce Commission and the Federal Communications Commission were empowered to set prices and control entry and exit in the industries they regulated, including railroads, telephone companies, and cable television. All states have similar boards, often called Public Service Commissions, that

69 Although this is the predominant view, whether any particular industry is a natural monopolies remains an open question.
70 We encompass within the term efficiency such phenomena as brand loyalty, in which a consumer gains more utility from one product than from another identical one based on the brand.
71 When regulation began, these industries were all considered natural monopolies. Beginning early this century, railroads faced competition from trucking concerns, which were also regulated for reasons unrelated to the discussion of natural monopolies. Recently, it has become unclear whether telephone service and cable television are natural monopolies, but this point is not relevant to this discussion.
perform the same functions for local natural monopolies, mostly electric and water utilities and telephone companies.

The natural monopoly analysis can be expanded slightly to include industries with a small number of large competitors dominating the industry, sometimes called an oligopolies. Due to factors ranging from brand loyalty to economies of scale, most industries’ “natural” states are oligopolies. The soft drink market, for example, is dominated by Coca-Cola and PepsiCo, with a few niche players (like RC Cola and store brands) dividing the remaining market share. Similarly, just a few airlines control the vast majority of that market, and a few over-the-air television stations dominate most geographic markets. In general, this type of market situation is the rule, not the exception; most industries that are not oligopolies have special attributes that make them particularly easy to enter, like a lack of brand loyalty, a lack of overhead costs, or small economies of scale. The computer retail business, which has a large number of competitors, for example, exhibits all three of these characteristics. In general, oligopolies are rarely regulated for reasons relating to the amount of competition; any regulation that occurs is usually the result of other concerns, like health and safety issues.

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72 Economies of scale occur when the cost of production per unit decreases as additional units are produced. This is often due to fixed overhead costs, like the cost of building a factory, which are unchanged over a range of production amounts. It can also be due to efficiency gains as more units are produced; for example, most workers become more productive with more experience, so the cost of production per unit will decrease as more units are produced.

73 This does not necessarily mean that the industry will in fact be an oligopoly. For example, the industry could be in transition between one set of oligopolists and another; for that period of time, the industry would falsely appear to support many competitors.

74 There are certainly exceptions to this division; taxicabs are highly regulated in most cities, yet they are clearly not a natural monopoly. Alcohol sales face significant regulation unconnected with health or safety concerns. These exceptions, however, are not relevant to the analysis.
3.3 The Computer Software Industry

This analysis leads to roughly two possibilities for the computer software industry. If the market for a particular type of software is a natural monopoly, then historical precedent would justify a high degree of regulation.\(^7\)\(^5\) Thus, for example, Congress could reasonably empower a commission to set prices, judge quality, authorize particular firms to enter or exit the market, etc. On the other hand, if the market could support more than one producer — whether two or many — historical precedent would generally not support regulation. Thus, evaluating government involvement into Microsoft’s operating system business must start from the question of the “natural state” of the operating system market.

3.3.1 Economies of Scale in the Computer Operating System Industry

To gain a rough idea of the “natural state” of the computer operating system industry, one can examine the ratio between the overhead cost and the marginal cost, and one can compare this ratio to comparable ratios in other industries. As a rough estimate, assume that Windows 95 contains 10 million lines of code and that a Microsoft programmer, costing an average of $150,000 per year (including overhead and benefits), writes an average of 5000 lines of code each year.\(^7\)\(^6\) This yields an estimate of $300 million for the fixed cost of Windows 95. Given the further assumption that the marginal

\(^{75}\) This does not necessarily mean that this would be the best approach. Many economists have argued that this type of regulation often protected the manufacturers from competition to the consumer’s detriment.\(^{76}\) This estimate is based on the COCOMO model in Boehm.
cost per copy is $50 (including service, support, distribution, etc.), this yields a ratio of six million to one. Although this is a rough estimate, it is probably accurate within an order of magnitude.

By comparison, consider the newspaper industry. A common rule of thumb is that the purchase price of a newspaper represents roughly one-fourth of the actual cost, including the appropriate share of overhead expenses. Thus, for a newspaper with a circulation of 100,000 copies and a purchase price of fifty cents, this yields an estimate of $200,000 for the fixed cost. If the “per copy” cost is estimated to be ten cents, then this yields a ratio of two million to one.

According to this analysis, the operating system market and the newspaper market should be comparable, as both have ratios that are roughly equivalent given the rough approximations used. In the newspaper industry, most geographic areas are served by a few newspapers, essentially a set of oligopolies. Thus, from this analysis, one could conclude that the operating system market should also be an oligopoly. Clearly, this analysis is very rough, and further work is required, both in the approximations and in the conclusions; however, the conclusions provide a reasonable starting point from which to proceed.

There is additional evidence that supports the prior analytic approach. There are two distinct questions that need to be considered: first, under any circumstances, could there be more than one profitable operating system for a particular type of computer; and

77 This number actually reflects the “per copy” costs as well; however, since these are nominal in the newspaper industry, it serves as an estimate for the fixed costs as well.
78 Both industries are similar on other grounds as well. In both cases, almost all of the costs are fixed, and the per copy marginal cost is negligible in comparison.
second, given the current state of the operating system market, could a new competing product be profitable over the long-term (assuming no radical shifts in technology). The first question asks whether it is possible for two operating systems to exist, assuming no historical predisposition toward any particular operating systems, i.e., whether the market is a natural monopoly or not. The second question asks whether, given current circumstances, history has “locked-in” a monopoly, such that no competitor could successfully compete against the dominant company, Microsoft. These two questions will each be considered in turn.

3.3.2 Is the Operating System Market a Natural Monopoly?

A number of arguments are often advanced to support the conclusion that the operating system market is inherently a natural monopoly. First, since software has extremely high fixed costs and negligible marginal costs, it is often argued that it is an inherent natural monopoly similar to the electric power industry. However, this argument ignores two factors.

First, there are many industries with high fixed costs and negligible marginal costs, yet few of them are actually natural monopolies. In addition to the newspaper industry, analyzed above, consider any industry with strong brand loyalty, from soft drinks to breakfast cereals to headache remedies. The time and expense required to build up a name like Coca-Cola, Kellogg’s Raisin Bran, or Bayer aspirin is extremely large; the amount of money these companies invest each year in advertising are proof of the value of the name. Restricting the market to non-generic products (i.e., excluding no-name competitors), the value of brand loyalty becomes part of the fixed cost of entry. In fact,
compared with this fixed cost, the marginal cost of production is negligible.\textsuperscript{79} The economies of scale in these industries are at least as unfavorable to competition as they are in Microsoft’s case, yet these markets all support multiple competitors. While the degree of economies of scale in the operating system market supports the conclusion that there could not be a large number of producers, it provides no guidance on the question of whether the operating system market is in fact a natural monopoly or simply a concentrated oligopoly.

This argument also ignores the fact that the economies of scale in the operating system market are similar to the economies of scale in other sectors of the software industry, yet most of these sectors have more than one competing product. Until Windows became near-universal with the release of Windows 3.0,\textsuperscript{80} there were at least three popular spreadsheets (Lotus 1-2-3, Quattro Pro, and Microsoft Excel) and two popular word processors (WordPerfect and Microsoft Word). These software programs were significantly more complicated and more expensive to produce than the dominant Microsoft operating system at the time, DOS, which was strictly text-based;\textsuperscript{81} however, the market was able to support more than one spreadsheet and more than one word processor. Further, since the markets for each of these products is smaller than the market

\textsuperscript{79} In fact, the marginal cost of a box of any of these products, proportional to the value of the brand name, is probably much less than the marginal cost of a copy of Windows 95, compared to its fixed cost.

\textsuperscript{80} When Windows 3.0 succeeded over OS/2 and became the dominant operating system, almost all software vendors other than Microsoft were focusing their development efforts on OS/2-compatible software, which gave Microsoft the opportunity to monopolize the Windows-compatible application software market unchallenged.

\textsuperscript{81} DOS once shipped on one or two disks, whereas Lotus 1-2-3 required between five and ten.
for operating systems, they would appear less able to support multiple competitors, which they did for many years. Further, the markets showed no signs that they were heading for a consolidation due to an unsupportable number of products. Therefore, it is clear that the standard natural monopoly argument, based on fixed costs and economies of scale, in and of itself, cannot convincingly be applied to the operating system market.

A second argument often applied to the operating system market is based on the economic theory of complements. Two goods are complements “if an increase (decrease) in the price of one good leads to a decrease (increase) in the quantity demanded of the other.” For example, if the price of hotels increases, people will take fewer vacations, so the prices of gasoline and rental cars will decrease. Similarly, if the price of rental cars decreases, the prices of gasoline and hotels will increase. Thus, hotels, rental car agencies, and gasoline producers all have an incentive to keep each others’ products as inexpensive as possible. Applying this paradigm to the operating system market, the demand for an operating system increases as software written for it becomes more available (and therefore less expensive). Since the cost of developing a piece of software for multiple operating systems is much higher than the cost of developing it for only one operating system, third-party vendors will be encouraged to develop software only for the dominant operating systems and forsake all others. This line of reasoning leads to the conclusion that the operating system market will inevitably reduce to only one competitor because operating systems without third-party vendor software will quickly become defunct.

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82 Every computer requires an operating system, but only a portion require a spreadsheet or a word processor.
83 Pindyck and Rubinfeld, p. 101.
A closer look, however, reveals the fallacy in this argument as well. For many years, Apple’s Macintosh line of computers has occupied a small niche market of around 10 percent of the personal computer market. This has not, however, prevented software from being written for it, nor has the product line declined in popularity due to a lack of third-party software. In fact, Microsoft recently gave Apple significant financial support, in part because of the high profitability of selling Macintosh software. Effectively, there are already two operating systems, and the less popular one shows no signs of dying due to inadequate third-party software development.\textsuperscript{84} It seems a stretch to argue that two operating systems is the natural number and that three would be economically insupportable.

A third argument often advanced is that although multiple competing operating systems are not completely proscribed by market forces, the added costs to third-party vendors of developing for multiple operating systems is sufficient to discourage consumers from buying any but the most popular operating system. Under this theory, for example, the increased cost of OS/2 software (resulting from the existence of fewer copies over which to divide the fixed costs of development) prices it out of the market for consumers with reasonable budget constraints, so these consumers avoid OS/2. This theory can also be rejected by studying the Macintosh example. If the theory were true, then the higher cost of Macintosh software would cause buyers to avoid Macintosh systems. However, it is clear that ownership of Macintosh computers is not confined to the elite; most consumers purchase the computer they believe to be superior, and any

\textsuperscript{84} The Macintosh line of computers does seems likely to fail for other reasons unrelated to third-party software, however.
differences in the price of the system or the price of the software are insufficient to significantly affect purchases. Evidently, the added costs of owning a Macintosh are not significant enough to affect computer purchase decisions, so there is little reason to believe that operating system purchase decisions would be affected by the increased cost of software.

Overall, it seems clear that none of the standard arguments advanced to support the proposition that the operating system market is a natural monopoly is particularly convincing. On the other hand, due to large fixed costs and large economies of scale, it seems highly likely that the market could not support a large number of competitors. This leads to the conclusion that the operating system market is most likely an oligopoly, a conclusion that agrees with the result of the prior, analytic approach, in which the economics of the operating system industry were found to be similar to those of the newspaper business.

3.3.3 Is Microsoft’s Dominance Forever?

The second question that must be answered is more complicated: Given the current dominance by Microsoft and assuming no radical shifts in technology, could another competitor successfully penetrate the operating system market? There have certainly been a number of attempts, from IBM’s OS/2 (after Microsoft and IBM dissolved their partnership on the project) to Digital Research’s DR-DOS, which later became Novell DOS. The arguments are similar to those in the natural monopoly question. For example, many people argue that the investment thus far in Microsoft-compatible software is so great that third-party vendors would never rewrite their
software for a new operating system. This claim, however, is clearly false; after the success of Windows 3.0, nearly every software vendor rewrote its DOS software to work with Windows. Although certainly many vendors did not succeed in the Windows market as they had in the DOS market, this was usually due to delays in their products getting to the market, not the inherent cost of rewriting the software. In addition, Microsoft claims to have written Windows NT completely from scratch, yet there is no evidence that it is anything but highly profitable.

A more substantive claim that Microsoft has “locked-in” its monopoly with Windows is based on the theory that third-party vendors cannot risk developing for an operating system that does not have a guarantee of success. Therefore, the argument goes, vendors will write software only for an operating system that is nearly certain to succeed, and because of the overwhelming dominance of Microsoft, development will only occur for Microsoft operating systems. To take an example, the theory would explain the failure of OS/2 3.0 in the marketplace by examining the failure of prior versions of OS/2, as well as IBM’s many mistakes in the PC market; combined, this set of prior mistakes made third-party vendors uncertain about the future prospects for OS/2. As a result, third-party vendors were generally unwilling to rewrite their software for OS/2, and this

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85 This is similar to the argument advanced against IBM during the 1970s, that the cost of rewriting IBM mainframe software to work on other company’s mainframes was too great to permit any other company to penetrate the mainframe market. The validity of this claim, however, is not clear.
86 As previously stated, this analysis neglects arguments that unfair business practices by Microsoft, particular the allegations that Microsoft persuaded other companies to develop for OS/2 while internally developing for Windows, are responsible for the delays.
87 After IBM and Microsoft ended their joint development agreement for OS/2, IBM developed OS/2 3.0 (marketed as OS/2 Warp), an operating system designed to compete directly with Windows. It never achieved much success, and IBM eventually discontinued it.
unwillingness contributed significantly to OS/2’s failure. If this “lock-in” argument is true, then it would have been the case that no company, even one with an excellent record, would have had the clout to support OS/2. It seems a stretch to argue that no combination of companies have sufficient clout to develop a new operating system and convince third-party vendors to develop software for it. In fact, the recent success of Sun in convincing developers to write for a Java environment would lend support to the notion that the operating system market is still competitive. This question is closely related to questions surrounding standardization and will be considered in more detail in Chapter 4.

3.4 Conclusion

This chapter analyzed the industrial organization of the computer operating system market. First, several distinct organizations were discussed, including natural monopolies, oligopolies, and industries with many competitors. Public-policy implications of these organizations were also examined; natural monopolies, for example, are usually subjected to vigorous regulation in all aspects of the industry, whereas other organizations are generally unregulated. The operating system market was analyzed in detail, and it was determined to most likely be an oligopoly, based on the relationship between the fixed costs in the industry and the marginal cost of production; an examination of the viability of the Apple Macintosh line of computers led to the same conclusion. Finally, the current operating system market was examined from the standpoint of whether Microsoft has “locked-in” a monopoly. This question will be
explored in Chapter 4 during the discussion of the role of standardization in software markets.
4 Standardization

4.1 Background

In any analysis of antitrust concerns in the computer software industry, it is essential to examine the effects of standardization. Among the many justifications for antitrust laws is the concern that a lack of competition leads to higher prices and less innovation than would occur if there were free competition. Traditional antitrust concerns are raised when companies take actions that artificially reduce the number of competitors in a given industry, for example, through price-fixing arrangement or mergers. Clearly, however, many of the same concerns can be raised by the issue of standardization; although standardization does not reduce price competition (in fact, price competition may be intensified), it certainly results in less innovation. Therefore, standardization triggers many of the same concerns that generally prompt antitrust action.

4.2 Standard Selection

As a general rule, most industries begin very chaotically, with many vendors producing different, incompatible products with different combinations of features at different price levels. Over time, however, industries usually settle down to relatively few vendors, and usually there is at least some convergence of product offerings. In
“Choosing How to Compete: Strategies and Tactics in Standardization,” 88 Stanley Besen and Joseph Farrell survey corporate strategies during standardization periods. Using a simplified model of two vendors (which easily generalizes to more than two vendors), they examine three possible models of competition. In the first, both firms develop different standards, and each prefers to compete in the marketplace based on its own proprietary standard. The authors call this arrangement “Tweedledum and Tweedledee.”

In the second model, both firms develop standards (possibly identical), but both would prefer to agree on a single standard within which to compete. The authors call this “The Battle of the Sexes.” 89 Finally, the authors consider the situation in which one firm prefers to compete using its own proprietary standard, while the other prefers to “piggy-back” on the first firm and copy its standard without its permission. This is called the “Pesky Little Brother.”

In the first case, “Tweedledum and Tweedledee,” both firms prefer not to have a single standard, resulting in a full-fledged standards battle in the marketplace. Each vendor will produce products incorporating its standard, and each will attempt to convince buyers to purchase its products. In certain cases, each vendor will attempt to persuade other vendors to produce products using its standard to help increase its standard’s market penetration. The authors discuss four specific techniques a vendor can

89 This name is based on that of a classic game-theory game. Consider a situation in which a husband and wife want to go out together one night, but each prefers a different activity (say the wife prefers activity A and the husband activity B). Then the wife receives her maximum payoff if both players do activity A, she receives a lesser payoff if both players do activity B, and she receives her minimum payoff if each player does a different activity. The husband’s payoffs are analogous. Based on the payoffs, it is easy to conclude that both players will do the same activity, although one cannot predict which activity it will be.
use to win the battle. Generally, inertia plays a very large role in determining the winner of a standards battle; therefore, each vendor will try to increase its standard’s installed base as quickly as possible. For example, in the computer software industry, many vendors will initially keep prices artificially low, or even give away copies of their product, to build market share.

Another method for building demand for products utilizing a particular standard is to encourage development of complements for them, while discouraging development of complements to its competitors’ products. Thus, operating system manufacturers often encourage third-party software development for their operating systems while discouraging development for other operating systems. Both IBM and Microsoft, for example, had programs to encourage software development for OS/2 and Windows respectively, and Microsoft developed and sold tools, like compilers and debuggers, to help third-party vendors in their efforts. In addition, a vendor, particularly one dominant in the market, can pre-announce its products to discourage customers from buying a competitors’ products. Microsoft, for example, has often been accused of “vaporware,” in which it announces shipment of a product long before it will actually ship, as a means of discouraging purchases of its competitors’ products. Finally, some vendors will make future price commitments to encourage marketplace acceptance of their products. For example, when color television was first developed, RCA announced that it would lower its $1,000 price for a color television to $500 within six months, and the announcement

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90 Recall that a complement is a product, the provision of which increases demand for another product. For example, the lower the price of gasoline, the greater the demand for automobiles. Therefore, gasoline is a complement to automobiles.
spurred development of color programming by ensuring television stations that the color television prices would soon become affordable.

In the second case, the “Battle of the Sexes,” both firms would prefer to have a single standard. If they agree on one, or if neither has a vested interest in any particular standard so both are willing to negotiate in good faith, the outcome is clear: The two vendors will adopt the same standard and compete within it. If the firms each have an interest in a different standard, there will be a behind-the-scenes “competition” to determine which standard the two companies will adopt, and then both companies will sell only products incorporating that standard in the marketplace. There are many approaches that firms can use in their attempts to “win,” although most are standard negotiation tactics. One firm, for example, could take steps which commit it to its own technology as a means of convincing the other firm of its unwillingness to compromise. On the other hand, a firm could make concessions to coax the other firm to join its standard; advantageous licensing agreements and patent-sharing schemes are particularly common in the computer industry. These situations involve standard concepts of bargaining and do not require further elaboration.

The third case, the “Pesky Little Brother,” is particularly relevant to the computer industry. In this scenario, one firm has a standard which it would like to keep proprietary but which the other firm would like to copy. One possibility is that intellectual property rights, like patents and copyrights, can be successfully used to keep the standard proprietary. For example, Intel has prevented competitors from cloning its popular microprocessors by asserting patent rights, and this has kept its markets particularly
lucrative. Similarly, IBM successfully defended its Microchannel Architecture from clone-developers, although the victory was short-lived as Microchannel failed in the marketplace. Even if intellectual property rights are not available, there are still many techniques that a firm can use too keep its standard proprietary, although their use may lead to charges of unfair business practices. These tactics will be discussed more later, as they were the genesis for a number of antitrust actions.

4.3 Historical Examples

The standardization process for Video Cassette Recorders (VCRs) is a good demonstration of the models previously developed. The history of commercially viable VCRs begins in early 1976, when Sony launched its first product in the United States and Japan using the Betamax standard, a proprietary standard that Sony controlled through intellectual property rights. In early 1977, JVC launched a product based on the now-dominant standard, VHS, which was designed as an open standard that other manufacturers were encouraged to adopt. Sony’s decision to keep Betamax proprietary clearly puts it in either the first case or the third case. It believed that its superior distribution and name recognition would allow it to monopolize the VCR market if it brought its standard to the marketplace. In addition, Betamax offered a technically superior picture, which Sony believed would be to its advantage. Therefore, it saw no incentive to cooperate with JVC unless JVC was willing to make concessions, such as paying high licensing fees.

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It is less clear whether JVC would have preferred to cooperate or to compete if Sony had made the Betamax standard free from royalties; however, the option to cooperate was precluded by Sony’s licensing arrangements. Therefore, JVC, with less name recognition and a less developed distribution network, believed that its interests lay in encouraging as many companies as possible to adopt the VHS standard. Although VHS had slightly poorer picture quality, it initially offered a two-hour tape length versus Betamax’s one-hour. JVC believed, correctly as it turns out, that this feature, combined with VHS’s lower selling price, would encourage its adoption by the marketplace. In fact, RCA was approached by both Sony and JVC to distribute VCRs in the United States, and the choice of VHS supposedly hinged on JVC’s promise to develop a four-hour tape, which could hold a football game. This situation is clearly in line with the first model, “Tweedledum and Tweedledee,” and the result is history. Betamax’s head start and superior picture quality were insufficient to combat the superior tape-length and price of VHS machines, and by 1979, VHS machines had a greater installed base than Betamax machines. Very quickly all producers other than Sony adopted VHS, and Sony finally capitulated in 1988 and began producing VHS machines.

The second model, the “Battle of the Sexes,” occurs all the time, though usually not in public view. Companies are always negotiating with each other to adopt particular standards or produce particular products. In the VCR situation, for example, both Sony and JVC spent considerable time wooing other companies to their standards. JVC generally won that battle because it was willing to make more concessions than Sony.

92 Ibid., p. 85.
Unfortunately, because most negotiations of this type occur privately, they are difficult to analyze. However, one set of negotiations that does occur publicly involves many telecommunications standards, which must be approved by the Federal Communications Commission. In these cases, the necessity of agreement on a single standard is overwhelming because the FCC will prohibit all non-adopted standards; therefore, companies have a strong incentive to bargain with each other in good faith or else risk the FCC selecting the standard. This type of situation is currently occurring in the negotiation of standards for high-definition television, and recently, a large group of interested parties agreed on a set of standards that create a level playing field for all involved companies.

There are a large number of examples of the third case, the “Pesky Little Brother.” A number are relatively uninteresting; Apple was successful in protecting the Macintosh from clone-developers for years by asserting intellectual property rights, and starting with the 80386 chip, Intel has done the same.93 If a standard is covered by intellectual property rights, it is fully protected and easy to defend.94 The more interesting situations occur when standards are not subject to intellectual property rights, and the companies must therefore protect them with other schemes. For example, companies in a wide variety of fields will change their standards very often to prevent other firms from developing competing products. The market in replacement automobile parts, for example, is very important to automobile manufacturers. Therefore, they often make slight changes to

93 Since the 80386 chip, Intel has only made licensing arrangements with IBM, and these went mostly unused.
94 Under certain circumstances, the Justice Department may consider the assertion of intellectual property rights to be a violation of antitrust laws.
these parts from one model year to the next to reduce other companies' ability to "clone" these parts.

A related technique companies use to protect their standards is to create concern over future changes in the standards but not actually make any changes. For example, both MS-DOS and Windows for years have had operating system functions that were "undocumented," and Microsoft made no future guarantees about them. In this case, the risk that these undocumented functions might be changed is sufficient to discourage many other companies from using them, often leading these other companies to produce inferior products. Another technique used to protect standards is economic; companies can use marketing and pricing policies to make it uneconomical for any competitor to copy its standard. For example, a company can bundle a product (say product A) incorporating the standard with another product (say B) that it has a monopoly on. The result will be to reduce the standalone market for product A, to the point where no competitor can economically produce product A. The company, however, has greater economies of scale (since it is producing A both for bundling and for standalone sales), so it can monopolize both markets.

4.4 Antitrust Analysis of Standardization

This rubric for standardization is very applicable to general antitrust. From an antitrust point-of-view, the government rarely involves itself in the first case, "Tweedledum and Tweedledee." If two firms both want to pursue different standards,
there seems little basis for the government to intervene. The second case, the “Battle of the Sexes,” raises concerns of unfair business practices if one firm is much larger and more powerful than the other. In that case, the larger firm could force the smaller one to compete on its turf, to the smaller firm’s disadvantage. It is not clear, however, whether this would constitute a violation of antitrust laws, and there do not seem to be any major cases in which this matter was an issue.

The situation in which antitrust concerns are most clear is the third, the “Pesky Little Brother,” when one firm is locked out of the other firm’s standard. Usually, the firm defending the standard is highly dominant in the industry and is accused of using its size and intellectual property rights to prevent competitors from adopting its standard, thereby monopolizing the market in products dependent on the standard. The law in this area is extremely unclear, and the range of practices considered to be violations has varied greatly over time. During the most aggressive period of antitrust enforcement, roughly between 1940 and 1970, many of the large antitrust cases were based on the “Pesky Little Brother” model. As discussed in Chapter 2, the Justice Department accused IBM of monopolizing the market in tabulating machines in a 1952 antitrust action, and IBM agreed to license its patents to competitors at reasonable terms to settle the matter. This is a clear example of the Justice Department intervening in a “Pesky Little Brother”

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95 Certainly intervention might be required if one of the firms uses an unfair business practice in the competition, but this is distinct from any issues raised by the standardization battle. In addition, government intervention may be warranted on grounds other than antitrust. For example, the FCC generally does not allow standards battles in areas within its jurisdiction due to the limited nature of the electromagnetic spectrum. In addition, this analysis assumes that the government will always be able to correctly identify whether the two firms are competing by choice or whether one firm has locked out the other firm along the lines of the “Pesky Little Brother” model.
situation; in the Justice Department's view, IBM has improperly protected its markets from competition by asserting intellectual property rights.

In another previously discussed case, the Justice Department in 1969 accused IBM of monopolizing the market for "general purpose digital computers" through four allegedly improper tactics. Effectively, the Justice Department argued that IBM’s pricing and marketing policies, aimed at protecting its standards from competitors, resulted in illegal monopolization, and it sought a court-ordered breakup of IBM. The suit was finally dismissed in 1982; however, one outcome was a new IBM pricing policy under which hardware, software, and support were separated.

In 1973, Xerox was similarly accused by the Federal Trade Commission of using its patents and technical skill to produce products that competitors could not duplicate. Xerox’s policy of only leasing copy machines was also targeted as restricting competition. To settle this matter, Xerox agreed in a 1975 consent decree to license its patents, supply technical "know-how" to its competitors, and sell its copy machines. Here again, Xerox’s tactics in defending its standards were challenged as improper.

4.5 Lessons for Microsoft

There seems little doubt that the main difference between Microsoft’s situation today and IBM’s and Xerox’s previously is the time period. Courts are currently less receptive to antitrust suits, and the Justice Department/Federal Trade Commission is less aggressive about bringing them. It seems clear that during the 1950s and 1960s, the

96 This case, as well as the allegedly improper tactics, was discussed in detail in chapter 2.
Justice Department would have asserted that many of Microsoft’s tactics for protecting its standard, from “undocumented” system functions to its application group’s advanced knowledge of future operating system changes, violate antitrust laws. According to the older rubric of antitrust enforcement, Microsoft seems to be a prime candidate for a required divestiture to separate its operating system division from its application division. Such a breakup would have a social good as well; it would prevent Microsoft from using its operating system standard to stifle innovation in the applications market. Under the new rubric of antitrust enforcement, since roughly 1970, the Justice Department has filed many fewer cases seeking divestiture, and courts have generally become less friendly to antitrust cases. Overall, given the uncertainty currently surrounding antitrust laws, it would be difficult to predict the outcome if the Justice Department filed such a suit in today’s legal environment. There does appear, however, to be a large potential for public good from such a move, by reducing the extent to which Microsoft would be able to monopolize sectors of the software industry solely through control of its operating system standards, and not through superior skill or products.

4.6 Conclusion

This chapter studied the process of standardization, examined in detail a key historic case of standardization, and analyzed the antitrust ramifications that occur when an industry standardizes. Because standardization can result in stagnation, just as monopolization can, standardization raises many concerns that can be addressed through the application of antitrust laws. A number of antitrust cases that involved standardization were examined, and lessons were drawn for the Microsoft case. Based on the
standardization rubric, Microsoft has certainly engaged in conduct that once would have been targeted by the Justice Department or the Federal Trade Commission; however, due to the confusion surrounding the current legal climate on antitrust matters, it is unclear that the Justice Department would be successful if it launched a broad antitrust case against Microsoft.
5 Conclusion

This project examined the current Justice Department dispute with Microsoft, by examining the historic backdrop within which the dispute takes place. First, the history of antitrust laws was reviewed, and Microsoft’s present situation was compared with key historic antitrust cases which also involved high-technology industries. This analysis revealed that although Microsoft’s operating system business is probably not subject to antitrust action, its applications business probably is. Specifically, Microsoft has engaged in conduct similar to the conduct of IBM and Xerox that triggered antitrust action during the 1960s and the 1970s, and which resulted in both companies’ making changes to their pricing and marketing policies. Microsoft’s current dispute with the Justice Department was also examined, and it appears that there is no self-consistent interpretation of the key provision of the 1993 consent decree, so it would appear difficult for the Justice Department to prevail in its enforcement action.

Next, the project examined a set of industries, called natural monopolies, which appear to share much in common with the computer operating system business. Public policy implications of these natural monopolies were examined; it is common, for example, for natural monopolies to be highly regulated, whereas other industrial organizations are generally unregulated. The operating system market was analyzed in detail, and it was determined to most likely be an oligopoly (an industry in which a small number of firms dominate), based both on the relationship between the fixed costs in the
industry and the marginal cost of production, and also by examining the viability of the Apple Macintosh line of computers.

Finally, the project examined a model that attempts to explain the process by which companies decide whether to standardize, and a key historic case, involving VCRs, was examined in detail. The model was then analyzed to determine the antitrust ramifications that standardization presents. Both the Microsoft case and a number of other antitrust cases involving standardization were examined. Based on this analysis, Microsoft’s conduct would certainly at one time have been targeted by antitrust authorities. Due to the confusion surrounding the current legal climate on antitrust matters, it is unclear what the judicial response would be to a broad antitrust case against Microsoft. However, it does appear that such a move, if successful, could produce significant public good.
References


Other Useful References:


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