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The Arc of Monopoly: A Case Study in Computing*

Randal C. Picker†

The world we live in today is defined by three great arcs. The first is the world of semiconductors and the innovation characterized by Moore's law, the second is the creation of ubiquitous wireless access, and the third is the emergence of the internet platform. In that context, this Essay looks at government claims of monopolization in telecommunications and computing by considering past antitrust actions against AT&T, IBM, and Microsoft. Early antitrust actions against AT&T and IBM of course long predated the rise of the Chicago School, but later actions against AT&T and IBM overlapped that rise as did the antitrust actions against Microsoft. These antitrust actions intersected with and influenced these three arcs, though teasing out the precise nature of that influence is ultimately quite tricky.

INTRODUCTION

“The Chicago School.” I am not sure that I know what that means exactly. It is often used to refer to the body of ideas in economics and antitrust associated with economists and lawyers at the University of Chicago. As to antitrust proper, if one had to choose a single text associated with the Chicago School—a bible as it were, and there is no question that some of this undertaking is about faith and belief in a world of incomplete facts and complex historical paths—a natural choice for that would be then-Professor Robert Bork's *The Antitrust Paradox: A Policy at War with Itself*. Bork's influential work was originally published in 1978 and then reissued in 1993 with a new introduction and epilogue.

The new 1993 material gave Bork a chance to look back at what the Chicago School had accomplished. In his 1993 introduction, Bork described the Chicago School as centered on two ideas: judges should use a conception of consumer welfare in deciding

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antitrust cases and they should do that analysis using economics.¹ In the new epilogue, Bork made clear that he didn't have a narrow conception of consumer welfare: "The argument of this book, of course, is that competition must be understood as the maximization of consumer welfare or, if you prefer, economic efficiency."² So perhaps the Chicago School is nothing more than using economics in pursuit of economic efficiency. I am not quite sure what it says about the book's current status—or perhaps about economic efficiency—that the book is currently out of print and you should expect to pay between \$100 and \$170 for a used copy.

In the new 1993 introduction, Bork was quite pleased by the success of the Chicago School: "Today, antitrust has been downsized. It is merely law, not a farrago of amorphous and leftist political and sociological propositions."³ I had to look up "farrago"—"a confused mixture"—but I had already guessed that it wasn't a compliment. At a more granular level, the Chicago School didn't do any real conceptual downsizing on how to think about illegal horizontal cartels that violate Section 1 of the Sherman Act. Bork clearly thought that part of the success of the Chicago School analysis—the downsizing—occurred in vertical restraint cases under Section 1, perhaps most exemplified by the Supreme Court's 1977 decision in *GTE Sylvania*⁴ and the eventual follow-on in 2007 in *Leegin*.⁵ And I think Bork thought downsizing had occurred in merger policy, in which he saw as failures earlier decisions like *Brown Shoe*⁶ and *Von's*.⁷

That quick doctrinal summary skips Section 2 of the Sherman Act on monopolization by a single firm. When Bork published his book in 1978, the Department of Justice (DOJ) had Section 2 cases pending against IBM and AT&T. The IBM case was filed in 1969, the AT&T case in 1974. Given the size and success of the companies, these were two of the leading Section 2 cases of their era. In 1978, Bork seemed to be skeptical about both suits and said more generally that "government suits seeking structural remedies [were] not soundly based in either law or economics."⁸

¹ Robert H. Bork, *The Antitrust Paradox: A Policy at War with Itself* xi (Free Press 2d ed 1993).

² *Id.* at 427.

³ *Id.* at x.

⁴ *Continental T.V., Inc v GTE Sylvania Inc*, 433 US 36 (1977).

⁵ *Leegin Creative Leather Products, Inc v PSKS, Inc*, 551 US 877 (2007).

⁶ *Brown Shoe Co v United States*, 370 US 294 (1962).

⁷ *United States v Von's Grocery Co*, 384 US 270 (1966).

⁸ Bork, *Antitrust Paradox* at 163 (cited in note 1).

Bork believed that size achieved through internal growth clearly was efficient and that therefore some type of breakup would necessarily create less efficient firms.⁹ By the time of the 1993 epilogue, both cases had been resolved, one with a dismissal and one with a breakup. And Bork believed that both cases had been resolved correctly, though his analysis was quite brief.¹⁰

But if Bork was right that antitrust had been downsized, there are ways in which the most dramatic downsizing might be regarding Section 2 and how the government controls monopolization. In the 1990s, the Antitrust Division filed nine civil Section 2 cases.¹¹ It filed no such cases from 2000 to 2009.¹² And between 2010 and 2018, it filed one such case.¹³ So ten cases total between 1990 and 2018 and only one after 1999. The number of Section 2 investigations has witnessed a similarly dramatic decline; while the Antitrust Division averaged almost eleven investigations per year in the 1990s, over the past decade the department has averaged fewer than two.¹⁴ This isn't mere shrinkage of the DOJ's Section 2 docket, but instead a quantum-level downsizing.

I want to look at the downsizing of monopolization and to do so through the development of one particular market: computing. That market was still young in 1978 when Bork published *The Antitrust Paradox*. The two great tech cases were pending, but the personal computer was presumably barely visible to Bork, and he had no sense of the world that we live in today. That world is really defined by the intersection of three great technical developments: semiconductor technology and Moore's law, ubiquitous wireless access, and an all-encompassing data and communications platform: the internet. It is worth sketching out in broad terms how we have reached this point and the role that Section 2

⁹ Again, Bork: "Antitrust should not interfere with any firm size created by internal growth, and this is true whether the result is monopoly or oligopoly." *Id.* at 178. And in the 1993 epilogue: "Breaking up such a firm would do more harm than good to consumers." *Id.* at 430.

¹⁰ *Id.* at 431.

¹¹ Department of Justice, *Antitrust Division Workload Statistics FY 1990–1999* *5 (June 9, 2016), archived at <https://perma.cc/89HT-LF92>.

¹² Department of Justice, *Antitrust Division Workload Statistics FY 2000–2009* *6 (Apr 4, 2012), archived at <https://perma.cc/FED9-PYCN>.

¹³ Department of Justice, *Antitrust Division Workload Statistics FY 2009–2018* *6 (July 1, 2019), archived at <https://perma.cc/A8N7-6CMH>.

¹⁴ *Antitrust Division Workload Statistics FY 1990–1999* at *1 (cited in note 11); *Antitrust Division Workload Statistics FY 2009–2018* at *1 (cited in note 13).

of the Sherman Act—and its equivalent in Europe—has played or failed to play in creating those developments.

Section 2's instruction to control monopolization might be used most naturally to shape competition within a given current market; to police competition in adjacent markets when a dominant firm might seek to use its market position to distort competition in a market related to the original market; and to control competition for the next market—competition over time—where the fear is that the incumbent will use its current position to its advantage to distort competition in the new coming market.

The success or failure of Section 2 in computing should be judged as to how it has shaped or failed to shape competition in current markets, in adjacent markets, and in future markets. The balance of this Essay will try to do just that in looking at a series of antitrust actions in computing and telecommunications. The fact that Section 2 enforcement has in some ways shut down since the 1990s means that, save for the Microsoft cases, much of the relevant landscape was available to Bork even in 1978 and certainly by 1993.

That is to say that I will focus on the US government's settlements in 1956 with AT&T and IBM, the 1969 antitrust suit against IBM, the 1974 suit against AT&T, the 1994 and 1998 actions against Microsoft in the United States, and the actions against Microsoft in Europe in the 2000s. Microsoft really is the antitrust bridge from the earlier era suits against IBM and AT&T to whatever will come next. Even Google, facing three different fines in Europe totaling \$9.4 billion, is still in many ways at the early days, with appeals pending and public opinions still not available in two of the three European Commission (EC) cases.¹⁵

As to the rest of the leading firms, in May 2019, the US Supreme Court issued an opinion in a case brought against Apple that will make it easier for individual customers to sue platforms

¹⁵ William Gallagher, *Google up to \$9.4 Billion in Total Fines to EU, with Latest \$1.7 Billion AdSense Penalty* (AppleInsider, Mar 20, 2019), archived at <https://perma.cc/F5ML-HQL7>; European Commission, Press Release, *Antitrust: Commission Fines Google €1.49 Billion for Abusive Practices in Online Advertising* (Mar 20, 2019), archived at <https://perma.cc/SRV5-74W7>.

for alleged antitrust violations;¹⁶ plus, there are other possible investigations against Apple, but again this is all quite early still.¹⁷ The German cartel office has issued an antitrust ruling regarding how Facebook combines data internally, though that is currently on appeal in the German court system, and there is a pending US Federal Trade Commission investigation into Facebook.¹⁸ And the EC opened a formal investigation on how Amazon operates its platform and uses the data of third-party retailers.¹⁹ There is no question that how to think about regulating these firms is very much on the table, and that makes this a particularly good time to revisit the prior antitrust path in computing and communications.

I. A SHORT HISTORY OF TODAY

Three great arcs define the world of computing and communications that we live in today. The first was the rise of computing power itself, from the vacuum tube machines of World War II to the world of semiconductors defined by Moore's law. The second great arc was the move from expensive wired communications dominated by AT&T and the rest of the Bell System to ubiquitous, cheap wireless communication. And the third was the creation of the Internet and its evolution from an arcane academic network to the universal data and communications platform of today.

A short version of the history of the rise of computing power would almost certainly start with World War II, though that would ignore an important earlier world of analog computers that certainly shaped how the creators of the new digital machines understood what they were doing. Digital computing using vacuum

¹⁶ See *Apple Inc v Pepper*, 139 S Ct 1514, 1525 (2019) (explaining that “[i]t is true that Apple’s alleged anticompetitive conduct may leave Apple subject to multiple suits by different plaintiffs”).

¹⁷ See, for example, Rochelle Toplensky, *Brussels Poised to Probe Apple over Spotify’s Fees Complaint* (Financial Times, May 6, 2019), online at <https://www.ft.com/content/1cc16026-6da7-11e9-80c7-60ee53e6681d> (visited Jan 27, 2020) (Perma archive unavailable); Jack Nicas, *Russia Opens Antitrust Inquiry into App Restriction at Apple* (NY Times, Aug 9, 2019), archived at <https://perma.cc/Z46R-844D>.

¹⁸ Bundeskartellamt, Press Release, *Bundeskartellamt Prohibits Facebook from Combining User Data from Different Sources* (Feb 7, 2019), archived at <https://perma.cc/5T4G-CBNE>; Natasha Lomas, *Facebook Succeeds in Blocking German FCO’s Privacy-Minded Order Against Combining User Data* (TechCrunch, Aug 26, 2019), archived at <https://perma.cc/ZSE7-K6N3>; Mike Isaac and Natasha Singer, *Facebook Antitrust Inquiry Shows Big Tech’s Freewheeling Era Is Past* (NY Times, July 24, 2019), archived at <https://perma.cc/C9LF-GU86>.

¹⁹ European Commission, Press Release, *Antitrust: Commission Opens Investigation into Possible Anti-Competitive Conduct of Amazon* (July 17, 2019), archived at <https://perma.cc/FXV9-JE5F>.

tubes emerged in World War II, most visibly with the public demonstration by the US War Department of ENIAC (the electronic numerical integrator and computer) on February 14, 1946.²⁰ Much less visibly, the British had achieved great success with their Colossus cryptography machines, which were also based on vacuum tubes, and Konrad Zuse had pursued a similar path during the war for Germany.²¹

The nature of historical inquiry is that causality is complicated, sometimes overdetermined, and it is almost always impossible to see the world that would have resulted had an alternative path played out. The digital computers that emerged in World War II reflected, at least in part, the nascent work being done before the war, especially by Professor John Atanasoff at Iowa State University, but it seems likely that the substantial resources brought to bear during World War II moved the path of digital computing forward much faster than it would have otherwise.²² The concentrated war effort put in place the new, much higher basecamp from which the next step in computing would emerge, even if that path linked back naturally to the baby steps that had been taken before the war.²³

The next step was clearly the move to semiconductors and the invention of the transistor at Bell Labs. John Bardeen and Walter Brattain demonstrated what we now know as the point-contact transistor on Christmas Eve 1947, and William Shockley quickly followed that with the invention of the junction transistor in January 1948.²⁴ Computing has been based on semiconductors ever since then, as transistors turned into integrated circuits and then into microprocessors. The great arc of computing power was a world defined by the relentless pace of change set by Moore's

²⁰ *Robot Calculator Knocks Out Figures Like Chain Lightning*, Chi Daily Trib 1 (Feb 15, 1946).

²¹ See Martin Campbell-Kelly, et al, *Computer: A History of the Information Machine* 37, 42 (Westview 3d ed 2013).

²² See generally, for example, Brian Randell, *On Alan Turing and the Origins of Digital Computers* (University of Newcastle upon Tyne Computing Laboratory Technical Report Series No 33, 1972), archived at <https://perma.cc/9PZB-CCPG>.

²³ Unsurprisingly, there are many books on the history of computers. On Atanasoff in particular, see generally Jane Smiley, *The Man Who Invented the Computer: The Biography of John Atanasoff, Digital Pioneer* (Doubleday 2010).

²⁴ Jon Gertner, *The Idea Factory: Bell Labs and the Great Age of American Innovation* 93–96 (Penguin 2012); William Shockley, *The Invention of the Transistor—An Example of “Creative-Failure Methodology”*, in Florence Essers and Jacob Rabinow, eds, *The Public Need and the Role of the Inventor: Proceedings of a Conference Held in Monterey, California June 11–14 1973* 47–87 (National Bureau of Standards 1974).

law, described by Gordon Moore in 1965 as an empirical regularity within the world of semiconductors.²⁵ Improvements in transistor density were exponential—doubling over a defined period—and that drove each succeeding computer generation, from mainframes to minicomputers to microcomputers (personal computers) and then to the handheld smartphones we have today.²⁶

The second great arc that defines today was the move from expensive wired communications dominated by AT&T and the Bell System to ubiquitous wireless communication. The future arrived on April 3, 1973, when Martin Cooper, a Motorola vice president, made the first portable phone call, though there was no easy way to see the world of today from that first phone call.²⁷ More than a year later, on November 20, 1974, the US government brought an antitrust suit against AT&T, and the government made clear from the outset that it wanted to break “Ma Bell” into pieces.²⁸ Quite remarkably, on January 9, 1982, AT&T agreed to settle the case with a breakup.²⁹ By August 1983, the US government and AT&T had agreed on the structure of the firms that would be formed from the breakup.³⁰ By the end of 1984, there were fewer than one hundred thousand portable phone subscribers in the United States.³¹

The breakup of AT&T was almost immediately directed at boosting competition in the market for long-distance phone calls.³²

²⁵ Gordon E. Moore, *Cramming More Components onto Integrated Circuits*, 38 *Electronics* 114, 115 (Apr 19, 1965) (describing “the production of larger and larger circuit functions on a single semiconductor substrate” year by year).

²⁶ See *id.* at 115–16. See also Tom Simonite, *Moore’s Law is Dead. Now What?* (MIT Technology Review, May 13, 2016), archived at <https://perma.cc/HAL9-LY8A>.

²⁷ See Joseph Egelhof, *Motorola Unveils New Radio-Phone*, *Chi Trib* 87 (Apr 4, 1973); Gene Smith, *Motorola Introduces Wire-Less Telephone*, *NY Times* 57 (Apr 4, 1973); Press Release, *Motorola Demonstrates Portable Telephone to Be Available for Public Use by 1976* (Motorola, Apr 3, 1973), archived at <https://perma.cc/BNW9-ED5N>.

²⁸ See Eileen Shanahan, *U.S. Sues to Divest A.T.&T. of Western Electric; Conspiracy Is Charged*, *NY Times* 1, 68 (Nov 21, 1974) (noting that “[a]mong the items of relief envisioned in the suit are the splitting of Western Electric . . . [Assistant Attorney General] Clearwaters said that he felt such an action could aid competition”).

²⁹ See Ernest Holsendolph, *U.S. Settles Phone Suit, Drops I.B.M. Case; A.T.&T. to Split Up, Transforming Industry* (*NY Times*, Jan 9, 1982), archived at <https://perma.cc/M2K5-PQRK>.

³⁰ See Andrew Pollack, *A.T.&T., U.S. Agree on Final Aspects of Bell Breakup* (*NY Times*, Aug 4, 1983), archived at <https://perma.cc/WM8J-6NPW>.

³¹ *In the Matter of Implementation of Section 6002(B) of the Omnibus Budget Reconciliation Act of 1993: Annual Report and Analysis of Competitive Market Conditions with Respect to Commercial Mobile Services*, 10 *FCC Rec* 8844, 8874 (1995).

³² See Andrew Pollack, *Bell System Breakup Opens Era of Great Expectations and Great Concern* (*NY Times*, Jan 1, 1984), archived at <https://perma.cc/PW2T-QYW4> (noting

Yet the breakup may have mattered most when the FCC moved to change wireless communications. On October 25, 1991, the FCC announced a policy statement and order on what it was describing as a new type of wireless personal communications services.³³ The world of wireless communications, still very much in its infancy at the time of the breakup of AT&T, would soon start to expand rapidly as the FCC held a series of spectrum auctions to provide the key infrastructure for the development of an expanded set of wireless services.³⁴ By the end of 1994, there were roughly twenty-four million now-cellular subscribers in the United States,³⁵ but the real spectrum big bang occurred at the end of 1994 and into early 1995 when the FCC auctioned off ninety-nine spectrum licenses for a total price of just over \$7 billion.³⁶ Absent the breakup of AT&T, AT&T clearly would have been the leading potential buyer of this new spectrum, but with the breakup, each of the RBOCs—the regional Bell operating companies—were competitors of AT&T in the bidding.³⁷ By the end of 2016, there were roughly 400 million US wireless connections.³⁸ (The number of US landline connections peaked at roughly 192.4 million at the end of 2000 and has been dropping since.³⁹)

The third great innovation was the Internet and the particular version of it that arose with the World Wide Web. The October 4, 1957 launch of Sputnik by the Soviet Union was a great technical achievement and a public relations triumph that forced

that, under the agreement, “[s]everal networks will be competing with the new A.T.&T. to carry long-distance calls” and “the increasing competition spurred by the Bell breakup is expected to speed [] up” innovations in the industry).

³³ See *In the Matter of Amendment of the Commission’s Rules to Establish New Personal Communications Services*, 6 FCC Rec 6601, 6601 (1991).

³⁴ See *In the Matter of Implementation of Section 6002(B)*, 10 FCC Rec at 8860 (cited in note 31).

³⁵ See *id.* at 8874.

³⁶ See FCC, *Auction 4: Broadband PCS A and B Block* (1995), archived at <https://perma.cc/8F6Q-D3DV>.

³⁷ See FCC, *Auction 4: Broadband PCS A and B Block: Bidder Activity by Dollar Value of High Bids* (1995), archived at <https://perma.cc/U7GX-RSQ5> (showing that Ameritech Wireless Communications, Pacific Telesis Mobile Services, and Southwestern Bell Mobile Systems all had high bids).

³⁸ *The State of Wireless 2018* (CTIA, July 10, 2018), archived at <https://perma.cc/BJZ8-WSNE>.

³⁹ See FCC, *Local Telephone Competition: Status as of December 31, 2009* *13 (Jan 2011), archived at <https://perma.cc/4Q3B-H25C> (Table 1).

the United States to respond.⁴⁰ The US military had been cutting back on military research but quickly reversed course given the Soviet achievement.⁴¹ A new intrabranch research arm, the Advanced Research Projects Agency (ARPA) was created.⁴² J.C.R. Licklider had come to ARPA in October 1962 and was confronted with the problem of how ARPA could best coordinate the computing power that it was seeding throughout the country. In an April 23, 1963 memo, Licklider proposed a network of computers each “netted together” through some sort of common computer language.⁴³

By December 1969, a four-node network—the ARPANET—was up and running.⁴⁴ At the time, it wasn’t at all clear what ARPANET would turn into, but we now know that it would become the Internet and then the internet. There is a rich history associated with that, of course, but to just have a date or two in mind and then jump forward nearly two decades, note that Tim Berners-Lee submitted a proposal in March 1989 to CERN for what Berners-Lee described as a “mesh” system for linking together hypertext information.⁴⁵ In early 1993, Berners-Lee’s back end was matched with a front end, Mosaic.⁴⁶ The new software, an Internet web browser, was developed at the National Center for Supercomputing Applications at the University of Illinois at Urbana-Champaign.⁴⁷ Marc Andreessen was one of the key developers of Mosaic; when his new company, Netscape, went public on August 9, 1995, the Internet boom was on.⁴⁸

⁴⁰ See, for example, John W. Finney, *Economy Campaign Halts Plans for New Military Research Projects: Scientists Warn of Peril to U.S.*, NY Times 13 (Oct 9, 1957) (reporting that “[s]cientific concern has been heightened by the technological strides being made by the Soviet Union, as exemplified in the launching of man’s first earth satellite”).

⁴¹ See id. See also James Reston, *Arms: A Progress Report*, NY Times 32 (Dec 6, 1957) (reporting that “[t]he new United States missiles budget will be up about \$2,000,000,000, representing an increase of one-third in the missile program,” some of which will be used on a “planned expansion of the warning system”).

⁴² See Reston, *Arms: A Progress Report*, NY Times at 32 (cited in note 41).

⁴³ See J.C.R. Licklider, *Topics for Discussion at the Forthcoming Meeting *3* (Advanced Research Projects Agency, Apr 23, 1963), archived at <https://perma.cc/JCT5-846G>.

⁴⁴ Bolt Beranek and Newman, Inc, *A History of the ARPANET: The First Decade III-77* (BBN Report No 4799, Apr 1981).

⁴⁵ Tim Berners-Lee, *Information Management: A Proposal* (World Wide Web Consortium, Mar 1989), archived at <https://perma.cc/LS9K-XGT9>.

⁴⁶ See John Markoff, *Business Technology; A Free and Simple Computer Link* (NY Times, Dec 8, 1993), archived at <https://perma.cc/Z6FG-ZD7A>.

⁴⁷ See Tim Anderson, *Mosaic Turns 20: Let’s Fire up the Old Girl, Show Her the Web Today* (The Register, Apr 26, 2013), archived at <https://perma.cc/3ZZS-SMH8>.

⁴⁸ See Molly Baker and Joan E. Rigdon, *Netscape’s IPO Gets an Explosive Welcome*, Wall St J C1 (Aug 9, 1995).

II. ANTITRUST AND THE DAWN OF THE COMPUTER INDUSTRY

In 1913, AT&T faced two separate channels of attack from the US government: one a possible antitrust suit, and the second a push by the US Postmaster General to bring the telegraph and telephone under the control of the federal government to create a unified communications system with the US Post Office.⁴⁹ AT&T navigated those threats by “voluntarily” agreeing in the Kingsbury commitment to spin off its recent acquisition of Western Union, one of the great telegraph firms of its era, and by agreeing to create a variety of interconnection rights with firms that wanted to access AT&T’s lines.⁵⁰ AT&T survived all of that very nicely, as by 1917, US Steel was by far and away the largest public US firm by market cap with a value of \$46.4 billion in 2017 dollars, while AT&T was number two with a value of \$14.1 billion.⁵¹

After World War II, AT&T would again face an antitrust threat from the US government, this time realized when the government brought an antitrust action against AT&T on January 14, 1949.⁵² US Attorney General Tom C. Clark made clear that the size and organization of AT&T made it almost impossible for state and federal regulators to control it.⁵³ AT&T and its operating entities were regulated under conventional public utility-style regulation, which focused on a rate of return based on the cost of operations. But Western Electric, AT&T’s manufacturing company, stood outside of those regulations, and the fear was that the operating companies were paying inflated rates in an effort to evade the effects of standard rate regulation.⁵⁴ The solution to that problem was to, again, break up AT&T by forcing it to divest its interest in Western Electric.⁵⁵

On January 24, 1956, the case settled.⁵⁶ AT&T would not be broken up, but it would agree to license its existing patents royalty-

⁴⁹ See *Telephone Trust to Dissolve, Giving Up Western Union Control: Government Accepts an Offer of Complete Separation*, NY Times 1 (Dec 20, 1913).

⁵⁰ See *id.* at 2.

⁵¹ See *A Century of America’s Top 10 Companies, in One Chart* (howmuch.net, Nov 14, 2017), archived at <https://perma.cc/4SVJ-UX3L>.

⁵² See John B. Owen, *Suit Attacks AT&T as Monopoly*, Wash Post 1 (Jan 15, 1949).

⁵³ See *id.* (featuring a quote from Attorney General Clark in which he explains that a breakup would “create a situation under which State and Federal regulatory commissions will be afforded an opportunity to reduce telephone rates to subscribers”).

⁵⁴ See Charles Zerner, *U.S. Sues to Force A.T.&T. to Drop Western Electric Co.*, NY Times 1, 3 (Jan 15, 1949).

⁵⁵ See *id.*

⁵⁶ See generally Consent Decree, *United States v Western Electric Co.*, Civil Action No 17-49, *71,134 (D NJ 1956).

free and its future patents at reasonable and nondiscriminatory rates, plus AT&T would be quarantined.⁵⁷ AT&T would operate in the communications business, but it was barred from entering new fields, including, most relevantly, the computer industry.⁵⁸ The government characterized the settlement as “one of the most important” in US antitrust history,⁵⁹ though after the fact, the settlement was seen as more controversial.⁶⁰

Assessing the exact causal role of the 1956 AT&T antitrust settlement—or final judgment, as it was called—is tricky. AT&T had an active practice of licensing its patents and had started holding symposia and licensing its transistor patents in 1951 and 1952.⁶¹ That licensing presumably reflected the idea that a single firm might not be well situated to fully exploit the full range of possible inventions associated with a particular invention.⁶² AT&T also had obligations under military contracts to disseminate information about the transistor to the military.⁶³ AT&T also might have been licensing the patents as part of managing the pending antitrust case. All of that suggests that AT&T’s licensing of the transistor patents was overdetermined. The 1956 antitrust settlement reduced the royalty rate on the presettlement patents, including the transistor patents, to zero, but a detailed look at the case suggests that the price drop didn’t change actual use of the transistors.⁶⁴ What really mattered was assured access to the new

⁵⁷ See *id.* at *71,139.

⁵⁸ See *id.* at *71,137.

⁵⁹ See Anthony Lewis, *A.T.&T. Settles Antitrust Case; Shares Patents*, *NY Times* 1 (Jan 25, 1956).

⁶⁰ See, for example, Lawrence A. Sullivan and Ellen Hertz, *The AT&T Antitrust Consent Decree: Should Congress Change the Rules?*, 5 *High Tech L J* 233, 236 (1990) (noting that, in the years following the 1956 consent decree, the FCC was “deluged by complaints” from equipment manufacturers claiming that AT&T refused to purchase their goods and that, by the 1970s, it was clear the overwhelmed Commission struggled to prevent AT&T from limiting competitive incursions).

⁶¹ See Martin Watzinger, et al, *How Antitrust Enforcement Can Spur Innovation: Bell Labs and the 1956 Consent Decree* *30 (working paper, Feb 12, 2019), archived at <https://perma.cc/UE49-LKFW>.

⁶² See Keith S. McHugh, *Bell System Patents and Patent Licensing*, *Bell Telephone Magazine* 217, 218 (Winter 1948–49) (explaining that “[i]n order to realize the value of the inventions, it is necessary to employ different types of patent license agreements in different situations”).

⁶³ See F.M. Smits, ed, *A History of Engineering and Science in the Bell System: Electronics Technology (1925–1975)* 21 (AT&T Bell Laboratories 1985).

⁶⁴ See Watzinger, et al, *How Antitrust Enforcement Can Spur Innovation* at 35 (cited in note 61).

technology in an easy way, so the small post-consent decree reduction in royalties appears to have had little further impact on use of the new transistor.⁶⁵

Whatever the reason for ready availability of AT&T's new and important transistor technology, there seems little doubt that the widespread availability of AT&T's transistor patents and knowhow mattered for the development of semiconductors. Firms like Texas Instruments and Fairchild Semiconductor were able to take important steps forward into silicon transistors and eventually integrated circuits that might have been prevented had AT&T's early transistor patents been given their full blocking force or if AT&T had kept everything in-house.⁶⁶ And the business line quarantine may have mattered for how the computer industry evolved.

But we need to fill in one more chunk of the history before considering that possibility. On January 25, 1956—the day after the US government announced its settlement of the AT&T anti-trust case—the government announced a settlement of its pending antitrust case against IBM.⁶⁷ The fact that the government had a case pending against IBM is noteworthy given the prior success that the government had had in suing IBM. In late March 1932, the US government brought an antitrust suit against IBM and Remington Rand alleging that the two firms dominated the tabulating equipment market through patent cross-licensing and by forcing their customers to buy tabulating cards from the same firm that made the tabulating equipment.⁶⁸ At that time, IBM held 88 percent of the market and Rand the balance.⁶⁹ The government won in the district court and again in 1936 in the US Supreme Court.⁷⁰ You might have expected that level of litigation success to have consequences in the marketplace, but that doesn't seem to have been the case. In January 1952, the US government again sued IBM, alleging that IBM had unlawfully restrained

⁶⁵ See *id.* at 31.

⁶⁶ Christopher Rhoads, *AT&T Inventions Fueled Tech Boom, and Its Own Fall*, Wall St J A1 (Feb 2, 2005) (describing how Texas Instruments and Fairchild were able to gain success by developing miniaturized transistors that served as the forerunners of microprocessors).

⁶⁷ *I.B.M. Trust Suit Ended by Decree; Machines Freed: Company Agrees to Sell Its Electronic Computers and License All Patents*, NY Times 1 (Jan 26, 1956).

⁶⁸ *United States v International Business Machines Corp*, 13 F Supp 11, 15, 20 (SDNY 1935).

⁶⁹ See *Sued as Monopoly in Adding Machines: International Corporation and Remington Rand Defendants in Anti-Trust Action*, NY Times 15 (Mar 27, 1932).

⁷⁰ See *International Business Machines Corp v United States*, 298 US 131, 140 (1936).

and monopolized the tabulating equipment market, and by then IBM was up to a 90 percent market share.⁷¹

With the benefit of hindsight, we know that the computer industry was really just getting started in January 1956. The new machines were perhaps ready to move out of the world of military and university operations into more general use. The 1950s were the early days of semiconductors and at the cusp of the creation of mainframe computers and a computing business. The combined effect of the AT&T and IBM antitrust settlements seemed to open the door wide at just the right moment to enable robust competition over the new machines, and there was no obvious reason to think that monopoly power would come to the computing market.

III. A COMPUTER MONOPOLY?

A little more than a decade later, in 1967, IBM was the largest US public firm by market capitalization with a value of \$258.6 billion in 2017 dollars (AT&T was still number two at \$200.5 billion).⁷² IBM had successfully navigated the deep changes in technology from the world of tabulating machines that it had dominated in the 1930s through vacuum tubes into the world of semiconductors and mainframe computers. And in January 1967, the US Justice Department began investigating IBM regarding possible violations of US antitrust laws.⁷³ Press reports at the time put IBM's market share in computers in the range of 70 percent, with the next largest firm, Honeywell, at 7.4 percent.⁷⁴

Two years later, on January 17, 1969, in the very last days of the Lyndon B. Johnson administration, the United States announced that it had brought an antitrust suit against IBM alleging that IBM had monopolized the computer market in violation of Section 2 of the Sherman Act.⁷⁵ IBM also faced a couple of new

⁷¹ *U.S. Files Anti-Trust Suit Against I.B.M.; Company Denies Charge: Justice Department Claims Firm Owns More than 90% of All Tabulating Machines*, Wall St J 2 (Jan 22, 1952).

⁷² *A Century of America's Top 10 Companies, in One Chart* (cited in note 51).

⁷³ See *IBM's Practices in the Computer Industry Are Being Investigated by Justice Agency*, Wall St J 3 (Jan 16, 1967).

⁷⁴ William D. Smith, *I.B.M. Confirms Antitrust Unit Is Studying Computer Industry*, NY Times 47 (Feb 1, 1967).

⁷⁵ See Edwin L. Dale Jr., *U.S. Accuses I.B.M. of Monopolizing Computer Market*, NY Times 1, 15 (Jan 18, 1969).

private antitrust suits,⁷⁶ but the suit with the US government promised to be epic.

Roughly thirteen years had passed since the US government's settlements with AT&T and IBM. Whatever one thought of the strength of IBM's market position in early 1969—the government believed that IBM had market power while IBM denied it—there can be little doubt that IBM's position was driven at least in part by its bold introduction of its new IBM System/360 on April 7, 1964.⁷⁷ IBM was responding to growing competition in mainframe computers even as the market itself was growing rapidly.⁷⁸ There is no guarantee that a leading firm will successfully ride its original position in one market into the next related evolutionary step in the market, but IBM had done just that in taking its long-term, strong position in tabulating equipment into the new computer industry. Remington Rand had tried the same feat with its early UNIVAC computers; although it clearly took a market lead in the new computer market as the first entrant, it didn't have anything like IBM's position in tabulating equipment.⁷⁹ The DOJ antitrust complaint accused IBM of monopolizing the “general purpose digital computer” industry in violation of Section 2 of the Sherman Act.⁸⁰

A complaint of course is just an allegation of facts and possible misconduct. It doesn't mean that anything in it is actually true, though DOJ is full of serious antitrust professionals and the government doesn't bring Section 2 cases lightly. I am more interested in how the prior antitrust actions (or inactions) shaped this moment than in trying to resolve exactly how much market power IBM may or may not have had in 1969.⁸¹

As noted above, the US government first sued IBM in 1932, prevailed up the court ladder, and seemingly didn't change market outcomes in an important way. That led to the 1952 suit and

⁷⁶ See, for example, John P. Mackenzie, *U.S. May File Antitrust Suit Against IBM*, LA Times A9 (Jan 6, 1969); William D. Smith, *I.B.M. Is Named in Antitrust Suit by Data Concern*, NY Times 39, 41 (Jan 4, 1969).

⁷⁷ See Stanley Penn, *IBM Unveils New Line of Computers, Says They Have More Speed, Capacity, Simplicity Than Predecessors*, Wall St J 2 (Apr 8, 1964).

⁷⁸ See *id.*

⁷⁹ *UNIVAC, the First Commercially Produced Digital Computer, Is Dedicated* (HISTORY, July 27, 2019), archived at <https://perma.cc/D54B-5UBZ>.

⁸⁰ United States' Memorandum on the 1969 Case, *United States v International Business Machines Corp*, Civil Action No 72-344, *2 (SDNY filed Oct 5, 1995), archived at <https://perma.cc/5X9F-LW4R> (1969 Case Memorandum).

⁸¹ Franklin M. Fisher, John J. McGowan, and Joen E. Greenwood, *Folded, Spindled, and Mutilated: Economic Analysis and U.S. v. IBM* 110–21 (MIT 1983).

then the 1956 settlement. Part of this path may be related to the theory of the 1932 case, which was that IBM was impermissibly tying punch cards to its tabulating equipment.⁸² Tying consumables like punch cards has historically just been a way to price discriminate as to the machine—here machines that IBM held patents on. Even if we ended the tying, all that would seem to lead to is greater competition in the cards market, but it isn't obvious that that would change competition in the equipment market itself. Sometimes increased competition in an adjacent market can then feed back into more competition in the original market, but the tabulating equipment market was highly technical and filled with patents and might naturally have been blocked off from competition in that market, at least until the market took a much larger discrete jump or was subsumed into something else.⁸³

That something else was computers. The tabulating machines were just tools for crunching data, and, by the standards of the day, they were good at that, but digital computers were going to be much better. Card readers were important for inputting data into computers, but building computers was a different undertaking. IBM could have bungled that, but with the introduction of the System/360 in 1964, IBM instead had hit a home run.

Note that the 1956 antitrust settlement didn't block IBM from going into computers.⁸⁴ That of course was the obvious next business for IBM, so it isn't at all clear that IBM would have agreed to a settlement had the government sought to quarantine it. The 1956 settlement with IBM was designed to ease entry into the tabulating equipment market by other firms by increasing their access to IBM's patents. The settlement even put in place a mechanism by which IBM might be forced to divest a chunk of its tabulating equipment business if it still controlled more than 50 percent of that business seven years after the settlement.⁸⁵

⁸² See *International Business Machines Corp.*, 298 US at 137.

⁸³ See Lars Heide, *Punched-Card Systems and the Early Information Explosion 1880–1945* 6 (Johns Hopkins 2009) (noting that “it was not easy to introduce punched cards for a task” because “[t]heir use demanded a high degree of standardization”).

⁸⁴ See Final Judgment, *United States v International Business Machines Corp.*, Civil Action No 72-344, *71,127 (SDNY filed Jan 25, 1956).

⁸⁵ See *id.* The divestiture clause would be triggered in 1963. See *Suit Would Force GM to Divorce Diesel Division*, Wash Post A16 (Jan 15, 1963) (reporting that IBM ultimately “agreed to divest itself of some of its capacity for production of tabulating machine cards” in accordance with the 1956 judgment).

But it seems extraordinarily unlikely that IBM would have agreed not to operate in the new computer market. But that was exactly part of the deal that AT&T agreed to in 1956 to resolve its pending antitrust case. AT&T and IBM were differently situated, of course, as the government saw AT&T as being in a regulated natural monopoly business—the telephone system—and wanted to make sure that AT&T didn't artificially cross-subsidize its competitive position in computers from the regulated industry.

But the cost of that restriction was to remove a potentially strong competitor from the computer market. It is impossible to know what the counterfactual world looks like in which AT&T builds computers in 1956. The mainframe computer was the natural successor to new digital computers of World War II, and the new transistor would reset how computers operated. This was a key point of competition for the new industry.

The settlement barred AT&T from entering the new computer market in an effort to control the possible distortion of competition in the computer market that might have resulted from the presence of a firm operating a natural monopoly. In making that choice, the US government assumed different risks to enhance competition. We avoided the cross-subsidization risk but we accepted the risk of depriving the market of a potentially innovative competitor.

Removing a competitor is probably unimportant if the market is competitive and the technology in play is relatively standardized. But if the market is likely to be occupied by a few large firms, losing a strong competitor may meaningfully increase the chance that market power will arise. And we know that the technology in the computer market was in its infancy, and in excluding AT&T from the new market we were depriving that market of what may have been the most technologically sophisticated firm in the market. Had AT&T been allowed to enter the computer business, perhaps through a separate subsidiary with restrictions to try to manage the cross-subsidization problem, competition in the computer market might have looked quite different.

But with AT&T on the sidelines, by 1969 the US government believed that IBM was monopolizing the computer market.⁸⁶ One of the central claims in the complaint was that IBM was monop-

⁸⁶ See William D. Smith, *I.B.M. Antitrust Suit Opens with U.S. Seeking Break-Up: Justice Department to Use Company's Files in Evidence* (NY Times, May 20, 1975), archived at <https://perma.cc/SPB4-3XQE>.

olizing by not establishing separate charges for hardware, software, and services; instead, consumers paid one price to IBM for all of those.⁸⁷ The complaint alleged that this practice limited competition, though exactly what that meant wasn't crystal clear.⁸⁸ One theory might have been that it was difficult to sell software in competition with IBM if IBM gave all of its software away, and the same would have been true of related services. A second version of the story, and the government might have been alleging both, is that by blocking the rise of independent software sellers and service providers, IBM was making it harder for its hardware competitors to compete. If there had been a robust independent software and services market, a hardware maker might have been able to specialize in hardware, but instead, in the world shaped by IBM's policies, IBM's competitors were forced to integrate software and services.

In June 1969, as the new government antitrust suit against IBM was really just getting going, IBM announced that it would unbundle hardware, software, and services.⁸⁹ IBM told customers that it would cut hardware prices by 3 percent.⁹⁰ It didn't immediately announce new prices for software and services, but a corresponding price for those would not have seemed to create much space for entry.⁹¹ It seems natural to attribute the change in IBM's practices to the antitrust suit, though IBM had disclosed in December 1968 that it was considering making the change.⁹² Of course, the unbundling was amidst the ongoing antitrust investigation of IBM, and that makes it quite hard to separate out possible independent business justifications for a switch from strategic considerations directed toward a possible antitrust action. And

⁸⁷ See *id.*

⁸⁸ See 1969 Case Memorandum at *6 (cited in note 80) (noting that "the 1969 action alleged that IBM predatorily manipulated interfaces for the purpose of excluding competition").

⁸⁹ See Scott R. Schmedel, *IBM Discloses Plan for Separating Its Computer and Services Prices: Profound Impact Anticipated from Division; Free Items Were Hit by Justice Unit*, Wall St J 38 (June 24, 1969); Franklin M. Fisher, James W. McKie, and Richard B. Mancke, *IBM and the U.S. Data Processing Industry: An Economic History* 175–79 (Praeger 1983).

⁹⁰ Schmedel, *IBM Discloses Plan*, Wall St J at 38 (cited in note 89).

⁹¹ See *id.*

⁹² See *IBM Studying Separate Prices for Servicing: Policy Change Could Alter Computer Firms' Methods and Increase Competition*, Wall St J 3 (Dec 9, 1968).

one of IBM's economic experts would later dispute the idea that the antitrust suit had anything to do with the change in pricing.⁹³

IV. THE 1982 BREAKUP OF AT&T

On November 20, 1974, the United States brought a new antitrust action against AT&T as part of its long-running effort to regulate the company.⁹⁴ The government was returning to the mission of the 1949 antitrust suit in seeking to separate Western Electric—AT&T's equipment manufacturing company—from AT&T and even splitting Western Electric itself into pieces, but the new suit went beyond the 1949 suit in seeking to separate AT&T's long-distance service from the local Bell operating companies.⁹⁵

It seemed that AT&T had grown too large to be regulated effectively by state and federal regulators.⁹⁶ As the complaint made clear, AT&T continued to dominate US telecommunications, though in parts of the network it looked as if competition might be possible. The FCC had issued rulings in 1968 in the *Carterfone* proceeding and then again in 1969 in response to an application by a long-distance telephone entrant, MCI, which required AT&T to allow new devices to be attached to the network and which forced AT&T to interconnect with new competitors.⁹⁷ The FCC ruling in favor of MCI was particularly noteworthy as it suggested that the FCC was open to the possibility of changing the basic structure of telephone rates, according to which lower local telephone service prices were effectively subsidized by higher long-distance charges. AT&T had characterized MCI as a "cream-skimming" entrant, meaning that MCI was entering only because

⁹³ Fisher, McKie, and Mancke, *IBM and the U.S. Data Processing Industry* at 177 (cited in note 89) ("The view that such [unbundling] was hastened by the onset of [the litigation] . . . is, so far as we know, only unsupported (if natural) speculation.").

⁹⁴ See Shanahan, *U.S. Sues to Divest A.T.&T. of Western Electric*, NY Times at 1 (cited in note 28).

⁹⁵ *Suit to Split Up AT&T Bears Out Ford Pledge of Antitrust Firmness: Justice Agency Is Viewed as Shucking Nixon Image of Coddling Big Business*, Wall St J 1 (Nov 21, 1974).

⁹⁶ See Steve Coll, *The Deal of the Century: The Breakup of AT&T* 59–61 (Atheneum 1986) (noting that "the [antitrust] division's lawyers believed that AT&T had abused its political power, circumvented the legal process, and cheated the American public").

⁹⁷ See *In the Matter of Use of the Carterfone Device in Message Toll Telephone Service*, 13 FCC2d 420, 423 (1968) (ruling that AT&T could not "prohibit[] the use of interconnecting devices which do not adversely affect the telephone system"). See also *In re Applications of Microwave Communications, Inc.*, 18 FCC2d 953, 977–78 (1969) (requiring AT&T to allow subscribers to connect to a third party's microwave sites).

it saw certain long-distance markets as attractive given the artificially high prices in those markets created by local/long-distance cross-subsidization.⁹⁸

Somewhat surprisingly, on January 8, 1982, the government and AT&T announced that the suit had settled and that AT&T would be broken up.⁹⁹ After the dust had settled, in August 1983, the final changes of the breakup were nailed down, with the split to occur on January 1, 1984.¹⁰⁰ Western Electric would remain intact and AT&T would continue to own it, but the twenty-two local Bell operating companies would be split from the parent and seven new, large regional companies would be created to house the operating companies. These would become the RBOCs.¹⁰¹

The new settlement, which was structured as a modification of the 1956 final judgment, reflected a series of trade-offs about how competition might work in the presence of a natural monopoly. The local telephone market was understood to remain a natural monopoly, and the restrictions imposed on the business activities of the new RBOCs reflected that.¹⁰² They were barred from the long-distance market, the equipment market, and potential new markets such as information services. Again, in each case, the choice was between losing a possible competitor versus adding a competitor who might have an advantaged position relative to other firms who did not have a business that was a natural monopoly.

AT&T would be in the long-distance business, plus a key part of the deal was that the business line restrictions from the 1956 final judgment would be lifted, though the district court judge hearing the case did add a restriction that delayed AT&T's right to enter the information services business.¹⁰³ And to ensure that AT&T didn't somehow enjoy advantaged access to the local networks that would be required to complete long-distance calls, the RBOCs also were given nondiscrimination obligations such that they would need to treat an entrant into the long-distance market on par with the treatment given to AT&T.¹⁰⁴

⁹⁸ See *In re Applications of Microwave Communications*, 18 FCC2d at 960.

⁹⁹ See Holsendolph, *U.S. Settles Phone Suit* (cited in note 29).

¹⁰⁰ See Pollack, *A.T.&T., U.S. Agree on Final Aspects of Bell Breakup* (cited in note 30).

¹⁰¹ See *id.*

¹⁰² See *United States v American Telephone and Telegraph Co*, 552 F Supp 131, 186–95 (DDC 1982), *affd*, *Maryland v United States*, 460 US 1001 (1983).

¹⁰³ See *American Telephone and Telegraph*, 552 F Supp at 143, 186.

¹⁰⁴ See *id.* at 232–33.

And AT&T itself was subject to a nondiscrimination rule.¹⁰⁵ Given that the scope of the AT&T long-distance market was likely to far exceed those of its competitors for an extended period of time, entrants into long-distance faced a real disadvantage regarding the scope of the service that they could offer.¹⁰⁶ Giving those competitors access to AT&T's infrastructure meant that a new firm could enter one segment and yet still offer customers much broader service because of their access to the AT&T long-distance system.

Why did AT&T agree to the deal? It was true that the trial wasn't going well, but AT&T almost certainly understood that they might fare better on appeal.¹⁰⁷ AT&T presumably believed that computers and communications were converging, and that it would be a strong competitor in that new combined market if it was free of the business line restrictions of the 1956 final judgment. The firm may not have seen much potential growth in local telecommunications proper, which, after all, would remain a regulated natural monopoly. AT&T really had been at the cutting edge of computing when business computing was starting. It had missed the computing boom completely and IBM had become sufficiently successful such that it was, at least in the eyes of the government, worthy of a complex monopolization case. AT&T had missed one computer competition, and presumably it did not want to miss the next one.

V. NEW COMPUTER MONOPOLIES?

AT&T presumably thought that the computer market was changing. On August 12, 1981, IBM had introduced a new personal computer, the IBM PC.¹⁰⁸ The 1969 antitrust case against IBM was then more than a decade old, and there was an assortment of trial wrangling going on and possible efforts at settle-

¹⁰⁵ Id at 227.

¹⁰⁶ See id at 223 (noting that "access to AT&T's local network is crucial if long distance carriers and equipment manufacturers are to be viable competitors").

¹⁰⁷ See Trudy E. Bell, *The Decision to Divest: Incredible or Inevitable?*, 22 IEEE Spectrum 46, 50 (Nov 1985) (noting that the denial of AT&T's motion to dismiss following the prosecution's presentation at trial was "pretty devastating" and that AT&T lawyers felt they were "confronted with a judge who wasn't hearing [their] side of the case").

¹⁰⁸ Press Release, *Personal Computer Announced by IBM* (IBM, Aug 12, 1981), archived at <https://perma.cc/E7YT-XFFM>.

ment, but IBM was actually in the business of building computers, not litigating antitrust cases, and it was continuing to build new computers.¹⁰⁹

The computer industry understood the personal computer to be the third generation of computers. Mainframe computers like the IBM System/360 were considered the first generation and minicomputers such as those built by market leader Digital Equipment Corp (DEC) were considered computing's second generation. DEC was started in 1957, had gone public in 1966, but still was a small fraction of IBM's size at the time of the 1969 antitrust suit.¹¹⁰ The personal computer—or microcomputer—was seen as the next generation of computing. Apple had introduced the Apple II in 1977, but it wasn't quite clear what market was ready for the new device. Talking at a computer expo in Boston in August 1977, Steve Jobs was convinced that the personal computer would become a consumer product, but he recognized that it wasn't there quite yet.¹¹¹

IBM had been slow to pay attention to the minicomputer market and only entered at the end of July 1969.¹¹² But IBM wanted to move faster on personal computers, and in August 1980, IBM decided to build a personal computer, even though it was quite uncertain about the likely size of the market. It faced a core question about how closed or open the design of the new computer would be, but it was quite clear that it would rely on at least some external components. One of the key internal backers of the project at IBM subsequently suggested that the open architecture was attractive in part because of the ongoing US government antitrust suit.¹¹³

It is easy to forget that the IBM PC was released with three different operating systems and that when IBM initially approached Microsoft and asked Bill Gates and Paul Allen for an

¹⁰⁹ Id. See also Larry Kramer, *IBM Trial Enters Its 2nd Decade*, Wash Post E1 (Jan 21, 1979).

¹¹⁰ *Digital Equipment Offer of \$8,250,000 Marketed*, Wall St J 15 (Aug 19, 1966). DEC's net sales in 1969 were roughly \$87.9 million, while IBM's total revenues that year were roughly \$7.2 billion. See *Digital Equipment Corporation 1969 Annual Report* 4 (DEC 1970); *International Business Machines Corporation, Annual Report for the Year Ended December 31, 1969* 3 (IBM 1970).

¹¹¹ See Lee Dembart, *Computer Show's Message: 'Be the First on Your Block'*, NY Times 10 (Aug 26, 1977).

¹¹² See William D. Smith, *I.B.M. Offers Small Computer and New Card*, NY Times 45, 48 (July 31, 1969).

¹¹³ Bill Lowe and Cary Sherburne, *No-Nonsense Innovation: Practical Strategies for Success* 50 (Morgan James 2009).

operating system for the new PC, Gates and Allen referred IBM to Digital Research, and were furious when their contact there balked at IBM's nondisclosure terms. How IBM ended up back at Microsoft is the stuff of legends, but the design choices made by IBM in relying on software from Microsoft and hardware from Intel turned those two firms into the leading computer firms of the personal computer era. When IBM clones emerged, IBM lost control of the personal computer market, and Microsoft and Intel rose.¹¹⁴

Note the market dynamic there. Everything suggests that IBM's entry into personal computers validated that market. IBM's entrance was an insurance policy that it would back this new market. It seems clear that IBM's entry into personal computers in August 1981 powerfully shaped that market and, at least initially, IBM gained a substantial advantage in the young personal computer market.¹¹⁵ It is true that there were then young incumbent firms like Apple Computer that had meaningful market shares, but in reality, if we had calibrated those market shares based upon the size of the market that *would* emerge, they had very small positions. IBM's brand was sufficiently powerful that it was effectively able to establish a new standard in those markets and thereby revolutionize the personal computer market.¹¹⁶

Again, one could have imagined an antitrust remedy to the 1969 lawsuit that would have made it harder for IBM to enter related computer markets and to limit the ability of IBM to extend its position in mainframes into this new computing market. An effective remedy of that sort would have diminished the credibility that IBM was able to confer on the new market. And the presence of the 1969 suit seems to have shaped the design of the IBM PC and then the competitive framework that would emerge from it.

As Microsoft rose, governments in the United States and Europe got interested. A 1994 settlement addressed Microsoft's licensing practices for MS-DOS, but nothing suggests that that

¹¹⁴ For just one take on the initial IBM/Microsoft deal from presumably someone who should have had a good handle on at least the Microsoft side, see the autobiography of Microsoft cofounder Paul Allen. Paul Allen, *Idea Man: A Memoir by the Cofounder of Microsoft* 133–36 (Portfolio 2012).

¹¹⁵ See James L. Rowe Jr., *IBM To Sell Personal Computer in Fall*, Wash Post D12 (Aug 13, 1981).

¹¹⁶ See Jeremy Reimer, *Total Share: 30 Years of Personal Computer Market Share Figures* *4 (Ars Technica, Dec 14, 2005), archived at <https://perma.cc/3AK2-39QS>.

settlement altered the path of the computer industry or how Microsoft operated.¹¹⁷ Indeed, as Bill Gates put it right after the settlement: “None of the people who run [Microsoft’s seven] divisions are going to change what they do or think or forecast. Nothing. Nothing. There’s one guy in charge of licenses. He’ll read the agreements.”¹¹⁸

But as Microsoft and Intel rose, IBM went into freefall. IBM’s earnings before taxes were over \$10 billion in 1990,¹¹⁹ but in 1991, they dropped to \$121 million,¹²⁰ before dropping further to a \$9 billion loss in 1992¹²¹ and an \$8.8 billion loss in 1993.¹²² IBM changed CEOs, but while IBM had in some basic sense defined the personal computer in establishing a new standard, that standard had a name—Wintel—that made crystal clear who the real winners had been.¹²³ And AT&T would spend billions of dollars in an effort to gain ground in the computer market only to abandon those efforts in September 1995, when it announced another breakup of the firm in which it spun off its acquired computer assets into a new firm.¹²⁴

But if the government couldn’t alter how Microsoft operated, a new competitor could. Netscape went public on August 9, 1995, but Gates saw clearly the threat that Netscape posed and described it in great detail in his famous May 26, 1995 Internet Tidal Wave memo.¹²⁵ Netscape and the Internet more generally threatened to turn Windows into, as Bill Gates put it, a commodity. The personal computer was going to get subsumed into something much larger, and that threatened Microsoft’s position. Microsoft responded aggressively to Netscape to try to protect its position in operating systems.¹²⁶

¹¹⁷ *United States v Microsoft Corp*, 56 F3d 1448, 1452 (DC Cir 1995).

¹¹⁸ Michael Schrage, *Windows of Opportunity Open for Microsoft and Bill Gates*, Wash Post D3 (July 22, 1994).

¹¹⁹ See *1991 Annual Report* 3 (IBM 1992).

¹²⁰ See *id.*

¹²¹ See *1992 Annual Report* 3 (IBM 1993).

¹²² See *1993 Annual Report* 3 (IBM 1994).

¹²³ See *id.*; Leslie Cauley, *The Search for a New CEO: IBM the Inside Story*, USA Today 1B (Apr 26, 1993).

¹²⁴ See Mark Landler, *AT&T, Reversing Strategy, Announces a Plan to Split into 3 Separate Companies*, NY Times A1 (Sept 21, 1995).

¹²⁵ Memorandum from Bill Gates to Executive Staff and Direct Reports at Microsoft, *The Internet Tidal Wave* (May 26, 1995), archived at <https://perma.cc/GR4Z-9TEB>.

¹²⁶ See *id.*; John Naughton, *Netscape: The Web Browser That Came Back to Haunt Microsoft* (The Guardian, Mar 22, 2015), archived at <https://perma.cc/3G6D-7NE4>.

On May 18, 1998, the US government filed an epic new antitrust suit against Microsoft.¹²⁷ Microsoft would lose that case and be faced with a potential breakup of the firm.¹²⁸ On appeal, in June 2001, the en banc DC Circuit unanimously ruled that Microsoft had violated Section 2 by illegally maintaining its operating system monopoly.¹²⁹ In the same decision, however, Microsoft was able to reverse a number of the lower court's liability findings, and the DC Circuit found the remedy phase of the case procedurally inadequate.¹³⁰ On remand, in November 2001, the DOJ reached a much more modest settlement with Microsoft that did not involve a breakup of the firm, and a federal district court judge would later bless that settlement.¹³¹

But as Microsoft was resolving the US antitrust actions against it, the EC stepped in to accuse the firm of violating the applicable European dominance rules. On August 1, 2000, the EC issued an initial statement of objections against Microsoft regarding Windows and server software interoperability, and the case expanded on August 30, 2001 when the EC sent a second statement of objections that alleged that Microsoft was impermissibly tying Windows Media Player to Windows. On March 24, 2004, the EC concluded that Microsoft had indeed abused its dominant position and engaged in illegal tying. The EC imposed a fine of €497 million and further ordered Microsoft to offer computer makers two different versions of Windows, one with Windows Media Player and one without.¹³²

In January 2009, the EC would take one more step with regard to Microsoft. The EC believed that Microsoft was impermissibly tying Internet Explorer to Windows. Microsoft presumably didn't want to delay the introduction of Windows 7 in Europe, and rather than fight, Microsoft settled. The settlement implemented a must-carry remedy requiring that a new European Windows computer user would be presented with the browser ballot (or

¹²⁷ *United States v Microsoft Corp*, 253 F3d 34, 47 (DC Cir 2001) (en banc). The Internet Tidal Wave memo was government exhibit 20 in the district court case.

¹²⁸ *Id* at 45.

¹²⁹ *Id* at 51.

¹³⁰ *Id* at 46.

¹³¹ See Stephen Labaton and Steve Lohr, *U.S. and Microsoft in Deal, but States Hold Back*, NY Times A1, C3 (Nov 3, 2001). See also generally *United States v Microsoft Corp*, 231 F Supp 2d 144 (DDC 2002); *Massachusetts v Microsoft Corp*, 373 F3d 1199 (DC Cir 2004).

¹³² For a summary of this investigation, see European Commission, Press Release, *Commission Concludes on Microsoft Investigation, Imposes Conduct Remedies and a Fine* (Mar 24, 2004), archived at <https://perma.cc/LJ79-BG77>.

browser choice) screen. The user would be asked to choose from one of fourteen presented browsers.¹³³ There was some irony in that result, as part of the original case in the United States was predicated on the idea that seeing two icons for browsers confused users, but perhaps the world had become more sophisticated by 2009.

Looking at the remedies against Microsoft as a group, the original breakup remedy in the US case was once again an effort to change competition going forward based on creating separate new firms. AT&T of course had agreed to this in 1982, and that makes it hard to generalize from that situation to one in which divestiture would be imposed as a remedy. Firms spin off divisions and otherwise voluntarily break up with some frequency, so it isn't as if firms aren't cleaved in two, but obviously what is much more unusual is forced separation.

The European Microsoft remedies sidestepped the forced separation problem by instead conducting direct product engineering: first by ordering the creation of multiple versions of Windows and then by creating a kind of must-carry remedy on the Internet browser. Of course, lots of products fail in the marketplace, but if you believed, as the EC clearly did, that Microsoft had distorted competition over media players through its tying, then creating a product offering that gives computer makers a real choice would let the competitive process run without choosing the result of that process. Microsoft undoubtedly incurred costs in managing both versions of the product, but those presumably were modest. All of that said, the market itself spoke decisively. In April 2005, Microsoft issued a fact sheet on Windows XP sales. In the period that Microsoft sold 35.5 million copies in Europe of Windows with Windows Media Player, it sold 1,787 copies of Windows without it.¹³⁴

And there is a more basic way in which the EC's theory of the case failed. The EC was concerned that Microsoft was trying to leverage its position in operating systems into the adjacent media player market. Given the fact that the imposed remedy didn't block Microsoft from distributing its media player, the EC should

¹³³ For a summary of this timeline, see European Commission, Press Release, *Anti-trust: Commission Accepts Microsoft Commitments to Give Users Browser Choice* (Dec 16, 2009), archived at <https://perma.cc/8RNL-LZAQ>. See also Richard Wray and Jack Schofield, *EU Ends Competition Case as Microsoft Offers Choice of Web Browsers* (The Guardian, Dec 16, 2009), archived at <https://perma.cc/WBD6-QLYE>.

¹³⁴ *Fact Sheet: Windows XP N Sales* (Microsoft News Center, Apr 2006), archived at <https://perma.cc/U6GA-37TG>.

have predicted that Microsoft would have succeeded in the media market. We know of course that this didn't happen. Apple released the iPod in October 2001, and in so doing changed the fate of Apple completely.¹³⁵

And on browsers, even though Microsoft had been able to thwart Netscape, it isn't clear that the European browser ballot mattered in an important way. In January 2009, Internet Explorer had roughly 73 percent of the market in the United States, while the corresponding figure in Europe was just over 50 percent. Ten years later, in January 2018, Microsoft's browser market share in the United States was only 4.5 percent, while it was down to 3.1 percent in Europe.¹³⁶ Microsoft's position in browsers had collapsed over the decade, but it had done so everywhere, including where there was no EC-enforced browser ballot. And Microsoft had also abandoned the Internet Explorer brand and had adopted a new browser, Microsoft Edge.¹³⁷

CONCLUSION

In 2017, the five largest US public firms by market capitalization were the firms we most associate with computers and online life today: Apple at number one, with a value of \$898 billion; Alphabet (Google), second at \$719 billion; Microsoft, third at \$644 billion; Amazon, fourth at \$543 billion; and Facebook, fifth at \$518 billion.¹³⁸ Fifty years earlier, in 1967, the largest firm by market capitalization had been IBM and AT&T had been second, and 100 years earlier, in 1917, AT&T had been the second most valuable public firm in the United States.¹³⁹

It is hard to know exactly how much the pair of suits against AT&T and IBM shaped the computing era. The 1956 AT&T final judgment solidified the rules regarding AT&T's critical transistor patents and knowhow, though entrants were getting access to those already absent the final judgment. The final judgment itself didn't change access to the transistor patents and knowhow, but

¹³⁵ See Walter S. Mossberg, *Apple Brings Its Flair for Smart Designs to Digital Music Player*, Wall St J B1 (Nov 1, 2001).

¹³⁶ *Browser Market Share Worldwide* (StatCounter), online at <https://gs.statcounter.com/browser-market-share/> (visited Jan 27, 2020) (Perma archive unavailable).

¹³⁷ See Sarah Mitroff, *Microsoft's Edge Beats Internet Explorer, but It's Not the Perfect Windows 10 Browser—Yet* (CNET, Aug 1, 2015), online at <https://www.cnet.com/news/microsoft-edge-vs-internet-explorer/> (visited Jan 27, 2020) (Perma archive unavailable).

¹³⁸ *A Century of America's Top 10 Companies, in One Chart* (cited in note 51).

¹³⁹ *Id.*

of course it could have prevented AT&T from later changing course on the access that it had already created. The 1956 final judgment blocked AT&T from entering the computer industry at a key point in its evolution. And that fact, coupled with the fact that the 1956 IBM final judgment didn't block IBM from entering mainframe computers, instead allowing it to continue to hold its dominant position in tabulating equipment, all seemed to smooth IBM's emergence as the leading computer company of the mainframe era. The fact that the System/360 was a great computer didn't hurt either.

The 1974 suit against AT&T showed the powerful ongoing effects of the 1956 final judgment. The line of business restrictions in the 1956 AT&T final judgment played an important if not decisive role in AT&T's willingness to settle the 1974 case. The coming convergence of computers and communications meant that AT&T wanted the opportunity to extend its strong position into the coming converged market. It failed dismally in multiple attempts to do so. And the actual breakup of AT&T in 1984 perhaps mattered most when telecommunications made a generational shift from wired to wireless as the presence of large telecommunications firms changed competition over the new wireless medium. In the new material in the 1993 reprint of *The Antitrust Paradox*, Bork thought that the result in the AT&T case was sensible, a change perhaps from his perspective in the original text. That said, Bork saw AT&T as a special case given the presence of the regulated natural monopoly.

In his new 1993 epilogue to *The Antitrust Paradox*, Bork described his days as Solicitor General—from 1973 to 1977—and from that vantage point, he saw the IBM case as the “Antitrust Division's Vietnam.”¹⁴⁰ As might be expected given that characterization, Bork applauded the 1982 dismissal of the IBM case. Yet the core violation described in the original 1969 complaint—the bundling of hardware, software, and services—went away early in the case. Perhaps it would have, absent the lawsuit, but it is hard to know for sure. And the fact that the 1969 suit was pending when IBM released its new personal computer in August 1981 is likely to have shaped the open design that IBM chose for the machine, which in turn may have led to the rise of Microsoft and Intel.¹⁴¹ These are antitrust shadows at work.

¹⁴⁰ Bork, *Antitrust Paradox* at 432 (cited in note 1).

¹⁴¹ For space reasons I have omitted any mention of antitrust actions against Intel. On November 2, 2010, the US Federal Trade Commission agreed to a settlement with Intel

As to Microsoft, the US government settled its first case against Microsoft in 1994 and nothing suggests that accomplished much of anything. The 1998 browser case was a decisive legal victory for the government, but the remedy in the case didn't somehow restore the competitive path that the industry had purportedly been on before Microsoft violated Section 2. But even if antitrust failed to accomplish that end and to restore Netscape's rising position in the new industry, the technology itself prevailed as the Internet grew into the platform we have today. Microsoft successfully used its monopoly position in operating systems to preserve its position in the desktop market, but in a world in which the internet became the main platform, the personal computer would play a much smaller role. That said, Microsoft has clearly recovered and has been able to ride to success in the cloud.

Finally, the European efforts to cabin Microsoft's position have on the whole been ineffective. It isn't clear that the browser ballot remedy has had important effects on browser market shares. And the earlier Windows Media player case didn't obviously change competitive results in any real way. And yet notwithstanding this ineffective enforcement, the fear that Microsoft would leverage its position in computer operating systems into media never really materialized. The October 2001 release of the iPod by Apple made sure of that, and the iPod, a product seemingly uninfluenced by the long reach of antitrust, was essential for creating the world we live in today. The iPod takes us to the iPhone and that in turn became the critical interface to the world of cloud computing and the datacenters that drive it.

And while the Microsoft case came too late to make it even into the new material in the 1993 reprint, Bork would have a chance to express his views on the case. After his nomination to the US Supreme Court was rejected, Bork eventually left the bench and in 1998 he became one of Netscape's lawyers. The great job of being a lawyer in litigation is that the answer is clear—your client should win—though the reasons for that can sometimes be tricky to articulate. But Bork presumably agreed to work for

of a complaint in which the FTC had alleged, among other things, that Intel had illegally maintained a monopoly in the computer microprocessor market. The complaint focused on ways in which Intel had allegedly used its market position to maintain that position through various exclusivity agreements. The European Commission has had a parallel action against Intel that dates back to a complaint filed in 2000. On September 6, 2017, the European Court of Justice overturned the judgment against Intel of the General Court of the European Union and referred the matter back for additional proceedings. See *Intel Corp v Commission of the European Communities*, Case C-413/14 P, EU:C:2017:632.

Netscape because he believed in the firm's position and so it is hardly surprising to learn that Bork believed that "the case of monopolization against Microsoft is cold."¹⁴²

¹⁴² *Robert Bork: Antitrust Case Strong Against Microsoft* (CNN, Apr 26, 1998), archived at <https://perma.cc/M9MU-YC29>.