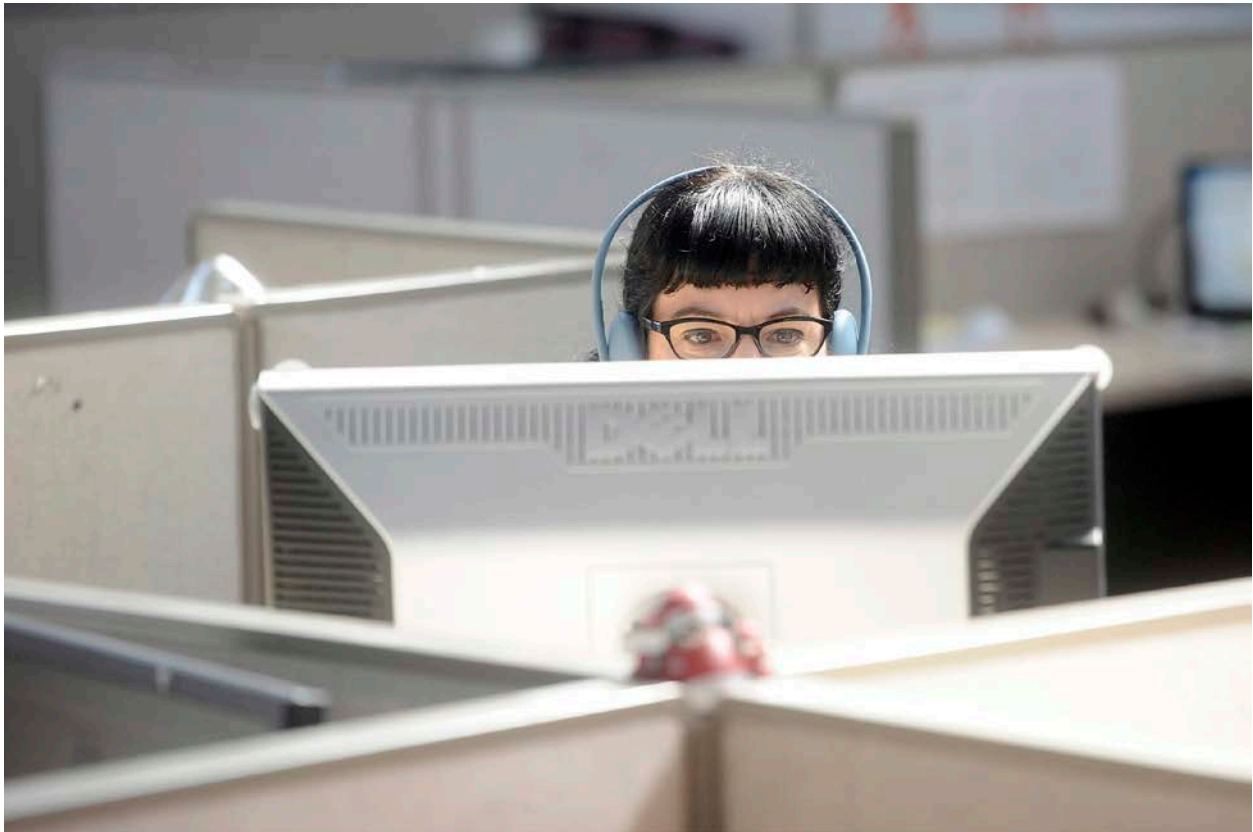




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How to Maintain a Competitive Internet

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The Internet has become an essential vehicle for communications, electronic commerce, and entrepreneurship. A McKinsey report found that the Internet provided 21 percent of the GDP growth over the past five years in 13 different countries.¹ As enumerated by the Boston Consulting Group, the Internet currently generates 4.1 percent of Gross Domestic Product; in some countries, the percentage is double that.² By 2016, analysts estimate that the digital economy will comprise \$4.2 trillion among G-20 nations, up from \$2.3 trillion in 2010.

The Web offers several features that drive its usefulness for consumers and businesses: interconnectivity, openness, scalability, and efficiency. Interconnectivity is important because the Internet links users across the globe. Americans can order goods from shops in Europe or Asia, and vice versa. The openness and growth possibilities allow entrepreneurs to scale up quickly. And since it offers these benefits in a ubiquitous manner, it is a remarkably efficient vehicle for communications and service delivery.³

To protect these virtues, a number of academic experts and business leaders have concluded that the government should be cautious about applying competition law to the Internet market. They argue we should have a “hands-off” competition policy given the rapidly changing nature of digital technology, the complexity of networked industries, the slow pace of government decision-making, the lack of substantive knowledge on the part of regulators, and the globalization of service delivery.⁴

In this paper, we argue that robust competition policy, including the application of law and enforcement, are vital to ensure the continuing benefits of Internet communications and commerce. Competition is good for consumers, and we need to protect against threats to open competition in Internet markets in order to maintain its beneficial features. It is important to have antitrust enforcement and fair, transparent, and non-discriminatory market behavior to gain the full benefits of the Internet. We need public policies that promote consumer choice and encourage innovation without stifling competition.

Dominant Platforms, Walled Gardens, and Competition Policy

Some argue that we do not need a robust competition policy because the digital world features a vibrant and dynamic ecosystem where durable market power is difficult to hold. Internet service providers offer a host of services, ranging from search and social media to advertising and electronic commerce. Furthermore, the entities providing services on the Internet are constantly changing as old participants offer new services and new providers, sometimes from other countries, enter the marketplace. In this situation, no company can feel completely secure amidst the regular churn of digital products, services, and applications. Instead, the market is filled with many disrupting technologies with

Even with a shifting mix of products, services, and companies, however, dominant firms have arisen in areas such as Internet search, social media, electronic commerce, and mobile devices.

the potential to transform digital service delivery.⁵

One expert who voices the argument that the threat of disruptive competition is adequate to constrain corporate misbehavior is New York University Stern School of Business Professor Nicholas Economides. He argues that “regulation is not well suited in industries with rapid technological change and frequently changing product definitions.”⁶ Others claim that antitrust law should not apply to Internet markets due to the fast pace of change. Former U.S. Solicitor General Robert Bork argues that “In this rapidly changing industry, control through an antitrust decree is simply unrealistic.”⁷

Still others wonder about the government’s understanding of the digital economy and the effectiveness of its regulatory actions.⁸ According to this viewpoint, market behavior is too complex for adoption of sufficient solutions by U.S. or E.U. law enforcement officials. A statement issued by 101 economists from academic institutions, think tanks, and analytical firms warned that the “government often fails to understand market competition and that history shows harm done to targeted companies frequently hits consumers.”⁹ The reason they cite is that the digital economy differs from one based on tangible goods because it has low marginal costs and easy scalability. Setting up a website or mobile application enables stores to reach a global marketplace very quickly, and it is difficult for government to regulate such fast-moving markets.¹⁰

Even with a shifting mix of products, services, and companies, however, dominant firms have arisen in areas such as Internet search, social media, electronic commerce, and mobile devices. According to the Pew Research Center Project on Excellence in Journalism,

“In the last year a small number of technology giants began rapidly moving to consolidate their power by becoming makers of ‘everything’ in our digital lives. Google, Amazon, Facebook, Apple and a few others are maneuvering to make the hardware people use, the operating systems that run those devices, the browsers on which people navigate, the e-mail services on which they communicate, the social networks on which they share and the web platforms on which they shop and play.”¹¹

Indeed, Eric Schmidt describes Google, Apple, Amazon, and Facebook as the Internet’s new “gang of four,” replacing the 1990s quartet of Microsoft, Intel, Cisco, and Dell.¹²

For example, Facebook controls 63 percent of the American social media market.¹³ Google accounts for 67 percent of all U.S. searches, compared to 15 percent for Microsoft Bing and 13 percent for Yahoo.¹⁴ Google also has 52 percent of the market for mobile ads and 95 percent for mobile search.¹⁵ Amazon is in a strong position with 90 percent of the e-book market before the Apple iBook and iPad entered the market. With smartphone operating systems, Google’s Android device has 51 percent of the U.S. market. Apple, through its iPhone/iOS, controls 32 percent of the U.S. market but reaps 75 percent of the profits.¹⁶ Sixty-three percent of the mobile/tablet operating systems are based on Apple’s iOS.¹⁷ Many

of these market shares are particularly high when compared to other industries. Moreover, some of these platforms have maintained their large market shares overtime, thereby demonstrating the durability of their platforms.

The development of dominant companies raises interesting issues about market competition.¹⁸ One such question concerns what level of market share poses a true threat to competition. In a famous antitrust case involving Alcoa, Judge Learned Hand of New York wrote that “the percentage we have already mentioned – over ninety – results only if we both include all ‘Alcoa’s’ production and exclude ‘secondary’. That percentage is enough to constitute a monopoly; it is doubtful whether sixty or sixty-four percent would be enough; and certainly thirty-three percent is not.”¹⁹

But competition is not just about market share. The Supreme Court defines monopoly as “the power to control prices or exclude competition.”²⁰ If a company offers free software or online services in order to build its user base, it is harder to meet the condition of controlling prices. Of course, technology firms still may engage in behaviors that harm competition, and that is at the heart of government enforcement. Public officials must evaluate whether there are anti-competitive practices such as using essential facilities to deny access to other firms, unfairly leveraging in favor of their own products, or subsidizing preemptive extensions.²¹ Internet actors can gain durable market power or engage in wrongful conduct just as is the case with non-Internet-based companies.

The possibility of these behaviors suggests that the Internet is not outside the rules of competition.²² The question is not whether government should regulate Internet firms, but whether it can maintain competition when it is possible to scale up quickly and become a dominant player. Even in a digital world that is complex and rapidly changing, it is important to have a robust competition policy that enforces competition law and encourages fair practices. The government has a useful role to play so that certain platforms don’t advantage one company or product unfairly over another.²³

As an illustration of a potential problem, companies can use their preeminent power in one area to leverage products elsewhere.²⁴ This was the charge by the federal government against Microsoft in 1998. By its very nature, the digital economy is not neutral, but has consequences for consumers and businesses in terms of choice, pricing, and leveraging strategies.²⁵ Reasonable enforcement doesn’t necessarily harm consumers, but can spur innovation and protect the marketplace.²⁶

Observers wonder whether the development of closed platforms creates “walled gardens” that hurt consumers.²⁷ When major carriers place consumer access behind a password, subscription, or proprietary service application, it affects the ability of others to make use of that information outside that digital garden.²⁸ However, some claim that there are advantages to walled gardens and they produce desirable consumer experiences and product innovation. Hazlett, Teece, and Waverman, for example, argue there is little evidence that “‘open’

platforms offer categorically superior welfare outcomes than do ‘closed’ systems – aka ‘walled gardens.’”²⁹

Others dispute those notions. Web inventor Timothy Berners-Lee says “closed, ‘walled gardens,’ no matter how pleasing can never compete in diversity, richness and innovation with the mad, throbbing Web market outside their gates.”³⁰

According to this view, the flexibility of open spaces provides the greatest possible consumer choice.

In evaluating the relative virtues and vices of the Internet, it is time to go beyond overly simplistic distinctions between “open” and “closed” systems.³¹ There are many new models emerging based on various combinations of open or proprietary software, open or closed platforms, licensing agreements, partnerships, and leveraging strategies. The plethora of options has created many gradations of openness and closeness that need to be evaluated.

It is possible for firms to behave unfairly through either open or closed platforms. Closed systems can dictate unfair pricing, limit consumer choice, or force people to operate within restrictive rules. Open platforms meanwhile can tie products to certain systems, utilize burdensome technical standards, or discriminate against downstream companies. Not all platforms that claim to be open actually meet necessary criteria in practice.

Leveraging Dominance, Pricing Practices, and Cross-Platform Links

Some fear companies with dominant market share can leverage their strength to the advantage of their own products and services, engage in unfair pricing practices, or use cross-platform links to enhance their own businesses unfairly. In assessing firm behavior, Columbia Law School Professor Tim Wu argues that government agencies need to be careful about a company “granting his own applications access to secret APIs, taking efforts to exclude applications that might themselves serve as platforms, selectively disabling certain functions on applications gathered for his own competitive advantage, and other tactics.”³²

Amazon looks at merchant sales on its marketplace and sometimes moves into areas that appear lucrative. This shifts the company from being a competitor for affected businesses to a dominant player. Some firms have complained that this gives Amazon unfair advantages and harms competition.³³

Pricing policies also represent a business practice that has attracted government attention. Apple has been accused by the U.S. Department of Justice and European Commission of anti-competitive pricing due to its e-book policies. Justice officials accused it and publishing companies Simon & Schuster, Harper Collins, Hachette Livre, and Verlagsgruppe Georg von Holzbrinck of price colluding at the level of \$12.99, \$14.99, or higher. This was well-above the \$9.99 level set by Amazon for its e-books. According to the complaint, Apple was given a 30 percent commission per book sold through its iBookstore from publishers that

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agreed to these prices.³⁴

In early 2012, the European Commission announced that it was investigating whether Google biased its own search over competitors by linking competing services to its own search results.³⁵ Within the United States, the Federal Trade Commission is exploring whether Google manipulates its algorithms to favor its own products and services.³⁶

Google has argued that its search service does not favor its own products or services.³⁷ The company maintains that its algorithms are not unfair, it distinguishes ads from unpaid search results, there is ample competition in the search engine market, and it has not illegally tied specialized search results to overall searches.³⁸ Some research has found that Bing searches favored Microsoft products 14.3 percent of the time compared to the 6.7 percent of the time that Google searches favored its own products.³⁹

Some experts worry about companies tying specific products exclusively to purchases through their own application store or payment systems. Mobile payment systems have been developed by Apple, Facebook, Google, PayPal, Square, and Intuit, among others.⁴⁰ If consumers can only use Amazon Pay, Apple's Passbook, Facebook Credits, or Google Wallet for product purchases, it potentially limits competition and helps companies use their overall market share to gain advantages for downstream products and services.⁴¹

Ways to Preserve Internet Competition and Innovation

Right now, the federal government devotes considerable attention to business mergers and acquisitions as part of its competition policy. Each year, the Federal Trade Commission Bureau of Competition and the Antitrust Division of the Department of Justice publish a report outlining their antitrust enforcement actions as required by the Hart-Scott-Rodino Antitrust Improvements Act of 1976.

In 2011, there were 1,450 merger transactions reported to these federal agencies.⁴² Of those acquisitions, the Federal Trade Commission investigated 17, or 1.2 percent, of the transactions, while the Department of Justice questioned 20, or 1.4 percent, of the mergers. Of the mergers questioned by the Commission, there were nine consent orders, three administrative complaints with requests for preliminary injunctions in federal court, and five acquisitions that were abandoned or restructured. Of the acquisitions challenged by the Department, 11 were resolved through consent decrees following court action, eight were abandoned, and another one was stopped following a court order granting a permanent injunction against the merger.⁴³

These agencies sought additional information in 4.1 percent of the mergers during 2011. Either federal organization can make a "second request" for more material on the transaction. This happened in 58 cases that year, 24 from the Commission and 34 from the Department. In such transactions, the government demands detailed information about the transaction's potential harms and

benefits, and conducts an intensive investigation into the likely consequences.

Competition policy, however, is about more than mergers and acquisitions. Businesses and consumers need policies that encourage fair, transparent, and non-discriminatory market behavior. Federal officials can do this by examining business practices that reduce consumer choice, deploy predatory pricing, or force businesses to rely on certain applications in order to access specific services. The government has a number of tools at its disposal, including cease and desist requirements, victim compensation, guidelines for business procedures that advance the public good, or information disclosure.⁴⁴ In some cases, officials have mandated after-the-fact oversight of Microsoft through technical committees or third-party arbitration in cases involving Comcast and Google.⁴⁵ These cases suggest that competition law can be enforced in high-tech and Internet-related markets. It is not clear that competition was harmed or markets fell apart as a result of enforcement action. Rather a whole host of competitors and innovators can arise in the wake of appropriate antitrust responses.

Agency administrators should ensure that remedies are future-oriented and adapted to new technology developments or changes in business strategies. This is especially relevant in the case of technology firms because of the rapidly-changing nature of innovation. Virtually every technology company is looking at mobile and social media, and how they affect in-house service offerings. Government actions must continue to be relevant even when firms deliver digital services through new means. George Washington University Law Professor William Kovacic notes that some past enforcement actions have suffered because they “devoted far too little attention to conceiving possible solutions.”⁴⁶ Officials must correct this problem in order to facilitate achievement of desired results for the regulations they enact.

The most challenging part of maintaining competition in the contemporary digital economy is the complex linkages between platforms, services, suppliers, application developers, licensees, and business models. Each part is connected to other aspects of the ecosystem. Unlike firms in non-networked industries, it is hard to disentangle discrete elements from the overall situation. The interconnectedness of digital businesses makes it challenging for government regulators to apply particular remedies.⁴⁷ But, this does not reduce the value of government regulators combatting anti-competitive practices. When considering enforcement, policymakers have to be careful to develop remedies that deal with the stated problem without harming future innovation.

It is important to encourage fair and competitive markets, especially in regard to small and mid-sized companies. Having an Internet that allows users to access a wide range of sites, materials, and data provides benefits for the digital ecosystem as a whole by promoting innovation, research, and overall creativity.⁴⁸ In the long-run, policies that make it difficult to restrict access are important for consumer protection and long-term economic development.

The rapid pace of technological innovation means that to ensure open Internet

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competition, it is crucial to speed up the government decision-making process. We need quicker investigatory processes and more thoughtful remedies so that government actions achieve their desired results. Governmental decision-making proceeds so slowly in relation to the dynamic marketplace that in some cases the remedies proposed are obsolete before they ever are implemented.

In a rapidly-changing marketplace, decisions often come years after initial complaints and when issues have been supplanted by new developments. The European Commission's investigation into Google's search practices, for instance, has taken over two years. It takes the public sector a while to collect and analyze information, and maneuver through complex institutional structures. Lengthy timelines create enormous distractions for the companies being investigated and the industry as a whole. We need governments that are faster, smarter, and more efficient in how they make decisions. Otherwise, it will be difficult to maintain a competitive Internet for consumers and businesses.

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Endnotes

¹ Matthieu Pelissie du Rausas, James Manyika, Eric Hazan, Jacques Bughin, Michael Chui, and Remi Said, "Internet Matters: The Net's Sweeping Impact on Growth, Jobs, and Prosperity," McKinsey Global Institute, May, 2011.

² David Dean, Sebastian Digrande, Dominic Field, Andreas Lundmark, James O'Day, John Pineda, and Paul Zwillenberg, "The Connected World: The \$4.2 Trillion Opportunity," Boston Consulting Group, March, 2012, p. 3

³ Salil Mehra, “Paradise is a Walled Garden? Trust, Antitrust, and User Dynamism,” *George Mason Law Review*, Volume 18, 2011, pp. 889-952.

⁴ Jonathan Sallet, “The Internet Ecosystem and Legal Regimes: Economic Regulation Supporting Innovation Dynamism,” draft paper, November 11, 2011.

⁵ Robert Hanh, “Google’s Turn to Quake?” *The Wall Street Journal*, April 4, 2012, accessed June 12, 2012, <http://online.wsj.com/article/SB10001424052702303816504577322071367081342.html>

⁶ Nicholas Economides, “Antitrust Issues in Network Industries,” *The Reform of EC Competition Law*, Ioannis Kokkoris and Ioannis Lianos, editors, Kluwer, 2008, p. 24.

⁷ Robert Bork, “Antitrust and Google.” *Chicago Tribune*, April 6, 2012, accessed June 7, 2012, http://articles.chicagotribune.com/2012-04-06/news/ct-perspec-0405-bork-20120406_1_unpaid-search-results-search-engines-search-algorithms.

⁸ Robert Litan and Hal Singer, “Are Google’s Search Results Unfair or Deceptive Under Section 5 of the FTC Act?,” 2012. Electronic copy available at <http://ssrn.com/abstract=2054751>.

⁹ “101 Economists Warn: Overzealous Antitrust Investigation of Google Threatens Consumer Choice and Market Innovation” (Press Release, Alexandria, VA, May 8, 2012).

¹⁰ Nicholas Economides, “Antitrust Issues in Network Industries,” *The Reform of EC Competition Law*, Ioannis Kokkoris and Ioannis Lianos, editors, Kluwer, 2008.

¹¹ Amy Mitchell and Tom Rosenstiel. “That State of the News Media 2012: An Annual Report on American Journalism.” *The Pew Research Center’s Project for Excellence in Journalism*, March 19, 2012, accessed May 25, 2012, <http://stateofthemedias.org/>

¹² Erick Schonfeld, “Eric Schmidt’s Gang Of Four,” *Tech Crunch*, May 31, 2011, accessed June 21, 2012, <http://techcrunch.com/2011/05/31/schmidt-gang-four-google-apple-amazon-facebook/>.

¹³ StatCounter Global Stats, “Social Media Sites from June 2011 to June 2012.” June, 2012, accessed June 21, 2012, <http://www.comscore.com/>.

¹⁴ ComScore.com, “Press Release,” June 13, 2012. http://www.comscore.com/Press_Events/Press_Releases/. Accessed July 30, 2012.

¹⁵ Claire Cain Miller, “As Google Changes, Its Revenue Keeps Rising,” *New York Times*, July 20, 2012, p. B3. Also see <http://www.nytimes.com/2012/07/20/technology/google-continues-growth-and-growing-pains.html>.

¹⁶ Associated Press, “Smartphone Market Share,” July 19, 2012, and Horace Dediu, “Apple’s Rank in Mobile Phone Profitability and Revenues,” *Asymco.com*, February 3, 2012.

¹⁷ “Mobile/Tablet Operating System Market Share,” NetMarketShare, , April 2012, accessed July 21, 2012, <http://www.netmarketshare.com>

¹⁸ Spencer Waller, “Antitrust and Social Networking,” Loyola University, undated.

¹⁹ The Justice Learned Hand opinion can be found in the case of United States v. Aluminum Co. of America, 148 F.2d 416 (2d Cir. 1945).

²⁰ *United States v. E. I. du Pont de Nemours & Co.*, 351 U.S., 1956, p. 391.

²¹ Jared Kagan, “Bricks, Mortar, and Google: Defining the Relevant Antitrust Market for Internet-Based Companies,” *New York Law School Law Review*, Volume 55, 2010/11.

²² George Bauer, “eMonopoly: Why Internet-Based Monopolies Have an Inherent ‘Get-Out-Of-Jail-Free Card’,” *Brooklyn Law Review*, Volume 76, 2011, pp. 731-773.

²³ Stephen Houck, “The Microsoft Case and Google,” *Competition Policy International*, May 2012.

²⁴ Erik Clemons and Nehal Madhani, “Regulation of Digital Businesses with Natural Monopolies or Third Party Payment Business Models: Antitrust Lessons from the Analysis of Google,” May 26, 2010.

²⁵ Mike Masnick, “Antitrust Complaints Against Google Still Don’t Make Any Sense.” *Tech Dirt*, June 4, 2012, accessed June 12, 2012, <http://www.techdirt.com/articles/20120523/04204919033/antitrust-complaints-against-google-still-dont-make-any-sense.shtml>

²⁶ Erick Schonfeld, “Search is Google’s Castle, Everything Else is a Moat.” *TechCrunch*, March, 25, 2012, accessed April 25, 2012, <http://techcrunch.com/2011/03/25/search-googles-castle-moat/>

²⁷ Thomas Hazlett, David Teece, and Leonard Waverman, “Walled Garden Rivalry: The Creation of Mobile Network Ecosystems,” George Mason University Law and Economics Research Paper Series Number 11-50, November 21, 2011.

²⁸ Jeff Atwood, “Avoiding Walled Gardens on the Internet,” June 29, 2007, <http://www.codinghorror.com/blog/2007/06/avoiding-walled-gardens-on-the-internet.html>.

²⁹ Thomas Hazlett, David Teece, and Leonard Waverman, “Walled Garden Rivalry: The Creation of Mobile Network Ecosystems,” George Mason University Law and Economics Research Paper Series Number 11-50, November 21, 2011.

³⁰ Timothy Berners-Lee, “Long Live the Web: A Call for Continued Open Standards and Neutrality,” *Scientific American*, November 22, 2010.

³¹ Hanno Kaiser, “Are ‘Closed Systems’ an Antitrust Problem?” *Competition Policy International*, Volume 7, number 1, Spring, 2011.

³² Tim Wu, “Hearing on Digital Economy,” Organisation for Economic Co-Operation and Development, February 12, 2012, p. 5.

³³ Ryan Tate, “Amazon Launches Christmas Attack on Local Shops,” *Gawker*, December 6, 2011, accessed April 25, 2012, <http://gawker.com/5865612/amazon-launches-christmas-attack-on-local-shops>

³⁴ Connie Guglielmo, “DOJ Settles with Three Publishers on E-Book Suit,” *Forbes*, April 11, 2012.

³⁵ “The Competition Versus Google.” *The Wall Street Journal*, May 24, 2012, accessed June 12, 2012, <http://online.wsj.com/article/SB10001424052702304019404577419883251569896.html>

³⁶ Matthew Ingram, “Google and the Antitrust Inquiry: Fighting Shadows.” *Gigaom*, October 4, 2011, accessed April 25, 2012, <http://gigaom.com/2011/10/05/google-and-the-antitrust-inquiry-fighting-shadows/>

³⁷ David Streitfeld and Edward Wyatt, “U.S. Antitrust Move Has Google Fighting on Two Fronts.” *New York Times*, April 27, 2012, accessed April 28, 2012, <http://www.nytimes.com/2012/04/28/technology/us-move-has-google-fighting-on-2-fronts.html?pagewanted=all>

³⁸ Robert Bork, “Antitrust and Google.” *Chicago Tribune*, April 6, 2012, accessed June 7, 2012, http://articles.chicagotribune.com/2012-04-06/news/ct-perspec-0405-bork-20120406_1_unpaid-search-results-search-engines-search-algorithms

³⁹ Joshua Wright, “Defining and Measuring Search Bias,” George Mason Law & Economics Research Paper no. 12-14, November, 2011. Also see Sherman, Chris. “Study: Bing More ‘Biased’ than Google; Google not Behaving anti-competitively,” *Search Engine Land*, November 3, 2011, accessed April 24, 2012, <http://searchengineland.com/study-bing-more-biased-than-google-google-not-behaving-anti-competitively-99774>

⁴⁰ David Pogue, “Pay by Voice? So Long, Wallet,” *New York Times*, July 18, 2012.

⁴¹ Jim Bruene, “Apple Just Put a Mobile Wallet in 100+ Million iPhones,” *Banknxt.com*, June 18, 2012 at <http://banknxt.com/471/apple-just-put-mobile-wallet-in-100-million-iphones-but-is-this-passbook-friend-foe-banks/>.

⁴² Jon Leibowitz and Joseph Wayland, “Hart-Scott-Rodino Annual Report, Fiscal Year 2011,” Washington, D.C.: Federal Trade Commission and Department of Justice, p. 1.

⁴³ Jon Leibowitz and Joseph Wayland, “Hart-Scott-Rodino Annual Report, Fiscal Year 2011,” Washington, D.C.: Federal Trade Commission and Department of Justice, p. 2.

⁴⁴ Douglas Melamed, “The Purposes of Antitrust Remedies,” *Antitrust Law Journal*, Volume 76, 2009-2010, pp. 359-368 and Spencer Waller, “Access and Information Remedies in High Tech Antitrust,” Loyola University Public Law and Legal Theory Research Paper No. 2011-018, 2011.

⁴⁵ Spencer Waller, “The Past, Present, and Future of Monopolization Remedies,” *Antitrust Law*, Phillip Areeda and Herbert Hovenkamp, editors, 2000.

⁴⁶ William Kovacic, “Designing Antitrust Remedies for Dominant Firm Misconduct,” *Connecticut Law Review*, Volume 31, 1998-1999, pp. 1285-1319.

⁴⁷ Spencer Waller, “Access and Information Remedies in High Tech Antitrust,” Loyola University Public Law and Legal Theory Research Paper No. 2011-018, 2011.

⁴⁸ John Markoff, “Trove of Personal Data, Forbidden to Researchers,” *New York Times*, May 21, 2012.