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New York University
Annual Survey
of American Law

WHAT MOTIVATES ILLEGAL FILE SHARING?
EMPIRICAL AND THEORETICAL APPROACHES

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Volume 69

2013

Issue 2

WHAT MOTIVATES ILLEGAL FILE SHARING? EMPIRICAL AND THEORETICAL APPROACHES

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Introduction	588
I. Legal and Political Background	589
A. The Advent of BitTorrent	590
B. Copyright Enforcement Methods	592
C. The Contours of the Modern File Sharing Battleground	595
II. Modeling the Market for Illegal File Sharing	598
A. Production Theory	598
B. Demand Theory	602
C. Cross-Price Elasticity of Demand	607
III. A Novel Empirical Study	607
A. Data	608
B. Results and Analysis	610
IV. Motivations and Policy Consequences	611
Conclusion	614

INTRODUCTION

In the age of cloud computing, how can the state enforce intellectual property rights against persistent, widespread violation? Should it even try? The factors that give the Internet its immense appeal—the ability to transfer information instantaneously between geographically disparate users, the collaborative power of online communities, and the scaled integration of computing capital and human labor—are the very same factors that make intellectual property theft inexpensive, widespread, and difficult to track. Yet these factors have also launched a new generation of content creators using YouTube,¹ Tumblr,² deviantART,³ and countless other

* J.D. 2013, N.Y.U. School of Law. I thank my advisors, Professor Oren Bar-Gill and Professor Barton Beebe, for their excellent guidance; Professor Jennifer Arlen, Professor Ryan Bubb, and my peers in the Lederman/Milbank Fellowship for their feedback; and Lawrence Lederman and Milbank, Tweed, Hadley & McCloy for their generous support of scholarship at NYU. Finally, I would like to thank my wife Kelly for her thoughtful comments and constant support.

1. YOUTUBE, <http://www.youtube.com> (last visited Oct. 21, 2013).

2. TUMBLR, <http://www.tumblr.com> (last visited Oct. 21, 2013).

sites that blur the line between amateur and professional intellectual property originators. Turning the traditional rationale for intellectual property protection on its head, a substantial portion of the work created by this new generation depends on the routine violation of intellectual property rights to create remixes, mash-ups, and cross-overs. The net effect on social utility created by these violations is impossible to measure.

Assuming, however, that the state does wish to enforce traditional intellectual property rights, particularly copyrights, in the face of illegal file sharing, this Note argues that it is essential to consider the motivation of file sharers when examining potential policy measures—motivations that are more complex than previously thought. Using a novel empirical study to measure the cross-price elasticity of demand between illegal and legal distribution methods, this Note will help reveal what motivates the persistence of file sharing and compare the effectiveness of various enforcement strategies.

This Note proceeds in five parts. Section I reviews the legal and political issues related to file sharing. Next, Section II presents two relevant economic models—one traditional and one novel—and their consequences on the markets for legal and illegal file sharing. Section III presents the note's empirical contribution: an estimate for the cross-price elasticity of demand between legal and illegal downloading. Section IV will examine the policy consequences of the empirical and theoretical models. Finally, the Conclusion will provide some concluding thoughts.

I.

LEGAL AND POLITICAL BACKGROUND

File sharing in violation of copyright law has likely been practiced for as long as people have owned personal computers.⁴ The advent of the Internet, increases in computing efficiency, and widespread computer ownership have only compounded the practice.⁵

3. DEVIANTART, <http://www.deviantart.com> (last visited Oct. 21, 2013).

4. See 63 AM. JUR. 3D *Proof of Facts* § 1 (2001).

5. See Nick Bilton, *Internet Pirates Will Always Win*, N.Y. TIMES, Aug. 5, 2012, at SR5, available at http://www.nytimes.com/2012/08/05/sunday-review/internet-pirates-will-always-win.html?_r=0 (“The way people download unauthorized content is changing. In the early days of music piracy, people transferred songs to their home or work computers. Now, with cloud-based sites, like Wuala, uTorrent and Tribler, people stream movies and music from third-party storage facilities, often to mobile devices and TV’s. . . . It’s like piracy-on-demand. And it will be much harder to trace and to stop.”).

Napster first thrust the problem of file sharing into the public sphere.⁶ Unlike previous venues for file sharing, Napster focused exclusively on music and provided a global, well-recognized forum for downloaders with a user-friendly interface.⁷ With the download and installation of Napster software, computer users with an Internet connection could search for any song that other users listed and made available for download, compressed into the fast-downloading MP3 format.⁸ Napster revealed the power of peer-to-peer file sharing networks: by centralizing users, not files, Napster could provide users with access to millions of songs without having to maintain a database of the songs itself.⁹ Capitalizing on the home-computing resources of users, the files were shared directly from peer to peer, with Napster tracking and indexing the downloads.¹⁰

Napster's programming seems outdated by comparison to more modern file sharing technology, but it marked an important tipping point in the historical development of file sharing. By one Recording Industry Association of America ("RIAA") estimate, "Since peer-to-peer (p2p) file-sharing site Napster emerged in 1999, music sales in the U.S. have dropped 53 percent, from \$14.6 billion to \$7.0 billion in 2011."¹¹ Although the RIAA does not estimate what percent of these lost sales are due to alternative legal distribution methods like YouTube, Pandora, and Spotify, there is little doubt that piracy has contributed to these losses.¹² Video game developers face similarly alarming statistics; industry titan Ubisoft estimates that as many as 93–95% of the downloads of its games

6. For a more comprehensive discussion of the history of file sharing, see Andrew Lee, *The History of File Sharing*, TORRENTFREAK (Apr. 22, 2012), <http://torrentfreak.com/the-history-of-filesharing-120422>.

7. *See id.*

8. For a brief overview of Napster's file sharing method, see James Allen-Robertson, *How Did Napster Work?*, YOUTUBE (Nov. 4, 2007), <http://www.youtube.com/watch?v=7AF18DUIH1Y>.

9. *See id.*

10. *See id.*

11. *Scope of the Problem*, RECORDING INDUS. ASS'N OF AM., http://www.riaa.com/physicalpiracy.php?content_selector=piracy-online-scope-of-the-problem (last visited Oct. 21, 2013).

12. Other commentators have also emphasized the recording industry's slow adoption of new technology in explaining the decline in traditional music sales. *See, e.g.*, Jessica Wang, *A Brave New Step: Why the Music Industry Should Follow the Hulu Model*, 51 IDEA 511, 523 (2011) ("Even from a business perspective, record industries are failing to combat illegal piracy because they have been unsuccessful in offering an attractive alternative to illegal piracy. Not only is its current business model outdated, but it is also unresponsive to changing consumer desires.").

represent copyright infringement.¹³ Additionally, because of technological changes and increased worldwide Internet access, the scope of file sharing is likely becoming more difficult to measure.

A. *The Advent of BitTorrent*

One by one, Napster and its successors were shut down, often as a result of injunctions or civil judgments.¹⁴ But during the legal battles over the traditional peer-to-peer network providers, a new file sharing protocol was born: BitTorrent, utilized by programs such as BitTorrent¹⁵, uTorrent¹⁶, and Vuze.¹⁷ Created and released by Bram Cohen in 2001, the BitTorrent file sharing protocol further decentralizes and streamlines the file sharing process.¹⁸ BitTorrent has become wildly popular for both legal and illegal file sharing. Currently, BitTorrent file sharing is estimated to constitute 17.9% of all Internet traffic, and at least 63.7% of that traffic (or 11.4% of all Internet traffic) is estimated to include copyright infringement.¹⁹

BitTorrent clients provide greater efficiency than traditional peer-to-peer networks. Traditional networks like Napster match one uploader with one downloader, and the desired file is obtained by a sequential transfer from the former to the latter.²⁰ BitTorrent clients are capable of downloading many pieces of a desired file at

13. David Thier, *Ubisoft CEO Yves Guillemot: PC Gaming Piracy Levels Up at 95%*, FORBES (Aug. 22, 2012), <http://www.forbes.com/sites/davidthier/2012/08/22/ubisoft-ceo-yves-guillemot-pc-gaming-piracy-levels-up-at-95>.

14. See, e.g., *Metro-Goldwyn-Mayer Studios Inc. v. Grokster, Ltd.*, 545 U.S. 913, 930 (2005). See also *LimeWire, Napster, The Pirate Bay: A Brief History of File Sharing*, GEEK (Oct. 27, 2012, 5:18 PM), <http://www.geek.com/articles/gadgets/limewire-napster-the-pirate-bay-a-brief-history-of-file-sharing-20101027>; Ernesto Van Der Sar, *LimeWire Shuts Down After Losing Court Battle with the RIAA*, TORRENTFREAK (Oct. 26, 2010), <http://torrentfreak.com/limewire-loses-court-battle-with-riaa-shuts-down-101026>.

15. BITTORRENT.COM, <http://www.bittorrent.com> (last visited Oct. 21, 2013).

16. μTORRENT, <http://www.utorrent.com> (last visited Oct. 21, 2013).

17. VUZE, <http://www.vuze.com> (last visited Oct. 21, 2013).

18. Interestingly, the original forum message from 2001 in which Bram Cohen releases his BitTorrent client is still accessible at the time of writing. Bram Cohen, *BitTorrent—A New P2P App*, Comment to *Implications of the End-to-End Principle*, YAHOO! GROUPS (July 2, 2001), <http://finance.groups.yahoo.com/group/decentralization/message/3160>.

19. ENVISIONAL, TECHNICAL REPORT: AN ESTIMATE OF INFRINGING USE OF THE INTERNET (2011), available at http://documents.envisional.com/docs/Envisional-Internet_Usage-Jan2011.pdf.

20. For a graphical overview, see *Position on Peer-to-Peer File Sharing*, UNIV. OF MISSOURI-KANSAS CITY INFO. SERVS., http://www.umkc.edu/is/security/p2p_explanation.asp (last visited Oct. 21, 2013).

once, out of sequential order, from many different peers.²¹ When downloading a movie, for example, a traditional client would seek out one user who owned the movie and begin to download the opening credits, proceed to the action, and finish with the ending credits. A BitTorrent client, on the other hand, might simultaneously download the ending credits from one user, part of the action from another, and the opening credits from a third.²²

To compound the complexity and efficiency of the system, as soon as a piece of a file is downloaded, the torrent user becomes an uploader for that piece of the file.²³ So, as soon as user *a* downloads the end credits to a movie, this portion of the file is available for download by user *b*, even before user *a* obtains the remainder of the movie. Some torrent clients require a certain amount of uploading, while others incentivize the behavior by restricting download speed for non-uploaders. By encouraging downloaders to become uploaders as well, BitTorrent clients ensure that files remain available for download—all downloaders are incentivized to carry their weight as uploaders. Colloquially, uploaders are known as “seeders,” downloaders are “downloaders,” and active client participants are “peers.”²⁴ Those who download more than they upload are called, pejoratively, “leechers.”²⁵

The unique characteristics of the BitTorrent file sharing method make it particularly difficult to track. Torrent clients enable an extraordinarily efficient method of file sharing marked by coordination across borders, fast transfer speeds, and decentralization of identifying data.²⁶

B. Copyright Enforcement Methods

Generally, file sharing is illegal insofar as it violates copyright law.²⁷ Because file sharing is so widespread and difficult to track,

21. For a more detailed, technical explanation, see *The BitTorrent Protocol Specification*, BITTORRENT.ORG (Jan. 10, 2008), http://www.bittorrent.org/beps/bep_0003.html.

22. *See id.*

23. *See id.*

24. *See Glossary of BitTorrent Terms*, WIKIPEDIA, http://en.wikipedia.org/w/index.php?title=Glossary_of_BitTorrent_terms&oldid=586442705 (last visited Dec. 29, 2013).

25. *Id.*

26. *See The BitTorrent Protocol Specification*, *supra* note 21; Bilton, *supra* note 5.

27. Currently, digital works are entitled to full copyright protection, but some scholars argue that intellectual property law should deal with digital works differently. *See, e.g.,* Raymond Shih Ray Ku, *The Creative Destruction of Copyright: Napster and the New Economics of Digital Technology*, 69 U. CHI. L. REV. 263 (2002).

copyright holders typically enforce their rights through one of two methods: suits against individual file sharers with high statutory damages,²⁸ and suits against file sharing clients relying on theories of secondary liability.²⁹ Additionally, governments sometimes enforce copyrights through criminal prosecution, especially for high-profile offenders.³⁰

Under the Copyright Act of 1976, copyright holders pursuing a private suit against an infringer may opt for the award of statutory damages rather than actual damages.³¹ The Copyright Act authorizes damage awards ranging from \$750 to \$30,000 per violation.³² In *Capitol Records v. Thomas-Rasset*, for example, the Eighth Circuit upheld a statutory damage award of \$9,250 per song shared by the defendant against a due process challenge.³³ Having shared twenty-four songs, the defendant was liable for \$222,000 in statutory damages.³⁴ The market value for twenty-four songs on iTunes at the time of publication is about \$24.³⁵ High damage suits like *Capitol v. Thomas*, while designed to strike fear in the hearts of illegal file sharers, did little to stem the tide of illegal downloading and were extraordinarily unpopular.³⁶ After initiating 35,000 such suits, the RIAA decided in 2008 to discontinue its practice of suing individual file sharers, largely due to public relations concerns.³⁷

Because individual file sharers are numerous and dispersed, targeting a file sharing client can be a far more effective way of preventing copyright infringement; to achieve this, copyright holders have turned to theories of secondary copyright infringement.

28. See, e.g., *Capitol Records, Inc. v. Thomas-Rasset*, 692 F.3d 899, 907 (8th Cir. 2012).

29. See, e.g., *Metro-Goldwyn-Mayer Studios Inc. v. Grokster, Ltd.*, 545 U.S. 913, 929–30 (2005).

30. See, e.g., *TIMELINE-Kim Dotcom's Year, from Megaupload to Mega*, REUTERS (Jan. 19, 2013, 2:36 AM), <http://www.reuters.com/article/2013/01/19/new-zealand-dotcom-idUSL6N0AL02Y20130119>.

31. 17 U.S.C. § 504(c)(1) (2006).

32. *Id.* However, the statute authorizes an upward adjustment to a maximum of \$150,000 per work for willful violations and a downward adjustment to a minimum of \$200 per work for unknowing violations. § 504(c)(2) (2006).

33. *Capitol Records, Inc. v. Thomas-Rasset*, 692 F.3d 899, 907 (8th Cir. 2012).

34. *Id.*

35. See *iTunes Store: iTunes Plus Frequently Asked Questions (FAQ)*, APPLE, <http://support.apple.com/kb/ht1711> (last visited Dec. 29, 2013).

36. For a look back on the RIAA's litigation strategy and its consequences, see *RIAA v. The People: Five Years Later*, ELEC. FRONTIER FOUND. (Sept. 30, 2008), <https://www.eff.org/wp/riaa-v-people-five-years-later>.

37. See Sarah McBride & Ethan Smith, *Music Industry to Abandon Mass Suits*, WALL ST. J. (Dec. 19, 2008, 12:01 AM), <http://online.wsj.com/article/SB122966038836021137.html>.

Traditionally, there are two such theories: contributory liability, which holds parties liable for “intentionally inducing or encouraging direct infringement,”³⁸ and vicarious liability, which holds parties liable for “profiting from direct infringement while declining to exercise a right to stop or limit it.”³⁹ Unfortunately, in *Grokster*, the only case in which the Supreme Court has considered secondary copyright infringement liability for peer-to-peer file sharing services, the Court was less than clear in specifying which theory it was applying to find the file sharing service *Grokster* liable.⁴⁰ The Court held that “one who distributes a device with the object of promoting its use to infringe copyright, as shown by clear expression or other affirmative steps taken to foster infringement, is liable for the resulting acts of infringement by third parties.”⁴¹ Although this sounds like an adoption of contributory liability, the Court considered as evidence of intent *Grokster*’s collection of advertising profits and its failure to filter for copyrighted works;⁴² both are behaviors traditionally associated with the vicarious liability framework.⁴³ Despite the muddled doctrine, it is clear in the wake of *Grokster* that at least some file sharing clients may be held liable for secondary copyright infringement and either sued for damages or enjoined from operation.

In addition to private enforcement, copyright protection may also be enforced through criminal prosecution. The Copyright Act authorizes criminal prosecution for willful copyright infringers who violate copyright laws for profit, make available works with a retail value of greater than \$1,000, or make available an unreleased work being prepared for commercial distribution.⁴⁴ While relatively rare, these criminal prosecutions are highly visible. Kim Dotcom, the flamboyant tech icon who created Megaupload, a site commonly used for hosting and sharing copyrighted content⁴⁵, is currently awaiting an extradition trial in New Zealand on charges of copy-

38. *Metro-Goldwyn-Mayer Studios Inc. v. Grokster, Ltd.*, 545 U.S. 913, 929–30 (2005).

39. *Id.*

40. *See id.* at 936–37.

41. *Id.*

42. *See id.* at 939–40.

43. For an argument that the Court defined a new type of contributory liability in *Grokster*, see Mark Bartholomew, *Copyright, Trademark and Secondary Liability After Grokster*, 32 *COLUM. J.L. & ARTS* 445, 465–66 (2009).

44. 17 U.S.C. § 506(a)(1) (2006).

45. *See generally*, Ben Sisario, *U.S. Charges Popular Site with Piracy*, *N.Y. TIMES*, Jan. 20, 2012, at B1, available at <http://www.nytimes.com/2012/01/20/technology/indictment-charges-megaupload-site-with-piracy.html>.

right infringement by the U.S. government.⁴⁶ Despite the pending trial, Dotcom has already launched a more heavily encrypted successor to Megaupload, called Mega.⁴⁷

All of these methods of enforcement can be seen as solutions to a central problem: file sharers are numerous, dispersed, and their behavior is difficult to track. Notably, the Supreme Court has not addressed any copyright infringement suits against BitTorrent clients.⁴⁸ The peculiar characteristics of BitTorrent clients make their legal status somewhat murky. Unlike Grokster, the BitTorrent protocol is used for legitimate file distribution more than 10% of the time.⁴⁹ Additionally, most BitTorrent clients avoid the kind of overt solicitation of copyright infringing activity that the Court found problematic in *Grokster*.⁵⁰ Many popular BitTorrent clients do not run ads, so the Court's "for profit" analysis will also be inapplicable.⁵¹ And as a procedural matter, there is no one "BitTorrent" entity to sue—whereas Napster and Grokster were companies that offered eponymous software products, the BitTorrent community is less centralized.⁵² There are many BitTorrent clients⁵³ and many BitTorrent indexing sites,⁵⁴ and any combination of client and site may be used by downloaders.⁵⁵ This is a marked change from the

46. See *TIMELINE—Kim Dotcom's Year, from Megaupload to Mega*, *supra* note 30.

47. *Id.*

48. See Bartholomew, *supra* note 43, at 446–49 (“The Supreme Court’s last pronouncement on the issue of secondary infringement, its 2005 decision in *Metro-Goldwyn-Mayer Studios Inc. v. Grokster, Ltd.*, did little to bridge the gap between copyright and trademark in this area.”).

49. See *ENVISIONAL*, *supra* note 19.

50. See *Metro-Goldwyn-Mayer Studios Inc. v. Grokster, Ltd.*, 545 U.S. 913, 940 (2005) (requiring “intent to bring about infringement” for an inducement theory of liability).

51. See *id.* at 940–41.

52. μ Torrent, purchased by BitTorrent Inc. in 2006, is a notable exception. Ernesto Van Der Sar, *BitTorrent Inc Buys μ Torrent*, *TORRENTFREAK* (Dec. 7, 2006), <http://torrentfreak.com/BitTorrent-inc-buys-%C2%B5torrent>.

53. See *Comparison of BitTorrent Clients*, WIKIPEDIA, http://en.wikipedia.org/w/index.php?title=Comparison_of_BitTorrent_clients&oldid=587460256 (last visited Dec. 29, 2013).

54. See *Comparison of BitTorrent Sites*, WIKIPEDIA, https://en.wikipedia.org/w/index.php?title=Comparison_of_BitTorrent_sites&oldid=588201334 (last visited Dec. 29, 2013).

55. *Columbia Pictures Indus. v. Fung*, 710 F.3d 1020, 1027 n.4 (9th Cir. 2013). Because of their more conspicuous role in facilitating peer-to-peer sharing of copyrighted content, the torrent listing sites are arguably more likely to be sued successfully than the torrent clients, which often offer a number of legal downloading applications. See, e.g., *id.* (finding the popular torrent listing site IsoHunt liable for inducing copyright infringement under *Grokster*).

Napster and Grokster era, where the search engine and download client were part of one software program. BitTorrent developers are likely to be dispersed, difficult to find, and easily replaceable by new coders. As is often the case when courts face legal issues dependent on emerging technology, the current jurisprudence is several steps behind the times. In the meantime, file sharing continues, and users push for even more decentralized file sharing client services.⁵⁶

C. *The Contours of the Modern File Sharing Battleground*

There is little consensus about how to deal with the issues of copyright law in the digital age. Some scholars argue that the best way to enforce copyrights is to ratchet up protection by granting the government and private actors more tools to target file sharers.⁵⁷ Stricter penalties against infringers may incentivize consumers to seek legal sources for their content, thus protecting the interests of copyright holders and distributors. Some data, however, tend to show that file sharing is used primarily as a supplement rather than a replacement for traditional market transactions.⁵⁸ According to one study by the non-partisan American Assembly, consumers who engaged in illegal peer-to-peer file sharing purchased 30% more songs legally than consumers who did not engage in file sharing.⁵⁹ As their report put it, “[t]he biggest music pirates are also the biggest spenders on recorded music.”⁶⁰ The overlap between legal and illegal downloaders makes it difficult to predict how increased enforcement of copyright law will affect the market for legally-distributed digital intellectual property goods. Scholarly empirical studies have found mixed results: some claim that file sharing reduces legal sales, while some find the opposite effect.⁶¹

56. See, e.g., Nate Anderson, *Pirate Bay Moves to Decentralized DHT Protocol, Kills Tracker*, ARS TECHNICA (Nov. 17, 2009, 1:40 PM), <http://arstechnica.com/tech-policy/2009/11/pirate-bay-kills-its-own-BitTorrent-tracker> (recounting The Pirate Bay’s move to a decentralized tracking system, obviating the need for a single entity to track torrents and thus making it more difficult to enjoin file sharing activity through vicarious or contributory theories of liability).

57. For a summary of the major arguments for expanding copyright protection, see Ku, *supra* note 27, at 279–84.

58. Joe Karaganis, *Where do Music Collections Come From?*, THE AM. ASSEMBLY (Oct. 15, 2012), <http://piracy.americanassembly.org/where-do-music-collections-come-from/>.

59. *Id.*

60. *Id.*

61. For a 2009 summary of empirical studies on file sharing, see Felix Oberholzer-Gee & Koleman Strumpf, *File-Sharing and Copyright* (Harvard Bus. Sch., Working Paper No. 09-132, 2009), available at <http://www.hbs.edu/faculty/Publication%20Files/09-132.pdf>.

Not all scholars agree that file sharing is a problem; some believe that it is copyright law that should yield to the times. Raymond Ku, for example, argues that changes in digital technology have decoupled the interests of content creators and content distributors.⁶² As a result, copyright law is no longer needed to incentivize the distribution of content, and digital works should, therefore, not be eligible for copyright protection.⁶³ To encourage artistic creation, Ku proposes a compensation system for content creators, which would be supported by a tax on computer components, and distributed to the content creators proportionally based on a measure of their internet popularity.⁶⁴ It is difficult to imagine the sweeping political changes necessary for the implementation of Ku's proposal.⁶⁵ Nonetheless, Ku correctly recognizes the tension between traditional copyright enforcement and the digital distribution technology owned by most consumers.

Additionally, appropriation from copyrighted subjects is a well-established artistic tradition, practiced by luminaries including Andy Warhol and Roy Lichtenstein, and contemporary artists like Girl Talk and Richard Prince.⁶⁶ Aggressive enforcement of copyright law in such an environment can frustrate the stated purpose of copyright law—encouraging the creation of valuable artistic content.⁶⁷ Fair use law provides some protection for artists, but fair use itself might be overly restrictive.⁶⁸ Justice Souter wrote in *Grokster*, “[t]he more artistic protection is favored, the more technological innovation may be discouraged; the administration of copyright law

62. See Ku, *supra* note 27.

63. See *id.* at 294–306.

64. See *id.* at 311–23.

65. Yet Ku is not alone in suggesting that sweeping changes to intellectual property law are necessary to avoid the inefficiencies caused by the grant of monopoly power. See, e.g., Michele Boldrin & David K. Levine, *The Case Against Patents* (Fed. Reserve Bank of St. Louis, Working Paper No. 2012-035A, 2012), available at <http://research.stlouisfed.org/wp/2012/2012-035.pdf> (arguing that there is little empirical evidence for the benefits of patents and strong evidence that patents have negative effects on innovation).

66. See LAWRENCE LESSIG, REMIX: MAKING ART AND COMMERCE THRIVE IN THE HYBRID ECONOMY 11–15 (2008), available at <http://archive.org/details/Lawrence-LessigRemix>. See also *Cariou v. Prince*, 714 F.3d 694, 706 (2d. Cir. 2013).

67. See U.S. CONST. art. I, § 8, cl. 8.

68. See Haochen Sun, *Fair Use as a Collective User Right*, 90 N.C. L. REV. 125 (2011) (arguing that the fair use doctrine is underproductive when it is conceptualized as an individual rather than a collective right). Provisions of the Digital Millennium Copyright Enforcement Act may be particularly problematic. See Jacqueline D. Lipton, *Solving the Digital Piracy Puzzle: Disaggregating Fair Use from the DMCA's Anti-Device Provisions*, 19 HARV. J.L. & TECH. 111, 112 (2005).

is an exercise in managing the tradeoff.”⁶⁹ Nine years after *Grokster* was decided, it is no longer clear that artistic protection and technological innovation are dichotomous goals. Songs, videos, logos, and other copyrighted content are used as the digital canvas for a new generation of content creators whose work is showcased on such sites as YouTube, Tumblr, and deviantART, and file sharing is an integral part of this creative process.⁷⁰ Policymakers and courts should take note of these content creators and remember the fundamental purpose of copyright—the promotion of the arts⁷¹—when weighing the costs and benefits of new developments in copyright enforcement.

Courts and lawmakers will continue to be challenged by new issues as technology emerges and markets, both legal and illegal, adapt. Regardless of the normative prescription for resolving the tension between traditional copyright law and emerging technology, the motivations of file sharers should be a central concern of policymakers. This Note proceeds to examine these motivations: first, through theoretical frameworks, and next, through a novel empirical study.

II. MODELING THE MARKET FOR ILLEGAL FILE SHARING

From a theoretical standpoint, understanding the motivations of file sharers requires elements of both classical and behavioral economic theory. Classical production theory reveals how intellectual property markets differ from markets for tangible goods and how these differences create difficulties for content creators, especially in the age of cloud computing. Although governments are attempting various measures to enforce intellectual property rights, production theory helps explain why these measures are needed and, perhaps, why they are failing. Most promisingly, production theory accurately predicts where the file sharing market should price its goods—at essentially zero cost. Additionally, this Note argues that behavioral theory principles are essential to expanding the theory of demand for digital intellectual property. Demand should be understood to be based on the totality of costs to the consumer, not just the nominal price. Including access costs, legal

69. *Metro-Goldwyn-Mayer Studios Inc. v. Grokster, Ltd.*, 545 U.S. 913, 928 (2005).

70. See LESSIG, *supra* note 66 at 1–5, 254–60.

71. See U.S. CONST. art. I, § 8, cl. 8.

costs, and moral costs, defined in Section II.B, *infra*, presents a clearer picture of the motivations of consumers of digital intellectual property. Finally, this section presents the concept of cross-price elasticity of demand. Data collected to estimate cross-price elasticity of demand, examined within the expanded demand framework, can reveal which motivations of file sharers are most determinative of file sharing activity.

A. Production Theory

Production of intellectual property goods differs in important ways from production of tangible goods. The process of production can be divided into two phases: (1) development costs, which include the research, design, and creative processes required to make the first model of a good; and (2) production costs, which include the cost of manufacturing and distributing additional copies of that good. Intellectual property is often characterized by high development costs and very low production costs.⁷² For example, blockbuster movies require a high expenditure to hire actors, film, and edit a movie.⁷³ Once the movie is made, however, there is typically a very low cost to make copies of the film for distribution, especially if a digital copy of the film is available.⁷⁴

When compared to intellectual property, tangible goods are characterized by relatively smaller development costs and relatively larger production costs. Putting aside intellectual property issues such as trademarks and patents, the automobile is an example of a typical tangible good. The bulk of the expense of producing vehicles comes from the large fixed and variable costs required by vehicle manufacturing processes.⁷⁵ Unlike the electronic transmission

72. See Edwin C. Hettinger, *Justifying Intellectual Property*, 18 PHIL. & PUB. AFF. 31, 34, 47–51 (1989) (discussing the extent to which intellectual property institutions provide necessary incentives for innovation and competition).

73. See Archie Thomas, *Anatomy of a Blockbuster*, THE GUARDIAN (June 10, 2004), <http://www.theguardian.com/film/2004/jun/11/3>.

74. See David S. Cohen, *Filmmakers Lament Extinction of Film Prints*, VARIETY (Apr. 17, 2013, 3:00 PM), <http://variety.com/2013/film/news/film-jobs-decline-as-digital-distribution-gains-foothold-1200375732>.

75. One study found that manufacturing costs (including material and labor but not depreciation) accounted for about 50% of the retail cost of cars. ANANT VYAS ET AL., COMPARISON OF INDIRECT COST MULTIPLIERS FOR VEHICLE MANUFACTURING 2 (2000), available at <http://www.transportation.anl.gov/pdfs/TA/57.pdf>. The research and design budget, according to the study, was less than 7% of the retail cost. *Id.*

of a movie from one computer user to another, the cost of creating an additional automobile is very high.⁷⁶

Video games are typical digital intellectual property goods. Recent production budgets for marquee video games have hovered in the \$40–100 million range, rivaling the production costs of Hollywood blockbusters.⁷⁷ MMOs (massively multiplayer online games), whose production costs can be recouped through monthly subscription fees, may pave the way for even greater budgets.⁷⁸ Many games take years of work by developers across multiple continents.⁷⁹

In contrast to these monumental production costs, the cost of distributing video games is quite small; in fact, in the age of widespread computer ownership and high-speed Internet, the cost of distribution for most digital intellectual property is essentially negligible.⁸⁰ A user of average skill with basic computer hardware and a connection to the Internet can reproduce practically any song, television show, movie, news article, book, or video game currently or previously available for consumption from traditional retail

76. *See id.* Interestingly, the increasing availability of three-dimensional printing devices may challenge the distinction between intellectual property and tangible goods by making factory-like processes available in the average home. *See* Ashlee Vance, *3-D Printing Spurs a Manufacturing Revolution*, N.Y. TIMES, Sept. 14, 2010, at A1, available at <http://www.nytimes.com/2010/09/14/technology/14print.html?pagewanted=all&r=0>.

77. *See* N. Van Zelfden, *What's Killing the Video-Game Business?*, SLATE (Feb. 16, 2009, 3:27 PM), http://www.slate.com/articles/technology/gaming/2009/02/whats_killing_the_videogame_business.html; *see also* Chris Morris, *As Video Game Development Costs Rise, So Do Risks*, CNBC (Mar. 18, 2010, 1:22 PM), http://www.cnbc.com/id/35932496/As_Video_Game_Development_Costs_Rise_So_Do_Risks.

78. The production costs for Star Wars: The Old Republic, for example, were reported to be almost \$200 million. Ben Fritz & Alex Pham, *Star Wars: The Old Republic—The Story Behind A Galactic Gamble*, L.A. TIMES (Jan. 20, 2012, 5:32 AM), http://herocomplex.latimes.com/2012/01/20/star-wars-the-old-republic-the-story-behind-a-galactic-gamble/?utm_source=dvrit.it&utm_medium=twitter&dlvrit=63378#/0.

79. *See id.*

80. A true calculation of the cost of sharing intellectual property would take into account the cost of the computer, the cost of Internet, the cost of electricity, and the cost of human labor expended. The cost of the computer, Internet, and electricity can alternatively be considered sunk costs (if we consider these as necessities for the average citizen in the industrialized world), or be depreciated against every use of the computer (which likely makes each transaction of intellectual property cost very little). The cost of human labor will vary with the opportunity cost (wage), computer skill, and method of file sharing. For experienced file sharers using torrent clients, the cost of human labor is very small.

sources.⁸¹ Like movies and music, video games have been customarily distributed through the sale of physical discs, which the user purchases along with a license to use the copyrighted content contained on the disc. Online retailers like iTunes,⁸² Netflix,⁸³ and Steam⁸⁴ now allow intellectual property distributors and customers to engage in transactions without physical goods ever changing hands, thus dispensing with the formality of handing over a book, CD, or DVD.

Changes in home computing have also decreased the production cost of digital intellectual property. Processor, memory, and storage manufacturers continue their torrid pace of developing more efficient and cheaper computer components.⁸⁵ Additionally, home computing has shaped the way people view media. Whereas many consumers once had different devices for running software programs, watching movies, and playing music, now a single, portable laptop is capable of accomplishing these tasks. Our time is marked by a blurring of the lines between computing instruments: the phone, once a fixed machine tethered to the home is now portable and powerful enough to perform mathematical calculations, record pictures and video, access email, provide GPS navigation (with a backup compass app), stream high quality videos from the internet, and, of course, take the occasional phone call.⁸⁶ With the capability to summon data from a wide repository of movies, T.V. shows, music, and games, intellectual property's equivalent of a Ford manufacturing plant now fits neatly into one's pocket.

In economic parlance, the nature of intellectual property production and the widespread availability of computing technology and high speed Internet have resulted in a zero marginal cost of

81. For an overview of the types of media available for download, see Envisional, *supra* note 19. To verify availability, the reader is encouraged to search (but not download from) ThePirateBay.se and other popular torrent indexes, or simply to search for content using a search engine.

82. iTUNES, <http://www.itunes.com> (last visited Dec. 31, 2013).

83. NETFLIX, <http://www.netflix.com> (last visited Dec. 31, 2013).

84. STEAM, <http://store.steampowered.com> (last visited Dec. 31, 2013).

85. See Michael Kanellos, *Moore's Law to Roll On for Another Decade*, CNET (Feb. 10, 2003, 2:27 PM), <http://news.cnet.com/2100-1001-984051.html>; Brad Chacos, *Breaking Moore's Law: How Chipmakers Are Pushing PCs to Blistering New Levels*, PCWORLD (Apr. 11, 2013, 3:00 AM), <http://www.pcworld.com/article/2033671/breaking-moores-law-how-chipmakers-are-pushing-pcs-to-blistering-new-levels.html>.

86. For a nonexclusive look at the capabilities of smartphones, see, e.g., *iPhone 5s*, APPLE, <http://www.apple.com/iphone-5s> (last visited Dec. 31, 2013); *Nexus 5*, GOOGLE, <http://www.google.com/nexus/5> (last visited Dec. 31, 2013).

production of movies, TV shows, music, and video games.⁸⁷ That is, it is essentially costless once a movie is filmed or song recorded to create innumerable perfect copies of that good. Under the perfect competition model of markets, the price of a good tends to converge on the marginal cost of production of the good. So, classical microeconomic theory predicts that, with no state intervention, the price for typical digital intellectual property goods in a competitive market is zero.⁸⁸

How then can creators be compensated for the effort expended in producing a digital good? The traditional solution is for the state to grant the creator exclusive rights to distribute and license the intellectual property.⁸⁹ In copyright, the monopoly period typically runs until the death of the creator plus seventy years.⁹⁰ The temporary monopoly control over the intellectual property compensates the creator for the effort and resources expended in the creation of the good. Thus, intellectual property rights are designed to incentivize creativity.

According to classical microeconomic theory, however, monopolies present certain market inefficiencies.⁹¹ The grant of monopoly power in this instance has the same effect as a price floor: the creator of a digital good is able to keep the price artificially higher than the marginal cost of production because of the grant of intellectual property rights. Due to the artificially high price, consumers who would have purchased the good at a competitive price abstain from consumption. The parties' inability to engage in mutually beneficial exchanges at less than the monopoly price leads to deadweight loss, mutually beneficial transactions forgone, a sure sign of market inefficiency. Grey markets often occur in precisely these circumstances, as suppliers and consumers attempt to recover some of the deadweight loss by engaging in illegal exchanges at prices lower than the monopoly price. For example, cigarettes

87. For an excellent introduction to intellectual property issues in economics, see Stan Liebowitz, *Intellectual Property*, in *LIBR. OF ECON. & LIBERTY* (David R. Henderson, ed., 2008), available at <http://www.econlib.org/library/Enc/IntellectualProperty.html>.

88. *See id.*

89. *See id.*

90. *See* 17 U.S.C. § 302(a) (2006).

91. For an overview of classical microeconomic theory and terminology, see ROBERT H. FRANK, *MICROECONOMICS AND BEHAVIOR* (7th ed. 2008).

taxed at a very high rate in New York are often smuggled in from lower-taxing states, such as New Jersey.⁹²

In conclusion, the above production analysis reveals a central motivation of file sharers: under traditional microeconomic theory, file sharing can be seen as a grey market response to prices artificially kept above the marginal cost of production. While there are real costs to developing digital content, the marginal cost of production is essentially zero—precisely where file sharers price their goods.

B. Demand Theory

While production theory is useful in describing the supply side of digital intellectual property good transactions, demand theory allows a more comprehensive treatment of the motivations of consumers. Traditional demand theory posits a rational consumer whose consumption choices are based on the prices of goods.⁹³ Thus,

$$Q_i = f(P_i),$$

where Q_i = quantity demanded, and P_i = price.

Although this theory is a good fit for many traditional markets, this note argues that it is essential to expand the theory of demand using behavioral principles to better understand the market for file sharing.

This Note proposes that demand for digital intellectual property is best explained using four factors: nominal price, access costs, legal costs, and moral costs.

Nominal price⁹⁴ refers to the dollar amount paid for the digital content. Nominal price operates on demand in essentially the same way price does in traditional demand theory.

Access costs capture the opportunity costs associated with obtaining digital content in a usable format and in a timely fashion. The time it takes to obtain content through downloading, the ease of access and transferability, the presence of digital rights management (“DRM”) software, and the format of the digital content can all contribute to access costs. In other words, an access cost is an

92. See Catherine Rampell, *Cigarette Taxes vs. Cigarette Smuggling*, *ECONOMIX* (Jan. 10, 2013, 5:31 PM), <http://economix.blogs.nytimes.com/2013/01/10/cigarette-taxes-vs-cigarette-smuggling>.

93. See generally FRANK, *supra* note 91.

94. “Nominal price” is not used here to distinguish the dollar cost from the real cost in terms of inflation. Instead, this Note argues that “real cost” in the context of file sharing should take into account factors other than the dollar amount paid for a good.

inconvenience that stands between consumers and the use of their digital content.

Legal costs include the expected costs of enforcement actions arising from consumer activity, such as costs incurred in litigating and settling copyright infringement claims. For illegal transactions, legal costs should equal the amount of liability incurred in the average copyright enforcement action multiplied by the perceived probability of being involved in such an action. For legal sales, legal costs should be negligible.

Finally, moral costs are comprised of the disutility a consumer feels for violating copyright law.⁹⁵ Similar to legal costs, moral costs should be negligible for a consumer engaging in a transaction that does not infringe copyright law.

Together, these four factors give a more comprehensive understanding of the demand for digital intellectual property goods. Thus,

$$Q_i = f(P_i, A_i, L_i, M_i) ,$$

where Q_i = quantity demanded, P_i = nominal price, A_i = access costs, L_i = legal costs, and M_i = moral costs.

The following table summarizes the effects of the independent variables on quantity demanded:

	Independent Variable Changed	Change in Quantity Demanded
Nominal Price	Increase	Decrease
Access Costs	Increase	Decrease
Legal Costs	Increase	Decrease
Moral Costs	Increase	Decrease

Access costs play a central role in the expanded theory of demand. In the electronic age, access costs are becoming more and more important in consumers' decisions regarding digital intellectual property goods. Access costs may include the time lost by downloading the good, the ease of access and transferability of file formats, and the level of protection provided by DRM software. DRM software, designed to protect and authenticate software licenses, may be particularly intrusive. One recent controversy was

95. In rare cases, moral costs may confer positive utility on a consumer who feels that downloading illegally is a way of expressing political dissent or a form of civil disobedience aimed at forcing the government to confront the issue of copyright reform.

game studio Blizzard's decision to require an active Internet connection for single player play in its game *Diablo III*.⁹⁶ This DRM protection was extremely unpopular because it limited consumers' access to the game based on server availability, and a workaround was soon created.⁹⁷

As in the *Diablo III* example, the legal method of distribution will often be associated with greater access costs as copyright license holders try to protect against piracy, but not all consumers will experience this. For some consumers, access costs may cut against illegal downloading. These users may feel most comfortable purchasing their digital content at a physical retailer or from a familiar online source; they will perceive the process of learning how to use torrent downloads as a high access cost to obtaining illegally downloaded content. Rational consumers who explore their options will often find that goods obtained through illegal file sharing are much less costly to access than their legal counterparts—BitTorrent downloads particularly are one of the most efficient ways to transfer data between users while conventional download speeds from online retailers, in contrast, remain limited.⁹⁸ In an era where consumers place high value on the speed of data transfer and ability to utilize digital content on a variety of devices with a variety of formats, these access costs are particularly strong motivators, especially for PC game consumers, who tend to be sophisticated computer users.⁹⁹ Nonetheless, many consumers, especially in the markets for movies, music, and TV shows, will be incentivized toward legal downloading because of what they perceive to be a high learning curve to illegal downloading.

This expanded theory of demand helps explain certain consumption habits in the market for digital intellectual property that seem counterintuitive when viewed in the context of traditional de-

96. Matthew Humphries, *Diablo III Offline Play Crack Released in Beta Form*, GEEK (July 2, 2012, 10:29 AM), <http://www.geek.com/articles/games/diablo-iii-off-line-play-crack-released-in-beta-form-2012072>.

97. *Id.*

98. For a technical analysis of the efficiencies of the BitTorrent protocol, see generally Gang Wu & Tzi-cker Chiueh, *How Efficient is BitTorrent?* (unpublished article, State University of New York at Stony Brook), available at <http://www.ecsl.cs.sunysb.edu/tr/TR185.pdf>.

99. At the very least, PC game consumers must own and be able to operate a PC with sufficient skill to run PC games. Additionally, there are many resources designed to enable PC gamers to create their own PCs. See, e.g., Jason Evangelho, *Build a Powerful 'Battlefield 4' Gaming PC for \$750—SSD and Windows 8 Included*, FORBES (Sept. 16, 2013, 2:41 PM), <http://www.forbes.com/sites/jasonevangelho/2013/09/16/build-a-powerful-battlefield-4-gaming-pc-for-less-than-750-ssd-and-windows-8-included>.

mand theory. Consider, for example, consumers who consummate legal sales when illegal goods are cheaper. Under traditional demand theory, no consumer with the capability to obtain a good for free should pay for it, because demand is motivated solely by price.¹⁰⁰ At the time of writing, the most popular TV show on DVD at Amazon.com is *Game of Thrones*, Season 3, priced at \$29.99.¹⁰¹ Across the Internet is The Pirate Bay,¹⁰² a popular website that provides links to torrents. These links can be used by downloaders to find and download torrents on a BitTorrent client. Using the torrent link from The Pirate Bay, Season 3 of *Game of Thrones* is being distributed by 950 seeders and downloaded by 158 peers for free.¹⁰³ This behavior is irrational under traditional demand theory—why would consumers pay \$29.99 when the same good, in easily-accessible electronic format, is available for free? Under the expanded theory of demand, however, this phenomenon is quite explainable. Despite the greatly reduced nominal price at The Pirate Bay, the legal, moral, and access costs of illegally downloading the show are too great for some consumers. These consumers worry about illegal downloading—either because they fear legal sanction or they feel bad about violating copyright law—and thus choose to pay for a good they could obtain for free. Access costs may also help explain these consumers' behavior. The consumers who continue to use legal methods of purchase may be the kind who are unsophisticated with respect to illegal downloading, and thus they perceive illegal downloading to be more costly.

This expanded theory of demand also helps explain activity that the traditional theory would have little to say about, including consumers' actions when goods are similarly priced. At Comedy Central's website, the *Daily Show with Jon Stewart*, dated February

100. It may be argued, persuasively, that traditional demand theory assumes that the great majority of transactions occur legally, with criminal activity being the exception. This is yet another reason that the theory of demand must be expanded to understand the current state of file sharing, where as much as 93–95% of transactions may occur illegally. See Thier, *supra* note 13.

101. Movies & TV, AMAZON, http://www.amazon.com/movies-tv-dvd-bluray/b/ref=topnav_storetab_mov?ie=UTF8&node=2625373011 (follow “Best Sellers” hyperlink) (last accessed Feb. 14, 2014, 5:35 PM).

102. THE PIRATE BAY, <http://thepiratebay.se> (last visited Dec. 31, 2013).

103. THE PIRATE BAY, <http://thepiratebay.se> (search for “Game of Thrones”; then click on “SE” to sort by number of seeders) (last accessed Feb. 14, 2014, 5:45 PM). Note that this number includes only active downloaders in the local swarm—the total number of downloaders worldwide is likely several orders of magnitude larger.

12, 2014, is available to stream for free.¹⁰⁴ Despite this, at the Pirate Bay, 1,605 users are seeding the same episode and 116 peers are downloading it.¹⁰⁵ Under traditional demand theory, users should be indifferent between these two methods of watching. The expanded theory of demand, however, gives more insight. Moral and legal costs cut against downloading the show from the Pirate Bay; access costs, then, must be the primary motivator for the illegal file sharers. Unlike Comedy Central's stream, a downloaded copy of the show will be available to watch without Internet connection on any of the user's media devices, can be ripped, converted, and altered with ease, may be available in higher quality, such as higher resolution, and will be free of advertisements.

As the above examples demonstrate, this expanded demand theory provides more tools with which to evaluate the conduct of consumers of digital intellectual property. As the average consumer becomes sophisticated with respect to methods of accessing content, access costs become relatively more important. Increasingly, consumers care not only about price, legality, and morality, but also about how conveniently they can access their content.

C. *Cross-Price Elasticity of Demand*

The concept of cross-price elasticity of demand is helpful for examining to what degree nominal price is a factor in motivating demand for illegal file sharing. Cross-price elasticity of demand measures the percent change in quantity demanded of one good in response to a percent change in price of another good.¹⁰⁶ Thus,

$$E_{a,b} = \% \Delta Q_a / \% \Delta P_b ,$$

where Q_a = quantity demanded of good a , and P_b = price of good b .

Positive cross-price elasticity is associated with substitute goods—as the price of a good falls, demand for that good increases and demand for its substitute decreases. Conversely, negative cross-price elasticity is associated with complementary goods. Goods with a cross-price elasticity of zero are considered independent. To measure the cross-price elasticity between illegal and legal downloading, this note estimates the change in quantity of illegal downloads

104. *The Daily Show*, (Comedy Central television broadcast Feb. 12, 2013), available at <http://www.thedailyshow.com> (click on "Full Episodes") (last accessed on Feb. 14, 2014, 5:45 PM).

105. THE PIRATE BAY, <http://thepiratebay.se> (search for "The Daily Show"; then click on "SE" to sort by number of seeders) (last accessed Feb. 14, 2014, 5:45 PM).

106. See FRANK, *supra* note 91, at 125.

(Q_a) using BitTorrent downloads and the change in price of legal downloads (P_b) using price changes from an online video game retailer.

Examining data on cross-price elasticity within the expanded theory of demand framework will be particularly revealing. Cross-price elasticity enables the isolation of the effect of nominal price on illegal downloads. When games go on sale on Steam,¹⁰⁷ a prominent online video game retailer, the nominal price drops, but the relative mix of access costs, legal costs, and moral costs between legal and illegal downloads does not change. Thus, cross-price elasticity can reveal how important nominal price is relative to the other demand factors.

III.

A NOVEL EMPIRICAL STUDY

Empirical studies on illegal file sharing age quickly and poorly. Carefully crafted empirical studies focusing on traditional peer-to-peer clients might reveal much about file sharing activity in the 2000s.¹⁰⁸ Since then, however, the advent of cheap, high-speed Internet, the rising popularity of the BitTorrent sharing protocol, and the proliferation of internet-accessible computing devices, especially mobile devices, have profoundly changed the way consumers access digital media. Furthermore, there has been little consensus on the effects of file sharing.¹⁰⁹ Finally, most studies have focused on the downloading of music, TV shows, and movies, while ignoring a large component of file sharing—PC games.

This Note proposes to update some of the scholarship by focusing on BitTorrent file sharing technology and, particularly, the downloading of video games. This Note will also take a different approach than most previous empirical work. Rather than examining the effect of illegal downloads on legal sales, this Note looks for the opposite—changes in illegal downloads during price changes in legal distribution methods. Using a hand-collected data set of BitTorrent downloads during price drops of video games from the online retailer Steam, this note estimates the cross-price elasticity of demand between legal and illegal downloads. The result can elucidate the motivations of file sharers and inform policy designed to deal with illegal downloading.

107. See STEAM, <http://store.steampowered.com> (last visited Dec. 31, 2013).

108. See Oberholzer-Gee & Strumpf, *supra* note 61.

109. See *id.*

A. *Data*

The quantity of illegal downloads was calculated using uTorrent's trackers, with torrent files downloaded from The Pirate Bay.¹¹⁰ The number of peers currently downloading the torrent was used as a proxy for quantity of downloads demanded. While comprehensive downloading data is not available, The Pirate Bay is likely the world's most popular torrent search engine.¹¹¹ When multiple torrents of a game were available on The Pirate Bay, the most popular torrent (by number of seeders and peers) was selected. The data were hand-collected and are on file with the author.¹¹²

Price change data were obtained by tracking sales on Steam, a popular online retailer. Steam has been estimated to have a 50–70% market share of the online game market, far outpacing its closest competitors.¹¹³ Additionally, Steam regularly has deals where the price of a game is dropped substantially, sometimes by as much as 90% of the original price.¹¹⁴ Data on sales were hand-collected and are on file with the author.¹¹⁵

Of all digital intellectual property goods, PC games are a particularly promising subject of empirical study because data are widely available. Unlike console video games, which traditionally have required physical media (like a cartridge or CD), PC games are now often distributed completely electronically.¹¹⁶ Additionally, the average PC gamer is likely to be computer-sophisticated and aware of both legal retail providers and illegal sources for games.¹¹⁷

The results should be generalizable to other digital goods. As mentioned in Section II.A, *supra*, video games are fairly typical digi-

110. To avoid legal liability, once the torrent is downloaded, the “update tracker” function is used. No parts of the copyrighted file are downloaded.

111. It is the most-visited torrent site, according to Alexa's site rankings. Ernesto Van Der Sar, *Top 10 Most Popular Torrent Sites of 2013*, TORRENTFREAK (Jan. 6, 2013), <http://torrentfreak.com/top-10-most-popular-torrent-sites-of-2013-130106>.

112. For more information, contact the author at: josephmeno@gmail.com.

113. See Oliver Chiang, *The Master of Online Mayhem*, FORBES (Feb. 9, 2011, 6:00 PM), <http://www.forbes.com/forbes/2011/0228/technology-gabe-newell-videogames-valve-online-mayhem.html>.

114. For current sales, see STEAM, <http://store.steampowered.com> (last visited Dec. 31, 2013).

115. For more information, contact the author at: josephmeno@gmail.com.

116. Recently, PC games crossed the milestone of having 50% of total sales occur electronically, with no exchange of physical media. See Chiang, *supra* note 113.

117. See Evangelho, *supra* note 99 and accompanying text. For an estimate of PC game downloads, see Envisional, *supra* note 19.

tal intellectual property goods, marked by high production costs and low distribution costs. However, several aspects of the data warrant caution. First, neither Steam nor The Pirate Bay constitutes a complete share of the market for legal and illegal downloaders. Nonetheless, as the most popular options for legal and illegal electronic distribution, the collected data represents a substantial portion of the market. Furthermore, torrents are often cross-listed on popular sites, meaning that tracking the Pirate Bay's torrents includes downloaders who sought their torrents from a different site.

The games in the data set are hand-picked and thus subject to sampling bias. Game selection was mostly determined by what games Steam picked to reduce in price. Thus, games not undergoing Steam sales, like recent marquee titles and games not marketed on Steam, are excluded. The result is not a perfect survey of the illegal downloading market, but it is a fairly comprehensive one.

Finally, the data are averaged and time-shifted. Several days' worth of observations on the number of peers for each torrent were collected and averaged during the sale and during a five day window after the sale. There was little effect in illegal downloads during the days that sales were announced. In fact, a slightly positive effect was measured. After this, however, there was generally a period of five days during which illegal downloads were depressed, followed by a return to the original downloading rate. Thus, the change in illegal downloads during the five day period is matched with the price change occurring just before this period.

B. Results and Analysis

The results for the cross-price elasticity of demand calculations are shown in Appendix A. Elasticity was estimated at 0.16. This indicates that a 1% decrease in the price of legal digital games should correspond with a 0.16% decrease in the number of illegal downloads. This result was found to be significant at the 95% confidence level, using a one-tailed t-test.

Because this calculation captures only fluctuations in nominal price, the low elasticity estimate suggests that nominal price is not the only factor motivating illegal file sharing—access, legal, and moral costs are also important for consumers choosing between legal and illegal downloading methods. Additionally, the outcome suggests that significant price discounts, even to the extent of providing digital goods for free, will not completely curb illegal file sharing. This is consistent with the anecdotal observation that ille-

gal file sharing markets exist even for digital goods that are provided through legal distribution services at no cost.¹¹⁸

These results also speak to the role of access, legal, and moral costs. Nominal price is only able to explain some of the demand for illegal downloads; the difference must be made up by some combination of access, legal, and moral costs. As argued earlier,¹¹⁹ access costs tend to be higher for legal downloads, largely due to copyright protection measures, format restrictions, and download speed. Thus, access costs tend to incentivize illegal downloading. Moral and legal costs, on the other hand, tend to be negligible for legal downloads. Thus, moral and legal costs disincentive illegal downloading. The conclusion, then, must be that access costs are of primary importance to the users who continue illegal file sharing. Perceived moral and legal costs are outweighed by access costs for many users, who, as a result, find illegal downloading to be less costly than legal purchases. Thus, it appears that the hassle of access costs, rather than nominal price or moral costs, is the primary motivation for many illegal downloaders.

IV.

MOTIVATIONS AND POLICY CONSEQUENCES

The preceding empirical and theoretical analysis has revealed three major motivations for the persistence of file sharing: the pricing of goods above the marginal cost of production, the high access costs associated with legal downloads, and the relatively small effect of moral and legal costs. This section will examine these motivations and discuss how they might shape the market for digital intellectual property.

Although the empirical results reveal that nominal price is not the only motivator for illegal downloads, it remains an important consideration. A computer user of average skill can reproduce most digital intellectual property goods at no cost.¹²⁰ As long as content creators continue to charge prices above the marginal cost of production, the incentive to reproduce the goods for free will exist. Stricter legal penalties for file sharing may help curb the incentives

118. See *supra* Section II.B. Additionally, by one recent industry estimate, 20% of Australian consumers with digital access to HBO's popular show *Game of Thrones* downloaded the show illegally, either instead of or in addition to their legal downloads. Nick Tabakoff, *Foxtel Triple Play of 'Great Appeal': Thomson*, THE AUSTRALIAN (Sept. 25, 2013, 12:31 PM), <http://www.theaustralian.com.au/media/foxtel-triple-play-of-great-appeal-thomson/story-e6frg996-1226726884826>.

119. See *supra* Section II.B.

120. See *supra* notes 99, 117, and accompanying text.

for unlicensed reproduction by raising perceived legal costs. But these legal penalties are often unpopular and difficult to enforce. Production companies may already be redesigning their goods to disincentive reproduction. Some companies focus on limiting access through the requirement of closed platforms. The market for console video games, for example, is less subject to piracy because console architecture is much more closed than the architecture of PCs;¹²¹ it is relatively more costly in terms of time and effort to illegally download and use a console game. Console developers have capitalized on this closed architecture to help stop the use of pirated and used games, but many consumers resist these measures. Recently, Microsoft backed off from an aggressive DRM policy for its new console the Xbox One.¹²² The proposed policy would have required users to maintain internet connectivity at least once every twenty-four hours to authorize the user to play even single-player games.¹²³ After a strongly negative reaction from prospective consumers, Microsoft announced that it would change its policy and no longer require regular internet connectivity.¹²⁴

Similarly, some software developers create closed ecosystems, particularly with the use of mobile devices like smartphones and tablet computers.¹²⁵ Users in these ecosystems will face much higher access costs in accessing illegal downloads than the user of a traditional personal computer. These devices may direct users toward a centralized application store and may even refuse to run applications that are not authorized through the store.¹²⁶ Other content creators have altered their delivery methods to provide free distribution through websites or on-demand TV services.¹²⁷ Still other content creators have altered the products themselves to de-

121. See, e.g., Erik Kain, *You Can't Build A PS4: Why Sony's Next Console Is Truly Next-Gen and Your PC Isn't*, FORBES (Feb. 25, 2013, 1:01 PM), <http://www.forbes.com/sites/erikkain/2013/02/25/you-cant-build-a-ps4-why-sonys-next-console-is-truly-next-gen-and-your-pc-isnt>.

122. See Carol Pinchefskey, *How Shedding Check-In DRM in the Xbox One Benefits Microsoft*, FORBES (June 19, 2013, 5:42 PM), <http://www.forbes.com/sites/carolpinchefskey/2013/06/19/how-shedding-drm-in-the-xbox-one-benefits-microsoft>.

123. See *id.*

124. See *id.*

125. See, e.g., Tim Worstall, *The Problem with Apple's Closed Apps Universe*, FORBES (Aug. 31, 2012, 12:44 PM), <http://www.forbes.com/sites/timworstall/2012/08/31/the-problem-with-apples-closed-apps-universe>.

126. See *id.*

127. For current examples, see, e.g., HBO GO, <http://www.hbogo.com> (last visited Jan. 2, 2014); HULU, <http://www.hulu.com> (last visited Jan. 2, 2014); NETFLIX, <http://www.netflix.com> (last visited Dec. 31, 2013).

rive revenue from advertising in the form of product placement.¹²⁸ Product placement generates positive views for advertisers even when content is illegally obtained, but not all creators and consumers are happy with the way product placement modifies the underlying work.¹²⁹

In addition to production-side concerns, access costs to consumers appear to be of paramount importance in motivating illegal file sharing. To increase the access costs of illegally obtaining material, some retailers provide strong DRM software, requiring illegal downloaders to work around these protections.¹³⁰ Ironically, this software can often make it much more difficult to enjoy the legal copy of a good, leading some users to seek alternative, DRM-free versions.¹³¹ This problem is especially acute in the market for PC gamers, in which most consumers are sophisticated computer users—capable of working around most DRM protections as a community, if not individually.¹³² Many of the successful legal retailers of digital intellectual property have taken steps to reduce access costs: iTunes provides users with the ability to purchase music track by track rather than as an album; Netflix lets users stream television shows and movies on a variety of devices at the user's convenience; and, Steam allows users to store game information on a cloud server, allowing for seamless transition between computers.¹³³ Yet these services still fall short of the convenience of illegal downloads: iTunes songs are provided in an obscure format which restricts their use on many devices;¹³⁴ Netflix requires an active internet

128. See, e.g., Jonathan Salem Baskin, *Anathema No More, 'Breaking Bad' Is Redefining Rules for Product Placement*, FORBES (Sept. 25, 2013, 2:03 PM), <http://www.forbes.com/sites/jonathansalembaskin/2013/09/25/anathema-no-more-breaking-bad-is-redefining-rules-for-product-placement>.

129. See, e.g., Emily Nussbaum, *What Tina Fey Would Do for a SoyJoy*, NEW YORK MAG., Oct. 5, 2008, available at <http://nymag.com/news/features/51014>.

130. See Pinchefskey, *supra* note 122.

131. Blizzard's *Diablo III*, which required an active Internet connection to authenticate the game every time a consumer played it, is an example of both effective DRM software and the capability of such software to arouse the ire of consumers. See Humphries, *supra* note 96.

132. Game developer Ubisoft famously began shipping all its games with a newly developed DRM system in 2010. See Josh Lowensohn, *How to Get DRM-Free PC Games: Just Wait*, CNET (Mar. 16, 2010, 4:00 AM), http://news.cnet.com/8301-27076_3-20000506-248.html. The DRM was cracked a month later. See Josh Lowensohn, *Ubisoft's Controversial 'Always On' PC DRM Hacked*, CNET (Apr. 21, 2010, 7:29 PM), http://news.cnet.com/8301-27076_3-20003120-248.html.

133. See *Steamworks Brochure 2010* (2010), <http://www.steamgames.com/steamworks/SteamworksBrochure2010.pdf>.

134. See *iTunes Store: iTunes Plus Frequently Asked Questions (FAQ)*, APPLE, <http://support.apple.com/kb/ht1711> (last visited Dec. 29, 2013).

connection; and, Steam requires users to download through conventional servers rather than through the much more efficient BitTorrent protocol.¹³⁵ Until these services are as fast, convenient, and flexible as using torrents, illegal file sharing will likely persist.

Finally, legal and moral costs appear to be weak motivators toward legal downloading, but some policy measures could change their effectiveness. Increasing the legal penalty for illegal downloading through larger statutory damages or increased criminal copyright enforcement could strongly disincentive downloading. Allegations in such proceedings are costly to prove, however, given the decentralized nature of BitTorrent clients. Enforcement actions against centralized websites and clients are more effective, but new sites and clients are created every day.¹³⁶ A second strategy aims to increase the moral costs of illegal downloading. One advertising campaign by the Motion Picture Association of America, for example, challenged viewers to equate copyright infringement with stealing a car.¹³⁷ Such campaigns seek to disincentivize downloading by increasing the disutility felt by users who violate copyright law. Finally, some content creators have created stronger moral incentives to download legally by offering discounted products bundled with charitable donations. The Humble Bundle project is one example: it offers users the chance to pay what they wish (relieving pressure caused by nominal price), obtain DRM-free games and soundtracks through a torrent download (substantially decreasing access costs), and donate a portion of the price paid to charity (creating moral incentives to download legally).¹³⁸ Such a strategy has thus far only worked with lower-budget independent games, but its

135. Compare Nicole Cozma, *How to Boost Your Steam Download Speed*, CNET (Oct. 8, 2012, 4:10 PM), http://howto.cnet.com/8301-11310_39-57528252-285/how-to-boost-your-steam-download-speed, with *BitTorrent, Explained*, VIMEO (2011), <http://vimeo.com/19545251>.

136. Grokster, for example, was created specifically as a successor to Napster. Despite its similarities, it took several years of litigation before the Supreme Court overturned the decisions by the District Court and Ninth Circuit and decided Grokster could be liable for copyright infringement. See *Metro-Goldwyn-Mayer Studios Inc. v. Grokster, Ltd.*, 545 U.S. 913 (2005). For a list of BitTorrent clients, see *Comparison of BitTorrent Clients*, WIKIPEDIA, http://en.wikipedia.org/w/index.php?title=Comparison_of_BitTorrent_clients&oldid=587460256 (last visited Dec. 29, 2013).

137. *Piracy: It's a Crime*, YOUTUBE (May 4, 2006), http://www.youtube.com/watch?feature=player_embedded&v=K_vHwFDNGdg.

138. HUMBLE BUNDLE, <https://www.humblebundle.com> (last visited Oct. 18, 2013). The Humble Bundle project uses a slider to let the consumer set several price levels, including how much of the sale price goes to the developer, the retailer, and the charity. While it suggests a default level of spending, the user can

success at encouraging legal downloads could serve as an example for major content distributors.

CONCLUSION

The conclusions of this Note are inextricably linked with the age and technology in which it is written. As stated previously, empirical studies in this area are obsolete nearly as quickly as computing technology. The development of cloud computing will only hasten this obsolescence. In an age where faster internet connections and corresponding file sharing infrastructure allows consumers to stream high quality video and other large files, the traditional notion of “possession” of digital content will cease to be much use—copyrighted content will be in the cloud, and attempts to protect it will be akin to building castles in the air.

Nonetheless, in examining the market for video game downloading using the BitTorrent protocol, this Note has endeavored to make several contributions to the scholarly discourse regarding illegal file sharing that should continue to be relevant in the near future. First, the analysis of file sharing supply under the production theory and demand under the expanded demand theory will continue to be useful in evaluating the motivations of file sharers. Additionally, the data indicating the central role of access costs to consumer decisions should be relevant to policymakers deciding how to shape and enforce copyright laws in the context of digital intellectual property goods. Finally, this Note has attempted to reveal some unique characteristics of markets governed by discrete, but overlapping regimes: copyright law, peer-to-peer file sharing norms, and artistic creation. Understanding the motivations behind the actors in these regimes is essential to explaining how these markets formed, how they function, and how they may change. Future scholars and policymakers should keep these motivations in mind when determining how to regulate these regimes.

APPENDIX A

Cross-Price Elasticity of Demand Data

Game Title	Retail Price	Sale Price	Avg. Peers During Sale	Avg. Peers After Sale	Percent Change Quantity	Percent Change Price	Cross Elasticity
Men of War: Condemned Heroes	\$39.99	\$9.99	40.50	36.00	0.11	0.75	0.15
L.A. Noire	\$19.99	\$4.99	458.00	368.00	0.20	0.75	0.26
The Elder Scrolls V: Skyrim	\$59.99	\$39.99	814.10	880.85	-0.08	0.33	-0.25
Bioshock	\$19.99	\$9.99	102.10	100.20	0.02	0.50	0.04
Grant Theft Auto IV	\$29.99	\$14.99	754.20	684.15	0.09	0.50	0.19
Dead Island	\$19.99	\$9.99	391.00	367.50	0.06	0.50	0.12
Dead Space 2	\$19.99	\$4.99	143.50	145.50	-0.01	0.75	-0.02
Fallout: New Vegas	\$19.99	\$9.99	137.50	135.50	0.01	0.50	0.03
Orcs Must Die 2	\$14.99	\$7.99	48.00	46.50	0.03	0.47	0.07
Bioshock 2	\$19.99	\$4.99	111.00	100.00	0.10	0.75	0.13
Amnesia: The Dark Descent	\$19.99	\$4.99	95.00	103.50	-0.09	0.75	-0.12
Darksiders	\$19.99	\$4.99	207.00	226.44	-0.09	0.75	-0.13
Darksiders II	\$49.99	\$16.99	254.00	206.67	0.19	0.66	0.28
Max Payne 3	\$39.99	\$13.59	1390.83	1400.50	-0.01	0.66	-0.01
I am Alive	\$14.99	\$5.09	101.00	50.67	0.50	0.66	0.75
From Dust	\$14.99	\$3.74	40.00	16.67	0.58	0.75	0.78
Rayman Origins	\$19.99	\$6.79	87.00	54.00	0.38	0.66	0.57
Train Simulator 2013	\$54.99	\$27.50	86.00	66.75	0.22	0.50	0.45
Assassin's Creed	\$19.99	\$4.99	92.00	88.33	0.04	0.75	0.05
Assassin's Creed II	\$19.99	\$4.99	63.00	62.67	0.01	0.75	0.01
Assassin's Creed III	\$49.99	\$24.99	411.00	390.67	0.05	0.50	0.10
Saint's Row the Third	\$39.99	\$13.59	415.00	388.00	0.07	0.66	0.10
Total Average							0.16 (2.42)*

*One tailed t-test score, indicating statistical significance above the 95% confidence level.

